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Rev. 0

River Corridor Baseline Risk Assessment

Volume I:
Ecological Risk Assessment

United States
Department of Energy

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Ecological Risk Assessment

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Table 2-1. Technical Baseline Reports.

Report Title	Document Number
100-B Area Technical Baseline Report	WHC-SD-EN-TI-220, Rev. 0
100-D Area Technical Baseline Report	WHC-SD-EN-TI-181, Rev. 0
100-F Reactor Site Technical Baseline Report Including Operable Units 100-FR-1 and 100-FR-2	BHI-00031, Rev. 0
100-H Area Technical Baseline Report	BHI-00127, Rev. 0
100-IU-6 Operable Unit Technical Baseline Report	BHI-00146, Rev. 0
100-K Area Technical Baseline Report	WHC-SD-EN-TI-239, Rev. 0
100-N Area Technical Baseline Report	WHC-SD-EN-TI-251, Rev. 0
300-FF-2 Operable Unit Technical Baseline Report	BHI-00012, Rev. 0
White Bluffs, 100-IU-2 Operable Unit Technical Baseline Report	BHI-00448, Rev. 00

Table 2-2. River Corridor Source Work Plan Reports.

Report Title	Document Number
Remedial Investigation/Feasibility Study Work Plan for the 100-BC-1 Operable Unit, Hanford Site, Richland, Washington	DOE/RL-90-07, Rev. 0
Remedial Investigation/Feasibility Study Work Plan for the 100-BC-2 Operable Unit, Hanford Site, Richland, Washington	DOE/RL-91-07, Rev. 0
RCRA Facility Investigation/Corrective Measures Study Work Plan for the 100-KR-1 Operable Unit, Hanford Site, Richland, Washington	DOE/RL-90-20, Rev. 0
RCRA Facility Investigation/Corrective Measures Study Work Plan for the 100-NR-1 Operable Unit, Hanford Site, Richland, Washington	DOE/RL-90-22, Rev. 0
RCRA Facility Investigation/Corrective Measures Study Work Plan for the 100-DR-1 Operable Unit, Hanford Site, Richland, Washington	DOE/RL-89-09, Rev. 0
RCRA Facility Investigation/Corrective Measures Study Work Plan for the 100-HR-1 Operable Unit, Hanford Site, Richland, Washington	DOE/RL-88-35, Rev. 0
RCRA Facility Investigation/Corrective Measures Study Work Plan for the 100-HR-2 Operable Unit, Hanford Site, Richland, Washington	DOE/RL-93-20, Rev. 0
Remedial Investigation/Feasibility Study Work Plan for the 100-FR-1 Operable Unit, Hanford Site, Richland, Washington	DOE/RL-90-33, Rev. 0

Table 2-3. Limited Field Investigation Reports.

Report Title	Document Number
Limited Field Investigation for the 100-BC-1 Operable Unit	DOE/RL-93-06, Rev. 0
Limited Field Investigation for the 100-HR-1 Operable Unit,	DOE/RL-93-51, Rev. 0
Limited Field Investigation for the 100-BC-2 Operable Unit	DOE/RL-94-42, Rev. 0
RCRA Facility Investigation/Corrective Measures Study Work Plan for the 100-DR-2 Operable Unit	DOE/RL-93-46, Rev. 2
Limited Field Investigation Report for the 100-DR-2 Operable Unit	DOE/RL-94-73, Rev. 0
Limited Field Investigation Report for the 100-FR-1 Operable Unit	DOE/RL-93-82, Rev. 0
Limited Field Investigation for the 100-HR-2 Operable Unit	DOE/RL-94-53, Rev. 0
Limited Field Investigation Report for the 100-KR-1 Operable Unit	DOE/RL-93-78, Rev. 0
Limited Field Investigation Report for the 100-NR-1 Operable Unit	DOE/RL-93-80, Rev. 0
Limited Field Investigation Report for the 100-NR-2 Operable Unit, Hanford Site, Richland, Washington	DOE/RL-93-81, Rev. 0
1301-N and 1325-N Liquid Waste Disposal Facilities Limited Field Investigation Report	DOE/RL-96-11, Rev. 0
Limited Field Investigation Report for the 300-FF-2 Operable Unit	DOE/RL-96-42, Rev. 0

Table 2-4. Qualitative Risk Assessment Reports.

Report Title	Document Number
Focused Feasibility Study for the 300-FF-2 Operable Unit	DOE/RL-99-40, Rev. 0
Phase III Feasibility Study Report for the 300-FF-1 Operable Unit	DOE/RL-94-49, Rev. 0
Qualitative Risk Assessment for the 100-BC-1 Source Operable Unit	WHC-SD-EN-RA-003, Rev. 0
Qualitative Risk Assessment for the 100-KR-1 Source Operable Unit	WHC-SD-EN-RA-009, Rev. 0
Qualitative Risk Assessment for the 100-NR-1 Source Operable Unit	BHI-00054, Rev. 0
Qualitative Risk Assessment for the 100-DR-1 Source Operable Unit	WHC-SD-EN-RA-005, Rev. 0
Qualitative Risk Assessment for the 100-HR-1 Source Operable Unit	WHC-SD-EN-RA-004, Rev. 0
Qualitative Risk Assessment for the 100-FR-1 Source Operable Unit	BHI-00053, Rev. 0

Table 2-5. Records of Decision in the River Corridor.

Record of Decision	Comments
Interim Action Record of Decision for the 100-BC-1, 100-DR-1, and 100-HR-1 Operable Units, Hanford Site, Benton County, Washington (EPA 1995)	This IAROD addressed 40 wastes sites contaminated by radioactive liquid effluents.
Amendment to the Record of Decision for the 100-BC-1, 100-DR-1, and 100-HR-1 Operable Units, Hanford Site, Benton County, Washington (EPA 1997)	This amendment to EPA (1995) selected the "remove, treat, dispose" (RTD) interim action remedy for an additional 34 soil sites. Additional proximity sites have been added to the ROD via letter agreements.
Record of Decision for the 100-NR-1 and 100-NR-2 Operable Units, Hanford Site, Benton County, Washington (EPA 1999b)	This IAROD selected the RTD remedy for 78 waste sites within the 100-N Area.
Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (EPA 1999a)	This IAROD was intended to address all 100 Area "remaining" waste sites: i.e., all 100 Area sites not covered by the 1995 ROD (EPA 1995) and 1997 ROD Amendment (EPA 1997), with the exception of the 100 Area solid waste burial grounds and 100-N Area.
Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-2, 100-HR-2, 100-KR-2 Operable Units (EPA 2000)	This IAROD selected the RTD remedy for 45 solid waste burial grounds in the 100 Area.
Record of Decision for the 300-FF-1 and 300-FF-5 Operable Units, Hanford Site, Benton County, Washington (EPA 1996b)	This ROD selected the RTD remedy for several waste sites in the 300-FF-1 OU including major liquid process waste disposal sites, one major solid waste burial ground, and three small landfills. This ROD also selected an interim action remedy for contaminated groundwater in the 300-FF-5 OU underlying the 300 Area.
Record of Decision for the 300-FF-2 Operable Unit, Hanford Site, Benton County, Washington (EPA 2001)	This IAROD selected the RTD remedy for 56 waste sites within the 300 Area including 40 waste sites in the 300 Area main industrial complex, 7 waste sites outside the main complex, 7 general content solid waste burial grounds, and 2 solid waste burial grounds containing transuranic-contaminated material.
Record of Decision for the 100-HR-3 and 100-KR-4 Operable Units, Hanford Site, Benton County, Washington (EPA 1996a)	This IAROD selected a pump-and-treat technology intended to mitigate ecological risk arising from movement of chromium-contaminated groundwater into the Columbia River.
Interim Action Record of Decision for the 100-KR-2 Operable Unit K Basins, Hanford Site, Benton County, Washington (EPA 1999c)	This IAROD selected the RTD remedy for the K Basins located in the 105-KE and 105-KW Reactor facilities in the 100 Area.
Interim Action Record of Decision for the 100-NR-1 and 100-NR-2 Operable Units, Hanford Site, Benton County, Washington (EPA 1999b)	This IAROD selected the RTD remedy for several waste sites in the 100-NR-1 OU. This ROD also selected an interim action remedy for contaminated groundwater in the 100-NR-2 OU underlying the 100-N Area.

EPA = U.S. Environmental Protection Agency
IAROD = interim action record of decision
OU = operable unit
ROD = record of decision
RTD = remove, treat, and dispose

Table 2-6. Summary of Waste Site Reclassification Categories.

Category	Description (Rev. 0, pre-2007)	Description (Rev. 1, 2007 to Present)
Rejected	Site is not a waste management unit and there is no evidence of actual or potential hazardous substance release.	Site does not require remediation under CERCLA, RCRA corrective action, or other cleanup standards based on qualitative information.
No Action	Waste management unit does not require action under RCRA corrective action, CERCLA, or other regulatory authority.	Site does not require further remedial action under CERCLA, RCRA corrective action, or other cleanup standards based on assessment of quantitative data collected for site.
Interim Closed Out	Waste management unit now meets interim cleanup standards or other interim regulatory closure requirements.	Due to actions taken, waste management unit meets cleanup standards specified in IAROD.
Closed Out	Waste management unit now meets cleanup standards or other regulatory closure requirements.	Due to actions taken, waste management unit meets applicable cleanup standards and closure requirements.

CERCLA = *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
IAROD = interim action record of decision
RCRA = *Resource Conservation and Recovery Act of 1976*

Table 2-7. Current Status of Reactor Facilities in the River Corridor.

Reactor Facility	D&D Status	Milestone Date	5-Year Surveillance Date(s)
105-B	Historic preservation	TBD	--
105-C	ISS complete	9/1998	12/2002, 7/2008
105-D	ISS complete	9/2004	11/2009
105-DR	ISS complete	1/2003	12/2007
105-F	ISS complete	1/2004	8/2008
105-H	ISS complete	10/2005	10/2010
105-KE	ISS in progress	7/2014	--
105-KW	ISS in progress	TBD	--
105-N	ISS in progress	9/2012	--
FFTF	Final disposition being evaluated	--	--

-- = not applicable
D&D = decontamination and decommissioning
FFTF = Fast Flux Test Facility
ISS = interim safe storage
TBD = to be determined per Tri-Party Agreement Milestone M-93-00

Table 2-8. Status of River Corridor Groundwater Operable Unit Interim Actions.

Operable Unit	Contaminant	Type of Action	Status of Action
100-KR-4	Chromium	Pump and treat	Under expansion
100-HR-3 (D Area)	Chromium	In situ barrier	Chemical enhancement
		Pump and treat	Under expansion
100-HR-3 (H Area)	Chromium	Pump and treat	Continued operations
100-NR-2 [a]	Strontium-90	Pump and treat	Cold standby
300-FF-5	Uranium	Monitored natural attenuation	Under evaluation

[a] The 100-N Area Pump-and-Treat Operations were placed in cold standby during the testing of alternative remedial methods.

Table 2-9. Comparison of Interim Action Record of Decision Cleanup Levels and Ecological Screening Values. (3 Pages)

Contaminant	Residential Direct Exposure (mg/kg)	Industrial Direct Exposure (mg/kg)	Groundwater Protection (mg/kg)	River Protection (mg/kg)	WAC Table 749-3 (mg/kg)	Eco-SSL (mg/kg)	Reference Sites Average (mg/kg)	Hanford Background 50th Percentile (mg/kg)	Hanford Background 90th Percentile (mg/kg)
Aluminum	80,000	NV	11,800 [a]	11,800 [a]	50 [b]	[c]	7,630	7,600	11,800
Antimony	32	1,400	5 [a]	5 [a]	5	0.27	0.3	NA	NA
Arsenic	20 [d]	20 [d]	20 [d]	20 [d]	7	18	2.8	3.55	6.47
Barium	5,600	4,900	200	400	102	330	88	88.4	132
Beryllium	10.4 [e]	104 [e]	1.51 [a]	1.51 [a]	10	21	0.51	1.09	1.51
Boron	7,200	700,000	320	NV	0.5	NV	1.6	NA	NA
Cadmium	13.9 [e]	139 [e]	0.81 [a]	0.81 [a]	4	0.36	0.082	NA	NA
Chromium VI	2.1	21	4.8 [f]	2	NV	130	NA	NA	NA
Chromium, total	80,000	>1,000,000	18.5 [a]	18.5 [a]	42	26	9.9	9.57	18.5
Cobalt	24	1,050	15.7 [a]	NV	20	13	NA	11.2	15.7
Copper	2,960	130,000	59.2	22 [a]	50	28	15.5	14.4	22
Lead	353 [g]	1,000 [d]	10.2 [a]	10.2 [a]	50	11	5.9	5.45	10.2
Lithium	160	7,000	33.5 [a]	NV	35	NV	NA	28.4	33.5
Manganese	3,760	165,000	512 [a]	512 [a]	1,100	220	NA	372	512
Mercury	24	1,050	0.33 [a]	0.33	0.1	NV	0.022	0.023	0.33
Molybdenum	400	17,500	8	NV	2	NV	NA	NA	NA
Nickel	1,600	70,000	19.1 [a]	27.4	30	38	NA	12.2	19.1
Selenium (trace)	400	17,500	5	1	0.3	0.52	NA	NA	NA
Silver (trace)	400	17,500	8	0.73 [a]	2	4.2	NA	0.054	0.73
Tin	48,000	>1,000,000	960	NV	50	NV	1.4	NA	NA
Uranium	240	505	3.21 [a]	3.21 [a]	5	NV	0.54	2.20	3.21
Vanadium	560	24,500	85.1 [a]	NV	2	7.8	NA	54.4	85.1
Zinc	24,000	>1,000,000	480	67.8 [a]	86	46	46.9	51.1	67.8
TPH (gasoline range)	200 [d]	200 [d]	200 [d]	200 [d]	100	NV	NA	NA	NA
Polychlorinated biphenyls	0.5	65.6	0.017 [h]	0.017 [h]	0.65 [i]	NV	NA	NA	NA
Aldrin	0.0588	NV	0.002	0.002	0.1	NV	NA	NA	NA
BHC, gamma (lindane)	0.769	NV	0.00673	0.0038	6	NV	NA	NA	NA
Chlordane (alpha, gamma)	2.86	NV	0.025	0.0165 [h]	1	NV	NA	NA	NA
DDD, 4,4'-	4.17	547	0.0365	0.005 [h]	0.75 [j]	0.021 [j]	NA	NA	NA
DDE, 4,4'-	2.94	386	0.0257	0.005 [h]	0.75 [j]	0.021 [j]	0.00043	NA	NA
DDT, 4,4'-	2.94	386	0.0257	0.005 [h]	0.75 [j]	0.021 [j]	NA	NA	NA

Table 2-9. Comparison of Interim Action Record of Decision Cleanup Levels and Ecological Screening Values. (3 Pages)

Contaminant	Residential Direct Exposure (mg/kg)	Industrial Direct Exposure (mg/kg)	Groundwater Protection (mg/kg)	River Protection (mg/kg)	WAC Table 749-3 (mg/kg)	Eco-SSL (mg/kg)	Reference Sites Average (mg/kg)	Hanford Background 50th Percentile (mg/kg)	Hanford Background 90th Percentile (mg/kg)
Dieldrin	0.0625	8.2	0.003 [h]	0.003 [h]	0.07	0.0049	NA	NA	NA
Endrin (and ketone, aldehyde)	24	1,050	0.2	0.039	0.2	NV	NA	NA	NA
Acenapthene	4,800	210,000	96	129	20	29 [k]	NA	NA	NA
Acenapthylene	4,800	210,000	96	129	NV	29 [k]	NA	NA	NA
Anthracene	24,000	>1,000,000	240	1,920	NV	29 [k]	0.0025	NA	NA
Benzo(a)anthracene	1.37	180	0.015 [h]	0.015 [h]	NV	1.1 [l]	0.0019	NA	NA
Benzo(a)pyrene	0.33	180	0.015 [h]	0.015 [h]	12	1.1 [l]	0.0017	NA	NA
Benzo(b)fluoranthene	1.37	180	0.015 [h]	0.015 [h]	NV	1.1 [l]	0.0018	NA	NA
Benzo(g,h,i)perylene	2,400	105,000	48	192	NV	1.1 [l]	0.002	NA	NA
Benzo(k)fluoranthene	1.37	180	0.015 [h]	0.015 [h]	NV	1.1 [l]	0.0016	NA	NA
Chrysene	13.7	1,800	1.2	0.1 [h]	NV	1.1 [l]	0.002	NA	NA
Dibenzo(a,h)anthracene	0.33	NV	0.33	0.33	NV	1.1 [l]	NA	NA	NA
Dichlorobenzene; 1,4-	41.7	5,470	0.33 [h]	0.972	20	NV	NA	NA	NA
Diethylphthalate	64,000	>1,000,000	1,280	4,600	100	NV	NA	NA	NA
Dimethylphenol; 2,4-	1,600	70,000	32	110.6	20	NV	NA	NA	NA
Dimethylphthalate	80,000	>1,000,000	1,600	14,400	200	NV	NA	NA	NA
Di-n-butylphthalate	8,000	350,000	160	540	200	NV	NA	NA	NA
Fluoranthene	3,200	140,000	64	18	NV	29 [k]	0.0062	NA	NA
Fluorene	3,200	140,000	64	260	30	29 [k]	0.0023	NA	NA
Hexachlorobenzene	0.625	NV	0.33	0.33	17	NV	NA	NA	NA
Hexachlorocyclopentadiene	480	21,000	5	48	10	NV	NA	NA	NA
Indeno(1,2,3-cd) pyrene	1.37	180	0.33 [h]	0.33 [h]	NV	1.1 [l]	0.0039	NA	NA
Methylnaphthalene; 2-	320	14,000	3.2	NV	NV	29 [k]	NA	NA	NA
Naphthalene	1,600	70,000	16	988	NV	29 [k]	0.018	NA	NA
Nitrophenol; 4-	640	28,000	12.8	1,254	7	NV	NA	NA	NA
Nitrosodiphenylamine;N-	204	26,800	1.79	1.95	20	NV	NA	NA	NA
Pentachlorophenol	8.33	1,090	0.33 [h]	0.33 [h]	3	2.1	NA	NA	NA
Phenanthrene	24,000	>1,000,000	240	1,920	NV	29 [k]	0.0024	NA	NA
Phenol	24,000	>1,000,000	960	4,200	70	NV	NA	NA	NA
Pyrene	2,400	105,000	48	192	NV	1.1 [l]	0.0023	NA	NA

Table 2-9. Comparison of Interim Action Record of Decision Cleanup Levels and Ecological Screening Values. (3 Pages)

Contaminant	Residential Direct Exposure (mg/kg)	Industrial Direct Exposure (mg/kg)	Groundwater Protection (mg/kg)	River Protection (mg/kg)	WAC Table 749-3 (mg/kg)	Eco-SSL (mg/kg)	Reference Sites Average (mg/kg)	Hanford Background 50th Percentile (mg/kg)	Hanford Background 90th Percentile (mg/kg)
Trichlorobenzene; 1,2,4-	800	35,000	7	45.4	20	NV	NA	NA	NA
Trichlorophenol; 2,4,5-	8,000	350,000	80	NV	4	NV	NA	NA	NA
Trichlorophenol; 2,4,6-	90.9	11,900	0.795	0.42	10	NV	NA	NA	NA
Toluene	64,000	64	1,360	200	200	NV	NA	NA	NA

= Screening value is lower than most restrictive cleanup level.
= Background is equal to or less than the lowest screening value or cleanup level.

[a] Background value.
[b] Soluble salts.
[c] Toxicity value is pH dependent and not expected to be toxic at Hanford's circumneutral soil pH.
[d] Method A value.
[e] Based on inhalation pathway.
[f] Lower of two values (residential and industrial) selected.
[g] Based on EPA's IEUBK model.
[h] RDL-based level.
[i] Total PCBs.
[j] Total of DDT, DDD, and DDE.
[k] Total value for low molecular weight PAHs.
[l] Total value for high molecular weight PAHs.

BHC = benezene hexachloride
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
Eco-SSL = Ecological Soil Screening Level
EPA = U.S. Environmental Protection Agency
IEUBK = Integrated Exposure Uptake Biokinetic Model
NA = not available
NV = no value
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
RDL = required detection limit
TPH = total petroleum hydrocarbons
WAC = *Washington Administrative Code*

Table 2-10. Comparison of Current Interim Action Record of Decision Cleanup Levels and Biota Concentration Guides for RCBRA Radioactive Analytes. (2 Pages)

Contaminant	Residential Direct Exposure (pCi/g)	Industrial Direct Exposure (pCi/g)	Groundwater Protection (pCi/g)	River Protection (pCi/g)	BCG (pCi/g)	Ratio of CUL to BCG	Reference Sites Average (pCi/g)	Hanford Background 50th Percentile (pCi/g)	Hanford Background 90th Percentile (pCi/g)
Americium-241	31.1	210	NV	NV	3,890	0.008	NA	NA	NA
Carbon-14	8.69	82	NV	NV	4,760	0.002	NA	NA	NA
Cesium-137	6.2	25	1,465	2,930	20.8	0.298	0.073	0.281	1.05
Cobalt-60	1.4	5.2	13,900	27,800	692	0.002	NA	0.00131	0.00842
Europium-152	3.3	12	NV	NV	1,520	0.002	NA	NA	NA
Europium-154	3.05	11	NV	NV	1,290	0.002	NA	0.000156	0.0334
Europium-155	125	518	NV	NV	15,800	0.008	NA	0.0188	0.0539
Iodine-129	0.25 [a]	NV	0.25 [a]	0.25 [a]	5,670	<0.001	NA	NA	NA
Neptunium-237	1	3,370,000	0.9	1.8	3,860	<0.001	NA	NA	NA
Plutonium-238	38.8	155	NV	NV	5,270	0.007	NA	0.000547	0.00378
Plutonium-239/240	35.1	245	NV	NV	6,110	0.006	0.03	0.0061	0.0248
Potassium-40	16.6 [b]	NV	16.6 [b]	16.6 [b]	119	0.140	NA	12.8	16.6
Radium-226	1.05	7.9	NV	NV	50.6	0.021	NA	0.53	0.815
Radium-228	1.69	NV	NV	NV	43.9	0.039	NA	NA	NA
Strontium-90	4.5	2,500	27.6	55.2	22.5	0.200	0.081	0.0554	0.178
Technetium-99	5.8	410,000	0.46	0.92	4,490	0.001	NA	NA	NA
Thorium-228	2.26	10.8	NV	NV	530	0.004	NA	NA	NA
Thorium-230	2.95	23.2	NV	NV	9,980	<0.001	NA	NA	NA
Thorium-232	1.3 [b]	4.8	NV	NV	1,510	<0.001	NA	0.909	1.32
Tritium	459	1,980	12.6	25.2	200,000	0.002	NA	NA	NA
Uranium-233/234	1.1 [b]	167	1.1 [b]	1.1 [b]	5,130	<0.001	0.18	0.762	1.1

Table 2-10. Comparison of Current Interim Action Record of Decision Cleanup Levels and Biota Concentration Guides for RCBRA Radioactive Analytes. (2 Pages)

Contaminant	Residential Direct Exposure (pCi/g)	Industrial Direct Exposure (pCi/g)	Groundwater Protection (pCi/g)	River Protection (pCi/g)	BCG (pCi/g)	Ratio of CUL to BCG	Reference Sites Average (pCi/g)	Hanford Background 50th Percentile (pCi/g)	Hanford Background 90th Percentile (pCi/g)
Uranium-235	0.61	16	0.5	0.5	2,770	<0.001	NA	0.0327	0.109
Uranium-238	1.1 [b]	167	1.1 [b]	1.1 [b]	1,580	<0.001	0.18	0.733	1.06
					Sum of fractions	0.74			
					Dose (rad/day)	0.074			

= Background is equal to or less than the lowest screening value or cleanup level.

[a] Required detection limit based limit.
[b] Background based limit.

BCG = biota concentration guideline
CUL = cleanup level
NA = not available
NV = no value

Table 3-1. Comparison of Ecological Risk Results Between Qualitative Risk Assessment and RCBRA Wildlife Receptors for Selected Waste Sites Before Cleanup.

Waste Site	Waste Site Type	QRA Ecological Risk [a] (rad/d)	RCBRA Ecological Risk [b] (rad/d)
116-N-2 (1310-N Chemical Waste Storage Tank)	Waste storage facility and potential underground contamination	<1	0.034
116-D-5 (1904-D Outfall Structure)	Reactor effluent spillway	0.0048	0.40
130-D-1 (1716-D Removed Gasoline Storage Tank)	Spill site	0.0022	0.0018
116-H-9 (117-H Seal Pit Crib)	Liquid waste disposal site	0.00023	0.0016
116-B-5 (108-B Crib)	Liquid waste disposal site	0.0052	0.020
116-N-1 (1301-N Crib and Trench)	Liquid waste disposal site	4,460	330,000
116-D-6 (105-D Cushion Corridor French Drain)	Liquid waste disposal site	0.0000071	0.0019
116-H-2 (1608-H Crib and Trench)	Liquid waste disposal site	4.1	0.48
116-H-3 (105-H Dummy Decontamination French Drain)	Liquid waste disposal site	0.00032	0.73

[a] Great Basin pocket mouse.
[b] Terrestrial receptor.
QRA = qualitative risk assessment
RCBRA = River Corridor Baseline Risk Assessment

Table 3-2. Examples of Waste Excavated from River Corridor Waste Sites. (2 Pages)

Waste Site	Site Type	Waste Streams/Forms	Key Contaminants
618-2	Burial ground	Laboratory and construction-type debris, lead debris, laboratory glassware, drummed oil, metal crucibles, and centrifuges	Uranium isotopes, plutonium isotopes, lead
618-4	Burial ground	• More than 780 drums containing depleted uranium shavings immersed in oil or containing depleted uranium oxide powder • Lead debris and contaminated soil • Miscellaneous construction and demolition debris • Lab waste	Uranium isotopes, lead, arsenic barium, PCBs, petroleum hydrocarbons, asbestos

Table 3-2. Examples of Waste Excavated from River Corridor Waste Sites. (2 Pages)

Waste Site	Site Type	Waste Streams/Forms	Key Contaminants
118-B-1	Burial ground	• Six pieces of SNF • Perforated and nonperforated spacers, spline cases, tritium separation components, lead debris, reactor parts and hardware, compressed gas cylinders, dried paints, tar, electrical components • 1,000 tritium gas tubes, 350 barium desiccant tubes, 81 mercury packaging tubes, 50 glass/plastic bottles	Cesium-137, cobalt-60, europium isotopes, strontium-90, tritium, lead, hexavalent chromium, mercury, PCBs, asbestos
116-DR-1 116-DR-2	Liquid effluent trench	More than 91,000 tons of contaminated soil from liquid waste disposal	Cesium-137, cobalt-60, europium isotopes, hexavalent chromium
116-B-1	Liquid effluent trench	More than 47,000 tons of contaminated soil from liquid waste disposal	Cesium-137, cobalt-60, europium isotopes, strontium-90, hexavalent chromium
316-1	Process pond	257,000 tons of contaminated soil from liquid waste disposal	Uranium isotopes, cobalt-60

PCB = polychlorinated biphenyl
SNF = spent nuclear fuel

Table 3-3. Sampling of Hanford Site River Effluent Pipelines.

Effluent Pipelines Site Number	Reactor Area or Facility	Number of River Effluent Pipelines	Characterized?
100-B-15	100-B	2	Yes
	100-C	2	Yes
100-D-60	100-D	2	Yes
	100-DR	1	Yes
100-F-39	100-F	2	Yes
100-H-34	100-H	2	No
100-K-80	100-KE and 100-KW	2	No
100-N-77	100-N	1	No
100-N-80	Hanford Generating Plant	1	No

Table 3-4. River Effluent Pipeline Waste Sites. (2 Pages)

Operable Unit	Site Name	Number of Effluent Pipelines	Description
100-BC-1	100-B-15	1	The effluent pipeline in the 100-B/C Area extending from the 116-B-7 outfall is constructed of 107-cm (42-in.)-diameter carbon steel pipe with a 1.3-cm (0.5-in.)-thick wall. The line is 228 m (750 ft) long. When last investigated, 13 m (40 ft) of the pipe near the discharge was exposed, and the remainder was buried (WHC-SD-EN-TI-278).
		1	The effluent pipeline in the 100-B/C Area extending from the 132-B-6 outfall is constructed of 168-cm (66-in.)-diameter carbon steel pipe with a 1.3-cm (0.5-in.)-thick wall. The line is 211 m (692 ft) long. When last investigated, 30 m (100 ft) of the pipe near the discharge was exposed, and the remainder was buried (WHC-SD-EN-TI-278).
		2	The effluent pipelines in the 100-B/C Area extending from the 132-C-2 outfall structure consist of two 137-cm (54-in.)-diameter steel pipes with 1.3-cm (0.5-in.)-thick walls. The lines are 204 m (670 ft) long. When last investigated, the pipes were exposed at various locations along their lengths (WHC-SD-EN-TI-278).
100-DR-1	100-D-60	2	The effluent pipelines in the 100-D Area extending from the 116-D-5 outfall are constructed of two 107-cm (42-in.)-diameter reinforced concrete/steel pipes. The steel pipes have a 1.3-cm (0.5-in.)-thick wall. The pipes extend approximately 576 m (1,850 ft) into the river, passing through 100-D Island. The outlets were not exposed on the river bottom when last inspected in 1994.
		1	The effluent pipeline in the 100-D Area extending from the 116-DR-5 outfall is constructed of a 168-cm (66-in.)-diameter carbon steel pipe with a 1.3-cm (0.5-in.)-thick wall. The line extends approximately 549 m (1,800 ft) into the river, passing through 100-D Island. The outlet was exposed on the river bottom when last investigated (WCH-SD-EN-TI-278).
100-FR-1	100-F-39	2	This site consists of the river effluent pipelines in the 100-F Area that extend from the 116-F-8 outfall structure into the main channel of the Columbia River. Two parallel pipelines were constructed of 107-cm (42-in.)-diameter reinforced concrete/steel pipes with 1.3-cm (0.5-in.)-thick walls. Conflicting information exists about whether the pipelines are 137 m (450 ft) long or 91 m (300 ft) in length. According to visual inspection by divers in 1984 (UNI-3262), pipelines and their anchors appeared to have moved a short distance from their original positions, and pipe sections of unknown length appeared to be missing. When last investigated, the pipelines could not be clearly identified (WHC-SD-EN-TI-278).

Table 3-4. River Effluent Pipeline Waste Sites. (2 Pages)

Operable Unit	Site Name	Number of Effluent Pipelines	Description
100-HR-1	100-H-34	2	This site includes two 152-cm (60-in.) diameter (1.3-cm [0.5-in.] thick walls) steel effluent pipelines in the 100-H Area that extend 230 m (753 ft) from the face of the 116-H-5 outfall structure into the main channel of the Columbia River. The total drop from the face of the outfall structure to the discharge end of the pipeline is 8.5 m (28 ft). The pipelines are separated by approximately 90 cm (35 in.) and are covered by a minimum of 1 m (3 ft) of sediment over their entire length, as well as large pieces of basalt riprap extending from the face of the outfall to the shoreline. When last investigated, the two pipelines appeared to be completely buried (WHC-SD-EN-TI-278).
100-KR-1	100-K-80	2	The effluent pipelines in the 100-K Area extending from the 116-K-3 outfall structure are constructed of a 213-cm (84-in.)-diameter carbon steel pipe with a 1.3-cm (0.5-in.) thick wall. The west and east pipelines are parallel lines extending approximately 400 m (1,313 ft) into the river. The tops of both pipelines were exposed along most of their length when last investigated (WHC-SD-EN-TI-278), protruding 0.3 to 0.9 m (1 to 3 ft) above the riverbed. The east pipeline is still used (as of February 2005) as a National Pollutant Discharge Elimination System discharge point by U.S. Department of Energy's Spent Nuclear Fuels Program.
100-NR-1	100-N-77	1	The site is located in the 100-N Area and consists of a 260-cm (102-in.) river effluent pipeline that extends from the 1908-N outfall structure into the main channel of the Columbia River approximately 265 m (871 ft). This pipeline is downstream of the 100-N-80 effluent pipeline. When last investigated (WHC-SD-EN-TI-278), the pipeline outlet was exposed on the river bottom.
100-NR-1	100-N-80	1	The site is located in the 100-N Area and consists of a 335-cm (132-in.) diameter river effluent pipeline that extends from the 1908-NE Hanford Generating Plant outfall structure into the main channel of the Columbia River approximately 313 m (1,028 ft). This pipeline is upstream of the 100-N-77 river effluent pipeline.

UNI-3262, 1986, *River Discharge Lines Characterization Report,* UNC Nuclear Industries, Inc., Richland, Washington.

WHC-SD-EN-TI-278, 1994, *Columbia River Effluent Pipeline Survey,* Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Table 3-5. Representative Assessment Endpoint Entities for River Corridor Ecological Guilds.

Ecological Guild	Environment	
	Terrestrial (Upland and Riparian)	Near-Shore (Aquatic)
Decomposers	Soil biota (e.g., darkling beetles, termites)	Invertebrates
Producers	Reed canary grass (*Phalaris arundinacea*), Sandberg's bluegrass, sagebrush	Algae; periphyton, macrophytes
Herbivores	Soil biota (e.g., darkling beetles and harvester ants), Great Basin pocket mouse, California quail	Benthic macroinvertebrates, juvenile suckers
Omnivores	Deer mouse; meadowlark	Clam (*Corbicula fluminea)*, caddisfly (trichopterans), bufflehead
Invertivores	Grasshopper mouse (*Onychomys leucogaster*), killdeer, kingbird, side-blotch lizard	Woodhouse's toad, sculpin, kingbirds (*Tyrannus verticalis*), bank swallow; bats
Carnivores	Great Basin gopher snake (*Pituophis melanoleucus*), red-tailed hawk, badger, mink	Chinook salmon, sturgeon, great blue heron (*Ardea herodias*), mink

Table 3-6. Home Range Information for Representative Receptors. (2 Pages)

Scale	Ecological Guild	Representative Receptor	Body Weight (kg)	Home Range (ha)	Home Range Notes
Local	Carnivore	Mink	1.02	14	Montana riverine system cited in EPA/600/R-93/187a, 1993, *Wildlife Exposure Factors Handbook*, Vol. I, U.S. Environmental Protection Agency, Office of Research and Development, Washington, D.C.
Local	Herbivore	California quail	0.18	10	Average of range ranges provided by EPA/600/R-93/187a, 1993, *Wildlife Exposure Factors Handbook*, Vol. I, U.S. Environmental Protection Agency, Office of Research and Development, Washington, D.C.
Local	Herbivore	Pocket mouse	0.0175	0.3	O'Farrell, T. P., R. J. Olson, R. O. Gilbert, and J. D. Hedlund, 1975, "A Population of Great Basin Pocket Mice, *Perognathus parvus*, in the Shrub-Steppe of South-Central Washington," *Ecological Monographs,* Vol. 45, pp. 1-28.
Local	Invertivore	Grasshopper mouse	0.0346	2.3	Blair, W. F., 1953, "Population Dynamics of Rodents and Other Small Mammals," *Advanced Genetics*, Vol. 5, pp. 1-41.
Local	Invertivore	Killdeer	0.0756	6	Plissner, J. H., L. W. Oring, and S. M. Haig, 2000, "Space Use Among Killdeer at a Great Basin Breeding Area," *Journal of Wildife Management*, Vol. 64, No. 2, pp. 421-429.
Local	Invertivore	Kingbird	0.0399	3.7	The Birds of North America Online (http://bna.birds.cornell.edu/bna/species/067/articles/behavior) indicates that regarding the density of breeding pairs, there is 1 pair per 3.7 ha (9.1 ac) for riparian habitat in New Mexico.
Local	Omnivore	Bufflehead	0.407	0.5	The Birds of North America Online (http://bna.birds.cornell.edu/bna/species/067/articles/behavior) indicate that bufflehead territories are about 0.5 ha (1.2 ac).
Local	Omnivore	Deer mouse	0.0194	0.12	Bowers, M. A. and H. D. Smith, 1979, "Differential Habitat Utilization by Sexes of the Deer Mouse, *Peromyscus maniculatus*," *Ecology*, Vol. 60, pp. 869-875; average of home range in western U.S. shrub sites.
Local	Omnivore	Meadowlark	0.0995	6.1	Davis, S. K. and W. E. Lanyon, 2008, "Western Meadowlark (*Sturnella neglecta*)," *The Birds of North America Online*, Cornell Lab of Ornithology (A. Poole, Ed.), Ithaca, New York. (http://bna.birds.cornell.edu/bna/species/104).

Table 3-6. Home Range Information for Representative Receptors. (2 Pages)

Scale	Ecological Guild	Representative Receptor	Body Weight (kg)	Home Range (ha)	Home Range Notes
Broad	Carnivore	Badger	7.6	420	Messick, J. P. and M. G. Hornocker, 1981, "Ecology of the Badger in Southwestern Idaho," *Wildlife Monographs* 76:1-53; average of all male/female home ranges.
Broad	Carnivore	Great blue heron	2.39	155	3.1-km (1.9-mi.) distance travel time, 0.5-km (0.3-mi) width based on studies conducted on the Columbia River; foraging area width is based on the size of the Columbia River.
Broad	Carnivore	Mink	1.02	100	Adult male mink traveling, on average, 2.63 km (1.63 mi.) and up to 5 km (3.10 mi) along a stream in Sweden. Mink travel only a few hundred meters from the water body; therefore, most of the range was from 5 to 100 m (16 to 328 ft) from the water body. However, using the maximum linear dimensions (5,000 by 200 m [16,404 by 656 ft]) yields a home range of 100 ha (247 ac).
Broad	Carnivore	Red-tailed hawk	1.18	164	Petersen, L., 1979, *Ecology of Great Horned Owls and Red-Tailed Hawks in Southeastern Wisconsin*, Wisconsin Department of Natural Resources Technical Bulletin No. 111, Madison, Wisconsin.
Broad	Insectivore	Bank swallow	0.0137	200	Bank swallows generally forage within 0.8 km (0.5 mi) or less of nest sites. Stoner, D. and L. C. Stoner, 1941, "Feeding of Nestling Bank Swallows," *Auk*, Vol. 58, pp. 52-55.
Broad	Insectivore	Occult myotis bat	0.00875	300	Average of 100 to 500 ha (247 to 1,235 ac) range for southeastern myotis bat provided by Menzel, M. A., J. M. Menzel, J. C. Kilgo, W. M. Ford, T. C. Carter, and J. W. Edwards, 2003, *Bats of the Savannah River Site and Vicinity,* General Technical Report SRS-68, U.S. Department of Agriculture, Forest Service, Southern Research Station, Asheville, North Carolina.

Table 3-7. Analytes Excluded as Contaminants of Potential Concern.

Analyte	Criterion	Analyte	Criterion
Soil Analytes			
Actimium-228	Half-life <3 yr	% Retained on No. 100 screen	Physical measurement
Beryllium-7	Half-life <3 yr	% Retained on No. 16 screen	Physical measurement
Cerium-144	Half-life <3 yr	% Retained on No. 200 screen	Physical measurement
Cesium-134	Half-life <3 yr	% Retained on No. 30 screen	Physical measurement
Cobalt-58	Half-life <3 yr	% Retained on No. 325 screen	Physical measurement
Iron-59	Half-life <3 yr	% Retained on No. 50 screen	Physical measurement
Lead-212	Half-life <3 yr	% Retained on No. 8 screen	Physical measurement
Lead-214	Half-life <3 yr	Nitrogen, Kjeldahl total	Physical measurement
Manganese-54	Half-life <3 yr	Percent moisture	Physical measurement
Ruthenium-103	Half-life <3 yr	pH Measurement	Physical measurement
Ruthenium-106	Half-life <3 yr	Total organic carbon	Physical measurement
Sodium-22	Half-life <3 yr	Potassium-40	Background radiation
Thorium-234	Half-life <3 yr	Radium-224	Background radiation
Tin-113	Half-life <3 yr	Radium-226	Background radiation
Calcium	Essential nutrient	Radium-228	Background radiation
Magnesium	Essential nutrient	Thorium-228	Background radiation
Potassium	Essential nutrient	Thorium-230	Background radiation
Sodium	Essential nutrient	Thorium-232	Background radiation
Silicon	Other		
Groundwater Analytes			
Actimium-228	Half-life <3 yr	Hardness	Water quality
Antimony-125	Half-life <3 yr	Ignitability	Water quality
Beryllium-7	Half-life <3 yr	Oxidation reduction potential	Water quality
Cesium-134	Half-life <3 yr	Alkalinity	Water quality
Cobalt-58	Half-life <3 yr	Specific conductance	Water quality
Iron-59	Half-life <3 yr	Temperature	Water quality
Lead-212	Half-life <3 yr	Total inorganic carbon	Water quality
Lead-214	Half-life <3 yr	Total organic carbon	Water quality
Ruthenium-106	Half-life <3 yr	Total organic halides	Water quality
Sodium-22	Half-life <3 yr	Turbidity	Water quality
Calcium	Essential nutrient	pH Measurement	Water quality
Magnesium	Essential nutrient	Potassium-40	Background radiation
Potassium	Essential nutrient	Radium-226	Background radiation
Sodium	Essential nutrient	Radium-228	Background radiation
Sodium dithionite	Tracer	Thorium-228	Background radiation
Coliform bacteria	Water quality	Thorium-230	Background radiation
Conductivity	Water quality	Thorium-232	Background radiation
Dissolved oxygen	Water quality	Silicon	Other

Table 3-8. Analytes Included as Contaminants of Potential Concern.

Analyte	100 Area	300 Area	Analyte	100 Area	300 Area
Waste Site Analytes					
Hexavalent chromium	Yes	No	Total chromium	Yes	No
Cobalt-60	Yes	Yes	Mercury	Yes	No
Cesium-137	Yes	Yes	Plutonium-239/240	Yes	Yes
Lead	Yes	Yes	Uranium-238	Yes	Yes
Europium-152	Yes	No	Uranium-233/234 [a]	Yes	Yes
Europium-154	Yes	No	Uranium-235 [a]	Yes	Yes
Strontium-90	Yes	Yes	Total uranium [a]	Yes	Yes
Groundwater Plume Analytes					
Chromium	Yes	No	Carbon-14	Yes	No
Hexavalent chromium	Yes	No	Strontium-90	Yes	Yes
Uranium [b]	Yes	Yes	Technetium-99	Yes	Yes
Nitrate	Yes	No	Tritium	Yes	Yes
Petroleum hydrocarbons [c]	Yes (100-N only)	No	cis-1,2-dichloroethene	No	Yes
Sulfate	Yes	No	Tetrachloroethene	No	Yes
Tributyl phosphate	No	Yes	Trichloroethene	Yes	Yes

[a] Uranium-233/234, uranium-235, and total uranium are included based on the inclusion of uranium-238.
[b] Isotopic and total uranium are included.
[c] Petroleum hydrocarbon constituents are included.

Table 3-9. Summary of Representative Concentration Data Sets.

Data Group [a]	Sample Medium	Site-Specific Statistics
Upland environment	Soil	CTE/RME; approximately 1 ha (2.47 ac)
	Plants	CTE; two samples
	Invertebrates	CTE; one sample
	Small mammals	CTE; one sample
Riparian environment	Soil	CTE/RME; approximately 0.1 ha (0.247 ac)
	Plants	CTE; two samples; approximately 0.1 ha (0.247 ac)
	Invertebrates	CTE; one sample; approximately 0.1 ha (0.247 ac)
	Small mammals	CTE; one sample; approximately 0.1 ha (0.247 ac)
	Birds	CTE; area varies
Near-shore environment	Sediment	CTE; one sample
	Surface water	CTE; one sample
	Pore water	CTE; one sample
	Macroinvertebrates	CTE; one sample
	Clams	CTE; one sample
	Sculpin	CTE; one sample

[a] For all data groups except for "Other," representative concentrations are also calculated using analogous reference area samples.

CTE = central tendency exposure
RME = reasonable maximum exposure

Table 3-10. Parametric Computation of an Upper Confidence Limit of the Mean of a Gamma Distribution with Shape Parameter, k, and Sample Size, n.

k	Sample Size, n [a]	Method
$k \geq 0.5$	For all n	Approximate gamma 95% UCL
$0.1 \leq k < 0.5$	For all n	Adjusted gamma 95% UCL
$k < 0.1$	n <15	95% Hall's bootstrap UCL
	n ≥15	Adjusted gamma 95% UCL

Source: EPA/600/R-07/041, Table 2.

[a] Note that for situations that include nondetects, a gamma ROS approach is used to impute concentrations prior to mean and UCL estimation.

ROS = regression on order statistics
UCL = upper confidence limit

Table 3-11. Nonparametric Computation of 95% Upper Confidence Limit of the Mean with Kaplan-Meier Estimation of the Mean and Standard Deviation in Cases with Nondetects.

σ	Sample Size, n	% Nondetects	Method
$\sigma \leq 0.5$	For all n	All	95% UCL based on Student's t
$0.5 < \sigma \leq 1.0$	n ≤50	0% to 20%	95% Chebyshev
	n >50		95% BCa Bootstrap
	All n	20% to 40%	95% BCa Bootstrap
	All n	>40%	95% UCL based on Student's t
$1.0 < \sigma \leq 1.5$	n <40	<50%	99% Chebyshev UCL
	n ≥40		97.5% Chebyshev UCL
	All n	>50%	95% BCa Bootstrap
$1.5 < \sigma \leq 2.0$	n <40	<50%	99% Chebyshev UCL
	n ≥40		97.5% Chebyshev UCL
	n <40	≥50%	97.5% Chebyshev UCL
	n ≥40		95% Chebyshev UCL
$\sigma > 2.0$	n <50	All	97.5% Chebyshev UCL
	n ≥50		99% Chebyshev UCL

Source: EPA/600/R-07/041, Table 3.
UCL = upper confidence limit

Table 4-1. Analytical Suites for All 100 Area and 300 Area Upland Soils and Biological Tissues.

Analyte Group	Analytical Methods [a]	Analyzed in Soil	Analyzed in Tissues [b]	Indicator Contaminants [c]
Inorganic chemicals	6010/6020	Yes	Yes	Antimony, arsenic, chromium, copper, lead, lithium, silver, uranium, zinc
	7196A	Yes	No	Hexavalent chromium
	7471	Yes	Yes	Mercury
PCBs and pesticides	8082 (PCBs)	Yes	Yes	Aroclor-1232, [d] Aroclor-1242, [d] Aroclor-1254, Aroclor-1260
	8081A (pesticides)	Yes	Yes	None, pesticides detected in tribal plant samples
Semivolatile organic chemicals	8310	Yes	No	Acenaphthene, acenaphthylene, [a] anthracene, [d] benzo(a)pyrene, benzo(ghi)perylene, [d] benzo(k)fluoranthene, [d] chrysene, dibenz[a,h]anthracene, fluoranthene, fluorene, [d] naphthalene, phenanthrene, pyrene, indeno(1,2,3-cd)pyrene [c]
	8270A	Yes	Yes	1,2,4-trichlorobenzene, [d] 1,2-dichlorobenzene, [d] 2,4,5-trichlorophenol, [d] 2,4,6-trichlorophenol, [d] dibenzofuran, [d] pentachlorophenol [d]
Radionuclides	Gamma energy analysis	Yes	Yes	Cesium-137, cobalt-60, europium-152, europium-154, [c] radium-226, radium-228 (Ra-228)
	Isotopic plutonium	Yes	Yes	Plutonium
	Isotopic thorium	Yes	Yes	Thorium-228, thorium-232 [c]
	Isotopic uranium	Yes	Yes	Uranium-233/234, uranium-235, uranium-238
	Total radioactive strontium	Yes	Yes	Strontium-90

[a] All analytes obtained by these methods.
[b] Analyses were subject to obtaining a sufficient amount of this media. Tissues included terrestrial plants, terrestrial invertebrates, small mammal carcass, and small mammal liver/kidney. Small mammal liver/kidney and invertebrates were measured for metals and uranium (as a metal – not isotopic) only.
[c] Indicator contaminants were constituents that did not pass the screen and therefore were used to identify analytical suites for the risk assessment.
[d] These indicator contaminants were included because nondetected results were greater than benchmarks in the DQO screening-level evaluation.
[e] Of the analytes presented, there is overlap among several ecological and human health contaminants of interest; however, footnoted analytes were of human health interest only.

DQO = data quality objective
PCB = polychlorinated biphenyl

Table 4-2. Characteristics of Selected Remediated Waste Sites. (2 Pages)

Site Name	Site Type	Residual Contamination Level	General Area	Site Selection Notes
1607-H2	Remediated/backfill; RLW	Elevated	100-H	Revegetated in 2001. Sufficient vegetation bordering site, animal activity onsite.
618-4	Remediated/backfill; RSW	Elevated	300	Revegetated in 2004. Old-growth shrub-steppe all around, some vegetation onsite. Combine with 300-44.
100-D-48:2	Remediated/backfill; RLW	Elevated	100-D	Revegetated in 2000. Sparse vegetation onsite, moderate rabbitbrush, tumbleweed, cheatgrass, perennial grass surrounding. Deer, mice, geese activity.
116-N-3	Remediated/backfill; RLW	Elevated	100-N	Revegetated in 2002. Important site for history of contamination spread (before remediation). No perennial vegetation on site, but moderate to heavy cheatgrass and tumblemustard.
300-49	Remediated/backfill; RSW	Low-moderate	300	Revegetated in 2003. Moderate grass and shrub cover.
100-D-49:2	Remediated/backfill; RLW	Low-moderate	100-D	Revegetated in 2000. Sparse vegetation onsite. Rabbitbrush, tumbleweed, cheatgrass, low and tall perennial grass surrounding. Deer, mice, geese activity.
116-DR-1&2	Remediated/backfill; RLW	Low-moderate	100-D	Revegetated in 2000. Sparse vegetation onsite, more surrounding, but still thin. Not optimal, but other remediated sites have insufficient habitat. Sample as one investigation with site 100-D-22.
1607-D2:1	Remediated/backfill; RLW	Low-moderate	100-D	Revegetated in 1999. Sparse vegetation onsite, surrounded by backfill.
100-F-2	Remediated/backfill; RSW	Low-moderate	100-F	Revegetated in 2002. Site is cobble and straw. Surrounding habitat is 0% to 25% bare ground, cheatgrass, tumbleweed, knapweed, Sandberg's bluegrass. Some rabbitbrush and tall perennials.
116-F-1	Remediated/backfill; RLW	Elevated	100-F	Revegetated in 2003. Little vegetation onsite, surrounding area has tumbleweeds, moderate to high cheatgrass, tumblemustard, some rabbitbrush. Animal activity.
600-23	Remediated/native soil; NRSW	Elevated	100-IU-6	25% to 50% bare soil, moderate cryptogam; common annual grass cover; moderate low perennial grass cover.
JA Jones 1	Remediated/native soil; NRSW	Elevated	600	25% to 50% bare soil; no cryptogams on site, <10% cheatgrass, common perennial. Surrounded by open shrub-steppe, grasses (annual and perennial), animal activity.

Table 4-2. Characteristics of Selected Remediated Waste Sites. (2 Pages)

Site Name	Site Type	Residual Contamination Level	General Area	Site Selection Notes
600-132	Remediated/native soil; NRSW	Elevated	600	Large site, but little removal of soil. Mostly revegetated for the last 40 years to scattered rabbitbrush and moderate grasses. Animal activity. Combine with adjacent 600-190.
600-139	Remediated/native soil; NRSW	Elevated	600	Onsite habitat is 0% to 5% bare soil; high cryptogam; common annual grass cover; common low perennial grass cover. Adjacent to unremediated site (600-176 [very small]).
600-204	Remediated/native soil; NRSW	Elevated	600	Onsite habitat is 5% to 25% bare ground; 5% cryptogams, light cheatgrass, moderate perennial grass, rabbitbrush, good natives, animal activity, surrounded by open shrub-steppe. Open trench (same as before remediation) 2.4 m (8-ft) deep, sloping sides.
600-208	Remediated/native soil; NRLW	Low-moderate	600	Onsite habitat is 0% bare ground; tall grasses, tumbleweed, tumblemustard. Good cryptogam growth. Animal activity. 600-208 has multiple locations. Area chosen is in old townsite.
600-131	Remediated/native soil; NRSW	Low-moderate	600	Large site, but little removal of soil. Mostly revegetated for the last 40 years to scattered rabbitbrush. Some foundations covered by thin soil layer and sparse vegetation. Animal activity.
600-181	Remediated/native soil; NRLW	Low-moderate	600	Small site (approximately 458.9 m^2 [550 yd^2]), 50% bare ground, no cryptogam, 20% cheatgrass, some posa, common tumbleweed, and tumblemustard. Surrounded by open sage/rabbitbrush/ cheatgrass, or cheatgrass/tumblemustard. Site had thick layer of hardened oil, scraped off. No backfill. Animal activity.
628-1	Remediated/native soil; NRSW	Low-moderate	600	25% bare ground, scattered rabbitbrush, animal activity. Only light site remediation.
600-171	Remediated/native soil; NRSW	Low-moderate	600	600-171 is the general location for the White Bluffs townsite.

NRLW = nonradioactive liquid waste
NRSW = nonradioactive solid waste
RLW = radioactive liquid waste
RSW = radioactive solid waste

Table 4-3. Summary of Background and Reference Data Resources.

Category	Resource	Description of Relevant Data
Area background	DOE/RL-92-24, 2001, *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes*, Rev. 4, 2 vols., U.S. Department of Energy, Richland Operations Office, Richland, Washington.	Media: Soil. Data were obtained from HEIS. Nonradionuclides only. Coordinates were not provided.
Area background	DOE/RL-95-55, 1995, *Hanford Site Background: Evaluation of Existing Soil Radionuclide Data,* Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.	Media: Soil. Data were hand entered. Radionuclides only. Coordinates provided.
Area background	DOE/RL-96-12, 1996, *Hanford Site Background: Part 2, Soil Background for Radionuclides,* Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.	Media: Soil. Some data were obtained from HEIS and some data were hand entered. Radionuclides only.
Washington State background	Ecology, 1994, *Natural Background Soil Metals Concentrations in Washington State,* Publication 94-115, Washington State Department of Ecology, Toxics Cleanup Program, Olympia, Washington.	Media: Soil. Nonradionuclides.
Reference	RCBRA Project (this report).	Media: Soil, biota, ecological measures, bioassays, histopathology.
Reference	DOE/RL-2007-50, 2008, *Central Plateau Terrestrial Ecological Risk Assessment Report*, Draft A, U.S. Department of Energy, Richland Operations Office, Richland, Washington.	Media: Soil, biota, ecological measures.
Reference comparison	Surface Environmental Surveillance Program data, originating from PNNL far-facility electronic monitoring files WARD SOIL 90-04 XY.txt, WARD VEG 90-04 XY.txt, WARD SOIL 05 XY.txt, WARD VEG 05 XY.txt.	Media: Soil, vegetation (1990 to 2005). Data provided by PNNL from their database. Coordinates were provided for some locations and converted to a common coordinate system.
Reference comparison	Hanford Site-relevant data from WCH-91, 2006, *Columbia River Component Data Evaluation Summary Report*, Rev. 0, Washington Closure Hanford, Richland Washington.	Media: Biota, surface water, and sediment data from a variety of sources.

HEIS = Hanford Environmental Information System
PNNL = Pacific Northwest National Laboratory
RCBRA = River Corridor Baseline Risk Assessment

Table 4-4. Upland Abiotic Media Sampled, Analyses Performed, and Field Measurements Collected.

Media Sampled	Analyses Performed	Field Measurements
Upland soils	Metals (including mercury) Radionuclides (including gamma energy analysis, isotopic uranium, plutonium, thorium, tritium, and total beta radiostrontium) Semivolatile organic analytes Pesticides/polychlorinated biphenyl compounds Particle size, pH, nutrients, organic matter	Soil type Thermoluminescent dosimetry

Table 4-5. Upland Biotic Media Sampled, Analyses Performed, and Field Measurements Collected.

Media Sampled	Analyses Performed	Field Measurements
Terrestrial vegetation (current year's growth) Terrestrial invertebrates (whole organism) Mice (whole organism, liver, kidney)	Metals (including mercury) Radionuclides (gamma energy analysis, isotopic uranium and thorium, and total beta radiostrontium) Semivolatile organic analytes Pesticides/polychlorinated biphenyl compounds	Vegetative canopy cover Species abundance and diversity Small mammal gross morphology

Table 4-6. Arsenic Concentrations from *MULTI INCREMENT®* Soil Samples. (2 Pages)

Sample Location	HEIS Number	Concentration (mg/kg)	Qualifier	PQL (mg/kg)	Mean as Reported (mg/kg)	Standard Deviation as Reported (mg/kg)	Standard Deviation Nondetect as 0 (mg/kg)	Standard Deviation Nondetect = 0.5 PQL (mg/kg)
600-131	J10DM5	2.4	--	0.2	2.14	0.167	--	--
	J10DM6	2.1	--	0.2				
	J10DM7	2.2	--	0.2				
	J10DM8	2	--	0.2				
	J10DM9	2	--	0.2				
Pit 23	J10DN0	2.3	--	0.2	2.2	0.1	--	--
	J10DN1	2.3	J	0.2				
	J10DN2	2.1	J	0.2				
	J10DN3	2.2	J	0.2				
	J10DN4	2.1	J	0.2				
Upland Native Reference Central Plateau	J10DR5	2.7	--	0.5	2.78	0.476	--	--
	J10DR6	3	--	0.5				
	J10DR7	2.1	--	0.5				
	J10DR8	2.7	--	0.5				
	J10DR9	3.4	--	0.5				
Upland Backfill Elevated 100-F-2	J10DP0	3.8	--	0.2	3.74	0.391	--	--
	J10DP1	3.5	--	0.2				
	J10DP2	4.1	--	0.2				
	J10DP3	4.1	--	0.2				
	J10DP4	3.2	--	0.2				
Upland Backfill Low 116-DR-1&2	J10DR0	2	--	0.5	2.32	0.311	--	--
	J10DR1	2.3	--	0.5				
	J10DR2	2.1	--	0.5				
	J10DR3	2.4	--	0.5				
	J10DR4	2.8	--	0.5				

Table 4-6. Arsenic Concentrations from *MULTI INCREMENT®* Soil Samples. (2 Pages)

Sample Location	HEIS Number	Concentration (mg/kg)	Qualifier	PQL (mg/kg)	Mean as Reported (mg/kg)	Standard Deviation as Reported (mg/kg)	Standard Deviation Nondetect as 0 (mg/kg)	Standard Deviation Nondetect = 0.5 PQL (mg/kg)
Upland Native Elevated JA Jones	J10DT0	2.8	--	0.5	2.2	0.43	--	--
	J10DT1	2.5	--	0.5				
	J10DT2	1.9	--	0.5				
	J10DT3	2	--	0.5				
	J10DT4	1.8	--	0.5				

-- = not applicable
HEIS = Hanford Environmental Information System
J = the reported value is an estimate
PQL = practical quantitation limit

Table 4-7. Hexavalent Chromium Concentrations from *MULTI INCREMENT®* Soil Samples. (2 Pages)

Sample Location	HEIS Number	Concentration (mg/kg)	Qualifier	PQL (mg/kg)	Mean as Reported (mg/kg)	Standard Deviation as Reported (mg/kg)	Standard Deviation Nondetect as 0 (mg/kg)	Standard Deviation Nondetect = 0.5 PQL (mg/kg)
600-131	J10DM5	0.199	U	0.2	0.342	0.188	0.274	0.228
	J10DM6	0.447	--	0.2				
	J10DM7	0.246	--	0.2				
	J10DM8	0.195	U	0.2				
	J10DM9	0.622	--	0.2				
Pit 23	J10DN0	0.256	J	0.2	0.222	0.035	0.134	0.08
	J10DN1	0.2	UJ	0.2				
	J10DN2	0.213	J	0.2				
	J10DN3	0.259	J	0.2				
	J10DN4	0.181	UJ	0.2				
Upland Native Reference Central Plateau	J10DR5	0.489	--	0.2	0.287	0.118	0.208	0.161
	J10DR6	0.205	U	0.2				
	J10DR7	0.204	U	0.2				
	J10DR8	0.286	--	0.2				
	J10DR9	0.25	--	0.2				
Upland Backfill Elevated 100-F-2	J10DP0	0.437	D	0.4	0.994	0.914	0.218	0.405
	J10DP1	0.2	U	0.2				
	J10DP2	0.351	--	0.2				
	J10DP3	1.99	UD	2				
	J10DP4	1.99	UD	2				
Upland Backfill Low 116-DR-1&2	J10DR0	0.4	UD	0.4	0.326	0.083	0.174	0.093
	J10DR1	0.399	UD	0.4				
	J10DR2	0.322	--	0.2				
	J10DR3	0.196	U	0.2				
	J10DR4	0.315	--	0.2				

Table 4-7. Hexavalent Chromium Concentrations from *MULTI INCREMENT®* Soil Samples. (2 Pages)

Sample Location	HEIS Number	Concentration (mg/kg)	Qualifier	PQL (mg/kg)	Mean as Reported (mg/kg)	Standard Deviation as Reported (mg/kg)	Standard Deviation Nondetect as 0 (mg/kg)	Standard Deviation Nondetect = 0.5 PQL (mg/kg)
Upland Native Elevated JA Jones	J10DT0	0.204	U	0.2	0.315	0.103	0.214	0.159
	J10DT1	0.398	--	0.2				
	J10DT2	0.399	--	0.2				
	J10DT3	0.201	U	0.2				
	J10DT4	0.372	--	0.2				

D = sample was analyzed using a secondary dilution factor (i.e., dilution factor different than 1.0)
HEIS = Hanford Environmental Information System
J = the reported value is an estimate
PQL = practical quantiation limit
U = analyzed for but not detected above limiting criteria (<= PQL)

Table 4-8. Lead Concentrations from *MULTI INCREMENT®* Soil Samples. (2 Pages)

Sample Location	HEIS Number	Concentration (mg/kg)	Qualifier	PQL (mg/kg)	Mean as Reported (mg/kg)	Standard Deviation as Reported (mg/kg)	Standard Deviation Nondetect as 0 (mg/kg)	Standard Deviation Nondetect = 0.5 PQL (mg/kg)
600-131	J10DM5	327	--	0.2	116	142	--	--
	J10DM6	198	--	0.2				
	J10DM7	12.4	--	0.2				
	J10DM8	29.4	--	0.2				
	J10DM9	12.3	--	0.2				
Pit 23	J10DN0	4.3	--	0.2	4.36	0.483	--	--
	J10DN1	4	J	0.2				
	J10DN2	4.1	J	0.2				
	J10DN3	5.2	J	0.2				
	J10DN4	4.2	J	0.2				
Upland Native Reference Central Plateau	J10DR5	6.3	C	0.5	6.3	0.561	--	--
	J10DR6	6.1	C	0.5				
	J10DR7	5.5	C	0.5				
	J10DR8	7	--	0.5				
	J10DR9	6.6	--	0.5				
Upland Backfill Elevated 100-F-2	J10DP0	10.2	--	0.2	11.2	1.39	--	--
	J10DP1	10.1	--	0.2				
	J10DP2	12.7	--	0.2				
	J10DP3	10.2	--	0.2				
	J10DP4	12.7	--	0.2				
Upland Backfill Low 116-DR-1&2	J10DR0	5.5	--	0.5	5.02	0.63	--	--
	J10DR1	4.8	--	0.5				
	J10DR2	5	--	0.5				
	J10DR3	4.1	--	0.5				
	J10DR4	5.7	--	0.5				

Table 4-8. Lead Concentrations from *MULTI INCREMENT®* Soil Samples. (2 Pages)

Sample Location	HEIS Number	Concentration (mg/kg)	Qualifier	PQL (mg/kg)	Mean as Reported (mg/kg)	Standard Deviation as Reported (mg/kg)	Standard Deviation Nondetect as 0 (mg/kg)	Standard Deviation Nondetect = 0.5 PQL (mg/kg)
Upland Native Elevated JA Jones	J10DT0	7.9	--	0.5	7.88	2.08	--	--
	J10DT1	7.3	--	0.5				
	J10DT2	6.7	--	0.5				
	J10DT3	6.1	--	0.5				
	J10DT4	11.4	--	0.5				

-- = not applicable
C = the analyte was detected in the associated quality control blank above the instrument detection limit/method detection limit
HEIS = Hanford Environmental Information System
J = the reported value is an estimate
PQL = practical quantiation limit

Table 4-9. Benzo(a)pyrene Concentrations from *MULTI INCREMENT®* Soil Samples. (2 Pages)

Sample Location	HEIS Number	Concentration (mg/kg)	Qualifier	PQL (mg/kg)	Mean as Reported (mg/kg)	Standard Deviation as Reported (mg/kg)	Standard Deviation Nondetect as 0 (mg/kg)	Standard Deviation Nondetect = 0.5 PQL (mg/kg)
600-131	J10DM5	0.009	--	0.003	0.0126	0.011	--	--
	J10DM6	0.008	--	0.003				
	J10DM7	0.009	--	0.003				
	J10DM8	0.032	--	0.003				
	J10DM9	0.005	--	0.003				
Pit 23	J10DN0	0.003	UJ	0.003	0.003	0	0	0
	J10DN1	0.003	UJ	0.003				
	J10DN2	0.003	UJ	0.003				
	J10DN3	0.003	UJ	0.003				
	J10DN4	0.003	UJ	0.003				
Upland Native Reference Central Plateau	J10DR5	0.003	U	0.003	0.003	0	0	0
	J10DR6	0.003	U	0.003				
	J10DR7	0.003	U	0.003				
	J10DR8	0.003	U	0.003				
	J10DR9	0.003	U	0.003				
Upland Backfill Elevated 100-F-2	J10DP0	0.003	U	0.003	0.008	0.0074	0.0084	0.008
	J10DP1	0.009	--	0.003				
	J10DP2	0.003	--	0.003				
	J10DP3	0.003	U	0.003				
	J10DP4	0.020	--	0.003				
Upland Backfill Low 116-DR-1&2	J10DR0	0.009	--	0.003	0.006	0.0017	--	--
	J10DR1	0.007	--	0.003				
	J10DR2	0.005	--	0.003				
	J10DR3	0.005	--	0.003				
	J10DR4	0.006	--	0.003				

Table 4-9. Benzo(a)pyrene Concentrations from *MULTI INCREMENT®* Soil Samples. (2 Pages)

Sample Location	HEIS Number	Concentration (mg/kg)	Qualifier	PQL (mg/kg)	Mean as Reported (mg/kg)	Standard Deviation as Reported (mg/kg)	Standard Deviation Nondetect as 0 (mg/kg)	Standard Deviation Nondetect = 0.5 PQL (mg/kg)
Upland Native Elevated JA Jones	J10DT0	0.009	--	0.003	0.0268	0.0301	--	--
	J10DT1	0.011	--	0.003				
	J10DT2	0.080	--	0.003				
	J10DT3	0.021	--	3.35				
	J10DT4	0.013	--	3.35				

-- = not applicable
HEIS = Hanford Environmental Information System
J = the reported value is an estimate
PQL = practical quantiation limit
U = analyzed for but not detected above limiting criteria (<= PQL)

Table 4-10. Uranium-233/234 Concentrations from *MULTI INCREMENT*® Soil Samples. (2 Pages)

Sample Location	HEIS Number	Concentration (mg/kg)	Qualifier	PQL (mg/kg)	Mean as Reported (mg/kg)	Standard Deviation as Reported (mg/kg)	Standard Deviation Nondetect as 0 (mg/kg)	Standard Deviation Nondetect = 0.5 PQL (mg/kg)
600-131	J10DM5	0.189	U	0.24	0.155	0.072	0.000	0.032
	J10DM6	0.146	U	0.22				
	J10DM7	0.26	U	0.33				
	J10DM8	0.083	U	0.32				
	J10DM9	0.096	U	0.37				
Pit 23	J10DN0	0.12	U	0.31	0.155	0.080	0.000	0.013
	J10DN1	0.134	U	0.26				
	J10DN2	0.105	U	0.27				
	J10DN3	0.297	U	0.32				
	J10DN4	0.119	U	0.3				
Upland Native Reference Central Plateau	J10DR5	0.212	U	0.27	0.306	0.118	0.181	0.137
	J10DR6	0.294	--	0.28				
	J10DR7	0.505	--	0.28				
	J10DR8	0.294	--	0.28				
	J10DR9	0.224	--	0.21				
Upland Backfill Elevated 100-F-2	J10DP0	0.256	--	0.15	0.197	0.039	--	--
	J10DP1	0.192	--	0.15				
	J10DP2	0.161	--	0.15				
	J10DP3	0.212	--	0.12				
	J10DP4	0.163	--	0.14				
Upland Backfill Low 116-DR-1&2	J10DR0	0.194	--	0.14	0.171	0.080	0.126	0.081
	J10DR1	0.077	U	0.15				
	J10DR2	0.228	--	0.19				
	J10DR3	0.257	--	0.2				
	J10DR4	0.097	U	0.19				

Table 4-10. Uranium-233/234 Concentrations from *MULTI INCREMENT®* Soil Samples. (2 Pages)

Sample Location	HEIS Number	Concentration (mg/kg)	Qualifier	PQL (mg/kg)	Mean as Reported (mg/kg)	Standard Deviation as Reported (mg/kg)	Standard Deviation Nondetect as 0 (mg/kg)	Standard Deviation Nondetect = 0.5 PQL (mg/kg)
Upland Native Elevated JA Jones	J10DT0	0.337	--	0.32	0.178	0.112	0.164	0.089
	J10DT1	0.252	--	0.21				
	J10DT2	0.085	U	0.22				
	J10DT3	0.088	U	0.34				
	J10DT4	0.13	U	0.33				

-- = not applicable
HEIS = Hanford Environmental Information System
PQL = practical quantiation limit
U = analyzed for but not detected above limiting criteria (<= method detection limit)

Table 4-11. Summary of Upland Soil Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (7 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg)								
Aluminum	163	163	0	1.00	3,040	11,900	--	--
Antimony	163	17	146	0.10	0.248	6.1	0.19	1.5
Arsenic	163	157	6	0.96	1.6	17.3	1.7	1.7
Barium	163	163	0	1.00	38.5	416	--	--
Beryllium	163	150	13	0.92	0.08	0.77	0.005	0.75
Bismuth	163	10	153	0.06	0.362	1.3	0.29	15
Boron	163	144	19	0.88	0.57	39.2	0.36	15
Cadmium	163	74	89	0.45	0.043	1.4	0.03	0.75
Calcium	163	163	0	1.00	2,260	11,000	--	--
Calculated total uranium	163	89	74	0.55	0.11	2.74	0.013	0.86
Chromium	163	163	0	1.00	4.3	24.6	--	--
Cobalt	163	158	5	0.97	3.6	12.5	7.4	7.5
Copper	163	163	0	1.00	6.9	65.8	--	--
Hexavalent chromium	163	80	83	0.49	0.2	0.74	0.181	20.1
Iron	163	163	0	1.00	10,100	34,800	--	--
Lead	163	163	0	1.00	2.4	327	--	--
Lithium	163	158	5	0.97	3.6	11.4	14.9	15
Magnesium	163	163	0	1.00	2,310	6,370	--	--
Manganese	163	163	0	1.00	178	567	--	--
Mercury	163	30	133	0.18	0.021	0.15	0.01	0.025
Molybdenum	163	51	112	0.31	0.119	1.4	0.1	15
Nickel	163	163	0	1.00	6.2	19.5	--	--
Phosphorus	163	163	0	1.00	558	1,290	--	--
Potassium	163	163	0	1.00	552	2,540	--	--
Selenium	163	4	159	0.02	0.24	0.73	0.17	1.3
Silicon	163	163	0	1.00	170	526	--	--
Silver	163	9	154	0.06	0.13	1.2	0.07	1.5

Table 4-11. Summary of Upland Soil Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (7 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Sodium	163	158	5	0.97	58.2	496	744	750
Strontium (elemental)	163	163	0	1.00	14.3	302	--	--
Thallium	163	5	158	0.03	0.37	1	0.3	2
Tin	163	32	131	0.20	0.53	33.3	0.79	15
Uranium (inorganic)	163	15	148	0.09	1.4	3.5	0.97	30
Vanadium	163	163	0	1.00	22.5	71.6	--	--
Zinc	163	163	0	1.00	22.6	93.1	--	--
Organics (mg/kg)								
1,2,4-Trichlorobenzene	162	0	162	0.00	--	--	0.32	0.67
1,2-Dichlorobenzene	162	0	162	0.00	--	--	0.32	0.67
1,3-Dichlorobenzene	162	0	162	0.00	--	--	0.32	0.67
1,4-Dichlorobenzene	162	0	162	0.00	--	--	0.32	0.67
2,4,5-Trichlorophenol	162	0	162	0.00	--	--	0.81	1.7
2,4,5-Trichlorophenoxyacetic acid	133	7	126	0.05	0.0094	0.068	0.017	0.017
2,4,6-Trichlorophenol	162	0	162	0.00	--	--	0.32	0.67
2,4-Dichlorophenol	161	0	161	0.00	--	--	0.32	0.67
2,4-Dichlorophenoxyacetic acid	133	53	80	0.40	0.005	0.42	0.033	0.034
2,4-Dimethylphenol	162	0	162	0.00	--	--	0.32	0.67
2,4-Dinitrophenol	162	0	162	0.00	--	--	0.81	1.7
2,4-Dinitrotoluene	162	0	162	0.00	--	--	0.32	0.67
2,6-Dinitrotoluene	162	0	162	0.00	--	--	0.32	0.67
2-[2,4,5-Trichlorophenoxy]propionic acid	133	37	96	0.28	0.0076	0.32	0.017	0.017
2-Chloronaphthalene	162	0	162	0.00	--	--	0.32	0.67
2-Chlorophenol	161	0	161	0.00	--	--	0.32	0.67
2-Methylnaphthalene	162	12	150	0.07	0.023	0.26	0.32	0.67
2-Methylphenol [cresol, o-]	162	0	162	0.00	--	--	0.32	0.67
2-Nitroaniline	162	0	162	0.00	--	--	0.81	1.7
2-Nitrophenol	162	0	162	0.00	--	--	0.32	0.67

Table 4-11. Summary of Upland Soil Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (7 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
2-secButyl-4,6-dinitrophenol[DNBP]	133	43	90	0.32	0.0067	0.15	0.017	0.017
3-3'-Dichlorobenzidine	162	0	162	0.00	--	--	0.32	0.67
3+4 Methylphenol [cresol, m+p]	162	1	161	0.01	0.019	0.019	0.32	0.67
3-Nitroaniline	162	0	162	0.00	--	--	0.81	1.7
4,6-Dinitro-2-methylphenol	162	0	162	0.00	--	--	0.81	1.7
4-[2,4-Dichlorophenoxy]butanoic acid	133	43	90	0.32	0.009	0.22	0.0099	0.17
4-Bromophenylphenyl ether	162	0	162	0.00	--	--	0.32	0.67
4-Chloro-3-methylphenol	161	0	161	0.00	--	--	0.32	0.67
4-Chloroaniline	162	0	162	0.00	--	--	0.32	0.67
4-Chlorophenylphenyl ether	162	0	162	0.00	--	--	0.32	0.67
4-Nitroaniline	162	0	162	0.00	--	--	0.81	1.7
4-Nitrophenol	162	0	162	0.00	--	--	0.81	1.7
Acenaphthene	162	24	138	0.15	0.015	0.33	0.0327	0.33
Acenaphthylene	162	6	156	0.04	0.012	0.74	0.0327	0.33
Aldrin	162	1	161	0.01	0.0005	0.0005	0.000004	0.033
Alpha-BHC	162	1	161	0.01	0.0004	0.0004	0.000004	0.033
alpha-Chlordane	162	4	158	0.02	0.00311	0.00612	0.000004	0.033
Anthracene	162	61	101	0.38	0.0007	0.11	0.00327	0.33
Aroclor-1016	163	0	163	0.00	--	--	0.013	1.3
Aroclor-1221	163	0	163	0.00	--	--	0.013	1.3
Aroclor-1232	163	0	163	0.00	--	--	0.013	1.3
Aroclor-1242	163	0	163	0.00	--	--	0.013	1.3
Aroclor-1248	163	1	162	0.01	0.028	0.028	0.013	1.3
Aroclor-1254	163	25	138	0.15	0.0068	9.4	0.013	0.014
Aroclor-1260	163	17	146	0.10	0.0069	0.13	0.013	1.3
Aroclor-1262	5	5	0	1.00	0.028	0.075	--	--
Aroclor-1268	5	0	5	0.00	--	--	0.013	0.013
Benzo[a]anthracene	162	85	77	0.52	0.00083	0.78	0.00327	0.00338

Table 4-11. Summary of Upland Soil Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (7 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Benzo[a]pyrene	162	89	73	0.55	0.00085	0.81	0.00327	0.00338
Benzo[b]fluoranthene	162	97	65	0.60	0.00083	0.63	0.00327	0.00338
Benzo[ghi]perylene	162	81	81	0.50	0.0009	0.4	0.00327	0.0034
Benzo[k]fluoranthene	162	71	91	0.44	0.00083	0.33	0.00327	0.0034
beta-1,2,3,4,5,6-Hexachlorocyclohexane	162	13	149	0.08	0.0005	0.0039	0.000004	0.033
Bis[2-chloro-1-methylethyl]ether	162	0	162	0.00	--	--	0.32	0.67
Bis[2-Chloroethoxy]methane	162	0	162	0.00	--	--	0.32	0.67
Bis[2-chloroethyl] ether	162	0	162	0.00	--	--	0.32	0.67
Bis[2-ethylhexyl] phthalate	162	138	24	0.85	0.017	0.592911	0.33	0.34
Butylbenzylphthalate	162	0	162	0.00	--	--	0.32	0.67
Carbazole	162	2	160	0.01	0.023	0.031	0.32	0.67
Chrysene	162	97	65	0.60	0.00095	1.3	0.00327	0.0034
Dalapon	133	40	93	0.30	0.0037	0.11	0.0001	0.17
Delta-BHC	162	0	162	0.00	--	--	0.000004	0.033
Dibenz[a,h]anthracene	162	46	116	0.28	0.001	0.083	0.00327	0.33
Dibenzofuran	162	4	158	0.02	0.018	0.25	0.32	0.67
Dicamba	133	68	65	0.51	0.0087	0.094	0.01	0.091
Dichlorodiphenyldichloroethane	162	6	156	0.04	0.0013	0.016	0.000004	0.033
Dichlorodiphenyldichloroethylene	162	44	118	0.27	0.00037	0.46	0.000004	0.0013
Dichlorodiphenyltrichloroethane	162	19	143	0.12	0.0014	1.1	0.000004	0.033
Dichloroprop	133	60	73	0.45	0.005	1.3	0.033	0.33
Dieldrin	162	10	152	0.06	0.00067	0.0066	0.000004	0.033
Diethylphthalate	162	0	162	0.00	--	--	0.32	0.67
Dimethyl phthalate	162	0	162	0.00	--	--	0.32	0.67
Di-n-butylphthalate	162	62	100	0.38	0.017	0.32	0.33	0.67
Di-n-octylphthalate	162	0	162	0.00	--	--	0.32	0.67
Endosulfan I	162	12	150	0.07	0.00027	0.0027	0.000004	0.033
Endosulfan II	162	2	160	0.01	0.0038	0.0065	0.000004	0.033

Table 4-11. Summary of Upland Soil Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (7 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Endosulfan sulfate	162	5	157	0.03	0.0012	0.018	0.000004	0.033
Endrin	162	1	161	0.01	0.00037	0.00037	0.000004	0.033
Endrin aldehyde	162	9	153	0.06	0.00073	0.24	0.000004	0.0014
Endrin ketone	162	7	155	0.04	0.00067	0.0053	0.000004	0.033
Fluoranthene	162	85	77	0.52	0.0015	2	0.00333	0.0067
Fluorene	162	34	128	0.21	0.0013	0.038	0.00327	0.33
Gamma-BHC (lindane)	162	0	162	0.00	--	--	0.000004	0.033
gamma-Chlordane	162	11	151	0.07	0.0007	0.0054	0.000004	0.033
Heptachlor	162	4	158	0.02	0.00057	0.00093	0.000004	0.033
Heptachlor epoxide	162	0	162	0.00	--	--	0.000004	0.033
Hexachlorobenzene	162	0	162	0.00	--	--	0.32	0.67
Hexachlorobutadiene	162	0	162	0.00	--	--	0.32	0.67
Hexachlorocyclopentadiene	162	0	162	0.00	--	--	0.32	0.67
Hexachloroethane	162	0	162	0.00	--	--	0.32	0.67
Indeno[1,2,3-cd]pyrene	162	56	106	0.35	0.0011	0.45	0.00327	0.0034
Isophorone	162	0	162	0.00	--	--	0.32	0.67
Methoxychlor	162	19	143	0.12	0.00054	0.01	0.000004	0.033
Naphthalene	162	42	120	0.26	0.0076	0.27	0.0327	0.034
Nitrobenzene	162	0	162	0.00	--	--	0.32	0.67
N-Nitroso-di-n-dipropylamine	162	0	162	0.00	--	--	0.32	0.67
N-Nitrosodiphenylamine	162	0	162	0.00	--	--	0.32	0.67
Pentachlorophenol	163	3	160	0.02	0.0084	0.12	0.013	1.7
Phenanthrene	162	115	47	0.71	0.00083	0.91	0.00327	0.0034
Phenol	162	3	159	0.02	0.0184	0.02	0.32	0.67
Picloram	120	31	89	0.26	0.0042	0.034	0.017	0.017
Pyrene	162	97	65	0.60	0.00083	1.6	0.00004	0.00674
Toxaphene	162	0	162	0.00	--	--	0.00004	0.33
Total organic carbon	43	41	2	0.95	212 mg/kg	50,300 mg/kg	153 mg/kg	243 mg/kg

Table 4-11. Summary of Upland Soil Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (7 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Radionuclides (pCi/g)								
Americium-241	163	0	163	0.00	--	--	0.023	0.46
Cesium-134	163	0	163	0.00	--	--	0.027	0.24
Cesium-137	163	42	121	0.26	0.052	0.362	0.028	0.19
Cobalt-60	163	1	162	0.01	0.092	0.092	0.022	0.25
Europium-152	163	3	160	0.02	0.219	0.758	0.048	0.42
Europium-154	163	0	163	0.00	--	--	0.068	0.58
Europium-155	163	1	162	0.01	0.177	0.177	0.036	0.29
Plutonium-238	163	2	161	0.01	0.036	1.4	-0.164	0.22
Plutonium-239/240	163	3	160	0.02	0.052	0.51	-0.021	0.384
Potassium-40	163	162	1	0.99	4.09	33	1.7	1.7
Radium-226	163	157	6	0.96	0.219	1.1	0.16	0.27
Radium-228	163	135	28	0.83	0.357	1.69	0.31	1
Strontium-90	163	3	160	0.02	0.147	0.189	-0.08	0.19
Thorium-228	163	118	45	0.72	0.185	0.945	0.064	0.514
Thorium-230	163	80	83	0.49	0.208	1.81	-0.095	0.636
Thorium-232	163	128	35	0.79	0.175	0.891	0	0.518
Uranium-233/234	163	93	70	0.57	0.085	0.909	0	0.297
Uranium-235	163	0	163	0.00	--	--	-0.017	0.101
Uranium-238	163	89	74	0.55	0.035	0.909	0	0.288
Anions (mg/kg)								
Chloride	43	43	0	1.00	0.0806	5.02	--	--
Fluoride	43	32	11	0.74	0.0819	1.24g	0.46	0.992
Nitrogen in ammonia	43	43	0	1.00	0.65	15	--	--
Nitrogen in nitrate	168	129	39	0.77	0.0771	23.48	0.537	0.651
Nitrogen in nitrite	43	30	13	0.70	0.0448	1.93	0.435	0.559
Nitrogen in nitrite and nitrate	133	129	4	0.97	0.002	22.9	0.19	0.21
Nitrogen, Kjeldahl total	43	43	0	1.00	91.5	710g	--	--

Table 4-11. Summary of Upland Soil Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (7 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
pH measurement	43	43	0	1.00	7.01 pH	9.11 pH	--	--
Sulfate	43	43	0	1.00	0.645	16	--	--
Physical Properties (%)								
Cumulative percent retained on No. 100 screen	43	43	0	1.00	26.11	98.9	--	--
Cumulative percent retained on No. 16 screen	43	43	0	1.00	0	11.08	--	--
Cumulative percent retained on No. 200 screen	43	43	0	1.00	65.64	99.65	--	--
Cumulative percent retained on No. 30 screen	43	43	0	1.00	2.51	43.37	--	--
Cumulative percent retained on No. 50 screen	43	43	0	1.00	8.16	87.04	--	--
Cumulative percent retained on No. 8 screen	43	43	0	1.00	0	0.06	--	--
Fraction coarse sand	43	43	0	1.00	1.57	43.37	--	--
Fraction coarse silt/silt/clay (less than 0.074 mm)	43	43	0	1.00	0.35	34.36	--	--
Fraction fine sand	43	43	0	1.00	10.35	40.59	--	--
Fraction granules (greater than 2.38 mm)	43	43	0	1.00	0	0.06	--	--
Fraction medium sand	43	43	0	1.00	4.12	63.41	--	--
Fraction total sand	43	43	0	1.00	65.64	99.65	--	--
Fraction very coarse sand	43	43	0	1.00	0	11.08	--	--
Fraction very fine sand	41	41	0	1.00	0.75	57.76	--	--
Percent moisture (wet sample)	43	43	0	1.00	0.155	4.9	--	--

-- = not applicable
BHC = benzene hexachloride
RCBRA = River Corridor Baseline Risk Assessment

Table 4-12. Summary of Upland Soil Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg)								
Aluminum	3	3	0	1.00	1,940	7,610	--	--
Antimony	3	0	3	0.00	--	--	0.36	0.37
Arsenic	3	3	0	1.00	1.7	2.7	--	--
Barium	3	3	0	1.00	28.5	87.4	--	--
Beryllium	3	3	0	1.00	0.29	0.8	--	--
Bismuth	3	0	3	0.00	--	--	0.42	0.43
Boron	3	3	0	1.00	0.72	2.4	--	--
Cadmium	3	3	0	1.00	0.06	0.15	--	--
Calcium	3	3	0	1.00	1,790	4,260	--	--
Chromium	3	3	0	1.00	3.4	12.2	--	--
Cobalt	3	3	0	1.00	4.3	7.7	--	--
Copper	3	3	0	1.00	9	14.6	--	--
Iron	3	3	0	1.00	20,100	24,500	--	--
Lead	3	3	0	1.00	2.1	5.8	--	--
Lithium	3	3	0	1.00	1.8	7.4	--	--
Magnesium	3	3	0	1.00	2,080	3,760	--	--
Manganese	3	3	0	1.00	193	383	--	--
Mercury	3	0	3	0.00	--	--	0.01	0.02
Molybdenum	3	3	0	1.00	0.24	0.33	--	--
Nickel	3	3	0	1.00	3.7	11.2	--	--
Phosphorus	3	3	0	1.00	575	1,230	--	--
Potassium	3	3	0	1.00	456	2,230	--	--
Selenium	3	0	3	0.00	--	--	0.45	0.46
Silicon	3	3	0	1.00	266	462	--	--
Silver	3	0	3	0.00	--	--	0.08	0.08
Sodium	3	3	0	1.00	63.3	170	--	--
Strontium (elemental)	3	3	0	1.00	7.2	24.5	--	--
Thallium	3	0	3	0.00	--	--	0.72	0.74
Tin	3	3	0	1.00	13.2	93.7	--	--
Uranium (inorganic)	3	0	3	0.00	--	--	1.8	1.9
Vanadium	3	3	0	1.00	16.5	46.3	--	--
Zinc	3	3	0	1.00	37.1	76.3	--	--
Zirconium	3	3	0	1.00	7.3	20.1	--	--

Table 4-12. Summary of Upland Soil Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Radionuclides (pCi/g)								
Antimony-125	4	0	4	0.00	--	--	-0.0162	0.0282
Beryllium-7	4	0	4	0.00	--	--	0.0354	0.0814
Carbon-14	4	0	4	0.00	--	--	0.236	0.435
Cesium-134	4	0	4	0.00	--	--	0.0331	0.0601
Cesium-137	4	4	0	1.00	0.147	1.92	--	--
Cobalt-60	4	0	4	0.00	--	--	0.000789	0.0308
Curium-242	4	0	4	0.00	--	--	0.000272	0.000708
Curium-244	4	1	3	0.25	0.00106	0.00106	-0.000205	0.00086
Europium-152	4	2	2	0.50	0.846	4.04	0.138	0.291
Europium-154	4	1	3	0.25	0.303	0.303	-0.0175	0.0558
Europium-155	4	0	4	0.00	--	--	0.00799	0.0613
Plutonium-238	4	2	2	0.50	0.00127	0.00404	0.000501	0.000859
Plutonium-239/240	4	4	0	1.00	0.00458	0.199	--	--
Potassium-40	4	4	0	1.00	14.5	17.2	--	--
Ruthenium-106	4	0	4	0.00	--	--	-0.0386	0.0813
Strontium-90	4	3	1	0.75	0.119	1.03	0.00745	0.00745

-- = not applicable

Table 4-13. Summary of Upland Soil Data Collected from Central Plateau Reference Sites. (3 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg)								
Antimony	1	0	1	0.00	--	--	1.05	1.05
Arsenic	1	1	0	1.00	2.16	2.16	--	--
Barium	1	1	0	1.00	83.7	83.7	--	--
Bismuth	1	0	1	0.00	--	--	0.23	0.23
Boron	1	1	0	1.00	0.723	0.723	--	--
Cadmium	1	1	0	1.00	0.197	0.197	--	--
Calculated total uranium	1	1	0	1.00	0.453	0.453	--	--
Chromium	1	1	0	1.00	8.63	8.63	--	--
Copper	1	1	0	1.00	10.5	10.5	--	--
Hexavalent chromium	1	1	0	1.00	0.26	0.26	--	--

Table 4-13. Summary of Upland Soil Data Collected from Central Plateau Reference Sites. (3 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Lead	1	1	0	1.00	5.95	5.95	--	--
Mercury	1	0	1	0.00	--	--	0.105	0.105
Molybdenum	1	1	0	1.00	0.381	0.381	--	--
Nickel	1	1	0	1.00	8.6	8.6	--	--
Selenium	1	1	0	1.00	0.63	0.63	--	--
Silver	1	0	1	0.00	--	--	0.105	0.105
Thallium	1	1	0	1.00	0.13	0.13	--	--
Tin	1	0	1	0.00	--	--	1.05	1.05
Uranium (inorganic)	1	1	0	1.00	0.448	0.448	--	--
Vanadium	1	1	0	1.00	45.6	45.6	--	--
Zinc	1	1	0	1.00	70.7	70.7	--	--
Organics (mg/kg)								
Aldrin	1	0	1	0.00	--	--	0.0022	0.0022
Alpha-BHC	1	0	1	0.00	--	--	0.0022	0.0022
alpha-Chlordane	1	0	1	0.00	--	--	0.0022	0.0022
Aroclor-1016	1	0	1	0.00	--	--	0.0042	0.0042
Aroclor-1221	1	0	1	0.00	--	--	0.0084	0.0084
Aroclor-1232	1	0	1	0.00	--	--	0.0042	0.0042
Aroclor-1242	1	0	1	0.00	--	--	0.0042	0.0042
Aroclor-1248	1	0	1	0.00	--	--	0.0042	0.0042
Aroclor-1254	1	0	1	0.00	--	--	0.0042	0.0042
Aroclor-1260	1	0	1	0.00	--	--	0.0042	0.0042
Aroclor-1262	1	0	1	0.00	--	--	0.0042	0.0042
Aroclor-1268	1	0	1	0.00	--	--	0.0042	0.0042
beta-1,2,3,4,5,6-Hexachloro-cyclohexane	1	0	1	0.00	--	--	0.0022	0.0022
Delta-BHC	1	0	1	0.00	--	--	0.0022	0.0022
Dichlorodi-phenyldi-chloroethane	1	0	1	0.00	--	--	0.0045	0.0045
Dichlorodi-phenyldi-chloroethylene	1	0	1	0.00	--	--	0.0045	0.0045
Dichlorodi-phenyltri-chloroethane	1	0	1	0.00	--	--	0.0045	0.0045
Dieldrin	1	0	1	0.00	--	--	0.0022	0.0022
Endosulfan I	1	0	1	0.00	--	--	0.0022	0.0022
Endosulfan II	1	0	1	0.00	--	--	0.0045	0.0045
Endosulfan sulfate	1	0	1	0.00	--	--	0.0045	0.0045
Endrin	1	0	1	0.00	--	--	0.0045	0.0045
Endrin aldehyde	1	0	1	0.00	--	--	0.0045	0.0045

Table 4-13. Summary of Upland Soil Data Collected from Central Plateau Reference Sites. (3 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Endrin ketone	1	0	1	0.00	--	--	0.0045	0.0045
Gamma-BHC (lindane)	1	0	1	0.00	--	--	0.0022	0.0022
gamma-Chlordane	1	0	1	0.00	--	--	0.0022	0.0022
Heptachlor	1	0	1	0.00	--	--	0.0022	0.0022
Heptachlor epoxide	1	0	1	0.00	--	--	0.0022	0.0022
Methoxychlor	1	0	1	0.00	--	--	0.022	0.022
Toxaphene	1	0	1	0.00	--	--	0.22	0.22
Other (mg/kg)								
Cyanide	1	0	1	0.00	--	--	0.2	0.2
Radionuclides (pCi/g)								
Americium-241	12	3	9	0.25	0.019	0.032	-0.025	0.02
Cesium-137	12	12	0	1.00	0.033	0.492	--	--
Cobalt-60	2	0	2	0.00	--	--	-0.006	-0.003
Europium-152	1	0	1	0.00	--	--	-0.015	-0.015
Europium-154	1	0	1	0.00	--	--	0.019	0.019
Europium-155	1	0	1	0.00	--	--	0.032	0.032
Plutonium-238	11	0	11	0.00	--	--	-0.032	0.039
Plutonium-239/240	11	3	8	0.27	0.021	0.023	0.003	0.019
Radium-226	1	1	0	1.00	0.612	0.612	--	--
Radium-228	1	1	0	1.00	0.813	0.813	--	--
Strontium-90	12	5	7	0.42	0.0143	1.5	-0.086	0.23
Uranium-233/234	1	1	0	1.00	0.14	0.14	--	--
Uranium-235	1	1	0	1.00	0.014	0.014	--	--
Uranium-238	1	1	0	1.00	0.15	0.15	--	--

-- = not applicable
BHC = benzene hexachloride

Table 4-14. Summary of Upland Plant Tissue Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	60	56	4	0.93	5.4	134	6.4	7.7
Antimony	60	0	60	0.00	--	--	0.41	2.9
Arsenic	60	8	52	0.13	0.6	2.2	0.56	4
Barium	60	60	0	1.00	1.2	38.5	--	--
Beryllium	60	1	59	0.02	0.02	0.02	0.02	0.13

Table 4-14. Summary of Upland Plant Tissue Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Bismuth	60	0	60	0.00	--	--	0.47	3.4
Boron	60	60	0	1.00	2.4	117	--	--
Cadmium	60	3	57	0.05	0.14	0.26	0.06	0.46
Calcium	60	60	0	1.00	730	33,200	--	--
Calculated total uranium	60	1	59	0.02	0.08	0.08	-0.02	0.15
Chromium	60	58	2	0.97	0.16	3.5	0.12	0.12
Cobalt	60	2	58	0.03	0.37	0.53	0.13	0.92
Copper	60	60	0	1.00	0.37	13.4	--	--
Iron	60	60	0	1.00	25	401	--	--
Lead	60	3	57	0.05	0.39	0.97	0.29	2
Lithium	60	55	5	0.92	0.03	0.96	0.09	0.2
Magnesium	60	60	0	1.00	289	4,740	--	--
Manganese	60	60	0	1.00	4.1	87.5	--	--
Mercury	60	0	60	0.00	--	--	0.01	0.1
Molybdenum	60	39	21	0.65	0.3	4.4	0.27	1.9
Nickel	60	42	18	0.70	0.24	4.1	0.22	1.5
Phosphorus	60	60	0	1.00	503	4,710	--	--
Potassium	60	60	0	1.00	2,390	24,400	--	--
Selenium	60	17	43	0.28	0.45	1.9	0.44	3.1
Silicon	60	60	0	1.00	27	760	--	--
Silver	60	16	44	0.27	0.07	7.6	0.06	0.46
Sodium	60	60	0	1.00	7.8	79.5	--	--
Strontium (elemental)	60	60	0	1.00	2.3	134	--	--
Thallium	60	0	60	0.00	--	--	0.65	4.6
Tin	60	5	55	0.08	2.8	6.1	0.99	7.1
Titanium	60	60	0	1.00	0.58	29.6	--	--
Uranium (inorganic)	60	6	54	0.10	2.2	9.9	0.81	5.4
Vanadium	60	26	34	0.43	0.1	0.98	0.08	0.59
Zinc	60	60	0	1.00	3	43.8	--	--
Zirconium	60	2	58	0.03	1.3	3.6	0.98	7
Organics (mg/kg-fw)								
1,2,4-Tri-chlorobenzene	58	0	58	0.00	--	--	3.8	100
1,2-Di-chlorobenzene	58	0	58	0.00	--	--	3.8	100
1,3-Di-chlorobenzene	58	0	58	0.00	--	--	3.8	100
1,4-Di-chlorobenzene	58	0	58	0.00	--	--	3.8	100

Table 4-14. Summary of Upland Plant Tissue Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
2,4,5-Tri-chlorophenol	58	0	58	0.00	--	--	0.05	250
2,4,6-Tri-chlorophenol	58	0	58	0.00	--	--	3.8	100
2,4-Di-chlorophenol	58	0	58	0.00	--	--	3.8	100
2,4-Di-methylphenol	58	0	58	0.00	--	--	3.8	100
2,4-Di-nitrophenol	58	0	58	0.00	--	--	0.05	250
2,4-Di-nitrotoluene	58	0	58	0.00	--	--	3.8	100
2,6-Di-nitrotoluene	58	0	58	0.00	--	--	3.8	100
2-Chloro-naphthalene	58	0	58	0.00	--	--	3.8	100
2-Chloro-phenol	58	0	58	0.00	--	--	3.8	100
2-Methyl-naphthalene	58	0	58	0.00	--	--	3.8	100
2-Methyl-phenol [cresol, o-]	58	0	58	0.00	--	--	3.8	100
2-Nitroaniline	58	0	58	0.00	--	--	0.05	250
2-Nitrophenol	58	0	58	0.00	--	--	3.8	100
3,3-'Dichloro-benzidine	58	0	58	0.00	--	--	3.8	100
3+4 Methylphenol [cresol, m+p]	58	0	58	0.00	--	--	3.8	100
3-Nitroaniline	58	0	58	0.00	--	--	0.05	250
4,6-Dinitro-2-methylphenol	58	0	58	0.00	--	--	0.05	250
4-Bromo-phenylphenyl ether	58	0	58	0.00	--	--	3.8	100
4-Chloro-3-methylphenol	58	0	58	0.00	--	--	3.8	100
4-Chloro-aniline	58	0	58	0.00	--	--	3.8	100
4-Chloro-phenylphenyl ether	58	0	58	0.00	--	--	3.8	100
4-Nitroaniline	58	0	58	0.00	--	--	0.05	250
4-Nitrophenol	58	0	58	0.00	--	--	0.05	250
Acenaphthene	58	0	58	0.00	--	--	3.8	100
Acenaphthy-lene	58	0	58	0.00	--	--	3.8	100
Aldrin	56	1	55	0.02	0.012	0.012	0.013	0.12
Alpha-BHC	57	4	53	0.07	0.0054	0.03	0.013	0.12
alpha-Chlordane	56	3	53	0.05	0.15	0.25	0.013	0.12
Anthracene	58	0	58	0.00	--	--	3.8	100
Aroclor-1016	56	0	56	0.00	--	--	0.08	1.2
Aroclor-1221	56	0	56	0.00	--	--	0.08	1.2
Aroclor-1232	56	0	56	0.00	--	--	0.08	1.2

Table 4-14. Summary of Upland Plant Tissue Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Aroclor-1242	56	0	56	0.00	--	--	0.08	1.2
Aroclor-1248	56	0	56	0.00	--	--	0.08	1.2
Aroclor-1254	56	0	56	0.00	--	--	0.08	1.2
Aroclor-1260	56	0	56	0.00	--	--	0.08	1.2
Benzo[a]anthracene	58	0	58	0.00	--	--	3.8	100
Benzo[a]-pyrene	58	0	58	0.00	--	--	3.8	100
Benzo[b]-fluoranthene	58	0	58	0.00	--	--	3.8	100
Benzo[ghi]-perylene	58	0	58	0.00	--	--	3.8	100
Benzo[k]-fluoranthene	58	0	58	0.00	--	--	3.8	100
beta-1,2,3,4,5,6-Hexachloro-cyclohexane	56	7	49	0.13	0.015	0.14	0.013	0.12
Bis[2-chloro-1-methylethyl] ether	58	0	58	0.00	--	--	3.8	100
Bis[2-chloro-ethoxy] methane	58	0	58	0.00	--	--	3.8	100
Bis[2-chloro-ethyl] ether	58	0	58	0.00	--	--	3.8	100
Bis[2-ethyl-hexyl] phthalate	58	5	53	0.09	0.75	1.4	0.26	100
Butylben-zylphthalate	58	0	58	0.00	--	--	3.8	100
Carbazole	58	0	58	0.00	--	--	3.8	100
Chrysene	58	0	58	0.00	--	--	3.8	100
Delta-BHC	57	12	45	0.21	0.011	0.18	0.01	0.12
Dibenz[a,h]-anthracene	58	0	58	0.00	--	--	3.8	100
Dibenzofuran	58	0	58	0.00	--	--	3.8	100
Dichlorodiphenyldi-chloroethane	56	4	52	0.07	0.01	0.042	0.013	0.12
Dichlorodi-phenyldi-chloroethylene	57	14	43	0.25	0.024	0.55	0.013	0.12
Dichlorodi-phenyl-trichloroethane	56	8	48	0.14	0.0091	0.18	0.013	0.12
Dieldrin	56	4	52	0.07	0.0094	0.34	0.013	0.12
Diethyl-phthalate	58	7	51	0.12	1.3	18	3.8	100
Dimethyl-phthalate	58	0	58	0.00	--	--	3.8	100
Di-n-butylphthalate	58	0	58	0.00	--	--	3.8	100
Di-n-octylphthalate	58	0	58	0.00	--	--	3.8	100
Endosulfan I	56	8	48	0.14	0.033	0.12	0.013	0.12
Endosulfan II	58	9	49	0.16	0.0093	0.078	0.013	0.12

Table 4-14. Summary of Upland Plant Tissue Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Endosulfan sulfate	57	4	53	0.07	0.012	0.11	0.013	0.12
Endrin	56	2	54	0.04	0.095	0.11	0.013	0.12
Endrin aldehyde	56	4	52	0.07	0.011	0.045	0.013	0.12
Endrin ketone	56	2	54	0.04	0.032	0.066	0.013	0.12
Fluoranthene	58	0	58	0.00	--	--	3.8	100
Fluorene	58	0	58	0.00	--	--	3.8	100
Gamma-BHC (lindane)	57	4	53	0.07	0.0078	0.12	0.013	0.12
gamma-Chlordane	58	21	37	0.36	0.0089	0.12	0.013	0.12
Heptachlor	56	12	44	0.21	0.012	0.21	0.013	0.12
Heptachlor epoxide	56	5	51	0.09	0.01	0.018	0.013	0.12
Hexachloro-benzene	58	0	58	0.00	--	--	3.8	100
Hexachloro-butadiene	58	0	58	0.00	--	--	3.8	100
Hexachlorocy-clopentadiene	58	0	58	0.00	--	--	3.8	100
Hexachloro-ethane	58	0	58	0.00	--	--	3.8	100
Indeno[1,2,3-cd]pyrene	58	0	58	0.00	--	--	3.8	100
Isophorone	58	0	58	0.00	--	--	3.8	100
Methoxychlor	58	20	38	0.34	0.019	0.17	0.013	0.12
Naphthalene	58	0	58	0.00	--	--	3.8	100
Nitrobenzene	58	0	58	0.00	--	--	3.8	100
N-Nitrosodin-dipropylamine	58	0	58	0.00	--	--	3.8	100
N-Nitrosodi-phenylamine	58	0	58	0.00	--	--	3.8	100
Pentachloro-phenol	58	0	58	0.00	--	--	0.05	250
Phenanthrene	58	0	58	0.00	--	--	3.8	100
Phenol	58	1	57	0.02	0.65	0.65	3.8	100
Pyrene	58	0	58	0.00	--	--	3.8	100
Toxaphene	56	0	56	0.00	--	--	0.13	1.2
Radionuclides (pCi/g-fw)								
Americium-241	60	0	60	0.00	--	--	0.019	1.6
Antimony-125	60	0	60	0.00	--	--	0.03	0.5
Barium-133	2	0	2	0.00	--	--	0.014	0.065
Beryllium-7	60	0	60	0.00	--	--	0.28	3.2
Cesium-134	60	0	60	0.00	--	--	0.015	0.24
Cesium-137	60	0	60	0.00	--	--	0.014	0.22
Cobalt-60	60	0	60	0.00	--	--	0.015	0.22

Table 4-14. Summary of Upland Plant Tissue Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Europium-152	60	0	60	0.00	--	--	0.032	0.58
Europium-154	60	0	60	0.00	--	--	0.049	0.69
Europium-155	60	0	60	0.00	--	--	0.032	0.73
Plutonium-238	60	0	60	0.00	--	--	-0.062	0.087
Plutonium-239/240	60	1	59	0.02	0.173	0.173	-0.026	0.054
Potassium-40	60	59	1	0.98	2.66	13.1	7.7	7.7
Radium-226	60	0	60	0.00	--	--	0.025	0.5
Radium-228	60	0	60	0.00	--	--	0.063	1
Ruthenium-106	60	0	60	0.00	--	--	0.12	2
Strontium-90	60	3	57	0.05	0.391	15.8	-0.17	0.13
Thorium-228	60	0	60	0.00	--	--	-0.122	0.118
Thorium-230	60	7	53	0.12	0.334	0.469	-0.152	0.281
Thorium-232	60	0	60	0.00	--	--	-0.039	0.08
Uranium-233/234	60	1	59	0.02	0.029	0.029	-0.025	0.052
Uranium-235	60	0	60	0.00	--	--	-0.013	0.022
Uranium-238	60	1	59	0.02	0.023	0.023	-0.009	0.05

-- = not applicable
BHC = benzene hexachloride
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 4-15. Summary of Upland Plant Tissue Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	4	4	0	1	8.4	1300	--	--
Antimony	4	1	3	0.25	0.021	0.021	0.0058	0.0058
Arsenic	4	1	3	0.25	0.16	0.16	0.061	0.061
Barium	24	24	0	1	1	29	--	--
Beryllium	4	1	3	0.25	0.012	0.012	0.0057	0.0057
Cadmium	24	22	2	0.92	0.01	0.2	0.0076	0.0076
Chromium	24	24	0	1	0.056	1.9	--	--
Copper	4	4	0	1	0.85	3.3	--	--
Lead	24	21	3	0.88	0.0071	0.67	0.0049	0.01
Manganese	24	24	0	1	2.7	49	--	--

Table 4-15. Summary of Upland Plant Tissue Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Mercury	24	14	10	0.58	0.0021	0.021	0.0014	0.014
Nickel	24	24	0	1	0.051	1.1	--	--
Selenium	24	11	13	0.46	0.0063	0.24	0.0054	0.057
Silver	12	2	10	0.17	0.015	0.018	0.011	0.014
Thallium	24	16	8	0.67	0.0062	0.35	0.0049	0.0064
Uranium (inorganic)	24	15	9	0.63	0.00045	0.13	0.0075	0.0094
Zinc	4	4	0	1	2.2	10	--	--
Radionuclides (pCi/g-fw)								
Antimony-125	12	0	12	0	--	--	-0.014	0.0035
Beryllium-7	12	12	0	1	0.28	0.86	--	--
Cesium-134	12	0	12	0	--	--	-0.0031	0.0073
Cesium-137	12	2	10	0.17	0.017	0.037	-0.0012	0.017
Cobalt-60	12	0	12	0	--	--	-0.0019	0.01
Europium-152	12	0	12	0	--	--	-0.0048	0.039
Europium-154	12	0	12	0	--	--	-0.016	0.02
Europium-155	12	0	12	0	--	--	-0.0047	0.0051
Potassium-40	12	12	0	1	2.8	18	--	--
Ruthenium-106	12	0	12	0	--	--	-0.064	0.085
Silver-108 metastable	8	0	8	0	--	--	-0.003	0.0023
Strontium-90	24	15	9	0.63	0.017	1.3	-0.0051	0.012

-- = not applicable
fw = fresh weight

Table 4-16. Summary of Upland Terrestrial Invertebrate Tissue Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (4 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	30	30	0	1.00	11.6	57	--	--
Antimony	30	6	24	0.20	0.44	0.56	0.41	3.1
Arsenic	30	26	4	0.87	0.59	2.9	0.58	4.4
Barium	30	30	0	1.00	0.97	4.1	--	--
Beryllium	30	0	30	0.00	--	--	0.02	0.14
Bismuth	30	0	30	0.00	--	--	0.48	3.6
Boron	30	30	0	1.00	1.3	7	--	--
Cadmium	30	7	23	0.23	0.07	0.57	0.07	0.5

Table 4-16. Summary of Upland Terrestrial Invertebrate Tissue Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (4 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Calcium	30	30	0	1.00	222	1100	--	--
Chromium	30	25	5	0.83	0.15	3.7	0.12	0.93
Cobalt	30	15	15	0.50	0.14	0.24	0.13	1
Copper	30	30	0	1.00	3.9	18.6	--	--
Iron	30	30	0	1.00	40.4	211	--	--
Lead	30	7	23	0.23	0.37	2.2	0.29	2.2
Lithium	30	15	15	0.50	0.03	0.11	0.04	0.24
Magnesium	30	30	0	1.00	496	952	--	--
Manganese	30	30	0	1.00	3.7	12.5	--	--
Mercury	30	1	29	0.03	0.36	0.36	0.01	0.03
Molybdenum	30	27	3	0.90	0.3	0.79	0.28	2.1
Nickel	30	15	15	0.50	0.26	1.9	0.22	1.7
Phosphorus	30	30	0	1.00	2,040	2,970	--	--
Potassium	30	30	0	1.00	2,220	3,440	--	--
Selenium	30	8	22	0.27	0.46	0.64	0.44	3.4
Silicon	30	30	0	1.00	31.3	71.8	--	--
Silver	30	5	25	0.17	0.07	0.12	0.07	0.5
Sodium	30	30	0	1.00	377	820	--	--
Strontium (elemental)	30	30	0	1.00	2	8.3	--	--
Thallium	30	0	30	0.00	--	--	0.65	5
Tin	30	0	30	0.00	--	--	1	7.6
Uranium (calculated total)	2	0	2	0.00	--	--	0.0000048	0.000012
Uranium (inorganic)	30	12	18	0.40	1.1	10.8	0.83	0.98
Vanadium	30	26	4	0.87	0.1	0.74	0.08	0.1
Zinc	30	30	0	1.00	27.4	61.1	--	--
Zirconium	15	0	15	0.00	--	--	1	1.2
Organics (mg/kg-fw)								
Acenaphthene	6	1	5	0.17	6.6	6.6	0.781	0.971
Acenaphthylene	6	1	5	0.17	9.7	9.7	0.781	0.971
Aldrin	10	1	9	0.10	0.01	0.01	0.023	0.04
Alpha-BHC	10	0	10	0.00	--	--	0.023	0.04
alpha-chlordane	10	1	9	0.10	0.22	0.22	0.023	0.038
Anthracene	6	0	6	0.00	--	--	0.0685	0.0971
Benzo[a]-anthraxcene	6	0	6	0.00	--	--	0.0685	0.0971
Benzo[a]pyrene	6	0	6	0.00	--	--	0.0685	0.0971
Benzo[b]-fluoranthene	6	0	6	0.00	--	--	0.0685	0.0971

Table 4-16. Summary of Upland Terrestrial Invertebrate Tissue Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (4 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Benzo[ghi]-perilene	6	0	6	0.00	--	--	0.0685	0.0971
Benzo[k]-fluoranthene	6	0	6	0.00	--	--	0.0685	0.0971
beta-1,2,3,4,5,6-Hexachloro-cyclohexane	10	2	8	0.20	0.021	0.12	0.023	0.04
Chrysene	6	1	5	0.17	0.033	0.033	0.0685	0.0971
Delta-BHC	10	0	10	0.00	--	--	0.023	0.04
Dibenz[a,h]-anthracene	6	0	6	0.00	--	--	0.0685	0.0971
Dichlorodi-phenyldi-chloroethane	10	2	8	0.20	0.039	0.074	0.023	0.04
Dichlorodi-phenyldi-chloroethylene	10	1	9	0.10	0.018	0.018	0.023	0.04
Dichlorodi-phenyltri-chloroethane	10	5	5	0.50	0.019	0.18	0.027	0.04
Dieldrin	10	0	10	0.00	--	--	0.023	0.04
Endosulfan I	10	4	6	0.40	0.021	0.1	0.023	0.04
Endosulfan II	10	0	10	0.00	--	--	0.023	0.04
Endosulfan sulfate	10	1	9	0.10	1.4	1.4	0.023	0.04
Endrin	10	0	10	0.00	--	--	0.023	0.04
Endrin aldehyde	10	1	9	0.10	0.02	0.02	0.023	0.04
Endrin ketone	10	0	10	0.00	--	--	0.023	0.04
Fluoranthene	6	3	3	0.50	0.062	0.36	0.0685	0.0813
Fluorene	6	1	5	0.17	0.14	0.14	0.0685	0.0971
Gamma-BHC (lindane)	10	0	10	0.00	--	--	0.023	0.04
gamma-Chlordane	10	0	10	0.00	--	--	0.023	0.04
Heptachlor	10	0	10	0.00	--	--	0.023	0.04
Heptachlor epoxide	10	1	9	0.10	0.036	0.036	0.023	0.04
Indeno[1,2,3-cd] pyrene	6	0	6	0.00	--	--	0.0685	0.0971
Methoxychlor	10	5	5	0.50	0.034	0.18	0.027	0.04
Naphthalene	6	0	6	0.00	--	--	0.685	0.971
Phenanthrene	6	1	5	0.17	0.097	0.097	0.0781	0.0971
Pyrene	6	1	5	0.17	0.041	0.041	0.0685	0.0971
Toxaphene	10	0	10	0.00	--	--	0.23	0.4

Table 4-16. Summary of Upland Terrestrial Invertebrate Tissue Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (4 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Radionuclides (pCi/g-fw)								
Strontium-90	1	0	1	0.00	--	--	-0.034	-0.034
Uranium-233/234	2	0	2	0.00	--	--	0.03	0.072
Uranium-235	2	0	2	0.00	--	--	0	0
Uranium-238	2	0	2	0.00	--	--	0	0

-- = not applicable
BHC = benzene hexachloride
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 4-17. Summary of Upland Terrestrial Invertebrate Tissue Data Collected for the 100-B/C Pilot Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	4	4	0	1	74	250	--	--
Antimony	4	3	1	0.75	0.012	0.018	0.0075	0.0075
Arsenic	4	4	0	1	0.2	0.58	--	--
Barium	4	4	0	1	1.8	3.7	--	--
Beryllium	4	2	2	0.50	0.012	0.028	0.0075	0.0075
Cadmium	4	4	0	1	0.13	0.49	--	--
Chromium	4	4	0	1	0.087	0.39	--	--
Copper	4	4	0	1	7.2	20	--	--
Lead	4	4	0	1	0.12	0.53	--	--
Manganese	4	4	0	1	8.8	21	--	--
Mercury	4	4	0	1	0.0066	0.017	--	--
Nickel	4	4	0	1	0.15	0.81	--	--
Selenium	4	4	0	1	0.049	0.48	--	--
Silver	4	1	3	0.25	0.03	0.03	0.018	0.018
Thallium	4	4	0	1	0.014	0.046	--	--
Uranium (inorganic)	4	1	3	0.25	0.018	0.018	0.012	0.012
Zinc	4	4	0	1	34	89	--	--

-- = not applicable
fw = fresh weight

Table 4-18. Summary of Upland Mammal Organ (Liver/Kidney) Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	31	13	18	0.42	2.3	5.1	2.2	2.3
Antimony	31	0	31	0.00	--	--	0.41	0.43
Arsenic	31	10	21	0.32	0.61	0.78	0.56	0.6
Barium	31	31	0	1.00	0.04	0.12	--	--
Beryllium	31	10	21	0.32	0.02	0.03	0.02	0.02
Bismuth	31	0	31	0.00	--	--	0.47	0.5
Boron	31	2	29	0.06	0.28	0.49	0.22	0.24
Cadmium	31	20	11	0.65	0.07	0.32	0.06	0.07
Calcium	31	31	0	1.00	46.3	140	--	--
Chromium	31	17	14	0.55	0.12	0.46	0.12	0.13
Cobalt	31	0	31	0.00	--	--	0.13	0.14
Copper	31	31	0	1.00	4.1	7.5	--	--
Iron	31	31	0	1.00	87.3	358	--	--
Lead	31	3	28	0.10	0.31	0.4	0.29	0.3
Lithium	31	19	12	0.61	0.03	0.05	0.03	0.03
Magnesium	31	31	0	1.00	183	259	--	--
Manganese	31	31	0	1.00	2.3	4.1	--	--
Mercury	31	1	30	0.03	0.02	0.02	0.01	0.02
Molybdenum	31	31	0	1.00	1	1.9	--	--
Nickel	31	2	29	0.06	0.41	0.44	0.22	0.24
Phosphorus	31	31	0	1.00	2,420	3,320	--	--
Potassium	31	31	0	1.00	1,980	2,700	--	--
Selenium	31	24	7	0.77	0.48	1.5	0.44	0.46
Silicon	31	31	0	1.00	4.2	15.2	--	--
Silver	31	6	25	0.19	0.07	0.1	0.06	0.07
Sodium	31	31	0	1.00	892	1230	--	--
Strontium (elemental)	31	31	0	1.00	0.05	0.14	--	--
Thallium	31	0	31	0.00	--	--	0.65	0.69
Tin	31	0	31	0.00	--	--	0.99	1
Uranium (inorganic)	31	0	31	0.00	--	--	0.81	0.86
Vanadium	31	0	31	0.00	--	--	0.08	0.09
Zinc	31	31	0	1.00	19.5	39.6	--	--
Zirconium	15	0	15	0.00	--	--	0.31	0.31

-- = not applicable
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 4-19. Summary of Upland Mammal Carcass Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	31	31	0	1.00	17.1	102	--	--
Antimony	31	0	31	0.00	--	--	0.41	0.43
Arsenic	31	4	27	0.13	0.63	0.87	0.58	0.59
Barium	31	31	0	1.00	1.9	7.1	--	--
Beryllium	31	0	31	0.00	--	--	0.02	0.02
Bismuth	31	0	31	0.00	--	--	0.48	0.5
Boron	31	22	9	0.71	0.25	1.5	0.23	0.23
Cadmium	31	5	26	0.16	0.07	0.07	0.07	0.07
Calcium	31	31	0	1.00	6,810	18,900	--	--
Chromium	31	31	0	1.00	0.37	0.84	--	--
Cobalt	31	2	29	0.06	0.13	0.2	0.13	0.14
Copper	31	31	0	1.00	2.5	3.7	--	--
Iron	31	31	0	1.00	88.6	233	--	--
Lead	31	21	10	0.68	0.31	2.4	0.3	0.3
Lithium	31	31	0	1.00	0.05	0.13	--	--
Magnesium	31	31	0	1.00	354	727	--	--
Manganese	31	31	0	1.00	2.3	8.2	--	--
Mercury	31	0	31	0.00	--	--	0.01	0.02
Molybdenum	31	11	20	0.35	0.28	0.36	0.27	0.28
Nickel	31	17	14	0.55	0.24	2.9	0.23	0.23
Phosphorus	31	31	0	1.00	4,350	12,500	--	--
Potassium	31	31	0	1.00	2,350	3,110	--	--
Selenium	31	26	5	0.84	0.46	1.2	0.45	0.45
Silicon	31	31	0	1.00	42.2	93.7	--	--
Silver	31	5	26	0.16	0.09	0.16	0.07	0.07
Sodium	31	31	0	1.00	1,080	1,690	--	--
Strontium (elemental)	31	31	0	1.00	3.2	18.7	--	--
Thallium	31	0	31	0.00	--	--	0.66	0.68
Tin	31	27	4	0.87	1.1	1.7	1	1
Titanium	16	16	0	1.00	1.9	10.1	--	--
Uranium (calculated total)	31	1	30	0.03	1.78	1.78	-0.08	0.24
Uranium (inorganic)	31	1	30	0.03	1	1	0.83	0.85
Vanadium	31	24	7	0.77	0.09	0.47	0.08	0.09
Zinc	31	31	0	1.00	40	108	--	--
Zirconium	16	0	16	0.00	--	--	1	1

Table 4-19. Summary of Upland Mammal Carcass Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Organics (mg/kg-fw)								
1,2,4-Trichlorobenzene	31	0	31	0.00	--	--	2.8	4
1,2-Dichlorobenzene	31	0	31	0.00	--	--	2.8	4
1,3-Dichlorobenzene	31	0	31	0.00	--	--	2.8	4
1,4-Dichlorobenzene	31	0	31	0.00	--	--	2.8	4
2,4,5-Trichlorophenol	31	0	31	0.00	--	--	7	9.9
2,4,6-Trichlorophenol	31	0	31	0.00	--	--	2.8	4
2,4-Dichlorophenol	31	0	31	0.00	--	--	2.8	4
2,4-Dimethylphenol	31	0	31	0.00	--	--	2.8	4
2,4-Dinitrophenol	31	0	31	0.00	--	--	7	9.9
2,4-Dinitrotoluene	31	0	31	0.00	--	--	2.8	4
2,6-Dinitrotoluene	31	0	31	0.00	--	--	2.8	4
2-Chloronaphthalene	31	0	31	0.00	--	--	2.8	4
2-Chlorophenol	31	0	31	0.00	--	--	2.8	4
2-Methylnaphthalene	31	0	31	0.00	--	--	2.8	4
2-Methylphenol [cresol, o-]	31	0	31	0.00	--	--	2.8	4
2-Nitroaniline	31	0	31	0.00	--	--	7	9.9
2-Nitrophenol	31	0	31	0.00	--	--	2.8	4
3-3'-Dichlorobenzi-dine	31	0	31	0.00	--	--	2.8	4
3+4 Methylphenol [cresol, m+p]	31	2	29	0.06	0.23	0.25	2.8	4
3-Nitroaniline	31	0	31	0.00	--	--	7	9.9
4,6-Dinitro-2-methylphenol	31	0	31	0.00	--	--	7	9.9
4-Bromo-phenylphenyl ether	31	0	31	0.00	--	--	2.8	4
4-Chloro-3-methylphenol	31	0	31	0.00	--	--	2.8	4
4-Chloroaniline	31	0	31	0.00	--	--	2.8	4
4-Chloro-phenylphenyl-ether	31	0	31	0.00	--	--	2.8	4
4-Nitroaniline	31	0	31	0.00	--	--	7	9.9
4-Nitrophenol	31	0	31	0.00	--	--	7	9.9
Acenaphthene	31	0	31	0.00	--	--	2.8	4
Acenaphthylene	31	0	31	0.00	--	--	2.8	4

Table 4-19. Summary of Upland Mammal Carcass Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Aldrin	31	16	15	0.52	0.0083	0.028	0.014	0.019
Alpha-BHC	31	0	31	0.00	--	--	0.014	0.02
alpha-Chlordane	31	0	31	0.00	--	--	0.014	0.02
Anthracene	31	0	31	0.00	--	--	2.8	4
Aroclor-1016	31	0	31	0.00	--	--	0.081	0.92
Aroclor-1221	31	0	31	0.00	--	--	0.081	0.92
Aroclor-1232	31	0	31	0.00	--	--	0.081	0.92
Aroclor-1242	31	0	31	0.00	--	--	0.081	0.92
Aroclor-1248	31	0	31	0.00	--	--	0.081	0.92
Aroclor-1254	31	1	30	0.03	0.079	0.079	0.081	0.92
Aroclor-1260	31	0	31	0.00	--	--	0.081	0.92
Benzo[a]-anthracene	31	0	31	0.00	--	--	2.8	4
Benzo[a]py-rene	31	0	31	0.00	--	--	2.8	4
Benzo[b]-fluoranthene	31	0	31	0.00	--	--	2.8	4
Benzo[ghi]-perylene	31	0	31	0.00	--	--	2.8	4
Benzo[k]-fluoranthene	31	0	31	0.00	--	--	2.8	4
beta-1,2,3,4,5,6-Hexachloro-cyclohexane	31	11	20	0.35	0.014	0.064	0.014	0.018
Bis[2-chloro1-methylethyl] ether	31	0	31	0.00	--	--	2.8	4
Bis[2-Chloroethoxy]methane	31	0	31	0.00	--	--	2.8	4
Bis[2-chloroethyl] ether	31	0	31	0.00	--	--	2.8	4
Bis[2-ethylhexyl] phthalate	31	18	13	0.58	0.17	2	2.8	4
Butylbenzyl-phthalate	31	0	31	0.00	--	--	2.8	4
Carbazole	31	0	31	0.00	--	--	2.8	4
Chrysene	31	0	31	0.00	--	--	2.8	4
Delta-BHC	31	3	28	0.10	0.012	0.04	0.014	0.02
Dibenz[a,h]-anthracene	31	0	31	0.00	--	--	2.8	4
Dibenzofuran	31	0	31	0.00	--	--	2.8	4
Dichlorodi-phenyldichloro-ethane	30	0	30	0.00	--	--	0.014	0.02
Dichlorodi-phenyldi-chloroethylene	31	2	29	0.06	0.011	0.012	0.014	0.02

Table 4-19. Summary of Upland Mammal Carcass Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Dichlorodi-phenyltri-chloroethane	31	3	28	0.10	0.01	0.019	0.014	0.02
Dieldrin	31	0	31	0.00	--	--	0.014	0.02
Diethylphthalate	31	0	31	0.00	--	--	2.8	4
Dimethylphthalate	31	0	31	0.00	--	--	2.8	4
Di-n-butylphthalate	31	9	22	0.29	0.16	2.2	2.8	4
Di-n-octylphthalate	31	1	30	0.03	1.9	1.9	2.8	4
Endosulfan I	31	2	29	0.06	0.0098	0.012	0.014	0.02
Endosulfan II	31	0	31	0.00	--	--	0.014	0.02
Endosulfan sulfate	31	0	31	0.00	--	--	0.014	0.02
Endrin	31	0	31	0.00	--	--	0.014	0.02
Endrin aldehyde	31	1	30	0.03	0.014	0.014	0.014	0.02
Endrin ketone	31	0	31	0.00	--	--	0.014	0.02
Fluoranthene	31	0	31	0.00	--	--	2.8	4
Fluorene	31	0	31	0.00	--	--	2.8	4
Gamma-BHC (lindane)	31	4	27	0.13	0.0073	0.015	0.014	0.02
gamma-Chlordane	31	0	31	0.00	--	--	0.014	0.02
Heptachlor	31	1	30	0.03	0.019	0.019	0.014	0.02
Heptachlor epoxide	31	0	31	0.00	--	--	0.014	0.02
Hexachlorobenzene	31	0	31	0.00	--	--	2.8	4
Hexachlorobutadiene	31	0	31	0.00	--	--	2.8	4
Hexachloro-cyclopentadiene	31	0	31	0.00	--	--	2.8	4
Hexachloroethane	31	0	31	0.00	--	--	2.8	4
Indeno[1,2,3-cd]pyrene	31	0	31	0.00	--	--	2.8	4
Isophorone	31	0	31	0.00	--	--	2.8	4
Methoxychlor	31	2	29	0.06	0.03	0.032	0.014	0.03
Naphthalene	31	0	31	0.00	--	--	2.8	4
Nitrobenzene	31	0	31	0.00	--	--	2.8	4
N-Nitroso-dindipropylamine	31	0	31	0.00	--	--	2.8	4
N-Nitrosodi-phenylamine	31	0	31	0.00	--	--	2.8	4
Pentachlorophenol	31	1	30	0.03	0.18	0.18	7	9.9
Phenanthrene	31	0	31	0.00	--	--	2.8	4
Phenol	31	21	10	0.68	0.16	0.66	3.2	4

Table 4-19. Summary of Upland Mammal Carcass Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Pyrene	31	0	31	0.00	--	--	2.8	4
Toxaphene	31	0	31	0.00	--	--	0.14	0.2
Radionuclides (pCi/g-fw)								
Americium-241	31	0	31	0.00	--	--	0.041	0.62
Antimony-125	31	0	31	0.00	--	--	0.071	0.33
Barium-133	15	0	15	0.00	--	--	0.032	0.11
Beryllium-7	31	0	31	0.00	--	--	0.26	1.4
Cesium-134	31	0	31	0.00	--	--	0.034	0.2
Cesium-137	31	0	31	0.00	--	--	0.031	0.17
Cobalt-60	31	0	31	0.00	--	--	0.032	0.21
Europium-152	31	0	31	0.00	--	--	0.076	0.38
Europium-154	31	0	31	0.00	--	--	0.092	0.5
Europium-155	31	0	31	0.00	--	--	0.073	0.35
Plutonium-238	31	0	31	0.00	--	--	-0.084	0.052
Plutonium-239/240	31	0	31	0.00	--	--	-0.032	0.157
Potassium-40	31	22	9	0.71	2.03	4.34	1.9	9.6
Radium-226	31	0	31	0.00	--	--	0.055	0.28
Radium-228	31	0	31	0.00	--	--	0.13	0.67
Ruthenium-106	31	0	31	0.00	--	--	0.26	1.2
Strontium-90	31	4	27	0.13	0.251	0.505	-0.087	0.139
Thorium-228	31	0	31	0.00	--	--	-0.112	0.282
Thorium-230	31	0	31	0.00	--	--	-0.144	0.25
Thorium-232	31	0	31	0.00	--	--	-0.051	0.069
Uranium-233/234	31	1	30	0.03	0.423	0.423	-0.021	0.054
Uranium-235	31	0	31	0.00	--	--	0	0.1
Uranium-238	31	1	30	0.03	0.597	0.597	-0.027	0.081

-- = not applicable
BHC = benzene hexachloride
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 4-20. Summary of Upland Mammal Tissue (Brain, Liver, Carcass) Data Collected for the 100-B/C Pilot Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	19	19	0	1	0.31	4.5	--	--
Antimony	19	13	6	0.68	0.0056	0.013	0.0054	0.0054
Arsenic	19	10	9	0.53	0.03	0.32	0.057	0.057
Barium	19	19	0	1	0.0053	0.16	--	--
Beryllium	19	7	12	0.37	0.017	0.085	0.0054	0.0054
Cadmium	19	18	1	0.95	0.0077	0.2	0.0072	0.0072
Chromium	19	19	0	1	0.0081	0.16	--	--
Copper	19	19	0	1	3.7	8.6	--	--
Lead	19	17	2	0.89	0.012	3.1	0.0097	0.0097
Manganese	19	19	0	1	1.6	4	--	--
Mercury	19	13	6	0.68	0.0017	0.063	0.0016	0.0016
Nickel	19	9	10	0.47	0.013	0.029	0.013	0.013
Selenium	19	19	0	1	0.29	2	--	--
Silver	19	0	19	0.00	--	--	0.013	0.013
Thallium	19	19	0	1	0.011	0.047	--	--
Uranium (inorganic)	19	0	19	0.00	--	--	0.0088	0.0088
Zinc	19	19	0	1	20	45	--	--
Organics (mg/kg-fw)								
Aroclor-1254	4	0	4	0	--	--	0.0078	0.039
Aroclor-1260	4	0	4	0	--	--	0.0078	0.039
Radionuclides (pCi/g-fw)								
Antimony-125	4	0	4	0	--	--	-0.016	0.27
Beryllium-7	4	0	4	0	--	--	-0.11	0.27
Cesium-134	4	0	4	0	--	--	0.0049	0.087
Cesium-137	4	0	4	0	--	--	-0.028	0.045
Cobalt-60	4	0	4	0	--	--	-0.0032	0.13
Europium-152	4	0	4	0	--	--	0.015	0.091
Europium-154	4	0	4	0	--	--	-0.27	0.057
Europium-155	4	0	4	0	--	--	-0.16	0.053
Potassium-40	4	4	0	1	1.6	4.8	--	--
Ruthenium-106	4	0	4	0	--	--	-0.081	0.12
Strontium-90	4	0	4	0	--	--	0.066	0.27

-- = not applicable
fw = fresh weight

Table 4-21. Summary of Analytes that Did Not Meet Target Soil Practical Quantitation Limits in Upland Samples.

Analyte	Performance Requirements [a]		Highest Nondetect Value	Consider as Uncertainty?	Reason
	Target PQL	Soil Ecological Protection Value			
Polychlorinated Biphenyls (mg/kg)					
Aroclor-1016	0.0165	NA	1.3	Yes	Greater than target PQL and no ecological protection level
Aroclor-1221	0.0165	NA	1.3	Yes	Greater than target PQL and no ecological protection level
Aroclor-1232	0.0165	0.65	1.3	Yes	Greater than target PQL and ecological protection level
Aroclor-1242	0.0165	0.65	1.3	Yes	Greater than target PQL and ecological protection level
Pesticides (mg/kg)					
Delta-BHC	0.005	NA	0.033	Yes	Greater than target PQL and no ecological protection level
Gamma-BHC (lindane)	0.005	NA	0.033	Yes	Greater than target PQL and no ecological protection level
Heptachlor epoxide	0.005	NA	0.033	Yes	Greater than target PQL and no ecological protection level
Toxaphene	0.005	NA	0.33	Yes	Greater than target PQL and no ecological protection level
Radionuclide (pCi/g)					
Europium-154	0.1	1,290	0.58	No	Greater than target PQL but less than ecological protection level
Semivolatile Organic Compounds (mg/kg)					
1,2-Dichlorobenzene	0.33	0.65	0.67	Yes	Greater than target PQL and ecological protection level
1,2,4-Trichlorobenzene	0.33	0.65	0.67	Yes	Greater than target PQL and ecological protection level
2,4,5-Trichlorophenol	0.33	4	1.7	No	Greater than target PQL but less than ecological protection level
2,4,6-Trichlorophenol	0.33	4	0.67	No	Greater than target PQL but less than ecological protection level

= Exceeds ecological protection value.

[a] Values from Table 2-2 of DOE/RL-2005-42, 2006, *100 Area and 300 Area Component of the RCBRA Sampling and Analysis Plan*, Rev. 1, U.S. Department of Energy, Richland Operations, Richland, Washington.

BHC = benzene hexachloride
NA = not available
PQL = practical quantitation limit

Table 4-22. Summary of Analytes that Did Not Meet Target Tissue Practical Quantitation Limits in Upland Samples.

Analyte	Performance Requirements [a]			Highest Nondetect Value			Consider as Uncertainty?	Reason
	Target PQL	Invertebrate and Plant Ecological Protection Value	Vertebrate Ecological Protection Value	Plants and Invertebrates		Vertebrates		
				Plant	Invertebrate	Mouse Carcass		
Inorganics (mg/kg)-fw								
Antimony	0.6	0.39	1.27	2.9	3.1	Met target PQL	Yes	Greater than target PQL and ecological protection level
Beryllium	0.05	NA	NA	0.13	0.14	Met target PQL	Yes	Greater than target PQL and no ecological protection level
Lead	0.5	53.6	102	2	2.2	Met target PQL	No	Greater than target PQL but less than ecological protection level
Tin	5	NA	NA	7.1	7.6	Met target PQL	Yes	Greater than target PQL and no ecological protection level
Polychlorinated Biphenyls (mg/kg-fw)								
Aroclor-1016	0.0017	NA	NA	1.2	Not measured	0.92	Yes	Greater than target PQL and no ecological protection level
Aroclor-1221	0.0017	NA	NA	1.2	Not measured	0.92	Yes	
Aroclor-1232	0.0017	NA	NA	1.2	Not measured	0.92	Yes	
Aroclor-1242	0.0017	NA	NA	1.2	Not measured	0.92	Yes	
Aroclor-1248	0.0017	NA	NA	1.2	Not measured	0.92	Yes	
Aroclor-1254	0.0017	NA	NA	1.2	Not measured	0.92	Yes	
Aroclor-1260	0.0017	NA	NA	1.2	Not measured	0.92	Yes	
Radionuclides (pCi/g-fw)								
Cesium-137	0.1	2,300	2,300	0.22	Not measured	0.17	No	Greater than target PQL but less than ecological protection level
Cobalt-60	0.05	55	55	0.22	Not measured	0.21	No	Greater than target PQL but less than ecological protection level
Europium-152	0.1	7.6	7.6	0.58	Not measured	0.38	No	
Europium-154	0.1	NA	NA	0.69	Not measured	0.5	Yes	Greater than target PQL and no ecological protection level

= Exceeds ecological protection value.

[a] Values from Table 2-5 of DOE/RL-2005-42, 2006, *100 Area and 300 Area Component of the RCBRA Sampling and Analysis Plan*, Rev. 1, U.S. Department of Energy, Richland Operations, Richland, Washington.

fw = fresh weight
NA = not available
PQL = practical quantitation limit

Table 4-23. Summary of Statistical Comparisons to Reference or Background for Upland Soil Data Collected at 20 Study Sites for the RCBRA Project. (7 Pages)

Analyte	Study Site				Reference Site [a]				Reference Comparison				Background Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Inorganics (mg/kg)																			
Aluminum	113	113	3,040	9,370	50	50	3,960	11,900	1	1	1	--	1	1	1	--	No	No	Not different from reference sites or background
Antimony	113	15	[0.19]	6.1	51	2	[0.2]	[1.05]	--	--	0.030	0.123	--	--	1	0.686	See Table 4-34	Yes	Greater than reference, not different from background
Arsenic	113	107	[1.7]	17.3	51	51	1.6	4.4	0.558	0.085	<0.001	--	1	0.759	1	0.136	See Table 4-34	Yes	Greater than reference, not different from background
Barium	113	113	38.5	416	51	51	48.6	134	0.999	1	0.032	--	1	0.999	0.032	--	See Table 4-34	Yes	Greater than reference site, greater than background
Beryllium	113	102	[0.005]	[0.75]	50	48	[0.005]	0.77	1	1	1	0.351	1	1	1	0.935	No	No	Not different from reference sites or background
Bismuth	113	6	[0.29]	[15]	51	4	[0.23]	[0.952]	--	--	0.423	0.783	No test	No test	No test	No test	No	No	Not greater than reference, two tests
Boron	113	98	0.57	39.2	51	47	[0.36]	2.7	0.015	<0.001	<0.001	0.458	No test	No test	No test	No test	See Table 4-34	Yes	Greater than reference based on three of four tests
Cadmium	113	57	[0.035]	1.4	51	18	[0.03]	0.24	--	0.008	<0.001	0.102	--	<0.001	1	<0.001	See Table 4-34	Yes	Greater than reference site, greater than background
Calcium	113	113	2,260	11,000	50	50	2,820	9,000	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Essential nutrient
Calculated total uranium	113	62	[0.01]	2.74	51	28	[0.08]	1.2	0.134	0.068	0.004	0.869	1	1	1	--	See Table 4-34	Yes	Greater than reference, not different from background
Chromium	113	113	4.3	24.6	51	51	4.5	14.4	0.306	0.430	<0.001	--	0.822	0.970	1	--	See Table 4-34	Yes	Greater than reference, not different from background
Cobalt	113	108	3.6	9.1	50	50	6	12.5	1	1	1	--	1	1	1	--	No	No	Not different from reference sites or background
Copper	113	113	6.9	65.8	51	51	10.3	22.1	0.989	0.748	0.004	--	0.875	0.869	0.076	--	See Table 4-34	Yes	Greater than reference, not different from background
Hexavalent chromium	113	56	[0.195]	[20.1]	51	25	[0.181]	0.489	--	0.010	0.183	0.916	No test	No test	No test	No test	See Table 4-34	Yes	Greater than reference based on one of three tests
Iron	113	113	10,100	34,800	50	50	17,200	28,900	1	1	0.330	--	1	1	1	--	No	No	Not different from reference sites or background
Lead	113	113	2.4	327	51	51	3.6	9.1	0.044	<0.001	<0.001	--	0.001	<0.001	<0.001	--	Yes	No	Greater than reference site, greater than background
Lithium	113	108	3.6	[15]	50	50	4.1	11.4	0.981	1	1	--	--	0.994	1	<0.001	See Table 4-34	Yes	Greater than background, not different from reference
Magnesium	113	113	2,310	4,960	50	50	3,500	6,370	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	113	113	178	433	50	50	280	567	1	1	1	--	1	1	1	--	No	No	Not different from reference sites or background
Mercury	113	28	[0.01]	0.15	51	2	[0.0189]	[0.105]	--	--	0.015	0.003	--	0.592	1	0.422	See Table 4-34	Yes	Greater than reference, not different from background
Molybdenum	113	36	0.119	[15]	51	16	[0.1]	0.94	--	0.748	0.209	0.905	--	<0.001	1	<0.001	See Table 4-34	Yes	Greater than background, not different from reference

Table 4-23. Summary of Statistical Comparisons to Reference or Background for Upland Soil Data Collected at 20 Study Sites for the RCBRA Project. (7 Pages)

Analyte	Study Site				Reference Site [a]				Reference Comparison				Background Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Nickel	113	113	6.2	19.5	51	51	7.4	16.9	0.400	0.989	0.689	--	0.999	0.999	1	--	No	No	Not different from reference sites or background
Phosphorus	113	113	558	1,240	50	50	657	1,290	0.951	0.983	1	--	No test	No test	No test	No test	No	No	Not greater than reference, three tests
Potassium	113	113	552	2,500	50	50	779	2,540	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	113	4	[0.17]	[1.3]	51	1	[0.17]	[0.71]	--	--	0.645	0.957	--	--	1	0.477	No	No	Not different from reference sites or background
Silicon	113	113	170	526	50	50	198	502	0.918	0.621	0.693	--	<0.001	<0.001	1	--	No	No	Soil property measurement
Silver	113	9	[0.07]	[1.5]	51	0	[0.07]	[0.218]	--	--	--	0.089	--	1	1	<0.001	See Table 4-34	Yes	Greater than background, not different from reference
Sodium	113	108	58.2	[750]	50	50	84.7	247	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	113	113	14.3	302	50	50	15.7	30.9	0.040	<0.001	<0.001	--	No test	No test	No test	No test	Yes	No	Greater than reference based on three tests
Thallium	113	5	[0.3]	[2]	51	1	0.13	[1.1]	--	--	0.167	0.742	--	--	1	0.897	No	No	Not different from reference sites or background
Tin	113	30	0.53	33.3	51	2	[0.79]	[1.6]	--	<0.001	<0.001	0.002	No test	No test	No test	No test	Yes	No	Greater than reference based on three tests
Uranium (inorganic)	113	14	[0.97]	[30]	51	2	0.448	[3.21]	--	--	0.683	0.159	No test	No test	No test	No test	No	No	Not greater than reference, two tests
Vanadium	113	113	22.5	63.4	51	51	37.7	71.6	1	1	1	--	1	1	1	--	No	No	Not different from reference sites or background
Zinc	113	113	22.6	93.1	51	51	36.1	70.7	0.963	0.430	0.103	--	1	0.999	1	--	No	No	Not different from reference sites or background
Radionuclides (pCi/g)																			
Americium-241	113	0	[0.023]	[0.46]	62	3	[-0.025]	[0.4]	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Not detected
Cesium-134	113	0	[0.027]	[0.24]	50	0	[0.056]	[0.18]	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Not detected
Cesium-137	113	30	[0.028]	0.362	62	24	0.033	0.492	--	0.671	1	0.135	--	1	1	--	No	No	Not different from reference sites or background
Cobalt-60	113	1	[0.022]	[0.25]	52	0	[-0.006]	[0.18]	--	--	--	0.689	No test	No test	No test	No test	See Table 4-34	Yes	Not greater than reference, one test
Europium-152	113	3	[0.048]	0.758	51	0	[-0.015]	[0.34]	--	--	--	0.586	No test	No test	No test	No test	See Table 4-34	Yes	Not greater than reference, one test
Europium-154	113	0	[0.068]	[0.58]	51	0	[0.019]	[0.55]	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Not detected
Europium-155	113	1	[0.036]	[0.29]	51	0	[0.032]	[0.27]	--	--	--	0.682	No test	No test	No test	No test	See Table 4-34	Yes	Not greater than reference, one test
Plutonium-238	113	1	[-0.164]	1.4	61	1	[-0.039]	[0.22]	--	--	0.649	0.764	No test	No test	No test	No test	No	No	Not greater than reference, two tests
Plutonium-239/240	113	2	[-0.021]	0.51	61	4	[-0.015]	[0.384]	--	--	0.649	0.224	--	1	0.517	--	No	No	Not different from reference sites or background
Potassium-40	113	112	[1.7]	33	50	50	5.9	14.4	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-226	113	108	[0.16]	1.1	51	50	[0.197]	0.885	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-228	113	89	[0.31]	1.46	51	47	0.374	1.69	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Background radionuclide
Strontium-90	113	2	[-0.08]	[0.19]	62	6	[-0.086]	1.5	--	--	1	0.044	--	1	1	--	See Table 4-34	Yes	Greater than reference, not different from background
Thorium-228	113	81	[0.064]	0.913	50	37	[0.191]	0.945	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-230	113	53	[-0.095]	1.81	50	27	[-0.064]	1.64	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Background radionuclide

Table 4-23. Summary of Statistical Comparisons to Reference or Background for Upland Soil Data Collected at 20 Study Sites for the RCBRA Project. (7 Pages)

Analyte	Study Site				Reference Site [a]				Reference Comparison				Background Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Thorium-232	113	87	[0]	0.774	50	41	[0.079]	0.891	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Background radionuclide
Uranium-233/234	113	65	[0.028]	0.909	51	29	[0]	0.505	0.165	0.148	0.151	0.927	1	1	1	--	No	No	Not different from reference sites or background
Uranium-235	113	0	[0]	[0.101]	51	1	[-0.017]	[0.093]	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Detected at reference site only
Uranium-238	113	62	[0]	0.909	51	28	[0.028]	0.397	0.183	0.0676	0.00415	0.869	1	1	1	--	See Table 4-34	Yes	Greater than background, not different from reference
Organics (mg/kg)																			
1,2,4-Trichlorobenzene	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
1,2-Dichlorobenzene	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
1,3-Dichlorobenzene	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
1,4-Dichlorobenzene	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
2,4,5-Trichlorophenol	112	0	[0.81]	[1.7]	50	0	[0.83]	[0.84]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
2,4,5-Trichlorophenoxyacetic acid	93	4	0.011	0.028	40	3	0.009	0.068	--	--	1	0.738	No BGD	No BGD	No BGD	No BGD	No	No	Not greater than reference, two tests
2,4,6-Trichlorophenol	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
2,4-Dichlorophenol	111	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
2,4-Dichlorophenoxyacetic acid	93	40	0.011	0.42	40	13	0.005	0.15	--	0.016	0.338	0.346	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Greater than reference based on one of three tests
2,4-Dimethylphenol	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
2,4-Dinitrophenol	112	0	[0.81]	[1.7]	50	0	[0.83]	[0.84]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
2,4-Dinitrotoluene	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
2,6-Dinitrotoluene	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
2-[2,4,5-Trichlorophenoxy] propionic acid	93	16	0.0087	0.32	40	21	0.008	0.12	--	0.999	0.699	<0.001	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Greater than reference based on one of three tests
2-Chloronaphthalene	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
2-Chlorophenol	111	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
2-Methylnaphthalene	112	12	0.023	[0.67]	50	0	[0.33]	[0.34]	--	--	--	0.0375	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Greater than reference based on one test
2-Methylphenol [cresol, o-]	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
2-Nitroaniline	112	0	[0.81]	[1.7]	50	0	[0.83]	[0.84]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
2-Nitrophenol	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
2-secButyl-4,6-dinitrophenol[DNBP]	93	38	0.0067	0.1	40	5	0.015	0.15	--	0.085	1	0.003	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Greater than reference based on one of three tests
3,3*-Dichlorobenzidine	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected

Table 4-23. Summary of Statistical Comparisons to Reference or Background for Upland Soil Data Collected at 20 Study Sites for the RCBRA Project. (7 Pages)

Analyte	Study Site				Reference Site [a]				Reference Comparison				Background Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
3+4 Methylphenol [cresol, m+p]	112	1	0.019	[0.67]	50	0	[0.33]	[0.34]	--	--	--	0.678	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Not greater than reference, one test
3-Nitroaniline	112	0	[0.81]	[1.7]	50	0	[0.83]	[0.84]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
4,6-Dinitro-2-methylphenol	112	0	[0.81]	[1.7]	50	0	[0.83]	[0.84]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
4-[2,4-Dichlorophenoxy] butanoic acid	93	28	0.009	0.22	40	15	0.009	0.075	--	0.578	0.0844	0.526	No BGD	No BGD	No BGD	No BGD	No	No	Not greater than reference, three tests
4-Bromophenyl phenylether	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
4-Chloro-3-methylphenol	111	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
4-Chloroaniline	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
4-Chlorophenylphenyl ether	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
4-Nitroaniline	112	0	[0.81]	[1.7]	50	0	[0.83]	[0.84]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
4-Nitrophenol	112	0	[0.81]	[1.7]	50	0	[0.83]	[0.84]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Acenaphthene	112	24	0.015	[0.33]	50	0	[0.0327]	[0.0335]	--	--	--	<0.001	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Greater than reference based on one test
Acenaphthylene	112	6	0.012	0.74	50	0	[0.0327]	[0.0335]	--	--	--	0.223	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Not greater than reference, one test
Aldrin	112	1	[0.00033]	[0.033]	51	0	[0.000004]	[0.0022]	--	--	--	0.686	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Not greater than reference, one test
Alpha-BHC	112	1	[0.00033]	[0.033]	51	0	[0.000004]	[0.0022]	--	--	--	0.686	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Not greater than reference, one test
alpha-Chlordane	112	4	[0.00033]	[0.033]	51	0	[0.000004]	[0.0022]	--	--	--	0.412	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Not greater than reference, one test
Anthracene	112	39	0.0007	[0.33]	50	22	0.0009	0.009	--	0.282	0.0124	0.348	No BGD	No BGD	No BGD	No BGD	Yes	No	Greater than reference based on three tests
Aroclor-1016	113	0	[0.013]	[1.3]	51	0	[0.0042]	[0.013]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Aroclor-1221	113	0	[0.013]	[1.3]	51	0	[0.0084]	[0.013]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Aroclor-1232	113	0	[0.013]	[1.3]	51	0	[0.0042]	[0.013]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Aroclor-1242	113	0	[0.013]	[1.3]	51	0	[0.0042]	[0.013]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Aroclor-1248	113	1	[0.013]	[1.3]	51	0	[0.0042]	[0.013]	--	--	--	0.682	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Not greater than reference, one test
Aroclor-1254	113	25	0.0068	9.4	51	0	[0.0042]	[0.013]	--	--	--	<0.001	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Greater than reference based on one test
Aroclor-1260	113	17	0.0069	[1.3]	51	0	[0.0042]	[0.013]	--	--	--	<0.001	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Greater than reference based on one test
Aroclor-1262	5	5	0.028	0.075	1	0	[0.0042]	[0.0042]	--	--	--	--	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	No reference site data
Aroclor-1268	5	0	[0.013]	[0.013]	1	0	[0.0042]	[0.0042]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Benzo[a]anthracene	112	78	0.0009	0.78	50	7	8E-04	0.004	--	<0.001	<0.001	<0.001	No BGD	No BGD	No BGD	No BGD	Yes	No	Greater than reference based on three tests
Benzo[a]pyrene	112	78	0.0009	0.81	50	11	9E-04	0.006	--	<0.001	<0.001	<0.001	No BGD	No BGD	No BGD	No BGD	Yes	No	Greater than reference based on three tests
Benzo[b]fluoranthene	112	84	0.0008	0.63	50	13	9E-04	0.008	--	<0.001	<0.001	<0.001	No BGD	No BGD	No BGD	No BGD	Yes	No	Greater than reference based on three tests
Benzo[ghi]perylene	112	75	0.0009	0.4	50	6	0.001	0.004	--	<0.001	<0.001	<0.001	No BGD	No BGD	No BGD	No BGD	Yes	No	Greater than reference based on three tests
Benzo[k]fluoranthene	112	66	0.0009	0.33	50	5	8E-04	[0.00335]	--	<0.001	<0.001	<0.001	No BGD	No BGD	No BGD	No BGD	Yes	No	Greater than reference based on three tests
beta-1,2,3,4,5,6-Hexachlorocyclohexane	112	13	[0.00033]	[0.033]	51	0	[0.000004]	[0.0022]	--	--	--	0.026	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Greater than reference based on one test

Table 4-23. Summary of Statistical Comparisons to Reference or Background for Upland Soil Data Collected at 20 Study Sites for the RCBRA Project. (7 Pages)

Analyte	Study Site				Reference Site [a]				Reference Comparison				Background Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Bis[2-chloro-1-methylethyl]ether	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Bis[2-Chloroethoxy]methane	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Bis[2-chloroethyl]ether	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Bis[2-ethylhexyl] phthalate	112	100	0.018	0.5929	50	38	0.017	[0.33]	0.070	0.282	0.050	0.050	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Greater than reference based on two of four tests
Butylbenzylphthalate	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Carbazole	112	2	0.023	[0.67]	50	0	[0.33]	[0.34]	--	--	--	0.857	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Not greater than reference, one test
Chrysene	112	80	0.001	1.3	50	17	1E-03	0.01	--	<0.001	<0.001	<0.001	No BGD	No BGD	No BGD	No BGD	Yes	No	Greater than reference based on three tests
Dalapon	93	26	[0.0001]	[0.17]	40	14	0.004	0.11	--	0.790	1	0.544	No BGD	No BGD	No BGD	No BGD	No	No	Not greater than reference, three tests
Delta-BHC	112	0	[0.00033]	[0.033]	51	0	[0.000004]	[0.0022]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Dibenz[a,h]anthracene	112	46	0.001	[0.33]	50	0	[0.00327]	[0.00335]	--	<0.001	--	<0.001	No BGD	No BGD	No BGD	No BGD	Yes	No	Greater than reference based on two tests
Dibenzofuran	112	4	0.018	[0.67]	50	0	[0.33]	[0.34]	--	--	--	0.421	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Not greater than reference, one test
Dicamba	93	38	0.0087	0.094	40	30	0.009	0.063	--	0.868	0.468	<0.001	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Greater than reference based on one of three tests
Dichlorodiphenyl dichloroethane	112	4	[0.00033]	[0.033]	51	2	[0.000004]	0.016	--	--	1	0.735	No BGD	No BGD	No BGD	No BGD	No	No	Not greater than reference, two tests
Dichlorodiphenyl dichloroethylene	112	39	[0.00033]	0.46	51	5	[0.000004]	[0.0045]	--	<0.001	<0.001	0.002	No BGD	No BGD	No BGD	No BGD	Yes	No	Greater than reference based on three tests
Dichlorodiphenyl trichloroethane	112	19	[0.00033]	1.1	51	0	[0.000004]	[0.0045]	--	--	--	0.00415	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Greater than reference based on one test
Dichloroprop	93	41	0.005	1.3	40	19	0.008	[0.33]	--	0.016	0.005	0.863	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Greater than reference based on two of three tests
Dieldrin	112	10	[0.00033]	[0.033]	51	0	[0.000004]	[0.0022]	--	--	--	0.0642	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Not greater than reference, one test
Diethylphthalate	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Dimethylphthalate	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Di-n-butylphthalate	112	51	0.017	[0.67]	50	11	0.02	[0.34]	--	0.002	0.15	0.008	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Greater than reference based on two of three tests
Di-n-octylphthalate	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Endosulfan I	112	12	0.0003	[0.033]	51	0	[0.000004]	[0.0022]	--	--	--	0.035	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Greater than reference based on one test
Endosulfan II	112	2	[0.00033]	[0.033]	51	0	[0.000004]	[0.0045]	--	--	--	0.847	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Not greater than reference, one test
Endosulfan sulfate	112	5	[0.00033]	[0.033]	51	0	[0.000004]	[0.0045]	--	--	--	0.297	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Not greater than reference, one test
Endrin	112	0	[0.00033]	[0.033]	51	1	[0.000004]	[0.0045]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Detected at reference site only
Endrin aldehyde	112	8	[0.00033]	0.24	51	1	[0.000004]	[0.0045]	--	--	0.154	0.330	No BGD	No BGD	No BGD	No BGD	No	No	Not greater than reference, two tests
Endrin ketone	112	7	[0.00033]	[0.033]	51	0	[0.000004]	[0.0045]	--	--	--	0.159	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Not greater than reference, one test
Fluoranthene	112	81	0.0015	2	50	4	0.002	0.018	--	<0.001	<0.001	<0.001	No BGD	No BGD	No BGD	No BGD	Yes	No	Greater than reference based on three tests

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Analyte	Study Site				Reference Site [a]				Reference Comparison				Background Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Fluorene	112	24	0.0014	[0.33]	50	10	0.001	[0.0335]	--	0.443	0.029	0.998	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Greater than reference based on one of three tests
Gamma-BHC (Lindane)	112	0	[0.00033]	[0.033]	51	0	[0.000004]	[0.0022]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
gamma-Chlordane	112	11	[0.00033]	[0.033]	51	0	[0.000004]	[0.0022]	--	--	--	0.048	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Greater than reference based on one test
Heptachlor	112	3	[0.00033]	[0.033]	51	1	[0.000004]	[0.0022]	--	--	0.364	0.786	No BGD	No BGD	No BGD	No BGD	No	No	Not greater than reference, two tests
Heptachlor epoxide	112	0	[0.00033]	[0.033]	51	0	[0.000004]	[0.0022]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Hexachlorobenzene	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Hexachlorobutadiene	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Hexachlorocyclo pentadiene	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Hexachloroethane	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Indeno[1,2,3-cd]pyrene	112	54	0.0011	0.45	50	2	0.003	0.004	--	<0.001	<0.001	<0.001	No BGD	No BGD	No BGD	No BGD	Yes	No	Greater than reference based on three tests
Isophorone	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Methoxychlor	112	18	[0.00033]	[0.033]	51	1	[0.000004]	[0.022]	--	--	0.003	0.019	No BGD	No BGD	No BGD	No BGD	Yes	No	Greater than reference based on two tests
Naphthalene	112	37	0.0076	0.27	50	5	0.015	[0.0335]	--	<0.001	0.007	0.004	No BGD	No BGD	No BGD	No BGD	Yes	No	Greater than reference based on three tests
Nitrobenzene	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
N-Nitroso-di-n-dipropylamine	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
N-Nitrosodiphenylamine	112	0	[0.32]	[0.67]	50	0	[0.33]	[0.34]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Pentachlorophenol	113	1	0.0084	[1.7]	50	2	0.01	[0.84]	--	--	1	0.464	No BGD	No BGD	No BGD	No BGD	No	No	Not greater than reference, two tests
Phenanthrene	112	89	0.0009	0.91	50	26	8E-04	0.018	<0.001	<0.001	<0.001	<0.001	No BGD	No BGD	No BGD	No BGD	Yes	No	Greater than reference based on four tests
Phenol	112	2	0.019	[0.67]	50	1	0.018	[0.34]	--	--	0.333	0.591	No BGD	No BGD	No BGD	No BGD	No	No	Not greater than reference, two tests
Picloram	80	17	0.0042	0.026	40	14	0.006	0.034	--	0.886	1	0.161	No BGD	No BGD	No BGD	No BGD	No	No	Not greater than reference, three tests
Pyrene	112	82	[0.00004]	1.6	50	15	8E-04	0.008	--	<0.001	<0.001	<0.001	No BGD	No BGD	No BGD	No BGD	Yes	No	Greater than reference based on three tests
Toxaphene	112	0	[0.0033]	[0.33]	51	0	[0.00004]	[0.22]	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Not detected
Total organic carbon	33	31	[153]	50300	10	10	892	3950	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Soil property measurement
Anions (mg/kg)																			
Chloride	33	33	0.0806	5.02	10	10	0.155	0.63	0.268	0.096	0.010	--	No BGD	No BGD	No BGD	No BGD	No	No	Soil property measurement
Fluoride	33	24	0.0819	1.24	10	8	0.315	1.14	0.936	0.989	0.767	0.962	No BGD	No BGD	No BGD	No BGD	No	No	Not greater than reference, four tests
Nitrogen in ammonia	33	33	0.65	15	10	10	0.883	12.5	0.500	0.390	0.585	--	No BGD	No BGD	No BGD	No BGD	No	No	Not greater than reference, three tests
Nitrogen in nitrate	118	94	0.107	23.5	50	35	0.077	2.03	<0.001	0.029	0.018	0.248	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Inconsistent results compared to related analytes
Nitrogen in nitrite	33	25	0.0448	1.93	10	5	0.046	[0.559]	0.091	0.096	0.060	0.246	No BGD	No BGD	No BGD	No BGD	No	No	Not greater than reference, four tests
Nitrogen in nitrite and nitrate	93	89	[0.19]	22.9	40	40	0.002	1.3	0.028	<0.001	0.001	--	No BGD	No BGD	No BGD	No BGD	See Table 4-34	Yes	Inconsistent results compared to related analytes
Nitrogen, Kjeldahl total	33	33	91.5	710	10	10	160	511	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Soil property measurement
Sulfate	33	33	0.683	16	10	10	0.645	3.79	0.059	0.096	0.016	--	No BGD	No BGD	No BGD	No BGD	No	No	Soil property measurement

Table 4-23. Summary of Statistical Comparisons to Reference or Background for Upland Soil Data Collected at 20 Study Sites for the RCBRA Project. (7 Pages)

Analyte	Study Site				Reference Site [a]				Reference Comparison				Background Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Physical Properties (%)																			
Cumulative percent retained on No. 100 screen	33	33	43.4	98.9	10	10	26.11	81.54	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Physical measurement
Cumulative percent retained on No. 16 screen	33	33	0	11.08	10	10	0	8.98	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Physical measurement
Cumulative percent retained on No. 200 screen	33	33	65.6	99.65	10	10	81.53	99.25	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Physical measurement
Cumulative percent retained on No. 30 screen	33	33	2.51	38.24	10	10	3.23	43.37	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Physical measurement
Cumulative percent retained on No. 50 screen	33	33	16.6	87.04	10	10	8.16	67.92	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Physical measurement
Cumulative percent retained on No. 8 screen	33	33	0	0.06	10	10	0	0.04	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Physical measurement
Fraction coarse sand	33	33	2.39	27.16	10	10	1.57	43.37	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Physical measurement
Fraction coarse silt/silt/clay (less than 0.074 mm)	33	33	0.35	34.36	10	10	0.75	18.47	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Physical measurement
Fraction fine sand	33	33	11.9	40.59	10	10	10.35	30.22	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Physical measurement
Fraction granules (greater than 2.38 mm)	33	33	0	0.06	10	10	0	0.04	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Physical measurement
Fraction medium sand	33	33	10.4	63.4	10	10	4.12	45.1	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Physical measurement
Fraction total sand	33	33	65.6	99.6	10	10	81.53	99.2	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Physical measurement
Fraction very coarse sand	33	33	0	11.1	10	10	0	8.98	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Physical measurement
Fraction very fine sand	31	31	0.75	47.1	10	10	17.71	57.8	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Physical measurement
Percent moisture (wet sample)	33	33	0.155	4.9	10	10	0.203	0.999	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Physical measurement
Other																			
pH measurement	33	33	7.01	9.11	10	10	7.26	9	No test	No test	No test	No test	No BGD	No BGD	No BGD	No BGD	No	No	Physical measurement

[a] Reference Site includes 10 reference sites collected for the RCBRA Project and 4 reference sites collected for the Central Plateau Project.

[value] = not detected
-- = not applicable
BGD = background data
BHC = benzene hexachloride
COPC = contaminant of potential concern
RCBRA = River Corridor Baseline Risk Assessment

Table 4-24. Summary of Statistical Comparisons to Reference or Background for Upland Soil Data Collected for the 100-B/C Pilot Project.

Analyte	Study Site				Reference Site [a]				Reference Comparison				Background Comparison				Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value		
Inorganics (mg/kg)																		
Aluminum	3	3	1,940	7,610	50	50	3,960	11,900	0.960	1	1	--	0.971	1	1	--	No	Not different from reference sites or background
Arsenic	3	3	1.7	2.7	51	51	1.6	4.4	0.944	1	1	--	0.996	1	1	--	No	Not different from reference sites or background
Barium	3	3	28.5	87.4	51	51	48.6	134	0.920	1	1	--	0.967	1	1	--	No	Not different from reference sites or background
Beryllium	3	3	0.29	0.8	50	48	[0.005]	0.77	0.183	0.088	0.057	--	0.985	1	1	--	No	Not different from reference sites or background
Boron	3	3	0.72	2.4	51	47	[0.36]	2.7	0.507	0.466	1	--	No test	No test	No test	No test	No	Not different from reference sites or background
Cadmium	3	3	0.06	0.15	51	18	[0.03]	0.24	--	0.537	1	--	--	--	1	--	No	Not different from reference sites or background
Calcium	3	3	1790	4260	50	50	2,820	9,000	No test	No test	No test	No test	No test	No test	No test	No test	No	Essential nutrient
Chromium	3	3	3.4	12.2	51	51	4.5	14.4	0.922	1	1	--	0.928	1	1	--	No	Not different from reference sites or background
Cobalt	3	3	4.3	7.7	50	50	6	12.5	0.982	1	1	--	0.995	1	1	--	No	Not different from reference sites or background
Copper	3	3	9	14.6	51	51	10.3	22.1	0.955	1	1	--	0.875	1	1	--	No	Not different from reference sites or background
Iron	3	3	20,100	24,500	50	50	17,200	28,900	0.744	1	1	--	0.799	1	1	--	No	Not different from reference sites or background
Lead	3	3	2.1	5.8	51	51	3.6	9.1	0.971	1	1	--	0.939	1	1	--	No	Not different from reference sites or background
Lithium	3	3	1.8	7.4	50	50	4.1	11.4	0.960	1	1	--	--	1	1	--	No	Not different from reference sites or background
Magnesium	3	3	2,080	3,760	50	50	3,500	6,370	No test	No test	No test	No test	No test	No test	No test	No test	No	Essential nutrient
Manganese	3	3	193	383	50	50	280	567	0.977	1	1	--	0.963	1	1	--	No	Not different from reference sites or background
Molybdenum	3	3	0.24	0.33	51	16	[0.1]	0.94	--	1	1	--	--	--	1	--	No	Not different from reference sites or background
Nickel	3	3	3.7	11.2	51	51	7.4	16.9	0.961	1	1	--	0.984	1	1	--	No	Not different from reference sites or background
Phosphorus	3	3	575	1,230	50	50	657	1,290	0.523	0.473	1	--	No test	No test	No test	No test	No	Not different from reference sites
Potassium	3	3	456	2,230	50	50	779	2,540	No test	No test	No test	No test	No test	No test	No test	No test	No	Essential nutrient
Silicon	3	3	266	462	50	50	198	502	0.168	0.473	1	--	0.002	0.007	1	--	No	Soil property measurement
Sodium	3	3	63.3	170	50	50	84.7	247	No test	No test	No test	No test	No test	No test	No test	No test	No	Essential nutrient
Strontium (elemental)	3	3	7.2	24.5	50	50	15.7	30.9	0.936	1	1	--	No test	No test	No test	No test	No	Not different from reference sites
Tin	3	3	13.2	93.7	51	2	[0.79]	[1.6]	--	--	0.003	--	No test	No test	No test	No test	See text	Greater than reference site, no background data
Vanadium	3	3	16.5	46.3	51	51	37.7	71.6	0.948	1	1	--	0.934	1	1	--	No	Not different from reference sites or background
Zinc	3	3	37.1	76.3	51	51	36.1	70.7	0.560	0.466	0.056	--	0.559	0.488	1	--	No	Not different from reference sites or background
Radionuclides (pCi/g)																		
Cesium-137	4	4	0.147	1.92	62	24	0.03	0.492	--	0.022	0.0028	--	0.278	0.154	0.068	--	See text	Greater than reference site, not different from background
Curium-244	4	1	[-0.0002]	0.0011	0	0	--	--	--	--	--	--	No test	No test	No test	No test	See text	Not reported in RCBRA samples
Europium-152	4	2	[0.138]	4.04	51	0	[-0.015]	[0.34]	--	--	--	<0.001	No test	No test	No test	No test	See text	Greater than reference based on one test
Europium-154	4	1	[-0.0175]	0.303	51	0	[0.019]	[0.55]	--	--	--	0.097	No test	No test	No test	No test	See text	Not greater than reference, one test
Plutonium-238	4	2	[0.0005]	0.004	61	1	[-0.039]	[0.22]	--	--	1	0.001	No test	No test	No test	No test	See text	Greater than reference site, no background data
Plutonium-239/240	4	4	0.005	0.199	61	4	[-0.015]	[0.384]	--	--	0.063	--	0.044	0.155	0.005	--	See text	Greater than background, not different from reference
Potassium-40	4	4	14.5	17.2	50	50	5.9	14.4	No test	No test	No test	No test	No test	No test	No test	No test	No	Background radionuclide
Strontium-90	4	3	[0.007]	1.03	62	6	[-0.086]	1.5	--	--	1	0.003	0.110	0.150	0.012	--	See text	Greater than background, not different from reference

[a] Reference Site includes 10 reference sites collected for the RCBRA Project and 4 reference sites collected for the Central Plateau Project

[value] = not detected
-- = not applicable
RCBRA = River Corridor Baseline Risk Assessment

Table 4-25. Summary of Statistical Comparisons to Reference for Upland Plant Tissue Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Inorganics (mg/kg-fw)															
Aluminum	40	39	5.4	131	20	17	[6.4]	134	0.230	0.641	1	0.200	No	No	Not greater than reference, four of four tests
Antimony	40	0	[0.41]	[2.9]	20	0	[0.41]	[2.7]	No test	No test	No test	No test	No	No	Not detected
Arsenic	40	6	[0.56]	[4]	20	2	[0.57]	[3.7]	--	--	0.226	0.893	No	No	Not greater than reference, two of two tests
Barium	40	40	1.2	23.6	20	20	1.3	38.5	0.968	0.954	1	--	No	No	Not greater than reference, three of three tests
Beryllium	40	1	0.02	[0.13]	20	0	[0.02]	[0.12]	--	--	--	0.721	See Table 4-34	Yes	Not greater than reference, one of one test
Bismuth	40	0	[0.47]	[3.4]	20	0	[0.48]	[3.1]	No test	No test	No test	No test	No	No	Not detected
Boron	40	40	2.4	117	20	20	3.5	52	0.692	0.375	0.048	--	See Table 4-34	Yes	Greater than reference, one of three tests
Cadmium	40	1	[0.06]	[0.46]	20	2	[0.07]	[0.43]	--	--	1	0.529	No	No	Not greater than reference, two of two tests
Calcium	40	40	730	20,500	20	20	1,030	33200	No test	No test	No test	No test	No	No	Essential nutrient
Calculated total uranium	40	1	[-0.0245]	[0.0863]	20	0	[-0.0189]	[0.149]	--	--	0.727	0.721	No	No	Not greater than reference, two of two tests
Chromium	40	38	[0.12]	3.3	20	20	0.19	3.5	0.902	0.783	1	--	No	No	Not greater than reference, three of three tests
Cobalt	40	1	[0.13]	[0.92]	20	1	[0.13]	[0.86]	--	--	1	0.799	No	No	Not greater than reference, two of two tests
Copper	40	40	0.37	13.4	20	20	1.2	13.3	0.869	0.375	0.667	--	No	No	Not greater than reference, three of three tests
Iron	40	40	25	393	20	20	25.7	401	0.655	0.848	1	--	No	No	Not greater than reference, three of three tests
Lead	40	3	[0.29]	[2]	20	0	[0.29]	[1.9]	--	--	--	0.530	See Table 4-34	Yes	Not greater than reference, one of one test
Lithium	40	36	0.03	0.87	20	19	0.05	0.96	0.706	0.375	1	0.869	No	No	Not greater than reference, four of four tests
Magnesium	40	40	289	3,390	20	20	409	4,740	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	40	40	4.1	57.2	20	20	7.5	87.5	0.946	0.954	1	--	No	No	Not greater than reference, three of three tests
Mercury	40	0	[0.01]	[0.1]	20	0	[0.01]	[0.08]	No test	No test	No test	No test	No	No	Not detected
Molybdenum	40	29	[0.27]	4.4	20	10	[0.27]	[1.8]	0.183	0.076	0.020	0.151	See Table 4-34	Yes	Greater than reference, one of four tests
Nickel	40	29	[0.22]	4.1	20	13	0.52	2.3	0.413	0.208	0.289	0.765	No	No	Not greater than reference, four of four tests
Phosphorus	40	40	503	4,710	20	20	832	3140	0.818	0.641	0.120	--	No	No	Not greater than reference, three of three tests
Potassium	40	40	2,390	24,400	20	20	5,030	22,300	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	40	9	[0.44]	[3.1]	20	8	[0.44]	[2.9]	--	0.990	1	0.265	No	No	Not greater than reference, three of three tests
Silicon	40	40	27	760	20	20	47.3	726	0.871	0.990	0.441	--	No	No	Not greater than reference, three of three tests
Silver	40	11	[0.06]	7.6	20	5	[0.07]	1.1	--	0.848	0.441	0.918	No	No	Not greater than reference, three of three tests
Sodium	40	40	7.9	79.5	20	20	7.8	71.2	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	40	40	2.3	92.4	20	20	3.4	134	0.864	0.848	1	--	No	No	Not greater than reference, three of three tests
Thallium	40	0	[0.65]	[4.6]	20	0	[0.65]	[4.3]	No test	No test	No test	No test	No	No	Not detected
Tin	40	4	[0.99]	[7.1]	20	1	[1]	[6.6]	--	--	0.399	0.869	No	No	Not greater than reference, two of two tests
Titanium	40	40	0.7	20.8	20	20	0.58	29.6	0.289	0.641	1	--	No	No	Not greater than reference, three of three tests
Uranium (inorganic)	40	5	[0.81]	9.9	20	1	[0.82]	[5.4]	--	--	0.159	0.648	No	No	Not greater than reference, two of two tests
Vanadium	40	18	[0.08]	0.98	20	8	[0.08]	0.91	--	0.3749	0.667	0.927	No	No	Not greater than reference, three of three tests

Table 4-25. Summary of Statistical Comparisons to Reference for Upland Plant Tissue Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Zinc	40	40	3	43.5	20	20	4.4	43.8	0.199	0.152	1	--	No	No	Not greater than reference, three of three tests
Zirconium	40	2	[0.98]	[7]	20	0	[0.99]	[6.5]	--	--	--	0.799	See Table 4-34	Yes	Not greater than reference, one of one test
Organics (mg/kg-fw)															
1,2,4-Trichlorobenzene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
1,2-Dichlorobenzene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
1,3-Dichlorobenzene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
1,4-Dichlorobenzene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
2,4,5-Trichlorophenol	38	0	[0.05]	[250]	20	0	[19]	[130]	No test	No test	No test	No test	No	No	Not detected
2,4,6-Trichlorophenol	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
2,4-Dichlorophenol	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
2,4-Dimethylphenol	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrophenol	38	0	[0.05]	[250]	20	0	[19]	[130]	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrotoluene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
2,6-Dinitrotoluene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
2-Chloronaphthalene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
2-Chlorophenol	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
2-Methylnaphthalene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
2-Methylphenol [cresol, o-]	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
2-Nitroaniline	38	0	[0.05]	[250]	20	0	[19]	[130]	No test	No test	No test	No test	No	No	Not detected
2-Nitrophenol	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
3,3-Dichlorobenzidine	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
3+4 Methylphenol [cresol, m+p]	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
3-Nitroaniline	38	0	[0.05]	[250]	20	0	[19]	[130]	No test	No test	No test	No test	No	No	Not detected
4,6-Dinitro-2-methylphenol	38	0	[0.05]	[250]	20	0	[19]	[130]	No test	No test	No test	No test	No	No	Not detected
4-Bromophenylphenylether	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
4-Chloro-3-methylphenol	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
4-Chloroaniline	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
4-Chlorophenylphenylether	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
4-Nitroaniline	38	0	[0.05]	[250]	20	0	[19]	[130]	No test	No test	No test	No test	No	No	Not detected
4-Nitrophenol	38	0	[0.05]	[250]	20	0	[19]	[130]	No test	No test	No test	No test	No	No	Not detected
Acenaphthene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Acenaphthylene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Aldrin	36	1	0.012	[0.12]	20	0	[0.013]	[0.11]	--	--	--	0.763	See Table 4-34	Yes	Not greater than reference, one of one test
Alpha-BHC	37	4	0.005	[0.12]	20	0	[0.013]	[0.11]	--	--	--	0.326	See Table 4-34	Yes	Not greater than reference, one of one test
alpha-Chlordane	36	3	[0.013]	0.25	20	0	[0.013]	[0.11]	--	--	--	0.479	See Table 4-34	Yes	Not greater than reference, one of one test

Table 4-25. Summary of Statistical Comparisons to Reference for Upland Plant Tissue Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Anthracene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Aroclor-1016	36	0	[0.08]	[1.2]	20	0	[0.08]	[1.1]	No test	No test	No test	No test	No	No	Not detected
Aroclor-1221	36	0	[0.08]	[1.2]	20	0	[0.08]	[1.1]	No test	No test	No test	No test	No	No	Not detected
Aroclor-1232	36	0	[0.08]	[1.2]	20	0	[0.08]	[1.1]	No test	No test	No test	No test	No	No	Not detected
Aroclor-1242	36	0	[0.08]	[1.2]	20	0	[0.08]	[1.1]	No test	No test	No test	No test	No	No	Not detected
Aroclor-1248	36	0	[0.08]	[1.2]	20	0	[0.08]	[1.1]	No test	No test	No test	No test	No	No	Not detected
Aroclor-1254	36	0	[0.08]	[1.2]	20	0	[0.08]	[1.1]	No test	No test	No test	No test	No	No	Not detected
Aroclor-1260	36	0	[0.08]	[1.2]	20	0	[0.08]	[1.1]	No test	No test	No test	No test	No	No	Not detected
Benzo[a]anthracene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Benzo[a]pyrene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Benzo[b]fluoranthene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Benzo[ghi]perylene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Benzo[k]fluoranthene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
beta-1,2,3,4,5,6-Hexachlorocyclohexane	36	5	[0.013]	0.14	20	2	[0.013]	[0.11]	--	--	0.407	1	No	No	Not greater than reference, two of two tests
Bis[2-chloro-1-methylethyl]ether	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Bis[2-Chloroethoxy]methane	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Bis[2-chloroethyl] ether	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Bis[2-ethylhexyl] phthalate	38	2	[0.26]	[100]	20	3	[0.55]	[52]	--	--	0.6	0.445	No	No	Not greater than reference, two of two tests
Butylbenzylphthalate	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Carbazole	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Chrysene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Delta-BHC	37	9	[0.01]	0.18	20	3	[0.013]	0.12	--	0.409	0.649	0.629	No	No	Not greater than reference, three of three tests
Dibenz[a,h]anthracene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Dibenzofuran	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Dichlorodiphenyldichloroethane	36	1	[0.013]	[0.12]	20	3	0.01	[0.11]	--	--	1	0.246	No	No	Not greater than reference, two of two tests
Dichlorodiphenyldichloroethylene	37	9	[0.013]	0.55	20	5	[0.017]	0.34	--	0.875	0.266	0.790	No	No	Not greater than reference, three of three tests
Dichlorodiphenyltrichloroethane	36	4	[0.013]	0.18	20	4	0.009	[0.11]	--	--	0.407	0.608	No	No	Not greater than reference, two of two tests
Dieldrin	36	4	0.009	0.34	20	0	[0.013]	[0.11]	--	--	--	0.315	See Table 4-34	Yes	Not greater than reference, one of one test
Diethylphthalate	38	7	1.3	[100]	20	0	[7.6]	[52]	--	--	--	0.105	See Table 4-34	Yes	Not greater than reference, one of one test
Dimethylphthalate	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Di-n-butylphthalate	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Di-n-octylphthalate	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Endosulfan I	36	4	[0.013]	[0.12]	20	4	[0.013]	0.12	--	--	1	0.608	No	No	Not greater than reference, two of two tests
Endosulfan II	38	7	0.009	[0.12]	20	2	[0.013]	[0.11]	--	--	0.648	0.645	No	No	Not greater than reference, two of two tests

Table 4-25. Summary of Statistical Comparisons to Reference for Upland Plant Tissue Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Endosulfan sulfate	37	4	0.012	[0.12]	20	0	[0.013]	[0.11]	--	--	--	0.326	See Table 4-34	Yes	Not greater than reference, one of one test
Endrin	36	2	[0.013]	[0.12]	20	0	[0.013]	[0.11]	--	--	--	0.747	See Table 4-34	Yes	Not greater than reference, one of one test
Endrin aldehyde	36	2	0.011	[0.12]	20	2	[0.013]	[0.11]	--	--	1	0.938	No	No	Not greater than reference, two of two tests
Endrin ketone	36	1	[0.013]	[0.12]	20	1	[0.013]	0.066	--	--	1	0.747	See Table 4-34	Yes	Not greater than reference, one of one test
Fluoranthene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Fluorene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Gamma-BHC (lindane)	37	4	0.008	0.12	20	0	[0.013]	[0.11]	--	--	--	0.326	See Table 4-34	Yes	Not greater than reference, one of one test
gamma-Chlordane	38	14	0.009	0.12	20	7	0.017	[0.11]	--	0.824	0.648	0.882	No	No	Not greater than reference, three of three tests
Heptachlor	36	9	0.012	0.21	20	3	[0.013]	0.15	--	0.390	0.258	0.593	No	No	Not greater than reference, three of three tests
Heptachlorepoxide	36	4	0.01	[0.12]	20	1	[0.013]	[0.11]	--	--	1	0.779	No	No	Not greater than reference, two of two tests
Hexachlorobenzene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Hexachlorobutadiene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Hexachlorocyclopentadiene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Hexachloroethane	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Indeno[1,2,3-cd]pyrene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Isophorone	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Methoxychlor	38	11	[0.013]	[0.12]	20	9	[0.017]	0.17	--	0.969	1	0.351	No	No	Not greater than reference, three of three tests
Naphthalene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Nitrobenzene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
N-Nitroso-di-n-dipropylamine	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
N-Nitrosodiphenylamine	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Pentachlorophenol	38	0	[0.05]	[250]	20	0	[19]	[130]	No test	No test	No test	No test	No	No	Not detected
Phenanthrene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Phenol	38	0	[3.8]	[100]	20	1	0.65	[52]	No test	No test	No test	No test	No	No	Detected in reference only
Pyrene	38	0	[3.8]	[100]	20	0	[7.6]	[52]	No test	No test	No test	No test	No	No	Not detected
Toxaphene	36	0	[0.13]	[1.2]	20	0	[0.13]	[1.1]	No test	No test	No test	No test	No	No	Not detected
Radionuclides (pCi/g-fw)															
Americium-241	40	0	[0.019]	[0.72]	20	0	[0.02]	[1.6]	No test	No test	No test	No test	No	No	Not detected
Antimony-125	40	0	[0.03]	[0.3]	20	0	[0.046]	[0.5]	No test	No test	No test	No test	No	No	Not detected
Barium-133	2	0	[0.014]	[0.065]	0	0	0	0	No test	No test	No test	No test	No	No	Not detected
Beryllium-7	40	0	[0.28]	[3.1]	20	0	[0.28]	[3.2]	No test	No test	No test	No test	No	No	Not detected
Cesium-134	40	0	[0.015]	[0.16]	20	0	[0.025]	[0.24]	No test	No test	No test	No test	No	No	Not detected
Cesium-137	40	0	[0.014]	[0.13]	20	0	[0.02]	[0.22]	No test	No test	No test	No test	No	No	Not detected
Cobalt-60	40	0	[0.015]	[0.15]	20	0	[0.019]	[0.22]	No test	No test	No test	No test	No	No	Not detected
Europium-152	40	0	[0.032]	[0.32]	20	0	[0.047]	[0.58]	No test	No test	No test	No test	No	No	Not detected

Table 4-25. Summary of Statistical Comparisons to Reference for Upland Plant Tissue Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Europium-154	40	0	[0.049]	[0.4]	20	0	[0.063]	[0.69]	No test	No test	No test	No test	No	No	Not detected
Europium-155	40	0	[0.032]	[0.35]	20	0	[0.042]	[0.73]	No test	No test	No test	No test	No	No	Not detected
Plutonium-238	40	0	[-0.062]	[0.087]	20	0	[-0.04]	[0.068]	No test	No test	No test	No test	No	No	Not detected
Plutonium-239/240	40	1	[-0.026]	0.173	20	0	[0]	[0.043]	--	--	--	0.721	See Table 4-34	No	Not greater than reference, one of one test
Potassium-40	40	39	2.66	13.1	20	20	3.15	11	No test	No test	No test	No test	No	No	Background radionuclide
Radium-226	40	0	[0.025]	[0.29]	20	0	[0.036]	[0.5]	No test	No test	No test	No test	No	No	Not detected
Radium-228	40	0	[0.063]	[0.65]	20	0	[0.089]	[1]	No test	No test	No test	No test	No	No	Not detected
Ruthenium-106	40	0	[0.12]	[1.2]	20	0	[0.18]	[2]	No test	No test	No test	No test	No	No	Not detected
Strontium-90	40	0	[-0.083]	[0.13]	20	3	[-0.17]	15.8	No test	No test	No test	No test	No	No	Not detected
Thorium-228	40	0	[-0.076]	[0.118]	20	0	[-0.122]	[0.098]	No test	No test	No test	No test	No	No	Not detected
Thorium-230	40	4	[-0.152]	0.424	20	3	[-0.121]	0.469	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-232	40	0	[-0.039]	[0.08]	20	0	[-0.028]	[0.057]	No test	No test	No test	No test	No	No	Not detected
Uranium-233/234	40	0	[-0.025]	[0.052]	20	1	[-0.01]	[0.03]	No test	No test	No test	No test	No	No	Not detected
Uranium-235	40	0	[-0.013]	[0.022]	20	0	[-0.008]	[0.017]	No test	No test	No test	No test	No	No	Not detected
Uranium-238	40	1	[-0.009]	[0.029]	20	0	[-0.007]	[0.05]	--	--	--	0.721	See Table 4-34	No	Not greater than reference, one of one test

[value] = not detected
-- = not applicable
BHC = benzene hexachloride
COPC = contaminant of potential concern
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 4-26. Summary of Statistical Comparisons to Reference for Upland Plant Tissue Data Collected for the 100-B/C Pilot Project.

Analyte	Study Site				Reference Site				Reference Comparison					Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Site vs. Reference		
Inorganics (mg/kg-fw)															
Aluminum	4	4	8.45	1300	20	17	[6.4]	134	0.335	0.544	0.167	1	Equal	No	Not greater than reference, four of four tests
Antimony	4	1	[0.00576]	0.021	20	0	[0.41]	[2.7]	--	--	--	0.361	Equal	See text	Not greater than reference, one of one test
Arsenic	4	1	[0.0607]	0.158	20	2	[0.57]	[3.7]	--	--	1	1	Equal	No	Not greater than reference, two of two tests
Barium	24	24	1.01	29.5	20	20	1.3	38.5	0.998	0.989	1	--	Equal	No	Not greater than reference, three of three tests
Beryllium	4	1	[0.00573]	0.012	20	0	[0.02]	[0.12]	--	--	--	0.361	Equal	See text	Not greater than reference, one of one test
Cadmium	24	22	[0.00762]	0.205	20	2	[0.07]	[0.43]	--	0.188	0.410	<0.001	Greater	See text	Greater than reference, one of three tests
Chromium	24	24	0.0561	1.86	20	20	0.19	3.5	1	0.989	1	--	Equal	No	Not greater than reference, four of four tests
Copper	4	4	0.854	3.26	20	20	1.2	13.3	0.997	1	1	--	Equal	No	Not greater than reference, three of three tests
Lead	24	21	[0.0049]	0.672	20	0	[0.29]	[1.9]	--	0.004	--	<0.001	Greater	See text	Greater than reference, two of two tests
Manganese	24	24	2.67	48.9	20	20	7.5	87.5	0.952	0.043	0.039	--	Equal	See text	Not greater than reference, three of three tests
Mercury	24	14	[0.00142]	0.021	20	0	[0.01]	[0.08]	--	0.004	--	<0.001	Greater	See text	Greater than reference, two of two tests
Nickel	24	24	0.0509	1.06	20	13	0.52	2.3	0.998	0.999	1	0.006	Greater	See text	Greater than reference, one of four tests
Selenium	24	11	[0.00537]	0.241	20	8	[0.44]	[2.9]	--	1	1	0.934	Equal	No	Not greater than reference, three of three tests
Silver	12	2	[0.0109]	0.0182	20	5	[0.07]	1.1	--	0.957	1	0.912	Equal	No	Not greater than reference, three of three tests
Thallium	24	16	[0.0049]	0.351	20	0	[0.65]	[4.3]	--	0.004	--	<0.001	Greater	See text	Greater than reference, two of two tests
Uranium (inorganic)	24	15	0.0004	0.128	20	1	[0.82]	[5.4]	--	0.043	1	<0.001	Greater	See text	Greater than reference sites, two of two tests
Zinc	4	4	62.2	10.5	20	20	4.4	43.8	0.997	1	1	--	Equal	No	Not greater than reference, three of three tests
Radionuclides (pCi/g-fw)															
Antimony-125	12	0	[-0.0141]	[0.00351]	20	0	[0.046]	[0.5]	No test	No test	No test	No test	No test	No	Not detected at site
Beryllium-7	12	12	0.279	0.857	20	0	[0.28]	[3.2]	No test	No test	No test	No test	No test	No	Half-life
Cesium-134	12	0	[-0.00308]	[0.00732]	20	0	[0.025]	[0.24]	No test	No test	No test	No test	No test	No	Half-life
Cesium-137	12	2	[-0.00117]	0.0372	20	0	[0.02]	[0.22]	--	--	--	0.258	Equal	See text	Not greater than reference, one of one test
Cobalt-60	12	0	[-0.00195]	[0.0101]	20	0	[0.019]	[0.22]	No test	No test	No test	No test	No test	No	Not detected at site
Europium-152	12	0	[-0.00485]	[0.0393]	20	0	[0.047]	[0.58]	No test	No test	No test	No test	No test	No	Not detected at site
Europium-154	12	0	[-0.0162]	[0.0201]	20	0	[0.063]	[0.69]	No test	No test	No test	No test	No test	No	Not detected at site
Europium-155	12	0	[-0.00468]	[0.0051]	20	0	[0.042]	[0.73]	No test	No test	No test	No test	No test	No	Not detected at site
Potassium-40	12	12	2.83	18.2	20	20	3.15	11	No test	No test	No test	No test	No test	No	Background radionuclide
Ruthenium-106	12	0	[-0.0644]	[0.0854]	20	0	[0.18]	[2]	No test	No test	No test	No test	No test	No	Half-life
Silver-108 metastable	8	0	[-0.00304]	[0.00231	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected at site
Strontium-90	24	15	[-0.00506]	1.26	20	3	[-0.17]	15.8	--	0.461	1	0.004	Greater	See text	Greater than reference, one of three tests

[value] = not detected
-- = not applicable
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment
TBD = to be determined

Table 4-27. Summary of Statistical Comparisons to Reference for Upland Terrestrial Invertebrate Tissue Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (3 Pages)

Analyte	Study Site				Reference Site				Reference Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Inorganics (mg/kg-fw)															
Aluminum	20	20	14.5	57	10	10	11.6	49.7	0.255	0.326	0.281	--	No	No	Not greater than reference, three of three tests
Antimony	20	4	[0.42]	[3.1]	10	2	[0.41]	0.56	--	0.694	1	0.628	No	No	Not greater than reference, three of three tests
Arsenic	20	17	[0.59]	[4.4]	10	9	[0.58]	1.2	0.043	0.065	0.032	0.849	See Table 4-34	Yes	Greater than reference, two of four tests
Barium	20	20	0.97	4.1	10	10	1	3	0.421	0.694	0.667	--	No	No	Not greater than reference, three of three tests
Beryllium	20	0	[0.02]	[0.14]	10	0	[0.02]	[0.02]	No test	No test	No test	No test	No	No	Not detected
Bismuth	20	0	[0.48]	[3.6]	10	0	[0.48]	[0.57]	No test	No test	No test	No test	No	No	Not detected
Boron	20	20	2.5	7	10	10	1.3	5.6	0.145	0.326	0.177	--	No	No	Not greater than reference, three of three tests
Cadmium	20	5	0.07	0.57	10	2	0.07	[0.08]	--	0.571	0.314	0.879	No	No	Not greater than reference, three of three tests
Calcium	20	20	264	1100	10	10	222	714	No test	No test	No test	No test	No	No	Essential nutrient
Calculated total uranium	2	0	[0.00000483]	[0.0000116]	0	0	--	--	No test	No test	No test	No test	No	No	Not detected
Chromium	20	18	[0.12]	3.7	10	7	[0.12]	0.44	0.026	0.326	0.098	0.386	See Table 4-34	Yes	Greater than reference, one of four tests
Cobalt	20	11	[0.13]	[1]	10	4	[0.13]	0.24	--	0.571	1	0.699	No	No	Not greater than reference, three of three tests
Copper	20	20	5.1	18.6	10	10	3.9	13.4	0.005	0.449	0.281	--	See Table 4-34	Yes	Greater than reference, one of three tests
Iron	20	20	40.4	211	10	10	43.3	170	0.371	0.326	0.437	--	No	No	Not greater than reference, three of three tests
Lead	20	6	[0.29]	2.2	10	1	[0.29]	0.38	--	0.326	0.0979	0.445	No	No	Not greater than reference, three of three tests
Lithium	20	8	0.03	[0.24]	10	7	0.03	[0.09]	--	0.109	0.116	0.245	No	No	Not greater than reference, three of three tests
Magnesium	20	20	540	952	10	10	496	888	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	20	20	4.5	12.5	10	10	3.7	8.4	0.439	0.694	0.437	--	No	No	Not greater than reference, three of three tests
Mercury	20	0	[0.01]	[0.03]	10	1	[0.01]	0.36	No test	No test	No test	No test	No	No	Detected at reference site only
Molybdenum	20	19	0.3	[2.1]	10	8	[0.28]	0.79	0.5	0.694	1	0.519	No	No	Not greater than reference, four of four tests
Nickel	20	12	[0.22]	1.9	10	3	[0.23]	0.37	--	0.065	0.032	0.245	See Table 4-34	Yes	Greater than reference, one of three tests
Phosphorus	20	20	2,090	2,970	10	10	2040	2610	0.109	0.326	0.177	--	No	No	Not greater than reference, three of three tests
Potassium	20	20	2,240	3,440	10	10	2220	2620	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	20	6	[0.44]	[3.4]	10	2	[0.44]	0.53	--	0.326	0.249	0.884	No	No	Not greater than reference, three of three tests
Silicon	20	20	31.8	67.4	10	10	31.3	71.8	No test	No test	No test	No test	No	No	Soil Component, no test
Silver	20	2	0.07	[0.5]	10	3	0.07	0.12	--	--	1	0.386	No	No	Not greater than reference, two of two tests
Sodium	20	20	388	820	10	10	377	542	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	20	20	2.7	8.3	10	10	2	6	0.172	0.449	0.281	--	No	No	Not greater than reference, three of three tests
Thallium	20	0	[0.65]	[5]	10	0	[0.66]	[0.78]	No test	No test	No test	No test	No	No	Not detected
Tin	20	0	[1]	[7.6]	10	0	[1]	[1.7]	No test	No test	No test	No test	No	No	Not detected
Uranium (inorganic)	20	10	[0.84]	10.8	10	2	[0.83]	2.2	--	0.449	0.281	0.236	No	No	Not greater than reference, three of three tests
Vanadium	20	20	0.1	0.74	10	6	[0.08]	0.4	0.017	0.694	0.281	0.014	See Table 4-34	Yes	Greater than reference, two of four tests

Table 4-27. Summary of Statistical Comparisons to Reference for Upland Terrestrial Invertebrate Tissue Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (3 Pages)

Analyte	Study Site				Reference Site				Reference Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Zinc	20	20	30.1	61.1	10	10	27.4	49.9	0.008	0.326	0.109	--	See Table 4-34	Yes	Greater than reference, one of three tests
Zirconium	8	0	[1]	[1]	7	0	[1]	[1.2]	No test	No test	No test	No test	No	No	Not detected
Organics (mg/kg-fw)															
Acenaphthene	6	1	[0.781]	6.6	0	0	--	--	No test	No test	No test	No test	See Table 4-34	Yes	Detected, no reference comparison
Acenaphthylene	6	1	[0.781]	9.7	0	0	--	--	No test	No test	No test	No test	See Table 4-34	Yes	Detected, no reference comparison
Aldrin	8	0	[0.023]	[0.04]	2	1	0.01	[0.03]	No test	No test	No test	No test	No	No	Detected at reference site only
Alpha-BHC	8	0	[0.023]	[0.04]	2	0	[0.029]	[0.03]	No test	No test	No test	No test	No	No	Not detected
alpha-Chlordane	8	1	[0.023]	0.22	2	0	[0.029]	[0.03]	--	--	--	0.429	See Table 4-34	Yes	Not greater than reference, one of one test
Anthracene	6	0	[0.0685]	[0.0971]	0	0	--	--	No test	No test	No test	No test	No	No	Not detected
Benzo[a]anthracene	6	0	[0.0685]	[0.0971]	0	0	--	--	No test	No test	No test	No test	No	No	Not detected
Benzo[a]pyrene	6	0	[0.0685]	[0.0971]	0	0	--	--	No test	No test	No test	No test	No	No	Not detected
Benzo[b]fluoranthene	6	0	[0.0685]	[0.0971]	0	0	--	--	No test	No test	No test	No test	No	No	Not detected
Benzo[ghi]perylene	6	0	[0.0685]	[0.0971]	0	0	--	--	No test	No test	No test	No test	No	No	Not detected
Benzo[k]fluoranthene	6	0	[0.0685]	[0.0971]	0	0	--	--	No test	No test	No test	No test	No	No	Not detected
beta-1,2,3,4,5,6-Hexachlorocyclohexane	8	2	0.021	0.12	2	0	[0.029]	[0.03]	--	0.622	--	0.843	No	No	Not greater than reference, two of two tests
Chrysene	6	1	0.033	[0.0971]	0	0	--	--	No test	No test	No test	No test	See Table 4-34	Yes	Detected, no reference comparison
Delta-BHC	8	0	[0.023]	[0.04]	2	0	[0.029]	[0.03]	No test	No test	No test	No test	No	No	Not detected
Dibenz[a,h]anthracene	6	0	[0.0685]	[0.0971]	0	0	--	--	No test	No test	No test	No test	No	No	Not detected
Dichlorodiphenyldichloroethane	8	2	[0.023]	0.074	2	0	[0.029]	[0.03]	--	0.622	--	0.843	No	No	Not greater than reference, two of two tests
Dichlorodiphenyldichloroethylene	8	1	0.018	[0.04]	2	0	[0.029]	[0.03]	--	--	--	0.429	See Table 4-34	Yes	Not greater than reference, one of one test
Dichlorodiphenyltrichloroethane	8	4	0.019	0.14	2	1	[0.03]	0.18	--	0.978	1	0.429	No	No	Not greater than reference, three of three tests
Dieldrin	8	0	[0.023]	[0.04]	2	0	[0.029]	[0.03]	No test	No test	No test	No test	No	No	Not detected
Endosulfan I	8	3	0.021	0.059	2	1	[0.029]	0.1	--	0.978	1	0.628	No	No	Not greater than reference, three of three tests
Endosulfan II	8	0	[0.023]	[0.04]	2	0	[0.029]	[0.03]	No test	No test	No test	No test	No	No	Not detected
Endosulfan sulfate	8	1	[0.023]	1.4	2	0	[0.029]	[0.03]	--	--	--	0.429	See Table 4-34	Yes	Not greater than reference, one of one test
Endrin	8	0	[0.023]	[0.04]	2	0	[0.029]	[0.03]	No test	No test	No test	No test	No	No	Not detected
Endrin aldehyde	8	1	0.02	[0.04]	2	0	[0.029]	[0.03]	No test	No test	No test	0.429	See Table 4-34	Yes	Not greater than reference, one of one test
Endrin ketone	8	0	[0.023]	[0.04]	2	0	[0.029]	[0.03]	No test	No test	No test	No test	No	No	Not detected
Fluoranthene	6	3	0.062	0.36	0	0	--	--	No test	No test	No test	No test	See Table 4-34	Yes	Detected, no reference comparison
Fluorene	6	1	[0.0685]	0.14	0	0	--	--	No test	No test	No test	No test	See Table 4-34	Yes	Detected, no reference comparison
Gamma-BHC (lindane)	8	0	[0.023]	[0.04]	2	0	[0.029]	[0.03]	No test	No test	No test	No test	No	No	Not detected
gamma-Chlordane	8	0	[0.023]	[0.04]	2	0	[0.029]	[0.03]	No test	No test	No test	No test	No	No	Not detected
Heptachlor	8	0	[0.023]	[0.04]	2	0	[0.029]	[0.03]	No test	No test	No test	No test	No	No	Not detected
Heptachlor epoxide	8	1	[0.023]	[0.04]	2	0	[0.029]	[0.03]	--	--	--	0.429	See Table 4-34	Yes	Not greater than reference, one of one test

Table 4-27. Summary of Statistical Comparisons to Reference for Upland Terrestrial Invertebrate Tissue Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (3 Pages)

Analyte	Study Site				Reference Site				Reference Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Indeno[1,2,3-cd]pyrene	6	0	[0.0685]	[0.0971]	0	0	--	--	No test	No test	No test	No test	No	No	Not detected
Methoxychlor	8	4	[0.027]	0.18	2	1	[0.03]	0.09	--	0.622	0.467	0.429	No	No	Not greater than reference, three of three tests
Naphthalene	6	0	[0.685]	[0.971]	0	0	--	--	No test	No test	No test	No test	No	No	Not detected
Phenanthrene	6	1	[0.0781]	[0.0971]	0	0	--	--	No test	No test	No test	No test	See Table 4-34	Yes	Detected, no reference comparison
Pyrene	6	1	0.041	[0.0971]	0	0	--	--	No test	No test	No test	No test	See Table 4-34	Yes	Detected, no reference comparison
Toxaphene	8	0	[0.23]	[0.4]	2	0	[0.29]	[0.3]	No test	No test	No test	No test	No	No	Not detected
Radionuclides (pCi/g-fw)															
Strontium-90	1	0	[-0.034]	[-0.034]	0	0	--	--	No test	No test	No test	No test	No	No	Not detected
Uranium-233/234	2	0	[0.03]	[0.072]	0	0	--	--	No test	No test	No test	No test	No	No	Not detected
Uranium-235	2	0	[0]	0	0	0	--	--	No test	No test	No test	No test	No	No	Not detected
Uranium-238	2	0	[0]	0	0	0	--	--	No test	No test	No test	No test	No	No	Not detected

[value] = not detected
-- = not applicable
BHC = benzene hexachloride
COPC = contaminant of potential concern
fw = fresh weight

Table 4-28. Summary of Statistical Comparisons to Reference for Upland Terrestrial Invertebrate Tissue Data Collected for the 100-B/C Pilot Project.

Analyte	Study Site				Reference Site				Reference Comparison					Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Site vs. Reference		
Inorganics (mg/kg-fw)															
Aluminum	4	4	74.2	250	10	10	11.6	49.7	0.003	0.066	0.001	--	Equal	See text	Greater than reference, two of three tests
Antimony	4	3	[0.00754]	0.0177	13	5	0.353	0.56	--	1	1	0.479	Equal	No	Not greater than reference, three of three tests
Arsenic	4	4	0.198	0.583	13	12	0.353	1.2	0.991	1	1	0.520	Equal	No	Not greater than reference, four of four tests
Barium	4	4	1.79	3.67	13	13	1	5.45	0.168	1	1	--	Equal	No	Not greater than reference, three of three tests
Beryllium	4	2	[0.0075]	0.0277	10	0	[0.02]	[0.02]	--	0.066	--	0.116	Equal	No	Not greater than reference, two of two tests
Cadmium	4	4	0.128	0.491	13	5	0.048	[0.08]	--	0.006	<0.001	0.113	Equal	See text	Greater than reference, two of three tests
Chromium	4	4	0.0866	0.39	13	10	[0.12]	2.05	0.676	1	1	0.758	Equal	No	Not greater than reference, four of four tests
Copper	4	4	7.22	19.9	13	13	3.9	13.4	0.014	0.121	0.044	--	Equal	See text	Greater than reference, two of three tests
Lead	4	4	0.122	0.531	13	4	0.135	0.38	--	0.121	0.235	0.064	Equal	No	Not greater than reference, three of three tests
Manganese	4	4	8.78	21.1	10	10	3.7	8.4	0.003	0.066	0.001	--	Equal	See text	Greater than reference, two of three tests
Mercury	4	4	0.00658	0.017	13	1	[0.01]	0.36	--	0.121	1	0.004	Greater	See text	Greater than reference, one of three tests
Nickel	4	4	0.15	0.81	13	6	[0.23]	1.81	--	0.579	1	0.183	Equal	No	Not greater than reference, three of three tests
Selenium	4	4	0.0491	0.479	13	4	0.11	0.53	--	0.579	1	0.064	Equal	No	Not greater than reference, three of three tests
Silver	4	1	[0.0178]	0.0297	13	3	[0.025]	0.12	--	1	1	0.552	Equal	No	Not greater than reference, three of three tests
Thallium	4	4	0.014	0.0459	13	1	0.026	[0.78]	--	0.121	0.600	0.004	Greater	See text	Greater than reference, one of three tests
Uranium (inorganic)	4	1	[0.0123]	0.0178	13	2	[0.025]	2.2	--	0.579	1	0.758	Equal	No	Not greater than reference, three of three tests
Zinc	4	4	34.3	89	13	13	27.4	49.9	0.632	0.121	0.044	--	Equal	See text	Greater than reference, one of three tests

[value] = not detected
-- = not available
COPC = contaminant of potential concern
fw = fresh weight
TBD = to be determined

Table 4-29. Summary of Statistical Comparisons to Reference for Upland Mammal Organ (Liver/Kidney) Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project.

Analyte	Study Site				Reference Site				Reference Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Inorganics (mg/kg-fw)															
Aluminum	20	8	[2.2]	3.9	11	5	[2.2]	5.1	--	0.646	1	0.932	No	No	Not greater than reference, three of three tests
Antimony	20	0	[0.41]	[0.43]	11	0	[0.41]	[0.43]	No test	No test	No test	No test	No	No	Not detected
Arsenic	20	8	[0.56]	0.78	11	2	[0.56]	0.76	--	0.284	0.645	0.399	No	No	Not greater than reference, three of three tests
Barium	20	20	0.04	0.11	11	11	0.04	0.12	0.067	0.192	1	--	No	No	Not greater than reference, three of three tests
Beryllium	20	9	0.02	0.03	11	1	0.02	0.02	--	0.409	0.409	0.1	No	No	Not greater than reference, three of three tests
Bismuth	20	0	[0.47]	[0.5]	11	0	[0.47]	[0.5]	No test	No test	No test	No test	No	No	Not detected
Boron	20	0	[0.22]	[0.24]	11	2	[0.22]	0.49	No test	No test	No test	No test	No	No	Detected at reference site only
Cadmium	20	16	0.07	0.32	11	4	[0.06]	0.08	--	0.053	<0.001	0.042	Yes	No	Greater than reference, two of three tests
Calcium	20	20	66.3	101	11	11	46.3	140	No test	No test	No test	No test	No	No	Essential nutrient
Chromium	20	10	0.12	0.36	11	7	[0.12]	0.46	0.852	0.902	1	0.724	No	No	Not greater than reference, four of four tests
Cobalt	20	0	[0.13]	[0.14]	11	0	[0.13]	[0.14]	No test	No test	No test	No test	No	No	Not detected
Copper	20	20	4.9	7.5	11	11	4.1	6.9	0.066	0.284	0.409	--	No	No	Not greater than reference, three of three tests
Iron	20	20	114	358	11	11	87.3	201	0.112	0.284	0.254	--	No	No	Not greater than reference, three of three tests
Lead	20	3	[0.29]	0.4	11	0	[0.29]	[0.3]	--	--	--	0.474	See Table 4-34	Yes	Not greater than reference, one of one test
Lithium	20	13	0.03	0.05	11	6	0.03	0.05	0.389	0.719	1	0.852	No	No	Not greater than reference, four of four tests
Magnesium	20	20	194	259	11	11	183	243	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	20	20	2.4	4.1	11	11	2.3	3.4	0.008	0.405	0.409	--	See Table 4-34	Yes	Greater than reference, one of three tests
Mercury	20	0	[0.01]	[0.02]	11	1	0.02	0.02	No test	No test	No test	No test	No	No	Detected at reference site only
Molybdenum	20	20	1	1.6	11	11	1	1.9	0.279	0.719	1	--	No	No	Not greater than reference, three of three tests
Nickel	20	1	[0.22]	0.41	11	1	[0.22]	0.44	--	--	1	0.749	No	No	Not greater than reference, two of two tests
Phosphorus	20	20	2,760	3,320	11	11	2420	3150	0.027	0.053	0.053	--	See Table 4-34	Yes	Greater than reference, one of three tests
Potassium	20	20	2,090	2,700	11	11	1980	2460	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	20	13	[0.44]	1.2	11	11	0.48	1.5	0.873	0.902	1	--	No	No	Not greater than reference, three of three tests
Silicon	20	20	4.2	15.2	11	11	4.3	9.1	No test	No test	No test	No test	No	No	Soil Component, no test
Silver	20	5	[0.06]	0.1	11	1	[0.06]	0.07	--	0.284	0.409	0.550	No	No	Not greater than reference, three of three tests
Sodium	20	20	892	1230	11	11	962	1160	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	20	20	0.06	0.14	11	11	0.05	0.11	0.010	0.154	0.154	--	See Table 4-34	Yes	Greater than reference, one of three tests
Thallium	20	0	[0.65]	[0.69]	11	0	[0.65]	[0.69]	No test	No test	No test	No test	No	No	Not detected
Tin	20	0	[0.99]	[1]	11	0	[0.99]	[1]	No test	No test	No test	No test	No	No	Not detected
Uranium (inorganic)	20	0	[0.81]	[0.86]	11	0	[0.81]	[0.86]	No test	No test	No test	No test	No	No	Not detected
Vanadium	20	0	[0.08]	[0.09]	11	0	[0.08]	[0.09]	No test	No test	No test	No test	No	No	Not detected
Zinc	20	20	24.9	39.6	11	11	19.5	33.7	0.516	0.902	0.254	--	No	No	Not greater than reference, three of three tests
Zirconium	8	0	[0.31]	[0.31]	7	0	[0.31]	[0.31]	No test	No test	No test	No test	No	No	Not detected

[value] = not detected
-- = not applicable
COPC = contaminant of potential concern
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 4-30. Summary of Statistical Comparisons to Reference for Upland Mammal Carcass Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Inorganics (mg/kg-fw)															
Aluminum	20	20	26.2	102	11	11	17.1	99.8	0.801	0.902	0.645	--	No	No	Not greater than reference, three of three tests
Antimony	20	0	[0.41]	[0.43]	11	0	[0.41]	[0.43]	No test	No test	No test	No test	No	No	Not detected
Arsenic	20	3	[0.58]	0.87	11	1	[0.58]	0.68	--	--	0.645	0.928	No	No	Not greater than reference, two of two tests
Barium	20	20	2	7.1	11	11	1.9	6.6	0.363	0.902	0.645	--	No	No	Not greater than reference, three of three tests
Beryllium	20	0	[0.02]	[0.02]	11	0	[0.02]	[0.02]	No test	No test	No test	No test	No	No	Not detected
Bismuth	20	0	[0.48]	[0.5]	11	0	[0.48]	[0.5]	No test	No test	No test	No test	No	No	Not detected
Boron	20	16	[0.23]	1.5	11	6	[0.23]	0.49	0.011	0.284	0.091	0.280	See Table 4-34	Yes	Greater than reference, one of four tests
Cadmium	20	5	0.07	0.07	11	0	[0.07]	[0.07]	--	--	--	0.193	See Table 4-34	Yes	Not greater than reference, one of one test
Calcium	20	20	6,890	18,900	11	11	6,810	18,400	No test	No test	No test	No test	No	No	Essential nutrient
Calculated total uranium	20	1	[-0.06]	1.8	11	0	[-0.08]	[0.24]	--	0.289	0.778	0.758	No	No	Not greater than reference, three of three tests
Chromium	20	20	0.37	0.73	11	11	0.37	0.84	0.363	0.646	1	--	No	No	Not greater than reference, three of three tests
Cobalt	20	2	0.13	0.2	11	0	[0.13]	[0.14]	--	--	--	0.749	See Table 4-34	Yes	Not greater than reference, one of one test
Copper	20	20	2.5	3.7	11	11	2.5	3.6	0.426	0.284	0.645	--	No	No	Not greater than reference, three of three tests
Iron	20	20	94.3	230	11	11	88.6	233	0.719	0.987	1	--	No	No	Not greater than reference, three of three tests
Lead	20	14	[0.3]	2.4	11	7	[0.3]	0.61	0.063	0.053	0.016	0.969	See Table 4-34	Yes	Greater than reference, one of four tests
Lithium	20	20	0.05	0.13	11	11	0.06	0.13	0.699	0.394	1	--	No	No	Not greater than reference, three of three tests
Magnesium	20	20	374	727	11	11	354	656	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	20	20	2.9	8.2	11	11	2.3	7.4	0.296	0.646	0.409	--	No	No	Not greater than reference, three of three tests
Mercury	20	0	[0.01]	[0.02]	11	0	[0.01]	[0.02]	No test	No test	No test	No test	No	No	Not detected
Molybdenum	20	7	[0.27]	0.36	11	4	[0.27]	0.33	--	0.646	0.154	0.752	No	No	Not greater than reference, three of three tests
Nickel	20	9	[0.23]	1	11	8	[0.23]	2.9	--	0.987	1	0.268	No	No	Not greater than reference, three of three tests
Phosphorus	20	20	5,270	12,500	11	11	4,350	10,300	0.128	0.646	0.254	--	No	No	Not greater than reference, three of three tests
Potassium	20	20	2,370	3,110	11	11	2,350	3,080	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	20	16	[0.45]	1.2	11	10	[0.45]	0.97	0.944	0.902	0.645	0.779	No	No	Not greater than reference, four of four tests
Silicon	20	20	42.2	93.7	11	11	42.3	91.7	No test	No test	No test	No test	No	No	Soil Component, no test
Silver	20	4	[0.07]	0.16	11	1	[0.07]	0.15	--	--	0.645	0.780	No	No	Not greater than reference, two of two tests
Sodium	20	20	1180	1,610	11	11	1,080	1,690	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	20	20	5.1	18.7	11	11	3.2	12.7	0.012	0.284	0.154	--	See Table 4-34	Yes	Greater than reference, one of four tests
Thallium	20	0	[0.66]	[0.68]	11	0	[0.66]	[0.68]	No test	No test	No test	No test	No	No	Not detected
Tin	20	16	[1]	1.7	11	11	1.1	1.5	0.977	0.958	0.645	--	No	No	Not greater than reference, three of three tests
Titanium	12	12	2.2	10.1	4	4	1.9	9.1	0.428	0.864	0.750	--	No	No	Not greater than reference, three of three tests
Uranium (inorganic)	20	1	[0.83]	1	11	0	[0.83]	[0.85]	--	--	--	0.758	See Table 4-34	Yes	Not greater than reference, one of one test
Vanadium	20	15	[0.08]	0.47	11	9	[0.09]	0.4	0.886	0.646	0.645	0.988	No	No	Not greater than reference, four of four tests

Table 4-30. Summary of Statistical Comparisons to Reference for Upland Mammal Carcass Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Zinc	20	20	40	106	11	11	41.4	108	0.332	0.646	1	--	No	No	Not greater than reference, three of three tests
Zirconium	12	0	[1]	[1]	4	0	[1]	[1]	No test	No test	No test	No test	No	No	Not detected
Organics (mg/kg-fw)															
1,2,4-Trichlorobenzene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
1,2-Dichlorobenzene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
1,3-Dichlorobenzene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
1,4-Dichlorobenzene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
2,4,5-Trichlorophenol	20	0	[7.1]	[9.9]	11	0	[7]	[9.5]	No test	No test	No test	No test	No	No	Not detected
2,4,6-Trichlorophenol	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
2,4-Dichlorophenol	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
2,4-Dimethylphenol	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrophenol	20	0	[7.1]	[9.9]	11	0	[7]	[9.5]	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrotoluene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
2,6-Dinitrotoluene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
2-Chloronaphthalene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
2-Chlorophenol	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
2-Methylnaphthalene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
2-Methylphenol [cresol, o-]	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
2-Nitroaniline	20	0	[7.1]	[9.9]	11	0	[7]	[9.5]	No test	No test	No test	No test	No	No	Not detected
2-Nitrophenol	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
3,3-Dichlorobenzidine	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
3+4 Methylphenol [cresol, m+p]	20	2	0.23	[4]	11	0	[2.8]	[3.8]	--	--	--	0.749	See Table 4-34	Yes	Not greater than reference, one of one test
3-Nitroaniline	20	0	[7.1]	[9.9]	11	0	[7]	[9.5]	No test	No test	No test	No test	No	No	Not detected
4,6-Dinitro-2-methylphenol	20	0	[7.1]	[9.9]	11	0	[7]	[9.5]	No test	No test	No test	No test	No	No	Not detected
4-Bromophenylphenyl ether	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
4-Chloro-3-methylphenol	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
4-Chloroaniline	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
4-Chlorophenylphenyl ether	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
4-Nitroaniline	20	0	[7.1]	[9.9]	11	0	[7]	[9.5]	No test	No test	No test	No test	No	No	Not detected
4-Nitrophenol	20	0	[7.1]	[9.9]	11	0	[7]	[9.5]	No test	No test	No test	No test	No	No	Not detected
Acenaphthene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Acenaphthylene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Aldrin	20	11	0.0083	0.028	11	5	0.011	[0.017]	--	0.405	0.232	0.894	No	No	Not greater than reference, three of three tests
Alpha-BHC	20	0	[0.014]	[0.02]	11	0	[0.014]	[0.02]	No test	No test	No test	No test	No	No	Not detected
alpha-Chlordane	20	0	[0.014]	[0.02]	11	0	[0.014]	[0.02]	No test	No test	No test	No test	No	No	Not detected

Table 4-30. Summary of Statistical Comparisons to Reference for Upland Mammal Carcass Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Anthracene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Aroclor-1016	20	0	[0.14]	[0.92]	11	0	[0.081]	[0.8]	No test	No test	No test	No test	No	No	Not detected
Aroclor-1221	20	0	[0.14]	[0.92]	11	0	[0.081]	[0.8]	No test	No test	No test	No test	No	No	Not detected
Aroclor-1232	20	0	[0.14]	[0.92]	11	0	[0.081]	[0.8]	No test	No test	No test	No test	No	No	Not detected
Aroclor-1242	20	0	[0.14]	[0.92]	11	0	[0.081]	[0.8]	No test	No test	No test	No test	No	No	Not detected
Aroclor-1248	20	0	[0.14]	[0.92]	11	0	[0.081]	[0.8]	No test	No test	No test	No test	No	No	Not detected
Aroclor-1254	20	0	[0.14]	[0.92]	11	1	0.079	[0.8]	No test	No test	No test	No test	No	No	Detected at reference site only
Aroclor-1260	20	0	[0.14]	[0.92]	11	0	[0.081]	[0.8]	No test	No test	No test	No test	No	No	Not detected
Benzo[a]anthracene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Benzo[a]pyrene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Benzo[b]fluoranthene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Benzo[ghi]perylene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Benzo[k]fluoranthene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
beta-1,2,3,4,5,6-Hexachlorocyclohexane	20	6	0.014	0.051	11	5	[0.014]	0.064	--	0.987	1	0.639	No	No	Not greater than reference, three of three tests
Bis[2-chloro-1-methylethyl]ether	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Bis[2-Chloroethoxy]methane	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Bis[2-chloroethyl]ether	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Bis[2-ethylhexyl]phthalate	20	11	0.18	[4]	11	7	0.17	[3.3]	0.559	0.646	1	0.932	No	No	Not greater than reference, four of four tests
Butylbenzylphthalate	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Carbazole	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Chrysene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Delta-BHC	20	1	[0.014]	0.04	11	2	0.012	0.018	--	--	0.621	0.580	No	No	Not greater than reference, two of two tests
Dibenz[a,h]anthracene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Dibenzofuran	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Dichlorodiphenyldichloroethane	19	0	[0.014]	[0.02]	11	0	[0.014]	[0.02]	No test	No test	No test	No test	No	No	Not detected
Dichlorodiphenyldichloroethylene	20	2	0.011	[0.02]	11	0	[0.014]	[0.02]	--	--	--	0.749	See Table 4-34	Yes	Not greater than reference, one of one test
Dichlorodiphenyltrichloroethane	20	1	[0.014]	[0.02]	11	2	0.01	[0.02]	--	--	0.333	0.580	No	No	Not greater than reference, two of two tests
Dieldrin	20	0	[0.014]	[0.02]	11	0	[0.014]	[0.02]	No test	No test	No test	No test	No	No	Not detected
Diethylphthalate	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Dimethyl phthalate	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Di-n-butylphthalate	20	5	0.17	[4]	11	4	0.16	[3.7]	--	0.646	1	0.799	No	No	Not greater than reference, three of three tests
Di-n-octylphthalate	20	1	1.9	[4]	11	0	[2.8]	[3.8]	--	--	--	0.758	See Table 4-34	Yes	Not greater than reference, one of one test
Endosulfan I	20	1	0.0098	[0.02]	11	1	0.012	[0.02]	--	--	1	0.749	No	No	Not greater than reference, two of two tests
Endosulfan II	20	0	[0.014]	[0.02]	11	0	[0.014]	[0.02]	No test	No test	No test	No test	No	No	Not detected

Table 4-30. Summary of Statistical Comparisons to Reference for Upland Mammal Carcass Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Endosulfan sulfate	20	0	[0.014]	[0.02]	11	0	[0.014]	[0.02]	No test	No test	No test	No test	No	No	Not detected
Endrin	20	0	[0.014]	[0.02]	11	0	[0.014]	[0.02]	No test	No test	No test	No test	No	No	Not detected
Endrin aldehyde	20	1	0.014	[0.02]	11	0	[0.014]	[0.02]	--	--	--	0.758	See Table 4-34	Yes	Not greater than reference, one of one test
Endrin ketone	20	0	[0.014]	[0.02]	11	0	[0.014]	[0.02]	No test	No test	No test	No test	No	No	Not detected
Fluoranthene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Fluorene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Gamma-BHC (lindane)	20	2	0.0088	[0.02]	11	2	0.0073	[0.02]	--	--	0.167	0.928	No	No	Not greater than reference, two of two tests
gamma-Chlordane	20	0	[0.014]	[0.02]	11	0	[0.014]	[0.02]	No test	No test	No test	No test	No	No	Not detected
Heptachlor	20	1	[0.014]	0.019	11	0	[0.014]	[0.02]	--	--	--	0.758	See Table 4-34	Yes	Not greater than reference, one of one test
Heptachlorepoxide	20	0	[0.014]	[0.02]	11	0	[0.014]	[0.02]	No test	No test	No test	No test	No	No	Not detected
Hexachlorobenzene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Hexachlorobutadiene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Hexachlorocyclopentadiene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Hexachloroethane	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Indeno[1,2,3-cd]pyrene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Isophorone	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Methoxychlor	20	1	[0.014]	0.032	11	1	[0.014]	0.03	--	--	0.645	0.749	No	No	Not greater than reference, two of two tests
Naphthalene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Nitrobenzene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
N-Nitroso-di-n-dipropylamine	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
N-Nitrosodiphenylamine	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Pentachlorophenol	20	1	0.18	[9.9]	11	0	[7]	[9.5]	--	--	--	0.758	See Table 4-34	Yes	Not greater than reference, one of one test
Phenanthrene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Phenol	20	11	0.17	[4]	11	10	0.16	[3.2]	0.292	0.646	1	0.100	No	No	Not greater than reference, four of four tests
Pyrene	20	0	[2.9]	[4]	11	0	[2.8]	[3.8]	No test	No test	No test	No test	No	No	Not detected
Toxaphene	20	0	[0.14]	[0.2]	11	0	[0.14]	[0.2]	No test	No test	No test	No test	No	No	Not detected
Radionuclides (pCi/g-fw)															
Americium-241	20	0	[0.08]	[0.62]	11	0	[0.041]	[0.38]	No test	No test	No test	No test	No	No	Not detected
Antimony-125	20	0	[0.079]	[0.33]	11	0	[0.071]	[0.22]	No test	No test	No test	No test	No	No	Not detected
Barium-133	8	0	[0.036]	[0.11]	7	0	[0.032]	[0.079]	No test	No test	No test	No test	No	No	Not detected
Beryllium-7	20	0	[0.26]	[1.4]	11	0	[0.27]	[0.86]	No test	No test	No test	No test	No	No	Not detected
Cesium-134	20	0	[0.039]	[0.18]	11	0	[0.034]	[0.2]	No test	No test	No test	No test	No	No	Not detected
Cesium-137	20	0	[0.034]	[0.17]	11	0	[0.031]	[0.11]	No test	No test	No test	No test	No	No	Not detected
Cobalt-60	20	0	[0.034]	[0.21]	11	0	[0.032]	[0.12]	No test	No test	No test	No test	No	No	Not detected
Europium-152	20	0	[0.08]	[0.38]	11	0	[0.076]	[0.27]	No test	No test	No test	No test	No	No	Not detected

Table 4-30. Summary of Statistical Comparisons to Reference for Upland Mammal Carcass Data Collected at 20 Study Sites and 10 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison				COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Europium-154	20	0	[0.095]	[0.5]	11	0	[0.092]	[0.32]	No test	No test	No test	No test	No	No	Not detected
Europium-155	20	0	[0.076]	[0.35]	11	0	[0.073]	[0.24]	No test	No test	No test	No test	No	No	Not detected
Plutonium-238	20	0	[-0.084]	[0.052]	11	0	[-0.036]	[0.051]	No test	No test	No test	No test	No	No	Not detected
Plutonium-239/240	20	0	[-0.027]	[0.157]	11	0	[-0.032]	[0.043]	No test	No test	No test	No test	No	No	Not detected
Potassium-40	20	14	[2]	[9.6]	11	8	[1.9]	3.48	No test	No test	No test	No test	No	No	Background radionuclide
Radium-226	20	0	[0.06]	[0.28]	11	0	[0.055]	[0.19]	No test	No test	No test	No test	No	No	Not detected
Radium-228	20	0	[0.15]	[0.67]	11	0	[0.13]	[0.45]	No test	No test	No test	No test	No	No	Not detected
Ruthenium-106	20	0	[0.26]	[1.2]	11	0	[0.28]	[0.89]	No test	No test	No test	No test	No	No	Not detected
Strontium-90	20	2	[-0.087]	0.254	11	2	[-0.082]	0.505	--	--	1	0.928	No	No	Not greater than reference, two of two tests
Thorium-228	20	0	[-0.108]	[0.282]	11	0	[-0.112]	[0.112]	No test	No test	No test	No test	No	No	Not detected
Thorium-230	20	0	[-0.132]	[0.243]	11	0	[-0.144]	[0.25]	No test	No test	No test	No test	No	No	Not detected
Thorium-232	20	0	[-0.04]	[0.069]	11	0	[-0.051]	[0.013]	No test	No test	No test	No test	No	No	Not detected
Uranium-233/234	20	1	[-0.021]	0.423	11	0	[0]	[0.054]	--	--	--	0.758	See Table 4-34	Yes	Not greater than reference, one of one test
Uranium-235	20	0	[0]	[0.048]	11	0	[0]	[0.1]	No test	No test	No test	No test	No	No	Not detected
Uranium-238	20	1	[-0.022]	0.597	11	0	[-0.027]	[0.081]	--	--	--	0.758	See Table 4-34	Yes	Not greater than reference, one of one test

[value] = not detected
-- = not applicable
BHC = benzene hexachloride
COPC = contaminant of potential concern
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 4-31. Summary of Statistical Comparisons to Reference for Upland Mammal Organ (Brain, Liver) Data Collected for the 100-B/C Pilot Project.

Analyte	Study Site				Reference Site				Reference Comparison					Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Site vs. Reference		
Inorganics (mg/kg-fw)															
Aluminum	19	19	0.312	4.55	11	5	[2.2]	5.1	NA	0.999	1	0.002	Greater	See text	Greater than reference, one of three tests
Antimony	19	13	[0.00541]	0.0126	11	0	[0.41]	[0.43]	NA	0.046	NA	0.001	Greater	See text	Greater than reference, two of two tests
Arsenic	19	10	0.0303	0.32	11	2	[0.56]	0.76	NA	0.620	1	0.142	Equal	No	Not greater than reference, three of three tests
Barium	19	19	0.00526	0.163	11	11	0.04	0.12	0.998	0.984	0.633	NA	Equal	No	Not greater than reference, four of four tests
Beryllium	19	7	[0.00538]	0.0852	11	1	0.02	0.02	NA	0.046	0.046	0.219	Equal	See text	Greater than reference, two of three tests
Cadmium	19	18	[0.00715]	0.196	11	4	[0.06]	0.08	NA	0.046	0.046	0.002	Greater	See text	Greater than reference, three of three tests
Chromium	19	19	0.00812	0.156	11	7	[0.12]	0.46	0.997	0.996	1	0.023	Greater	See text	Greater than reference, one of four tests
Copper	19	19	3.69	8.55	11	11	4.1	6.9	0.682	0.261	0.082	NA	Equal	No	Not greater than reference, three of three tests
Lead	19	17	[0.00967]	3.09	11	0	[0.29]	[0.3]	NA	0.046	NA	<0.001	Greater	See text	Greater than reference, two of two tests
Manganese	19	19	1.57	3.98	11	11	2.3	3.4	0.602	0.261	0.141	NA	Equal	No	Not greater than reference, three of three tests
Mercury	19	13	[0.00155]	0.0632	11	1	[0.02]	[0.02]	NA	0.261	0.393	0.006	Greater	See text	Greater than reference, one of three tests
Nickel	19	9	[0.0128]	0.0292	11	1	[0.22]	0.44	NA	0.261	1	0.082	Equal	No	Not greater than reference, three of three tests
Selenium	19	19	0.286	2	11	11	0.48	1.5	0.010	0.261	0.082	NA	Equal	See text	Greater than reference, one of three tests
Silver	19	0	[0.0127]	[0.0127]	11	1	[0.06]	[0.07]	no test	no test	no test	no test	no test	No	Not detected at site
Thallium	19	19	0.0111	0.0475	11	0	[0.65]	[0.69]	NA	0.046	NA	<0.001	Greater	See text	Greater than reference, two of two tests
Uranium (inorganic)	19	0	[0.00884]	[0.00884]	11	0	[0.81]	[0.86]	no test	no test	no test	no test	no test	No	Not detected at site
Zinc	19	19	20.4	103	11	11	19.5	33.7	0.667	0.082	0.0816	NA	Equal	No	Not greater than reference, three of three tests
Organics (mg/kg-fw)															
Aroclor-1254	4	0	[0.00778]	[0.0385]	0	0	No reference data	No reference data	No reference data	No reference data	No reference data	No reference data	No reference data	No	Not detected at site
Aroclor-1260	4	0	[0.00778]	[0.0385]	0	0	No reference data	No reference data	No reference data	No reference data	No reference data	No reference data	No reference data	No	Not detected at site

-- = not available
COPC = contaminant of potential concern
fw = fresh weight
TBD = to be determined

Table 4-32. Summary of Statistical Comparisons to Reference for Upland Mammal Carcass Data Collected for the 100-B/C Pilot Project.

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Site vs. Reference			
Radionuclides (pCi/g-fw)																
Antimony-125	4	0	[-0.0161]	[0.268]	11	0	[0.071]	[0.22]	No test	No test	No test	No test	No test	No	No	Not detected at site
Beryllium-7	4	0	[-0.109]	[0.266]	11	0	[0.27]	[0.86]	No test	No test	No test	No test	No test	No	No	Half-life
Cesium-134	4	0	[0.00487]	[0.0869]	11	0	[0.034]	[0.2]	No test	No test	No test	No test	No test	No	No	Half-life
Cesium-137	4	0	[-0.0277]	[0.0449]	23	0	[-4.69]	[8.7]	No test	No test	No test	No test	No test	No	No	Not detected at site
Cobalt-60	4	0	[-0.00319]	[0.132]	23	0	[-3.19]	[11.3]	No test	No test	No test	No test	No test	No	No	Not detected at site
Europium-152	4	0	[0.0146]	[0.0907]	23	0	[-4.82]	[26.6]	No test	No test	No test	No test	No test	No	No	Not detected at site
Europium-154	4	0	[-0.268]	[0.0566]	23	0	[-11.9]	[24.9]	No test	No test	No test	No test	No test	No	No	Not detected at site
Europium-155	4	0	[-0.157]	[0.053]	23	0	[-9.69]	[20.3]	No test	No test	No test	No test	No test	No	No	Not detected at site
Potassium-40	4	4	1.57	4.84	12	8	[1.9]	[187]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Ruthenium-106	4	0	[-0.0808]	[0.121]	11	0	[0.28]	[0.89]	No test	No test	No test	No test	No test	No	No	Half-life
Strontium-90	4	0	[0.0658]	[0.267]	22	3	[-0.095]	0.505	No test	No test	No test	No test	No test	No	No	Not detected at site

-- = not available
COPC = contaminant of potential concern
fw = fresh weight
TBD = to be determined

Table 4-33. Overview of Statistical Comparisons for Upland Soil and Biotic Tissue Data Collected at 20 Study Sites for the RCBRA Project. (7 Pages)

Analyte	Soil Study Site Summary				Plant Study Site Summary				Invertebrate Study Site Summary				Mammal Organs Study Site Summary				Mammal Carcass Study Site Summary				COPC for Upland?
	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	
Inorganics (mg/kg or mg/kg-fw)																					
Aluminum	113	1.00	9,370	No	40	0.98	131	No	20	1.00	57	No	20	0.40	3.9	No	20	1.00	102	No	Yes, see Table 4-34
Antimony	113	0.13	6.1	TBD	40	0.00	[2.9]	No	20	0.20	[3.1]	No	20	0.00	[0.43]	No	20	0.00	[0.43]	No	Yes, see Table 4-34
Arsenic	113	0.95	17.3	TBD	40	0.15	[4]	No	20	0.85	[4.4]	TBD	20	0.40	0.78	No	20	0.15	0.87	No	Yes, see Table 4-34
Barium	113	1.00	416	TBD	40	1.00	23.6	No	20	1.00	4.1	No	20	1.00	0.11	No	20	1.00	7.1	No	Yes, see Table 4-34
Beryllium	113	0.90	[0.75]	No	40	0.03	[0.13]	TBD	20	0.00	[0.14]	No	20	0.45	0.03	No	20	0.00	[0.02]	No	Yes, see Table 4-34
Bismuth	113	0.05	[15]	No	40	0.00	[3.4]	No	20	0.00	[3.6]	No	20	0.00	[0.5]	No	20	0.00	[0.5]	No	No
Boron	113	0.87	39.2	TBD	40	1.00	117	TBD	20	1.00	7	No	20	0.00	[0.24]	No	20	0.80	1.5	TBD	Yes, see Table 4-34
Cadmium	113	0.50	1.4	TBD	40	0.03	[0.46]	No	20	0.25	0.57	No	20	0.80	0.32	Yes	20	0.25	0.07	TBD	Yes, see Table 4-34
Calcium	113	1.00	11,000	No	40	1.00	20,500	No	20	1.00	1,100	No	20	1.00	101	No	20	1.00	18,900	No	No
Calculated total uranium	113	0.55	2.74	TBD	40	0.03	[0.0863]	No	2	0.00	[0.0000116]	No	--	--	--	--	20	0.05	1.8	No	Yes, see Table 4-34
Chromium	113	1.00	24.6	TBD	40	0.95	3.3	No	20	0.90	3.7	TBD	20	0.50	0.36	No	20	1.00	0.73	No	Yes, see Table 4-34
Cobalt	113	0.96	9.1	No	40	0.03	[0.92]	No	20	0.55	[1]	No	20	0.00	[0.14]	No	20	0.10	0.2	TBD	No, see Table 4-34
Copper	113	1.00	65.8	TBD	40	1.00	13.4	No	20	1.00	18.6	TBD	20	1.00	7.5	No	20	1.00	3.7	No	Yes, see Table 4-34
Hexavalent chromium	113	0.50	[20.1]	TBD	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Yes, see Table 4-34
Iron	113	1.00	34,800	No	40	1.00	393	No	20	1.00	211	No	20	1.00	358	No	20	1.00	230	No	No
Lead	113	1.00	327	Yes	40	0.08	[2]	TBD	20	0.30	2.2	No	20	0.15	0.4	TBD	20	0.70	2.4	TBD	Yes, see Table 4-34
Lithium	113	0.96	[15]	TBD	40	0.90	0.87	No	20	0.40	[0.24]	No	20	0.65	0.05	No	20	1.00	0.13	No	No, see Table 4-34
Magnesium	113	1.00	4,960	No	40	1.00	3,390	No	20	1.00	952	No	20	1.00	259	No	20	1.00	727	No	No
Manganese	113	1.00	433	No	40	1.00	57.2	No	20	1.00	12.5	No	20	1.00	4.1	TBD	20	1.00	8.2	No	Yes, see Table 4-34
Mercury	113	0.25	0.15	TBD	40	0.00	[0.1]	No	20	0.00	[0.03]	No	20	0.00	[0.02]	No	20	0.00	[0.02]	No	Yes, see Table 4-34
Molybdenum	113	0.32	[15]	TBD	40	0.73	4.4	TBD	20	0.95	[2.1]	No	20	1.00	1.6	No	20	0.35	0.36	No	No, see Table 4-34
Nickel	113	1.00	19.5	No	40	0.73	4.1	No	20	0.60	1.9	TBD	20	0.05	0.41	No	20	0.45	1	No	No, see Table 4-34
Phosphorus	113	1.00	1,240	No	40	1.00	4,710	No	20	1.00	2,970	No	20	1.00	3,320	TBD	20	1.00	12,500	No	No, see Table 4-34
Potassium	113	1.00	2,500	No	40	1.00	24,400	No	20	1.00	3,440	No	20	1.00	2,700	No	20	1.00	3,110	No	No
Selenium	113	0.04	[1.3]	No	40	0.23	[3.1]	No	20	0.30	[3.4]	No	20	0.65	1.2	No	20	0.80	1.2	No	Yes, see Table 4-34
Silicon	113	1.00	526	No	40	1.00	760	No	20	1.00	67.4	No	20	1.00	15.2	No	20	1.00	93.7	No	No
Silver	113	0.08	[1.5]	TBD	40	0.28	7.6	No	20	0.10	[0.5]	No	20	0.25	0.1	No	20	0.20	0.16	No	Yes, see Table 4-34
Sodium	113	0.96	[750]	No	40	1.00	79.5	No	20	1.00	820	No	20	1.00	1,230	No	20	1.00	1,610	No	No
Strontium (elemental)	113	1.00	302	Yes	40	1.00	92.4	No	20	1.00	8.3	No	20	1.00	0.14	TBD	20	1.00	18.7	TBD	Yes, see Table 4-34
Thallium	113	0.04	[2]	No	40	0.00	[4.6]	No	20	0.00	[5]	No	20	0.00	[0.69]	No	20	0.00	[0.68]	No	No, see Table 4-34
Tin	113	0.27	33.3	Yes	40	0.10	[7.1]	No	20	0.00	[7.6]	No	20	0.00	[1]	No	20	0.80	1.7	No	Yes, see Table 4-34
Titanium	--	--	--	--	40	1.00	20.8	No	--	--	--	--	--	--	--	--	12	1.00	10.1	No	No
Uranium (inorganic)	113	0.12	[30]	No	40	0.13	9.9	No	20	0.50	10.8	No	20	0.00	[0.86]	No	20	0.05	1	TBD	Yes, see Table 4-34

Table 4-33. Overview of Statistical Comparisons for Upland Soil and Biotic Tissue Data Collected at 20 Study Sites for the RCBRA Project. (7 Pages)

Analyte	Soil Study Site Summary				Plant Study Site Summary				Invertebrate Study Site Summary				Mammal Organs Study Site Summary				Mammal Carcass Study Site Summary				COPC for Upland?
	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	
Vanadium	113	1.00	63.4	No	40	0.45	0.98	No	20	1.00	0.74	TBD	20	0.00	[0.09]	No	20	0.75	0.47	No	No, see Table 4-34
Zinc	113	1.00	93.1	No	40	1.00	43.5	No	20	1.00	61.1	TBD	20	1.00	39.6	No	20	1.00	106	No	Yes, see Table 4-34
Zirconium	--	--	--	--	40	0.05	[7]	TBD	8	0.00	[1]	No	8	0.00	[0.31]	No	12	0.00	[1]	No	No, see Table 4-34
Organics (mg/kg or mg/kg-fw)																					
2-[2,4,5-Trichlorophenoxy] propionic acid	93	0.17	0.32	TBD	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No, see Table 4-34
2-secButyl-4,6-dinitrophenol[DNBP]	93	0.41	0.1	TBD	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No, see Table 4-34
2,4-Dichlorophenoxyacetic acid	93	0.43	0.42	TBD	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No, see Table 4-34
2,4,5-Trichlorophenoxyacetic acid	93	0.04	0.028	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
4-[2,4-Dichlorophenoxy] butanoic acid	93	0.30	0.22	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Dalapon	93	0.28	[0.17]	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Dicamba	93	0.41	0.094	TBD	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No, see Table 4-34
Dichloroprop	93	0.44	1.3	TBD	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Yes, see Table 4-34
Picloram	80	0.21	0.026	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
2-Methylnaphthalene	112	0.11	[0.67]	TBD	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	Yes, see Table 4-34
2-Methylphenol [cresolo-]	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
Acenaphthene	112	0.21	[0.33]	TBD	38	0.00	[100]	No	6	0.17	6.6	TBD	--	--	--	--	20	0.00	[4]	No	Yes, see Table 4-34
Acenaphthylene	112	0.05	0.74	TBD	38	0.00	[100]	No	6	0.17	9.7	TBD	--	--	--	--	20	0.00	[4]	No	Yes, see Table 4-34
Anthracene	112	0.35	[0.33]	Yes	38	0.00	[100]	No	6	0.00	[0.0971]	No	--	--	--	--	20	0.00	[4]	No	Yes, see Table 4-34
Benzo[a]anthracene	112	0.70	0.78	Yes	38	0.00	[100]	No	6	0.00	[0.0971]	No	--	--	--	--	20	0.00	[4]	No	Yes, see Table 4-34
Benzo[a]pyrene	112	0.70	0.81	Yes	38	0.00	[100]	No	6	0.00	[0.0971]	No	--	--	--	--	20	0.00	[4]	No	Yes, see Table 4-34
Benzo[b]fluoranthene	112	0.75	0.63	Yes	38	0.00	[100]	No	6	0.00	[0.0971]	No	--	--	--	--	20	0.00	[4]	No	Yes, see Table 4-34
Benzo[ghi]perylene	112	0.67	0.4	Yes	38	0.00	[100]	No	6	0.00	[0.0971]	No	--	--	--	--	20	0.00	[4]	No	Yes, see Table 4-34
Benzo[k]fluoranthene	112	0.59	0.33	Yes	38	0.00	[100]	No	6	0.00	[0.0971]	No	--	--	--	--	20	0.00	[4]	No	Yes, see Table 4-34
Chrysene	112	0.71	1.3	Yes	38	0.00	[100]	No	6	0.17	[0.0971]	TBD	--	--	--	--	20	0.00	[4]	No	Yes, see Table 4-34
Dibenz[a,h]anthracene	112	0.41	[0.33]	Yes	38	0.00	[100]	No	6	0.00	[0.0971]	No	--	--	--	--	20	0.00	[4]	No	Yes, see Table 4-34
Fluoranthene	112	0.72	2	Yes	38	0.00	[100]	No	6	0.50	0.36	TBD	--	--	--	--	20	0.00	[4]	No	Yes, see Table 4-34
Fluorene	112	0.21	[0.33]	TBD	38	0.00	[100]	No	6	0.17	0.14	TBD	--	--	--	--	20	0.00	[4]	No	Yes, see Table 4-34
Indeno[1,2,3-cd]pyrene	112	0.48	0.45	Yes	38	0.00	[100]	No	6	0.00	[0.0971]	No	--	--	--	--	20	0.00	[4]	No	Yes, see Table 4-34
Naphthalene	112	0.33	0.27	Yes	38	0.00	[100]	No	6	0.00	[0.971]	No	--	--	--	--	20	0.00	[4]	No	Yes, see Table 4-34

Table 4-33. Overview of Statistical Comparisons for Upland Soil and Biotic Tissue Data Collected at 20 Study Sites for the RCBRA Project. (7 Pages)

Analyte	Soil Study Site Summary				Plant Study Site Summary				Invertebrate Study Site Summary				Mammal Organs Study Site Summary				Mammal Carcass Study Site Summary				COPC for Upland?
	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	
Phenanthrene	112	0.79	0.91	Yes	38	0.00	[100]	No	6	0.17	[0.0971]	TBD	--	--	--	--	20	0.00	[4]	No	Yes, see Table 4-34
Pyrene	112	0.73	1.6	Yes	38	0.00	[100]	No	6	0.17	[0.0971]	TBD	--	--	--	--	20	0.00	[4]	No	Yes, see Table 4-34
Aroclor-1016	113	0.00	[1.3]	No	36	0.00	[1.2]	No	--	--	--	--	--	--	--	--	20	0.00	[0.92]	No	No
Aroclor-1221	113	0.00	[1.3]	No	36	0.00	[1.2]	No	--	--	--	--	--	--	--	--	20	0.00	[0.92]	No	No
Aroclor-1232	113	0.00	[1.3]	No	36	0.00	[1.2]	No	--	--	--	--	--	--	--	--	20	0.00	[0.92]	No	No
Aroclor-1242	113	0.00	[1.3]	No	36	0.00	[1.2]	No	--	--	--	--	--	--	--	--	20	0.00	[0.92]	No	No
Aroclor-1248	113	0.01	[1.3]	TBD	36	0.00	[1.2]	No	--	--	--	--	--	--	--	--	20	0.00	[0.92]	No	No, see Table 4-34
Aroclor-1254	113	0.22	9.4	TBD	36	0.00	[1.2]	No	--	--	--	--	--	--	--	--	20	0.00	[0.92]	No	Yes, see Table 4-34
Aroclor-1260	113	0.15	[1.3]	TBD	36	0.00	[1.2]	No	--	--	--	--	--	--	--	--	20	0.00	[0.92]	No	Yes, see Table 4-34
Aroclor-1262	5	1.00	0.075	TBD	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Yes, see Table 4-34
Aroclor-1268	5	0.00	[0.013]	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Aldrin	112	0.01	[0.033]	TBD	36	0.03	[0.12]	TBD	8	0.00	[0.04]	No	--	--	--	--	20	0.55	0.028	No	No, see Table 4-34
Dieldrin	112	0.09	[0.033]	TBD	36	0.11	0.34	TBD	8	0.00	[0.04]	No	--	--	--	--	20	0.00	[0.02]	No	Yes, see Table 4-34
Methoxychlor	112	0.16	[0.033]	Yes	38	0.29	[0.12]	No	8	0.50	0.18	No	--	--	--	--	20	0.05	0.032	No	Yes, see Table 4-34
Alpha-BHC	112	0.01	[0.033]	TBD	37	0.11	[0.12]	TBD	8	0.00	[0.04]	No	--	--	--	--	20	0.00	[0.02]	No	No, see Table 4-34
beta-1,2,3,4,5,6-Hexachlorocyclohexane	112	0.12	[0.033]	TBD	36	0.14	0.14	No	8	0.25	0.12	No	--	--	--	--	20	0.30	0.051	No	Yes, see Table 4-34
Delta-BHC	112	0.00	[0.033]	No	37	0.24	0.18	No	8	0.00	[0.04]	No	--	--	--	--	20	0.05	0.04	No	No
Gamma-BHC (lindane)	112	0.00	[0.033]	No	37	0.11	0.12	TBD	8	0.00	[0.04]	No	--	--	--	--	20	0.10	[0.02]	No	No, see Table 4-34
alpha-Chlordane	112	0.04	[0.033]	TBD	36	0.08	0.25	TBD	8	0.13	0.22	TBD	--	--	--	--	20	0.00	[0.02]	No	Yes, see Table 4-34
gamma-Chlordane	112	0.10	[0.033]	TBD	38	0.37	0.12	No	8	0.00	[0.04]	No	--	--	--	--	20	0.00	[0.02]	No	Yes, see Table 4-34
Dichlorodiphenyl dichloroethane	112	0.04	[0.033]	No	36	0.03	[0.12]	No	8	0.25	0.074	No	--	--	--	--	19	0.00	[0.02]	No	No
Dichlorodiphenyl dichloroethylene	112	0.35	0.46	Yes	37	0.24	0.55	No	8	0.13	[0.04]	TBD	--	--	--	--	20	0.10	[0.02]	TBD	Yes, see Table 4-34
Dichlorodiphenyl trichloroethane	112	0.17	1.1	TBD	36	0.11	0.18	No	8	0.50	0.14	No	--	--	--	--	20	0.05	[0.02]	No	Yes, see Table 4-34
Endosulfan I	112	0.11	[0.033]	TBD	36	0.11	[0.12]	No	8	0.38	0.059	No	--	--	--	--	20	0.05	[0.02]	No	Yes, see Table 4-34
Endosulfan II	112	0.02	[0.033]	TBD	38	0.18	[0.12]	No	8	0.00	[0.04]	No	--	--	--	--	20	0.00	[0.02]	No	Yes, see Table 4-34
Endosulfan sulfate	112	0.04	[0.033]	TBD	37	0.11	[0.12]	TBD	8	0.13	1.4	TBD	--	--	--	--	20	0.00	[0.02]	No	Yes, see Table 4-34
Endrin	112	0.00	[0.033]	No	36	0.06	[0.12]	TBD	8	0.00	[0.04]	No	--	--	--	--	20	0.00	[0.02]	No	No, see Table 4-34
Endrin aldehyde	112	0.07	0.24	No	36	0.06	[0.12]	No	8	0.13	[0.04]	TBD	--	--	--	--	20	0.05	[0.02]	TBD	No, see Table 4-34
Endrin ketone	112	0.06	[0.033]	TBD	36	0.03	[0.12]	TBD	8	0.00	[0.04]	No	--	--	--	--	20	0.00	[0.02]	No	No, see Table 4-34
Heptachlor	112	0.03	[0.033]	No	36	0.25	0.21	No	8	0.00	[0.04]	No	--	--	--	--	20	0.05	0.019	TBD	No, see Table 4-34
Heptachlor epoxide	112	0.00	[0.033]	No	36	0.11	[0.12]	No	8	0.13	[0.04]	TBD	--	--	--	--	20	0.00	[0.02]	No	No, see Table 4-34

Table 4-33. Overview of Statistical Comparisons for Upland Soil and Biotic Tissue Data Collected at 20 Study Sites for the RCBRA Project. (7 Pages)

Analyte	Soil Study Site Summary				Plant Study Site Summary				Invertebrate Study Site Summary				Mammal Organs Study Site Summary				Mammal Carcass Study Site Summary				COPC for Upland?
	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	
Bis[2-ethylhexyl] phthalate	112	0.89	0.592911	TBD	38	0.05	[100]	No	--	--	--	--	--	--	--	--	20	0.55	[4]	No	No, see Table 4-34
Butylbenzylphthalate	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
Di-n-butylphthalate	112	0.46	[0.67]	TBD	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.25	[4]	No	No, see Table 4-34
Di-n-octylphthalate	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.05	[4]	TBD	No, see Table 4-34
Diethylphthalate	112	0.00	[0.67]	No	38	0.18	[100]	TBD	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No, see Table 4-34
Dimethyl phthalate	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
1,2-Dichlorobenzene	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
1,2,4-Trichlorobenzene	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
1,3-Dichlorobenzene	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
1,4-Dichlorobenzene	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
2-Chloronaphthalene	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
2-Chlorophenol	111	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
2-Nitroaniline	112	0.00	[1.7]	No	38	0.00	[250]	No	--	--	--	--	--	--	--	--	20	0.00	[9.9]	No	No
2-Nitrophenol	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
2,4-Dichlorophenol	111	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
2,4-Dimethylphenol	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
2,4-Dinitrophenol	112	0.00	[1.7]	No	38	0.00	[250]	No	--	--	--	--	--	--	--	--	20	0.00	[9.9]	No	No
2,4-Dinitrotoluene	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
2,4,5-Trichlorophenol	112	0.00	[1.7]	No	38	0.00	[250]	No	--	--	--	--	--	--	--	--	20	0.00	[9.9]	No	No
2,4,6-Trichlorophenol	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
2,6-Dinitrotoluene	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
3-Nitroaniline	112	0.00	[1.7]	No	38	0.00	[250]	No	--	--	--	--	--	--	--	--	20	0.00	[9.9]	No	No
3,3*-Dichlorobenzidine	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
3+4 Methylphenol [cresol, m+p]	112	0.01	[0.67]	TBD	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.10	[4]	TBD	No, see Table 4-34
4-Bromophenylphenyl ether	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
4-Chloro-3-methyl phenol	111	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
4-Chloroaniline	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
4-Chlorophenylphenyl ether	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
4-Nitroaniline	112	0.00	[1.7]	No	38	0.00	[250]	No	--	--	--	--	--	--	--	--	20	0.00	[9.9]	No	No
4-Nitrophenol	112	0.00	[1.7]	No	38	0.00	[250]	No	--	--	--	--	--	--	--	--	20	0.00	[9.9]	No	No
4,6-Dinitro-2-methyl phenol	112	0.00	[1.7]	No	38	0.00	[250]	No	--	--	--	--	--	--	--	--	20	0.00	[9.9]	No	No

Table 4-33. Overview of Statistical Comparisons for Upland Soil and Biotic Tissue Data Collected at 20 Study Sites for the RCBRA Project. (7 Pages)

Analyte	Soil Study Site Summary				Plant Study Site Summary				Invertebrate Study Site Summary				Mammal Organs Study Site Summary				Mammal Carcass Study Site Summary				COPC for Upland?
	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	
Bis[2-chloro-1-methylethyl]ether	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
Bis[2-Chloroethoxy]methane	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
Bis[2-chloroethyl] ether	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
Carbazole	112	0.02	[0.67]	TBD	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No, see Table 4-34
Dibenzofuran	112	0.04	[0.67]	TBD	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No, see Table 4-34
Hexachlorobenzene	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
Hexachlorobutadiene	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
Hexachlorocyclo pentadiene	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
Hexachloroethane	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
Isophorone	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
N-Nitroso-di-n-dipropylamine	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
N-Nitrosodiphenylamine	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
Nitrobenzene	112	0.00	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.00	[4]	No	No
Pentachlorophenol	113	0.01	[1.7]	No	38	0.00	[250]	No	--	--	--	--	--	--	--	--	20	0.05	[9.9]	TBD	No, see Table 4-34
Phenol	112	0.02	[0.67]	No	38	0.00	[100]	No	--	--	--	--	--	--	--	--	20	0.55	[4]	No	No
Toxaphene	112	0.00	[0.33]	No	36	0.00	[1.2]	No	8	0.00	[0.4]	No	--	--	--	--	20	0.00	[0.2]	No	No
Total organic carbon	33	0.94	50300	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Anions (mg/kg)																					
Chloride	33	1.00	5.02	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Fluoride	33	0.73	1.24	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Nitrogen in ammonia	33	1.00	15	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Nitrogen in nitrate	118	0.80	23.483824	TBD	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No, see Table 4-34
Nitrogen in nitrite	33	0.76	1.93	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Nitrogen in nitrite and nitrate	93	0.96	22.9	TBD	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No, see Table 4-34
Nitrogen, Kjeldahl total	33	1.00	710	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Sulfate	33	1.00	16	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Physical Properties (%)																					
Cumulative percent retained on No. 100 screen	33	1.00	98.9	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Cumulative percent retained on No. 16 screen	33	1.00	11.08	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No

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Analyte	Soil Study Site Summary				Plant Study Site Summary				Invertebrate Study Site Summary				Mammal Organs Study Site Summary				Mammal Carcass Study Site Summary				COPC for Upland?
	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	
Cumulative percent retained on No. 200 screen	33	1.00	99.65	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Cumulative percent retained on No. 30 screen	33	1.00	38.24	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Cumulative percent retained on No. 50 screen	33	1.00	87.04	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Cumulative percent retained on No. 8 screen	33	1.00	0.06	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Fraction coarse sand	33	1.00	27.16	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Fraction coarse silt/silt/clay (less than 0.074 mm)	33	1.00	34.36	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Fraction fine sand	33	1.00	40.59	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Fraction granules (greater than 2.38 mm)	33	1.00	0.06	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Fraction medium sand	33	1.00	63.41	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Fraction total sand	33	1.00	99.65	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Fraction very coarse sand	33	1.00	11.08	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Fraction very fine sand	31	1.00	47.06	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Percent moisture (wet sample)	33	1.00	4.9	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Other																					
pH measurement	33	1.00	9.11	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No
Radionuclides (pCi/g or pCi/g-fw)																					
Americium-241	113	0.00	[0.46]	No	40	0.00	[0.72]	No	--	--	--	--	--	--	--	--	20	0.00	ND	No	No
Antimony-125	--	--	--	--	40	0.00	[0.3]	No	--	--	--	--	--	--	--	--	20	0.00	ND	No	No
Barium-133	--	--	--	--	2	0.00	[0.065]	No	--	--	--	--	--	--	--	--	8	0.00	ND	No	No
Beryllium-7	--	--	--	--	40	0.00	[3.1]	No	--	--	--	--	--	--	--	--	20	0.00	ND	No	No
Cesium-134	113	0.00	[0.24]	No	40	0.00	[0.16]	No	--	--	--	--	--	--	--	--	20	0.00	ND	No	No
Cesium-137	113	0.27	0.362	No	40	0.00	[0.13]	No	--	--	--	--	--	--	--	--	20	0.00	ND	TBD	Yes, see Table 4-34
Cobalt-60	113	0.01	[0.25]	TBD	40	0.00	[0.15]	No	--	--	--	--	--	--	--	--	20	0.00	ND	No	No, see Table 4-34
Curium-244	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Yes, see Table 4-34
Europium-152	113	0.03	0.758	TBD	40	0.00	[0.32]	No	--	--	--	--	--	--	--	--	20	0.00	ND	No	Yes, see Table 4-34
Europium-154	113	0.00	[0.58]	No	40	0.00	[0.4]	No	--	--	--	--	--	--	--	--	20	0.00	ND	No	Yes, see Table 4-34
Europium-155	113	0.01	[0.29]	TBD	40	0.00	[0.35]	No	--	--	--	--	--	--	--	--	20	0.00	ND	No	No, see Table 4-34

Table 4-33. Overview of Statistical Comparisons for Upland Soil and Biotic Tissue Data Collected at 20 Study Sites for the RCBRA Project. (7 Pages)

Analyte	Soil Study Site Summary				Plant Study Site Summary				Invertebrate Study Site Summary				Mammal Organs Study Site Summary				Mammal Carcass Study Site Summary				COPC for Upland?
	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	Number of Samples	Detect Frequency	Maximum Value	COPC Status	
Plutonium-238	113	0.01	1.4	No	40	0.00	[0.087]	No	--	--	--	--	--	--	--	--	20	0.00	ND	No	No
Plutonium-239/240	113	0.02	0.51	No	40	0.03	0.173	TBD	--	--	--	--	--	--	--	--	20	0.00	ND	No	Yes, see Table 4-34
Potassium-40	113	0.10	33	No	40	0.98	13.1	No	--	--	--	--	--	--	--	--	20	0.70	ND	No	No
Radium-226	113	0.96	1.1	No	40	0.00	[0.29]	No	--	--	--	--	--	--	--	--	20	0.00	ND	No	No
Radium-228	113	0.79	1.46	No	40	0.00	[0.65]	No	--	--	--	--	--	--	--	--	20	0.00	ND	No	No
Ruthenium-106	--	--	--	--	40	0.00	[1.2]	No	--	--	--	--	--	--	--	--	20	0.00	ND	No	No
Strontium-90	113	0.02	[0.19]	TBD	40	0.00	[0.13]	No	1	0.00	0	No	--	--	--	--	20	0.10	0.254	No	Yes, see Table 4-34
Thorium-228	113	0.72	0.913	No	40	0.00	[0.118]	No	--	--	--	--	--	--	--	--	20	0.00	ND	No	No
Thorium-230	113	0.47	1.81	No	40	0.10	0.424	No	--	--	--	--	--	--	--	--	20	0.00	ND	No	No
Thorium-232	113	0.77	0.774	No	40	0.00	[0.08]	No	--	--	--	--	--	--	--	--	20	0.00	ND	No	No
Uranium-233/234	113	0.58	0.909	No	40	0.00	[0.052]	No	2	0.00	[0.072]	No	--	--	--	--	20	0.05	0.423	TBD	Yes, see Table 4-34
Uranium-235	113	0.00	[0.101]	No	40	0.00	[0.022]	No	2	0.00	0	No	--	--	--	--	20	0.00	ND	No	No
Uranium-238	113	0.55	0.909	TBD	40	0.03	[0.029]	TBD	2	0.00	0	No	--	--	--	--	20	0.05	0.597	TBD	Yes, see Table 4-34

[value] = not detected
-- = not applicable
BHC = benzene hexachloride
COPC = contaminant of potential concern
fw = fresh weight
ND = nondetect
RCBRA = River Corridor Baseline Risk Assessment
TBD = to be determined

Table 4-34. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status. (7 Pages)

Analyte	COPC?	Explanation
Inorganics		
Aluminum	Yes	No statistical differences based on RCBRA soil or tissue data, but differences for 100-B/C Pilot invertebrate and mammal organ concentrations from RCBRA reference and thus retained as a COPC.
Antimony	Yes	Considered for narrative analyses in soil; soil has statistical difference from reference and background data are nondetects based on a less preferred analytical method. Analyte is on the potential ecorisk driver list and thus retained based on the difference from reference site concentrations. The maximum detect is from the 600-132 waste site. No statistical differences from reference for RCBRA tissue data (plant, invertebrate, or mammal) and 100-B/C Pilot tissues are less than the concentrations reported for RCBRA tissues (Appendix D-3).
Arsenic	Yes	Concentrations in soil at four study sites (116-F-1, 1607-H2, 600-171, 600-208) are greater than other study sites or reference sites, thus retained as COPC; maximum study site arsenic invertebrate concentrations are greater than reference. No differences from reference for other RCBRA tissue data (plant or mammal).
Barium	Yes	Soil concentrations are greater than reference and background (based on Splippage test). No difference of tissues from RCBRA reference.
Beryllium	Yes	No difference for soil, invertebrate, mammal; plants have low detection frequency. One detect in study site plant is within the concentration range of nondetects at reference sites. Identified as COPC based on statistical difference in 100-B/C Pilot mammal-organ (liver/kidney) concentrations compared to RCBRA and 100-B/C Pilot reference (see plots in Appendix D-3).
Boron	Yes	Soil and plant concentrations are greater than reference (Slippage test). No differences from reference for other RCBRA tissue data (invertebrate or mammal).
Cadmium	Yes	Soil concentrations are greater than reference (multiple tests). No differences from reference for RCBRA tissue data (plant, invertebrate, or mammal).
Calculated total uranium	Yes	On inclusion list; concentrations in soil at one waste site (300-49) are greater than other study sites or reference sites. No differences from reference for RCBRA tissue data (plant, invertebrate, or mammal).
Chromium	Yes	On inclusion list; concentrations in soil at two waste sites (100-F-2, 600-139) are greater than other study sites or reference sites (see plots in Appendix D-2). There was also an outlier soil concentration at JA Jones. Chromium was also frequently detected in tissues, but the maximum concentrations were not different for study sites compared to reference sites. No differences from reference for RCBRA tissue data (plant, invertebrate, or mammal).
Cobalt	No	No difference for soil, plant, invertebrate, mammal. Mammal-carcass samples have low detection frequency, one detect in study site mammal, and a detected concentration at the lower end of detection limits in other samples.
Copper	Yes	Soil concentration maximum greater than reference (Slippage test). The majority of soil concentrations at 600-139 are greater than reference site concentrations (see Appendix D-2 for soil concentrations by location). No difference for RCBRA plant, invertebrate, mammal (organ or carcass). BC Pilot invertebrate was greater than RCBRA reference (Slippage test); also greater than 100-B/C Pilot reference (see plots in Appendix D-3).
Hexavalent chromium	Yes	On inclusion list; detected concentrations in soil at one waste site (600-132) are greater than other study sites or reference sites. Not measured in tissues.

Table 4-34. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status. (7 Pages)

Analyte	COPC?	Explanation
Lead	Yes	Soil concentrations are greater than reference and background. Mammal (carcass) is greater than reference (Slippage test, see plot in Appendix D-3). No other RCBRA tissues (plant, invertebrate, mammal-organ) are different from reference. BC Pilot plant and mammal-organ concentrations are not difference from 100-B/C Pilot reference and BC Pilot plant concentrations are less than RCBRA plant concentrations (see plot in Appendix D-3).
Lithium	No	No difference for plant, invertebrate, mammal. No difference in soil from background or reference other than one elevated detection limit.
Manganese	Yes	No difference for RCBRA soil, plant, invertebrate, mammal-carcass. Mammal-organ (liver/kidney) has statistically significant difference between site and reference (Slippage test). Also identified as a COPC based on statistical differences of 100-B/C Pilot invertebrate to RCBRA and 100-B/C Pilot reference concentrations (see plots in Appendix D-3).
Mercury	Yes	On inclusion list. Concentrations in soil at two waste sites (300-49, 600-139) are greater than other study sites or reference sites. There were also two large soil concentrations at 628-1. No differences from reference for RCBRA tissue data (plant, invertebrate, or mammal). Detections in 100-B/C Pilot tissues were less than the detection limits in RCBRA tissues and the range of BC Pilot tissue concentrations were similar to BC Pilot reference (see plots in Appendix D-3).
Molybdenum	No	No difference for invertebrate, mammal. Plant concentrations higher at selected study site, but difference from reference is less than a factor of three (four different sites have the four highest plant concentrations [116-N-3, 300-49, 600-23, 600-208]). Soil did not have difference from reference and no difference in maximum compared to the background data. Only weak evidence to suggest it is elevated relative to background. Strong evidence saying it is not elevated with respect to reference.
Nickel	No	No difference for soil, plant, mammal-organ (liver/kidney), mammal-carcass. Invertebrate has low statistical significance and a minimal difference between site and reference. 100-B/C Pilot plant concentrations had a greater detection frequency than reference, but there was no statistical difference in concentrations.
Phosphorus	No	No difference for soil, plant, invertebrate, mammal-carcass. Mammal-organ (liver/kidney) study site concentrations are statistically greater, but with a low difference in concentrations.
Selenium	Yes	No statistical differences of RCBRA soil or tissues to reference, but there are statistical differences of 100-B/C Pilot mammal-organ (liver) to reference and thus selenium is retained as a COPC.
Silver	Yes	Retained as COPC because concentrations in soil at one waste site (300-49) are greater than other study sites or reference sites. One notable soil detect at about 1 mg/kg at the 600-171 waste site (see plots in Appendix D-2). No differences from reference for RCBRA tissue data (plant, invertebrate, or mammal).
Strontium [elemental]	Yes	RCBRA soil concentrations are greater than reference and retained as a COPC. No differences from reference for RCBRA tissue data based on Slippage test (plant, invertebrate, or mammal).
Thallium	No	Thallium was not frequently detected in RCBRA samples and was not different from reference. Detected values in 100-B/C Pilot tissue samples were less than the detection limits of most RCBRA samples. Concentrations in 100-B/C Pilot tissue samples were similar to 100-B/C Pilot reference samples (see plots in Appendix D-3). Thus, thallium was not identified as a COPC.

Table 4-34. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status. (7 Pages)

Analyte	COPC?	Explanation
Tin	Yes	RCBRA and BC Pilot soil concentrations are greater than reference and retained as a COPC. No differences from reference for RCBRA tissue data (plant, invertebrate, or mammal).
Uranium (inorganic)	Yes	On inclusion list. Calculated total uranium has been retained as a COPC, thus inorganic uranium is also retained as a COPC. One detect at reference site soil. Detected in all five soil samples from 628-1 (see plots in Appendix D-2). No differences from reference for RCBRA tissue data (plant, invertebrate, or mammal).
Vanadium	No	No difference for soil, plant, mammal. Invertebrate has low statistical significance and with a minimal difference between site and reference.
Zinc	Yes	No difference for soil, plant, mammal. Invertebrate not statistically significant for Slippage test. Identified as a COPC based on statistical differences of 100-B/C Pilot invertebrate to RCBRA and 100-B/C Pilot reference concentrations (see plots in Appendix D-3).
Zirconium	No	No difference for invertebrate, mammal. Plant has too few detects to run one of the statistical tests, but the analyte did not fail the chi-square test comparing the frequency of detected values between site and reference. The two detected results were within the range of detected values.
Herbicides		
2-[2,4,5-Trichlorophenoxy]propionic acid	No	Only measured in soil. Detection frequency greater in reference site, and maxima are not statistically different. The slippage test evaluates the upper range of the sample results. The slippage test was used to evaluate the upper values in the data, as well as the more qualitative review of the box plots.
2-secButyl-4,6-dinitrophenol[DNBP]	No	Only measured in soil. Detection frequency greater in study site, but maxima are not statistically different. The slippage test was used to evaluate the upper values in the data, as well as the more qualitative review of the box plots.
2,4-Dichlorophenoxyacetic acid	No	Only measured in soil. Detection frequency and maxima are not statistically different. Shift in quantile is not sufficient to include as COPC. The slippage test was used to evaluate the upper range of the data, as well as the more qualitative review of the box plots. The chi-square is used to determine if there is a statistical difference in the counts of detects and nondetects for study site versus reference site (or background). A difference in the quantile tests suggests a degree if shift in concentrations (the upper 20th percentile). A shift in the slippage test indicated a shift in the maximum concentrations. The tests were meant to identify cases where there would be a gradient in concentrations between study sites and reference.
Dicamba	No	Only measured in soil. Detection frequency greater in reference site, and maxima are not statistically different. The slippage test was used to evaluate the upper values of the data, as well as the more qualitative review of the box plots.
Dichloroprop	Yes	Only measured in soil. Detection frequency equal, but maximum is greater at study sites.
PAH		
2-Methylnaphthalene	Yes	Only detected in soil and no reference soil detects. Other PAH identified as COPCs thus retained. Concentrations not greater than reference for RCBRA tissues.
Acenaphthene	Yes	Detected in soil and no reference soil detects. Other PAH identified as COPCs thus retained. One detect in invertebrates. Concentrations not greater than reference for RCBRA tissues.

Table 4-34. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status. (7 Pages)

Analyte	COPC?	Explanation
Acenaphthylene	Yes	Detected in soil and no reference soil detects. Other PAH identified as COPCs thus retained. One detect in invertebrates. Concentrations not greater than reference for RCBRA tissues.
Benzo[a]anthracene	Yes	Soil concentrations are greater than reference and retained as a COPC. Concentrations not greater than reference for RCBRA tissues.
Benzo[a]pyrene	Yes	Soil concentrations are greater than reference and retained as a COPC. Concentrations not greater than reference for RCBRA tissues.
Benzo[b]fluoranthene	Yes	Soil concentrations are greater than reference and retained as a COPC. Concentrations not greater than reference for RCBRA tissues.
Benzo[ghi]perylene	Yes	Soil concentrations are greater than reference and retained as a COPC. Concentrations not greater than reference for RCBRA tissues.
Benzo[k]fluoranthene	Yes	Soil concentrations are greater than reference and retained as a COPC. Concentrations not greater than reference for RCBRA tissues.
Chrysene	Yes	Soil concentrations are greater than reference and retained as a COPC. Concentrations not greater than reference for RCBRA tissues.
Dibenz[a,h]anthracene	Yes	Soil concentrations are greater than reference and retained as a COPC. Concentrations not greater than reference for RCBRA tissues.
Fluoranthene	Yes	Soil concentrations are greater than reference and retained as a COPC. Concentrations not greater than reference for RCBRA tissues.
Fluorene	Yes	Retained because other PAHs are retained and on the potential ecorisk driver list. Concentrations not greater than reference for RCBRA tissues.
Indeno[1,2,3-cd]pyrene	Yes	Soil concentrations are greater than reference and retained as a COPC. Concentrations not greater than reference for RCBRA tissues.
Naphthalene	Yes	Soil concentrations are greater than reference and retained as a COPC. Concentrations not greater than reference for RCBRA tissues.
Phenanthrene	Yes	Soil concentrations are greater than reference and retained as a COPC. Concentrations not greater than reference for RCBRA tissues.
Pyrene	Yes	Soil concentrations are greater than reference and retained as a COPC. Concentrations not greater than reference for RCBRA tissues.
PCBs		
Aroclor-1248	No	Detection frequency is less than 5% in all media. Detected value in soil is within the range of nondetects.
Aroclor-1254	Yes	Detected in study site soil. No detections in reference site soil thus retained as COPC. Concentrations not greater than reference for RCBRA tissues.
Aroclor-1260	Yes	Detected in study site soil. No detections in reference site soil thus retained as COPC. Concentrations not greater than reference for RCBRA tissues.
Aroclor-1262	Yes	Aroclor-1254 and -1260 were retained as COPCs. These aroclors (Aroclor-1254, Aroclor-1260, Aroclor-1262 combined) were detected in approximately 20% of RCBRA upland soil samples, but were never detected in the reference area. Not measured in RCBRA tissues.
Pesticides		
Aldrin	No	Soil, plant have low detection frequency. Detected concentration less than detection limits in other samples. Detected in mammal-carcass but not significantly different.

Table 4-34. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status. (7 Pages)

Analyte	COPC?	Explanation
Dieldrin	Yes	Detect in plant and soil and no reference site detections. Detected values are greater than the detection limits for most other samples so greater than reference for soil and plant. Not different from reference for other tissues (invertebrate and mammal).
Methoxychlor	Yes	Soil concentrations are greater than reference and retained as a COPC. Concentrations not greater than reference for RCBRA tissues.
BHC Pesticides		
Alpha-BHC	No	Soil, plant have low detection frequency. Detected concentration less than detection limits in other samples.
beta-1,2,3,4,5,6-Hexachlorocyclohexane	Yes	Detected in study site soil and no detections in reference site soil so greater than reference for soil. Not different from reference for tissues (plant, invertebrate, and mammal).
Gamma-BHC (lindane)	No	Not detected in soil. Detection in plant and mammal-carcass are less than detection limits in other samples.
Chlordane Pesticides		
alpha-Chlordane	Yes	Detected in invertebrate and no reference samples. One detect in soil. Detects in plant greater than detection limits.
gamma-Chlordane	Yes	Detected in study soil and no detects in reference soil. Detects in plant greater than most detection limits. Greater than reference for soil and plant. Not different from reference for other tissues (invertebrate and mammal).
DDT+metabolite Pesticide		
DDE	Yes	Soil concentrations are greater than reference so retained as a COPC. Tissues are not different from reference (plant, invertebrate, and mammal).
DDT	Yes	Detected in soil and invertebrate. Detection frequency greater in study site soil and detects at study sites greater than detection limits in most samples. Soil concentrations are greater than reference. Tissues are not different from reference (plant, invertebrate, and mammal). In addition, DDE was identified as COPC thus, DDT+ metabolites are identified.
Endosulfan Pesticides		
Endosulfan I	Yes	All endosulfan compounds are retained based on detection in soil and no detection in reference site. Detected values in soil are greater than detection limits in most samples. Tissues are not different from reference (plant, invertebrate, and mammal).
Endosulfan II	Yes	All endosulfan compounds are retained based on detection in soil and no detection in reference site. Detected values in soil are greater than detection limits in most samples. Tissues are not different from reference (plant, invertebrate, and mammal).
Endosulfan sulfate	Yes	All endosulfan compounds are retained based on detection in soil and no detection in reference site. Detected values in soil are greater than detection limits in most samples. Greater than reference for soil and invertebrate. Not different from reference for other tissues (plant and mammal).
Endrin Pesticides		
Endrin	No	Endrin compounds have low detection frequency and the detected values are within the range of detection limits in other samples.
Endrin aldehyde	No	Endrin compounds have low detection frequency and all but one detected value is within the range of detection limits in other samples.

Table 4-34. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status. (7 Pages)

Analyte	COPC?	Explanation
Endrin ketone	No	Endrin compounds have low detection frequency and the detected values are within the range of detection limits in other samples.
Heptachlor Pesticides		
Heptachlor	No	Heptachlor compounds are detected infrequently and the detected values are within the range of detection limits in other samples. Detections in plant are comparable to reference.
Heptachlor epoxide	No	Heptachlor compounds are detected infrequently and the detected values are within the range of detection limits in other samples.
Phthalates		
Bis[2-ethylhexyl] phthalate	No	Detected in soil, mammal-carcass, and plant. Marginally significant difference in maximum soil concentrations from reference, but not other statistical differences in soil or plant or mammal-carcass. Also a common lab contaminant.
Di-n-butylphthalate	No	Detected in soil. Significant difference in detection frequency, but no difference in range of soil concentrations. Also a common lab contaminant.
Di-n-octylphthalate	No	Detection frequency 5% or less in all media. Detected value in mammal-carcass is within the range of nondetects. Also a common lab contaminant.
Diethylphthalate	No	Detected in plant tissue, but the detected values are less than the detection limits in most samples. Also a common lab contaminant.
Semivolatiles		
3+4 Methylphenol [cresol, m+p]	No	One detect in soil and two detects in mammal-carcass. Detects are less than the range of detect limits in other samples. No clear contaminant signature.
Carbazole	No	Detection frequency is less than 5% in all media. Detects are less than the range of detect limits in other samples.
Dibenzofuran	No	Detection frequency 5% or less in all media. Detects are less than the range of detect limits in other samples.
Pentachlorophenol	No	Detection frequency 5% or less in all media. Detected values in soil are within the range of nondetects.
Other Chemicals		
Nitrogen in nitrate	No	No difference in nitrate or nitrite from Hanford Site background thus not retained. Nitrite/nitrate will be evaluated as potential confounding factors for bioassays.
Nitrogen in nitrite and nitrate	No	No difference in nitrate or nitrite from Hanford Site background thus not retained. Nitrite/nitrate will be evaluated as potential confounding factors for bioassays.
Radionuclides		
Cesium-137	Yes	Greater than reference in 100-B/C Pilot soil samples only. On inclusion list.
Cobalt-60	No	On inclusion list, but only detected in 1 of 113 study site soil samples. Not detected in plant or mammal tissue.
Curium-244	Yes	Only measured in 100-B/C Pilot samples and was detected. No background or reference data.
Europium-152	Yes	On inclusion list, but only detected in 3 of 113 study site soil samples. Not detected in plant or mammal tissue. One 100-B/C Pilot detected result is greater than detection limits in other samples.
Europium-154	Yes	On inclusion list. Only detected in 100-B/C Pilot soil samples. No background detects and greater than reference.

Table 4-34. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status. (7 Pages)

Analyte	COPC?	Explanation
Europium-155	No	Detected in 1 of 113 study site soil samples. Not detected in plant or mammal tissue.
Plutonium-239/240	Yes	On inclusion list, but only detected in 2 of 113 study site soil samples. Detected in plant tissue, but not detected in mammal tissue. Statistically greater than background in 100-B/C Pilot soil samples.
Strontium-90	Yes	On inclusion list, but only detected in 2 of 113 study site soil samples. Detected in mammal tissue, but not detected in plant or invertebrate tissue. Statistically greater than background in 100-B/C Pilot soil samples.
Uranium-233/234	Yes	On inclusion list. Concentrations in soil at one waste site (300-49) are greater than other study sites or reference sites.
Uranium-238	Yes	On inclusion list. Concentrations in soil at one waste site (300-49) are greater than other study sites or reference sites.

BHC = benzene hexachloride
COPC = contaminant of potential concern
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
RCBRA = River Corridor Baseline Risk Assessment

Table 4-35. Summary of Representative Concentration Types for Upland Contaminants of Potential Concern by Media and Data Source.

Data Source	Total Number of Measurements	Number of Nondetect Measurements; No CTE or RME	Representative Concentration Calculation Based on Number of Detects (n)		
			n = 1 or 2; Maximum = CTE CTE = RME	n = 3 or 4; Mean [a] = CTE Maximum = RME	n = 5 or More; Mean [b] = CTE UCL [b] = RME
Soil					
100-B/C Pilot	24	5	0	19	0
RCBRA	2,387	1,173	468	177	569
Plant					
100-B/C Pilot	19	2	4	3	10
RCBRA	1,616	1,237	379	0	0
Terrestrial Invertebrate					
100-B/C Pilot	15	3	12	0	0
RCBRA	743	408	335	0	0
Mouse					
100-B/C Pilot	21	8	0	0	13
RCBRA	2,190	1,592	598	0	0

NOTE: Summary applies to contaminants of potential concern only.
[a] Using Student's t-test statistics.
[b] Using three different methods.
CTE = central tendency exposure
n = number of detects
RCBRA = River Corridor Baseline Risk Assessment
RME = reasonable maximum exposure
UCL = upper confidence limit

Table 4-36. Comparison of Reasonable Maximum Exposure to the Maximum Detected Sample Result.

Media	Number Where the Ratio of Maximum Divided by RME is Less than 0.5	Number Where the Ratio of Maximum Divided by RME is Between 0.5 and 0.8	Number Where the Ratio of Maximum Divided by RME is Between 0.8 and 1.2	Number Where the Ratio of Maximum Divided by RME is Between 1.2 and 1.5	Number Where the Ratio of Maximum Divided by RME is Between 1.5 and 2	Number Where the Ratio of Maximum Divided by RME is Greater than 2
Soil	3	27	1,172	31	0	0
Plant	0	0	386	1	1	8
Terrestrial invertebrate	0	0	350	0	0	0
Mouse	0	0	598	4	2	7
Total	3	27	2,506	36	3	15

NOTE: Summary applies to contaminants of potential concern only.
RME = reasonable maximum exposure

Table 4-37. Cases Where the Reasonable Maximum Exposure is Very Different from the Maximum Detect Value. (2 Pages)

Study Site	COPC	Number of Sample Results	Number of Detects	RME	Maximum Detect	Maximum Divided by RME
Soil MIS (mg/kg)						
Backfill Study Site						
100-D-49	Indeno[1,2,3-cd]pyrene	5	5	0.96	0.45	0.47
Native Soil Study Site						
628-1	DDE	5	5	0.98	0.46	0.47
JA Jones	Phenanthrene	5	5	0.22	0.10	0.47
Plant (mg/kg-fw or pCi/g-fw)						
100-B/C Pilot	Barium	24	24	9.87	29.5	2.98
100-B/C Pilot	Chromium	24	24	0.51	1.86	3.64
100-B/C Pilot	Lead	24	21	0.23	0.67	2.95
100-B/C Pilot	Manganese	24	24	22.2	48.9	2.20
100-B/C Pilot	Mercury	24	14	0.0068	0.021	3.06
100-B/C Pilot	Selenium	24	11	0.071	0.24	3.41
100-B/C Pilot	Strontium-90	24	24	0.34	1.26	3.70
100-B/C Pilot	Uranium (inorganic)	24	15	0.038	0.13	3.38
Mouse Liver (mg/kg-fw)						
100-B/C Pilot	Aluminum	19	19	1.25	4.55	3.65
100-B/C Pilot	Arsenic	19	10	0.11	0.32	2.90
100-B/C Pilot	Barium	19	19	0.055	0.16	2.93
100-B/C Pilot	Beryllium	19	7	0.032	0.085	2.60
100-B/C Pilot	Chromium	19	19	0.060	0.16	2.59

Table 4-37. Cases Where the Reasonable Maximum Exposure is Very Different from the Maximum Detect Value. (2 Pages)

Study Site	COPC	Number of Sample Results	Number of Detects	RME	Maximum Detect	Maximum Divided by RME
100-B/C Pilot	Lead	19	17	0.54	3.09	5.75
100-B/C Pilot	Mercury	19	13	0.021	0.063	2.93

= Higher value between RME and maximum detect.

COPC = contaminant of potential concern
DDE = dichlorodiphenyldichloroethylene
fw = fresh weight
RME = reasonable maximum exposure
MIS = *MULTI INCREMENT*® sampling

Table 4-38. Soil Ecological Risk Screening Values. (5 Pages)

Analyte Name	Analyte Code	Soil Screening Value	Source
Screening Values for Chemical COPCs (mg/kg)[a]			
Plant Receptors			
alpha-Chlordane	5103-71-9	2.2	LA-UR-08-6673
Aluminum	7429-90-5	50	WAC 173-340-900, Table 749-3 (for aluminum, soluble salts)
Antimony	7440-36-0	0.05	LA-UR-08-6673
Aroclor-1254	11097-69-1	40	WAC 173-340-900, Table 749-3 value for total PCBs
Aroclor-1260	11096-82-5	40	WAC 173-340-900, Table 749-3 value for total PCBs
Aroclor-1262	37324-23-5	40	WAC 173-340-900, Table 749-3 value for total PCBs
Arsenic	7440-38-2	10	WAC 173-340-900, Table 749-3 value for Arsenic V
Barium	7440-39-3	110	LA-UR-08-6673
Beryllium	7440-41-7	2.5	LA-UR-08-6673
beta-1,2,3,4,5,6-Hexachlorocyclohexane	319-85-7	NA	NA
Boron	7440-42-8	0.5	WAC 173-340-900, Table 749-3
Cadmium	7440-43-9	4.0	WAC 173-340-900, Table 749-3
Calculated total uranium	NA	250	Sheppard et al. 2005
Chromium	7440-47-3	2.4	LA-UR-08-6673
Copper	7440-50-8	70	OSWER 9285.7-68
Dichlorodiphenyldichloroethylene	72-55-9	NA	NA
Dichlorodiphenyltrichloroethane	50-29-3	4.1	LA-UR-08-6673
Dichloroprop	120-36-5	NA	NA
Dieldrin	60-57-1	10	LA-UR-08-6673
Endosulfan I	959-98-8	NA	NA
Endosulfan II	33213-65-9	NA	NA
Endosulfan sulfate	1031-07-8	NA	NA
gamma-Chlordane	5566-34-7	2.2	LA-UR-08-6673
Hexavalent chromium	18540-29-9	0.35	LA-UR-08-6673
Lead	7439-92-1	50	WAC 173-340-900, Table 749-3
Manganese	7439-96-5	220	OSWER 9285.7-71
Mercury	7439-97-6	0.3	WAC 173-340-900, Table 749-3
Methoxychlor	72-43-5	NA	NA
Selenium	7782-49-2	0.52	OSWER 9285.7-72
Silver	7440-22-4	2.0	WAC 173-340-900, Table 749-3

Table 4-38. Soil Ecological Risk Screening Values. (5 Pages)

Analyte Name	Analyte Code	Soil Screening Value	Source
Strontium (elemental)	7440-24-6	NA	NA
Tin	7440-31-5	50	WAC 173-340-900, Table 749-3
Uranium (inorganic)	7440-61-1	250	Sheppard et al. 2005 substituted for WAC 173-340-900 Table 749-3 value
Zinc	7440-66-6	86	WAC 173-340-900, Table 749-3
Terrestrial Invertebrate Receptors			
alpha-Chlordane	5103-71-9	1.0	WAC 173-340-900, Table 749-3
Aluminum	7429-90-5	NA	NA
Antimony	7440-36-0	78	OSWER 9285.7-61
Aroclor-1254	11097-69-1	NA	NA
Aroclor-1260	11096-82-5	NA	NA
Aroclor-1262	37324-23-5	NA	NA
Arsenic	7440-38-2	6.8	LA-UR-08-6673
Barium	7440-39-3	330	OSWER 9285.7-63
Beryllium	7440-41-7	40	OSWER 9285.7-64
beta-1,2,3,4,5,6-Hexachlorocyclohexane	319-85-7	NA	NA
Boron	7440-42-8	NA	NA
Cadmium	7440-43-9	20	WAC 173-340-900, Table 749-3
Calculated total uranium	NA	100	Sheppard et al. 2005
Chromium	7440-47-3	2.3	LA-UR-08-6673
Copper	7440-50-8	50	WAC 173-340-900, Table 749-3
Dichlorodiphenyldichloroethylene	72-55-9	NA	NA
Dichlorodiphenyltrichloroethane	50-29-3	NA	NA
Dichloroprop	120-36-5	NA	NA
Dieldrin	60-57-1	NA	NA
Endosulfan I	959-98-8	NA	NA
Endosulfan II	33213-65-9	NA	NA
Endosulfan sulfate	1031-07-8	NA	NA
gamma-Chlordane	5566-34-7	1.0	WAC 173-340-900, Table 749-3
Hexavalent chromium	18540-29-9	0.34	LA-UR-08-6673
Lead	7439-92-1	500	WAC 173-340-900, Table 749-3
Manganese	7439-96-5	450	OSWER 9285.7-71
Mercury	7439-97-6	0.05	LA-UR-08-6673
Methoxychlor	72-43-5	NA	NA
Selenium	7782-49-2	4.1	OSWER 9285.7-72
Silver	7440-22-4	NA	NA
Strontium (elemental)	7440-24-6	NA	NA
Tin	7440-31-5	NA	NA
Uranium (inorganic)	7440-61-1	100	Sheppard et al. 2005
Zinc	7440-66-6	120	OSWER 9285.7-73
Wildlife Receptors			
alpha-Chlordane	5103-71-9	0.27	LA-UR-08-6673
Aluminum	7429-90-5	NA	NA
Antimony	7440-36-0	0.26	LA-UR-08-6673
Aroclor-1254	11097-69-1	0.041	LA-UR-08-6673
Aroclor-1260	11096-82-5	0.14	LA-UR-08-6673
Aroclor-1262	37324-23-5	0.65	WAC 173-340-900, Table 749-3 value for total PCBs
Arsenic	7440-38-2	7	WAC 173-340-900, Table 749-3 value for Arsenic III
Barium	7440-39-3	102	OSWER 9285.7-63
Beryllium	7440-41-7	18	LA-UR-08-6673
beta-1,2,3,4,5,6-Hexachlorocyclohexane	319-85-7	0.27	LA-UR-08-6673

Table 4-38. Soil Ecological Risk Screening Values. (5 Pages)

Analyte Name	Analyte Code	Soil Screening Value	Source
Boron	7440-42-8	2.0	LA-UR-08-6673
Cadmium	7440-43-9	0.27	LA-UR-08-6673
Calculated total uranium	NA	3.0	Calculated with CHPRC EcoPRG NOAEL and WAC 173-340-900 Table 749-4 model (shrew)
Chromium	7440-47-3	26	OSWER 9285.7-66
Copper	7440-50-8	15	LA-UR-08-6673
Dichlorodiphenyldichloroethylene	72-55-9	0.021	OSWER 9285.7-63
Dichlorodiphenyltrichloroethane	50-29-3	0.021	OSWER 9285.7-63
Dichloroprop	120-36-5	NA	NA
Dieldrin	60-57-1	0.0045	LA-UR-08-6673
Endosulfan I	959-98-8	0.64	LA-UR-08-6673, used Endosulfan as surrogate
Endosulfan II	33213-65-9	0.64	LA-UR-08-6673, used Endosulfan as surrogate
Endosulfan sulfate	1031-07-8	0.64	LA-UR-08-6673, used Endosulfan as surrogate
gamma-Chlordane	5566-34-7	2.2	LA-UR-08-6673
Hexavalent chromium	18540-29-9	130	OSWER 9285.7-66
Lead	7439-92-1	11	OSWER 9285.7-70
Manganese	7439-96-5	1,400	LA-UR-08-6673
Mercury	7439-97-6	0.013	LA-UR-08-6673
Methoxychlor	72-43-5	5.0	LA-UR-08-6673
Selenium	7782-49-2	0.30	WAC 173-340-900, Table 749-3
Silver	7440-22-4	2.6	LA-UR-08-6673
Strontium (elemental)	7440-24-6	96	LA-UR-08-6673
Tin	7440-31-5	NA	NA
Uranium (inorganic)	7440-61-1	3.0	Calculated with CHPRC EcoPRG NOAEL and WAC 173-340-900 Table 749-4 model (shrew)
Zinc	7440-66-6	46	OSWER 9285.7-73
Screening Values for PAH COPCs (mg/kg)			
Plant Receptors			
Benzo[a] anthracene	56-55-3	18	LA-UR-08-6673
Benzo[a]pyrene	50-32-8	NA	NA
Benzo[b] fluoranthene	205-99-2	18	LA-UR-08-6673
Benzo[ghi] perylene	191-24-2	NA	NA
Benzo[k] fluoranthene	207-08-9	NA	NA
Chrysene	218-01-9	NA	NA
Dibenz[a,h] anthracene	53-70-3	NA	NA
Indeno[1,2,3-cd] pyrene	193-39-5	NA	NA
Pyrene	129-00-0	NA	NA
2-Methyl-naphthalene	91-57-6	NA	NA
Acenaphthene	83-32-9	0.25	LA-UR-08-6673
Acenaphthylene	208-96-8	NA	NA
Anthracene	120-12-7	6.8	LA-UR-08-6673
Fluoranthene	206-44-0	NA	NA
Fluorene	86-73-7	NA	NA
Naphthalene	91-20-3	1	LA-UR-08-6673
Phenanthrene	85-01-8	NA	NA
Terrestrial Invertebrate Receptors			
Benzo[a] anthracene	56-55-3	18	OSWER 9285.7-78
Benzo[a]pyrene	50-32-8	18	OSWER 9285.7-78

Table 4-38. Soil Ecological Risk Screening Values. (5 Pages)

Analyte Name	Analyte Code	Soil Screening Value	Source
Benzo[b] fluoranthene	205-99-2	18	OSWER 9285.7-78
Benzo[ghi] perylene	191-24-2	18	OSWER 9285.7-78
Benzo[k] fluoranthene	207-08-9	18	OSWER 9285.7-78
Chrysene	218-01-9	18	OSWER 9285.7-78
Dibenz[a,h] anthracene	53-70-3	18	OSWER 9285.7-78
Indeno[1,2,3-cd] pyrene	193-39-5	18	OSWER 9285.7-78
Pyrene	129-00-0	18	OSWER 9285.7-78
2-Methyl-naphthalene	91-57-6	29	OSWER 9285.7-78
Acenaphthene	83-32-9	29	OSWER 9285.7-78
Acenaphthylene	208-96-8	29	OSWER 9285.7-78
Anthracene	120-12-7	29	OSWER 9285.7-78
Fluoranthene	206-44-0	29	OSWER 9285.7-78
Fluorene	86-73-7	29	OSWER 9285.7-78
Naphthalene	91-20-3	29	OSWER 9285.7-78
Phenanthrene	85-01-8	29	OSWER 9285.7-78
Wildlife Receptors			
Benzo[a] anthracene	56-55-3	1.1	OSWER 9285.7-78
Benzo[a]pyrene	50-32-8	1.1	OSWER 9285.7-78
Benzo[b] fluoranthene	205-99-2	1.1	OSWER 9285.7-78
Benzo[ghi] perylene	191-24-2	1.1	OSWER 9285.7-78
Benzo[k] fluoranthene	207-08-9	1.1	OSWER 9285.7-78
Chrysene	218-01-9	1.1	OSWER 9285.7-78
Dibenz[a,h] anthracene	53-70-3	1.1	OSWER 9285.7-78
Indeno[1,2,3-cd] pyrene	193-39-5	1.1	OSWER 9285.7-78
Pyrene	129-00-0	1.1	OSWER 9285.7-78
2-Methyl-naphthalene	91-57-6	100	OSWER 9285.7-78
Acenaphthene	83-32-9	100	OSWER 9285.7-78
Acenaphthylene	208-96-8	100	OSWER 9285.7-78
Anthracene	120-12-7	100	OSWER 9285.7-78
Fluoranthene	206-44-0	100	OSWER 9285.7-78
Fluorene	86-73-7	100	OSWER 9285.7-78
Naphthalene	91-20-3	100	OSWER 9285.7-78
Phenanthrene	85-01-8	100	OSWER 9285.7-78
Screening Values for Radionuclide COPECs (pCi/g)			
Plant BCGs			
Cesium-137	10045-97-3	2,210	RESRAD Biota v1.5
Curium-244	13981-15-2	153,000	RESRAD Biota v1.5
Europium-152	14683-23-9	14,700	RESRAD Biota v1.5
Europium-154	15585-10-1	12,500	RESRAD Biota v1.5
Plutonium-239/240	PU-239/240	12,700	RESRAD Biota v1.5
Strontium-90	10098-97-2	3,580	RESRAD Biota v1.5
Uranium-233/234	13966-29-5	51,600	RESRAD Biota v1.5
Uranium-238	U-238	15,700	RESRAD Biota v1.5
Wildlife BCGs			
Cesium-137	10045-97-3	20.8	RESRAD Biota v1.5
Curium-244	13981-15-2	4,060	RESRAD Biota v1.5
Europium-152	14683-23-9	1,520	RESRAD Biota v1.5
Europium-154	15585-10-1	1,290	RESRAD Biota v1.5
Plutonium-239/240	PU-239/240	6,110	RESRAD Biota v1.5
Strontium-90	10098-97-2	22.5	RESRAD Biota v1.5
Uranium-233/234	13966-29-5	5,130	RESRAD Biota v1.5

Table 4-38. Soil Ecological Risk Screening Values. (5 Pages)

Analyte Name	Analyte Code	Soil Screening Value	Source
Uranium-238	U-238	1,580	RESRAD Biota v1.5

[a] PAH are listed separately.

BCG = biota concentration guide
CHPRC = CH2M HILL Plateau Remediation Company
COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern
DOE = U.S. Department of Energy
EcoPRG = Ecological Preliminary Remediation Goal
EPA = U.S. Environmental Protection Agency
LANL = Los Alamos National Laboratory
NA = not available
NOAEL = no observable adverse effect level
PAH = polycyclic aromatic hydrocarbons
RESRAD = RESidual RADioactivity
WAC = *Washington Administrative Code*

LA-UR-08-6673, 2008, Ecorisk Database (Release 2.3), Los Alamos National Laboratory, Los Alamos, New Mexico.
OSWER Directive 9285.7-63, 2005, *Ecological Soil Screening Levels for Barium: Interim Final*, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-66, 2005, *Ecological Soil Screening Levels for Chromium: Interim Final*, revised 2008, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-68, 2006, *Ecological Soil Screening Levels for Copper: Interim Final*, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-71, 2007, *Ecological Soil Screening Levels for Manganese: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-72, 2007, *Ecological Soil Screening Levels for Selenium: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-73, 2007, *Ecological Soil Screening Levels for Zinc: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-78, 2007, *Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs): Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
RESRAD BIOTA Software Version 1.5. Available online at: http://www.ead.anl.gov/resrad/.
Sheppard, S. C., M. I. Sheppard, M. O. Gallerand, and B. Sanipelli, 2005, "Derivation of Ecotoxicity Thresholds for Uranium," *Journal Environmental Radioactivity* 79:55-83.
WAC 173-340-900, "Tables," *Washington Administrative Code*, as amended.

Table 4-39. Screening Results for Upland Contaminants of Potential Concern in Study Site Soil (Except Radionuclides and Polycyclic Aromatic Hydrocarbons). (3 Pages)

Contaminant of Potential Concern	Number of Analyses	Number of Nonzero Results	Maximum RME (mg/kg)	Soil Screening Value (mg/kg)			COPEC?	Reason
				Plant	Terrestrial Invertebrate	Wildlife		
alpha-Chlordane	20	1	0.0061	2.2	1	0.27	No	RME < all SSV
Aluminum	21	21	9,200	50	NA	NA	No	[a]
Antimony	21	7	6.1	0.05	78	0.26	Yes	RME > plant and wildlife SSV
Aroclor-1254	21	6	13.5	40	NA	0.041	Yes	RME > wildlife SSV
Aroclor-1260	21	6	0.13	40	NA	0.14	Yes	Data gap (terrestrial invertebrate)
Aroclor-1262	20	1	0.063	40	NA	0.65	Yes	Data gap (terrestrial invertebrate)
Arsenic	21	21	14	10	6.8	7	Yes	RME > all SSV
Barium	21	21	410	110	330	102	Yes	RME > > all SSV
Beryllium	21	20	0.8	2.5	40	18	No	RME < all SSV
beta-1,2,3,4,5,6-Hexachlorocyclohexane	20	4	0.0039	NA	NA	0.27	Yes	Data gap (plant and terrestrial invertebrate)
Boron	21	20	36	0.5	NA	2	Yes	RME > plant and wildlife SSV
Cadmium	21	15	1.1	4	20	0.27	Yes	RME > wildlife SSV
Calculated total uranium	20	18	2.60	250	100	3	Yes	[b]
Chromium	21	21	21.8	2.4	2.3	26	Yes	RME > plant and terrestrial invertebrate SSV
Copper	21	21	58	70	50	15	Yes	RME > terrestrial invertebrate and wildlife SSV
DDE	20	8	0.978	NA	NA	0.21	Yes	RME > wildlife SSV
DDT	20	6	1.1	4.1	NA	0.21	Yes	RME > wildlife SSV
Dichloroprop	17	15	1.46	NA	NA	NA	Yes	Data gap (all)
Dieldrin	20	4	0.0066	10	NA	0.0045	Yes	RME > wildlife SSV
Endosulfan I	20	4	0.0027	NA	NA	0.64	Yes	Data gap (plant and terrestrial invertebrate)
Endosulfan II	20	1	0.0065	NA	NA	0.64	Yes	Data gap (plant and terrestrial invertebrate)
Endosulfan sulfate	20	3	0.018	NA	NA	0.64	Yes	Data gap (plant and terrestrial invertebrate)

Table 4-39. Screening Results for Upland Contaminants of Potential Concern in Study Site Soil (Except Radionuclides and Polycyclic Aromatic Hydrocarbons). (3 Pages)

Contaminant of Potential Concern	Number of Analyses	Number of Nonzero Results	Maximum RME (mg/kg)	Soil Screening Value (mg/kg)			COPEC?	Reason
				Plant	Terrestrial Invertebrate	Wildlife		
gamma-Chlordane	20	3	0.0054	2.24	1	2.2	No	RME < all SSV
Hexavalent chromium	20	18	0.708	0.35	0.34	130	Yes	RME > plant and invertebrate SSV
Lead	21	21	510	50	500	11	Yes	RME > all SSV
Manganese	21	21	420	220	450	1400	Yes	RME > plant SSV
Mercury	21	9	0.143	0.3	0.05	0.013	Yes	RME > terrestrial invertebrate and wildlife SSV
Methoxychlor	20	5	0.01	NA	NA	5	Yes	Data gap (plant and terrestrial invertebrate)
Selenium	21	3	0.73	0.52	4.1	0.3	Yes	RME > plant and wildlife SSV
Silver	21	2	0.45	2	NA	2.6	Yes	Data gap (plant)
Strontium (elemental)	21	21	281	NA	NA	96	Yes	RME > wildlife SSV
Tin	21	9	93.7[c]	50	NA	NA	Yes	RME > plant SSV; Maximum value in BC Pilot samples
Uranium (inorganic)	21	7	3.10	250	100	3	Yes	RME > wildlife SSV
Zinc	21	21	88	86	120	46	Yes	RME > plant and wildlife SSV
Discrete Soil Samples in Rare Plant Habitat (Plant Screening Only)								
alpha-Chlordane	6	0	--	2.2	--	--	No	Not detected in discrete samples
Aluminum	6	6	4790	50	--	--	No	[a]
Antimony	6	0	--	0.05	--	--	No	Not detected in discrete samples
Aroclor-1254	6	1	0.17	40	--	--	No	RME < plant SSV
Aroclor-1260	6	1	0.0069	40	--	--	No	RME < plant SSV
Aroclor-1262	6	0	--	40	--	--	No	Not detected in discrete samples
Arsenic	6	4	5.3	10	--	--	No	RME < plant SSV
Barium	6	6	68.1	110	--	--	No	RME < plant SSV
Beryllium	6	6	0.28	2.5	--	--	No	RME < plant SSV
beta-1,2,3,4,5,6-Hexachlorocyclohexane	6	1	0.0013	NA	--	--	Yes	Data gap
Boron	6	2	3.6	0.5	--	--	Yes	RME > plant SSV
Cadmium	6	1	0.26	4	--	--	No	RME < plant SSV

Table 4-39. Screening Results for Upland Contaminants of Potential Concern in Study Site Soil (Except Radionuclides and Polycyclic Aromatic Hydrocarbons). (3 Pages)

Contaminant of Potential Concern	Number of Analyses	Number of Nonzero Results	Maximum RME (mg/kg)	Soil Screening Value (mg/kg)			COPEC?	Reason
				Plant	Terrestrial Invertebrate	Wildlife		
Calculated total uranium	6	6	1.6	250	--	--	No	RME < plant SSV
Chromium	6	6	12.7	2.4	--	--	Yes	RME > plant SSV
Copper	6	6	13.2	70	--	--	No	RME < plant SSV
DDE	6	1	0.0065	NA	--	--	Yes	Data gap
DDT	6	0	--	4.1	--	--	No	Not detected in discrete samples
Dichloroprop	6	1	0.036	NA	--	--	Yes	Data gap
Dieldrin	6	0	--	10	--	--	No	Not detected in discrete samples
Endosulfan I	6	2	0.00067	NA	--	--	Yes	Data gap
Endosulfan II	6	0	--	NA	--	--	No	Not detected in discrete samples
Endosulfan sulfate	6	0	--	NA	--	--	No	Not detected in discrete samples
gamma-Chlordane	6	1	0.0017	2.24	--	--	No	RME < plant SSV
Hexavalent chromium	6	6	0.39	0.35	--	--	Yes	RME > plant SSV
Lead	6	6	33.1	50	--	--	No	RME < plant SSV
Manganese	6	6	314	220	--	--	Yes	RME > plant SSV
Mercury	6	0	--	0.3	--	--	No	Not detected in discrete samples
Methoxychlor	6	2	0.0006	NA	--	--	Yes	Data gap
Selenium	6	0	--	0.52	--	--	No	Not detected in discrete samples
Silver	6	1	1.2	2	--	--	No	RME < plant SSV
Strontium (elemental)	6	6	35.2	NA	--	--	Yes	Data gap
Tin	6	0	--	50	--	--	No	Not detected in discrete samples
Uranium (inorganic)	6	1	2.8	250	--	--	No	RME < plant SSV
Zinc	6	6	60.7	86	--	--	No	RME < plant SSV

[a] The Eco-SSL indicates aluminum toxicity based on pH, specifically pH <5.5, and therefore aluminum nontoxic in RCBRA soil circumneutral pH range (OSWER Directive 9285.7-60, 2003, *Ecological Soil Screening Levels for Aluminum: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.).

[b] Identified as COPEC because uranium (inorganic) was identified as a COPEC.

-- = not applicable
COPEC = contaminant of potential ecological concern
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
Eco-SSL = ecological soil screening level
HQ = hazard quotient
NA = not available
ND = not detected
RCBRA = River Corridor Baseline Risk Assessment
RME = reasonable maximum exposure
SSV = soil screening value

Table 4-40. Evaluation of Hazard Index for Polycyclic Aromatic Hydrocarbons in Study Site Soil. (2 Pages)

Contaminant of Potential Concern	Number of Analyses	Number of Nonzero Results	Maximum RME (mg/kg)	Soil Screening Value (mg/kg)			Ratio (Maximum RME/SSV)			COPEC?		
				Plant	Terrestrial Invertebrate	Wildlife	Plant	Terrestrial Invertebrate	Wildlife	Plant	Terrestrial Invertebrate	Wildlife
PAH Type: High Molecular Weight												
Benzo[a] anthracene	20	17	1.12	18	18	1.1	0.06	0.062	1.022	No	No	Yes
Benzo[a]pyrene	20	16	1.17	NA	18	1.1	NA	0.065	1.062	No	No	Yes
Benzo[b] fluoranthene	20	18	0.907	18	18	1.1	0.05	0.050	0.825	No	No	No
Benzo[ghi] perylene	20	17	0.4	NA	18	1.1	NA	0.022	0.364	No	No	No
Benzo[k] fluoranthene	20	15	0.475	NA	18	1.1	NA	0.026	0.432	No	No	No
Chrysene	20	20	1.88	NA	18	1.1	NA	0.105	1.712	No	No	Yes
Dibenz[a,h] anthracene	20	11	0.119	NA	18	1.1	NA	0.007	0.108	No	No	No
Indeno[1,2,3-cd] pyrene	20	14	0.957	NA	18	1.1	NA	0.053	0.870	No	No	No
Pyrene	20	19	2.30	NA	18	1.1	NA	0.128	2.090	No	No	Yes
HMW Hazard Index								**0.518**	**8.484**	**--**	**No**	**Yes**
PAH Type: Low Molecular Weight												
2-Methyl-naphthalene	20	3	0.26	NA	29	100	NA	0.009	0.003	No	No	No
Acenaphthene	20	10	0.365	0.25	29	100	1.8	0.013	0.004	See text	No	No
Acenaphthylene	20	5	0.74	NA	29	100	NA	0.026	0.007	No	No	No
Anthracene	20	11	0.11	6.8	29	100	0.02	0.004	0.001	No	No	No
Fluoranthene	20	17	2.88	NA	29	100	NA	0.099	0.029	No	No	No
Fluorene	20	11	0.038	NA	29	100	NA	0.001	0.000	No	No	No
Naphthalene	20	8	0.27	1	29	100	0.27	0.009	0.003	No	No	No
Phenanthrene	20	19	1.31	NA	29	100	NA	0.045	0.013	No	No	No
LMW Hazard Index								**0.206**	**0.060**	**--**	**No**	**No**
Discrete Soil Samples in Rare Plant Habitat (Plant Screening Only)												
PAH Type: High Molecular Weight												
Benzo[a] anthracene	6	3	0.031	18	--	--	0.0017	--	--	No	--	--
Benzo[a]pyrene	6	3	0.049	NA	--	--	--	--	--	No	--	--
Benzo[b] fluoranthene	6	3	0.11	18	--	--	0.0061	--	--	No	--	--

Table 4-40. Evaluation of Hazard Index for Polycyclic Aromatic Hydrocarbons in Study Site Soil. (2 Pages)

Contaminant of Potential Concern	Number of Analyses	Number of Nonzero Results	Maximum RME (mg/kg)	Soil Screening Value (mg/kg)			Ratio (Maximum RME/SSV)			COPEC?		
				Plant	Terrestrial Invertebrate	Wildlife	Plant	Terrestrial Invertebrate	Wildlife	Plant	Terrestrial Invertebrate	Wildlife
Benzo[ghi] perylene	6	1	0.072	NA	--	--	--	--	--	No	--	--
Benzo[k] fluoranthene	6	2	0.025	NA	--	--	--	--	--	No	--	--
Chrysene	6	1	0.048	NA	--	--	--	--	--	No	--	--
Dibenz[a,h] anthracene	6	1	0.0081	NA	--	--	--	--	--	No	--	--
Indeno[1,2,3-cd] pyrene	6	1	0.16	NA	--	--	--	--	--	No	--	--
Pyrene	6	4	0.1	NA	--	--	--	--	--	No	--	--
HMW Hazard Index							**0.0071**	**--**	**--**	**No**	**--**	**--**
PAH Type: Low Molecular Weight												
2-Methyl-naphthalene	6	1	0.044	NA	--	--	--	--	--	No	--	--
Acenaphthene	6	1	0.1	0.25	--	--	0.4	--	--	No	--	--
Acenaphthylene	6	0	--	NA	--	--	--	--	--	No	--	--
Anthracene	6	2	0.0032	6.8	--	--	0.02	--	--	No	--	--
Fluoranthene	6	2	0.34	NA	--	--	--	--	--	No	--	--
Fluorene	6	1	0.0046	NA	--	--	--	--	--	No	--	--
Naphthalene	6	1	0.099	1	--	--	0.099	--	--	No	--	--
Phenanthrene	6	5	0.093	NA	--	--	--	--	--	No	--	--
LMW Hazard Index							**0.52**	**--**	**--**	**No**	**--**	**--**

-- = not applicable
COPEC = contaminant of potential ecological concern
HMW = high molecular weight
LMW = low molecular weight
NA = not available
PAH = polycyclic aromatic hydrocarbons
RME = reasonable maximum exposure
SSV = soil screening value

Table 4-41. Evaluation of Sum of Fractions and Dose for Radionuclides in Study Site Soil.

Contaminant of Potential Concern	Number of Analyses	Number of Nonzero Results	Maximum RME (pCi/g)	Biota Concentration Guide (pCi/g)		Ratio (Maximum RME/BCG)	
				Plant	Wildlife	Plant	Wildlife
Cesium-137	21	13	1.92	2,210	20.8	0.00087	0.092
Curium-244	1	1	0.001	153,000	4,060	<0.0001	<0.0001
Europium-152	21	2	4.04	14,700	1,520	0.00027	0.0027
Europium-154	21	1	0.30	12,500	1,290	<0.0001	0.00023
Plutonium-239/240	21	3	0.530	12,700	6,110	<0.0001	<0.0001
Strontium-90	21	3	1.03	3,580	22.5	0.00029	0.046
Uranium-233/234	20	17	0.933	51,600	5,130	<0.0001	0.00018
Uranium-238	20	18	0.863	15,700	1,580	<0.0001	<0.0001
					Sum of Fractions:	**0.0016**	**0.142**
					Dose (rad/day):	**0.002**	**0.014**
					Dose Threshold (rad/day):	**1**	**0.1**
Discrete Soil Samples in Rare Plant Habitat (Plant Screening Only)							
Cesium-137	6	2	0.362	2,210	--	0.00164	--
Curium-244	NM	--	--	153,000	--	--	--
Europium-152	6	0	--	14,700	--	--	--
Europium-154	6	0	--	12,500	--	--	--
Plutonium-239/240	6	0	--	12,700	--	--	--
Strontium-90	6	0	--	3,580	--	--	--
Uranium-233/234	6	6	0.603	51,600	--	0.00012	--
Uranium-238	6	6	0.529	15,700	--	0.000034	--
					Sum of Fractions:	**0.00021**	**--**
					Dose (rad/day):	**0.0002**	**--**
					Dose Threshold (rad/day):	**1**	**--**

-- = not applicable
BCG = biota concentration guideline
CTE = central tendency exposure
NM = not measured
RME = reasonable maximum exposure

Table 4-42. Plant Benchmarks. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Source	Test Species	Duration	Soil pH	Organic Matter (%)	General Effect Endpoint	Specific Effect Endpoint	Effect Level (mg/kg)	Confidence	Secondary Source	Notes	Selected Plant Benchmark (mg/kg)
Antimony	Unspecified	WAC 173-340-900, Table 749-3	NA	Unspecified, assumed subchronic	Unspecified	Unspecified	Unspecified	Unspecified	5	Low	ES/ER/TM-85/R3	No EPA Eco-SSL available to replace low confidence WAC value.	5
Antimony	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Arsenic	As(V)	WAC 173-340-900, Table 749-3	Multiple species	Multiple duration	5 - 7	1 - 6	Multiple effects	Multiple endpoints	10	Moderate	ES/ER/TM-85-R3	Studies considered growth (weight, height) and reproduction (yield). Lowest value with at least moderate confidence.	10
Arsenic	Unspecified in primary source	Eco-SSL OSWER Directive 9285.7-62	Multiple species	Chronic	5.6 - 7.9	0.7 - 1.1	Growth	MATC based on multiple endpoints	18	Moderate-high	Multiple studies	Not selected because WAC 173-340-900, Table 749-3 value of moderate confidence available.	--
Barium	Barium nitrate	WAC 173-340-900, Table 749-3	Barley	14 days	7.1 - 8.4	1.0 - 2.4	Growth	Shoot growth reduced 38%	500	Low	ES/ER/TM-85/R3	Based on Chaudhry et al. (1977), lowest low effect level between two species (barley and bush beans), low effect range: 500 – 2,000 mg/kg, no effect for beans at 1,000 mg/kg. No higher confidence value available.	500
Barium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Boron	Boric acid	WAC 173-340-900, Table 749-3	Corn	4 weeks	5.7	6	Growth	Growth reduced 37%	0.5	Low	ES/ER/TM-85/R3	WAC value based on John et al. (1977), as cited in ES/ER/TM-85/R3; specifically, low end of concentration range associated with effects. No EPA Eco-SSL available to replace low confidence WAC value.	0.5
Boron	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Cadmium	Multiple forms	WAC 173-340-900, Table 749-3	Multiple species	Multiple durations	Multiple pH and unspecified pH	Multiple OM and unspecified OM in secondary source	Multiple effects	Multiple endpoints	4	High	ES/ER/TM-85/R3	Confidence in a benchmark value of 4 mg/kg Cd is high because of the high number (74) of values available for its derivation. Approximately 40% of the concentrations responsible for greater than 20% reductions in plant growth parameters fall between 1 and 10 mg/kg Cd added to soil. Lowest value with at least moderate confidence.	4
Cadmium	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-65	Multiple species	Chronic	4.2 - 6.9	0.1 - 4.43	Growth	MATC	32	Moderate-high	Multiple studies	GMM of MATC values. Not selected because WAC 173-340-900, Table 749-3 value of high confidence available.	--
Chromium	--	WAC 173-340-900, Table 749-3	--	--	--	--	--	--	42	--	--	WAC value is Washington state background concentration. Selected because only low confidence benchmark available from preferred sources.	42
Chromium	Cr(VI)	ES/ER/TM-85/R3	Multiple species	Multiple durations	Multiple pH and unspecified pH in secondary source	Multiple OM and unspecified OM in secondary source	Growth effects and unspecified effects in secondary source	Multiple endpoints	1	Low	Multiple studies	Not selected due to low confidence level.	--
Chromium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Copper	Copper sulfate	WAC 173-340-900, Table 749-3	Bush bean	17 days	Unspecified	Unspecified	Growth	No effect on leaf weight	100	Low	ES/ER/TM-85-R3	Not selected due to low confidence level because based on less than 10 values.	--
Copper	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-68	Multiple species	Chronic	4.4 - 6.4	0.98 - 2.8	Growth and reproduction	EC_{10} and MATC	70	Moderate-high	Multiple studies	GMM of MATC and EC_{10} values. Lowest value with at least moderate confidence.	70

Table 4-42. Plant Benchmarks. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Source	Test Species	Duration	Soil pH	Organic Matter (%)	General Effect Endpoint	Specific Effect Endpoint	Effect Level (mg/kg)	Confidence	Secondary Source	Notes	Selected Plant Benchmark (mg/kg)
Hexavalent chromium	--	WAC 173-340-900, Table 749-3	--	--	--	--	--	--	--	--	--	--	--
Hexavalent chromium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Lead	Multiple forms	WAC 173-340-900, Table 749-3	Multiple species	17 days	3 - 8	1.5 - 45.3	Multiple endpoints	Reduced shoot, root weight, transpiration	50	Moderate	ES/ER/TM-85-R3	Moderate confidence is assumed for the 50 mg/kg benchmark for lead because it is based on 17 values from experiments conducted with a range of different plant species. Lowest value with at least moderate confidence.	50
Lead	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-70	Multiple species	Chronic	4 - 6.7	0.1 - 3.11	Growth	MATC	120	Moderate-high	Multiple studies	Not selected because WAC 173-340-900, Table 749-3 value of moderate confidence available.	--
Manganese	--	WAC 173-340-900, Table 749-3	--	--	--	--	--	--	1,100	--	--	WAC value is Washington state background concentration.	--
Manganese	MnSO4	ES/ER/TM-85-R3	Bush beans	Chronic	Unspecified	Unspecified	Growth	Stem weight	500	Low	Wallace et al. 1977	Because 500 mg/kg benchmark for Mn is based on one study, confidence in it is low.	--
Manganese	Unspecified in secondary source	OSWER Directive 9285.7-71	Multiple species	Chronic	4.6 - 7.3	0.017 - 4.24	Growth	MATC	220	Moderate-high	Multiple studies	EPA Eco-SSL available to replace non-toxicity based WAC value.	220
Mercury	Unspecified	WAC 173-340-900, Table 749-3	Unspecified	Unspecified	Unspecified	Unspecified	Unspecified	Unspecified	0.3	Low	ES/ER/TM-85-R3	No higher confidence value available.	0.3
Mercury	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Selenium	Sodium selenate	WAC 173-340-900, Table 749-3	Sorgrass	42 days	6	18.5	Growth	53% reduction in shoot weight	1	Low	ES/ER/TM-85/R3	Based on one study, Carlson et al. (1991), and therefore attributed low confidence. Not selected due to low confidence level.	--
Selenium	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-72	Multiple species	Chronic	6.3 - 8	0.1 - 1.1	Growth	EC_{20} and MATC	0.52	Moderate-high	Multiple studies	GMM of EC_{20} and MATC values. Lowest value with at least moderate confidence.	0.52
Silver	Unspecified in primary source	WAC 173-340-900, Table 749-3	Unspecified	Unspecified	Unspecified	Unspecified	Unspecified	Unspecified	2	Low	ES/ER/TM-85-R3	Based on one study, Kabata-Pendias and Pendias (1984), and therefore attributed low confidence. Not selected due to low confidence level.	--
Silver	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-77	Multiple species	Chronic	7.4	0.17 - 2.8	Growth	MATC	560	Moderate-high	Weaver and Klarich 1973	Based on GMM of MATC values from Weaver and Klarich (1973). GMM is the lowest value with at least moderate confidence.	560
Strontium	--	WAC 173-340-900, Table 749-3	--	--	--	--	--	--	--	--	--	--	--
Strontium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Tin	Unspecified	WAC 173-340-900, Table 749-3	Unspecified	Unspecified	Unspecified	Unspecified	Unspecified	Unspecified	50	Low	ES/ER/TM-85/R3	Unspecified toxic effect on plants grown in surface soil (Kabata-Pendias and Pendias 1984). Adopted benchmark selected in secondary source. No EPA Eco-SSL available to replace low confidence WAC value.	50
Tin	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Uranium	Uranyl nitrate	WAC 173-340-900, Table 749-3	Swiss chard	Chronic	3 - 6	Unspecified and 92% in secondary source	Growth	Root weight	5	Low	ES/ER/TM-85/R3	WAC value of 5 mg/kg, as reported in ES/ER/TM-85/R3 (based on Sheppard et al. 1983) is in error and therefore not used.	--
Uranium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--

Table 4-42. Plant Benchmarks. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Source	Test Species	Duration	Soil pH	Organic Matter (%)	General Effect Endpoint	Specific Effect Endpoint	Effect Level (mg/kg)	Confidence	Secondary Source	Notes	Selected Plant Benchmark (mg/kg)
Uranium	Multiple forms	Sheppard et al. 2005	Multiple species	Chronic	Unspecified in secondary source	Unspecified in secondary source	Multiple effects	Multiple endpoints	250	High	Multiple studies	Sheppard et al. (2005) report probable no effects concentration.	250
Zinc	--	WAC 173-340-900, Table 749-3	--	--	--	--	--	--	86	--	--	WAC value is Washington state background concentration.	--
Zinc	Multiple forms	ES/ER/TM-85/R3	Multiple species	Chronic	Multiple pH	Unspecified	Multiple	Multiple	50	Moderate	Multiple studies	Lowest value with at least moderate confidence.	50
Zinc	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-73	Multiple species	Chronic	4.3 - 6.5	0.8 - 2.6	Growth	MATC	160	Moderate-high	Multiple studies	Not selected because WAC 173-340-900, Table 749-3 value of moderate confidence available.	--
Benzo(a)pyrene	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Benzo(ghi)perylene	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Benzo(ghi)perylene	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Chrysene	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Chrysene	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Dibenz(ah)anthracene	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Dibenz(ah)anthracene	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Indeno[1,2,3cd] pyrene	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Indeno[1,2,3cd] pyrene	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Pyrene	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--

Table 4-42. Plant Benchmarks. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Source	Test Species	Duration	Soil pH	Organic Matter (%)	General Effect Endpoint	Specific Effect Endpoint	Effect Level (mg/kg)	Confidence	Secondary Source	Notes	Selected Plant Benchmark (mg/kg)
Pyrene	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1254	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1254	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1260	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1260	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1262	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1262	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Dichloroprop	--	No WAC 1 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Dichloroprop	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
beta-1,2,3,4,5,6-Hexachlorocyclohexane	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
beta-1,2,3,4,5,6-Hexachlorocyclohexane	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
DDE	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
DDE	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
DDT	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
DDT	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Dieldrin	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Dieldrin	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Endosulfan I	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Endosulfan I	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Endosulfan II	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Endosulfan II	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--

Table 4-42. Plant Benchmarks. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Source	Test Species	Duration	Soil pH	Organic Matter (%)	General Effect Endpoint	Specific Effect Endpoint	Effect Level (mg/kg)	Confidence	Secondary Source	Notes	Selected Plant Benchmark (mg/kg)
Endosulfan sulfate	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Endosulfan sulfate	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Methoxychlor	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Methoxychlor	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--

-- = not applicable
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
EC = effective concentration x % of the test population
Eco-SSL = ecological soil screening level
EPA = U.S. Environmental Protection Agency
GMM = geometric mean
MATC = maximum acceptable toxicant concentration
NA = not available
OM = organic matter
WAC = *Washington Administrative Code*

Carlson, C. L., D. C. Adriano, K. S. Sajwan, S. L. Abels, D. P. Thoma, and J. T. Driver, 1991, "Effects of Selected Trace Metals on Germinating Seeds of Six Plant Species," *Water Air Soil Pollut.* 59:231-240.

Chaudhry, F. M., A. Wallace, and R. T. Meuller, 1977, "Barium Toxicity in Plants," *Commun. Soil Sci. Plant Anal.*, 8(9):795-797.

ES/ER/TM-85/R3, 1997, *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision*, Prepared for the U.S. Department of Energy Office of Environmental Management by Lockheed Martin Energy Systems, Inc., Oak Ridge, Tennessee.

John, M. K., H. H. Chuah, and C. J. Van Laerhoven, 1977, "Boron Response and Toxicity as Affected by Soil Properties and Rates of Boron," *Soil Sci.*, 124:34-39.

Kabata-Pendias, A. and H. Pendias, 1984, *Trace Elements in Soils and Plants*, CRC Press, Inc. Boca Raton, Florida.

OSWER Directive 9285.7-62, 2005, *Ecological Soil Screening Levels for Arsenic: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-63, 2005, *Ecological Soil Screening Levels for Barium: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-65, 2005, *Ecological Soil Screening Levels for Cadmium: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-68, 2006, *Ecological Soil Screening Levels for Copper: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-70, 2005, *Ecological Soil Screening Levels for Lead: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-71, 2007, *Ecological Soil Screening Levels for Manganese: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-72, 2007, *Ecological Soil Screening Levels for Selenium: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-73, 2007, *Ecological Soil Screening Levels for Zinc: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-77, 2006, *Ecological Soil Screening Levels for Silver: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

Sheppard M.I., T. T. Vandergraaf, D. H. Thibault, J. A. K. Reid, 1983, "Technetium and Uranium: Sorption by and Plant Uptake from Peat and Sand," Health Physics 44:635-643.

Sheppard, S. C., M. I. Sheppard, M. O. Gallerand, and B. Sanipelli, 2005, "Derivation of Ecotoxicity Thresholds for Uranium," *Journal Environmental Radioactivity* 79:55-83.

WAC 173-340-900, "Tables," *Washington Administrative Code*, as amended.

Wallace, A., G. V. Alexander, and F. M. Chaudhry, 1977, "Phytotoxicity and Some Interactions of the Essential Trace Metals Iron, Manganese, Molybdenum, Zinc, Copper, and Boron," Commun. Soil Sci. Plant Anal. 8(9):741-50.

Weaver, T. W. III. and Klarich, D. 1973. Ecological Effects of Silver Iodide in Terrestrial Ecosystems: A Preliminary Study, Section 3. In: Final Res Rep No.42, Impacts of Induced Rainfall on the Great Plains of Montana, Mont.Agric.Exp Stn., Montana State Univ., MT: 18

Table 4-43. Invertebrate Benchmarks. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Source	Test Species	Duration	Soil pH	Organic Matter (%)	General Effect Endpoint	Specific Effect Endpoint	Effect Level (mg/kg)	Confidence	Secondary Source	Notes	Selected Invertebrate Benchmark (mg/kg)
Antimony	Unspecified in secondary source	OSWER Directive 9285.7-61	Multiple species	Unspecified, assumed subchronic	4.08-5.29	1.2	Reproduction	EC20	78	Moderate-high	Multiple studies	Sufficient details on studies to justify using effect level. No WAC 173 340 900, Table 749-3 value available to replace EPA Eco-SSL.	78
Arsenic	Potassium arsenate	WAC 173-340-900, Table 749-3	Earthworm	56 days	Unspecified	Unspecified	Reproduction	Progeny count	60	Low	ES/ER/TM-126/R2	68 mg/kg is lowest concentration tested (Fischer and Koszorus 1992). It is unclear how the concentration of 60 was derived for an effect level in ES/ER/TM-126/R2. No EPA Eco-SSL available to replace low confidence WAC value.	60
Arsenic	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Barium	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Barium	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-63	Multiple species	Chronic	4.26 - 5.29	1.2	Reproduction	EC_{20}	330	Moderate-high	Multiple studies	GMM of three EC_{20} values, lowest value of at least moderate confidence.	330
Boron	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Boron	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Cadmium	Multiple forms	WAC 173-340-900, Table 749-3	Multiple species	Chronic	Multiple and unspecified pH	Multiple and unspecified OM	Multiple	Multiple	20	Moderate	ES/ER/TM-126/R2	A benchmark of 20 mg/kg was computed for Cd on the basis of the 18 available concentrations causing toxicity; therefore, confidence in this benchmark is moderate. Lowest value of at least moderate confidence.	20
Cadmium	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-65	Multiple species	Chronic	4.5 - 6	10	Reproduction, growth and population effects	Multiple	140	Moderate-high	Multiple studies	Not selected because WAC 173-340-900, Table 749-3 value of moderate confidence available	--
Chromium	--	WAC 173-340-900, Table 749-3	--	--	--	--	--	--	42	--	--	WAC value is Washington state background concentration. Selected because only low confidence benchmark available from preferred sources.	42
Chromium	Multiple forms	ES/ER/TM-126/R2	Multiple species	Multiple duration	Multiple and unspecified pH	Multiple and unspecified OM	Multiple	Multiple	0.4	Low	Abbasi and Soni (1983)	A safety factor of 5 was applied to the 2 ppm LOEC from Abbasi and Soni (1983) because it caused a 75% reduction in earthworm survival.	--
Chromium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Copper	Multiple forms	WAC 173-340-900, Table 749-3	Multiple species	Multiple duration	Multiple and unspecified pH	Multiple and unspecified OM	Multiple	Multiple	50	NA	ES/ER/TM-126/R2	Secondary source recommended 60 mg/kg, but 50 mg/kg was presented in Table 1 in ES/ER/TM-126/R2. Selected because assumed that confidence rating was moderate.	50
Copper	Multiple forms	ES/ER/TM-126/R2	Multiple species	Multiple duration	Multiple and unspecified pH	Multiple and unspecified OM	Multiple	Multiple	60	Moderate	Multiple studies	Moderate confidence benchmark based on multiple studies.	--
Copper	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-68	Multiple species	Chronic	4 - 5.6	<1 - 5.7	Reproduction, growth and population effects	EC_{10} and MATC	80	Moderate-high	Multiple studies	GMM of EC_{10} and MATC values values for at least six test species under different test conditions (pH and OM%). Not selected because WAC 173-340-900, Table 749-3 value of moderate confidence available.	--

Table 4-43. Invertebrate Benchmarks. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Source	Test Species	Duration	Soil pH	Organic Matter (%)	General Effect Endpoint	Specific Effect Endpoint	Effect Level (mg/kg)	Confidence	Secondary Source	Notes	Selected Invertebrate Benchmark (mg/kg)
Hexavalent chromium	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Hexavalent chromium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Lead	Multiple forms	WAC 173-340-900, Table 749-3	Earthworm	4 months	4.5, 5.5, 6.5	Unspecified	Reproduction	No effect on cocoons/ worm, hatchlings/ cocoon, % hatched cocoons at pH 5.5 and 6.5	500	Low	ES/ER/TM-126/R2	Based on Bengtsson et al. 1986, not selected due to low confidence level.	--
Lead	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-70	Collembola	Chronic	4.5 - 6.0	10	Reproduction	MATC	1,700	Moderate-high	Multiple studies	GMM of four MATC values for one test species under three different test conditions (pH). Selected because lowest value of at least moderate confidence.	1,700
Manganese	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Manganese	Unspecified in secondary source	OSWER Directive 9285.7-71	Collembola	Chronic	4.56 - 5.39	1.2	Reproduction	EC20	450	Moderate-high	Multiple studies	Sufficient details on studies to justify using effect level. Data lacking in support of higher effect level.	450
Mercury	Mercuric chloride	WAC 173-340-900, Table 749-3	Earthworm	60 days	Unspecified in primary source	Unspecified in primary source	Survival	65% reduction	0.1	Low	ES/ER/TM-126/R2	Oak Ridge applied safety factor of 5 applied to 0.5 mg/kg LOEC in Abbasi and Soni (1983). No higher confidence value available	0.1
Mercury	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Selenium	Sodium selenite	WAC 173-340-900, Table 749-3	Earthworm	56 days	Unspecified in primary source	Unspecified in primary source	Reproduction	Cocoon production	70	Low	ES/ER/TM-126/R2	Lowest tested concentration was 77 mg/kg from Fischer and Koszorus (1992). Not selected due to low confidence level.	--
Selenium	Unspecified in secondary source	EPA Eco-SSL OSWER Directive 9285.7-72	Multiple species	Chronic	7.1	1	Reproduction	EC20	4.1	Moderate-high	Multiple studies	GMM of three EC_{20} values for three test species. Lowest value of at least moderate confidence.	4.1
Silver	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Silver	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Strontium	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Strontium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Tin	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Tin	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Uranium	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Uranium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Zinc	Multiple forms	WAC 173-340-900, Table 749-3	Multiple species	Chronic	4 - 7.05	2.5 - 10.8	Multiple	Multiple	200	NA	ES/ER/TM-85/R3	ES/ER/TM-85/R3 listed 200 mg/kg in Table 1 but the narrative recommended 100 mg/kg zinc as benchmark.	--

Table 4-43. Invertebrate Benchmarks. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Source	Test Species	Duration	Soil pH	Organic Matter (%)	General Effect Endpoint	Specific Effect Endpoint	Effect Level (mg/kg)	Confidence	Secondary Source	Notes	Selected Invertebrate Benchmark (mg/kg)
Zinc	Multiple forms	ES/ER/TM-85/R3	Multiple species	Chronic	4 - 7.05	2.5 - 10.8	Multiple	Multiple	100	High	Multiple studies	The benchmark of 100 mg/kg Zn is the 10th percentile of the 46 reported effective values. Confidence in this benchmark is high because of the relatively large amount of data available for a variety of functional response factors. Selected because this is lowest value with at least moderate confidence.	100
Zinc	Multiple forms	EPA Eco-SSL OSWER Directive 9285.7-73	Multiple species	Chronic	4.1 - 4.8	1.9 - 4.0	Population reproduction	EC_{10} and MATC	120	Moderate-high	Multiple studies	GMM is EC_{10} and MATC values for at least three test species under different test conditions (pH and OM%). Not selected because high confidence benchmark is available from ES/ER/TM-85/R3.	--
Benzo(a)pyrene	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	Pyrene	Multiple studies	Multiple species	Chronic	6 - 6.2	2.8 - 10	Reproduction growth	EC10 and MATC	18	Moderate-high	OSWER Directive 9285.7-78	No WAC 173-340-900, Table 749-3 value available.	18
Benzo(a)anthracene	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	Pyrene	Multiple studies	Multiple species	Chronic	6 - 6.2	2.8 - 10	Reproduction growth	EC10 and MATC	18	Moderate-high	OSWER Directive 9285.7-78	No WAC 173-340-900, Table 749-3 value available.	18
Benzo(b)fluoranthene	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	Pyrene	Multiple studies	Multiple species	Chronic	6 - 6.2	2.8 - 10	Reproduction growth	EC10 and MATC	18	Moderate-high	OSWER Directive 9285.7-78	No WAC 173-340-900, Table 749-3 value available.	18
Benzo(ghi)perylene	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Benzo(ghi)perylene	Pyrene	Multiple studies	Multiple species	Chronic	6 - 6.2	2.8 - 10	Reproduction growth	EC10 and MATC	18	Moderate-high	OSWER Directive 9285.7-78	No WAC 173-340-900, Table 749-3 value available.	18
Benzo(k)fluoranthene	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	Pyrene	Multiple studies	Multiple species	Chronic	6 - 6.2	2.8 - 10	Reproduction growth	EC10 and MATC	18	Moderate-high	OSWER Directive 9285.7-78	No WAC 173-340-900, Table 749-3 value available.	18
Chrysene	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Chrysene	Pyrene	Multiple studies	Multiple species	Chronic	6 - 6.2	2.8 - 10	Reproduction growth	EC10 and MATC	18	Moderate-high	OSWER Directive 9285.7-78	No WAC 173-340-900, Table 749-3 value available.	18
Dibenz(ah)anthracene	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Dibenz(ah)anthracene	Pyrene	Multiple studies	Multiple species	Chronic	6 - 6.2	2.8 - 10	Reproduction growth	EC10 and MATC	18	Moderate-high	OSWER Directive 9285.7-78	No WAC 173-340-900, Table 749-3 value available.	18
Indeno[1,2,3-cd]pyrene	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	Pyrene	Multiple studies	Multiple species	Chronic	6 - 6.2	2.8 - 10	Reproduction growth	EC10 and MATC	18	Moderate-high	OSWER Directive 9285.7-78	No WAC 173-340-900, Table 749-3 value available.	18

Table 4-43. Invertebrate Benchmarks. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Source	Test Species	Duration	Soil pH	Organic Matter (%)	General Effect Endpoint	Specific Effect Endpoint	Effect Level (mg/kg)	Confidence	Secondary Source	Notes	Selected Invertebrate Benchmark (mg/kg)
Pyrene	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Pyrene	--	Multiple studies	Multiple species	Chronic	6 - 6.2	2.8 - 10	Reproduction growth	EC10 and MATC	18	Moderate-high	OSWER Directive 9285.7-78	No WAC 173-340-900, Table 749-3 value available.	18
Aroclor-1254	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1254	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1260	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1260	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1262	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1262	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Dichloroprop	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Dichloroprop	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
beta-1,2,3,4,5,6-Hexachlorocyclohexane	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
beta-1,2,3,4,5,6-Hexachlorocyclohexane	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
DDE	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
DDE	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
DDT	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
DDT	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Dieldrin	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Dieldrin	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Endosulfan I	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Endosulfan I	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Endosulfan II	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Endosulfan II	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Endosulfan sulfate	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Endosulfan sulfate	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Methoxychlor	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--

Table 4-43. Invertebrate Benchmarks. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Source	Test Species	Duration	Soil pH	Organic Matter (%)	General Effect Endpoint	Specific Effect Endpoint	Effect Level (mg/kg)	Confidence	Secondary Source	Notes	Selected Invertebrate Benchmark (mg/kg)
Methoxychlor	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--

-- = not applicable
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
EC = effective concentration x % of the test population
EPA = U.S. Environmental Protection Agency
GMM = geometric mean
Eco-SSI =ecological soil screening levelWAC
LC = lethal concentration x % of the test population
LOEC = lowest observable effect concentration
MATC = maximum acceptable toxicant concentration
NA = not available
NOEC = no observable effect concentration
OM = organic matter
= *Washington Administrative Code*

Abbasi, S. A. and R. Soni, 1983, "Stress-Induced Enhancement of Reproduction in Earthworm Octochaetus pattoni Exposed to Chromium (VI) and Mercury (II) - Implications in Environmental Management," *Intern J Environ Stud* 22:43-47.

Bengtsson G, Gunnarsson T, Rundgren S. 1986. Effects of metal pollution on the earthworm Dendrobaena rubida (Sav.) in acidified soils. Water Air Soil Pollution 28:361-383.

ES/ER/TM-126/R2, 1997, *Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Processes: 1997 Revision*, Lockheed Martin Energy Systems, Inc., Oak Ridge, Tennessee.

Fischer, E. and L. Koszorus, 1992, "Sublethal Effects, Accumulation Capacities, and Elimination Rates of As, Hg, and Se in the Manure Worm, Eisenia fetida (Oligochaeta, Lumbricidae)," *Pedobiologia* 36:172-178.

OSWER Directive 9285.7-61, 2005, *Ecological Soil Screening Levels for Antimony: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-63, 2005, *Ecological Soil Screening Levels for Barium: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-65, 2005, *Ecological Soil Screening Levels for Cadmium: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-70, 2005, *Ecological Soil Screening Levels for Lead: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-71, 2007, *Ecological Soil Screening Levels for Manganese: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-72, 2007, *Ecological Soil Screening Levels for Selenium: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-78, 2007, *Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs): Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

WAC 173-340-900, "Tables," *Washington Administrative Code*, as amended.

Table 4-44. Avian Wildlife Toxicity Reference Values. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Avian NOAEL TRV (mg/kg/d)	Selected Avian LOAEL TRV (mg/kg/d)
Antimony	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**
Arsenic	Arsenic oxide	Holcman and Stibilj 1997 [a]	Chicken	1.6	19 days during reproduction	Oral in diet	Reproduction	Progeny count	--	--	2.24	--	OSWER Directive 9285.7-62	--	**--**	**--**
Arsenic	Sodium arsenate	Stanley et al. 1994	Mallard	1	>10 weeks	Oral in diet	Reproduction	--	--	--	9.3	40.3	--	--	**9.3**	**40.3**
Barium	Barium hydroxide	Johnson et al. 1960	1-day-old chicks	0.121	4 weeks	Oral in diet	Mortality	--	0.1	Subchronic-chronic	20.8	41.7	ES/ER/TM-86/R3	--	**20.8**	**41.7**
Boron	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**
Cadmium	Multiple forms	Multiple studies [a]	Multiple species	--	--	--	--	--	--	--	1.47	--	OSWER Directive 9285.7-65	Geometric mean of NOAELs for reproduction and growth.	**1.47**	**--**
Cadmium	Cadmium sulfate	Leach et al. 1979 [a]	Chicken	1.6	12 weeks during egg laying	Oral in diet	Reproduction	Egg production, progeny count	--	--	0.593	2.37	OSWER Directive 9285.7-65	--	**--**	**2.37**
Chromium (3+)	Multiple forms	Multiple studies [a]	Chicken	--	--	--	Reproduction and growth	--	--	--	2.66	--	OSWER Directive 9285.7-66	Geometric mean of NOAELs for reproduction and growth.	**2.66**	**--**
Chromium (3+)	Chrome alum doceahydrate	Haseltine et al. unpublished [a]	Black duck	1.17	180 to 190 days	Oral in diet	Reproduction	Reproductive success	--	--	0.569	2.78	OSWER Directive 9285.7-66	Field study.	**--**	**2.78**
Copper	Copper	al Ankari et al. 1998 [a]	Chicken	1.52	84 days during egg laying	Oral in diet	Reproduction	Eggs per nest	--	--	4.05	12.1	OSWER Directive 9285.7-68	--	**4.05**	**12.1**
Hexavalent chromium	Dichromate, soddium or potassium	Multiple studies	Chicken	--	1 – 11 days--	Oral in diet	Mutliple	Multiple	--	--	0.4	--	OSWER Directive 9285.7-66	GMM NOAEL one species	**0.4**	**--**
Hexavalent chromium	Dichromate, soddium or potassium	Asmatullah et al. 1999	Chicken	2.02	32	Oral in diet	Reproduction and growth	Multiple	--	--	--	4.02	OSWER Directive 9285.7-66	Lowest LOAEL for one species	**--**	**4.02**
Lead	Lead acetate	Edens and Garlich 1983 [a]	Chicken	1.81	4 weeks during egg laying	Oral in diet	Reproduction	Progeny count	--	--	1.63	3.26	OSWER Directive 9285.7-70	--	**1.63**	**3.26**
Manganese	Multiple forms	Multiple studies [a]	Multiple species	--	--	--	Reproduction and growth	--	--	--	179	--	OSWER Directive 9285.7-71	Geometric mean of NOAELs for reproduction and growth.	**179**	**--**
Manganese	Manganese chloride tetrahydrate	Southern and Baker 1983 [a]	Chicken	0.316	14 days	Oral in diet	Growth	Body weight	--	--	261	348	OSWER Directive 9285.7-71	--	**--**	**348**

Table 4-44. Avian Wildlife Toxicity Reference Values. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Avian NOAEL TRV (mg/kg/d)	Selected Avian LOAEL TRV (mg/kg/d)
Mercury	Methyl mercury	Heinz and Hoffman 1998; Heinz 1976	Mallard	1	2.5 months to 2 generations	Oral in diet	Reproduction	--	--	--	0.068	0.37	--	--	**0.068**	**0.37**
Selenium	Sodium selenite	El-Begearmi and Combs 1982 [a]	Chicken	0.328	2 weeks	Oral in diet	Survival	Mortality	--	--	0.29	0.579	OSWER Directive 9285.7-72	--	**0.29**	**0.579**
Silver	Silver acetate	Jensen et al. 1974 [a]	Turkey	0.662	5 weeks	Oral in diet	--	Growth	0.1	LOAEL-NOAEL	2.02	20.2	OSWER Directive 9285.7-77	--	**2.02**	**20.2**
Strontium	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**
Tin	Bis(Tributyltin) oxide	Schlatterer et al. 1993	Japanese quail	0.15	6 weeks during reproduction	Oral in diet	Reproduction	Egg weight and hatchability	--	--	6.8	16.9	ES/ER/TM-86/R3	--	**6.8**	**16.9**
Uranium	Depleted metallic	Haseltine and Sileo 1983	Black duck	1.25	6 weeks	Oral in diet	Growth, mortality, organ pathology	Mortality, body weight, blood chemistry, liver or kidney effects	0.1	Subchronic-chronic	16	--	ES/ER/TM-86/R3	--	**16**	**--**
Zinc	Multiple forms	Multiple studies [a]	Multiple species	--	--	--	Reproduction and growth	--	--	--	66.1	--	OSWER Directive 9285.7-73	Geometric mean of reproduction and growth studies.	**66.1**	**--**
Zinc	Zinc acetate	Gibson et al. 1986 [a]	Chicken	2	10 weeks	Oral in diet	Reproduction	Progeny count	--	--	57.3	66.5	OSWER Directive 9285.7-73	--	**--**	**66.5**
Benzo(a)pyrene	Benzo(a)anthracene	Beall 2007	Bobwhite quail	--	60 days	Oral in diet	Growth	--	--	--	0.65	--	--	NOAEL based on mean exposure over 60-day duration of the study.	0.65	**--**
Benzo(a)anthracene	NA	Beall 2007	Bobwhite quail	--	60 days	Oral in diet	Growth	--	--	--	0.65	--	--	NOAEL based on mean exposure over 60-day duration of the study	0.65	**--**
Benzo(b)fluoranthene	Benzo(a)anthracene	Beall 2007	Bobwhite quail	--	60 days	Oral in diet	Growth	--	--	--	0.65	--	--	NOAEL based on mean exposure over 60-day duration of the study	0.65	**--**
Benzo(ghi)perylene	Benzo(a)anthracene	Beall 2007	Bobwhite quail	--	60 days	Oral in diet	Growth	--	--	--	0.65	--	--	NOAEL based on mean exposure over 60-day duration of the study	0.65	**--**
Benzo(k)fluoranthene	Benzo(a)anthracene	Beall 2007	Bobwhite quail	--	60 days	Oral in diet	Growth	--	--	--	0.65	--	--	NOAEL based on mean exposure over 60-day duration of the study	0.65	**--**
Chrysene	Benzo(a)anthracene	Beall 2007	Bobwhite quail	--	60 days	Oral in diet	Growth	--	--	--	0.65	--	--	NOAEL based on mean exposure over 60-day duration of the study	0.65	**--**

Table 4-44. Avian Wildlife Toxicity Reference Values. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Avian NOAEL TRV (mg/kg/d)	Selected Avian LOAEL TRV (mg/kg/d)
Dibenz(ah)anthracene	Benzo(a)anthracene	Beall 2007	Bobwhite quail	--	60 days	Oral in diet	Growth	--	--	--	0.65	--	--	NOAEL based on mean exposure over 60-day duration of the study	0.65	--
Indeno[1,2,3-cd] pyrene	Benzo(a)anthracene	Beall 2007	Bobwhite quail	--	60 days	Oral in diet	Growth	--	--	--	0.65	--	--	NOAEL based on mean exposure over 60-day duration of the study	0.65	--
Pyrene	Benzo(a)anthracene	Beall 2007	Bobwhite quail	--	60 days	Oral in diet	Growth	--	--	--	0.65	--	--	NOAEL based on mean exposure over 60-day duration of the study	0.65	--
Aroclor-1254	Aroclor-1254	Dahlgren et al. 1972	Ring-necked pheasant	1	17 weeks during egg laying	Oral via gelatin capsule	Reproduction	Reduced egg hatchability	0.1	LOAEL-NOAEL	0.18	1.8	ES/ER/TM-86/R3	--	**0.18**	**1.8**
Aroclor-1260	Aroclor-1254	Dahlgren et al. 1972	Ring-necked pheasant	1	17 weeks during egg laying	Oral via gelatin capsule	Reproduction	Reduced egg hatchability	0.1	LOAEL-NOAEL	0.18	1.8	ES/ER/TM-86/R3	--	**0.18**	**1.8**
Aroclor-1262	Aroclor-1254	Dahlgren et al. 1972	Ring-necked pheasant	1	17 weeks during egg laying	Oral via gelatin capsule	Reproduction	Reduced egg hatchability	0.1	LOAEL-NOAEL	0.18	1.8	ES/ER/TM-86/R3	--	**0.18**	**1.8**
Dichloroprop	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Beta-1,2,3,4,5,6-Hexachlorocyclo-hexane	Gamma hexachlorobenzene (lindane)	Chakravarty and Lahiri 1986; Chakravarty et al. 1986	Mallard	1	8 weeks	Oral intubation	Reproduction	Eggshell thickness, egg number, etc.	0.1	For interspecies uncertainty	0.571	0.857	CHPPM 2009	Study and value selected based on an extensive review of available literature - documented in CHPPM 2009.	--	--
DDE	DDT	Cecil et al. 1978	Chicken	--	30 days	Oral in diet	Growth	Body weight	--	--	0.227	2.27	OSWER Directive 9285.7-57	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth, or survival; LOAEL is from same study.	**0.227**	--
DDE	DDT	Heath et al. 1969	Mallard	--	1 year	Oral in diet	Reproduction	Reproductive success	--	--	0.563	1.892	OSWER Directive 9285.7-57	Value is lowest reproductive LOAEL above the NOAEL used for the Eco-SSL; NOAEL is from same study.	--	**1.892**

Table 4-44. Avian Wildlife Toxicity Reference Values. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Avian NOAEL TRV (mg/kg/d)	Selected Avian LOAEL TRV (mg/kg/d)
DDT	NA	Cecil et al. 1978	Chicken	--	30 days	Oral in diet	Growth	Body weight	--	--	0.227	2.27	OSWER Directive 9285.7-57	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth, or survival; LOAEL is from same study.	**0.227**	**--**
DDT	NA	Heath et al. 1969	Mallard	--	1 year	Oral in diet	Reproduction	Reproductive success	--	--	0.563	1.892	OSWER Directive 9285.7-57	Value is lowest reproductive LOAEL above the NOAEL used for the Eco-SSL; NOAEL is from same study.	**--**	**1.892**
Dieldrin	NA	Nebeker et al. 1992	Mallard	--	24 days	Oral in diet	Growth	Body weight	--	--	0.0709	3.78	OSWER Directive 9285.7-56	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study.	**0.0709**	**--**
Dieldrin	NA	Weise et al. 1968	Crowned guinea fowl	--	21 months	Oral in diet	Reproduction	Number of progeny	--	--	0.0671	0.223	OSWER Directive 9285.7-56	Value is lowest reproductive LOAEL above the NOAEL used for the Eco-SSL; NOAEL is from same study.	**--**	**0.223**
Endosulfan I	Endosulfan	Abiola 1992	Gray partridge	0.4	4 weeks (during reproduction)	Oral in diet	Reproduction	--	--	--	10	--	ES/ER/TM-86/R3	--	**10**	**--**
Endosulfan II	Endosulfan	Abiola 1992	Gray partridge	0.4	4 weeks (during reproduction)	Oral in diet	Reproduction	--	--	--	10	--	ES/ER/TM-86/R3	--	**10**	**--**
Endosulfan sulfate	Endosulfan	Abiola 1992	Gray partridge	0.4	4 weeks (during reproduction)	Oral in diet	Reproduction	--	--	--	10	--	ES/ER/TM-86/R3	--	**10**	**--**

Table 4-44. Avian Wildlife Toxicity Reference Values. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Avian NOAEL TRV (mg/kg/d)	Selected Avian LOAEL TRV (mg/kg/d)
Methoxychlor	Methoxychlor	Hill and Camardese 1986	Japanese quail	0.0225	5 days	Oral in diet	Survival	Survival	0.01	Acute to chronic	25.8	--	LANL Ecorisk database	Tier 3 critical study TRV	**25.8**	**--**

NOTE: Uncertainty factors were used to adjust all measured effect concentrations to chronic NOAELs and chronic LOAELs as follows: LOAEL to NOAEL = 0.1; Subchronic to chronic = 0.1 where: chronic = >12 weeks or during critical lifestage, subchronic = 4 to 12 weeks.
Bold = values selected as the avian TRVs.

[a] Study information and calculated NOAELs and LOAELs for these sources were taken directly from the cited Eco-SSL report developed by the EPA. All other primary sources were obtained, reviewed, and TRVs were extracted or developed from the study.

-- = not applicable
CHPPM = Center for Health Promotion and Preventative Medicine
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
Eco-SSL = Ecological Soil Screening Level
EPA = U.S. Environmental Protection Agency
LOAEL = lowest observable adverse effect level
mg/kg/d = milligram per kilogram per day
NA = not available
NOAEL = no observable adverse effect level
TRV = toxicity reference value

Abiola, F. A., 1992, "Ecotoxicity of Organochloride Insecticides: Effects of Endosulfan on Birds Reproduction and Evaluation of Its Induction Effects in Partridge, Perdix perdix L." Rev. Vet. Med., 143:443-450
al Ankari, A., H. Najib, and A. al Hozab, 1998, "Yolk and Serum Cholesterol and Production Traits, As Affected by Incorporating a Supraoptimal Amount of Copper in the Diet of the Leghorn Hen," Br. Poult. Sci. 39(3): 393-397.
Asmatullah, Asma, A., Latif, A., and Shakoori, A. R. 1999. Effect of hexavalent chromium on egg laying capacity, hatchability of eggs, thickness of egg shell and post-hatching development of gallus domesticus. Asian-Australasian Journal of Animal Sciences. 12(6): 944-950.
Beall, B. N., 2007, Effects of Polycyclic Aromatic Hydrocarbons in Northern Bobwhite Quail (Colinus virginianus), A Thesis In Environmental Toxicology Submitted to the Graduate Faculty of Texas Tech University in Partial Fulfillment of the Requirements for the Degree of Master of Sciences.
Cecil, H. C., S. J. Harris, and J. Bitman, 1978, "Liver Mixed Function Oxidases in Chickens: Induction by Polychlorinated Biphenyls and Lack of Induction by DDT," Arch. Environm. Contam. Toxicol., 7: 283-290.
Chakravarty, S. and P. Lahiri, 1986, "Effects of Lindane on Eggshell Characteristics and Calcium Level in the Domestic Duck," Toxicology, 42:245-258
Chakravarty, S., A. Mandal, and P. Lahiri, 1986, Effect of Lindane on Clutch Size and Level of Egg Yolk Protein in Domestic Duck," Toxicology, 39: 93-103.
Dahlgren, R. B., R. L. Linder, and C. W. Carlson, 1972, "Polychlorinated Biphenyls: Their Effects on Penned Pheasants," Environ. Health Perspect, 1: 89-101.
Edens, F.W. and J.D. Garlich, 1983, "Lead-Induced Egg Production Decrease in Leghorn and Japanese Quail Hens," Poult Sci 62: 1757-1763.
El-Begearmi, M. M. and G. F. Combs Jr., 1982, "Dietary Effects on Selenite Toxicity in the Chick," Poult. Sci. 61(4): 770-776.
ES/ER/TM-86/R3, 1996, Toxicological Benchmarks for Wildlife: 1996 Revision, Oak Ridge National Laboratory, Environmental Sciences Division, Oak Ridge, Tennessee.
Gibson, S. W., M. H. Stevenson, and N. Jackson, 1986, "Comparison of theEffects of Feeding Diets Supplemented with Zinc Oxide or Zinc Acetate on the Performance and Tissue Mineral Content of Mature Female Fowls," Br. Poult. Sci. (1986) 27(3): 391-402.
Haseltine, S. D. and L. Sileo, 1983, "Response of American Black Ducks to Dietary Uranium: A Proposed Substitute for Lead Shot," J. Wildl. Manage. 47: 1124-1129.
Heath, R. G., J. W. Spann, and J. F. Kreitzer, 1969, "Marked DDE Impairment of Mallard Reproduction in Controlled Studies," Nature., 224(214): 47-48.
Heinz, G. H., 1976, "Methylmercury: Second-Year Feeding Effects on Mallard Reproduction and Duckling Behavior," J Wildl Manage 4: 82-90.
Heinz, G. H. and D. J. Hoffman, 1998, "Methylmercury Chloride and Selenomethionine Interactions on Health and Reproduction in Mallards," Environ Toxicol Chem 17: 139-145.
Hill, E. F. and M. B. Camardese, 1986, *Lethal Dietary Toxicities of Environmental Contaminants and Pesticides to Coturnix*, United States Fish And Wildlife Service: Fish and Wildlife Tech Rep 2 (NTIS PB86-176914). Laurel, Maryland.
Holcman, A. and V. Stibilj, 1997, "Arsenic Residues in Eggs from Laying Hens Fed with a Diet Containing Arsenic (iii) Oxide," Arch. Environ. Contam. Toxicol. (1997) 32(4): 407-410.
Jensen, L. S., R. P. Peterson, and L. Falen, 1974, "Inducement of Enlarged Hearts and Muscular Dystrophy in Turkey Poults with Dietary Silver," Poultry Sci 53(1): 57-64.
Johnson, D., Jr., A. L. Mehring, Jr., and H. W. Titus, 1960, "Tolerance of Chickens for Barium," Proc. Soc. Exp. Biol. Med. 104: 436-438.
Leach, R. M. Jr, K. W. Wang, and D. E. Baker, 1979, "Cadmium and the Food Chain: The Effect of Dietary Cadmium on Tissue Composition in Chicks and Laying Hens," J Nutr. 109(3): 437-43.
Nebeker, A. V., W. L. Griffis, T. W. Stutzman, G. S. Schuytema, L. A. Carey, and S. M. Scherer, 1992, "Effects of Aqueous and Dietary Exposure of Dieldrin on Survival, Growth and Bioconcentration in Mallard Ducklings," Environ Toxicol Chem., 11(5): 687-699.
OSWER Directive 9285.7-56, 2006, Ecological Soil Screening Levels for Dieldren: Interim Final, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-57, 2007, Ecological Soil Screening Levels for DDT and Metabolites: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-62, 2005, Ecological Soil Screening Levels for Arsenic: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-65, 2005, Ecological Soil Screening Levels for Cadmium: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-66, 2005, Ecological Soil Screening Levels for Chromium: Interim Final, revised 2008, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-68, 2006, Ecological Soil Screening Levels for Copper: Interim Final, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-70, 2005, Ecological Soil Screening Levels for Lead: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-71, 2007, Ecological Soil Screening Levels for Manganese: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-72, 2007, Ecological Soil Screening Levels for Selenium: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-73, 2007, Ecological Soil Screening Levels for Zinc: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-77, 2006, Ecological Soil Screening Levels for Silver: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
Schlatterer, B., T. M. M. Coenen, E. Ebert, R. Grau, V. Hilbig, and R. Munk, 1993, "Effects of Bis(tri-n-butyltin)oxide in Japanese Quail Exposed During Egg-laying Period: An Interlaboratory Comparison Study," Arch Environ Contam Toxicol, 24:440-448.
Stanley, T. R. Jr., J. W. Spann, G. J. Smith, and R. Rosscoe, 1994, "Main and Interactive Effects of Arsenic and Selenium on Mallard Reproduction and Duckling Growth and Survival," Arch Environ Contam Toxicol 26: 444-451.
Southern, L. L. and D. H. Baker, 1983, "Eimeria Acervulina Infection in Chicks Fed Deficient or Excess Levels of Manganese," J. Nutr., 113(1): 172-7.
Wiese, I. H., N. C. J. Basson, J. H. Van Der Vyver, and J. H. Van Der Merwe, 1969, "Toxicology and Dynamics of Dieldrin in the Crowned Guinea-fowl, Numida Meleagris (L)," Phytophylactica., 1(3-4): 161-175.
WAC 173-340-900, "Tables," Washington Administrative Code, as amended.

Table 4-45. Mammalian Wildlife Toxicity Reference Values. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
Antimony	Antimony trichloride	Rossi et al. 1987 [a]	Rat	0.33	31 days	Oral in water	Reproduction	Progeny body weight	--	--	0.059	0.59	OSWER Directive 9285.7-62	--	**0.059**	**0.59**
Arsenic	Sodium arsenite	Neiger and Osweiler 1989 [a]	Dog	10.1	8 weeks	Oral in diet	Growth	Reduced body weight	--	--	1.04	1.66	OSWER Directive 9285.7-62	--	**1.04**	**1.66**
Barium	Multiple forms	Multiple studies [a]	Multiple species	--	--	--	--	--	--	--	51.8	--	OSWER Directive 9285.7-63	Geometric mean of NOAELs for reproduction and growth.	**--**	--
Barium	Barium chloride dihydrate	Dietz et al. 1992 [a]	Rat	0.34	92 days	Oral in water	Growth	Reduced body weight	--	--	61	121	OSWER Directive 9285.7-63	Lowest LOAEL in growth or reproduction endpoints below the geomean NOAEL (Eco-SSL).	--	**--**
Barium	Barium chloride	NTP 1994	Rat	0.35	105 weeks	Oral in water	Nephrotoxicity	Increased kidney weight	--	--	45	75	--	Study selected because NOAEL is similar to Eco-SSL, study is of long duration, and a LOAEL was identified.	**45**	**75**
Boron	Boric acid or borax	Weir and Fischer 1972	Rat	0.35	3 generations	Oral in diet	Reproduction	Sterility	--	--	28	93.6	ES/ER/TM-86/R3	--	**28**	**93.6**
Cadmium	Cadmium acetate	Yuhas et al. 1979 [a]	Rat	0.43	2 weeks	Oral in water	Growth	Body weight	--	--	0.77	7.7	OSWER Directive 9285.7-65	--	--	--
Cadmium	Cadmium chloride	Sutou et al. 1980	Rat	0.303	6 weeks during reproduction	Oral gavage	Reproduction	Reduced fetal survival	--	--	1	10	ES/ER/TM-86/R3	The ORNL TRV for cadmium was selected as it represents reproductive effects, is a longer study, and is comparable to the TRV used for Eco-SSLs.	**1**	**10**
Chromium (3+)	Multiple forms	Multiple studies [a]	Multiple species	--	--	--	Reproduction and growth	--	--	--	2.4	--	OSWER Directive 9285.7-66	Geometric mean of NOAELs for reproduction and growth.	**2.4**	--
Chromium (3+)	Chromium sulfate	Zahid et al. 1990 [a]	Mouse	0.0249	35 days	Oral in diet	Reproduction	Sperm cell counts	0.1	LOAEL-NOAEL	0.962	9.62	OSWER Directive 9285.7-66	--	--	**9.62**
Copper	Copper sulfate pentahydrate	Allcroft et al. 1961 [a]	Pig	100	4 weeks	Oral in diet	Growth	Body weight	--	--	5.6	9.34	OSWER Directive 9285.7-68	--	**5.6**	**9.34**
Hexavalent chromium	Multiple forms	Multiple studies [a]	Multiple species	--	--	--	Reproduction and growth	--	--	--	9.24	--	EPA 2008	Geometric mean of NOAELs for reproduction and growth.	**9.24**	--
Hexavalent chromium	Potassium dichromate	R.O.W. Scientists, Inc. [a]	Mouse	0.2036	3 weeks	Oral in diet	Growth	Body weight	--	--	5.66	12	OSWER Directive 9285.7	--	--	--
Hexavalent chromium	Sodium dichromate	Chowdhury and Mitra 1995	Rat	0.3084	90 days	Oral gavage	Reproduction	Testes weight	--	--	20	40	OSWER Directive 9285.7	Lowest bounded reproductive LOAEL above the geometric mean NOAEL from EPA (2008).	--	**40**
Lead	Lead acetate	Kimmel et al. 1980 [a]	Rat	0.3	7 weeks during gestation	Oral in water	Growth	Body weight	--	--	4.7	8.9	OSWER Directive 9285.7-70	--	**4.7**	**8.9**
Manganese	Multiple forms	Multiple studies [a]	Multiple species	--	--	--	Reproduction and growth	--	--	--	51.5	--	OSWER Directive 9285.7-71	Geometric mean of NOAELs for reproduction and growth.	**51.5**	--

Table 4-45. Mammalian Wildlife Toxicity Reference Values. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
Manganese	Manganese oxide	Rehnberg et al. 1980 [a]	Rat	0.0566	20 days	Gavage	Reproduction, growth	Reproductive organ histology, body weight	--	--	21	71	OSWER Directive 9285.7-71	--	--	**71**
Mercury	Methylmercury chloride	Verschuuren et al. 1976a	Rat	0.35	3 generations	Oral in diet	Reproduction	Pup viability	--	--	0.032	0.16	ES/ER/TM-86/R3	--	**0.032**	**0.16**
Selenium	Sodium selenite	Mahan and Moxon 1984 [a]	Pig	17.8	37 days	Oral in diet	Growth	Body weight	--	--	0.143	0.215	OSWER Directive 9285.7-72	--	**0.143**	**0.215**
Silver	Silver acetate	Van Vleet 1976 [a]	Pig	8.86	40 days	Oral in diet	Growth	Body weight	0.1	LOAEL-NOAEL	6.02	60.2	OSWER Directive 9285.7-77	--	**6.02**	**60.2**
Strontium	Strontium chloride	Skoryna 1981	Rat	0.35	3 years	Oral in water	Growth	Body weight	--	--	263	--	ES/ER/TM	--	**263**	--
Tin	Bis(tibutyltin) oxide	Davis et al. 1987	Mouse	0.03	Days 6 to 15 of gestation	Oral intubation	Reproduction	Reduced fetal weight and fetal survival	--	--	23.4	35	ES/ER/TM	--	**23.4**	**35**
Uranium	Uranyl acetate (61.32% U)	Paternain et al. 1989	Mouse	0.028	60 days prior to gestation, gestation, delivery, and lactation	Oral intubation	Reproduction	Pup survival and body weight	--	--	3.07	6.13	ES/ER/TM	--	**3.07**	**6.13**
Zinc	Various forms	Multiple studies [a]	Multiple species	--	--	--	Reproduction and growth	--	--	--	75.4	--	OSWER Directive 9285.7-73	Geometric mean of NOAELs for reproduction and growth.	**75.4**	--
Zinc	Zinc sulfate	Miller et al. 1989 [a]	Cattle	580	14 weeks	Oral in diet	Reproduction	Progeny body weight	--	--	37.9	75.9	OSWER Directive 9285.7-73	This is lowest LOAEL above geometric mean NOAEL.	--	**75.9**
Benzo(a)pyrene	NA	Mackenzie and Angevine 1981	Mouse	0.03	Gestation days 7 to 16	Oral intubation	Reproduction	Reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/R3; CHPPM 2005	Study and value selected based on an extensive review of available literature - documented in CHPPM 2005.	**1**	**10**
Benzo(a)anthracene	Benzo(a)pyrene	Mackenzie and Angevine 1981	Mouse	0.03	Gestation days 7 to 16	Oral intubation	Reproduction	Reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/R3; CHPPM 2005	Study and value selected based on an extensive review of available literature - documented in CHPPM 2005.	**1**	**10**
Benzo(b)fluoranthene	Benzo(a)pyrene	Mackenzie and Angevine 1981	Mouse	0.03	Gestation days 7 to 16	Oral intubation	Reproduction	Reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/R3; CHPPM 2005	Study and value selected based on an extensive review of available literature - documented in CHPPM 2005.	**1**	**10**
Benzo(ghi)perylene	Benzo(a)pyrene	Mackenzie and Angevine 1981	Mouse	0.03	Gestation days 7 to 16	Oral intubation	Reproduction	Reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/R3; CHPPM 2005	Study and value selected based on an extensive review of available literature - documented in CHPPM 2005.	**1**	**10**

Table 4-45. Mammalian Wildlife Toxicity Reference Values. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
Benzo(k)fluoranthene	Benzo(a)pyrene	Mackenzie and Angevine 1981	Mouse	0.03	Gestation days 7 to 16	Oral intubation	Reproduction	Reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/R3; CHPPM 2005	Study and value selected based on an extensive review of available literature - documented in CHPPM 2005.	**1**	**10**
Chrysene	Benzo(a)pyrene	Mackenzie and Angevine 1981	Mouse	0.03	Gestation days 7 to 16	Oral intubation	Reproduction	Reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/R3; CHPPM 2005	Study and value selected based on an extensive review of available literature - documented in CHPPM 2005.	**1**	**10**
Dibenz(ah)anthracene	Benzo(a)pyrene	Mackenzie and Angevine 1981	Mouse	0.03	Gestation days 7 to 16	Oral intubation	Reproduction	Reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/R3; CHPPM 2005	Study and value selected based on an extensive review of available literature - documented in CHPPM 2005.	**1**	**10**
Indeno[1,2,3cd]pyrene	Benzo(a)pyrene	Mackenzie and Angevine 1981	Mouse	0.03	Gestation days 7 to 16	Oral intubation	Reproduction	Reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/R3; CHPPM 2005	Study and value selected based on an extensive review of available literature - documented in CHPPM 2005.	**1**	**10**
Pyrene	NA	U.S. EPA 1989	Mouse	0.03	13 weeks	Oral gavage	Nephropathy	--	--	--	75	125	IRIS	Verified on IRIS (http://www.epa.gov/ncea/iris/subst/0445.htm) December 9, 2009.	**75**	**125**
Aroclor-1254	Aroclor 1254	McCoy et al. 1995	Oldfield mouse	0.014	12 months	Oral in diet	Reproduction	Reduced number of litters, pup body weight, and pup survival	0.1	LOAEL-NOAEL	0.068	0.68	ES/ER/TM-86/R3	--	**0.068**	**0.68**
Aroclor-1260	Aroclor 1254	McCoy et al. 1995	Oldfield mouse	0.014	12 months	Oral in diet	Reproduction	Reduced number of litters, pup body weight, and pup survival	0.1	LOAEL-NOAEL	0.068	0.68	ES/ER/TM-86/R3	--	**0.068**	**0.68**
Aroclor-1262	Aroclor 1254	McCoy et al. 1995	Oldfield mouse	0.014	12 months	Oral in diet	Reproduction	Reduced number of litters, pup body weight, and pup survival	0.1	LOAEL-NOAEL	0.068	0.68	ES/ER/TM-86/R3	--	**0.068**	**0.68**
Dichloroprop	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
beta-1,2,3,4,5,6-Hexachlorocyclohexane	NA	Van Velsen et al. 1986	Rat	0.35	13 weeks	Oral in diet	Growth, blood chemistry, organ histology	Gonadal atrophy in male and female rats	0.1	Chronic-subchronic	0.4	2	ES/ER/TM-86/R3	--	**0.4**	**2**
DDE	DDT	Wrenn et al. 1970	Rat	--	15 days (during gestation)	Oral gavage	Reproduction	--	--	--	0.147	0.735	OSWER Directive 9285.7-57	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study.	**0.147**	**0.735**

Table 4-45. Mammalian Wildlife Toxicity Reference Values. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
DDT	NA	Wrenn et al. 1970	Rat	--	15 days (during gestation)	Oral gavage	Reproduction	--	--	--	0.147	0.735	OSWER Directive 9285.7-57	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study.	**0.147**	**0.735**
Dieldrin	NA	Harr et al. 1970	Rat	--	750 days	Oral in diet	Reproduction	--	--	--	0.015	0.03	OSWER Directive 9285.7-56	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study.	**0.015**	**0.03**
Endosulfan I	Endosulfan	Dikshith et al. 1984	Rat	0.35	30 days (not during reproduction)	Oral intubation	Reproduction and blood chemistry	--	0.1	Chronic-subchronic	0.15	--	ES/ER/TM-86/R3	No effects observed at highest dose.	**0.15**	**--**
Endosulfan II	Endosulfan	Dikshith et al. 1984	Rat	0.35	30 days (not during reproduction)	Oral intubation	Reproduction and blood chemistry	--	0.1	Chronic-subchronic	0.15	--	ES/ER/TM-86/R3	No effects observed at highest dose.	**0.15**	**--**
Endosulfan sulfate	Endosulfan	Dikshith et al. 1984	Rat	0.35	30 days (not during reproduction)	Oral intubation	Reproduction and blood chemistry	--	0.1	Chronic-subchronic	0.15	--	ES/ER/TM-86/R3	No effects observed at highest dose.	**0.15**	**--**
Methoxychlor	NA	Gray et al. 1988	Rat	0.35	11 months (during reproduction)	Oral in diet	Reproduction	Fertility and litter size reduced	--	--	4	8	ES/ER/TM-86/R3	--	**4**	**8**

NOTE: Uncertainty factors were used to adjust all measured effect concentrations to chronic NOAELS and chronic LOAELs as follows: LOAEL to NOAEL = 0.1; Subchronic to chronic = 0.1 where: chronic = >12 weeks or during critical lifestage, subchronic = 4 to 12 weeks.
Bold = values selected as the mammalian TRVs.

[a] Study information and calculated NOAELs and LOAELs for these sources were taken directly from the cited Eco-SSL report developed by the EPA. All other primary sources were obtained, reviewed, and TRVs were extracted or developed from the study.

-- = not applicable
CHPPM = Center for Health Promotion and Preventative Medicine
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
Eco-SSL = Ecological Soil Screening Level
EPA = U.S. Environmental Protection Agency
IRIS = Integrated Risk Information System
LOAEL = lowest observable adverse effect level
mg/kg/d = milligram per kilogram per day
NA = not available
NOAEL = no observable adverse effect level
TRV = toxicity reference value

Allcroft, R., K. N. Burns, and G. Lewis, 1961, "The Effects of High Levels of Copper in Rations for Pigs," Vet Rec 73: 714.

Chowdhury, A. R. and C. Mitra, 1995, "Spermatogenic and Steroidogenic Impairment After Chromium Treatment in Rats," Indian Journal of Experimental Biology 33(7): 480-484.

CHPPM, 2005, Wildlife Toxicity Assessment for Benzo(a)pyrene, USACHPPM Document No: 39-EJ-1138-01P, U.S. Army Center for Health Promotion and Preventive Medicine.

Davis, A., R. Barale, and G. Brun, 1987, "Evaluation of the Genetic and Embryotoxic Effects of Bis(tri-n-butyltin)oxide (TBTO), A Broad Spectrum Pesticide, in Multiple In Vivo and In Vitro Short-term Tests," Muta Res., 188:65-95.

Dietz, D., D. M. R. Elwell, W. E. Davis, Jr., and E. F. Meirhenry, 1992, "Subchronic Toxicity of Barium Chloride Dihydrate Administered to Rrats and Mice in the Drinking Water," Fundam. Appl. Toxicol., 19(4):527-37.

Dikshith, T. S. S., R. B. Raizada, M. K. Srivastava, and B. S. Kaphalia, 1984, "Response of Rats to Repeated Oral Administration of Endosulfan," Industrial Health, 22:295-304.ES/ER/TM-86/R3, 1996, Toxicological Benchmarks for Wildlife: 1996 Revision, Oak Ridge National Laboratory, Environmental Sciences Division, Oak Ridge, Tennessee.

Gray, L. E., J. Ostby, R. Sigmon, J. Ferrel, R. Rehnberg, R. Linder, J. Cooper, J. Goldman, and J. Laskey, 1988, "The Development of A Protocol to Assess Reproduction Effects of Toxicants in the Rat," Reprod Toxicol., 2:281-287.

Harr, J. R., Claeys, R. R., Bone, J. F., and T. W. McCorcle, 1970, "Dieldrin Toxidosis: Rat Reproduction," Am J Vet Res., 31(1): 181-9.

Kimmel, C.A., L. D. Grant, C. S. Sloan, and B. C. Gladen, 1980, "Chronic Low-Level Lead Toxicity in the Rat. I. Maternal Toxicity and Perinatal Effects," Toxicol Appl Pharm 56: 28-41.

Mackenzie, K. M. and D. M. Angevine, 1981, "Infertility in Mice Exposed In Utero to Benzo[a]pyrene," Bio Reprod, 24:183-191.

Mahan, D. C. and A. L. Moxon, 1984, "Effect of Inorganic Selenium Supplementation on Selenosis in Postweaning Swine," Journal of Animal Science, 58(5): 1216-1221.

McCoy, G, M. F. Finlay, A. Rhone, K. James, and G. P. Cobb, 1995, "Chronic Polychlorinated Biphenyls Exposure on Three Generations of Oldfield Mice (Permyscus polionotus): Effects on Reproduction, Growth, and Body Residues," Arch Environ Con Toxic 28:431-435.

Miller, W. J., H. E. Amos, R. P. Gentry, D. M. Blackmon, R. M. Durrance, C. T. Crowe, A. S. Fielding, and M. W. Neathery, 1989, "Long-Term Feeding of High Zinc Sulfate Diets to Lactating and Gestating Dairy Cows," J Dairy Sci 72(6):1499-508.

Neiger, R. D. and G. D. Osweiler, 1989, "Effect of Subacute Low Level Dietary Sodium Arsenite on Dogs," Fund. Appl. Toxicol. 13: 439-451.

NTP, 1994, NTP Technical Report on the Toxicology and Carcinogenesis Studies of Barium Chloride Dihydrate (CAS No.10326-27-9)in F344/N Rats and B6C3F1 Mice (Drinking Water Studies), NTP TR 432, National Toxicity Program, Research Triangle Park, North Carolina. NIH pub. No. 94-3163. NTIS pub PB94214178.

OSWER Directive 9285.7-56, 2006, Ecological Soil Screening Levels for Dieldren: Interim Final, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-57, 2007, Ecological Soil Screening Levels for DDT and Metabolites: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

Table 4-45. Mammalian Wildlife Toxicity Reference Values. (5 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)

OSWER Directive 9285.7-61, 2005, Ecological Soil Screening Levels for Antimony: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-62, 2005, Ecological Soil Screening Levels for Arsenic: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-63, 2005, Ecological Soil Screening Levels for Barium: Interim Final, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-65, 2005, Ecological Soil Screening Levels for Cadmium: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-66, 2005, Ecological Soil Screening Levels for Chromium: Interim Final, revised 2008, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-68, 2006, Ecological Soil Screening Levels for Copper: Interim Final, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-70, 2005, Ecological Soil Screening Levels for Lead: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-71, 2007, Ecological Soil Screening Levels for Manganese: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-72, 2007, Ecological Soil Screening Levels for Selenium: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-73, 2007, Ecological Soil Screening Levels for Zinc: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-77, 2006, Ecological Soil Screening Levels for Silver: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
Paternain, J. L., J. L. Domingo, A. Ortega, and J. M. Llobet, 1989, "The Effects of Uranium on Reproduction, Gestation, and Postnatal Survival in Mice," Ecotox Environ Saf 17: 291-296.
Rehnberg, G. L., J. F. Hein, S. D. Carter, and J. W. Laskey, 1980, "Chronic Manganese Oxide Administration to Preweanling Rats: Manganese Accumulation and Distribution," J Toxicol Environm Health, 6: 217-226.
Rossi, F., R. Acampora, C. Vacca, S. Maione, M. G. Matera, R. Servodio, and E. Marmo, 1987, "Prenatal and Postnatal Antimony Exposure in Rats: Effect on Vasomotor Reactivity Development of Pups," Teratog. Carcinog. Mutagen., 7(5): 491-496.
ROW Scientists, Inc. 1996. Final report on the reproductive toxicity of potassium dichromate (hexavalent) (CAS NO. 7778-50-9) administered in diet to SD rats. 26 Dec 1996. PB97125355. National Toxicology Program RACB95001. 177 p
Skoryna, S. C., 1981, "Effects of Oral Supplementation with Stable Strontium," Can Med Assoc J, 125:703-712.
Sutou, S., K. Yamamoto, H. Sendota, and M. Sugiyama, 1980, "Toxicity, Fertility, Teratogenicity, and Dominant Lethal Tests in Rats Administered Cadmium Subchronically, I. Fertility, Teratogenicity, and Dominant Lethal Tests," Ecotox Environ Safe 4:51-56.
U.S. EPA. 1989. 13-Week Mouse Oral Subchronic Toxicity with Pyrene. TRL Study #042-012. Study conducted by Toxicity Research Laboratories, Muskegon, MI for the Office of Solid Waste, Washington, DC.
Van Velsen, F. L., L. H. J. C. Danse, F. X. R. Van Leeuwen, J. A. M. A. Dormans, and M. J. Van Logten. 1986. The subchronic oral toxicity of the beta-isomer of hexachlorocyclohexane in rats. Fund. Appl. Toxicol. 6: 697-712.
Van Vleet, J. F., 1974, "Induction of Lesions of Selenium Vitamin E Deficiency in Pigs Fed Silver," Am J Vet Res 37(12): 1415-1420.
Verschuuren, H. G., R. Kroes, E. M. Den Tonkelaar, J. M. Berkvens, P. W. Helleman, A. G. Rauws, P. L. Schuller, and G. J. Van Esch, 1976, "Toxicity of Methyl Mercury Chloride in Rats. II. Reproduction Study," Toxicology 6: 97-106.
Weir, R. J. and R. S. Fisher, 1972, "Toxicological Studies on Borax and Boric Acid," Toxicol Appl Pharmacol, 23:351-364.
Wrenn, T. R., J. R. Weyant, G. F. Fries, and J. Bitman, 1971, "Effect of Several Dietary Levels of o,p'-DDT on Reproduction and Lactation in the Rat," Bull. Environ. Contam. Toxicol., 6(5): 471-80.
Yuhas, E. M., R. C. Schnell, and T. S. Miya, 1979, "Dose-Related Alterations in Growth and Mineral Disposition by Chronic Oral Cadmium Administration in the Male Rat," Toxicology 12(1): 19-29.
Zahid, Z. R., Z. S. Al Hakkak, A. H. H. Kadhim, E. A. Elias, and I. S. al Jumaily, 1990, "Comparative Effects of Trivalent and Hexavalent Chromium on Spermatogenesis of the Mouse," Toxicol Environ Chem 25(2-3): 131-136.

Table 4-46. Summary of Maximum Benchmark Hazard Quotients for all Upland Plant Contaminants of Potential Ecological Concern. (2 Pages)

COPEC	Plant Benchmark (mg/kg)	Study Sites				Reference Sites				Location of Maximum Concentration
		Maximum CTE (mg/kg)	Maximum RME (mg/kg)	CTE HQ (Maximum CTE/Benchmark)	RME HQ (Maximum RME/Benchmark)	Maximum CTE (mg/kg)	Maximum RME (mg/kg)	CTE HQ (Maximum CTE/Benchmark)	RME HQ (Maximum RME/Benchmark)	
Antimony	5	6.1	6.1	1.2	1.2	0.3	0.3	0.06	0.06	Native waste site
Aroclor-1254	40	2.1	13.5	0.05	0.34	ND	ND	--	--	Native waste site
Aroclor-1260	40	0.10	0.13	<0.01	<0.01	ND	ND	--	--	Native waste site
Aroclor-1262	40	0.044	0.063	<0.01	<0.01	ND	ND	--	--	Native waste site
Arsenic	10	10.9	14.4	1.1	1.4	4.1	4.3	0.41	0.43	Native waste site
Barium	500	358	406	0.72	0.81	130	133	0.26	0.27	Backfill waste site
Benzo[a]anthracene	NA	0.17	1.12	--	--	0.0037	0.0037	--	--	Backfill waste site
Benzo[a]pyrene	NA	0.17	1.17	--	--	0.0028	0.0058	--	--	Backfill waste site
Benzo[b]fluoranthene	NA	0.15	0.91	--	--	0.0032	0.0071	--	--	Backfill waste site
Benzo[ghi]perylene	NA	0.13	0.40	--	--	0.0033	0.0044	--	--	Backfill waste site
Benzo[k]fluoranthene	NA	0.072	0.48	--	--	0.0030	0.0030	--	--	Backfill waste site
beta-1,2,3,4,5,6-Hexachlorocyclohexane	NA	0.0031	0.0039	--	--	ND	ND	--	--	Native waste site
Boron	0.5	28.6	36.4	57	73	2.5	2.6	5.0	5.3	Backfill waste site
Cadmium	4	0.83	1.1	0.21	0.29	0.18	0.22	0.04	0.05	Native waste site
Calculated total uranium	250	2.4	2.6	<0.01	0.01	1.2	1.2	<0.01	<0.01	Backfill waste site
Chromium	42	18.2	21.8	0.43	0.52	14.0	14.3	0.33	0.34	Native waste site
Chrysene	NA	0.32	1.9	--	--	0.0055	0.010	--	--	Backfill waste site
Copper	70	45.6	58	0.65	0.83	21.4	21.9	0.31	0.31	Native waste site
Dibenz[a,h]anthracene	NA	0.024	0.12	--	--	ND	ND	--	--	Backfill waste site
DDE	NA	0.11	0.98	--	--	0.00049	0.00067	--	--	Native waste site
DDT	NA	0.37	1.1	--	--	0.01	0.01	--	--	Native waste site
Dichloroprop	NA	0.68	1.5	--	--	0.13	0.26	--	--	Native waste site
Dieldrin	NA	0.0041	0.0066	--	--	ND	ND	--	--	Native waste site
Endosulfan I	NA	0.0015	0.0027	--	--	ND	ND	--	--	Native waste site
Endosulfan II	NA	0.0065	0.0065	--	--	ND	ND	--	--	Native waste site
Endosulfan sulfate	NA	0.018	0.018	--	--	ND	ND	--	--	Native waste site
Hexavalent chromium	NA	0.54	0.71	--	--	0.36	0.49	--	--	Native waste site
Indeno[1,2,3-cd]pyrene	NA	0.24	0.96	--	--	0.0039	0.0039	--	--	Backfill waste site
Lead	50	116	511	2.3	10	8.7	9.0	0.17	0.18	Native waste site
Manganese	220	412	420	1.8	1.9	550	562	2.5	2.6	Native reference site
Mercury	0.3	0.14	0.14	0.45	0.48	0.022	0.022	0.07	0.07	Backfill waste site
Methoxychlor	NA	0.01	0.01	--	--	0.0016	0.0016	--	--	Backfill waste site
Pyrene	NA	0.4	2.3	--	--	0.0044	0.0081	--	--	Backfill waste site

Table 4-46. Summary of Maximum Benchmark Hazard Quotients for all Upland Plant Contaminants of Potential Ecological Concern. (2 Pages)

COPEC	Plant Benchmark (mg/kg)	Study Sites				Reference Sites				Location of Maximum Concentration
		Maximum CTE (mg/kg)	Maximum RME (mg/kg)	CTE HQ (Maximum CTE/Benchmark)	RME HQ (Maximum RME/Benchmark)	Maximum CTE (mg/kg)	Maximum RME (mg/kg)	CTE HQ (Maximum CTE/Benchmark)	RME HQ (Maximum RME/Benchmark)	
Selenium	0.52	0.73	0.73	1.4	1.4	ND	ND	--	--	Native waste site
Silver	560	1.2	1.2	<0.01	<0.01	ND	ND	--	--	Native waste site
Strontium (elemental)	NA	255	281	--	--	29.6	30.8	--	--	Backfill waste site
Tin	50	62.1	93.7	1.2	1.9	1.4	1.4	0.03	0.03	100-B/C Pilot site
Uranium (inorganic)	250	2.8	3.1	0.01	0.01	3.1	3.1	0.01	0.01	Native waste site
Zinc	50	75.2	87.6	1.5	1.8	56.7	58.1	1.1	1.2	Native waste site

= Benchmark hazard quotient greater than 1.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HQ = hazard quotient
NA = not available
ND = not detected
RME = reasonable maximum exposure

Table 4-47. Summary of Locations and Contaminants of Potential Ecological Concern with Soil Concentrations Greater than Plant Benchmarks and Reference. (2 Pages)

Site Name	COPEC [a]	Plant Benchmark (mg/kg)	CTE (mg/kg)	RME (mg/kg)
Study Site				
Backfill				
100-B/C Pilot	Boron (discrete)	0.5	1.57	2.4
	Tin (discrete)	50	62.1	93.7
	Zinc (discrete)	50	53.0	76.3
100-D-48	Boron	0.5	2.12	2.45
100-D-49	Boron	0.5	2.98	3.36
100-F-2	Boron	0.5	3.5	3.74
	Zinc	50	53.4	56.1
116-DR-1&2	Boron	0.5	1.64	1.91
116-F-1	Arsenic	10	10.9	11.6
	Boron	0.5	2.18	2.39
	Lead	50	51.6	56.0
116-N-3	Boron	0.5	1.28	1.42
300-49	Boron	0.5	1.46	1.60
	Zinc	50	48.1	50.2
618-4	Boron	0.5	0.978	1.12
1607-D2:1	Boron (discrete)	0.5	2.6	2.6
1607-H2	Boron	0.5	28.6	36.4
	Zinc	50	58.3	62.9
Native Soil				
JA Jones	Boron	0.5	1.48	1.65
	Selenium	0.52	0.73	0.73
600-131	Boron	0.5	1.32	1.57
	Lead	120	116	511
600-132	Antimony	5	6.1	6.1
	Boron	0.5	1.54	1.78
	Lead	50	83	115
600-139	Boron	0.5	3.08	3.72
	Lead	120	116	159
	Zinc	50	75.2	87.6
600-171	Arsenic	10	9.88	14.4
	Boron (discrete)	0.5	3.6	3.6
	Boron	0.5	1.96	2.31
	Lead	50	45.2	66.8
	Zinc (discrete)	50	43.7	60.7
	Zinc	50	63.2	71.4
600-181	Boron	0.5	1.3	1.54
600-204	Boron	0.5	1.46	1.57
	Zinc	50	50.0	50.6
600-208	Boron	0.5	7.38	9.75
	Zinc	50	49.1	56.7
600-23	Boron	0.5	1.25	2.25

Table 4-47. Summary of Locations and Contaminants of Potential Ecological Concern with Soil Concentrations Greater than Plant Benchmarks and Reference. (2 Pages)

Site Name	COPEC [a]	Plant Benchmark (mg/kg)	CTE (mg/kg)	RME (mg/kg)
628-1	Boron	0.5	3.3	3.95
	Zinc	50	60.6	76.3
Reference Site				
Backfill				
Pit 9	Boron	0.5	1.17	1.31
Pit 14	Boron	0.5	1.28	1.38
	Zinc	50	49.3	50.8
Pit 18	Boron	0.5	0.85	0.85
Pit 23	Boron	0.5	1.2	1.35
Pit 24	Boron	0.5	2.28	2.49
Native Soil				
Central Plateau Reference 2	Boron	0.5	1.12	1.43
McGee	Boron	0.5	2.52	2.64
	Zinc	50	50.7	51.6
Saddle Mountain	Boron	0.5	2.1	2.32
	Zinc	50	53.5	54.1
Yakima Ridge 2	Boron	0.5	2.06	2.25
	Zinc	50	56.7	58.1

= Concentration greater than benchmark.

[a] Based on MIS from study sites unless noted as "discrete".

COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
RME = reasonable maximum exposure
MIS = *MULTI INCREMENT*® sampling

Table 4-48. Summary of Upland Plant Cover and Diversity Measures by Study Site. (2 Pages)

Study Site	Diversity	Species Richness	Bare Ground (%)	Annual Cover (%)	Alien Species Cover (%)	Native Species Cover (%)	Grass Cover (%)	Litter Cover (%)	Shrub Cover (%)	Crytogamic Cover (%)	Total Cover (%)	Rare Plant Habitat Area (ha)	Study Site Area (ha)	Fraction of Rare Plant Habitat Per Site
Study Site														
Backfill														
100-D-48	1.37	11	30	21	21	8	18	15	1.3	0.0	28	0	1.00	0
100-D-49	1.24	10	34	24	22	12	18	22	0.4	0.8	34	0	1.01	0
100-F-2	0.57	7	3	67	76	NA	64	21	0	0.2	76	0	1.00	0
116-DR-1&2	1.25	11	41	21	21	7	19	23	0	0.0	28	0.05	0.99	0.05
116-F-1	1.46	12	23	38	40	2	8	16	0.8	5.7	42	0	1.00	0
116-N-3	1.12	9	9	39	41	2	30	20	0.2	1.1	43	0	0.99	0
300-49	1.28	14	46	34	33	11	30	16	0	0.0	44	0	0.63	0
618-4	1.03	9	66	20	19	5	18	14	0	0.0	25	0	1.03	0
1607-D2:1	1.02	9	37	20	20	3	18	23	0	0.0	23	0.20	1.00	0.20
1607-H2	1.6	12	14	17	37	6	10	18	3.5	8.7	43	0	1.00	0
Native Soil														
600-131	1.18	9	20	28	23	18	27	11	11.5	14.9	42	0	0.99	0
600-132	1.5	9	41	21	15	16	20	17	6.0	3.1	32	0	0.99	0
600-139	1.26	14	10	20	22	20	19	9	17.4	26.4	42	0.03	0.99	0.03
600-171	1.77	13	35	22	25	13	18	14	6.8	10.5	38	0.30	1.00	0.30
600-181	1.37	14	25	42	41	19	37	14	8.8	6.3	60	0.23	0.99	0.23
600-204	0.85	5	23	40	40	20	40	14	14.4	5.5	60	0	0.99	0
600-208	0.89	11	5	57	60	5	50	26	0	3.6	66	0	1.00	0
600-23	1.41	9	33	11	9	18	10	9	0	0.0	27	0	0.99	0
628-1	1.35	12	21	33	32	15	29	18	10.6	9.9	47	0.29	0.99	0.29
JA Jones	1.47	11	47	15	13	19	11	10	0	0.0	32	0	0.55	0
Reference Site														
Backfill														
Pit 9	1.39	11	17	16	15	5	13	7	3.3	0.1	20	NS	1.00	NA
Pit 14	1.3	8	48	15	15	15	13	4	13.1	8.7	29	NS	0.99	NA
Pit 18	1.37	10	19	21	21	20	21	9	9.6	3.2	41	NS	0.55	NA
Pit 23	1.43	14	34	14	13	5	12	4	0.5	10.3	18	NS	0.98	NA
Pit 24	1.45	13	18	17	35	3	12	32	0	7.8	38	NS	0.58	NA

Table 4-48. Summary of Upland Plant Cover and Diversity Measures by Study Site. (2 Pages)

Study Site	Diversity	Species Richness	Bare Ground (%)	Annual Cover (%)	Alien Species Cover (%)	Native Species Cover (%)	Grass Cover (%)	Litter Cover (%)	Shrub Cover (%)	Crytogamic Cover (%)	Total Cover (%)	Rare Plant Habitat Area (ha)	Study Site Area (ha)	Fraction of Rare Plant Habitat Per Site
Native Soil														
Central Plateau Reference 2	1.22	13	46	24	23	19	23	15	13.5	5.7	42	NS	1.01	NA
McGee	1.47	8	41	9	9	28	9	24	17.8	13.4	36	NS	0.99	NA
Saddle Mountain	1.1	5	45	13	13	26	13	16	17.9	15.0	39	NS	1.01	NA
Vernita South	1.42	13	21	28	22	20	27	27	3.0	8.1	43	NS	1.00	NA
Yakima Ridge 2	1.71	9	49	5	4	25	5	17	12.3	16.6	29	NS	1.00	NA

= Less 80% of the average measure in reference sites.

= Greater than 120% of average measure in reference sites.

NA = not available
NS = not surveyed

Table 4-49. Summary of Upland Plant to Soil Regression Results. (4 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Ref.)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Plant Concentration (fw) to Average Soil Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R^2)	Statistical Significance (P-Value)
Antimony	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Aroclor-1254	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Aroclor-1260	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Aroclor-1262	Soil only	0	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Arsenic	Soil only	8	0.29	Plant = 1.3 + 0.043 soil	0.088	0.48	ln(Plant) = 0.22 + 0.079 ln(soil)	0.015	0.77
Barium	Soil only	30	0.16	Plant = 16 - 0.013 soil	0.0073	0.65	ln(Plant) = 2.9 - 0.084 ln(soil)	0.0027	0.78
Benzo[a]anthracene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Benzo[a]pyrene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Benzo[b]fluoranthene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Benzo[ghi]perylene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Benzo[k]fluoranthene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
beta-1,2,3,4,5,6-Hexachlorocyclo-hexane	Soil only	1	None, insufficient data	None, insufficient data	--	--	None, insufficient data	--	--
Boron	Soil and plant	29	11	Plant = 32 + 0.39 soil	0.0054	0.7	ln(Plant) = 3.1 + 0.16 ln(soil)	0.015	0.52
Cadmium	Soil only	1	None, insufficient data	None, insufficient data	--	--	None, insufficient data	--	--
Calculated total uranium	Soil only	1	None, insufficient data	None, insufficient data	--	--	None, insufficient data	--	--

Table 4-49. Summary of Upland Plant to Soil Regression Results. (4 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Ref.)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Plant Concentration (fw) to Average Soil Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R^2)	Statistical Significance (P-Value)
Chromium	Soil only	30	0.1	Plant = 1.1 - 0.0032 soil	0.00014	0.95	ln(Plant) = 0.27 - 0.21 ln(soil)	0.0048	0.72
Chrysene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Copper	Soil only	30	0.33	Plant = 2.6 + 0.17 soil	0.14	0.044	ln(Plant) = 0.19 + 0.49 ln(soil)	0.059	0.2
Dibenz[a,h]anthra-cene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
DDE	Soil only	3	Insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	Insufficient data to determine if there is a biologically significant relationship	--	--
DDT	Soil only	0	None, not detected in soil and tissue at the same site	None, not detected in soil and tissue at the same site	--	--	None, not detected in soil and tissue at the same site	--	--
Dichloroprop	Soil only	0	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Dieldrin	Soil and plant	1	None, insufficient data	None, insufficient data	--	--	None, insufficient data	--	--
Endosulfan I	Soil only	0	None, not detected in soil and tissue at the same site	None, not detected in soil and tissue at the same site	--	--	None, not detected in soil and tissue at the same site	--	--
Endosulfan II	Soil only	0	None, not detected in soil and tissue at the same site	None, not detected in soil and tissue at the same site	--	--	None, not detected in soil and tissue at the same site	--	--
Endosulfan sulfate	Soil only	1	None, insufficient data	None, insufficient data	--	--	None, insufficient data	--	--

Table 4-49. Summary of Upland Plant to Soil Regression Results. (4 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Ref.)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Plant Concentration (fw) to Average Soil Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R^2)	Statistical Significance (P-Value)
Hexavalent chromium	Soil only	0	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Indeno[1,2,3-cd]pyrene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Lead	Soil only	3	Insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	Insufficient data to determine if there is a biologically significant relationship	--	--
Manganese	Neither	30	0.1	Plant = 10 + 0.074 soil	0.081	0.13	ln(Plant) = -2 + 0.92 ln(soil)	0.07	0.16
Mercury	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Methoxychlor	Soil only	3	Insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	Insufficient data to determine if there is a biologically significant relationship	--	--
Pyrene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Selenium	Neither	2	Insufficient data to determine if there is a biologically significant relationship	Insufficient data to determine if there is a biologically significant relationship	--	--	Insufficient data to determine if there is a biologically significant relationship	--	--

Table 4-49. Summary of Upland Plant to Soil Regression Results. (4 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Ref.)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Plant Concentration (fw) to Average Soil Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R^2)	Statistical Significance (P-Value)
Silver	Soil only	0	None, not detected in soil and tissue at the same site	None, not detected in soil and tissue at the same site	--	--	None, not detected in soil and tissue at the same site	--	--
Strontium (elemental)	Soil only	30	1	Plant = 38 - 0.098 soil	0.021	0.44	ln(Plant) = 3.9 - 0.2 ln(soil)	0.016	0.51
Tin	Soil only	3	Insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	--	--	--
Uranium (inorganic)	Soil only	3	Insufficient data to determine if there is a biologically significant relationship	Insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
Zinc	Neither	30	0.45	Plant = -1.9 + 0.49 soil	0.13	0.052	ln(Plant) = -1 + 1 ln(soil)	0.07	0.16

COPEC = contaminant of potential ecological concern
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
fw = fresh weight

Table 4-50. Summary of Supplemental Upland Soil Data (Phytotoxicity) Collected for the RCBRA Project. (3 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg)								
Aluminum	10	10	0	1.00	7,090	12,000	--	--
Antimony	10	0	10	0.00	--	--	0.45	0.45
Arsenic	10	10	0	1.00	2.5	15.9	--	--
Barium	10	10	0	1.00	67.5	314	--	--
Beryllium	10	10	0	1.00	0.39	0.85	--	--
Bismuth	10	7	3	0.70	0.97	1.6	0.9	0.91
Boron	10	10	0	1.00	1.6	29.6	--	--
Cadmium	10	4	6	0.40	0.1	0.53	0.07	0.08
Calcium	10	10	0	1.00	3,460	10,000	--	--
Chromium	10	10	0	1.00	11.2	18.2	--	--
Cobalt	10	10	0	1.00	5.8	11.2	--	--
Copper	10	10	0	1.00	11.2	38.5	--	--
Iron	10	10	0	1.00	17,600	29,700	--	--
Lead	10	10	0	1.00	5.4	102	--	--
Lithium	10	10	0	1.00	6.9	11	--	--
Magnesium	10	10	0	1.00	3,870	6,010	--	--
Manganese	10	10	0	1.00	273	528	--	--
Mercury	10	0	10	0.00	--	--	0.025	0.025
Molybdenum	10	2	8	0.20	0.45	0.88	0.45	0.45
Nickel	10	10	0	1.00	10.9	16.1	--	--
Phosphorus	10	10	0	1.00	663	1,000	--	--
Potassium	10	10	0	1.00	1,190	2,300	--	--
Selenium	10	1	9	0.10	1.2	1.2	0.89	0.91
Silicon	10	10	0	1.00	123	239	--	--
Silver	10	0	10	0.00	--	--	0.15	0.15
Sodium	10	10	0	1.00	163	466	--	--
Strontium (elemental)	10	10	0	1.00	23.1	180	--	--
Thallium	10	0	10	0.00	--	--	0.89	0.91
Tin	10	1	9	0.10	14.2	14.2	0.89	0.91
Uranium (inorganic)	10	0	10	0.00	--	--	3	3
Vanadium	10	10	0	1.00	39.5	68.8	--	--
Zinc	10	10	0	1.00	39.9	145	--	--

Table 4-50. Summary of Supplemental Upland Soil Data (Phytotoxicity) Collected for the RCBRA Project. (3 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Organics (mg/kg)								
Acenaphthene	10	3	7	0.30	0.012	0.51	0.0002	0.0333
Acenaphthylene	10	1	9	0.10	0.003	0.003	0.0002	0.0333
Anthracene	10	5	5	0.50	0.00097	0.014	0.00333	0.0333
Benzo[a]-anthracene	10	8	2	0.80	0.0012	0.045	0.0333	0.0333
Benzo[a]pyrene	10	7	3	0.70	0.0012	0.053	0.0333	0.0333
Benzo[b]-fluoranthene	10	6	4	0.60	0.0025	0.075	0.0333	0.0333
Benzo[ghi]-perylene	10	5	5	0.50	0.0039	0.18	0.0333	0.0333
Benzo[k]-fluoranthene	10	6	4	0.60	0.00087	0.026	0.0333	0.0333
Chrysene	10	4	6	0.40	0.014	0.03	0.0333	0.0333
Dibenz[a,h]-anthracene	10	4	6	0.40	0.0019	0.0062	0.0333	0.0333
Fluoranthene	10	7	3	0.70	0.0024	0.15	0.0333	0.0333
Fluorene	10	5	5	0.50	0.0011	0.036	0.0333	0.0333
Indeno[1,2,3-cd]pyrene	10	7	3	0.70	0.0019	0.24	0.0333	0.0333
Naphthalene	10	6	4	0.60	0.0013	0.19	0.0002	0.0333
Phenanthrene	10	7	3	0.70	0.0018	0.076	0.0333	0.0333
Pyrene	10	5	5	0.50	0.0086	0.053	0.0333	0.0333
Total organic carbon	10	10	0	1.00	1,940	19,500	--	--
Anions (mg/kg)								
Chloride	10	10	0	1.00	0.272	2.04	--	--
Fluoride	10	9	1	0.90	0.36	1.06	1.05	1.05
Nitrogen in ammonia	10	10	0	1.00	0.212	1.41	--	--
Nitrogen in nitrate	20	19	1	0.95	0.193	2.7	0.6	0.6
Nitrogen in nitrite	10	6	4	0.60	0.0829	0.609	0.918	1.02
Nitrogen in nitrite and nitrate	10	10	0	1.00	0.52	3.5	--	--
Nitrogen, Kjeldahl total	10	10	0	1.00	181	539	--	--
pH measurement	10	10	0	1.00	7.31 pH	8.39 pH	--	--

Table 4-50. Summary of Supplemental Upland Soil Data (Phytotoxicity) Collected for the RCBRA Project. (3 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Physical Properties (%)								
Sulfate	10	10	0	1.00	3.58 mg/kg	137 mg/kg	--	--
Cumulative percent retained on No. 100 screen	10	10	0	1.00	57.76	87.08	--	--
Cumulative percent retained on No. 16 screen	10	10	0	1.00	1.04	6.57	--	--
Cumulative percent retained on No. 200 screen	10	10	0	1.00	93.72	99.2	--	--
Cumulative percent retained on No. 30 screen	10	10	0	1.00	4.14	19.21	--	--
Cumulative percent retained on No. 50 screen	10	10	0	1.00	17.15	57.4	--	--
Cumulative percent retained on No. 8 screen	10	10	0	1.00	0	0	--	--
Fraction coarse sand	10	10	0	1.00	3.1	12.64	--	--
Fraction coarse silt/silt/clay (less than 0.074 mm)	10	10	0	1.00	0.8	6.28	--	--
Fraction fine sand	10	10	0	1.00	25.51	58.83	--	--
Fraction granules (greater than 2.38 mm)	10	10	0	1.00	0	0	--	--
Fraction medium sand	10	10	0	1.00	11.54	45.28	--	--
Fraction total sand	10	10	0	1.00	93.72	99.2	--	--
Fraction very coarse sand	10	10	0	1.00	1.04	6.57	--	--
Fraction very fine sand	10	10	0	1.00	12.12	35.96	--	--
Percent moisture (wet sample)	10	10	0	1.00	0.704	1.94	--	--

-- = not applicable
RCBRA = River Corridor Baseline Risk Assessment

Table 4-51. Summary of Regression Analyses of Phytotoxicity Measures Versus Soil Concentrations Based on Supplemental Samples Only. (4 Pages)

Analyte	Number of Sites with Detects [a]	Minimum of P-Value	Maximum of P-Value	Number of Significant Regressions [b]	Maximum CTE Tested (mg/kg) [c]	Maximum CTE Evaluated for Benchmarks (mg/kg) [d]
Contaminants of Potential Ecological Concern						
Antimony [e]	0	--	--	0	--	6.1
Arsenic [e]	10	0.14	0.94	0	16	10.9
Barium [e]	10	0.092	0.97	0	314	358
Benzo[a]anthracene [e]	8	0.056	0.85	0	0.045	0.168
Benzo[a]pyrene [e]	7	0.24	0.83	0	0.053	0.174
Benzo[b]fluoranthene [e]	6	0.22	0.92	0	0.075	0.149
Benzo[ghi]perylene [e]	5	0.066	0.81	0	0.18	0.134
Benzo[k]fluoranthene [e]	6	0.30	0.86	0	0.026	0.072
Boron [e]	10	0.17	0.87	0	29.6	28.6
Cadmium [e]	4	--	--	0	0.53	0.83
Chromium [e]	10	0.14	0.77	0	18.2	18.2
Chrysene [e]	4	--	--	0	0.03	0.322
Copper [e]	10	0.089	0.95	0	38.5	45.6
Dibenz[a,h]anthracene [e]	4	--	--	0	0.0062	0.024
Indeno[1,2,3-cd]pyrene [e]	7	0.15	0.86	0	0.24	0.16
Lead [e]	10	0.027	0.85	1	102	116
• Bluegrass 14-day germination = 77 + -0.22 Lead, n = 10, $r^2 = 0.48$, p = 0.027						
Manganese	10	0.026	0.58	2	528	550
• Bluegrass average root length = 78 + -0.083 Manganese, n = 10, $r^2 = 0.48$, p = 0.026 • Bluegrass average shoot biomass (wet) = 13 + 0.05 Manganese, n = 10, $r^2 = 0.43$, p = 0.038						
Mercury [e]	0	--	--	0	--	0.136
Pyrene [e]	5	0.22	0.86	0	0.053	0.372
Selenium	1	--	--	0	1.2	0.73
Silver [e]	0	--	--	0	--	1.2

Table 4-51. Summary of Regression Analyses of Phytotoxicity Measures Versus Soil Concentrations Based on Supplemental Samples Only. (4 Pages)

Analyte	Number of Sites with Detects [a]	Minimum of P-Value	Maximum of P-Value	Number of Significant Regressions [b]	Maximum CTE Tested (mg/kg) [c]	Maximum CTE Evaluated for Benchmarks (mg/kg) [d]
Strontium (elemental) [e]	10	0.15	0.94	0	180	255
Tin [e]	1	--	--	0	14.2	62.1 [f]
Uranium (inorganic) [e]	0	--	--	0	--	3.1
Zinc	10	0.0052	0.77	1	145	75.2
• Bluegrass average stem height = 80 + -0.23 Zinc, n = 10, r^2 = 0.64, p = 0.0052						
Confounding Factors						
Calcium	10	0.28	0.82	0	10,000	10,036
Chloride	10	0.18	0.93	0	2.04	5.02
Cumulative percent retained on No. 100 screen	10	0.12	0.97	0	87.1	96.1
Cumulative percent retained on No. 16 screen	10	0.14	0.86	0	6.6	11.1
Cumulative percent retained on No. 200 screen	10	0.094	1	0	99.2	99.3
Cumulative percent retained on No. 30 screen	10	0.27	0.97	0	19.2	43.4
Cumulative percent retained on No. 50 screen	10	0.053	0.8	0	57.5	76.6
Cumulative percent retained on No. 8 screen	10 [g]	0	0	0	--	0.06
Fluoride	9	0.0059	0.42	4	1.06	1.24
• Bluegrass average shoot biomass (wet) = 13 + 28 fluoride, n = 9, r^2 = 0.68, p = 0.0059 • Total average root shoot mass (wet) = 20 + 33 fluoride, n = 9, r^2 = 0.63, p = 0.011 • Bluegrass average root length = 74 + -43 fluoride, n = 9, r^2 = 0.58, p = 0.017 • Bluegrass average shoot biomass (dry) = 2.6 + 2.3 fluoride, n = 9, r^2 = 0.45, p = 0.047						
Fraction coarse sand	10	0.12	0.83	0	12.6	43.4
Fraction coarse silt/silt/clay (less than 0.074 mm)	10	0.094	1	0	6.28	34.4
Fraction fine sand	10	0.069	0.65	0	58.8	40.6
Fraction granules (greater than 2.38 mm)	10 [g]	--	--	0	--	0.06
Fraction medium sand	10	0.021	0.93	2	45.3	61.4
• Total average root shoot mass (wet) = 59 + -0.57 fraction medium sand, n = 10, r^2 = 0.5, p = 0.021 • Bluegrass average shoot biomass (wet) = 45 + -0.45 fraction medium sand, n = 10, r^2 = 0.47, p = 0.028						

Table 4-51. Summary of Regression Analyses of Phytotoxicity Measures Versus Soil Concentrations Based on Supplemental Samples Only. (4 Pages)

Analyte	Number of Sites with Detects [a]	Minimum of P-Value	Maximum of P-Value	Number of Significant Regressions [b]	Maximum CTE Tested (mg/kg) [c]	Maximum CTE Evaluated for Benchmarks (mg/kg) [d]
Fraction total sand	10	0.094	1	0	99.2	99.2
Fraction very coarse sand	10	0.14	0.86	0	6.57	11.1
Fraction very fine sand	10	0.13	0.94	0	36	57.8
Magnesium	10	0.065	0.88	0	6,010	6,110
Nitrogen in ammonia	10	0.028	0.95	1	1.41	15
• Bluegrass average stem height = 51 + 20 nitrogen in ammonia, n = 10, r^2 = 0.47, p = 0.028						
Nitrogen in nitrate	10	0.062	0.66	0	2.12	8.89
Nitrogen in nitrite	6	0.17	0.97	0	0.609	1.93
Nitrogen in nitrite and nitrate	10	0.0093	0.84	4	3.5	5.43
• Total average root shoot mass (wet) = 57 + -8.1 nitrogen in nitrite and nitrate, n = 10, r^2 = 0.59, p = 0.0093 • Bluegrass 14-day germination = 88 + -11 nitrogen in nitrite and nitrate, n = 10, r^2 = 0.58, p = 0.011 • Bluegrass average shoot biomass (wet) = 43 + -6.3 nitrogen in nitrite and nitrate, n = 10, r^2 = 0.53, p = 0.017 • Bluegrass average root biomass (wet) = 14 + -1.8 nitrogen in nitrite and nitrate, n = 10, r^2 = 0.43, p = 0.04						
Nitrogen, Kjeldahl total	10	0.0045	0.95	1	539	710
• Bluegrass average stem height = 42 + 0.058 nitrogen, Kjeldahl total, n=10, r^2=0.66, p=0.0045						
Percent moisture (wet sample)	10	0.027	0.88	1	1.94	4.9
• Bluegrass average shoot biomass (wet) = 17 + 12 percent moisture (wet sample), n = 10, r^2 = 0.48, p = 0.027						
pH Measurement	10	0.023	0.84	1	8.39	9.11
• Bluegrass average root biomass (wet) = 53 + -5.3 pH measurement, n = 10, r^2 = 0.5, p = 0.023						
Phosphorus	10	0.15	0.95	0	1,000	1,186
Potassium	10	0.025	0.52	2	2,300	2,460
• Bluegrass average shoot biomass (wet) = 11 + 0.012 potassium, n = 10, r^2 = 0.49, p = 0.025 • Total average root shoot mass (wet) = 18 + 0.014 potassium, n = 10, r^2 = 0.48, p = 0.027						

Table 4-51. Summary of Regression Analyses of Phytotoxicity Measures Versus Soil Concentrations Based on Supplemental Samples Only. (4 Pages)

Analyte	Number of Sites with Detects [a]	Minimum of P-Value	Maximum of P-Value	Number of Significant Regressions [b]	Maximum CTE Tested (mg/kg) [c]	Maximum CTE Evaluated for Benchmarks (mg/kg) [d]
Silicon	10	0.25	0.89	0	239	474
Sodium	10	0.16	0.92	0	466	405
Sulfate	10	0.18	0.75	0	137	16
Total organic carbon	10	0.22	0.9	0	19,500	50,300

= Statistically significant regression, p-value <0.05.

[a] Number of sites with detects for both soil and phytotoxicity measurements, out of 10 sites with paired soil and toxicity measurements.
[b] Number of significant regression relationships out of nine phytotoxicity endpoints measured.
[c] "Tested" are supplemental samples collected for phytoxicity testing (Table 4-50).
[d] "Evaluated" are the samples evaluated versus benchmarks in Table 4-46 (RCBRA and 100-B/C Pilot soil samples).
[e] Study site concentrations are statistically greater than reference.
[f] Value from 100-B/C Pilot sample.
[g] All 10 soil samples have a detected result of 0 %.

-- = insufficient data to determine if there is a biologically significant relationship
CTE = central tendency exposure
RCBRA = River Corridor Baseline Risk Assessment

Table 4-52. Summary of Phytotoxicity Results and Contaminants of Potential Ecological Concern and Confounding Factor Measures.

Sample Site	Germination (%)	Root Biomass (dry; mg)	Root Biomass (wet; mg)	Root Length (mm)	Shoot Biomass (dry; mg)	Shoot Biomass (wet; mg)	Stem Height (mm)	Root-Shoot Mass (dry; mg)	Root-Shoot Mass (wet; mg)	Key COPECs (CTE)			Confounding Factor (CTE)						
										Lead (mg/kg)	Manganese	Zinc	Nitrogen in Nitrite and Nitrate (mg/kg)	Fluoride (mg/kg)	Fraction Medium Sand (%)	Nitrogen in Ammonia (mg/kg)	Percent Moisture (wet sample)	pH	Potassium (mg/kg)
Study Site																			
Backfill																			
116-F-1	44	0.81	8.45	47.3	3.45	25.51	77.2	4.26	34	95.8	273	39.9	3.5	0.5	32.1	1.4	0.9	8.0	1,590
1607-H2	76	1.2	10.53	46.8	5.31	37.57	67.5	6.5	48.1	77.2	314	72.8	1.8	1.1	27.6	0.7	1.5	7.9	1,310
Native Soil																			
600-131	72	1.39	8.45	45.3	4.05	28.12	58.3	5.44	36.6	13.2	328	45.2	2.2	0.7	45.3	0.6	0.8	8.4	1,380
600-132	64	1.62	9.95	47.8	2.85	17.73	47.3	4.47	27.7	23.9	302	145	2.1	0.4	36.6	0.2	0.7	8.2	1,290
600-139	52	0.77	8.71	49.8	3.45	25.54	58.3	4.23	34.3	102	303	79.9	2.2	0.6	42.9	0.9	1.0	7.8	1,190
600-171	72	1.74	12.69	69.2	4.33	28.81	62.5	6.07	41.5	62.8	290	62.9	2.5	0.4	34.1	0.8	0.8	8.1	1,420
600-208	72	1.59	11.78	62	4.77	33.63	73	6.35	45.4	30.3	355	48	1.4	0.6	22.4	0.9	1.3	7.8	1,830
Reference Site																			
McGee	68	0.88	9.08	33.5	4.05	36.06	73.6	4.94	45.1	8.4	528	52.6	1.4	0.7	15.5	0.7	1.9	8.3	2,300
Saddle Mountain	84	1.04	11.95	35.6	4.56	36.96	67.1	5.59	48.9	6.5	528	53.7	1	0.8	35.8	0.5	1.5	8.0	2,210
Vernita South	76	1.25	15.64	33.4	5.29	42.06	68.7	6.54	57.7	5.4	440	48.3	0.52	1.1	11.5	0.7	1.1	7.3	2,180

= Less 80% of the average measure in reference sites.

= Greater than 120% of average measure in reference sites.

COPEC = contaminant of potential ecological concern
CTE = central tendency exposure

Table 4-53. Summary of Risk Characterization for Upland Plants.

Receptor	Line of Evidence	Weight	Result	Summary
Plants	Rare plant surveys (and planned toxicity tests)	None	No rare plants observed, minimal rare plant habitat present. Potential for exposure and adverse effects evaluated, but toxicity tests were not conducted to evaluate the potential for adverse effects.	Available data show evidence for risk with uncertainty based on the upland bioassay data (based on three COPECs and confounding factors).
	Bioassay (Sandberg's bluegrass)	Medium	Significantly decreased growth at study sites relative to reference sites for two of nine measures (fresh shoot weight and fresh total weight). There are correlations suggesting an adverse relationship with lead, manganese, and zinc and confounding factors in the upland environment.	
	Benchmarks	Low	Benchmarks and reference concentrations are exceeded for seven COPECs (antimony, arsenic, boron, lead, selenium, tin, and zinc), suggesting potential for adverse effects.	
	Tissue concentrations	Low	Some detections and differences of study sites from reference sites, one COPEC (copper) correlated to soil.	

COPEC = contaminant of potential ecological concern

Table 4-54. Uncertainty Analysis for Upland Plants.

Attributes	Risk Questions	Observations	Impact on Assessment
Literature toxicity information	Are mean soil concentrations greater than adverse effect levels?	Toxicity information is lacking for some COPECs. The effect levels for metals are based on bioavailable forms of this metal. For example, Menzie et al. (2008) present an example study involving barium toxicity and chemical form showing that the most stable form in the environment is also the least toxic.	Risks could be underestimated for certain COPECs. Bioavialability could be greatly overestimated as would be the potential for adverse effects in the upland environment.
Measured tissue concentrations	Are mean plant concentrations greater than reference sites or increase along a COPEC gradient?	Exposure is based on the average for the study site. Few COPECs were identified in plants compared to soil. Detection limits for organics in plants may have limited the ability to detect these chemicals in plants.	High and low concentrations are integrated. Elevated detection limits can lead to underestimating risks. Only current year plant growth was sampled. This might underestimate or overestimate exposure, and therefore risks.
Survival and growth from germination test	Is germination/growth lower at study sites compared to reference or decrease along a COPEC gradient?	Generally, fewer uncertainties for bioassays compared to other measures. Uncertainties relate to selection of a test species and its representativeness of all plants at upland sites and the test duration and life stage. For example, the test is not a life-cycle test. Statistical analyses evaluated single COPEC trends but did not evaluate the potential for additive or synergistic effects of COPECs and/or confounding factors.	Life-cycle tests could identify lower effect levels, and thus the single generation test could underestimate risk. This is also true of most literature toxicity data. The interactions among COPECs or confounding factors are not well documented and there are insufficient data from these studies to adequately define a statistical model that includes all potential factors. The potential for COPEC effects is therefore uncertain when accounting for such potential interactions.

COPEC = contaminant of potential ecological concern

Menzie, C. A., B. Southworth, G. Stephenson, and N. Feisthauer, 2008, "The Importance of Understanding the Chemical Form of a Metal in the Environment: The Case of Barium Sulfate (Barite)," *Hum Ecol Risk Assess* 14-974-991.

Table 4-55. Summary of Upland Plant Risk Results for all Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status (Table 4-34)		Soil Concentrations Compared to Benchmarks (Table 4-46)	Plant Versus Soil Regression (Table 4-49)	Phytotoxicity - Measures Related to COPECs in Soil (Table 4-51)	Notes
	Soil	Plant Tissue				
Inorganics						
Antimony	Yes	No	Soil concentration greater than the benchmark	No plant detects	No soil detects	Identified as key COPEC based on benchmark comparison. In addition, COPEC was not detected in sample evaluated for phytotoxicity
Arsenic	Yes	No	Soil concentration greater than the benchmark	No relationship	No relationships	Identified as key COPEC based on benchmark comparison
Barium	Yes	No	Soil concentrations less than the benchmark	No relationship	No relationships	No significant findings
Boron	Yes	Yes	Soil concentration greater than the benchmark	No relationship	No relationships	Identified as key COPEC based on benchmark comparison
Cadmium	Yes	No	Soil concentrations less than the benchmark	Insufficient data	Insufficient data	No significant findings
Calculated total uranium	Yes	No	Soil concentrations less than the benchmark	Insufficient data	Not measured	No significant findings
Chromium	Yes	No	Soil concentrations less than the benchmark	No relationship	No relationships	No significant findings
Copper	Yes	No	Soil concentrations less than the benchmark	Significant relationship	No relationships	No significant findings
Hexavalent chromium	Yes	Not measured	Not available	Not measured in tissue	No relationships	No significant findings
Lead	Yes	No	Soil concentration greater than the benchmark	Insufficient data	One of nine significant, adverse relationship	Identified as key COPEC based on benchmark comparison
Manganese	No	No	Soil concentration greater than the benchmark and the highest concentrations were at reference sites.	No relationship	Two of nine significant, one is an adverse relationship	Maximum concentrations at reference sites; no statistical difference of soil or plant concentrations from reference. Therefore not idenfied as a key COPEC for plants
Mercury	Yes	No	Soil concentrations less than the benchmark	No plant detects	No soil detects	No significant findings

Table 4-55. Summary of Upland Plant Risk Results for all Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status (Table 4-34)		Soil Concentrations Compared to Benchmarks (Table 4-46)	Plant Versus Soil Regression (Table 4-49)	Phytotoxicity - Measures Related to COPECs in Soil (Table 4-51)	Notes
	Soil	Plant Tissue				
Selenium	No	No	Soil concentration greater than the benchmark	Insufficient data	One soil detect, no relationships	Identified as key COPEC based on benchmark comparison
Silver	Yes	No	Soil concentrations less than the benchmark	Insufficient data	No soil detects	No significant findings
Strontium (elemental)	Yes	No	Not available	No relationship	No relationships	No significant findings
Tin	Yes	No	Soil concentration greater than the benchmark	Insufficient data	Insufficient data	Identified as key COPEC based on benchmark comparison. Greater than benchmark for 100-B/C Pilot only and maximum soil concentration was not tested with bioassay
Uranium (inorganic)	Yes	No	Soil concentrations less than the benchmark	Insufficient data	No soil detects	No significant findings
Zinc	No	No	Soil concentration greater than the benchmark	No relationship	One of nine significant, adverse relationship	Identified as key COPEC based on benchmark comparison. However, no statistical difference of soil or plant concentrations from reference
PAH						
Benzo[a]anthracene	Yes	No	Not available	No plant detects	No relationships	No significant findings
Benzo[a]pyrene	Yes	No	Not available	No plant detects	No relationships	No significant findings
Benzo[b]fluoranthene	Yes	No	Not available	No plant detects	No relationships	No significant findings
Benzo[ghi]perylene	Yes	No	Not available	No plant detects	No relationships	No significant findings
Benzo[k]fluoranthene	Yes	No	Not available	No plant detects	No relationships	No significant findings
Chrysene	Yes	No	Not available	No plant detects	Insufficient data	No significant findings
Dibenz[a,h]anthracene	Yes	No	Not available	No plant detects	Insufficient data	No significant findings
Indeno[1,2,3-cd]pyrene	Yes	No	Not available	No plant detects	No relationships	No significant findings
Pyrene	Yes	No	Not available	No plant detects	No relationships	No significant findings

Table 4-55. Summary of Upland Plant Risk Results for all Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status (Table 4-34)		Soil Concentrations Compared to Benchmarks (Table 4-46)	Plant Versus Soil Regression (Table 4-49)	Phytotoxicity - Measures Related to COPECs in Soil (Table 4-51)	Notes
	Soil	Plant Tissue				
PCBs						
Aroclor-1254	Yes	No	Soil concentrations less than the benchmark	No plant detects	Not measured	No significant findings
Aroclor-1260	Yes	No	Soil concentrations less than the benchmark	No plant detects	Not measured	No significant findings
Aroclor-1262	Yes	Not measured	Soil concentrations less than the benchmark	Not measured	Not measured	No significant findings
Herbicide						
Dichloroprop	Yes	Not measured	Not available	Not measured	Not measured	No significant findings
Pesticides						
beta-1,2,3,4,5,6-Hexachlorocyclohexane	Yes	No	Not available	Insufficient data	Not measured	No significant findings
DDE	Yes	No	Not available	Insufficient data	Not measured	No significant findings
DDT	Yes	No	Not available	Insufficient data	Not measured	No significant findings
Dieldrin	Yes	Yes	Not available	Insufficient data	Not measured	No significant findings
Endosulfan I	Yes	No	Not available	Insufficient data	Not measured	No significant findings
Endosulfan II	Yes	No	Not available	Insufficient data	Not measured	No significant findings
Endosulfan sulfate	Yes	No	Not available	Insufficient data	Not measured	No significant findings
Methoxychlor	Yes	No	Not available	Insufficient data	Not measured	No significant findings

= COPECs have soil concentrations greater than benchmark and reference or significant bioassay trend.

COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HQ = hazard quotient
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl

Table 4-56. Summary of Maximum Benchmark Hazard Quotients for all Upland Terrestrial Invertebrate Contaminants of Potential Ecological Concern. (2 Pages)

COPEC	Terrestrial Invertebrate Benchmark (mg/kg)	Study Sites				Reference Sites				Location of Maximum Concentration
		Maximum CTE (mg/kg)	Maximum RME (mg/kg)	CTE HQ (Maximum CTE/ Benchmark)	RME HQ (Maximum RME/ Benchmark)	Maximum CTE (mg/kg)	Maximum RME (mg/kg)	CTE HQ (Maximum CTE/ Benchmark)	RME HQ (Maximum RME/ Benchmark)	
Antimony	78	6.1	6.1	0.08	0.08	0.3	0.3	<0.01	<0.01	Native waste site
Aroclor-1254	NA	2.05	13.5	--	--	ND	ND	--	--	Native waste site
Aroclor-1260	NA	0.1	0.13	--	--	ND	ND	--	--	Native waste site
Aroclor-1262	NA	0.044	0.063	--	--	ND	ND	--	--	Native waste site
Arsenic	60	10.9	14.4	0.18	0.24	4.1	4.3	0.07	0.07	Native waste site
Barium	330	358	406	1.1	1.2	130	133	0.40	0.40	Backfill waste site
Benzo[a]anthracene	18	0.17	1.12	<0.01	0.06	0.0037	0.0037	<0.01	<0.01	Backfill waste site
Benzo[a]pyrene	18	0.17	1.168	<0.01	0.06	0.0028	0.0058	<0.01	<0.01	Backfill waste site
Benzo[b]fluoranthene	18	0.15	0.91	<0.01	0.05	0.0032	0.0071	<0.01	<0.01	Backfill waste site
Benzo[ghi]perylene	18	0.13	0.4	<0.01	0.02	0.0033	0.0044	<0.01	<0.01	Backfill waste site
Benzo[k]fluoranthene	18	0.07	0.48	<0.01	0.03	0.0030	0.0030	<0.01	<0.01	Backfill waste site
beta-1,2,3,4,5,6-Hexachlorocyclo-hexane	NA	0.0031	0.0039	--	--	0.096	0.096	--	--	Native waste site
Boron	NA	28.6	36.4	--	--	2.5	2.6	--	--	Backfill waste site
Cadmium	20	0.83	1.15	0.04	0.06	0.18	0.22	<0.01	0.01	Native waste site
Calculated total uranium	NA	2.4	2.6	--	--	1.2	1.2	--	--	Backfill waste site
Chromium	42	18.2	21.8	0.43	0.52	14.0	14.3	0.33	0.34	Native waste site
Chrysene	18	0.32	1.9	0.02	0.10	0.0055	0.010	<0.01	<0.01	Backfill waste site
Copper	50	45.6	58	0.91	1.2	21.4	21.9	0.43	0.44	Native waste site
Dibenz[a,h]anthracene	18	0.024	0.12	<0.01	<0.01	ND	ND	--	--	Backfill waste wite
DDE	NA	0.11	0.98	--	--	0.00049	0.00067	--	--	Native waste site
DDT	NA	0.37	1.1	--	--	0.01	0.01	--	--	Native waste site
Dichloroprop	NA	0.68	1.46	--	--	0.13	0.26	--	--	Native waste site
Dieldrin	NA	0.0041	0.0066	--	--	ND	ND	--	--	Native waste site
Endosulfan I	NA	0.0015	0.0027	--	--	0.12	0.12	--	--	Native waste site

Table 4-56. Summary of Maximum Benchmark Hazard Quotients for all Upland Terrestrial Invertebrate Contaminants of Potential Ecological Concern. (2 Pages)

COPEC	Terrestrial Invertebrate Benchmark (mg/kg)	Study Sites				Reference Sites				Location of Maximum Concentration
		Maximum CTE (mg/kg)	Maximum RME (mg/kg)	CTE HQ (Maximum CTE/ Benchmark)	RME HQ (Maximum RME/ Benchmark)	Maximum CTE (mg/kg)	Maximum RME (mg/kg)	CTE HQ (Maximum CTE/ Benchmark)	RME HQ (Maximum RME/ Benchmark)	
Endosulfan II	NA	0.0065	0.0065	--	--	0.068	0.068	--	--	Native waste site
Endosulfan sulfate	NA	0.018	0.018	--	--	ND	ND	--	--	Native waste site
Hexavalent chromium	NA	0.54	0.71	--	--	0.36	0.49	--	--	Native waste site
Indeno[1,2,3-cd]pyrene	18	0.16	0.96	<0.01	0.05	0.0039	0.0039	<0.01	<0.01	Backfill waste site
Lead	1700	116	511	0.07	0.30	8.7	9.0	<0.01	<0.01	Native waste site
Manganese	450	412	420	0.92	0.93	550	562	1.2	1.2	Native reference site
Mercury	0.1	0.14	0.14	1.4	1.4	0.022	0.022	0.22	0.22	Backfill waste site
Methoxychlor	NA	0.01	0.01	--	--	0.0016	0.0016	--	--	Backfill waste site
Pyrene	18	0.372	2.3	0.02	0.13	0.0044	0.0081	<0.01	<0.01	Backfill waste site
Selenium	4.1	0.73	0.73	0.18	0.18	ND	ND	--	--	Native waste site
Silver	NA	0.34	0.45	--	--	ND	ND	--	--	Backfill waste site
Strontium (elemental)	NA	255	281	--	--	134	134	--	--	Backfill waste site
Tin	NA	62.1	93.7	--	--	1.4	1.4	--	--	100-B/C Pilot site
Uranium (inorganic)	NA	2.52	3.1	--	--	3.1	3.1	--	--	Native waste site
Zinc	100	75.2	87.6	0.75	0.88	56.7	58.1	0.57	0.58	Native waste site

= Benchmark hazard quotient greater than 1.0.

COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HQ = hazard quotient
NA = not available
ND = not detected
NV = no value
RME = reasonable maximum exposure

Table 4-57. Summary of Locations and Contaminants of Potential Ecological Concern with Soil Concentrations Greater than Terrestrial Invertebrate Benchmarks and Reference.

Site Name	COPEC	Terrestrial Invertebrate Benchmark (mg/kg)	CTE (mg/kg)	RME (mg/kg)
Study Site				
Backfill				
1607-H2	Barium	330	358	406
300-49	Mercury	0.1	0.122	0.143
Native Soil				
600-139	Copper	50	45.6	58.0
628-1	Mercury	0.1	0.136	0.136

= Concentration exceeds benchmark.

COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
RME = reasonable maximum exposure

Table 4-58. Summary of Invertebrate to Upland Soil Regression Results. (2 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Reference)	Number of Sites With Detects for Soil and Tissue	Ratio of Average Invertebrate Concentration (fw) to Average Soil Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Loglinear Regression Equation	Explained Variance of the Regression (R^2)	Statistical Significance (P-Value)
Antimony	Soil only	3	Insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	Insufficient data to determine if there is a biologically significant relationship	--	--
Aroclor-1254	Soil only	0	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Aroclor-1260	Soil only	0	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Aroclor-1262	Soil only	0	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Arsenic	Soil and invertebrate	26	0.32	Invertebrate = 0.58 + 0.16 soil	0.56	<0.001	ln(Invertebrate) = -0.49 + 0.49 ln(soil)	0.41	< 0.001
Barium	Soil only	30	0.022	Invertebrate = 2.2 - 0.0028 soil	0.43	0.27	ln(Invertebrate) = 1.5 - 0.2 ln(soil)	0.042	0.28
Benzo[a]anthracene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Benzo[a]pyrene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Benzo[b]fluoranthene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Benzo[ghi]perylene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Benzo[k]fluoranthene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
beta-1,2,3,4,5,6-Hexachlorocyclohexane	Soil only	0	None, not detected in soil and tissue at the same site	None, not detected in soil and tissue at the same site	--	--	None, not detected in soil and tissue at the same site	--	--
Boron	Soil only	29	1.3	Invertebrate = 3.8 + 0.039 soil	0.018	0.49	ln(Invertebrate) = 1.3 - 0.0084 ln(soil)	0.00021	0.94
Cadmium	Soil only	5	0.67	Invertebrate = 0 + 0.68 soil	0.98	0.001	ln(Invertebrate) = -0.65 + 0.85 ln(soil)	0.84	0.03
Calculated total uranium	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Chromium	Soil only	25	0.048	Invertebrate = 0.98 - 0.048 soil	0.029	0.42	ln(Invertebrate) = 0.11 - 0.54 ln(soil)	0.034	0.38
Chrysene	Soil only	1	None, insufficient data	None, insufficient data	--	--	None, insufficient data	--	--
Copper	Soil and invertebrate	30	0.48	Invertebrate = 4.4 + 0.2 soil	0.13	0.052	ln(Invertebrate) = 1.3 + 0.25 ln(soil)	0.038	0.3
Dibenz[a,h]anthraxcene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
DDE	Soil only	1	None, insufficient data	None, insufficient data	--	--	None, insufficient data	--	--
DDT	Soil only	3	Insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	Insufficient data to determine if there is a biologically significant relationship	--	--
Dichloroprop	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Dieldrin	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Endosulfan I	Soil only	2	Insufficient data to determine if there is a biologically significant relationship	None, insufficient data	--	--	Insufficient data to determine if there is a biologically significant relationship	--	--
Endosulfan II	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--

Table 4-58. Summary of Invertebrate to Upland Soil Regression Results. (2 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Reference)	Number of Sites With Detects for Soil and Tissue	Ratio of Average Invertebrate Concentration (fw) to Average Soil Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Loglinear Regression Equation	Explained Variance of the Regression (R^2)	Statistical Significance (P-Value)
Endosulfan sulfate	Soil and invertebrate	1	None, insufficient data	None, insufficient data	--	--	None, insufficient data	--	--
Hexavalent chromium	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Indeno[1,2,3-cd]pyrene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Lead	Soil only	7	0.028	Invertebrate = 0.94 - 0.00031 soil	0.038	0.67	ln(Invertebrate) = -0.43 + 0.019 ln(soil)	0.0015	0.93
Manganese	Invertebrate only	30	0.019	Invertebrate = 6.5 + 0.00031 soil	0.00021	0.94	ln(Invertebrate) = 1.7 + 0.025 ln(soil)	0.00049	0.91
Mercury	Soil only	0	None, not detected in soil and tissue at the same site	None, no detects in tissue	--	--	None, not detected in soil and tissue at the same site	--	--
Methoxychlor	Soil only	2	Insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	--	--	Insufficient data to determine if there is a biologically significant relationship	--	--
Pyrene	Soil only	1	None, not detected in soil and tissue at the same site	None, insufficient data	--	--	None, not detected in soil and tissue at the same site	--	--
Selenium	Neither	0	None, not detected in soil and tissue at the same site	None, not detected in soil and tissue at the same site	--	--	None, not detected in soil and tissue at the same site	--	--
Silver	Soil only	0	None, not detected in soil and tissue at the same site	None, not detected in soil and tissue at the same site	--	--	None, not detected in soil and tissue at the same site	--	--
Strontium (elemental)	Soil only	30	0.13	Invertebrate = 4.5 + -0.0035 Soil	0.012	0.57	ln(Invertebrate) = 1.6 - 0.049 ln(soil)	0.0062	0.68
Tin	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Uranium (inorganic)	Soil only	4	Insufficient data to determine if there is a biologically significant relationship	Insufficient data to determine if there is a biologically significant relationship	Insufficient data to determine if there is a biologically significant relationship	--	Insufficient data to determine if there is a biologically significant relationship	--	--
Zinc	Invertebrate only	30	0.83	Invertebrate = 41 - 0.027 soil	0.00059	0.9	ln(Invertebrate) = 4 - 0.1 ln(soil)	0.0063	0.68

= Statistically significant regression, p-value <0.05.

-- = not applicable
COPEC = contaminant of potential ecological concern
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
fw = fresh weight

Table 4-59. Summary of Regression Analyses of Nematode Survival Versus Soil Concentrations. (3 Pages)

Analyte	Equation	Number of Sites with Detects	R-Squared Value	P-Value	Maximum CTE Tested with Bioassay (mg/kg) [a]	Maximum CTE Evaluated Versus Benchmark (mg/kg) [b]
Contaminants of Potential Ecological Concern						
Antimony [c]	Not statistically significant	8	0.012	0.8	6.1	6.1
Aroclor-1254 [c]	Not statistically significant	6	0.62	0.061	2.05	2.05
Aroclor-1260 [c]	Not statistically significant	6	0.007	0.88	0.1	0.1
Aroclor-1262 [c]	Insufficient data	1	--	--	0.044	0.044
Arsenic [c]	Not statistically significant	30	0.023	0.43	10.9	10.9
Barium [c]	Not statistically significant	30	0.010	0.61	358	358
Benzo[a]anthracene [c]	Not statistically significant	20	0.015	0.61	0.168	0.168
Benzo[a]pyrene [c]	Not statistically significant	20	0.015	0.61	0.174	0.174
Benzo[b]fluoranthene [c]	Not statistically significant	21	0.046	0.35	0.149	0.149
Benzo[ghi]perylene [c]	Not statistically significant	20	0.059	0.3	0.134	0.134
Benzo[k]fluoranthene [c]	Not statistically significant	18	0.053	0.36	0.072	0.072
beta-1,2,3,4,5,6-Hexachlorocyclohexane [c]	Insufficient data	4	--	--	0.003	0.003
Boron [c]	Not statistically significant	29	0.028	0.39	28.6	28.6
Cadmium [c]	Not statistically significant	18	0.037	0.45	0.83	0.83
Calculated total uranium [c]	Not statistically significant	28	0.003	0.79	2.4	2.4
Chromium [c]	Not statistically significant	30	0.009	0.62	18.2	18.2
Chrysene [c]	Not statistically significant	27	0.130	0.064	0.322	0.322
Copper [c]	Not statistically significant	30	0.003	0.79	45.6	45.6
Dibenz[a,h]anthracene [c]	Not statistically significant	11	0.051	0.5	0.024	0.024
DDE [c]	Not statistically significant	10	0.001	0.92	0.113	0.113
DDT [c]	Not statistically significant	6	0.26	0.30	0.372	0.372
Dichloroprop c[a]	Not statistically significant	23	0.150	0.073	0.684	0.684
Dieldrin [c]	Insufficient data	4	--	--	0.004	0.004
Endosulfan I [c]	Insufficient data	4	--	--	0.002	0.002

Table 4-59. Summary of Regression Analyses of Nematode Survival Versus Soil Concentrations. (3 Pages)

Analyte	Equation	Number of Sites with Detects	R-Squared Value	P-Value	Maximum CTE Tested with Bioassay (mg/kg) [a]	Maximum CTE Evaluated Versus Benchmark (mg/kg) [b]
Endosulfan II [c]	Insufficient data	1	--	--	0.007	0.007
Endosulfan sulfate [c]	Insufficient data	3	--	--	0.018	0.018
Hexavalent chromium [c]	Not statistically significant	28	0.021	0.46	0.536	0.536
Indeno[1,2,3-cd]pyrene [c]	Not statistically significant	16	0.097	0.24	0.156	0.156
Lead [c]	Not statistically significant	30	0.029	0.37	116	116
Manganese	Not statistically significant	30	0.007	0.66	550	550
Mercury [c]	Not statistically significant	10	0.088	0.41	0.136	0.136
Methoxychlor [c]	Not statistically significant	6	0.10	0.54	0.01	0.01
Pyrene [c]	Not statistically significant	23	0.012	0.62	0.372	0.372
Selenium	Insufficient data	3	--	--	0.73	0.73
Silver [c]	Insufficient data	2	--	--	0.344	1.2
Strontium (elemental) [c]	Not statistically significant	30	0.040	0.29	255	255
Tin [c]	Not statistically significant	9	0.120	0.35	19.0	62.1 [d]
Uranium (inorganic) [c]	Not statistically significant	8	0.310	0.15	3.1	3.1
Zinc	Not statistically significant	30	0.005	0.70	75.2	75.2
Confounding Factors						
Ammonia	--	0	--	--	--	--
Calcium	Not statistically significant	30	0.013	0.54	10000	10000
Chloride	Nematode survival = 89 - 2.8 soil	30	0.140	0.04	5.02	5.02
Fluoride	Not statistically significant	19	0.018	0.86	1.24	1.24
Fraction coarse sand	Not statistically significant	30	0.018	0.48	43.4	43.4
Fraction coarse silt/silt/clay (less than 0.074 mm)	Not statistically significant	30	0.008	0.64	34.4	34.4
Fraction fine sand	Not statistically significant	30	0.052	0.23	40.6	40.6
Fraction granules (greater than 2.38 mm)	Not statistically significant	30	0.056	0.21	0.06	0.06
Fraction medium sand	Not statistically significant	30	<0.001	0.97	49.8	61.4

Table 4-59. Summary of Regression Analyses of Nematode Survival Versus Soil Concentrations. (3 Pages)

Analyte	Equation	Number of Sites with Detects	R-Squared Value	P-Value	Maximum CTE Tested with Bioassay (mg/kg) [a]	Maximum CTE Evaluated Versus Benchmark (mg/kg) [b]
Fraction total sand	Not statistically significant	30	0.008	0.64	99.2	99.2
Fraction very coarse sand	Not statistically significant	30	0.060	0.19	11.1	11.1
Fraction very fine sand	Not statistically significant	28	0.0052	0.97	57.8	57.8
Magnesium	Not statistically significant	30	<0.001	0.95	6,110	6,110
Nitrogen in ammonia	Not statistically significant	30	<0.001	0.93	12.5	15
Nitrogen in nitrate	Not statistically significant	28	0.035	0.34	8.89	8.89
Nitrogen in nitrite	Not statistically significant	22	0.049	0.32	1.93	1.93
Nitrogen in nitrite and nitrate	Not statistically significant	24	0.009	0.67	5.43	5.43
Nitrogen, Kjeldahl total	Not statistically significant	30	0.024	0.42	710	710
Percent moisture (wet sample)	Nematode survival = 92 - 6.5 soil	30	0.380	<0.001	4.9	4.9
pH Measurement	Not statistically significant	30	0.005	0.71	9.11	9.11
Phosphorus	Not statistically significant	30	0.047	0.25	1186	1186
Potassium	Not statistically significant	30	<0.001	0.93	2,460	2,460
Silicon	Not statistically significant	30	0.008	0.63	410	474
Sodium	Not statistically significant	29	0.015	0.52	405	405
Sulfate	Not statistically significant	30	0.023	0.42	16	16
Total organic carbon	Not statistically significant	30	0.007	0.67	50,300	50,300

= Statistically significant regression, p-value <0.05.

[a] "Tested" refer to samples paired with bioassay or only RCBRA MIS.
[b] "Evaluated" versus benchmarks includes RCBRA MIS and 100-B/C Pilot discrete samples (Table 4-56).
[c] Study site concentrations are statistically greater than reference.
[d] Value from 100-B/C Pilot sample.

-- = not applicable
CTE = central tendency exposure
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
MIS = *MULTI INCREMENT*® sampling
RCBRA = River Corridor Baseline Risk Assessment

Table 4-60. Summary of Nematode Survival Results and Confounding Factor Measures.

Site	Survival (%)	Moisture (%)	Chloride (mg/kg)
Study Site			
Backfill			
100-D-48	96.7	0.5	0.573
100-D-49	96.7	0.6	0.812
100-F-2	73.3	1.9	2.22
116-DR-1&2	63.3	4.9	5.02
116-F-1	100	0.5	0.359
116-N-3	63.3	1.0	0.986
1607-D2:1	90	10.4	0.637
1607-H2	76.7	1.3	0.639
300-49	90	0.4	4.94
618-4	80	1.1	0.834
Native Soil			
600-131	90	0.8	0.848
600-132	83.3	0.4	0.283
600-139	93.3	0.4	0.289
600-171	86.7	0.3	0.994
600-181	93.3	0.2	0.344
600-204	80	0.4	0.149
600-208	86.7	0.4	0.557
600-23	90	0.7	0.82
628-1	93.3	0.5	0.667
JA Jones	90	0.7	1.92
Reference Site			
Backfill			
Pit 14	96.7	0.4	0.164
Pit 18	76.7	0.2	0.155
Pit 23	83.3	1.0	0.391
Pit 24	86.7	1.0	0.588
Pit 9	93.3	0.9	0.309
Native Soil			
Central Plateau Reference 2	83.3	0.8	0.486
McGee	90	1.0	0.49
Saddle Mountain	90	0.7	0.395
Vernita South	90	1.0	0.63
Yakima Ridge 2	86.7	1.0	0.452

= Less than 80% of the average survival in reference sites.

Table 4-61. Summary of Risk Characterization for Upland Invertebrates.

Receptor	Line of Evidence	Weight	Result	Summary and Recommendation
Invertebrates	Nematode bioassays	High	No difference between study sites and reference sites, no correlation between COPECs and decreased survival, thus no indication of adverse effects.	No indication of adverse effects based on no significant difference in nematode survival. Potential for adverse effects suggested by exceedance of toxicity benchmarks. No major uncertainties.
	Benchmarks	Low	Benchmarks are exceeded for three COPECs at study sites (barium, copper, and mercury), suggesting the potential for adverse effects.	
	Tissue concentrations	Low	Some detections and differences from reference site, arsenic and cadmium in invertebrate tissues were significantly, positively correlated to soil concentrations.	
	Diversity and abundance from pitfall traps	None	Precluded as line of evidence; invertebrates were hand picked.	

NOTE: "No difference" means no difference between study sites and reference sites.
COPEC = contaminant of potential ecological concern

Table 4-62. Uncertainty Analysis for Upland Invertebrates. (2 Pages)

Attributes	Risk Questions	Observations	Impact on Assessment
Literature toxicity information	Are mean soil concentrations greater than adverse effect levels?	Toxicity information is lacking for some COPECs. The effect levels for metals are based on bioavailable forms of this metal and for example, Menzie et al. (2008) presents an example study involving barium toxicity and chemical form showing that the most stable form in the environment is also the least toxic.	Risks could be underestimated for certain COPECs. Bioavailability could be greatly overestimated as would the potential for adverse effects in the upland environment.

Table 4-62. Uncertainty Analysis for Upland Invertebrates. (2 Pages)

Attributes	Risk Questions	Observations	Impact on Assessment
Measured tissue concentrations	Are mean study site tissue concentrations greater than at reference sites or increase along an increasing COPEC gradient?	Tissue concentrations in soil biota are subject to the following: • Exposure is based on the average for the study site • Analytical measurement uncertainties (e.g., detection limits typically are elevated in tissues because of matrix interferences) • Pitfall-collected invertebrate tissues representing contaminant concentrations in all invertebrate matrices/compartments (e.g., flying insects) at study sites or reference sites • Considering the mobility of receptors, whether pitfall-collected invertebrate tissues represent contaminant concentrations for organisms within study sites or reference sites (vs. offsite organisms) • Hand collecting invertebrates introduces a bias into the type of invertebrates collected – larger, slower species are more likely to be caught.	High and low concentrations are intergrated. Detection limits can lead to underestimating risks. Hand collecting invertebrates is a taxonomic and size bias – could lead to over- or underestimating concentrations and therefore risk.
Survival from nematode test	Is survival lower at study sites compared to reference sites or does it decrease along a COPEC gradient?	Nematode survival is subject to the following: • Test duration and endpoint reflects one of many time scales for effects • Test species reflects one kind of invertebrate organism – there is uncertainty in applying these results to all upland invertebrates. Statistical analyses evaluated single COPEC trends, but did not evaluate the potential for additive or synergistic effects of COPECs and/or confounding factors.	Effects could be underestimated. The interactions among COPECs or confounding factors are not well documented and there are insufficient data from these studies to adequately define a statistical model that includes all potential factors. The potential for COPEC effects is therefore uncertain when accounting for such potential interactions.

COPEC = contaminant of potential ecological concern

Menzie, C. A., B. Southworth, G. Stephenson, and N. Feisthauer, 2008, "The Importance of Understanding the Chemical Form of a Metal in the Environment: The Case of Barium Sulfate (Barite)," *Hum Ecol Risk Assess* 14-974-991.

Table 4-63. Summary of Upland Terrestrial Invertebrate Risk Results for all Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status (Table 4-34)		Soil Concentrations Compared to Benchmarks (Table 4-56)	Invertebrate Versus Soil Regression (Table 4-58)	Nematode Survival Related to COPECs in Soil (Table 4-60)	Notes
	Soil	Invertebrate Tissue				
Inorganics						
Antimony	Yes	No	Soil concentrations less than the benchmark	Insufficient data	No relationship	No significant findings
Arsenic	Yes	Yes	Soil concentrations less than the benchmark	Significant regression	No relationship	No significant findings
Barium	Yes	No	Soil concentrations greater than the benchmark	No relationship	No relationship	Identified as key COPEC based on benchmark comparison
Boron	Yes	No	No information	No relationship	No relationship	No significant findings
Cadmium	Yes	No	Soil concentrations less than the benchmark	Significant regression	No relationship	No significant findings
Calculated total uranium	Yes	No	No information	No detects in tissue	No relationship	No significant findings
Chromium	Yes	No	Soil concentrations less than the benchmark	No relationship	No relationship	No significant findings
Copper	Yes	Yes	Soil concentrations greater than the benchmark	No relationship	No relationship	Identified as key COPEC based on benchmark comparison. Invertebrate concentrations not different from reference at RCBRA sites; invertebrate concentrations are greater than reference at the 100-B/C Pilot
Hexavalent chromium	Yes	Not measured	No information	Not measured	No relationship	No significant findings
Lead	Yes	No	Soil concentrations less than the benchmark	No relationship	No relationship	No significant findings
Manganese	No	Yes	Soil concentrations greater than the benchmark at reference sites only	No relationship	No relationship	Soil and invertebrate concentrations not different from reference at RCBRA sites; invertebrate concentrations are greater than reference at the 100-B/C Pilot
Mercury	Yes	No	Soil concentrations greater than the benchmark	No relationship	No relationship	Identified as key COPEC based on benchmark comparison

Table 4-63. Summary of Upland Terrestrial Invertebrate Risk Results for all Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status (Table 4-34)		Soil Concentrations Compared to Benchmarks (Table 4-56)	Invertebrate Versus Soil Regression (Table 4-58)	Nematode Survival Related to COPECs in Soil (Table 4-60)	Notes
	Soil	Invertebrate Tissue				
Selenium	No	No	Soil concentrations less than the benchmark	Insufficient data	No relationship	No significant findings. In addition, no statistical difference of soil or invertebrate concentrations from reference
Silver	Yes	No	No information	Insufficient data	No relationship	No significant findings
Strontium (elemental)	Yes	No	No information	No relationship	No relationship	No significant findings
Tin	Yes	No	No information	No invertebrate detects	No relationship	No significant findings
Uranium (inorganic)	Yes	No	Soil concentrations less than the benchmark	Insufficient data	No relationship	No significant findings
Zinc	No	Yes	Soil concentrations less than the benchmark	Significant, negative relationship	No relationship	No significant findings. In addition, soil and invertebrate concentrations not different from reference at RCBRA sites; invertebrate concentrations are greater than reference at the 100-B/C Pilot
PAH						
Benzo[a]anthracene	Yes	No	Soil concentrations less than the benchmark	No invertebrate detects	No relationship	No significant findings
Benzo[a]pyrene	Yes	No	Soil concentrations less than the benchmark	No invertebrate detects	No relationship	No significant findings
Benzo[b]fluoranthene	Yes	No	Soil concentrations less than the benchmark	No invertebrate detects	No relationship	No significant findings
Benzo[ghi]perylene	Yes	No	Soil concentrations less than the benchmark	No invertebrate detects	No relationship	No significant findings
Benzo[k]fluoranthene	Yes	No	Soil concentrations less than the benchmark	No invertebrate detects	No relationship	No significant findings
Chrysene	Yes	No	Soil concentrations less than the benchmark	Insufficient data	No relationship	No significant findings
Dibenz[a,h]anthracene	Yes	No	Soil concentrations less than the benchmark	No invertebrate detects	No relationship	No significant findings
Indeno[1,2,3-cd]pyrene	Yes	No	Soil concentrations less than the benchmark	No invertebrate detects	No relationship	No significant findings

Table 4-63. Summary of Upland Terrestrial Invertebrate Risk Results for all Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status (Table 4-34)		Soil Concentrations Compared to Benchmarks (Table 4-56)	Invertebrate Versus Soil Regression (Table 4-58)	Nematode Survival Related to COPECs in Soil (Table 4-60)	Notes
	Soil	Invertebrate Tissue				
Pyrene	Yes	No	Soil concentrations less than the benchmark	Insufficient data	No relationship	No significant findings
PCBs						
Aroclor-1254	Yes	Not measured	No information	Not measured	No relationship	No significant findings
Aroclor-1260	Yes	Not measured	No information	Not measured	No relationship	No significant findings
Aroclor-1262	Yes	Not measured	No information	Not measured	Insufficient data	No significant findings
Herbicide						
Dichloroprop	Yes	Not measured	No information	Not measured	No relationship	No significant findings
Pesticides						
beta-1,2,3,4,5,6-Hexachlorocyclohexane	Yes	No	No information	Insufficient data	Insufficient data	No significant findings
DDE	Yes	No	No information	Insufficient data	No relationship	No significant findings
DDT	Yes	No	No information	Insufficient data	No relationship	No significant findings
Dieldrin	Yes	No	No information	No invertebrate detects	Insufficient data	No significant findings
Endosulfan I	Yes	No	No information	Insufficient data	Insufficient data	No significant findings
Endosulfan II	Yes	No	No information	No invertebrate detects	Insufficient data	No significant findings
Endosulfan sulfate	Yes	Yes	No information	Insufficient data	Insufficient data	No significant findings
Methoxychlor	Yes	No	No information	Insufficient data	No relationship	No significant findings

= COPECs have soil concentrations greater than the benchmark and reference.

COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl

Table 4-64. Summary of Upland Mammal Organ (Liver/Kidney) to Soil Regression Results. (5 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Reference)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Mammal Organ Concentration (fw) to Average Soil Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R^2)	Statistical Significance (P-Value)
Antimony	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Aroclor-1254	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Aroclor-1260	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Aroclor-1262	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Arsenic	Soil only	9	0.17	Mouse kidney/liver = 0.65 + 0.0097 soil	0.18	0.26	ln(Mouse kidney/liver) = -0.51 + 0.1 ln(soil)	0.32	0.11
Barium	Soil only	30	0.00083	Mouse kidney/liver = 0.078 - 4.2e-005 soil	0.01	0.59	ln(Mouse kidney/liver) = -2.4 - 0.052 ln(soil)	0.0036	0.75
Benzo[a]anthracene	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Benzo[a]pyrene	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Benzo[b]fluoranthene	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Benzo[ghi]perylene	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--

Table 4-64. Summary of Upland Mammal Organ (Liver/Kidney) to Soil Regression Results. (5 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Reference)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Mammal Organ Concentration (fw) to Average Soil Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R^2)	Statistical Significance (P-Value)
Benzo[k]fluoranthene	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
beta-1,2,3,4,5,6-Hexachlorocyclohexane	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Boron	Soil only	2	Insufficient data to determine if there is a biologically significant relationship	None, insufficient data	--	--	Insufficient data to determine if there is a biologically significant relationship	--	--
Cadmium	Soil only	12	0.48	Mouse kidney/liver = 0.11 + 0.075 soil	0.046	0.5	ln(Mouse kidney/liver) = -2 + 0.09 ln(soil)	0.017	0.68
Calculated total uranium	Soil only	0	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Chromium	Soil only	17	0.02	Mouse kidney/liver = 0.34 - 0.014 soil	0.12	0.17	ln(Mouse kidney/liver) = -0.39 - 0.57 ln(soil)	0.14	0.14
Chrysene	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Copper	Soil only	30	0.38	Mouse kidney/liver = 6.2 - 0.0041 soil	0.0013	0.85	ln(Mouse kidney/liver) = 1.7 + 0.024 ln(soil)	0.0031	0.77
Dibenz[a,h]anthracene	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--

Table 4-64. Summary of Upland Mammal Organ (Liver/Kidney) to Soil Regression Results. (5 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Reference)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Mammal Organ Concentration (fw) to Average Soil Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R^2)	Statistical Significance (P-Value)
DDE	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
DDT	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Dichloroprop	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Dieldrin	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Endosulfan I	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Endosulfan II	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Endosulfan sulfate	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Hexavalent chromium	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Indeno[1,2,3-cd]pyrene	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--

Table 4-64. Summary of Upland Mammal Organ (Liver/Kidney) to Soil Regression Results. (5 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Reference)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Mammal Organ Concentration (fw) to Average Soil Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R^2)	Statistical Significance (P-Value)
Lead	Soil only	3	Insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	Insufficient data to determine if there is a biologically significant relationship	--	--
Manganese	Organ only	30	0.0088	Mouse kidney/liver = 3.3 - 0.00081 soil	0.022	0.43	ln(Mouse kidney/liver) = 1.7 - 0.11 ln(soil)	0.025	0.4
Mercury	Soil only	0	None, not detected in soil and tissue at the same site	None, no detects in tissue	--	--	None, not detected in soil and tissue at the same site	--	--
Methoxychlor	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Pyrene	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Selenium	Organ only	2	Insufficient data to determine if there is a biologically significant relationship	Insufficient data to determine if there is a biologically significant relationship	--	--	Insufficient data to determine if there is a biologically significant relationship	--	--
Silver	Soil only	0	None, not detected in soil and tissue at the same site	None, not detected in soil and tissue at the same site	--	--	None, not detected in soil and tissue at the same site	--	--
Strontium (elemental)	Soil only	30	0.0026	Mouse kidney/liver = 0.086 + 8.9e-005 soil	0.025	0.4	ln(Mouse kidney/liver) = -2.7 + 0.081 ln(soil)	0.022	0.44

Table 4-64. Summary of Upland Mammal Organ (Liver/Kidney) to Soil Regression Results. (5 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Reference)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Mammal Organ Concentration (fw) to Average Soil Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R^2)	Statistical Significance (P-Value)
Tin	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Uranium (inorganic)	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Zinc	Neither	30	0.62	Mouse kidney/liver = 30 - 0.023 soil	0.0029	0.78	ln(Mouse kidney/liver) = 3.5 - 0.025 ln(soil)	0.0011	0.86

-- = not applicable
COPEC = contaminant of potential ecological concern
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
fw = fresh weight

Table 4-65. Summary of Upland Mammal Carcass to Soil Regression Results. (4 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Reference)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Mammal Carcass Concentration (fw) to Average Soil Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Loglinear Regression Equation	Explained Variance of the Regression (R^2)	Statistical Significance (P-Value)
Antimony	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Aroclor-1254	Soil only	0	None, not detected in soil and tissue at the same site	None, no detects in tissue	--	--	None, not detected in soil and tissue at the same site	--	--
Aroclor-1260	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Aroclor-1262	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Arsenic	Soil only	4	Insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	Insufficient data to determine if there is a biologically significant relationship	--	--
Barium	Soil only	30	0.045	Mouse-carcass = 4.1 + -0.0012 soil	0.0025	0.79	ln(Mouse carcass) = 1.1 + 0.062 ln(soil)	0.005	0.71
Benzo[a]anthracene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Benzo[a]pyrene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Benzo[b]fluoran-thene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Benzo[ghi]perylene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Benzo[k]fluoran-thene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--

Table 4-65. Summary of Upland Mammal Carcass to Soil Regression Results. (4 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Reference)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Mammal Carcass Concentration (fw) to Average Soil Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Loglinear Regression Equation	Explained Variance of the Regression (R^2)	Statistical Significance (P-Value)
beta-1,2,3,4,5,6-Hexachlorocyclo-hexane	Soil only	0	None, not detected in soil and tissue at the same site	None, not detected in soil and tissue at the same site	--	--	None, not detected in soil and tissue at the same site	--	--
Boron	Soil only	21	0.14	Mouse-carcass = 0.34 + 0.039 soil	0.71	<0.001	ln(Mouse carcass) = -1.1 + 0.27 ln(soil)	0.26	0.018
Cadmium	Soil only	4	Insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	None, insufficient data to determine if there is a biologically significant relationship	Insufficient data to determine if there is a biologically significant relationship	--	--
Calculated total uranium	Soil only	1	None, insufficient data	None, insufficient data	--	--	None, insufficient data	--	--
Chromium	Soil only	30	0.052	Mouse carcass = 0.54 + 0.001 soil	0.00071	0.89	ln(Mouse carcass) = -0.6 - 0.0087 ln(soil)	0.00014	0.95
Chrysene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Copper	Soil only	30	0.18	Mouse carcass = 2.8 + 0.0072 soil	0.021	0.44	ln(Mouse carcass) = 0.91 + 0.062 ln(soil)	0.03	0.36
Dibenz[a,h]anthra-cene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
DDE	Soil only	0	None, not detected in soil and tissue at the same site	None, not detected in soil and tissue at the same site	--	--	None, not detected in soil and tissue at the same site	--	--
DDT	Soil only	0	None, not detected in soil and tissue at the same site	None, no detects in tissue	--	--	None, not detected in soil and tissue at the same site	--	--

Table 4-65. Summary of Upland Mammal Carcass to Soil Regression Results. (4 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Reference)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Mammal Carcass Concentration (fw) to Average Soil Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Loglinear Regression Equation	Explained Variance of the Regression (R^2)	Statistical Significance (P-Value)
Dichloroprop	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Dieldrin	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Endosulfan I	Soil only	0	None, not detected in soil and tissue at the same site	None, not detected in soil and tissue at the same site	--	--	None, not detected in soil and tissue at the same site	--	--
Endosulfan II	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Endosulfan sulfate	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Hexavalent chromium	Soil only	--	None, not measured in tissue	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Indeno[1,2,3-cd]pyrene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Lead	Soil and carcass	20	0.034	Mouse carcass = 0.62 + 0.007 soil	0.16	0.076	ln(Mouse carcass) = -1.3 + 0.34 ln(soil)	0.32	0.0092
Manganese	Neither	30	0.015	Mouse carcass = 3 + 0.0057 soil	0.08	0.13	ln(Mouse carcass) = -1.4 + 0.5 ln(soil)	0.11	0.078
Mercury	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Methoxychlor	Soil only	0	None, not detected in soil and tissue at the same site	None, not detected in soil and tissue at the same site	--	--	None, not detected in soil and tissue at the same site	--	--
Pyrene	Soil only	0	None, no detects in tissue	None, no detects in tissue	--	--	None, no detects in tissue	--	--

Table 4-65. Summary of Upland Mammal Carcass to Soil Regression Results. (4 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Reference)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Mammal Carcass Concentration (fw) to Average Soil Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Loglinear Regression Equation	Explained Variance of the Regression (R^2)	Statistical Significance (P-Value)
Selenium	Neither	1	None, insufficient data	None, insufficient data	--	--	None, insufficient data	--	--
Silver	Soil only	1	None, insufficient data	None, insufficient data	--	--	None, insufficient data	--	--
Strontium (elemental)	Soil only	30	0.27	Mouse carcass = 8.8 + 0.0077 soil	0.0065	0.67	ln(Mouse carcass) = 1.7 + 0.11 ln(soil)	0.017	0.5
Tin	Soil only	8	0.29	Mouse carcass = 1.2 + 0.015 soil	0.34	0.13	ln(Mouse carcass) = 0.19 + 0.064 ln(soil)	0.27	0.18
Uranium (inorganic)	Soil only	0	None, not detected in soil and tissue at the same site	None, not detected in soil and tissue at the same site	--	--	None, not detected in soil and tissue at the same site	--	--
Zinc	Neither	30	1.4	Mouse carcass = 77 - 0.23 soil	0.013	0.55	ln(Mouse carcass) = 4.5 - 0.093 ln(soil)	0.0036	0.75

= Statistically significant regression, p-value >0.05.

-- = not applicable
COPEC = contaminant of potential ecological concern
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
fw = fresh weight

Table 4-66. Exposure Parameters for Upland Receptors. (5 Pages)

Diet	Parameter	Value	Units	Reference	Notes
Bird Receptors					
Killdeer					
Insectivore	Body weight	0.0756	kg	Median weight from four papers, see notes on gender and counts	Purdue and Haines 1977: 0.0711 (n = 1) Stegman 1955: 0.1218 (M, n = 1) Jackson et al. 2000: 0.0756 (M, n = 2) Dunning 1993: 0.095 (M F, weighted mean of males and females from the Great Plains).
Insectivore	Diet composition soil	7.3	%	Beyer et al. 1994	Data regarding soil ingestion of killdeer are unavailable. For the purposes of this ERA, it was assumed that soil ingestion for killdeer is similar to that of the least sandpiper. However, it should be noted that this value is likely somewhat higher than the actual soil ingestion for killdeer because killdeer do not probe in the soil/sediment.
Insectivore	Ingestion soil	0.014	kg/kg/d	--	Soil ingestion is equal to the percent soil in diet multiplied by the food ingestion rate as follows: soil ingestion = (diet composition soil/100 * intake food dry weight).
Insectivore	Ingestion water	0	L/kg/d	--	No water consumed at upland sites.
Insectivore	Intake food dry weight	0.192	kg/kg/d	Nagy 2001	Allometric estimation for "*Charadriiformes*" (Nagy 2001) normalized to kg/kg-bw/d dry weight.
Insectivore	Conversion factor (fresh from dry intake)	3.23	--	EPA/600/R-93/187	Fresh from dry intake conversion factor based on 69% moisture in diet (grasshoppers and crickets), calculated as 1 divided dry fraction.
Insectivore	Intake food fresh weight	0.620	kg/kg/d	--	Intake food dry weight * conversion factor.
Insectivore	Diet composition terrestrial invertebrate	1	Proportion	Assumed	--
Meadowlark					
Omnivore	Body weight	0.0995	kg	Median weight from two papers, see notes on gender and counts	Wiens and Rotenberry 1981: 0.0894 (F, n = 32), 0.106 (M, n = 51) Maher 1979: 0.1153 (M, n = 76), 0.093 (F, n = 53).

Table 4-66. Exposure Parameters for Upland Receptors. (5 Pages)

Diet	Parameter	Value	Units	Reference	Notes
Omnivore	Diet composition soil	2.08	%	Sample and Suter 1994	Data regarding soil ingestion of western meadowlarks are unavailable. For the purposes of this ERA, it was assumed that soil ingestion for meadowlarks is similar to that derived for the American robin. No information concerning soil ingestion in American robins could be found in the literature. Both robins and woodcocks consume earthworms; however, earthworms comprise >60% and up to 99% of the American woodcock diet (Sperry 1940; Krohn 1970; Stribling and Doerr 1985) compared to <20% of the American robin diet (Howell 1942). Therefore, the soil ingestion rate of 10.4% or the diet reported for American woodcocks (Beyer et al., 1994) is likely to be an extreme upperbound for the robin. If the soil ingestion rate is proportioned to the percent of earthworms in the diet, then soil would only make up 2.1% of the robin diet.
Omnivore	Ingestion soil	0.0025	kg/kg/d	OSWER Directive 9285.7-55	Soil ingestion is equal to the percent soil in diet multiplied by the food ingestion rate as follows: soil ingestion = (diet composition soil/100 * intake food dry weight).
Omnivore	Ingestion water	0	L/kg/d	--	No water consumed at upland sites.
Omnivore	Intake food dry weight	0.12	kg/kg/d	Nagy 2001	Allometric estimation for "omnivorous birds" normalized to kg/kg-bw/d.
Omnivore	Conversion factor (fresh from dry intake)	3.66	--	EPA/600/R-93/187	Fresh from dry intake conversion factor based on weighted mean of 72.7% moisture in diet (69% moisture in grasshoppers and crickets [63.3% of diet]], 79% moisture in young grasses [36.7% of diet]), calculated as 1 divided dry fraction.
Omnivore	Intake food fresh weight	0.439	kg/kg/d	--	Intake food dry weight * conversion factor.
Omnivore	Diet composition terrestrial invertebrate	0.63	Proportion	Bryant 1914	Diet consists of 63.3% invertebrates.
Omnivore	Diet composition plant	0.37	Proportion	Bryant 1914	Diet consists 36.7% mixed seeds/vegetables.
California Quail					
Granivore	Body weight	0.18	kg	Median weight from three papers, see notes on gender and counts	Robel 1969: 0.1899 (A B Fall), 0.1939 (A B Winter), 0.19 (A B spring) Roseberry and Klimstra 1971: 0.181 (M winter), 0.163 (M summer), 0.183 (F winter), 0.18 (F summer) Guthrey et al. 1988: 0.161 (M winter), 0.154 (M summer), 0.157 (F winter), 0.157 (F summer).

Table 4-66. Exposure Parameters for Upland Receptors. (5 Pages)

Diet	Parameter	Value	Units	Reference	Notes
Granivore	Diet composition soil	6.1	%	OSWER Directive 9285.7-55	Median soil ingestion rate estimated for mourning dove in Table 3 of the Eco-SSL guidance. The median was selected as the best measure of central tendency that is unbiased by outliers.
Granivore	Ingestion soil	0.0048	kg/kg/d	EPA/600/R-93/187	Soil ingestion is equal to the percent soil in diet multiplied by the food ingestion rate as follows: soil ingestion = (diet composition soil/100 * intake food dry weight).
Granivore	Ingestion water	0	L/kg/d	--	No water consumed at upland sites.
Granivore	Intake food dry weight	0.078	kg/kg/d	Koerth and Guthery 1990	Average of food ingestion rates over four seasons from exposure factors handbook (EPA/600/R-93/187a). Rate based on diet of commercial game food with only 5 to 10% water content, therefore assumed dry weight.
Granivore	Conversion factor (fresh from dry intake)	1.1	--	EPA/600/R-93/187	Fresh from dry intake conversion factor based on 9.3% moisture in diet (seeds), calculated as 1 divided dry fraction.
Granivore	Intake food fresh weight	0.086	kg/kg/d	--	Intake food dry weight * conversion factor.
Granivore	Diet composition plant	1	Proportion	Assumed	--
Mammal Receptors					
Deer Mouse					
Omnivore	Body weight	0.0194	kg	Median weight from two papers, see notes on gender and counts	O'Farrel 1975: 0.0217 (M, n = 2), 0.018 (M, n = 2), 0.0212 (M, n = 6), 0.0203 (M, n = 11), 0.0184 (M), Silva and Downing 1995: 0.0166 (mean of males and females from Washington).
Omnivore	Diet composition soil	2	%	Beyer et al. 1994	Assumed to be similar to the white-footed mouse because of similar dietary and foraging habits.
Omnivore	Ingestion soil	0.003	kg/kg/d	OSWER Directive 9285.7-55	Soil ingestion is equal to the percent soil in diet multiplied by the food ingestion rate as follows: soil ingestion = (diet composition soil/100 * intake food dry weight).
Omnivore	Ingestion water	0	L/kg/d	--	No water consumed at upland sites.
Omnivore	Intake food dry weight	0.166	kg/kg/d	Nagy 2001	Allometric estimation for "carnivorous mammals" normalized to kg/kg-bw/d.
Omnivore	Conversion Factor (fresh from dry intake)	3.85	--	EPA/600/R-93/187	Fresh from dry intake conversion factor based on mean of 74% moisture in diet (69% moisture in grasshoppers and crickets, 79% moisture in young grasses), calculated as 1 divided dry fraction.
Omnivore	Intake food fresh weight	0.639	kg/kg/d	--	Intake food dry weight * conversion factor.
Omnivore	Diet composition terrestinvertebrate	0.5	Proportion	Assumed	--

Table 4-66. Exposure Parameters for Upland Receptors. (5 Pages)

Diet	Parameter	Value	Units	Reference	Notes
Omnivore	Diet composition plant	0.5	Proportion	Assumed	--
Pocket Mouse					
Granivore	Body weight	0.0175	kg	Median weight from three papers, see notes on gender and counts	O'Farrel 1975: 0.0174 (M, n = 18), 0.0183 (M, n = 12), 0.0176 (M, n = 11), 0.0191 (M, n = 12) Scheffer 1938: 0.0175 (M, n = 10), 0.0143 (F, n = 10) Schreiber 1978: 0.0174 (M, n = 4), 0.016 (F, n = 4).
Granivore	Diet composition soil	2	%	Beyer et al. 1994	Assumed to be similar to the white-footed mouse because of similar dietary and foraging habits.
Granivore	Ingestion soil	0.002	kg/kg/d	OSWER Directive 9285.7-55	Soil ingestion is equal to the percent soil in diet multiplied by the food ingestion rate as follows: soil ingestion = (diet composition soil/100 * intake food dry weight).
Granivore	Ingestion water	0	L/kg/d	--	No water consumed at upland sites.
Granivore	Intake food dry weight	0.123	kg/kg/d	EPA/600/R-93/187	Allometric estimation for "granivorous mammals" normalized to kg/kg-bw/d using mean weight as reported by Scheffer 1938, O'Farrell et al. 1975, and Schreiber 1978.
Granivore	Conversion factor (fresh from dry intake)	4.76	--	EPA/600/R-93/187	Fresh from dry intake conversion factor based on 79% moisture in diet (young grasses), calculated as 1 divided dry fraction.
Granivore	Intake food fresh weight	0.585	kg/kg/d	--	Intake food dry weight * conversion factor.
Granivore	Diet composition_plant	1	Proportion	Assumed	--
Grasshopper Mouse					
Insectivore	Body weight	0.0346	kg	Median weight from three papers, see notes on gender and counts	Wied, Maximilian, Prinz zu 1841: 0.026 (low end of range), 0.049 (high end of range) McKinney and Pasley 1974: 0.0347 (F, n = 9, 60-80 d), 0.0346 (F, n = 13, 100-108 d) BHI-01757: 0.026 (Mitchell, R., personal communication).
Insectivore	Diet composition soil	0.9	%	OSWER Directive 9285.7-55	Assumed to be similar to the short-tailed shrew because of similar dietary and foraging habits. Median soil ingestion rate estimated for short-tailed shrew in Table 3 of the Eco-SSL guidance. The median was selected as the best measure of central tendency that is unbiased by outliners.
Insectivore	Ingestion soil	0.0009	kg/kg/d	OSWER Directive 9285.7-55	Soil ingestion is equal to the percent soil in diet multiplied by the food ingestion rate as follows: soil ingestion = (diet composition soil/100 * intake food dry weight).
Insectivore	Ingestion water	0	L/kg/d	--	No water consumed at upland sites.

Table 4-66. Exposure Parameters for Upland Receptors. (5 Pages)

Diet	Parameter	Value	Units	Reference	Notes
Insectivore	Intake food dry weight	0.0977	kg/kg/d	EPA/600/R-93/187	Allometric estimation for "insectivorous mammals" normalized to kg/kg-bw/d using mean weight as reported by BHI-01757.
Insectivore	Conversion factor (fresh from dry intake)	3.23	--	EPA/600/R-93/187	Fresh from dry intake conversion factor based on 69% moisture in diet (grasshoppers and crickets), calculated as 1 divided dry fraction.
Insectivore	Intake food fresh weight	0.316	kg/kg/d	--	Intake food dry weight * conversion factor.
Insectivore	Diet composition terrestinvertebrate	1	Proportion	Assumed	--

-- = not applicable
Eco-SSL = ecological soil screening level
EPA = U.S. Environmental Protection Agency
ERA = ecological risk assessment

Beyer, W. N., E. E. Connor, and S. Gerould, 1994, "Estimates of Soil Ingestion by Wildlife," *J. Wildlife Manage* 58:375-382.

BHI-01757, 2005, *DQO Summary Report for the 100 Area and 300 Area Component of the River Corridor Baseline Risk Assessment*, Rev. 0, Bechtel Hanford, Inc., Richland, Washington.

Bryant, H. C., 1914, "A Determination of the Economic Status of the Western Meadowlark (*Stunella neglecta*) in California," *Univ. Calif. Publ. Zool.* 11(14):377-510.

Dunning, J. B. Jr. (ed.), 1993, *CRC Handbook of Avian Body Masses*, CRC Press, Boca Raton, Florida.

EPA/600/R-93/187, 1993, *Wildlife Exposure Factors Handbook,* Vol. 1, Office of Health and Environmental Assessment and Office of Research and Development, U.S. Environmental Protection Agency, Washington, D.C.

Guthery, F. S., N. E. Koerth, and D. S. Smith, 1988, "Reproduction of Northern Bobwhites in Semiarid Environments," *J Wildl Manage* 42:144-149.

Howell, J. C., 1942, "Notes on the Nesting Habits of the American robin (*Turdus migratorius* L.)," *Am Midl Nat* 28:529-603.

Jackson, Bette J. and Jerome A. Jackson. 2000. Killdeer (*Charadrius vociferus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/517

Koerth, N. E. and F. S. Guthery, 1990, "Water Requirements of Captive Northern Bobwhites Under Subtropical Seasons," *J Wildl Manage* 54:667-672.

Krohn, W. B., 1970, "Woodcock Feeding Habits As Related to Summer Field Usage in Central Maine," *J Wildlife Manage* 34:769-775.

Maher, W. J., 1979, "Nestling Diets of Prairie Passerine Birds at Matador, Saskatchewan, Canada," *Ibis* 121:437-452.

McKinney, T. D. and J. N. Pasley, 1974, "Effects of ACTH on Reproductive Organs of Immature Female Northern Grasshopper Mice (*Onychomys leucogaster*)," *J Reprod Fertil* 41:467-470.

Nagy, K. A., 2001, "Food Requirements for Wild Animals: Predictive Equations for Free-Living Mammals, Reptiles, and Birds," *Nutrition Abstracts and Reviews*, Series B 71, 21R-31R.

O'Farrel, T. P., 1975, "Seasonal and Altitudinal Variation in Populations of Small Mammals on Rattlesnake Mountain, Washington," *Am Midl Nat* 94:190-207.

OSWER Directive 9285.7-55, 2003, *Guidance for Developing Ecological Soil Screening Levels*, Attachment 4-1 Revised April 2007, U.S. Environmental Protection Agency, Washington, D.C.

Purdue, J. R. and H. Haines, 1977, "Salt Water Tolerance and Water Turnover in the Snowy Plover," *Auk* 94: 248-255.

Robel, R. J., 1969, "Food Habits, Weight Dynamics, and Fat Content of Bobwhites in Relation to Food Plantings in Kansas," *J Wildlife Manage*, 33:237–249.

Roseberry, J. L. and W. D. Klimstra, 1971, "Annual weight cycles in male and female Bobwhite quail," *Auk* 88:116–123.

Sample, B. and G. W. Suter, 1994, "Ecological Risk Assessment in a Large River Reservoir: 4, Piscivorous Wildlife," *Environ Toxicol Chem*, Vol. 18, No. 4, pp. 610-62.

Scheffer, T. H., 1938, *Pocket Mice of Washington and Oregon in Relation to Agriculture*, 347 USDA Tech. Bull. No. 608, U.S. Department of Agriculture.

Schrieber, R. K., 1978, "Bioenergetics of the Great Basin Pocket Mouse *Perognathus parvus*," *Acta Theriologica* 23:469-487.

Silva, M. and J. A. Downing, 1995, *CRC Handbook of Mammalian Body Masses*, CRC Press, Boca Raton, Florida.

Sperry, C. C., 1940, "Food Habits of a Group of Shorebirds: Woodcock, Snipe, Knot, and Dowitcher," U.S. Biological Survey, *Wildl Res Bull 1*, 37 pp.

Stegman, L. C. 1955. Weights of some small birds in central New York. Bird-Banding 26:19-27.

Stribling, H. L. and P. D. Doerr, 1985, "Nocturnal Use of Field by American Woodcock," *J Wildlife Manage*, 49:485-491.

Wied, Maximilian, Prinz zu, 1841, "Reise in Das Innere Nort-America in Den Jahren 1832 bis 1834," *J. Holscher*, Coblenz, p. 99, xxiv + 687 pp.

Wiens, J. A. and J. T. Rotenberry, 1981, "Habitat Associations and Community Structure of Birds in Shrubsteppe Environments," *Ecol Monogr* 51:21-41.

Table 4-67. Upland Receptors and Exposure Pathways for Hazard Quotient Calculations.

Receptor	HQ Pathway Parameters	Representative Concentrations
Killdeer (invertivore)	Soil	Five MIS samples – used mean
	Invertebrates	One composite sample
California quail (herbivore)	Soil	Five MIS samples – used mean
	Plants	Two composite samples – used maximum
Meadowlark (omnivore)	Soil	Five MIS samples – used mean
	Plants	Two composite samples – used maximum
	Invertebrates	One composite sample
Deer mouse (omnivore)	Soil	Five MIS samples – used mean
	Plants	Two composite samples – used maximum
	Invertebrates	One composite sample
Pocket mouse (herbivore)	Soil	Five MIS samples – used mean
	Plants	Two composite samples – used maximum
Grasshopper mouse (omnivore)	Soil	Five MIS samples – used mean
	Invertebrates	One composite sample

HQ = hazard quotient
MIS = *MULTI INCREMENT*® sampling

Table 4-68. Summary of Upland Middle Trophic-Level Hazard Quotients for All Contaminants of Potential Ecological Concern. (2 Pages)

COPEC	Study Sites				Reference Sites			
	NOAEL		LOAEL		NOAEL		LOAEL	
	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ
Antimony	<0.01	3.0	<0.01	0.30	<0.01	3.0	<0.01	0.30
Aroclor-1254	<0.01	1.1	<0.01	0.10	NA	NA	NA	NA
Aroclor-1260	<0.01	0.01	<0.01	<0.01	NA	NA	NA	NA
Aroclor-1262	<0.01	<0.01	<0.01	<0.01	NA	NA	NA	NA
Arsenic	<0.01	1.5	<0.01	0.90	<0.01	0.91	<0.01	0.57
Barium	<0.01	0.30	<0.01	0.20	<0.01	0.51	<0.01	0.30
Benzo[a]anthracene	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo[a]pyrene	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo[b]fluoranthene	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo[ghi]perylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo[k]fluoranthene	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
beta-1,2,3,4,5,6-Hexachlorocyclohexane	<0.01	0.20	<0.01	0.09	0.01	0.14	<0.01	0.03
Boron	<0.01	2.4	<0.01	0.70	0.01	1.1	<0.01	0.33
Cadmium	<0.01	0.30	<0.01	0.20	<0.01	0.15	<0.01	0.03
Calculated total uranium	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	<0.01	0.90	<0.01	0.90	<0.01	0.86	<0.01	0.24
Chrysene	<0.01	0.10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	0.04	3.1[a]	0.01	1.1	0.07	2.1	0.02	0.84
Dibenz[a,h]anthracene	<0.01	<0.01	<0.01	<0.01	NA	NA	NA	NA
DDE	<0.01	2.2	<0.01	0.40	<0.01	1.4	<0.01	0.27
DDT	<0.01	0.70	<0.01	0.10	<0.01	0.49	<0.01	0.08

Table 4-68. Summary of Upland Middle Trophic-Level Hazard Quotients for All Contaminants of Potential Ecological Concern. (2 Pages)

COPEC	Study Sites				Reference Sites			
	NOAEL		LOAEL		NOAEL		LOAEL	
	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ
Dichloroprop	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	<0.01	13	<0.01	6.6	NA	NA	NA	NA
Endosulfan I	<0.01	0.40	NA	NA	<0.01	0.47	NA	NA
Endosulfan II	<0.01	0.30	NA	NA	<0.01	0.27	NA	NA
Endosulfan sulfate	<0.01	3.0	NA	NA	NA	NA	NA	NA
Hexavalent chromium	<0.01	0.02	<0.01	<0.01	<0.01	0.02	<0.01	<0.01
Indeno[1,2,3-cd]pyrene	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Lead	<0.01	4.4	<0.01	2.2	<0.01	0.19	<0.01	0.09
Manganese	0.01	0.7	<0.01	0.5	0.01	1.0	<0.01	0.73
Mercury	<0.01	0.20 [a]	<0.01	0.05 [a]	<0.01	3.6	<0.01	0.72
Methoxychlor	<0.01	0.02	<0.01	<0.01	<0.01	0.02	<0.01	0.01
Pyrene	<0.01	0.09	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	<0.01	7.0	<0.01	4.6	0.13	7.8	0.07	5.2
Silver	<0.01	0.7	<0.01	0.07	<0.01	0.11	<0.01	0.01
Strontium (elemental)	<0.01	0.2	NA	NA	<0.01	0.30	NA	NA
Tin	<0.01	0.20 [a]	<0.01	0.1	<0.01	0.08	<0.01	0.05
Uranium (inorganic)	<0.01	1.9	<0.01	0.9	<0.01	0.46	<0.01	0.23
Zinc	<0.01	0.90 [a]	<0.01	0.80 [a]	0.02	0.48	0.02	0.47

= HQ >1 for NOAEL or LOAEL.

[a] Maximum value is from the 100-B/C Pilot site.

COPEC = contaminant of potential ecological concern
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
NA = toxicity reference value is not available
NOAEL = no observable adverse effect level

Table 4-69. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for California Quail (Herbivore).

Site Name	COPEC	Concentration (mg/kg) [a]				NOAEL HQ						LOAEL HQ					
		Soil		Plant		CTE			RME			CTE			RME		
		CTE	RME	CTE	RME	Soil	Plant	Sum [b]	Soil	Plant	Sum [b]	Soil	Plant	Sum [b]	Soil	Plant	Sum [b]
Study Site																	
Native Soil																	
600-131	Lead	116	511	ND	ND	0.34	--	0.34	1.5	--	1.5	0.17	--	0.17	0.75	--	0.75

= HQ >1.

[a] The pathway HQs use soil and food concentrations to calculate dose based on Equation 4-6 and then convert dose to HQ based on Equation 4-7.
[b] Soil HQ + Plant HQ.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
ND = not detected
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 4-70. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for Pocket Mouse (Herbivore). (2 Pages)

Site Name	COPEC	Concentration (mg/kg) [a]				NOAEL HQ						LOAEL HQ					
		Soil		Plant		CTE			RME			CTE			RME		
		CTE	RME	CTE	RME	Soil	Plant	Sum [b]	Soil	Plant	Sum [b]	Soil	Plant	Sum [b]	Soil	Plant	Sum [b]
Study Site																	
Backfill																	
100-D-48	Boron	2.12	2.45	90.1	90.1	<0.01	1.9	1.9	<0.01	1.9	1.9	<0.01	0.56	0.56	<0.01	0.56	0.56
100-D-49	Boron	2.98	3.36	57.2	57.2	<0.01	1.2	1.2	<0.01	1.2	1.2	<0.01	0.36	0.36	<0.01	0.36	0.36
	DDE	ND	ND	0.39	0.39	--	1.6	1.6	--	1.6	1.6	--	0.31	0.31	--	0.31	0.31
116-DR-1&2	Boron	1.64	1.91	68.5	68.5	<0.01	1.4	1.4	<0.01	1.4	1.4	<0.01	0.43	0.43	<0.01	0.43	0.43
116-F-1	Arsenic	10.9	11.6	1.8	1.8	0.02	1.0	1.3	0.02	1.0	1.3	0.01	0.63	0.65	0.01	0.63	0.65
	Uranium (inorganic)	1.4	1.4	7.9	7.9	<0.01	1.5	1.5	<0.01	1.5	1.5	<0.01	0.75	0.76	<0.01	0.75	0.76
300-49	Arsenic	2.52	2.7	1.8	1.8	<0.01	1.0	1.0	<0.01	1.0	1.02	<0.01	0.63	0.64	<0.01	0.63	0.64
	Uranium (inorganic)	2.1	2.1	9.9	9.9	<0.01	1.9	1.9	<0.01	1.9	1.9	<0.01	0.95	0.95	<0.01	0.95	0.95
1607-D2:1	Boron	ND	ND	104	104	--	2.2	2.2	--	2.2	2.2	--	0.65	0.65	--	0.65	0.65
	DDE	ND	ND	0.31	0.31	--	1.2	1.2	--	1.2	1.2	--	0.25	0.25	--	0.25	0.25
Native Soil																	
600-23	Dieldrin	ND	ND	0.04	0.04	--	1.6	1.6	--	1.6	1.6	--	0.78	0.78	--	0.78	0.78
600-139	Boron	3.08	3.72	62.3	62.3	<0.01	1.3	1.3	<0.01	1.3	1.3	<0.01	0.39	0.39	<0.01	0.39	0.39
	Copper	45.6	58	13.4	13.4	0.02	1.4	1.4	0.02	1.4	1.4	0.01	0.84	0.85	0.01	0.84	0.86
	DDE	0.0034	0.0059	0.55	0.55	<0.01	2.2	2.2	<0.01	2.2	2.2	<0.01	0.44	0.44	<0.01	0.44	0.44
	Dieldrin	0.00101	0.0013	0.34	0.34	<0.01	13	13	<0.01	13	13	<0.01	6.6	6.6	<0.01	6.6	6.6
600-171	Arsenic	9.88	14.4	2.2	2.2	0.02	1.2	1.3	0.03	1.2	1.3	0.01	0.78	0.79	0.02	0.78	0.8
	Boron	1.96	2.31	59.6	59.6	<0.01	1.2	1.2	<0.01	1.2	1.2	<0.01	0.37	0.37	<0.01	0.37	0.37
	DDE	ND	ND	0.51	0.51	--	2.0	2.0	--	2.0	2.0	--	0.41	0.41	--	0.41	0.41
600-204	Dieldrin	ND	ND	0.16	0.16	--	6.2	6.2	--	6.2	6.2	--	3.1	3.1	--	3.1	3.1
600-208	Boron	7.38	9.75	117	117	<0.01	2.4	2.4	<0.01	2.4	2.4	<0.01	0.73	0.73	<0.01	0.73	0.73
Reference																	
Backfill																	
Pit 14	DDE	ND	ND	0.34	0.34	--	1.4	1.4	--	1.4	1.4	--	0.27	0.27	--	0.27	0.27
Pit 18	Copper	13.2	13.4	13.3	13.3	<0.01	1.4	1.4	<0.01	1.4	1.4	<0.01	0.83	0.84	<0.01	0.83	0.84

Table 4-70. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for Pocket Mouse (Herbivore). (2 Pages)

Site Name	COPEC	Concentration (mg/kg) [a]				NOAEL HQ						LOAEL HQ					
		Soil		Plant		CTE			RME			CTE			RME		
		CTE	RME	CTE	RME	Soil	Plant	Sum [b]	Soil	Plant	Sum [b]	Soil	Plant	Sum [b]	Soil	Plant	Sum [b]
Pit 23	Boron	1.2	1.35	52	52	<0.01	1.1	1.1	<0.01	1.1	1.1	<0.01	0.33	0.33	<0.01	0.33	0.33
	DDE	ND	ND	0.33	0.33	--	1.3	1.3	--	1.3	1.3	--	0.26	0.26	--	0.26	0.26

= HQ >1.

[a] The pathway HQs use soil and food concentrations to calculate dose based on Equation 4-6 and then convert dose to HQ based on Equation 4-7.

[b] Soil HQ + Plant HQ.

-- =not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
DDE = dichlorodiphenyldichloroethylene
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
ND = not detected
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 4-71. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for Meadowlark (Omnivore).

Site Name	COPEC	Concentration (mg/kg) [a]						NOAEL HQ								LOAEL HQ							
		Soil		Plant		Invertebrate		CTE				RME				CTE				RME			
		CTE	RME	CTE	RME	CTE	RME	Soil	Plant	Invertebrate	Sum [b]	Soil	Plant	Invertebrate	Sum [b]	Soil	Plant	Invertebrate	Sum [b]	Soil	Plant	Invertebrate	Sum [b]
Study Site																							
100-B/C Pilot																							
100-B/C Pilot	Copper	12.2	14.6	1.7	3.26	12.5	19.9	<0.01	0.07	0.85	0.93	<0.01	0.13	1.4	1.5	<0.01	0.02	0.29	0.31	<0.01	0.04	0.46	0.5
Backfill																							
618-4	Copper	9.66	9.83	1.7	1.7	15.6	15.6	<0.01	0.07	1.1	1.1	<0.01	0.07	1.1	1.1	<0.01	0.02	0.36	0.38	<0.01	0.02	0.36	0.38
Native Soil																							
600-139	Copper	45.6	58	13.4	13.4	18.3	18.3	0.03	0.54	1.3	1.8	0.04	0.54	1.3	1.8	<0.01	0.18	0.42	0.61	0.01	0.18	0.42	0.61
600-171	Copper	15.4	19.8	7.5	7.5	18.6	18.6	<0.01	0.30	1.3	1.6	0.01	0.3	1.3	1.6	<0.01	0.10	0.43	0.53	<0.01	0.10	0.43	0.53
Reference																							
Backfill																							
Pit 14	Copper	13.9	14.1	6.2	6.2	13.4	13.4	<0.01	0.25	0.92	1.2	<0.01	0.25	0.92	1.2	<0.01	0.08	0.31	0.39	<0.01	0.08	0.31	0.39

= HQ >1.

[a] The pathway HQs use soil and food concentrations to calculate dose based on Equation 4-6 and then convert dose to HQ based on Equation 4-7.
[b] Soil HQ + Plant HQ + Invertebrate HQ.

COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 4-72. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for Deer Mouse (Omnivore).

Site Name	COPEC	Concentration (mg/kg) [a]						NOAEL HQ								LOAEL HQ							
		Soil		Plant		Invertebrate		CTE				RME				CTE				RME			
		CTE	RME	CTE	RME	CTE	RME	Soil	Plant	Invertebrate	Sum [b]	Soil	Plant	Invertebrate	Sum [b]	Soil	Plant	Invertebrate	Sum [b]	Soil	Plant	Invertebrate	Sum[b]
Study Site																							
100-B/C Pilot																							
100-B/C Pilot	Copper	12.2	14.6	1.7	3.26	12.5	19.9	<0.01	0.10	0.71	0.82	<0.01	0.19	1.1	1.3	<0.01	0.058	0.43	0.49	<0.01	0.11	0.68	0.8
Backfill																							
100-D-48	Boron	2.12	2.45	90.1	90.1	6.9	6.9	<0.01	1.0	0.08	1.1	<0.01	1.0	0.08	1.1	<0.01	0.31	0.02	0.33	<0.01	0.31	0.02	0.33
116-F-1	Arsenic	10.9	11.6	1.8	1.8	2.9	2.9	0.03	0.55	0.89	1.5	0.03	0.55	0.89	1.5	0.02	0.35	0.56	0.92	0.02	0.35	0.56	0.93
	Uranium (inorganic)	1.4	1.4	7.9	7.9	1.8	1.8	<0.01	0.82	0.19	1.0	<0.01	0.82	0.19	1.0	<0.01	0.41	0.09	0.51	<0.01	0.41	0.09	0.51
1607-D2:1	Boron	ND	ND	104	104	3.7	3.7	--	1.2	0.04	1.2	--	1.2	0.04	1.2	--	0.36	0.01	0.37	--	0.36	0.01	0.37
300-49	Uranium (inorganic)	2.1	2.1	9.9	9.9	ND	ND	<0.01	1.0	--	1.0	<0.01	1.0	--	1.0	<0.01	0.52	--	0.52	<0.01	0.52	--	0.52
618-4	Uranium (inorganic)	ND	ND	ND	ND	10.8	10.8	--	--	1.1	1.1	--	--	1.1	1.1	--	--	0.56	0.56	--	--	0.56	0.56
Native Soil																							
600-139	Copper	45.6	58	13.4	13.4	18.3	18.3	0.02	0.76	1.04	1.8	0.03	0.76	1.04	1.8	0.015	0.46	0.63	1.1	0.02	0.46	0.63	1.1
	DDE	0.0034	0.0059	0.55	0.55	ND	ND	<0.01	1.2	--	1.2	<0.01	1.2	--	1.2	<0.01	0.24	--	0.24	<0.01	0.24	--	0.24
	Dieldrin	0.00101	0.0013	0.34	0.34	ND	ND	<0.01	7.2	--	7.2	<0.01	7.2	--	7.2	<0.01	3.6	--	3.6	<0.01	3.6	--	3.6
600-171	Arsenic	9.88	14.4	2.2	2.2	1.5	1.5	0.03	0.68	0.46	1.2	0.04	0.68	0.46	1.2	0.02	0.42	0.29	0.73	0.03	0.42	0.29	0.74
	Copper	15.4	19.8	7.5	7.5	18.6	18.6	<0.01	0.43	1.1	1.5	0.01	0.43	1.1	1.5	<0.01	0.26	0.64	0.9	<0.01	0.26	0.64	0.90
	DDE	ND	ND	0.51	0.51	ND	ND	--	1.1	--	1.1	--	1.1	--	1.1	--	0.22	--	0.22	--	0.22	--	0.22
600-204	Dieldrin	ND	ND	0.16	0.16	ND	ND	--	3.4	--	3.4	--	3.4	--	3.4	--	1.7	--	1.7	--	1.7	--	1.7
600-208	Boron	7.38	9.75	117	117	2.8	2.8	<0.01	1.3	0.03	1.4	<0.01	1.3	0.03	1.4	<0.01	0.4	<0.01	0.41	<0.01	0.4	<0.01	0.41
	Endosulfan sulfate	0.0012	0.0012	ND	ND	1.4	1.4	<0.01	--	3.0	3.0	<0.01	--	3.0	3.0	--	--	--	--	--	--	--	--
Reference																							
Backfill																							
Pit 14	Copper	13.9	14.1	6.2	6.2	13.4	13.4	<0.01	0.35	0.76	1.1	<0.01	0.35	0.76	1.1	<0.01	0.21	0.46	0.68	<0.01	0.21	0.46	0.68
Pit 18	Copper	13.2	13.4	13.3	13.3	6.4	6.4	<0.01	0.76	0.37	1.1	<0.01	0.76	0.37	1.1	<0.01	0.46	0.22	0.68	<0.01	0.46	0.22	0.68

= HQ >1.

[a] The pathway HQs use soil and food concentrations to calculate dose based on Equation 4-6 and then convert dose to HQ based on Equation 4-7.

[b] Soil HQ + Plant HQ + Invertebrate HQ.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
DDE = dichlorodiphenyldichloroethylene
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
ND = not detected
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 4-73. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for Killdeer (Insectivore). (2 Pages)

Site Name	COPEC	Concentration (mg/kg) [a]				NOAEL HQ						LOAEL HQ					
		Soil		Invertebrate		CTE			RME			CTE			RME		
		CTE	RME	CTE	RME	Soil	Invertebrate	Sum [b]	Soil	Invertebrate	Sum [b]	Soil	Invertebrate	Sum [b]	Soil	Invertebrate	Sum [b]
Study Site																	
100-B/C Pilot																	
100-B/C Pilot	Copper	12.2	14.6	12.5	19.9	0.04	1.9	2.0	0.05	3.0	3.1	0.01	0.64	0.66	0.02	1.0	1.0
Backfill																	
100-D-48	Copper	14.4	14.6	6.5	6.5	0.05	1.0	1.1	0.05	1.0	1.1	0.02	0.33	0.35	0.02	0.33	0.35
100-D-49	Copper	14.3	14.4	6.5	6.5	0.05	1.0	1.0	0.05	1.0	1.0	0.02	0.33	0.35	0.02	0.33	0.35
116-F-1	Copper	11.9	12.1	6.8	6.8	0.04	1.0	1.1	0.04	1.0	1.1	0.01	0.35	0.36	0.01	0.35	0.36
300-49	Copper	20.1	24.7	8	8	0.07	1.2	1.3	0.09	1.2	1.3	0.02	0.41	0.43	0.03	0.41	0.44
618-4	Copper	9.66	9.83	15.6	15.6	0.03	2.4	2.4	0.03	2.4	2.4	0.01	0.80	0.81	0.01	0.80	0.81
1607-D2:1	Copper	13.6	13.8	6.8	6.8	0.05	1.0	1.1	0.05	1.0	1.1	0.02	0.35	0.36	0.02	0.35	0.36
1607-H2	Copper	26.1	27.1	6	6	0.09	0.92	1.0	0.09	0.92	1.0	0.03	0.31	0.34	0.03	0.31	0.34
Native Soil																	
600-23	Copper	12.4	12.6	10.3	10.3	0.04	1.6	1.6	0.04	1.6	1.6	0.01	0.53	0.54	0.02	0.53	0.54
600-131	Copper	12.8	13.7	7.3	7.3	0.04	1.1	1.2	0.05	1.1	1.2	0.02	0.37	0.39	0.02	0.37	0.39
	Lead	116	511	ND	ND	0.99	--	0.99	4.4	--	4.4	0.50	--	0.50	2.2	--	2.2
600-132	Aroclor-1254	2.05	13.5	ND	ND	0.16	--	0.16	1.1	--	1.1	0.02	--	0.02	0.11	--	0.11
	Copper	13.4	13.9	7.8	7.8	0.05	1.2	1.2	0.05	1.2	1.2	0.02	0.40	0.42	0.02	0.40	0.42
600-139	Copper	45.6	58	18.3	18.3	0.16	2.8	3.0	0.20	2.8	3.0	0.05	0.94	0.99	0.07	0.94	1.0
	Lead	116	159	0.44	0.44	1.0	0.17	1.2	1.4	0.17	1.5	0.50	0.08	0.58	0.68	0.08	0.77
600-171	Copper	15.4	19.8	18.6	18.6	0.05	2.8	2.9	0.07	2.8	2.9	0.02	0.95	0.97	0.02	0.95	0.98
600-204	Copper	13.2	13.4	8	8	0.05	1.2	1.3	0.05	1.2	1.3	0.02	0.41	0.43	0.02	0.41	0.43
600-208	Copper	12.9	13.6	7	7	0.05	1.1	1.1	0.05	1.1	1.1	0.02	0.36	0.37	0.02	0.36	0.37
628-1	Copper	21.9	23.5	6.8	6.8	0.08	1.0	1.1	0.08	1.0	1.1	0.03	0.35	0.37	0.03	0.35	0.37
Reference																	
Backfill																	
Pit 14	Copper	13.9	14.1	13.4	13.4	0.05	2.1	2.1	0.05	2.1	2.1	0.02	0.69	0.70	0.02	0.69	0.70
Pit 18	Copper	13.2	13.4	6.4	6.4	0.05	0.98	1.0	0.05	0.98	1.0	0.02	0.33	0.34	0.02	0.33	0.34
Pit 24	Copper	15.8	16.2	6.4	6.4	0.06	0.98	1.0	0.06	0.98	1.0	0.02	0.33	0.35	0.02	0.33	0.35

Table 4-73. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for Killdeer (Insectivore). (2 Pages)

Site Name	COPEC	Concentration (mg/kg) [a]				NOAEL HQ						LOAEL HQ					
		Soil		Invertebrate		CTE			RME			CTE			RME		
		CTE	RME	CTE	RME	Soil	Invertebrate	Sum [b]	Soil	Invertebrate	Sum [b]	Soil	Invertebrate	Sum [b]	Soil	Invertebrate	Sum [b]
Native Soil																	
Yakima Ridge 2	Copper	21.4	21.9	6.1	6.1	0.07	0.93	1.0	0.08	0.93	1.0	0.03	0.31	0.34	0.03	0.31	0.34

= HQ >1.

[a] The pathway HQs use soil and food concentrations to calculate dose based on Equation 4-6 and then convert dose to HQ based on Equation 4-7.
[b] Soil HQ + Invertebrate HQ.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
ND = not detected
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 4-74. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for Grasshopper Mouse (Insectivore).

Site Name	COPEC	Concentration (mg/kg) [a]				NOAEL HQ						LOAEL HQ					
		Soil		Invertebrate		CTE			RME			CTE			RME		
		CTE	RME	CTE	RME	Soil	Invertebrate	Sum [b]	Soil	Invertebrate	Sum [b]	Soil	Invertebrate	Sum [b]	Soil	Invertebrate	Sum [b]
Study Site																	
100-B/C Pilot																	
100-B/C Pilot	Copper	12	15	13	20	<0.01	0.70	0.71	<0.01	1.1	1.1	<0.01	0.42	0.42	<0.01	0.67	0.67
Backfill																	
618-4	Uranium (inorganic)	ND	ND	10.8	10.8	--	1.1	1.1	--	1.1	1.1	--	0.56	0.56	--	0.56	0.56
Native Soil																	
600-139	Copper	46	58	18	18	<0.01	1.0	1.0	<0.01	1.0	1.0	<0.01	0.62	0.62	<0.01	0.62	0.62
600-171	Copper	15	20	19	19	<0.01	1.1	1.1	<0.01	1.1	1.1	<0.01	0.63	0.63	<0.01	0.63	0.63
600-208	Endosulfan sulfate	0.012	0.012	1.4	1.4	<0.01	2.9	2.9	<0.01	2.9	2.9	--	--	--		--	--

= HQ >1.

[a] The pathway HQs use soil and food concentrations to calculate dose based on Equation 4-6 and then convert dose to HQ based on Equation 4-7.
[b] Soil HQ + Invertebrate HQ.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
ND = not detected
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 4-75. Summary of Risk Characterization for Upland Middle Trophic-Level Vertebrates.

Receptor	Line of Evidence	Weight	Result	Summary and Recommendation
Mammals	Exposure evaluation of pocket mouse (herbivore)	Medium	NOAEL- and LOAEL-based HQs are greater than 1 at study sites for dieldrin indicating a potential for adverse effects.	Potential for adverse effects from multiple COPECs based on the exposure evaluation. Potential for adverse effects from exposure to copper and dieldrin. No major uncertainties.
	Exposure evaluation of deer mouse (omnivore)	Medium	NOAEL- and LOAEL-based HQs are greater than 1 at study sites for copper and dieldrin indicating a potential for adverse effects.	
	Exposure evaluation of grasshopper mouse (insectivore)	Medium	NOAEL-based HQs are greater than 1 but LOAEL-based HQs are less than 1 thus indicating a low potential for adverse effects.	
	Gross morphological anomalies	Low	None observed at study sites or reference sites.	
	Tissue concentrations	Low	Boron and lead in carcass correlated to soil, but otherwise no correlations of tissue concentrations to soil concentrations.	
	Tissue benchmarks for livers	Low	Effect levels not exceeded thus adverse effects are unlikely.	
Birds	Exposure evaluation of quail (herbivore)	Medium	NOAEL-based HQs are greater than 1 but LOAEL-based HQs are less than 1 thus indicating a low potential for adverse effects.	Potential for adverse effects from multiple COPECs based on the exposure evaluation. Potential for adverse effects from exposure to copper and lead. No major uncertainties.
	Exposure evaluation of meadowlark (omnivore)	Medium	NOAEL-based HQs are greater than 1 but LOAEL-based HQs are less than 1 thus indicating a low potential for adverse effects.	
	Exposure evaluation of killdeer (insectivore)	Medium	NOAEL- and LOAEL-based HQs are greater than 1 at study sites for copper and lead, indicating a potential for adverse effects.	

COPEC = contaminant of potential ecological concern
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
NOAEL = no observable adverse effect level

Table 4-76. Uncertainty Analysis for Upland Middle Trophic-Level Vertebrates.

Attributes	Risk Questions	Observations	Impact on Assessment
Literature toxicity information	Are mean soil concentrations greater than adverse effect levels?	Toxicity information is lacking for some COPECs The effect levels for metals are based on bioavailable forms of this metal. For example, Menzie et al. (2008) present an example study involving barium toxicity and chemical form showing that the most stable form in the environment is also the least toxic.	Risks could be underestimated for certain COPECs. Bioavailability could be greatly overestimated as would the potential for adverse effects in the upland environment.
Measured tissue concentrations	Are mean study site tissue concentrations greater than at reference sites or increase along an increasing COPEC gradient?	Tissue concentrations are subject to the following considerations: • Exposure is based on the average for the study site • Analytical measurement uncertainties (e.g., detection limits typically are elevated in tissues because of matrix interferences) • Considering the mobility of small mammals, whether tissues of trapped animals represent contaminant concentrations for organisms within study sites or reference sites (versus offsite organisms) • Whether small mammals represent contaminant concentrations in all middle trophic-level vertebrates (e.g., birds) at study sites or reference site • Uncertainties associated with measured exposure include small sample sizes for some groups at some sites.	High and low concentrations are integrated. Detection limits can lead to underestimating risks.

COPEC = contaminant of potential ecological concern

Menzie, C. A., B. Southworth, G. Stephenson, and N. Feisthauer, 2008, "The Importance of Understanding the Chemical Form of a Metal in the Environment: The Case of Barium Sulfate (Barite)," *Human Ecol Risk Assess* 14-974-991.

Table 4-77. Summary of Upland Middle Trophic-Level Vertebrate Risk Results for All Contaminants of Potential Ecological Concern. (4 Pages)

COPEC	COPC Refinement Status (Table 4-34)				Exposure Evaluation Based on Soil and Food (Table 4-68)	Mammal Tissue Versus Soil Regression (Tables 4-66 and 4-67)	Notes
	Plant Tissue	Invertebrate Tissue	Mammal Carcass	Mammal Organ			
Inorganics							
Antimony	No	No	No	No	NOAEL-based HQ >1, but LOAEL-based HQ<1	No mammal tissue detects	Highest HQ is at a reference site so not identified as a key COPEC
Arsenic	No	Yes	No	No	NOAEL-based HQ >1, but LOAEL-based HQ<1	Insufficient detections for carcass; no relationship for organs	Identified as key COPEC based on NOAEL comparison.
Barium	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	No relationship for organs or carcass	No significant findings
Boron	Yes	No	No	No	NOAEL-based HQ >1, but LOAEL-based HQ<1	Significant regression for carcass; insufficient detections for organs	Identified as key COPEC based on NOAEL comparison
Cadmium	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Insufficient detections for carcass; no relationship for organs	No significant findings
Calculated total uranium	No	No	No	Not measured	NOAEL- and LOAEL-based HQs are less than 1	Insufficient detections for carcass, radionuclides not measured in organs	No significant findings
Chromium	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	No relationship for organs or carcass	No significant findings
Copper	No	Yes	No	No	NOAEL- and LOAEL-based HQs are greater than 1	No relationship for organs or carcass	Identified as key COPEC based on LOAEL comparison. In addition, invertebrate greater than reference at 100-B/C Pilot only
Hexavalent chromium	Not measured	Not measured	Not measured	Not measured	NOAEL- and LOAEL-based HQs are less than 1	Not measured	No significant findings
Lead	No	No	Yes	No	NOAEL- and LOAEL-based HQs are greater than 1	Significant regression for carcass; insufficient detections for organs	Identified as key COPEC based on LOAEL comparison
Manganese	No	Yes	No	Yes	NOAEL-based HQ >1 at a reference site only, but LOAEL-based HQ<1	No relationship for organs or carcass	NOAEL-based HQ>1 at reference site only. In addition, Invertebrate greater than reference at 100-B/C Pilot only

Table 4-77. Summary of Upland Middle Trophic-Level Vertebrate Risk Results for All Contaminants of Potential Ecological Concern. (4 Pages)

COPEC	COPC Refinement Status (Table 4-34)				Exposure Evaluation Based on Soil and Food (Table 4-68)	Mammal Tissue Versus Soil Regression (Tables 4-66 and 4-67)	Notes
	Plant Tissue	Invertebrate Tissue	Mammal Carcass	Mammal Organ			
Mercury	No	No	No	No	NOAEL-based HQ >1 for killdeer and meadowlark, but LOAEL-based HQ<1	Insufficient detections for tissue	HQs are greater than 1 at a reference site
Selenium	No	No	No	Yes	NOAEL- and LOAEL-based HQs are greater than 1	Insufficient detections for tissue	Highest HQ is at a reference site so not identified as a key COPEC. In addition, mammal-organ greater than reference at 100-B/C Pilot only
Silver	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Insufficient detections for carcass and organs	No significant findings
Strontium (elemental)	No	No	No	No	NOAEL-based HQs are less than 1	No relationship for organs or carcass	No significant findings
Tin	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	No relationship; insufficient detects in organs	No significant findings
Uranium (inorganic)	No	No	No	No	NOAEL-based HQ >1, but LOAEL-based HQ<1	Insufficient detections for carcass; no mammal organ detects	Identified as key COPEC based on NOAEL comparison
Zinc	No	Yes	No	No	NOAEL- and LOAEL-based HQs are less than 1	No relationship for organs or carcass	No significant findings
PAH							
Benzo[a]anthracene	No	No	No	Not measured	NOAEL- and LOAEL-based HQs are less than 1	No mammal detects	No significant findings
Benzo[a]pyrene	No	No	No	Not measured	NOAEL- and LOAEL-based HQs are less than 1	No mammal detects	No significant findings
Benzo[b]fluoranthene	No	No	No	Not measured	NOAEL- and LOAEL-based HQs are less than 1	No mammal detects	No significant findings
Benzo[ghi]perylene	No	No	No	Not measured	NOAEL- and LOAEL-based HQs are less than 1	No mammal detects	No significant findings
Benzo[k]fluoranthene	No	No	No	Not measured	NOAEL- and LOAEL-based HQs are less than 1	No mammal detects	No significant findings
Chrysene	No	No	No	Not measured	NOAEL- and LOAEL-based HQs are less than 1	No mammal detects	No significant findings
Dibenz[a,h]anthracene	No	No	No	Not measured	NOAEL- and LOAEL-based HQs are less than 1	No mammal detects	No significant findings

Table 4-77. Summary of Upland Middle Trophic-Level Vertebrate Risk Results for All Contaminants of Potential Ecological Concern. (4 Pages)

COPEC	COPC Refinement Status (Table 4-34)				Exposure Evaluation Based on Soil and Food (Table 4-68)	Mammal Tissue Versus Soil Regression (Tables 4-66 and 4-67)	Notes
	Plant Tissue	Invertebrate Tissue	Mammal Carcass	Mammal Organ			
Indeno[1,2,3-cd]pyrene	No	No	No	Not measured	NOAEL- and LOAEL-based HQs are less than 1	No mammal detects	No significant findings
Pyrene	No	No	No	Not measured	NOAEL- and LOAEL-based HQs are less than 1	No mammal detects	No significant findings
PCBs							
Aroclor-1254	No	Not measured	No	Not measured	NOAEL-based HQ >1, but LOAEL-based HQ<1	No mammal detects	Identified as key COPEC based on NOAEL comparison
Aroclor-1260	No	Not measured	No	Not measured	NOAEL- and LOAEL-based HQs are less than 1	No mammal detects	No significant findings
Aroclor-1262	Not measured	Not measured	Not measured	Not measured	NOAEL- and LOAEL-based HQs are less than 1	Not measured	No significant findings
Herbicide							
Dichloroprop	Not measured	Not measured	Not measured	Not measured	No information	Not measured	No NOAEL or LOAEL
Pesticides							
beta-1,2,3,4,5,6-Hexachlorocyclohexane	No	No	No	Not measured	NOAEL- and LOAEL-based HQs are less than 1	No mammal detects	No significant findings
DDE	No	No	No	Not measured	NOAEL-based HQ >1, but LOAEL-based HQ<1	No mammal detects	Identified as key COPEC based on NOAEL comparison
DDT	No	No	No	Not measured	NOAEL- and LOAEL-based HQs are less than 1	No mammal detects	No significant findings
Dieldrin	Yes	No	No	Not measured	NOAEL- and LOAEL-based HQs are greater than 1	No mammal detects	Identified as key COPEC based on LOAEL comparison
Endosulfan I	No	No	No	Not measured	NOAEL-based HQs are less than 1	No mammal detects	No significant findings
Endosulfan II	No	No	No	Not measured	NOAEL-based HQs are less than 1	No mammal detects	No significant findings
Endosulfan sulfate	No	Yes	No	Not measured	NOAEL-based HQs are greater than 1	No mammal detects	Identified as key COPEC based on NOAEL comparison. No LOAEL

Table 4-77. Summary of Upland Middle Trophic-Level Vertebrate Risk Results for All Contaminants of Potential Ecological Concern. (4 Pages)

COPEC	COPC Refinement Status (Table 4-34)				Exposure Evaluation Based on Soil and Food (Table 4-68)	Mammal Tissue Versus Soil Regression (Tables 4-66 and 4-67)	Notes
	Plant Tissue	Invertebrate Tissue	Mammal Carcass	Mammal Organ			
Methoxychlor	No	No	No	Not measured	NOAEL- and LOAEL-based HQs are less than 1	No mammal detects	No significant findings

= COPECs have HQ >1 for NOAEL or LOAEL and HQ at study sites is greater than reference sites.

COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
NOAEL = no observable adverse effect level
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl

Table 4-78. Summary of Upland Risk Results for Contaminants of Potential Ecological Concern. (4 Pages)

COPEC	COPC Refinement Results				Plant Risk Results	Invertebrate Risk Results	Wildlife Risk Results	Conclusions
	Soil	Plant	Invertebrate	Mammal				
Inorganics								
Antimony	Yes	No	No	No	Soil concentrations were greater than the benchmark, thus a potential for adverse effects. Benchmark exceedance occurred at the 600-132 waste site.	Soil concentrations were less than the benchmark and suggest adverse effects are unlikely. No trend with nematode survival.	NOAEL-based HQs were greater than 1 but LOAEL-based HQs were less than 1 and suggests a low potential for adverse effects. Highest HQ is at a reference site.	Based on soil concentrations greater than the plant benchmark evaluate this COPEC further in Section 8.0.
Arsenic	Yes	No	Yes	No	Soil concentrations were greater than the benchmark and thus a potential for adverse effects. No trend with phytotoxicity measures.	Soil concentrations were less than the benchmark and suggest adverse effects are unlikely. No trend with nematode survival.	NOAEL-based HQs were greater than 1 but LOAEL-based HQs were less than 1 and suggests a low potential for adverse effects.	Based on soil concentrations greater than the plant benchmark evaluate this COPEC further in Section 8.0.
Barium	Yes	No	No	No	Soil concentrations were less than the benchmark and thus adverse effects are unlikely. No trend with phytotoxicity measures.	Soil concentrations were greater than the benchmark and suggest a potential for adverse effects. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggests adverse effects are unlikely.	Based on soil concentrations greater than the invertebrate benchmark evaluate this COPEC further in Section 8.0.
Boron	Yes	Yes	No	No	Soil concentrations were greater than the benchmark thus a potential for adverse effects. No trend with phytotoxicity measures.	No toxicity information. No trend with nematode survival.	NOAEL-based HQs were greater than 1 but LOAEL-based HQs were less than 1 and suggests a low potential for adverse effects.	Based on soil concentrations greater than the plant benchmark evaluate this COPEC further in Section 8.0.
Cadmium	Yes	No	No	No	Soil concentrations were less than the benchmark and suggest adverse effects are unlikely.	Soil concentrations were less than the benchmark and suggest adverse effects are unlikely. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggests adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
Calculated total uranium	Yes	No	No	No	Soil concentrations were less than the benchmark and suggest adverse effects are unlikely. Not analyzed in soil for phytotoxicity bioassay.	No toxicity information. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggests adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
Chromium	Yes	No	No	No	Soil concentrations were less than the benchmark and suggest adverse effects are unlikely.	Soil concentrations were less than the benchmark and suggest adverse effects are unlikely. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggests adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
Copper	Yes	No	Yes	No	Soil concentrations were less than the benchmark suggesting adverse effects are unlikely. No trends with phytotoxicity measures.	Soil concentrations were greater than the benchmark suggesting a potential for adverse effects. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were greater than 1, suggesting a potential for adverse effects. LOAEL-based HQ exceedances occurred at 100-B/C Pilot sites (116-B-11, 116-C-1, 116-C-5) and 600-139.	Based on soil concentrations greater than the invertebrate benchmark and wildlife LOAEL-based HQs greater than 1 evaluate this COPEC further in Section 8.0.
Hexavalent chromium	Yes	Not measured	Not measured	Not measured	No toxicity information. No trend with phytotoxicity measures.	No toxicity information. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1, suggesting adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
Lead	Yes	No	No	Carcass	Soil concentrations were greater than the benchmark, suggesting a potential for adverse effects. There was a trend of decreased germination with increased lead in soil.	Soil concentrations were less than the benchmark, suggesting adverse effects are unlikely. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were greater than 1, indicating a potential for adverse effects. LOAEL exceedance occurred at 600-131.	Based on soil concentrations greater than the plant benchmark and wilfdlife LOAEL-based HQs greater than 1 evaluate this COPEC further in Section 8.0.

Table 4-78. Summary of Upland Risk Results for Contaminants of Potential Ecological Concern. (4 Pages)

COPEC	COPC Refinement Results				Plant Risk Results	Invertebrate Risk Results	Wildlife Risk Results	Conclusions
	Soil	Plant	Invertebrate	Mammal				
Manganese	No	No	Yes	Organ	Soil concentrations were greater than the benchmark but the highest concentrations were at reference sites. Increased soil manganese was correlated with decreased root length.	Soil concentrations were less than the benchmark at study sites and suggest adverse effects are unlikely. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were equal to 1 indicating adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
Mercury	Yes	No	No	No	Soil concentrations were less than the benchmark and thus adverse effects are unlikely.	Soil concentrations were greater than the benchmark and suggest a potential for adverse effects. No trend with nematode survival.	NOAEL-based HQs were greater than 1 but LOAEL-based HQs were less than 1 and suggests a low potential for adverse effects.	Based on soil concentrations greater than the invertebrate benchmark evaluate this COPEC further in Section 8.0.
Selenium	No	No	No	Organ	Soil concentrations were greater than the benchmark, suggesting a potential for adverse effects.	Soil concentrations were less than the benchmark, suggesting adverse effects are unlikely. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were greater than 1, suggesting a potential for adverse effects. LOAEL exceedances occurred at study sites and reference sites, but the largest HQ was as reference sites.	Based on soil concentrations greater than the plant benchmark evaluate this COPEC further in Section 8.0.
Silver	Yes	No	No	No	Soil concentrations were less than the benchmark and thus adverse effects are unlikely.	No toxicity information. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 indicating adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
Strontium (elemental)	Yes	No	No	No	No toxicity information. No trend with phytotoxicity measures.	No toxicity information. No trend with nematode survival.	NOAEL-based HQs were less than 1 indicating adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
Tin	Yes	No	No	No	Soil concentrations were greater than the benchmark at 100-B/C Pilot sites (116-B-11, 116-C-1, 116-C-5) suggesting a potential for adverse effects. No trends with phytotoxicity measures.	No toxicity information. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1, so adverse effects are unlikely.	Based on soil concentrations greater than the plant benchmark evaluate this COPEC further in Section 8.0.
Uranium (inorganic)	Yes	No	No	No	Soil concentrations were less than the benchmark, so adverse effects are unlikely.	No toxicity information. No trend with nematode survival.	NOAEL-based HQs were greater than 1 but LOAEL-based HQs were less than 1 and suggests a low potential for adverse effects.	Further evaluation is not indicated by the upland risk results.
Zinc	No	No	Yes	No	Soil concentrations were greater than the benchmark, so adverse effects are unlikely. Decreased stem height was correlated with increasing soil zinc.	Soil concentrations were less than the benchmark, suggesting adverse effects are unlikely. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggests adverse effects are unlikely.	Based on soil concentrations greater than the plant benchmark evaluate this COPEC further in Section 8.0.
PAHs								
Benzo[a]anthracene	Yes	No	No	No	No toxicity information. No trends with phytotoxicity measures.	Soil concentrations were less than the benchmark and suggest adverse effects are unlikely. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggests adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
Benzo[a]pyrene	Yes	No	No	No	No toxicity information. No trends with phytotoxicity measures.	Soil concentrations were less than the benchmark and suggest adverse effects are unlikely. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggests adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
Benzo[b]fluoranthene	Yes	No	No	No	No toxicity information. No trends with phytotoxicity measures.	Soil concentrations were less than the benchmark and suggest adverse effects are unlikely. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggests adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.

Table 4-78. Summary of Upland Risk Results for Contaminants of Potential Ecological Concern. (4 Pages)

COPEC	COPC Refinement Results				Plant Risk Results	Invertebrate Risk Results	Wildlife Risk Results	Conclusions
	Soil	Plant	Invertebrate	Mammal				
Benzo[ghi]perylene	Yes	No	No	No	No toxicity information. No trends with phytotoxicity measures.	Soil concentrations were less than the benchmark and suggest adverse effects are unlikely. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggests adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
Benzo[k]fluoranthene	Yes	No	No	No	No toxicity information. No trends with phytotoxicity measures.	Soil concentrations were less than the benchmark and suggest adverse effects are unlikely. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggests adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
Chrysene	Yes	No	No	No	No toxicity information.	Soil concentrations were less than the benchmark and suggest adverse effects are unlikely. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggests adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
Dibenz[a,h]anthracene	Yes	No	No	No	No toxicity information.	Soil concentrations were less than the benchmark and suggest adverse effects are unlikely. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggests adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
Indeno[1,2,3-cd]pyrene	Yes	No	No	No	No toxicity information. No trends with phytotoxicity measures.	Soil concentrations were less than the benchmark and suggest adverse effects are unlikely. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggests adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
Pyrene	Yes	No	No	No	No toxicity information. No trends with phytotoxicity measures.	Soil concentrations were less than the benchmark and suggest adverse effects are unlikely. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggests adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
PCBs								
Aroclor-1254	Yes	No	Not measured	No	Soil concentrations were less than the benchmark and suggest adverse effects are unlikely.	No toxicity information. No trend with nematode survival.	NOAEL-based HQs were greater than 1 but LOAEL-based HQs were less than 1 and suggests a low potential for adverse effects.	Further evaluation is not indicated by the upland risk results.
Aroclor-1260	Yes	No	Not measured	No	Soil concentrations were less than the benchmark and suggest adverse effects are unlikely.	No toxicity information. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggests adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
Aroclor-1262	Yes	Not measured	Not measured	Not measured	Soil concentrations were less than the benchmark and suggest adverse effects are unlikely.	No toxicity information.	NOAEL- and LOAEL-based HQs were less than 1 and suggests adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
Herbicide								
Dichloroprop	Yes	Not measured	Not measured	Not measured	No toxicity information. Not analyzed in soil for phytotoxicity bioassay.	No toxicity information. No trend with nematode survival.	No toxicity information.	Further evaluation is not indicated by the upland risk results.
Pesticides								
beta-1,2,3,4,5,6-Hexachlorocyclohexane	Yes	No	No	No	No toxicity information. Not analyzed in soil for phytotoxicity bioassay.	No toxicity information.	NOAEL- and LOAEL-based HQs were less than 1 and suggests adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
DDE	Yes	No	No	No	No toxicity information. Not analyzed in soil for phytotoxicity bioassay.	No toxicity information. No trend with nematode survival.	NOAEL-based HQs were greater than 1 but LOAEL-based HQs were less than 1 and suggests a low potential for adverse effects.	Further evaluation is not indicated by the upland risk results.

Table 4-78. Summary of Upland Risk Results for Contaminants of Potential Ecological Concern. (4 Pages)

COPEC	COPC Refinement Results				Plant Risk Results	Invertebrate Risk Results	Wildlife Risk Results	Conclusions
	Soil	Plant	Invertebrate	Mammal				
DDT	Yes	No	No	No	No toxicity information. Not analyzed in soil for phytotoxicity bioassay.	No toxicity information. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1, so adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
Dieldrin	Yes	Yes	No	No	No toxicity information. Not analyzed in soil for phytotoxicity bioassay.	No toxicity information.	NOAEL- and LOAEL-based HQs were greater than 1, suggesting a potential for adverse effects. LOAEL exceedances occurred at 600-139 and 600-204.	Based on wilfdlife LOAEL-based HQs greater than 1 evaluate this COPEC further in Section 8.0.
Endosulfan I	Yes	No	No	No	No toxicity information. Not analyzed in soil for phytotoxicity bioassay..	No toxicity information.	NOAEL-based HQs were less than 1, so adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
Endosulfan II	Yes	No	No	No	No toxicity information. Not analyzed in soil for phytotoxicity bioassay.	No toxicity information.	NOAEL-based HQs were less than 1, so adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
Endosulfan sulfate	Yes	No	Yes	No	No toxicity information. Not analyzed in soil for phytotoxicity bioassay.	No toxicity information.	NOAEL-based HQ was greater than 1 at one study site (HQ was 3 at 600-208) and suggests a low potential for adverse effects.	Further evaluation is not indicated by the upland risk results.
Methoxychlor	Yes	No	No	No	No toxicity information. Not analyzed in soil for phytotoxicity bioassay.	No toxicity information. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1, so adverse effects are unlikely.	Further evaluation is not indicated by the upland risk results.
	COPECs are recommended for further evaluation in Section 8.0 based on highlighted receptor results.							

COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
NOAEL = no observable adverse effect level
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl

Table 4-79. Summary of Upland Risk Results for Assessment Endpoints.

Comparison Type	Results	Key Uncertainties
Plants		
Evidence for adverse effects based on comparison of study sites to reference sites.	Two of nine phytotoxicity comparisons between study sites and reference sites indicated evidence for adverse effects.	Ten instead of 30 sites were sampled for phytotoxicity using the seedling germination test. No phytotoxicity tests for the discrete soil samples (potential threatened and endangered plant species habitat).
Trends with COPEC concentrations.	Three COPECs had relationships with phytotoxicity measures, but confounding factors also were correlated with phytotoxicity measures. Copper in plant tissue was significantly correlated to soil copper concentrations.	
Potential for adverse effects based on comparisons of soil concentrations to benchmarks.	Benchmarks and reference concentrations were exceeded for seven COPECs (antimony, arsenic, boron, lead, selenium, tin, and zinc), suggesting a potential for risk from these analytes.	
Terrestrial Invertebrates		
Evidence for adverse effects based on comparison of study sites to reference sites.	Nematode survival did not differ between study sites and reference sites; thus no evidence for adverse effects.	Relative abundance measures for terrestrial invertebrates were not obtained, but adequate sample mass was obtained for contaminant tissue analyses.
Trends with COPEC concentrations.	No COPECs had relationships with nematode survival. Terrestrial invertebrate tissue concentrations of arsenic and cadmium correlated to soil concentrations. Cause-effect relationships based on COPECs are not evident.	
Potential for adverse effects based on comparisons of soil concentrations to benchmarks.	Benchmarks and reference concentrations were exceeded for three COPECs (barium, copper, and mercury), suggesting a potential for risk from these analytes.	
Middle Trophic-Level Wildlife		
Evidence for adverse effects based on comparison of study sites to reference sites.	There was no difference in exposure for some COPECs because both reference sites and study sites had HQ>1.	Key uncertainties are associated with estimated exposure levels based on uptake through soil and the food chain, exposure parameters (including soil ingestion rates), and with TRVs for site-specific receptors. Integrated exposure to the site is assumed incorporating high and low concentrations based on MIS and composite sampling.
Trends with COPEC concentrations.	Relationships of soil and tissue concentrations are not indicated with the exception of boron and lead in mammal carcass.	
Potential for adverse effects based on comparisons of soil concentrations to NOAELs/LOAELs.	Exposures based on measured diet concentrations were greater than NOAELs and reference for nine COPECs (arsenic, boron, copper, lead, uranium [inorganic], Aroclor-1254, DDE, dieldrin, and endosulfan sulfate) thus there is a potential for risk from these analytes. Also, LOAELs and reference were exceeded for three COPECs (copper, dieldrin, and lead), suggesting a potential for adverse effects.	

COPEC = contaminant of potential ecological concern
DDE = dichlorodiphenyldichloroethylene
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
MIS = *MULTI INCREMENT*® sampling
NOAEL = no observable adverse effect level
TRV = toxicity reference value

Table 4-80. Linkage of Upland Risk Results to Waste Site Types.

Study Site	Site Type	Site Description	Excavation Depth (m)	COPEC	Receptor
600-131	NRSW	Surface debris and paint chips	1.7	Lead	Plant, killdeer
600-132	NRSW	Construction waste, landfill, and paint chips	None	Antimony	Plant
				Lead	Plant
600-139	NRSW	Surface disposal and debris	None	Copper	Invertebrate, deer mouse, killdeer
				Dieldrin	Pocket mouse, deer mouse
600-171	NRSW	White Bluffs townsite	None	Arsenic	Plant
				Lead	Plant
600-204	NRSW	Landfill and burn pit	None	Dieldrin	Pocket mouse, deer mouse
628-1	NRSW	Burn pit and surface debris	1.2	Mercury	Invertebrate
JA Jones 1	NRSW	Construction waste, paints and solvents	3.4	Selenium	Plant
300-49	RSW	Laboratory waste landfill	3	Mercury	Invertebrate
116-F-1	RLW	"Lewis Canal" emergency cooling water from 105-F Reactor	4.5	Arsenic	Plant
				Lead	Plant
1607-H2	RLW	Septic system	5.6	Barium	Invertebrate
116-B-11, 116-C-1, 116-C-5 [a]	RLW	Reactor liquid effluent disposal	4.6 to 5	Tin	Plant
				Copper	Killdeer

[a] These are the 100-B/C Pilot sample sites.

COPEC = contaminant of potential ecological concern
NRSW = nonradioactive solid waste
RLW = radioactive liquid waste
RSW = radioactive solid waste

Table 5-1. Analytical Suites for All Riparian Soils and Biological Tissues.

Analyte Group	Analytical Methods [a]	Analyzed in		Indicator Contaminants [c]
		Riparian Soil	Tissues [b]	
Inorganic chemicals	6010/6020	Yes	Yes	Al, Sb, As, [d] Ba, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, Ag, Sn, U, V, Zn
	7196A	Yes	No	Cr-VI
	7471	Yes	Yes	Hg [c]
	300.0	Yes	No	NO_3 [d]
PCBs and pesticides	8081A	Yes	Yes	Methoxychlor
	8082	Yes	Yes	None, but PCBs in fish have been risk drivers in previous risk assessments (EPA 910/R-02-006)
Semivolatile organic chemicals	418.1	No	No	Total petroleum hydrocarbons
	WTPH-G and WTPH-D	No	No	TPH gasoline and diesel range
	8270A	Yes	Yes	None, but needed to evaluate risk from TPH constituents
Radionuclides	Carbon-14 [f]	No	Yes	C-14
	Gamma energy analysis	Yes	Yes	Cs-137, Co-60, Ra-226, [g] Ra-228 [g]
	Isotopic thorium	Yes	Yes	Th-232
	Isotopic uranium	Yes	Yes	U-233/234, U-235, U-238
	Total radioactive strontium	Yes	Yes	Sr-90
	Tritium	No	No	H-3 [d]

[a] All analytes obtained by these methods.
[b] Analyses are subject to obtaining a sufficient amount of these media. Tissues include riparian plants, riparian small mammals, riparian small mammal liver/kidney, riparian terrestrial invertebrates and birds. Small mammal liver/kidney and invertebrates were measured for metals and uranium (as a metal, not isotopic) only.
[c] Indicator contaminants were used to identify analytical suites for the risk assessment and comprised the contaminants that were the focus in the soil sampling, multi-increment performance assessment.
[d] Of the analytes presented, there is overlap among several ecological and human health contaminants of interest; however, "d" footnoted analytes are of human health interest only.
[e] Mercury was not identified as an indicator contaminant in the near-shore or riparian environment but was investigated for completeness and for human health analysis.
[f] Carbon-14 was measured in samples collected from the 100-K Area only.
[g] Radium concentrations in water were measured by total radium isotopic analysis. Gamma energy analysis was used for all other media types.

PCB = polychlorinated biphenyl
TPH = total petroleum hydrocarbons
WTPH-D = Washington total petroleum hydrocarbons – diesel
WTPH-G = Washington total petroleum hydrocarbons – gasoline

EPA 910/R-02-006, *Columbia River Basin Fish Contaminant Survey 1996-1998*, U.S. Environmental Protection Agency, Region 10, Seattle, Washington.

Table 5-2. Summary of Background and Reference Data Resources.

Category	Resource	Description of Relevant Data
Area background	DOE/RL-92-24, 1995, *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes*, Rev. 4, 2 vols., U.S. Department of Energy, Richland Operations Office, Richland, Washington	Media: Soil. Data were obtained from HEIS. Nonradionuclides only. Coordinates were not provided.
Area background	DOE/RL-95-55, 1995, *Hanford Site Background: Evaluation of Existing Soil Radionuclide Data,* Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington	Media: Soil. Data were hand entered. Radionuclides only. Coordinates provided.
Area background	DOE/RL-96-12, 1996, *Hanford Site Background: Part 2, Soil Background for Radionuclides,* Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington	Media: Soil. Some data were obtained from HEIS and some data were hand entered. Radionuclides only.
Washington State background	Ecology, 1994, *Natural Background Soil Metals Concentrations in Washington State,* Publication 94-115, Washington State Department of Ecology, Toxics Cleanup Program, Olympia, Washington	Media: Soil. Nonradionuclides.
Reference	RCBRA Project (this report)	Media: Soil, biota, ecological measures, bioassays, histopathology.
Reference	DOE/RL-2007-50, 2008, *Central Plateau Terrestrial Ecological Risk Assessment Report*, Draft A, U.S. Department of Energy, Richland Operations Office, Richland, Washington	Media: Soil, biota, ecological measures.
Reference comparison	Surface Environmental Surveillance Program data, originating from PNNL far-facility electronic monitoring files WARD SOIL 90-04 XY.txt, WARD VEG 90-04 XY.txt, WARD SOIL 05 XY.txt, WARD VEG 05 XY.txt.	Media: Soil, vegetation (1990 to 2005). Data provided by PNNL from their database. Coordinates were provided for some locations and converted to a common coordinate system.
Reference comparison	Hanford Site-relevant data from WCH-91, *Columbia River Component Data Evaluation Summary Report*, Rev. 0, Washington Closure Hanford, Richland Washington, July 2006	Media: Biota, surface water, and sediment data from a variety of sources.

HEIS = Hanford Environmental Information System
PNNL = Pacific Northwest National Laboratory
RCBRA = River Corridor Baseline Risk Assessment

Table 5-3. Riparian Abiotic Media Sampled, Analyses Performed, and Field Measurements Collected.

Media Sampled	Analyses Performed	Field Measurements
Riparian soils	Metals (including mercury) Radionuclides (including gamma energy analysis, isotopic uranium, plutonium, thorium, tritium, and total beta radiostrontium) Semivolatile organic analytes Pesticides/polychlorinated biphenyl compounds Particle size, pH, nutrients, organic matter	Soil type Thermoluminescent dosimetry

Table 5-4. Riparian Biotic Media Sampled, Analyses Performed and Field Measurements Collected.

Media Sampled	Analyses Performed	Field Measurements
Terrestrial vegetation (current years growth) Terrestrial invertebrates (whole organism) Mice (whole organism, liver, kidney) Kingbird, cliff swallow (crop contents, carcass)	Metals (including mercury) Radionuclides (gamma energy analysis, isotopic uranium and thorium, and total beta radiostrontium) Semivolatile organic analytes Pesticides/polychlorinated biphenyl compounds	Vegetative canopy cover Species abundance and diversity Avian reproductive success

Table 5-5. Riparian Study Sites and Associated Riverbank Seeps. (2 Pages)

Riparian Study Site	Spring Name (Used in 2009)	Hanford River Mile	Northing (NAD83)	Easting (NAD83)
2a	SB-037-1	3.73	145297	564617
	SB-038-3	3.75	145278	564663
2c	None identified	--	--	--
100-B Spring 39-2	SB-039-2	3.95	145369	564952
100-B/C Outfall 1	041-1	4.1	145400	565260
	4-1	4.11	145400	565283
100-B/C Area DR	None identified	--	--	--
100-B/C Intermediate	None identified	--	--	--
100-B/C Outfall 2	None identified	--	--	--
100-B/C Outfall 3	None identified	--	--	--
2c	SK-057-3	5.55	146205	567532
	5-4A	5.56	146190	567551
RIP 5	7-1A	6.95	147500	569121
	7-1B	7	147580	569180

Table 5-5. Riparian Study Sites and Associated Riverbank Seeps. (2 Pages)

Riparian Study Site	Spring Name (Used in 2009)	Hanford River Mile	Northing (NAD83)	Easting (NAD83)
RIP 4	None identified	--	--	--
100-NR-2 SDA	Dirkes-F	8.76	149683	571136
	8-12	8.82	149791	571188
100-NR-2 SP	SN-089-1	8.9	149920	571300
	SN-092-2	9.06	150150	571465
	SN-092-3	9.08	150170	571480
	SN-093-1	9.15	150257	571552
	9-2	9.175	150288	571575
100-NR-2 EMA	9-4	9.25	150392	571641
	Dirkes-H	9.275	150425	571663
	SN-094-1	9.31	150470	571676
100-N Spring 8-13	SN-NS8-13	9.325	150500	571686
100-NR-2 EMA	Dirkes-I	9.36	150542	571729
2f	None identified	--	--	--
RIP 3	SD-102-1	10.24	151683	572634
RIP 2	SD-110-1	11.025	152483	573606
RIP 1	SH-145-1	14.38	153713	577184
	SH-145-2	14.44	153667	577257
	Dirkes-S	14.525	153622	577360
RIP 8	None identified	--	--	--
RIP 9	SH-152-2	15.265	152807	578191
	SH-152-4	15.315	152716	578221
RIP 10	None identified	--	--	--
2j	None identified	--	--	--
2l	None identified	--	--	--
3b	247-1	24.72	140949	584855
	25-1S	24.75	140924	584876
4a	SHTS-DR28-2	28.29	137453	589441
RIP 7	None identified	--	--	--
5c	37-1	37.1	124875	594544
RIP 6	Spr-8	42.32	116290	594468
	S3-DR42-2	42.365	116210	594489
	Spr-10	42.43	116084	594525

-- = not applicable

Table 5-6. Arsenic Concentrations from *MULTI INCREMENT*® Soil Sample Results Evaluated in the Performance Assessment.

Sample Location	HEIS Number	Replicate Concentration (mg/kg)	Qualifier	PQL (mg/kg)	Mean as Reported (mg/kg)	Standard Deviation as Reported (mg/kg)	Standard Deviation Nondetect as 0 (mg/kg)	Standard Deviation Nondetect = 0.5 PQL (mg/kg)
Riparian Study Site 3	J10DP5	3.1		0.5	2.96	0.297	--	--
	J10DP6	2.6						
	J10DP7	3.3						
	J10DP8	2.7						
	J10DP9	3.1						
Riparian Study Site 10	J10LJ0	6.8		0.5	6.46	0.207	--	--
	J10LJ1	6.3	C					
	J10LJ2	6.3						
	J10LJ3	6.5						
	J10LJ4	6.4						
Riparian Reference Site 13	J10DN5	8.2		0.5	8.36	0.658	--	--
	J10DN6	7.8						
	J10DN7	8.2						
	J10DN8	8.1						
	J10DN9	9.5						

-- = not applicable
C = the analyte was detected in the associated quality control blank above the instrument detection limit/method detection limit
HEIS = Hanford Environmental Information System
PQL = practical quantitation limit

Table 5-7. Hexavalent Chromium Concentrations from *MULTI INCREMENT*® Soil Sample Results Evaluated in the Performance Assessment.

Sample Location	HEIS Number	Replicate Concentration (mg/kg)	Qualifier	PQL (mg/kg)	Mean as Reported (mg/kg)	Standard Deviation as Reported (mg/kg)	Standard Deviation Nondetect as 0 (mg/kg)	Standard Deviation Nondetect = 0.5 PQL (mg/kg)
Riparian Study Site 3	J10DP5	0.252		0.2	0.344	0.110	0.185	0.146
	J10DP6	0.407						
	J10DP7	0.440						
	J10DP8	0.200	U					
	J10DP9	0.419						
Riparian Study Site 10	J10LJ0	0.244		0.2	0.557	0.234	0.344	0.310
	J10LJ1	0.595						
	J10LJ2	0.745						
	J10LJ3	0.398	U					
	J10LJ4	0.801						
Riparian Reference Site 13	J12XD5-A	0.21	U	No PQL reported	0.216	0.025	0.112	No PQL reported
	J12XD7-A	0.2	U					
	J12XD8-A	0.2	U					
	J12XD9-A	0.21	U					
	J12XD6-A	0.26						

HEIS = Hanford Environmental Information System
PQL = practical quantitation limit
U = analyzed for but not detected above limiting criteria (< = PQL)

Table 5-8. Lead Concentrations from *MULTI INCREMENT*® Soil Sample Results Evaluated in the Performance Assessment.

Sample Location	HEIS Number	Replicate Concentration (mg/kg)	Qualifier	PQL (mg/kg)	Mean as Reported (mg/kg)	Standard Deviation as Reported (mg/kg)	Standard Deviation Nondetect as 0 (mg/kg)	Standard Deviation Nondetect = 0.5 PQL (mg/kg)
Riparian Study Site 3	J10DP5	17.8		0.5	16.7	1.94	--	--
	J10DP6	19.5						
	J10DP7	15.6						
	J10DP8	14.6						
	J10DP9	16.1	C					
Riparian Study Site 10	J10LJ0	37.2	C	0.5	36.8	3.92	--	--
	J10LJ1	36.4						
	J10LJ2	39.2						
	J10LJ3	40.6						
	J10LJ4	30.4						
Riparian Reference Site 13	J10DN5	49.9		0.5	49.7	3.64	--	--
	J10DN6	47.1						
	J10DN7	45.9	C					
	J10DN8	50.4						
	J10DN9	55.3	C					

-- = not applicable
C = the analyte was detected in the associated quality control blank above the instrument detection limit/method detection limit
HEIS = Hanford Environmental Information System
PQL = practical quantitation limit

Table 5-9. Uranium-233/234 Concentrations from *MULTI INCREMENT*® Soil Sample Results Evaluated in the Performance Assessment.

Sample Location	HEIS Number	Replicate Concentration (mg/kg)	Qualifier	MDA (pCi/g)	Mean as Reported (pCi/g)	Standard Deviation as Reported (pCi/g)	Standard Deviation Nondetect as 0 (pCi/g)	Standard Deviation Nondetect = 0.5 PQL (pCi/g)
Riparian Study Site 3	J10DP5	0.501		0.27	0.516	0.159	0.267	0.183
	J10DP6	0.252	U	0.39				
	J10DP7	0.598		0.42				
	J10DP8	0.668		0.23				
	J10DP9	0.559		0.17				
Riparian Study Site 10	J10LJ0	0.679		0.13	0.669	0.059	--	--
	J10LJ1	0.571		0.12				
	J10LJ2	0.679		0.14				
	J10LJ3	0.688		0.14				
	J10LJ4	0.729		0.15				
Riparian Reference Site 13	J10DN5	0.879		0.34	1.190	0.198	--	--
	J10DN6	1.23		0.25				
	J10DN7	1.15		0.24				
	J10DN8	1.28		0.26				
	J10DN9	1.41		0.26				

-- = not applicable
HEIS = Hanford Environmental Information System
MDA = minimum detectable activity
PQL = practical quantitation limit
U = analyzed for but not detected above limiting criteria (< = MDA)

Table 5-10. Summary of Riparian Soil Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg)								
Aluminum	138	138	0	1.00	4,560	11,800	--	--
Antimony	133	15	118	0.11	0.41	0.83	0.37	0.9
Arsenic	138	138	0	1.00	2.6	19.3	--	--
Barium	138	138	0	1.00	52.2	206	--	--
Beryllium	138	135	3	0.98	0.01	0.81	0.15	0.15
Bismuth	138	0	138	0.00	--	--	0.58	1.8
Boron	138	128	10	0.93	0.38	3.1	0.28	1.5
Cadmium	138	138	0	1.00	0.35	2.9	--	--
Calcium	138	138	0	1.00	3,080	6,250	--	--
Calculated total uranium	138	132	6	0.96	0.566	8.10	0.312	0.964
Chromium	138	138	0	1.00	11.5	190	--	--
Cobalt	138	138	0	1.00	4.8	9.9	--	--
Copper	138	138	0	1.00	15.6	75.7	--	--
Hexavalent chromium	136	35	101	0.26	0.21	0.801	0.19	2
Iron	138	138	0	1.00	13,700	29,900	--	--
Lead	138	138	0	1.00	13.3	125	--	--
Lithium	138	138	0	1.00	4.8	14.5	--	--
Magnesium	138	138	0	1.00	3,240	5,930	--	--
Manganese	138	138	0	1.00	156	675	--	--
Mercury	138	128	10	0.93	0.01	0.184	0.02	0.025
Molybdenum	138	127	11	0.92	0.23	1.9	0.197	0.9
Nickel	138	138	0	1.00	10.1	29.6	--	--
Phosphorus	138	138	0	1.00	548	1,180	--	--
Potassium	138	138	0	1.00	531	1,770	--	--
Selenium	138	8	130	0.06	0.67	1.2	0.53	1.8
Silicon	138	138	0	1.00	144	3,640	--	--
Silver	138	9	129	0.07	0.08	0.2	0.07	0.36
Sodium	138	138	0	1.00	118	307	--	--
Strontium (elemental)	138	138	0	1.00	17.4	38.7	--	--
Thallium	138	4	134	0.03	0.988	1.1	0.81	3.2
Tin	138	96	42	0.70	0.54	10.2	0.766	1.9
Uranium (inorganic)	138	43	95	0.31	1.4	7.2	1.3	15
Vanadium	138	138	0	1.00	27.6	89.4	--	--
Zinc	138	138	0	1.00	93.2	621	--	--

Table 5-10. Summary of Riparian Soil Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Organics (mg/kg)								
1,2,4-Trichlorobenzene	138	0	138	0.00	--	--	0.02	0.67
1,2-Dichlorobenzene	138	0	138	0.00	--	--	0.02	0.67
1,3-Dichlorobenzene	138	0	138	0.00	--	--	0.02	0.67
1,4-Dichlorobenzene	138	1	137	0.01	0.022	0.022	0.02	0.67
2,4,5-Trichlorophenol	138	0	138	0.00	--	--	0.05	1.7
2,4,6-Trichlorophenol	138	0	138	0.00	--	--	0.02	0.67
2,4-Dichlorophenol	138	0	138	0.00	--	--	0.02	0.67
2,4-Dimethylphenol	138	0	138	0.00	--	--	0.02	0.67
2,4-Dinitrophenol	138	0	138	0.00	--	--	0.05	1.7
2,4-Dinitrotoluene	138	0	138	0.00	--	--	0.02	0.67
2,6-Dinitrotoluene	138	0	138	0.00	--	--	0.02	0.67
2-Chloronaphthalene	138	0	138	0.00	--	--	0.02	0.67
2-Chlorophenol	138	0	138	0.00	--	--	0.02	0.67
2-Methylnaphthalene	138	0	138	0.00	--	--	0.02	0.67
2-Methylphenol [cresol, o-]	138	0	138	0.00	--	--	0.02	0.67
2-Nitroaniline	138	0	138	0.00	--	--	0.05	1.7
2-Nitrophenol	138	1	137	0.01	0.021	0.021	0.02	0.67
3,3'-Dichlorobenzidine	138	0	138	0.00	--	--	0.02	0.67
3+4 Methylphenol [cresol, m+p]	138	0	138	0.00	--	--	0.02	0.67
3-Nitroaniline	138	0	138	0.00	--	--	0.05	1.7
4,6-Dinitro-2-methylphenol	138	0	138	0.00	--	--	0.05	1.7
4-Bromophenylphenyl ether	138	0	138	0.00	--	--	0.02	0.67
4-Chloro-3-methylphenol	138	0	138	0.00	--	--	0.02	0.67
4-Chloroaniline	138	0	138	0.00	--	--	0.02	0.67
4-Chlorophenylphenyl ether	138	0	138	0.00	--	--	0.02	0.67
4-Nitroaniline	138	0	138	0.00	--	--	0.05	1.7
4-Nitrophenol	138	0	138	0.00	--	--	0.05	1.7
Acenaphthene	138	0	138	0.00	--	--	0.02	0.67
Acenaphthylene	138	0	138	0.00	--	--	0.02	0.67
Aldrin	138	6	132	0.04	<0.001	0.002	<0.001	0.002
Alpha-BHC	138	3	135	0.02	.002	0.003	<0.001	0.002
alpha-Chlordane	138	1	137	0.01	<0.001	<0.001	<0.001	0.002
Anthracene	138	1	137	0.01	0.031	0.031	0.02	0.67
Aroclor-1016	138	0	138	0.00	--	--	0.013	0.018
Aroclor-1221	138	0	138	0.00	--	--	0.013	0.018
Aroclor-1232	138	0	138	0.00	--	--	0.013	0.018
Aroclor-1242	138	0	138	0.00	--	--	0.013	0.018

Table 5-10. Summary of Riparian Soil Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Aroclor-1248	138	0	138	0.00	--	--	0.013	0.018
Aroclor-1254	138	2	136	0.02	0.0069	0.018	0.013	0.018
Aroclor-1260	138	8	130	0.06	0.0021	0.0095	0.013	0.018
Benzo[a]anthracene	138	5	133	0.04	0.017	0.32	0.02	0.67
Benzo[a]pyrene	138	9	129	0.07	0.017	0.23	0.02	0.67
Benzo[b]fluoranthene	138	8	130	0.06	0.017	0.22	0.02	0.67
Benzo[ghi]perylene	138	5	133	0.04	0.018	0.14	0.02	0.67
Benzo[k]fluoranthene	138	5	133	0.04	0.018	0.23	0.02	0.67
beta-1,2,3,4,5,6-Hexachlorocyclohexane	138	3	135	0.02	0.0006	0.0021	<0.001	0.0018
Bis[2-chloro-1-methylethyl]ether	138	0	138	0.00	--	--	0.02	0.67
Bis[2-Chloroethoxy]methane	138	0	138	0.00	--	--	0.02	0.67
Bis[2-chloroethyl] ether	138	0	138	0.00	--	--	0.02	0.67
Bis[2-ethylhexyl] phthalate	138	132	6	0.96	0.017	0.8	0.33	0.66
Butylbenzylphthalate	138	0	138	0.00	--	--	0.02	0.67
Carbazole	138	0	138	0.00	--	--	0.02	0.67
Chrysene	138	12	126	0.09	0.017	0.35	0.02	0.67
Delta-BHC	138	8	130	0.06	<0.001	.0021	<0.001	0.0018
Dibenz[a,h]anthracene	138	2	136	0.02	0.017	0.07	0.02	0.67
Dibenzofuran	138	0	138	0.00	--	--	0.02	0.67
Dichlorodiphenyldichloroethane	138	7	131	0.05	<0.001	0.0027	<0.001	0.0018
Dichlorodiphenyldichloroethylene	138	67	71	0.49	<0.001	0.011	<0.001	0.0014
Dichlorodiphenyltrichloroethane	138	26	112	0.19	<0.001	0.013	<0.001	0.0018
Dieldrin	138	3	135	0.02	0.0049	0.022	<0.001	0.0018
Diethylphthalate	138	24	114	0.17	0.017	0.067	0.02	0.67
Dimethyl phthalate	138	0	138	0.00	--	--	0.02	0.67
Di-n-butylphthalate	138	59	79	0.43	0.0168	0.11	0.33	0.67
Di-n-octylphthalate	138	0	138	0.00	--	--	0.02	0.67
Endosulfan I	138	43	95	0.31	0.0004	0.011	<0.001	0.0014
Endosulfan II	138	0	138	0.00	--	--	<0.001	0.0018
Endosulfan sulfate	138	5	133	0.04	<0.001	0.13	<0.001	0.0014
Endrin	138	1	137	0.01	0.0036	0.0036	<0.001	0.0018
Endrin aldehyde	138	8	130	0.06	<0.001	0.12	<0.001	0.0014
Endrin ketone	138	0	138	0.00	--	--	<0.001	0.0018
Fluoranthene	138	5	133	0.04	0.02	0.54	0.02	0.67
Fluorene	138	0	138	0.00	--	--	0.02	0.67
Gamma-BHC (lindane)	138	2	136	0.02	<0.001	0.0026	<0.001	0.0018
gamma-Chlordane	138	10	128	0.07	<0.001	0.0046	<0.001	0.0018

Table 5-10. Summary of Riparian Soil Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Heptachlor	138	1	137	0.01	<0.001	<0.001	<0.001	0.0018
Heptachlor epoxide	138	1	137	0.01	<0.001	<0.001	<0.001	0.0018
Hexachlorobenzene	138	0	138	0.00	--	--	0.02	0.67
Hexachlorobutadiene	138	0	138	0.00	--	--	0.02	0.67
Hexachlorocyclopentadiene	138	0	138	0.00	--	--	0.02	0.67
Hexachloroethane	138	0	138	0.00	--	--	0.02	0.67
Indeno[1,2,3-cd]pyrene	138	5	133	0.04	0.017	0.14	0.02	0.67
Isophorone	138	0	138	0.00	--	--	0.02	0.67
Methoxychlor	138	8	130	0.06	0.0014	0.012	<0.001	0.0018
Naphthalene	138	0	138	0.00	--	--	0.02	0.67
Nitrobenzene	138	0	138	0.00	--	--	0.02	0.67
N-Nitroso-di-n-dipropylamine	138	0	138	0.00	--	--	0.02	0.67
N-Nitrosodiphenylamine	138	0	138	0.00	--	--	0.02	0.67
Pentachlorophenol	138	0	138	0.00	--	--	0.05	1.7
Phenanthrene	138	4	134	0.03	0.021	0.13	0.02	0.67
Phenol	138	65	73	0.47	0.0178	0.33	0.02	0.67
Pyrene	138	15	123	0.11	0.017	0.44	0.02	0.67
Toxaphene	138	0	138	0.00	--	--	<0.001	0.018
Total organic carbon	34	34	0	1.00	1,530	19,000	--	--
Radionuclides (pCi/g)								
Americium-241	123	0	123	0.00	--	--	0.031	0.91
Antimony-125	40	0	40	0.00	--	--	0.11	0.28
Barium-133	20	0	20	0.00	--	--	0.069	0.13
Beryllium-7	20	0	20	0.00	--	--	0.55	1.3
Carbon-14	10	3	7	0.30	12.2	112	-1.86	0.482
Cesium-134	138	0	138	0.00	--	--	0.037	0.27
Cesium-137	138	93	45	0.67	0.068	2.69	0.072	0.38
Cobalt-60	138	0	138	0.00	--	--	0.026	0.24
Europium-152	138	16	122	0.12	0.23	1.23	0.059	1.3
Europium-154	138	0	138	0.00	--	--	0.068	0.75
Europium-155	138	1	137	0.01	0.209	0.209	0.07	0.4
Plutonium-238	10	0	10	0.00	--	--	-0.032	0.073
Plutonium-239/240	10	0	10	0.00	--	--	0	0.048
Potassium-40	138	134	4	0.97	5.79	31.2	0.116	15
Radium-226	138	136	2	0.99	0.314	2.03	0.3	0.86
Radium-228	138	126	12	0.91	0.473	2.85	0.62	1.3
Ruthenium-106	20	0	20	0.00	--	--	0.37	0.88
Strontium-90	138	1	137	0.01	0.355	0.355	-0.34	0.194

Table 5-10. Summary of Riparian Soil Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Technetium-99	20	10	10	0.50	0.023	1.43	-0.214	0.118
Thorium-228	138	108	30	0.78	0.318	2.03	0.061	0.662
Thorium-230	138	70	68	0.51	0.228	1.08	-0.132	0.681
Thorium-232	138	108	30	0.78	0.28	2.31	0.106	0.684
Uranium-233/234	138	136	2	0.99	0.216	4.3	0.17	0.252
Uranium-235	138	4	134	0.03	0.039	0.049	0	0.272
Uranium-238	138	132	6	0.96	0.19	2.7	0.1	0.324
Anions (mg/kg)								
Bromide	10	0	10	0.00	--	--	2.48	2.5
Chloride	44	43	1	0.98	0.857	26.1	0.46	0.46
Fluoride	44	33	11	0.75	0.0742	10.1	0.416	1.12
Nitrogen in ammonia	34	34	0	1.00	0.158	16.8	--	--
Nitrogen in nitrate	167	164	3	0.98	0.0975	48.8	0.443	0.577
Nitrogen in nitrite	44	25	19	0.57	0.031	1.11	0.441	1.24
Nitrogen in nitrite and nitrate	132	132	0	1.00	0.36	52.6	--	--
Nitrogen, Kjeldahl total	34	34	0	1.00	200	1,580	--	--
Phosphate	10	0	10	0.00	--	--	2.48	2.5
Sulfate	44	44	0	1.00	2.67	73	--	--
Physical Properties (%)								
Cumulative percent retained on No. 100 screen	34	34	0	1.00	38.1	95.9	--	--
Cumulative percent retained on No. 16 screen	34	34	0	1.00	0	35.9	--	--
Cumulative percent retained on No. 200 screen	34	34	0	1.00	76.5	98.8	--	--
Cumulative percent retained on No. 30 screen	34	34	0	1.00	0.26	65.1	--	--
Cumulative percent retained on No. 50 screen	34	34	0	1.00	4.04	90.2	--	--
Cumulative percent retained on No. 8 screen	34	34	0	1.00	0	12.2	--	--
Fraction coarse sand	34	34	0	1.00	0.24	39.7	--	--
Fraction coarse silt/silt/clay (less than 0.074 mm)	34	34	0	1.00	1.25	23.5	--	--
Fraction fine sand	34	34	0	1.00	5.77	67.1	--	--
Fraction granules (greater than 2.38 mm)	34	34	0	1.00	0	12.2	--	--
Fraction medium sand	34	34	0	1.00	3.78	47.9	--	--

Table 5-10. Summary of Riparian Soil Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Fraction total sand	34	34	0	1.00	76.5	98.8	--	--
Fraction very coarse sand	34	34	0	1.00	0	35.9	--	--
Fraction very fine sand	34	34	0	1.00	2.45	38.4	--	--
Percent moisture (wet sample)	34	34	0	1.00	0.507	22.9	--	--
Other								
pH measurement	34	34	0	1.00	6.62	7.85	--	--

-- = not applicable
BHC = benzene hexachloride
RCBRA = River Corridor Baseline Risk Assessment

Table 5-11. Summary of Riparian Soil Data Collected for the 100-B/C Pilot Project. (4 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg)								
Aluminum	17	17	0	1.00	4,210	7,620	--	--
Antimony	17	5	12	0.29	0.291	0.374	0.286	0.291
Arsenic	17	17	0	1.00	2	12.5	--	--
Barium	17	17	0	1.00	47.4	134	--	--
Beryllium	17	17	0	1.00	0.098	0.261	--	--
Bismuth	17	0	17	0.00	--	--	0.619	0.631
Boron	17	17	0	1.00	0.394	1.3	--	--
Cadmium	17	16	1	0.94	0.075	1.7	0.038	0.038
Calcium	17	17	0	1.00	2,030	4,520	--	--
Chromium	17	17	0	1.00	11.1	38.6	--	--
Cobalt	17	17	0	1.00	3.2	7.4	--	--
Copper	17	17	0	1.00	9.1	22.1	--	--
Iron	17	17	0	1.00	8,360	18,500	--	--
Lead	17	17	0	1.00	6.1	33.2	--	--
Lithium	17	17	0	1.00	5.2	9.8	--	--
Magnesium	17	17	0	1.00	2,660	4,710	--	--
Manganese	17	17	0	1.00	108	789	--	--
Mercury	9	1	8	0.11	0.036	0.036	0.014	0.016
Molybdenum	17	17	0	1.00	0.191	1.3	--	--
Nickel	17	17	0	1.00	10.1	19.1	--	--
Phosphorus	17	17	0	1.00	443	1,140	--	--
Potassium	17	17	0	1.00	522	1,410	--	--
Selenium	17	7	10	0.41	0.458	1	0.409	0.413
Silicon	17	17	0	1.00	358	1,110	--	--
Silver	17	2	15	0.12	0.097	0.187	0.076	0.078
Sodium	17	17	0	1.00	73.7	139	--	--
Strontium (elemental)	17	17	0	1.00	15.7	25.4	--	--
Thallium	17	2	15	0.12	0.749	0.75	0.695	0.709
Tin	17	10	7	0.59	0.497	1.6	0.486	0.495
Uranium (inorganic)	17	0	17	0.00	--	--	1.3	1.33
Vanadium	17	17	0	1.00	18.8	35.7	--	--
Zinc	17	17	0	1.00	45.2	236	--	--
Zirconium	17	17	0	1.00	2.9	10.6	--	--

Table 5-11. Summary of Riparian Soil Data Collected for the 100-B/C Pilot Project. (4 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Organics (mg/kg)								
1,2,4-Trichlorobenzene	3	0	3	0.00	--	--	0.032	0.036
1,2-Dichlorobenzene	3	0	3	0.00	--	--	0.022	0.025
1,3-Dichlorobenzene	3	0	3	0.00	--	--	0.021	0.024
1,4-Dichlorobenzene	3	0	3	0.00	--	--	0.025	0.028
2,4,5-Trichlorophenol	3	0	3	0.00	--	--	0.056	0.062
2,4,6-Trichlorophenol	3	0	3	0.00	--	--	0.058	0.064
2,4-Dichlorophenol	3	0	3	0.00	--	--	0.047	0.052
2,4-Dimethylphenol	3	0	3	0.00	--	--	0.052	0.058
2,4-Dinitrophenol	3	0	3	0.00	--	--	0.12	0.13
2,4-Dinitrotoluene	3	0	3	0.00	--	--	0.033	0.036
2,6-Dinitrotoluene	3	0	3	0.00	--	--	0.037	0.041
2-Chloronaphthalene	3	0	3	0.00	--	--	0.029	0.032
2-Chlorophenol	3	0	3	0.00	--	--	0.025	0.028
2-Methylnaphthalene	3	0	3	0.00	--	--	0.027	0.03
2-Methylphenol [cresol, o-]	3	0	3	0.00	--	--	0.036	0.04
2-Nitroaniline	3	0	3	0.00	--	--	0.07	0.077
2-Nitrophenol	3	0	3	0.00	--	--	0.036	0.04
3,3'-Dichlorobenzidine	3	0	3	0.00	--	--	0.042	0.047
3-Nitroaniline	3	0	3	0.00	--	--	0.048	0.053
4,6-Dinitro-2-methylphenol	3	0	3	0.00	--	--	0.11	0.13
4-Bromophenylphenyl ether	3	0	3	0.00	--	--	0.041	0.046
4-Chloro-3-methylphenol	3	0	3	0.00	--	--	0.049	0.055
4-Chloroaniline	3	0	3	0.00	--	--	0.056	0.063
4-Chlorophenylphenyl ether	3	0	3	0.00	--	--	0.033	0.037
4-Methylphenol [cresol, p-]	3	0	3	0.00	--	--	0.093	0.1
4-Nitroaniline	3	0	3	0.00	--	--	0.04	0.045
4-Nitrophenol	3	0	3	0.00	--	--	0.078	0.087
Acenaphthene	3	0	3	0.00	--	--	0.03	0.034
Acenaphthylene	3	0	3	0.00	--	--	0.03	0.034
Anthracene	3	0	3	0.00	--	--	0.033	0.037
Benzo[a]anthracene	3	0	3	0.00	--	--	0.042	0.047
Benzo[a]pyrene	3	0	3	0.00	--	--	0.036	0.04
Benzo[b]fluoranthene	3	0	3	0.00	--	--	0.071	0.079
Benzo[ghi]perylene	3	0	3	0.00	--	--	0.19	0.21

Table 5-11. Summary of Riparian Soil Data Collected for the 100-B/C Pilot Project. (4 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Benzo[k]fluoranthene	3	0	3	0.00	--	--	0.036	0.04
Bis[2-chloro-1-methylethyl]ether	3	0	3	0.00	--	--	0.028	0.031
Bis[2-Chloroethoxy]methane	3	0	3	0.00	--	--	0.038	0.042
Bis[2-chloroethyl] ether	3	0	3	0.00	--	--	0.025	0.027
Bis[2-ethylhexyl] phthalate	3	2	1	0.67	0.13	0.16	0.07	0.07
Butylbenzylphthalate	3	0	3	0.00	--	--	0.048	0.053
Carbazole	3	0	3	0.00	--	--	0.037	0.041
Chrysene	3	0	3	0.00	--	--	0.026	0.029
Dibenz[a,h]anthracene	3	0	3	0.00	--	--	0.15	0.17
Dibenzofuran	3	0	3	0.00	--	--	0.041	0.046
Diethylphthalate	3	0	3	0.00	--	--	0.075	0.084
Dimethyl phthalate	3	0	3	0.00	--	--	0.036	0.04
Di-n-butylphthalate	3	0	3	0.00	--	--	0.051	0.057
Di-n-octylphthalate	3	0	3	0.00	--	--	0.26	0.29
Fluoranthene	3	0	3	0.00	--	--	0.042	0.047
Fluorene	3	0	3	0.00	--	--	0.035	0.039
Hexachlorobenzene	3	0	3	0.00	--	--	0.033	0.036
Hexachlorobutadiene	3	0	3	0.00	--	--	0.023	0.025
Hexachlorocyclopentadiene	3	0	3	0.00	--	--	0.13	0.15
Hexachloroethane	3	0	3	0.00	--	--	0.03	0.033
Indeno[1,2,3-cd]pyrene	3	0	3	0.00	--	--	0.031	0.035
Isophorone	3	0	3	0.00	--	--	0.034	0.038
Naphthalene	3	0	3	0.00	--	--	0.027	0.03
Nitrobenzene	3	0	3	0.00	--	--	0.033	0.037
N-Nitroso-di-n-dipropylamine	3	0	3	0.00	--	--	0.036	0.04
N-Nitrosodiphenylamine	3	0	3	0.00	--	--	0.038	0.043
Pentachlorophenol	3	0	3	0.00	--	--	0.22	0.24
Phenanthrene	3	0	3	0.00	--	--	0.03	0.033
Phenol	3	0	3	0.00	--	--	0.16	0.18
Pyrene	3	0	3	0.00	--	--	0.041	0.046
Radionuclides (pCi/g)								
Antimony-125	16	0	16	0.00	--	--	-0.327	0.057
Beryllium-7	16	0	16	0.00	--	--	-0.556	0.789
Carbon-14	6	0	6	0.00	--	--	0.0527	0.563
Cesium-134	16	0	16	0.00	--	--	-0.0119	0.0968

Table 5-11. Summary of Riparian Soil Data Collected for the 100-B/C Pilot Project. (4 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Cesium-137	16	10	6	0.63	0.0332	1.37	0.0329	0.204
Cobalt-60	16	0	16	0.00	--	--	-0.0329	0.11
Europium-152	16	0	16	0.00	--	--	-0.0895	0.547
Europium-154	16	0	16	0.00	--	--	-0.223	0.0644
Europium-155	16	0	16	0.00	--	--	0.00649	0.149
Nickel-63	6	0	6	0.00	--	--	2.27	6.88
Plutonium-238	12	0	12	0.00	--	--	-0.000408	0.000892
Plutonium-239/240	12	11	1	0.92	0.00238	0.0131	0.000768	0.000768
Potassium-40	16	16	0	1.00	11.7	18.2	--	--
Ruthenium-106	16	0	16	0.00	--	--	-0.469	0.486
Strontium-90	16	11	5	0.69	0.0328	0.196	0.0297	0.0442
Technetium-99	12	2	10	0.17	0.826	1.99	-0.0602	0.45

-- = not applicable

Table 5-12. Summary of Riparian Soil Data Collected for the 100-NR-2 Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg)								
Antimony	23	23	0	1.00	0.0506	0.241	--	--
Arsenic	23	23	0	1.00	1.6	12.9	--	--
Barium	23	23	0	1.00	48.2	155	--	--
Cadmium	23	23	0	1.00	0.0898	2.13	--	--
Chromium	23	23	0	1.00	10.8	52.7	--	--
Lead	23	23	0	1.00	3.6	96.5	--	--
Manganese	23	23	0	1.00	207	736	--	--
Mercury	23	23	0	1.00	0.0002	0.0604	--	--
Nickel	23	23	0	1.00	11.1	32.2	--	--
Selenium	23	6	17	0.26	0.212	0.516	0.2	0.2
Uranium (inorganic)	23	23	0	1.00	0.54	6.22	--	--
Vanadium	23	23	0	1.00	29.1	69.4	--	--
Zinc	23	23	0	1.00	38	453	--	--
Organics (mg/kg)								
1,1',2,3',4,4',5-Pentachlorobiphenyl	13	2	11	0.15	0.000109	0.000109	0.000097	0.000111
2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	13	0	13	0.00	--	--	0.000097	0.000111
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	13	3	10	0.23	0.000105	0.00016	0.000097	0.00011
2,2',3,3',4,4',5,6-Octachlorobiphenyl	13	1	12	0.08	0.000109	0.000109	0.000097	0.000111
2,2',3,3',4,4',5-Heptachlorobiphenyl	13	2	11	0.15	0.000108	0.000193	0.000097	0.000111
2,2',3,3',4,4'-Hexachlorobiphenyl	13	1	12	0.08	0.000103	0.000103	0.000097	0.000111
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	13	2	11	0.15	0.000125	0.000158	0.000097	0.000111
2,2',3,4',5,5',6-Heptachlorobiphenyl	13	9	4	0.69	0.000117	0.000308	0.000098	0.000105
2,2',3,4,4',5'-Hexachlorobiphenyl	13	11	2	0.85	0.000233	0.000622	0.000101	0.000102
2,2',3,4,4',5,5'-Heptachlorobiphenyl	13	0	13	0.00	--	--	0.000097	0.000111
2,2',3,5'-Tetrachloro-1-1'-biphenyl	13	1	12	0.08	0.000277	0.000277	0.000097	0.000111

Table 5-12. Summary of Riparian Soil Data Collected for the 100-NR-2 Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
2,2',4,4',5,5'-Hexachloro-Biphenyl	13	8	5	0.62	0.000102	0.000378	0.000102	0.000111
2,2',4,5,5'-Pentachlorobiphenyl	13	1	12	0.08	0.00114	0.00114	0.000097	0.000111
2,2',5,5'-Tetrachlorobiphenyl	13	1	12	0.08	0.000138	0.000138	0.000097	0.000111
2,2',5-Trichlorobiphenyl	13	0	13	0.00	--	--	0.000097	0.000111
2,3',4,4'-Tetrachlorobiphenyl	13	1	12	0.08	0.00122	0.00122	0.000097	0.000111
2,3,3',4,4'-Pentachlorobiphenyl	13	3	10	0.23	0.000237	0.000686	0.000097	0.000111
2,4'-Dichlorobiphenyl	13	1	12	0.08	0.000194	0.000194	0.000097	0.00011
2,4,4'-Trichlorobiphenyl	13	0	13	0.00	--	--	0.000097	0.000111
3,3',4,4',5-Pentachlorobiphenyl	13	0	13	0.00	--	--	0.000097	0.000111
3,3',4,4'-Tetrachlorobiphenyl	13	0	13	0.00	--	--	0.000097	0.000111
Total PCB	13	13	0	1.00	0.00369	0.01	--	--
Total petroleum hydrocarbons - diesel range	2	1	1	0.50	570	570	0.94	0.94
Radionuclides (pCi/g)								
Strontium-90	23	3	20	0.13	0.0942	5.37	-0.0503	0.0424
Technetium-99	21	0	21	0.00	--	--	-0.397	0.403

-- = not applicable
PCB = polychlorinated biphenyl

Table 5-13. Summary of Riparian Plant Tissue Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	52	37	15	0.71	3.7	470	1.7	17
Antimony	52	6	46	0.12	0.27	0.6	0.21	2.4
Arsenic	52	1	51	0.02	0.84	0.84	0.39	3.3
Barium	52	52	0	1.00	1.3	26	--	--
Beryllium	52	3	49	0.06	0.02	0.03	0.01	0.11
Bismuth	52	0	52	0.00	--	--	0.31	2.7
Boron	52	49	3	0.94	0.31	39.7	0.34	1.1
Cadmium	52	5	47	0.10	0.03	1.1	0.03	0.38
Calcium	52	52	0	1.00	235	13,200	--	--
Calculated total uranium	52	1	51	0.02	0.984	0.984	-0.0119	0.155
Chromium	52	32	20	0.62	0.1	3	0.13	0.37
Cobalt	52	5	47	0.10	0.14	0.34	0.08	0.75
Copper	52	48	4	0.92	1.2	9.8	0.95	1.2
Iron	52	33	19	0.63	34.6	850	10.6	68.9
Lead	52	10	42	0.19	0.34	1.7	0.27	1.7
Lithium	52	28	24	0.54	0.03	0.62	0.03	0.18
Magnesium	52	52	0	1.00	164	3,070	--	--
Manganese	52	52	0	1.00	2.3	53.8	--	--
Mercury	52	0	52	0.00	--	--	0.01	0.08
Molybdenum	52	27	25	0.52	0.14	1.7	0.13	1.6
Nickel	52	45	7	0.87	0.26	8.4	0.18	1.1
Phosphorus	52	52	0	1.00	282	7,260	--	--
Potassium	52	52	0	1.00	2,940	32,200	--	--
Selenium	52	5	47	0.10	0.4	1.1	0.35	2.5
Silicon	52	52	0	1.00	61.4	832	--	--
Silver	52	2	50	0.04	0.07	0.15	0.07	0.38
Sodium	52	28	24	0.54	6.8	63.5	7.5	32.6
Strontium (elemental)	52	52	0	1.00	1.1	48.7	--	--
Thallium	52	0	52	0.00	--	--	0.54	3.8

Table 5-13. Summary of Riparian Plant Tissue Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Tin	52	2	50	0.04	1.5	5.2	1	5.8
Titanium	30	30	0	1.00	1.1	32.9	--	--
Uranium (inorganic)	52	4	48	0.08	2.5	6.3	0.84	4.7
Vanadium	52	18	34	0.35	0.1	1.7	0.08	0.49
Zinc	52	52	0	1.00	5.3	72.6	--	--
Zirconium	30	0	30	0.00	--	--	1	5.7
Organics (mg/kg-fw)								
1,2,4-Trichlorobenzene	49	0	49	0.00	--	--	2	74
1,2-Dichlorobenzene	49	0	49	0.00	--	--	2	74
1,3-Dichlorobenzene	49	0	49	0.00	--	--	2	74
1,4-Dichlorobenzene	49	0	49	0.00	--	--	2	74
2,4,5-Trichlorophenol	49	0	49	0.00	--	--	5	180
2,4,6-Trichlorophenol	49	0	49	0.00	--	--	2	74
2,4-Dichlorophenol	49	0	49	0.00	--	--	2	74
2,4-Dimethylphenol	49	0	49	0.00	--	--	2	74
2,4-Dinitrophenol	49	0	49	0.00	--	--	5	180
2,4-Dinitrotoluene	49	0	49	0.00	--	--	2	74
2,6-Dinitrotoluene	49	0	49	0.00	--	--	2	74
2-Chloronaphthalene	49	0	49	0.00	--	--	2	74
2-Chlorophenol	49	0	49	0.00	--	--	2	74
2-Methylnaphthalene	49	0	49	0.00	--	--	2	74
2-Methylphenol [cresol, o-]	49	0	49	0.00	--	--	2	74
2-Nitroaniline	49	0	49	0.00	--	--	5	180
2-Nitrophenol	49	0	49	0.00	--	--	2	74
3,3'-Dichlorobenzidine	49	0	49	0.00	--	--	2	74
3+4 Methylphenol [cresol, m+p]	49	4	45	0.08	0.11	3.1	2	74
3-Nitroaniline	49	0	49	0.00	--	--	5	180
4,6-Dinitro-2-methylphenol	49	0	49	0.00	--	--	5	180
4-Bromophenylphenyl ether	49	0	49	0.00	--	--	2	74
4-Chloro-3-methylphenol	49	0	49	0.00	--	--	2	74
4-Chloroaniline	49	0	49	0.00	--	--	2	74

Table 5-13. Summary of Riparian Plant Tissue Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
4-Chlorophenylphenyl ether	49	0	49	0.00	--	--	2	74
4-Nitroaniline	49	0	49	0.00	--	--	5	180
4-Nitrophenol	49	0	49	0.00	--	--	5	180
Acenaphthene	49	0	49	0.00	--	--	2	74
Acenaphthylene	49	0	49	0.00	--	--	2	74
Aldrin	52	4	48	0.08	0.0054	0.012	0.008	0.24
Alpha-BHC	52	7	45	0.13	0.0024	0.0056	0.008	0.24
alpha-Chlordane	52	1	51	0.02	0.01	0.01	0.008	0.24
Anthracene	49	0	49	0.00	--	--	2	74
Aroclor-1016	52	0	52	0.00	--	--	0.08	1.9
Aroclor-1221	52	0	52	0.00	--	--	0.08	1.9
Aroclor-1232	52	0	52	0.00	--	--	0.08	1.9
Aroclor-1242	52	0	52	0.00	--	--	0.08	1.9
Aroclor-1248	52	0	52	0.00	--	--	0.08	1.9
Aroclor-1254	52	0	52	0.00	--	--	0.08	1.9
Aroclor-1260	52	0	52	0.00	--	--	0.08	1.9
Benzo[a]anthracene	49	0	49	0.00	--	--	2	74
Benzo[a]pyrene	49	0	49	0.00	--	--	2	74
Benzo[b]fluoranthene	49	0	49	0.00	--	--	2	74
Benzo[ghi]perylene	49	0	49	0.00	--	--	2	74
Benzo[k]fluoranthene	49	1	48	0.02	1.3	1.3	2	74
beta-1,2,3,4,5,6-Hexachlorocyclohexane	52	2	50	0.04	0.01	0.014	0.008	0.24
Bis[2-chloro-1-methylethyl]ether	49	0	49	0.00	--	--	2	74
Bis[2-Chloroethoxy]methane	49	0	49	0.00	--	--	2	74
Bis[2-chloroethyl] ether	49	0	49	0.00	--	--	2	74
Bis[2-ethylhexyl] phthalate	50	16	34	0.32	0.23	2.3	0.36	74
Butylbenzylphthalate	49	0	49	0.00	--	--	2	74
Carbazole	49	0	49	0.00	--	--	2	74
Chrysene	49	0	49	0.00	--	--	2	74
Delta-BHC	52	6	46	0.12	0.0024	0.011	0.008	0.24
Dibenz[a,h]anthracene	49	0	49	0.00	--	--	2	74

Table 5-13. Summary of Riparian Plant Tissue Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Dibenzofuran	49	0	49	0.00	--	--	2	74
Dichlorodiphenyldichloroethane	52	1	51	0.02	0.011	0.011	0.008	0.24
Dichlorodiphenyldichloroethylene	52	5	47	0.10	0.0061	0.15	0.008	0.24
Dichlorodiphenyltrichloroethane	52	3	49	0.06	0.013	0.033	0.008	0.24
Dieldrin	52	7	45	0.13	0.0058	0.012	0.008	0.24
Diethylphthalate	49	0	49	0.00	--	--	2	74
Dimethyl phthalate	49	0	49	0.00	--	--	2	74
Di-n-butylphthalate	50	3	47	0.06	0.25	0.92	0.4	74
Di-n-octylphthalate	49	0	49	0.00	--	--	2	74
Endosulfan I	52	14	38	0.27	0.0042	0.044	0.008	0.24
Endosulfan II	52	5	47	0.10	0.0026	0.015	0.008	0.24
Endosulfan sulfate	52	2	50	0.04	0.011	0.014	0.008	0.24
Endrin	52	6	46	0.12	0.0022	0.21	0.008	0.24
Endrin aldehyde	52	4	48	0.08	0.0044	0.013	0.008	0.24
Endrin ketone	52	5	47	0.10	0.0068	0.014	0.008	0.24
Fluoranthene	49	0	49	0.00	--	--	2	74
Fluorene	49	0	49	0.00	--	--	2	74
Gamma-BHC (lindane)	52	16	36	0.31	0.002	0.013	0.008	0.24
gamma-Chlordane	52	8	44	0.15	0.0024	0.083	0.008	0.24
Heptachlor	52	2	50	0.04	0.002	0.0067	0.008	0.24
Heptachlor epoxide	52	5	47	0.10	0.0042	0.02	0.008	0.24
Hexachlorobenzene	49	0	49	0.00	--	--	2	74
Hexachlorobutadiene	49	0	49	0.00	--	--	2	74
Hexachlorocyclopentadiene	49	0	49	0.00	--	--	2	74
Hexachloroethane	49	0	49	0.00	--	--	2	74
Indeno[1,2,3-cd]pyrene	49	0	49	0.00	--	--	2	74
Isophorone	49	0	49	0.00	--	--	2	74
Methoxychlor	52	9	43	0.17	0.0055	0.083	0.008	0.24
Naphthalene	49	0	49	0.00	--	--	2	74
Nitrobenzene	49	0	49	0.00	--	--	2	74
N-Nitroso-di-n-dipropylamine	49	0	49	0.00	--	--	2	74

Table 5-13. Summary of Riparian Plant Tissue Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
N-Nitrosodiphenylamine	49	0	49	0.00	--	--	2	74
Pentachlorophenol	49	1	48	0.02	1	1	5	180
Phenanthrene	49	0	49	0.00	--	--	2	74
Phenol	49	4	45	0.08	0.58	11	2	74
Pyrene	49	0	49	0.00	--	--	2	74
Toxaphene	52	0	52	0.00	--	--	0.024	2.4
Radionuclides (pCi/g-fw)								
Americium-241	52	0	52	0.00	--	--	0.022	0.8
Antimony-125	52	0	52	0.00	--	--	0.053	0.52
Barium-133	2	0	2	0.00	--	--	0.094	0.12
Beryllium-7	52	1	51	0.02	3.11	3.11	-0.3	3
Carbon-14	8	1	7	0.13	12.5	12.5	-0.406	3.11
Cesium-134	52	0	52	0.00	--	--	0.028	0.26
Cesium-137	52	0	52	0.00	--	--	0.023	0.21
Cobalt-60	52	0	52	0.00	--	--	0.025	0.27
Europium-152	52	0	52	0.00	--	--	0.055	0.53
Europium-154	52	0	52	0.00	--	--	0.073	0.73
Europium-155	52	0	52	0.00	--	--	0.031	0.53
Potassium-40	52	36	16	0.69	2.11	10.4	0	6.9
Radium-226	52	0	52	0.00	--	--	0.039	0.48
Radium-228	52	0	52	0.00	--	--	0.077	0.99
Ruthenium-106	52	0	52	0.00	--	--	0.196	2.1
Strontium-90	52	3	49	0.06	0.484	10.1	-0.104	0.072
Technetium-99	4	0	4	0.00	--	--	-0.003	0.182
Thorium-228	52	1	51	0.02	0.112	0.112	-0.146	0.17
Thorium-230	52	11	41	0.21	0.227	0.417	-0.162	0.204
Thorium-232	52	0	52	0.00	--	--	-0.041	0.096
Tritium	12	0	12	0.00	--	--	-4.23	3.36
Uranium-233/234	52	1	51	0.02	0.225	0.225	-0.017	0.086
Uranium-235	52	0	52	0.00	--	--	0	0.042
Uranium-238	52	1	51	0.02	0.326	0.326	-0.004	0.052

Table 5-13. Summary of Riparian Plant Tissue Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Anion (mg/kg-fw)								
Nitrogen in nitrite and nitrate	10	10	0	1.00	8.2	436	--	--

-- = not applicable
BHC = benzene hexachloride
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 5-14. Summary of Riparian Plant Tissue Data Collected for the 100-B/C Pilot Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	12	12	0	1.00	2.06	611	--	--
Antimony	12	7	5	0.58	0.00515	0.0311	0.00461	0.00576
Arsenic	12	11	1	0.92	0.052	0.287	0.0486	0.0486
Barium	30	30	0	1.00	0.876	14.2	--	--
Beryllium	12	5	7	0.42	0.0031	0.0149	0.00459	0.00573
Cadmium	30	24	6	0.80	0.00288	0.57	0.00244	0.0061
Chromium	30	30	0	1.00	0.0452	1.44	--	--
Copper	12	12	0	1.00	1.01	4.48	--	--
Lead	30	29	1	0.97	0.00537	0.936	0.00488	0.00488
Manganese	30	30	0	1.00	1.31	45.8	--	--
Mercury	30	10	20	0.33	0.00146	0.00616	0.00166	0.0143
Nickel	30	30	0	1.00	0.0893	1.05	--	--
Selenium	30	12	18	0.40	0.00974	0.0578	0.00671	0.0572
Silver	12	0	12	0.00	--	--	0.0109	0.0136
Thallium	30	17	13	0.57	0.00539	0.263	0.00488	0.00512
Uranium (inorganic)	30	25	5	0.83	0.000298	0.196	0.000244	0.00754
Zinc	12	12	0	1.00	5.9	45.4	--	--
Radionuclides (pCi/g-fw)								
Antimony-125	12	0	12	0.00	--	--	-0.025	0.0299
Beryllium-7	12	7	5	0.58	0.515	1.75	0.268	0.531
Cesium-134	12	0	12	0.00	--	--	-0.00128	0.0202
Cesium-137	12	1	11	0.08	0.065	0.065	-0.00225	0.07
Cobalt-60	12	0	12	0.00	--	--	-0.00864	0.0196
Europium-152	12	0	12	0.00	--	--	-0.0202	0.0473
Europium-154	12	0	12	0.00	--	--	-0.0354	0.0544
Europium-155	12	0	12	0.00	--	--	-0.00189	0.0445
Potassium-40	12	12	0	1.00	1.76	5.37	--	--
Ruthenium-106	12	0	12	0.00	--	--	-0.0796	0.0702
Silver-108 metastable	12	0	12	0.00	--	--	-0.00744	0.0101
Strontium-90	30	9	21	0.30	0.0189	1.3	-0.0216	0.021
Technetium-99	28	19	9	0.68	0.0456	1.62	-0.00895	0.451

-- = not applicable
fw = fresh weight

Table 5-15. Summary of Riparian Plant Tissue Data Collected for the 100-NR-2 Operable Unit.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	1	1	0	1.00	0.615	0.615	--	--
Antimony	13	2	11	0.15	0.00578	0.00599	0.0015	0.0021
Arsenic	13	8	5	0.62	0.029	0.104	0.015	0.021
Barium	13	13	0	1.00	0.643	6.99	--	--
Beryllium	1	0	1	0.00	--	--	0.000367	0.000367
Cadmium	13	9	4	0.69	0.0013	0.0441	0.00168	0.00168
Chromium	13	13	0	1.00	0.0229	0.332	--	--
Copper	1	1	0	1.00	0.374	0.374	--	--
Lead	13	13	0	1.00	0.00479	0.236	--	--
Manganese	13	13	0	1.00	0.835	9.53	--	--
Mercury	13	12	1	0.92	0.00149	0.00357	0.000367	0.000367
Nickel	13	13	0	1.00	0.0842	0.356	--	--
Selenium	13	5	8	0.38	0.0348	0.0519	0.0184	0.042
Silver	1	0	1	0.00	--	--	0.000918	0.000918
Thallium	1	1	0	1.00	0.0133	0.0133	--	--
Thorium	1	1	0	1.00	0.00118	0.00118	--	--
Uranium (inorganic)	13	3	10	0.23	0.0025	0.0447	0.000275	0.00189
Vanadium	12	8	4	0.67	0.0131	0.468	0.0084	0.0084
Zinc	13	13	0	1.00	2.28	12.9	--	--
Radionuclides (pCi/g-fw)								
Antimony-125	1	0	1	0.00	--	--	-0.00384	-0.00384
Beryllium-7	1	0	1	0.00	--	--	-0.0219	-0.0219
Cesium-134	1	0	1	0.00	--	--	-0.002	-0.002
Cesium-137	1	0	1	0.00	--	--	-0.00075	-0.00075
Cobalt-60	1	0	1	0.00	--	--	0.00149	0.00149
Europium-152	1	0	1	0.00	--	--	-0.00068	-0.00068
Europium-154	1	0	1	0.00	--	--	0.00156	0.00156
Europium-155	1	0	1	0.00	--	--	-0.00093	-0.00093
Potassium-40	1	1	0	1.00	0.14	0.14	--	--
Ruthenium-106	1	0	1	0.00	--	--	0.000515	0.000515
Strontium-90	13	11	2	0.85	0.0233	2.01	0.00022	0.00288
Technetium-99	8	1	7	0.13	0.147	0.147	-0.00531	0.0909

-- = not applicable
fw = fresh weight

Table 5-16. Summary of Riparian Terrestrial Invertebrate Tissue Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	26	26	0	1.00	4.5	91.2	--	--
Antimony	26	0	26	0.00	--	--	0.21	0.67
Arsenic	26	21	5	0.81	0.51	1.7	0.59	0.91
Barium	26	26	0	1.00	0.4	22.8	--	--
Beryllium	26	0	26	0.00	--	--	0.01	0.03
Bismuth	26	0	26	0.00	--	--	0.38	0.77
Boron	26	25	1	0.96	0.24	3.9	0.25	0.25
Cadmium	26	20	6	0.77	0.07	1.1	0.05	0.1
Calcium	26	26	0	1.00	154	8,410	--	--
Calculated total uranium	12	1	11	0.08	0.696	0.696	0	0.244
Chromium	26	22	4	0.85	0.15	0.86	0.25	0.48
Cobalt	26	2	24	0.08	0.08	0.09	0.08	0.21
Copper	26	26	0	1.00	3.8	29.5	--	--
Iron	26	26	0	1.00	24.3	203	--	--
Lead	26	6	20	0.23	0.32	0.49	0.29	0.47
Lithium	26	14	12	0.54	0.04	0.11	0.04	0.18
Magnesium	26	26	0	1.00	244	1,030	--	--
Manganese	26	26	0	1.00	2.9	55.9	--	--
Mercury	26	9	17	0.35	0.02	0.1	0.01	0.02
Molybdenum	26	19	7	0.73	0.2	0.45	0.28	0.44
Nickel	26	10	16	0.38	0.26	0.78	0.22	0.36
Phosphorus	26	26	0	1.00	1,380	2,840	--	--
Potassium	26	26	0	1.00	1,650	3,060	--	--
Selenium	26	14	12	0.54	0.56	1.8	0.45	1
Silicon	26	26	0	1.00	7.5	148	--	--
Silver	26	2	24	0.08	0.07	0.08	0.07	0.11
Sodium	26	26	0	1.00	137	1140	--	--
Strontium (elemental)	12	12	0	1.00	1.1	14.4	--	--
Thallium	26	0	26	0.00	--	--	0.65	1.1
Tin	26	3	23	0.12	1.2	1.6	1	4
Titanium	14	14	0	1.00	0.26	1.9	--	--
Uranium (inorganic)	26	1	25	0.04	1.9	1.9	0.82	1.4
Vanadium	26	11	15	0.42	0.09	0.28	0.08	0.14
Zinc	26	26	0	1.00	28	99.4	--	--
Zirconium	14	0	14	0.00	--	--	0.99	1.6

Table 5-16. Summary of Riparian Terrestrial Invertebrate Tissue Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Organics (mg/kg-fw)								
Acenaphthene	1	0	1	0.00	--	--	0.787	0.787
Acenaphthylene	1	0	1	0.00	--	--	0.787	0.787
Anthracene	1	0	1	0.00	--	--	0.0787	0.0787
Benzo[a]anthracene	1	0	1	0.00	--	--	0.0787	0.0787
Benzo[a]pyrene	1	0	1	0.00	--	--	0.0787	0.0787
Benzo[b]fluoranthene	1	0	1	0.00	--	--	0.0787	0.0787
Benzo[ghi]perylene	1	0	1	0.00	--	--	0.0787	0.0787
Benzo[k]fluoranthene	1	0	1	0.00	--	--	0.0787	0.0787
Chrysene	1	0	1	0.00	--	--	0.0787	0.0787
Dibenz[a,h]anthracene	1	0	1	0.00	--	--	0.0787	0.0787
Fluoranthene	1	0	1	0.00	--	--	0.0787	0.0787
Fluorene	1	0	1	0.00	--	--	0.0787	0.0787
Indeno[1,2,3-cd]pyrene	1	0	1	0.00	--	--	0.0787	0.0787
Naphthalene	1	0	1	0.00	--	--	0.787	0.787
Phenanthrene	1	0	1	0.00	--	--	0.0787	0.0787
Pyrene	1	0	1	0.00	--	--	0.0787	0.0787
Radionuclides (pCi/g-fw)								
Strontium-90	11	0	11	0.00	--	--	-0.18	0.067
Technetium-99	2	0	2	0.00	--	--	-0.244	0.179
Thorium-228	11	0	11	0.00	--	--	-0.068	0.233
Thorium-230	11	2	9	0.18	0.291	0.344	-0.034	0.252
Thorium-232	11	0	11	0.00	--	--	-0.04	0.233
Uranium-233/234	12	0	12	0.00	--	--	0	0.077
Uranium-235	12	0	12	0.00	--	--	0	0.032
Uranium-238	12	1	11	0.08	0.234	0.234	0	0.077

-- = not applicable
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 5-17. Summary of Riparian Terrestrial Invertebrate Tissue Data Collected for the 100-B/C Pilot Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	6	6	0	1.00	74.2	271	--	--
Antimony	6	6	0	1.00	0.0133	0.0396	--	--
Arsenic	6	6	0	1.00	0.261	0.435	--	--
Barium	6	6	0	1.00	1.43	20.8	--	--
Beryllium	6	0	6	0.00	--	--	0.0075	0.0075
Cadmium	6	6	0	1.00	0.523	2.51	--	--
Chromium	6	6	0	1.00	0.253	0.846	--	--
Copper	6	6	0	1.00	11.7	34	--	--
Lead	6	6	0	1.00	0.0455	0.332	--	--
Manganese	6	6	0	1.00	8.34	41.1	--	--
Mercury	6	6	0	1.00	0.0218	0.0559	--	--
Nickel	6	6	0	1.00	0.107	0.515	--	--
Selenium	6	6	0	1.00	1.37	2.33	--	--
Silver	6	6	0	1.00	0.0261	0.118	--	--
Thallium	6	6	0	1.00	0.0301	0.0842	--	--
Uranium (inorganic)	6	4	2	0.67	0.0148	0.0392	0.0123	0.0123
Zinc	6	6	0	1.00	72.2	151	--	--

-- = not applicable
fw = fresh weight

Table 5-18. Summary of Riparian Terrestrial Invertebrate Tissue Data Collected for the 100-NR-2 Operable Unit.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Antimony	9	9	0	1.00	0.00452	0.0464	--	--
Arsenic	9	9	0	1.00	0.278	0.94	--	--
Barium	9	9	0	1.00	1.35	3.48	--	--
Cadmium	9	9	0	1.00	0.0406	0.979	--	--
Chromium	9	9	0	1.00	0.144	0.464	--	--
Lead	9	9	0	1.00	0.0243	2.16	--	--
Manganese	9	9	0	1.00	8.07	18.6	--	--
Mercury	9	9	0	1.00	0.012	0.0246	--	--
Nickel	9	9	0	1.00	0.0612	0.577	--	--
Selenium	9	9	0	1.00	0.0901	0.839	--	--
Uranium (inorganic)	9	9	0	1.00	0.00351	0.0144	--	--
Vanadium	9	9	0	1.00	0.0757	1.08	--	--
Zinc	9	9	0	1.00	31.3	79.6	--	--
Radionuclides (pCi/g-fw)								
Strontium-90	3	3	0	1.00	0.0511	6.28	--	--

-- = not applicable
fw = fresh weight

Table 5-19. Summary of Riparian Bird-Crop Contents Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	19	19	0	1.00	7	2,420	--	--
Antimony	19	6	13	0.32	0.24	1.3	0.21	2.2
Arsenic	19	11	8	0.58	0.48	1.8	0.41	3
Barium	19	19	0	1.00	0.65	36.1	--	--
Beryllium	19	7	12	0.37	0.02	0.11	0.01	0.03
Bismuth	19	0	19	0.00	--	--	0.38	2.6
Boron	19	15	4	0.79	0.48	12.7	0.38	0.78
Cadmium	19	11	8	0.58	0.09	0.76	0.05	0.2
Calcium	19	19	0	1.00	239	124,000	--	--
Calculated total uranium	3	0	3	0.00	--	--	<0.001	0.02
Chromium	19	12	7	0.63	0.22	4.5	0.28	0.65
Cobalt	19	3	16	0.16	0.16	0.94	0.08	0.7
Copper	19	19	0	1.00	1.6	14.4	--	--
Iron	19	19	0	1.00	33.8	2,830	--	--
Lead	19	1	18	0.05	0.72	0.72	0.32	1.6
Lithium	19	13	6	0.68	0.07	1.4	0.01	0.26
Magnesium	19	19	0	1.00	153	1,820	--	--
Manganese	19	19	0	1.00	3.2	225	--	--
Mercury	19	2	17	0.11	0.03	0.05	0.02	0.08
Molybdenum	19	16	3	0.84	0.19	16.8	0.63	0.83
Nickel	19	7	12	0.37	0.31	1.7	0.29	1.2
Phosphorus	19	19	0	1.00	192	1,930	--	--
Potassium	19	19	0	1.00	862	3,260	--	--
Selenium	19	13	6	0.68	0.66	2.2	0.41	2.4
Silicon	19	19	0	1.00	15.2	866	--	--
Silver	19	0	19	0.00	--	--	0.09	0.35
Sodium	19	19	0	1.00	524	2,550	--	--
Strontium (elemental)	19	19	0	1.00	1.1	119	--	--
Thallium	19	0	19	0.00	--	--	0.77	3.5
Tin	19	9	10	0.47	1.8	5.4	1.8	6.2
Titanium	7	7	0	1.00	0.82	7.5	--	--
Uranium (inorganic)	19	0	19	0.00	--	--	1.4	4.4
Vanadium	19	12	7	0.63	0.18	4.8	0.08	0.45

Table 5-19. Summary of Riparian Bird-Crop Contents Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Zinc	19	19	0	1.00	13.3	61.3	--	--
Zirconium	7	0	7	0.00	--	--	1.8	5.3
Radionuclides (pCi/g-fw)								
Strontium-90	4	0	4	0.00	--	--	-0.225	-0.033
Technetium-99	4	0	4	0.00	--	--	0.026	1.15
Uranium-233/234	3	0	3	0.00	--	--	0.071	0.107
Uranium-235	3	0	3	0.00	--	--	0	0.043
Uranium-238	3	0	3	0.00	--	--	0	0

-- = not available
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 5-20. Summary of Riparian Bird-Carcass Tissue Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	26	21	5	0.81	2.6	66	2.3	2.4
Antimony	26	3	23	0.12	0.21	0.43	0.2	0.43
Arsenic	26	4	22	0.15	0.39	0.66	0.37	0.6
Barium	26	26	0	1.00	0.13	2.3	--	--
Beryllium	26	10	16	0.38	0.01	0.02	0.009	0.02
Bismuth	26	0	26	0.00	--	--	0.36	0.5
Boron	26	5	21	0.19	0.24	0.46	0.23	0.36
Cadmium	26	9	17	0.35	0.05	0.27	0.05	0.07
Calcium	26	26	0	1.00	1,340	8,700	--	--
Calculated total uranium	26	1	25	0.04	2.51	2.51	-0.01	0.13
Chromium	26	26	0	1.00	0.17	1.7	--	--
Cobalt	26	0	26	0.00	--	--	0.07	0.14
Copper	26	26	0	1.00	2	14.3	--	--
Iron	26	26	0	1.00	29.1	197	--	--
Lead	26	1	25	0.04	0.33	0.33	0.29	0.33
Lithium	26	24	2	0.92	0.03	0.09	0.03	0.03
Magnesium	26	26	0	1.00	131	352	--	--
Manganese	26	26	0	1.00	0.5	3.3	--	--
Mercury	26	15	11	0.58	0.02	0.05	0.01	0.02
Molybdenum	26	10	16	0.38	0.16	0.25	0.15	0.28
Nickel	26	9	17	0.35	0.27	1	0.23	0.27
Phosphorus	26	26	0	1.00	1,960	5,820	--	--
Potassium	26	26	0	1.00	1,850	2,570	--	--
Selenium	26	26	0	1.00	1.1	2.2	--	--
Silicon	26	26	0	1.00	2.5	117	--	--
Silver	26	7	19	0.27	0.07	0.12	0.07	0.09
Sodium	26	26	0	1.00	1,030	2,020	--	--
Strontium (elemental)	26	26	0	1.00	0.76	6.8	--	--
Thallium	26	0	26	0.00	--	--	0.66	0.8
Tin	26	15	11	0.58	0.93	2.4	1	2
Titanium	10	10	0	1.00	0.08	0.28	--	--
Uranium (inorganic)	26	1	25	0.04	1.2	1.2	0.83	1.4
Vanadium	26	6	20	0.23	0.1	0.21	0.07	0.09
Zinc	26	26	0	1.00	14.6	69.7	--	--
Zirconium	10	0	10	0.00	--	--	0.83	0.86

Table 5-20. Summary of Riparian Bird-Carcass Tissue Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Organics (mg/kg-fw)								
1,2,4-Trichlorobenzene	3	0	3	0.00	--	--	1.7	3.2
1,2-Dichlorobenzene	3	0	3	0.00	--	--	1.7	3.2
1,3-Dichlorobenzene	3	0	3	0.00	--	--	1.7	3.2
1,4-Dichlorobenzene	3	0	3	0.00	--	--	1.7	3.2
2,4,5-Trichlorophenol	2	0	2	0.00	--	--	4.2	4.2
2,4,6-Trichlorophenol	2	0	2	0.00	--	--	1.7	1.7
2,4-Dichlorophenol	3	0	3	0.00	--	--	1.7	3.2
2,4-Dimethylphenol	2	0	2	0.00	--	--	1.7	1.7
2,4-Dinitrophenol	2	0	2	0.00	--	--	4.2	4.2
2,4-Dinitrotoluene	3	0	3	0.00	--	--	1.7	4
2,6-Dinitrotoluene	2	0	2	0.00	--	--	1.7	1.7
2-Chloronaphthalene	2	0	2	0.00	--	--	1.7	1.7
2-Chlorophenol	3	0	3	0.00	--	--	1.7	3.2
2-Methylnaphthalene	3	0	3	0.00	--	--	1.7	3.2
2-Methylphenol [cresol, o-]	3	0	3	0.00	--	--	1.7	3.2
2-Nitroaniline	2	0	2	0.00	--	--	4.2	4.2
2-Nitrophenol	2	0	2	0.00	--	--	1.7	1.7
3,3'-Dichlorobenzidine	2	0	2	0.00	--	--	1.7	1.7
3+4 Methylphenol [cresol, m+p]	2	0	2	0.00	--	--	1.7	1.7
3-Nitroaniline	2	0	2	0.00	--	--	4.2	4.2
4,6-Dinitro-2-methylphenol	3	0	3	0.00	--	--	4.2	10
4-Bromophenylphenyl ether	2	0	2	0.00	--	--	1.7	1.7
4-Chloro-3-methylphenol	3	0	3	0.00	--	--	1.7	3.2
4-Chloroaniline	3	0	3	0.00	--	--	1.7	3.2
4-Chlorophenylphenyl ether	3	0	3	0.00	--	--	1.7	4
4-Nitroaniline	3	0	3	0.00	--	--	4.2	10
4-Nitrophenol	2	0	2	0.00	--	--	4.2	4.2
Acenaphthene	2	0	2	0.00	--	--	1.7	1.7
Acenaphthylene	2	0	2	0.00	--	--	1.7	1.7
Aldrin	2	0	2	0.00	--	--	0.002	0.002
Alpha-BHC	2	0	2	0.00	--	--	0.002	0.002
alpha-Chlordane	2	0	2	0.00	--	--	0.002	0.002
Anthracene	2	0	2	0.00	--	--	1.7	1.7
Aroclor-1016	2	0	2	0.00	--	--	0.02	0.02
Aroclor-1221	2	0	2	0.00	--	--	0.02	0.02
Aroclor-1232	2	0	2	0.00	--	--	0.02	0.02
Aroclor-1242	2	0	2	0.00	--	--	0.02	0.02

Table 5-20. Summary of Riparian Bird-Carcass Tissue Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Aroclor-1248	2	0	2	0.00	--	--	0.02	0.02
Aroclor-1254	2	2	0	1.00	0.064	0.13	--	--
Aroclor-1260	2	0	2	0.00	--	--	0.02	0.02
Benzo[a]anthracene	2	0	2	0.00	--	--	1.7	1.7
Benzo[a]pyrene	2	0	2	0.00	--	--	1.7	1.7
Benzo[b]fluoranthene	2	0	2	0.00	--	--	1.7	1.7
Benzo[ghi]perylene	2	0	2	0.00	--	--	1.7	1.7
Benzo[k]fluoranthene	3	0	3	0.00	--	--	1.7	4
beta-1,2,3,4,5,6-Hexachlorocyclohexane	2	0	2	0.00	--	--	0.002	0.002
Bis[2-chloro-1-methylethyl]ether	2	0	2	0.00	--	--	1.7	1.7
Bis[2-Chloroethoxy]methane	2	0	2	0.00	--	--	1.7	1.7
Bis[2-chloroethyl] ether	3	0	3	0.00	--	--	1.7	3.2
Bis[2-ethylhexyl] phthalate	2	2	0	1.00	0.28	0.28	--	--
Butylbenzylphthalate	4	0	4	0.00	--	--	1.7	4
Carbazole	3	0	3	0.00	--	--	1.7	3.2
Chrysene	2	0	2	0.00	--	--	1.7	1.7
Delta-BHC	2	0	2	0.00	--	--	0.002	0.002
Dibenz[a,h]anthracene	2	0	2	0.00	--	--	1.7	1.7
Dibenzofuran	3	0	3	0.00	--	--	1.7	4
Dichlorodiphenyldichloroethane	2	2	0	1.00	0.0082	0.01	--	--
Dichlorodiphenyldichloroethylene	2	2	0	1.00	0.15	0.31	--	--
Dichlorodiphenyltrichloroethane	2	0	2	0.00	--	--	0.002	0.002
Dieldrin	2	0	2	0.00	--	--	0.002	0.002
Diethylphthalate	3	0	3	0.00	--	--	1.7	4
Dimethyl phthalate	2	0	2	0.00	--	--	1.7	1.7
Di-n-butylphthalate	2	0	2	0.00	--	--	1.7	1.7
Di-n-octylphthalate	2	0	2	0.00	--	--	1.7	1.7
Endosulfan I	2	1	1	0.50	0.011	0.011	0.002	0.002
Endosulfan II	2	0	2	0.00	--	--	0.002	0.002
Endosulfan sulfate	2	2	0	1.00	0.0075	0.01	--	--
Endrin	2	0	2	0.00	--	--	0.002	0.002
Endrin aldehyde	2	2	0	1.00	0.0055	0.0058	--	--
Endrin ketone	2	1	1	0.50	0.0023	0.0023	0.002	0.002
Fluoranthene	3	0	3	0.00	--	--	1.7	3.2
Fluorene	3	0	3	0.00	--	--	1.7	4
Gamma-BHC (lindane)	2	1	1	0.50	0.0038	0.0038	0.002	0.002
gamma-Chlordane	2	0	2	0.00	--	--	0.002	0.002

Table 5-20. Summary of Riparian Bird-Carcass Tissue Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Heptachlor	2	0	2	0.00	--	--	0.002	0.002
Heptachlor epoxide	2	0	2	0.00	--	--	0.002	0.002
Hexachlorobenzene	3	0	3	0.00	--	--	1.7	3.2
Hexachlorobutadiene	3	0	3	0.00	--	--	1.7	3.2
Hexachlorocyclopentadiene	3	0	3	0.00	--	--	1.7	3.2
Hexachloroethane	2	0	2	0.00	--	--	1.7	1.7
Indeno[1,2,3-cd]pyrene	2	0	2	0.00	--	--	1.7	1.7
Isophorone	2	0	2	0.00	--	--	1.7	1.7
Methoxychlor	2	2	0	1.00	0.0072	0.008	--	--
Naphthalene	3	0	3	0.00	--	--	1.7	3.2
Nitrobenzene	2	0	2	0.00	--	--	1.7	1.7
N-Nitroso-di-n-dipropylamine	2	0	2	0.00	--	--	1.7	1.7
N-Nitrosodiphenylamine	4	0	4	0.00	--	--	1.7	4
Pentachlorophenol	2	0	2	0.00	--	--	4.2	4.2
Phenanthrene	3	0	3	0.00	--	--	1.7	3.2
Phenol	3	0	3	0.00	--	--	1.7	3.2
Pyrene	2	0	2	0.00	--	--	1.7	1.7
Toxaphene	2	0	2	0.00	--	--	0.02	0.02
Radionuclides (pCi/g-fw)								
Americium-241	26	0	26	0.00	--	--	0.056	1.1
Antimony-125	26	0	26	0.00	--	--	0.15	1.6
Barium-133	10	0	10	0.00	--	--	0.061	0.69
Beryllium-7	26	0	26	0.00	--	--	0	6.4
Cesium-134	26	0	26	0.00	--	--	0.071	1.3
Cesium-137	26	0	26	0.00	--	--	0.062	0.94
Cobalt-60	26	0	26	0.00	--	--	0.064	1.1
Europium-152	26	0	26	0.00	--	--	0.15	1.6
Europium-154	26	0	26	0.00	--	--	0.19	3.6
Europium-155	26	0	26	0.00	--	--	0.1	1.3
Potassium-40	26	18	8	0.69	2.14	21.4	-0.004	8.3
Radium-226	26	2	24	0.08	0.803	2.02	0.124	1.8
Radium-228	26	0	26	0.00	--	--	0.269	4.6
Ruthenium-106	26	0	26	0.00	--	--	0.531	7.5
Strontium-90	26	2	24	0.08	0.19	0.376	-0.131	0.136
Technetium-99	4	0	4	0.00	--	--	-0.147	0.137
Thorium-228	26	0	26	0.00	--	--	-0.07	0.07
Thorium-230	26	3	23	0.12	0.195	0.301	-0.189	0.19
Thorium-232	26	0	26	0.00	--	--	-0.035	0.09

Table 5-20. Summary of Riparian Bird-Carcass Tissue Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (5 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Uranium-233/234	26	1	25	0.04	0.893	0.893	-0.02	0.065
Uranium-235	26	1	25	0.04	0.04	0.04	-0.004	0.034
Uranium-238	26	1	25	0.04	0.836	0.836	-0.003	0.045

-- = not applicable
BHC = benzene hexachloride
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 5-21. Summary of Riparian Mammal-Organ Tissue (Liver/Kidney) Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	27	11	16	0.41	1.8	6.5	1.7	2.9
Antimony	27	0	27	0.00	--	--	0.21	0.44
Arsenic	27	14	13	0.52	0.42	0.75	0.57	0.6
Barium	27	27	0	1.00	0.06	0.24	--	--
Beryllium	27	8	19	0.30	0.01	0.03	0.01	0.02
Bismuth	27	0	27	0.00	--	--	0.38	0.51
Boron	27	7	20	0.26	0.26	0.87	0.22	0.36
Cadmium	27	27	0	1.00	0.05	0.93	--	--
Calcium	27	27	0	1.00	63	145	--	--
Chromium	27	26	1	0.96	0.15	0.47	0.12	0.12
Cobalt	27	0	27	0.00	--	--	0.08	0.14
Copper	27	27	0	1.00	4.8	11.3	--	--
Iron	27	27	0	1.00	90	182	--	--
Lead	27	1	26	0.04	1	1	0.29	0.33
Lithium	27	15	12	0.56	0.03	0.16	0.03	0.03
Magnesium	27	27	0	1.00	111	245	--	--
Manganese	27	27	0	1.00	1.8	3	--	--
Mercury	27	11	16	0.41	0.02	0.13	0.01	0.03
Molybdenum	27	27	0	1.00	0.96	1.9	--	--
Nickel	27	1	26	0.04	0.26	0.26	0.22	0.27
Phosphorus	27	27	0	1.00	2,720	3,670	--	--
Potassium	27	27	0	1.00	2,300	3,200	--	--
Selenium	27	27	0	1.00	0.69	2.6	--	--
Silicon	27	27	0	1.00	2.6	17.9	--	--
Silver	27	3	24	0.11	0.09	0.17	0.07	0.09
Sodium	27	27	0	1.00	905	1,430	--	--
Strontium (elemental)	13	13	0	1.00	0.08	0.17	--	--
Thallium	27	0	27	0.00	--	--	0.65	0.79
Tin	27	13	14	0.48	1.1	2.6	1	1.1
Titanium	14	4	10	0.29	0.04	0.06	0.03	0.03
Uranium (inorganic)	27	2	25	0.07	1.4	1.4	0.82	1.4
Vanadium	27	0	27	0.00	--	--	0.08	0.09
Zinc	27	27	0	1.00	25.5	38.8	--	--
Zirconium	14	14	0	1.00	0.43	0.81	--	--

-- = not applicable
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 5-22. Summary of Riparian Mammal-Carcass Tissue Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (4 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	27	27	0	1.00	15.2	176	--	--
Antimony	27	0	27	0.00	--	--	0.21	0.43
Arsenic	27	7	20	0.26	0.4	0.57	0.39	0.6
Barium	27	27	0	1.00	0.54	4.1	--	--
Beryllium	27	0	27	0.00	--	--	0.01	0.02
Bismuth	27	0	27	0.00	--	--	0.38	0.5
Boron	27	21	6	0.78	0.35	2.2	0.34	0.36
Cadmium	27	2	25	0.07	0.05	0.05	0.05	0.07
Calcium	27	27	0	1.00	2,230	18,100	--	--
Calculated total uranium	27	1	26	0.04	2.87	2.87	0.0	0.20
Chromium	27	27	0	1.00	0.13	0.91	--	--
Cobalt	27	1	26	0.04	0.08	0.08	0.08	0.14
Copper	27	27	0	1.00	2	15.3	--	--
Iron	27	27	0	1.00	32.5	216	--	--
Lead	27	24	3	0.89	0.33	1.2	0.32	0.33
Lithium	27	3	24	0.11	0.05	0.09	0.03	0.16
Magnesium	27	27	0	1.00	121	788	--	--
Manganese	27	27	0	1.00	1	5.9	--	--
Mercury	27	5	22	0.19	0.02	0.03	0.01	0.02
Molybdenum	27	16	11	0.59	0.16	0.42	0.27	0.28
Nickel	27	23	4	0.85	0.24	2.8	0.23	0.26
Phosphorus	27	27	0	1.00	1,730	11,900	--	--
Potassium	27	27	0	1.00	731	3,540	--	--
Selenium	27	26	1	0.96	0.5	1.1	0.41	0.41
Silicon	27	27	0	1.00	18.9	76.1	--	--
Silver	27	0	27	0.00	--	--	0.07	0.09
Sodium	27	27	0	1.00	331	3,400	--	--
Strontium (elemental)	13	13	0	1.00	1.3	10.6	--	--
Thallium	27	0	27	0.00	--	--	0.66	0.79
Tin	27	11	16	0.41	1.1	1.5	0.63	3.4
Titanium	16	16	0	1.00	0.44	4.1	--	--
Uranium (inorganic)	27	6	21	0.22	0.87	1.5	0.83	1.4
Vanadium	27	9	18	0.33	0.08	0.14	0.08	0.09
Zinc	27	27	0	1.00	17.7	130	--	--

Table 5-22. Summary of Riparian Mammal-Carcass Tissue Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (4 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Zirconium	16	14	2	0.88	0.63	1.1	1	1
Organics (mg/kg-fw)								
Aroclor-1016	27	0	27	0.00	--	--	0.093	0.2
Aroclor-1221	27	0	27	0.00	--	--	0.093	0.2
Aroclor-1232	27	0	27	0.00	--	--	0.093	0.2
Aroclor-1242	27	0	27	0.00	--	--	0.093	0.2
Aroclor-1248	27	0	27	0.00	--	--	0.093	0.2
Aroclor-1254	27	0	27	0.00	--	--	0.093	0.2
Aroclor-1260	27	1	26	0.04	0.24	0.24	0.093	0.2
Benzo[a]anthracene	27	0	27	0.00	--	--	2.7	4.8
Benzo[a]pyrene	27	0	27	0.00	--	--	2.7	4.8
Benzo[b]fluoranthene	27	0	27	0.00	--	--	2.7	4.8
Benzo[ghi]perylene	27	1	26	0.04	0.22	0.22	2.7	4.8
Benzo[k]fluoranthene	27	0	27	0.00	--	--	2.7	4.8
beta-1,2,3,4,5,6-Hexachlorocyclohexane	27	0	27	0.00	--	--	0.015	0.02
Bis[2-chloro-1-methylethyl]ether	27	0	27	0.00	--	--	2.7	4.8
Bis[2-Chloroethoxy]methane	27	0	27	0.00	--	--	2.7	4.8
Bis[2-chloroethyl] ether	27	0	27	0.00	--	--	2.7	4.8
Bis[2-ethylhexyl] phthalate	27	16	11	0.59	0.23	14	0.54	3.3
Butylbenzylphthalate	27	0	27	0.00	--	--	2.7	4.8
Carbazole	27	0	27	0.00	--	--	2.7	4.8
Chrysene	27	0	27	0.00	--	--	2.7	4.8
Delta-BHC	27	9	18	0.33	0.016	0.04	0.015	0.02
Dibenz[a,h]anthracene	27	0	27	0.00	--	--	2.7	4.8
Dibenzofuran	27	0	27	0.00	--	--	2.7	4.8
Dichlorodiphenyldichloroethane	27	0	27	0.00	--	--	0.015	0.02
Dichlorodiphenyldichloroethylene	27	0	27	0.00	--	--	0.015	0.02
Dichlorodiphenyltrichloroethane	27	0	27	0.00	--	--	0.015	0.02
Dieldrin	27	0	27	0.00	--	--	0.015	0.02
Diethylphthalate	27	0	27	0.00	--	--	2.7	4.8
Dimethyl phthalate	27	0	27	0.00	--	--	2.7	4.8
Di-n-butylphthalate	27	8	19	0.30	0.18	0.39	2.7	4.8
Di-n-octylphthalate	27	10	17	0.37	0.3	0.74	2.7	4.3
Endosulfan I	27	0	27	0.00	--	--	0.015	0.02
Endosulfan II	27	0	27	0.00	--	--	0.015	0.02
Endosulfan sulfate	27	0	27	0.00	--	--	0.015	0.02
Endrin	27	0	27	0.00	--	--	0.015	0.02

Table 5-22. Summary of Riparian Mammal-Carcass Tissue Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (4 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Endrin aldehyde	27	0	27	0.00	--	--	0.015	0.02
Endrin ketone	27	0	27	0.00	--	--	0.015	0.02
Fluoranthene	27	0	27	0.00	--	--	2.7	4.8
Fluorene	27	0	27	0.00	--	--	2.7	4.8
Gamma-BHC (lindane)	27	0	27	0.00	--	--	0.015	0.02
gamma-Chlordane	27	0	27	0.00	--	--	0.015	0.02
Heptachlor	27	0	27	0.00	--	--	0.015	0.02
Heptachlor epoxide	27	0	27	0.00	--	--	0.015	0.02
Hexachlorobenzene	27	0	27	0.00	--	--	2.7	4.8
Hexachlorobutadiene	27	0	27	0.00	--	--	2.7	4.8
Hexachlorocyclopentadiene	27	0	27	0.00	--	--	2.7	4.8
Hexachloroethane	27	0	27	0.00	--	--	2.7	4.8
Indeno[1,2,3-cd]pyrene	27	0	27	0.00	--	--	2.7	4.8
Isophorone	27	0	27	0.00	--	--	2.7	4.8
Methoxychlor	27	0	27	0.00	--	--	0.015	0.02
Naphthalene	27	0	27	0.00	--	--	2.7	4.8
Nitrobenzene	26	0	26	0.00	--	--	2.7	4.8
N-Nitroso-di-n-dipropylamine	26	0	26	0.00	--	--	2.7	4.8
N-Nitrosodiphenylamine	26	0	26	0.00	--	--	2.7	4.8
Pentachlorophenol	27	0	27	0.00	--	--	6.8	12
Phenanthrene	27	0	27	0.00	--	--	2.7	4.8
Phenol	27	20	7	0.74	0.17	1.2	3.9	4.5
Pyrene	27	0	27	0.00	--	--	2.7	4.8
Toxaphene	27	0	27	0.00	--	--	0.15	0.2
Radionuclides (pCi/g-fw)								
Americium-241	27	0	27	0.00	--	--	0.046	2.2
Antimony-125	27	0	27	0.00	--	--	0.082	1.4
Beryllium-7	27	0	27	0.00	--	--	0	8.1
Carbon-14	5	0	5	0.00	--	--	-1.92	-0.106
Cesium-134	27	0	27	0.00	--	--	0.042	0.69
Cesium-137	27	0	27	0.00	--	--	0.037	0.65
Cobalt-60	27	0	27	0.00	--	--	0.04	0.64
Europium-152	27	0	27	0.00	--	--	0.092	1.5
Europium-154	27	0	27	0.00	--	--	0.113	1.8
Europium-155	27	0	27	0.00	--	--	0.073	1.4
Potassium-40	27	11	16	0.41	1.83	4.15	0	11
Radium-226	27	0	27	0.00	--	--	0.077	1.1
Radium-228	27	0	27	0.00	--	--	0.152	2.7

Table 5-22. Summary of Riparian Mammal-Carcass Tissue Data Collected at 18 Study and 7 Reference Sites for the RCBRA Project. (4 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Ruthenium-106	27	0	27	0.00	--	--	0.3	5.7
Strontium-90	27	0	27	0.00	--	--	-0.075	0.132
Technetium-99	2	0	2	0.00	--	--	0.067	0.155
Thorium-228	27	2	25	0.07	0.112	0.18	-0.07	0.186
Thorium-230	27	7	20	0.26	0.291	0.786	-0.136	0.567
Thorium-232	27	2	25	0.07	0.119	0.15	-0.042	0.084
Uranium-233/234	27	1	26	0.04	1.16	1.16	0	0.068
Uranium-235	27	0	27	0.00	--	--	0	0.034
Uranium-238	27	1	26	0.04	0.96	0.96	0	0.068

-- = not applicable
BHC = benzene hexachloride
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 5-23. Summary of Riparian Mammal-Organ (Brain or Liver) Tissue Data Collected for the 100-B/C Pilot Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw) in Liver								
Aluminum	5	4	1	0.80	0.512	1.27	0.366	0.366
Antimony	5	5	0	1.00	0.00732	0.0115	--	--
Arsenic	5	3	2	0.60	0.0824	0.195	0.0569	0.0569
Barium	8	5	3	0.63	0.0186	0.163	0.0229	0.0229
Beryllium	5	0	5	0.00	--	--	0.00538	0.00538
Cadmium	8	8	0	1.00	0.0423	0.117	--	--
Chromium	8	8	0	1.00	0.0871	0.195	--	--
Copper	5	5	0	1.00	4.07	5.72	--	--
Lead	8	1	7	0.13	1.54	1.54	0.00887	0.0512
Manganese	8	7	1	0.88	1.6	2.61	1.67	1.67
Mercury	8	8	0	1.00	0.00529	0.0271	--	--
Nickel	8	2	6	0.25	0.0201	0.0222	0.0128	0.0143
Selenium	8	8	0	1.00	1.09	2.51	--	--
Silver	5	0	5	0.00	--	--	0.0127	0.0127
Thallium	8	7	1	0.88	0.00222	0.0452	0.00143	0.00143
Uranium (inorganic)	8	0	8	0.00	--	--	0.000858	0.00884
Zinc	5	5	0	1.00	22	35.8	--	--
PCBs (mg/kg-fw) in Brain								
Aroclor-1254	5	0	5	0.00	--	--	0.0426	0.0625
Aroclor-1260	5	0	5	0.00	--	--	0.0426	0.0625

-- = not applicable
fw = fresh weight
PCB = polychlorinated biphenyl

Table 5-24. Summary of Riparian Mammal-Carcass Tissue Data Collected for the 100-B/C Pilot Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Barium	5	3	2	0.60	1.27	2.56	0.228	0.838
Cadmium	5	5	0	1.00	0.00818	0.0864	--	--
Chromium	5	5	0	1.00	0.137	0.255	--	--
Lead	5	4	1	0.80	0.0716	62.3	0.00902	0.00902
Manganese	5	4	1	0.80	1.89	4.04	1.3	1.3
Mercury	5	5	0	1.00	0.00727	0.0179	--	--
Nickel	5	3	2	0.60	0.346	0.591	0.0146	0.185
Selenium	5	3	2	0.60	0.424	2.1	0.331	0.36
Thallium	5	5	0	1.00	0.00231	0.00978	--	--
Uranium (inorganic)	5	4	1	0.80	0.000952	0.00326	0.000873	0.000873
Radionuclides (pCi/g-fw)								
Antimony-125	2	0	2	0.00	--	--	0.00176	0.00448
Beryllium-7	2	0	2	0.00	--	--	-0.163	0.139
Cesium-134	2	0	2	0.00	--	--	-0.00223	0.00834
Cesium-137	2	0	2	0.00	--	--	-0.0228	0.0203
Cobalt-60	2	0	2	0.00	--	--	0.00556	0.0121
Europium-152	2	0	2	0.00	--	--	-0.00082	0.0133
Europium-154	2	0	2	0.00	--	--	-0.0232	0.0102
Europium-155	2	0	2	0.00	--	--	-0.0124	0.00872
Potassium-40	2	2	0	1.00	2.63	3.3	--	--
Ruthenium-106	2	0	2	0.00	--	--	-0.0525	0.0305
Strontium-90	9	4	5	0.44	0.0524	0.0778	-0.00013	0.0445
Technetium-99	9	1	8	0.11	0.194	0.194	-0.0894	0.147

-- = not applicable
fw = fresh weight

Table 5-25. Summary of Riparian Mammal-Organ (Brain or Liver) Tissue Data Collected for the 100-NR-2 Operable Unit. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw) in Liver								
Antimony	6	6	0	1	0.00499	0.0176	--	--
Arsenic	6	6	0	1	0.458	0.675	--	--
Barium	6	6	0	1	0.011	0.0765	--	--
Cadmium	6	6	0	1	0.026	0.0922	--	--
Chromium	6	6	0	1	0.033	0.0675	--	--
Lead	6	6	0	1	0.04	13.6	--	--
Manganese	6	6	0	1	1.88	4.29	--	--
Mercury	6	6	0	1	0.00947	0.0243	--	--
Nickel	6	1	5	0.166667	0.0172	0.0172	0.016	0.016
Selenium	6	6	0	1	1.48	2.66	--	--
Uranium (inorganic)	6	0	6	0	--	--	0.00288	0.00288
Vanadium	6	0	6	0	--	--	0.0128	0.0128
Zinc	6	6	0	1	28.8	41.3	--	--
PCB Congeners (mg/kg-fw) in Brain								
1,1',2,3',4,4',5-Pentachlorobiphenyl	9	0	9	0	--	--	0.000585	0.000833
2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	9	0	9	0	--	--	0.000585	0.000833
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	9	1	8	0.111111	0.00114	0.00114	0.000585	0.000769
2,2',3,3',4,4',5,6-Octachlorobiphenyl	9	0	9	0	--	--	0.000585	0.000833
2,2',3,3',4,4',5-Heptachlorobiphenyl	9	0	9	0	--	--	0.000585	0.000833
2,2',3,3',4,4'-Hexachlorobiphenyl	9	0	9	0	--	--	0.000585	0.000833
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	9	0	9	0	--	--	0.000585	0.000833
2,2',3,4',5,5',6-Heptachlorobiphenyl	9	2	7	0.222222	0.000773	0.00164	0.000585	0.000833
2,2',3,4,4',5'-Hexachlorobiphenyl	9	5	4	0.555556	0.00127	0.00223	0.000645	0.000833
2,2',3,4,4',5,5'-Heptachlorobiphenyl	9	0	9	0	--	--	0.000585	0.000833
2,2',3,5'-Tetrachloro-1-1'-biphenyl	9	0	9	0	--	--	0.000585	0.000833
2,2',4,4',5,5',-Hexachlorobiphenyl	9	1	8	0.111111	0.000871	0.000871	0.000585	0.000833
2,2',4,5,5'-Pentachlorobiphenyl	9	0	9	0	--	--	0.000585	0.000833
2,2',5,5'-Tetrachlorobiphenyl	9	0	9	0	--	--	0.000585	0.000833
2,2',5-Trichlorobiphenyl	9	0	9	0	--	--	0.000585	0.000833
2,3',4,4'-Tetrachlorobiphenyl	9	1	8	0.111111	0.000769	0.000769	0.000585	0.000833
2,3,3',4,4'-Pentachlorobiphenyl	9	0	9	0	--	--	0.000585	0.000833
2,4'-Dichlorobiphenyl	9	0	9	0	--	--	0.000585	0.000833
2,4,4'-Trichlorobiphenyl	9	2	7	0.222222	0.00119	0.0012	0.000645	0.000833
3,3',4,4',5-Pentachlorobiphenyl	9	0	9	0	--	--	0.000585	0.00105
3,3',4,4'-Tetrachlorobiphenyl	9	6	3	0.666667	0.000948	0.00248	0.000585	0.000735

Table 5-25. Summary of Riparian Mammal-Organ (Brain or Liver) Tissue Data Collected for the 100-NR-2 Operable Unit. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Total PCB	9	9	0	1	0.0236	0.0306	--	--

-- = not applicable
fw = fresh weight
PCB = polychlorinated biphenyl

Table 5-26. Summary of Riparian Mammal-Carcass Tissue Data Collected for the 100-NR-2 Operable Unit.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Radionuclides (pCi/g-fw)								
Strontium-90	6	5	1	0.833	0.153	7.78	0.0106	0.0106
Technetium-99	6	4	2	0.667	0.0538	0.0749	0.0293	0.0435

fw = fresh weight

Table 5-27. Summary of Analytes that Did Not Meet Target Soil Practical Quantitation Limits in Riparian Samples.

Analyte	Performance Requirements [a]		Highest Nondetect Value	Consider as Uncertainty?	Reason
	Target PQL	Soil Ecological Protection Value			
Polycyclic Aromatic Hydrocarbons (mg/kg)					
Acenaphthene	0.1	0.1	0.67	Yes	Greater than target PQL and ecological protection level
Acenaphthylene	0.1	0.1	0.67	Yes	Greater than target PQL and ecological protection level
Fluorene	0.03	1.2	0.67	No	Greater than target PQL but less than ecological protection level
Naphthalene	0.1	0.1	0.67	Yes	Greater than target PQL and ecological protection level
Polychlorinated Biphenyls (mg/kg)					
Aroclor-1016	0.0165	0.65	0.018	No	Greater than target PQL but less than ecological protection level
Aroclor-1221	0.0165	0.65	0.018	No	Greater than target PQL but less than ecological protection level
Aroclor-1232	0.0165	0.65	0.018	No	Greater than target PQL but less than ecological protection level
Aroclor-1242	0.0165	0.65	0.018	No	Greater than target PQL but less than ecological protection level
Aroclor-1248	0.0165	0.65	0.018	No	Greater than target PQL but less than ecological protection level
Pesticides (mg/kg)					
Toxaphene	0.005	--	0.018	Yes	Greater than target PQL and no ecological protection level
Radionuclides (pCi/g)					
Cobalt-60	0.05	692	0.24	No	Greater than target PQL but less than ecological protection level
Europium-154	0.1	1,290	0.75	No	Greater than target PQL but less than ecological protection level
Semivolatile Organics (mg/kg)					
1,2-Dichlorobenzene	0.33	0.65	0.67	Yes	Greater than target PQL and ecological protection level
1,2,4-Trichlorobenzene	0.33	0.65	0.67	Yes	Greater than target PQL and ecological protection level
2,4,5-Trichlorophenol	0.33	4	1.7	No	Greater than target PQL but less than ecological protection level
2,4,6-Trichlorophenol	0.33	4	0.67	No	Greater than target PQL but less than ecological protection level
Dibenzofuran	0.33	6.1	0.67	No	Greater than target PQL but less than ecological protection level
Pentachlorophenol	0.33	0.32	1.7	Yes	Greater than target PQL and ecological protection level

= Exceeds soil ecological protection value.

[a] Values from Table 2-2 of DOE/RL-2005-42, 2006, *100 Area and 300 Area Component of the RCBRA Sampling and Analysis Plan,* Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

-- = not applicable
PQL = practical quantitation limit

Table 5-28. Summary of Analytes That Did Not Meet Target Tissue Practical Quantitation Limits in RCBRA Riparian Samples.

Analyte	Performance Requirements			Highest Nondetect Value						Consider as Uncertainty?	Reason
				Plants and Invertebrates		Vertebrates					
	Target PQL	Invertebrate and Plant Ecological Protection Value	Vertebrate Ecological Protection Value	Plant	Invertebrate	Bird Crop	Bird Carcass	Mouse Organ	Mouse Carcass		
Inorganics (mg/kg-fw)											
Antimony	0.6	0.39	1.27	2.4	0.67	2.2	Met target PQL	Met target PQL	Met target PQL	Yes	Greater than target PQL and ecological protection level
Arsenic	1	0.83	2.67	3.3	Met target PQL	3.0	Met target PQL	Met target PQL	Met target PQL	Yes	Greater than target PQL and ecological protection level
Beryllium	0.05	--	--	0.11	Met target PQL	Met target PQL	Met target PQL	Met target PQL	Met target PQL	Yes	Greater than target PQL and no ecological protection level
Chromium	0.2	23.7	45.4	0.37	0.48	0.65	All detects	Met target PQL	All detects	No	Greater than target PQL but less than ecological protection level
Lead	0.5	53.6	102	1.7	Met target PQL	1.6	Met target PQL	Met target PQL	Met target PQL	No	Greater than target PQL but less than ecological protection level
Silver	0.2	25.8	49.4	0.38	Met target PQL	Met target PQL	Met target PQL	0.35	Met target PQL	No	Greater than target PQL but less than ecological protection level
Tin	5	--	--	5.8	Met target PQL	6.2	Met target PQL	Met target PQL	Met target PQL	Yes	Greater than target PQL and no ecological protection level
Polychlorinated Biphenyls (mg/kg-fw)											
Aroclor-1016	0.0017	--	--	1.9	Not measured	Not measured	0.02	Not measured	0.2	Yes	Greater than target PQL and no ecological protection level
Aroclor-1221	0.0017	--	--	1.9	Not measured	Not measured	0.02	Not measured	0.2	Yes	Greater than target PQL and no ecological protection level
Aroclor-1232	0.0017	--	--	1.9	Not measured	Not measured	0.02	Not measured	0.2	Yes	Greater than target PQL and no ecological protection level
Aroclor-1242	0.0017	--	--	1.9	Not measured	Not measured	0.02	Not measured	0.2	Yes	Greater than target PQL and no ecological protection level
Aroclor-1248	0.0017	--	--	1.9	Not measured	Not measured	0.02	Not measured	0.2	Yes	Greater than target PQL and no ecological protection level
Aroclor-1254	0.0017	--	--	1.9	Not measured	Not measured	All detects	Not measured	0.2	Yes	Greater than target PQL and no ecological protection level
Aroclor-1260	0.0017	--	--	1.9	Not measured	Not measured	0.02	Not measured	0.2	Yes	Greater than target PQL and no ecological protection level
Pesticides (mg/kg-fw)											
Methoxychlor	0.017	--	--	0.24	Not measured	Not measured	All detects	Not measured	0.02	Yes	Greater than target PQL and no ecological protection level
Radionuclides (pCi/g-fw)											
Cesium-137	0.1	2,300	2,300	0.21	Not measured	Not measured	0.94	Not measured	0.65	No	Greater than target PQL but less than ecological protection level
Cobalt-60	0.05	55	55	0.27	Not measured	Not measured	1.1	Not measured	0.64	No	Greater than target PQL but less than ecological protection level
Europium-152	0.1	7.6	7.6	0.53	Not measured	Not measured	1.6	Not measured	1.5	No	Greater than target PQL but less than ecological protection level
Europium-154	0.1	--	--	0.73	Not measured	Not measured	3.6	Not measured	1.8	Yes	Greater than target PQL and no ecological protection level

= Exceeds ecological protection value.

[a] Values from Table 2-5 of DOE/RL-2005-42, 2006, *100 Area and 300 Area Component of the RCBRA Sampling and Analysis Plan,* Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

-- = not applicable
fw = fresh weight
PQL = practical quantitation limit

Table 5-29. Summary of Statistical Comparisons to Reference or Background for Riparian Soil Data Collected for the RCBRA Project. (9 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Background Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Inorganics (mg/kg)																					
Aluminum	98	98	4,560	11,700	40	40	7,560	11,800	0.999	0.977	1	--	--	0.065	0.608	1	--	--	No	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 3 tests
Antimony	93	5	[0.37]	[0.9]	40	10	[0.37]	0.83	--	--	1	0.003	Less	--	--	1	0.363	Equal	No	No	Not greater than reference, 0 of 2 tests; not greater than background, 0 of 2 tests
Arsenic	98	98	2.6	19.3	40	40	3.8	10	0.241	0.135	0.013	--	--	<0.001	<0.001	1	--	--	See Table 5-48	Yes	Greater than reference, 1 of 3 tests; greater than background, 2 of 3 tests
Barium	98	98	52.2	206	40	40	65.5	130	0.993	1	0.123	--	--	0.978	1	1	--	--	No	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 3 tests
Beryllium	98	95	0.01	0.81	40	40	0.25	0.51	0.023	0.165	0.25	--	--	1	1	1	0.136	Equal	See Table 5-48	Yes	Greater than reference, 1 of 3 tests; not greater than background, 0 of 4 tests
Bismuth	98	0	[0.58]	[1.8]	40	0	[0.58]	[0.78]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Boron	98	89	[0.28]	3.1	40	39	[0.36]	2.5	0.934	0.956	0.503	0.312	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 4 tests; no background data
Cadmium	98	98	0.35	2.9	40	40	0.37	1.9	0.073	0.024	<0.001	--	--	--	<0.001	1	--	--	See Table 5-48	Yes	Greater than reference, 2 of 3 tests; greater than background, 2 of 2 tests
Calcium	98	98	3,080	6,250	40	40	3,480	5,930	No test	No test	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Essential nutrient
Calculated total uranium	98	92	[0.312]	8.1	40	40	0.926	3.24	0.989	0.788	0.009	--	--	0.995	0.825	0.017	--	--	See Table 5-48	Yes	Greater than reference, 1 of 3 tests; greater than background, 1 of 3 tests
Chromium	98	98	11.5	190	40	40	14.8	32.4	0.001	<0.001	<0.001	--	--	<0.001	<0.001	<0.001	--	--	Yes	No	Greater than reference, 3 of 3 tests; greater than background, 3 of 3 tests
Cobalt	98	98	4.8	8.8	40	40	5.2	9.9	0.742	1	1	--	--	1	1	1	--	--	No	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 3 tests
Copper	98	98	16.7	75.7	40	40	15.6	52.2	0.275	0.447	0.503	--	--	<0.001	<0.001	<0.001	--	--	See Table 5-48	Yes	Not greater than reference, 0 of 3 tests; greater than background, 3 of 3 tests
Hexavalent chromium	96	24	[0.19]	[2]	40	11	[0.2]	[0.399]	--	0.664	0.078	0.929	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 3 tests; no background data
Iron	98	98	13,700	29,900	40	40	17,100	27,600	0.466	0.997	0.355	--	--	1	1	1	--	--	No	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 3 tests
Lead	98	98	13.3	125	40	40	14	101	0.016	0.135	0.71	--	--	<0.001	<0.001	<0.001	--	--	See Table 5-48	Yes	Greater than reference, 1 of 3 tests; greater than background, 3 of 3 tests

Table 5-29. Summary of Statistical Comparisons to Reference or Background for Riparian Soil Data Collected for the RCBRA Project. (9 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Background Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Lithium	98	98	4.8	14.5	40	40	8.4	13.8	0.996	0.788	0.355	--	--	--	0.995	1	--	--	See Table 5-48	Yes	Not greater than reference, 0 of 3 tests; greater than background, 1 of 2 tests
Magnesium	98	98	3,240	5,830	40	40	3,890	5,930	No test	No test	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	98	98	156	458	40	40	157	675	0.996	1	1	--	--	1	1	1	--	--	No	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 3 tests
Mercury	98	92	0.01	0.184	40	36	[0.02]	0.113	0.445	0.447	0.041	0.663	Equal	--	0.598	1	<0.001	Greater	See Table 5-48	Yes	Greater than reference, 1 of 4 tests; greater than background, 1 of 3 tests
Molybdenum	98	88	[0.197]	1.3	40	39	0.3	1.9	0.589	0.632	1	0.242	Equal	--	<0.001	1	<0.001	Greater	See Table 5-48	Yes	Not greater than reference, 0 of 4 tests; greater than background, 2 of 3 tests
Nickel	98	98	10.1	28.5	40	40	15.7	29.6	1	1	1	--	--	<0.001	0.002	1	--	--	See Table 5-48	Yes	Not greater than reference, 0 of 3 tests; greater than background, 3 of 3 tests
Phosphorus	98	98	575	1,180	40	40	548	1,030	0.365	0.27	0.175	--	--	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 3 tests; no background data
Potassium	98	98	531	1,770	40	40	643	1,230	No test	No test	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	98	3	[0.53]	[1.8]	40	5	[0.62]	1.2	--	--	1	0.08	Equal	--	--	1	0.406	Equal	No	No	Not greater than reference, 0 of 2 tests; not greater than background, 0 of 2 tests
Silicon	98	98	144	3,640	40	40	236	358	No test	No test	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Soil component, no test
Silver	98	8	[0.07]	[0.36]	40	1	[0.07]	0.12	--	--	0.126	0.4	Equal	--	1	1	<0.001	Less	No	No	Not greater than reference, 0 of 2 tests; not greater than background, 0 of 3 tests
Sodium	98	98	118	307	40	40	143	271	No test	No test	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	98	98	17.4	35.9	40	40	22.4	38.7	1	0.999	1	--	--	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 3 tests; no background data
Thallium	98	2	[0.81]	[3.2]	40	2	[0.81]	[1.1]	--	--	1	0.703	Equal	--	--	1	0.633	Equal	No	No	Not greater than reference, 0 of 2 tests; not greater than background, 0 of 2 tests
Tin	98	73	0.54	10.2	40	23	0.62	9.5	0.113	0.698	0.710	0.078	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 4 tests; no background data
Uranium (inorganic)	98	27	[1.3]	[15]	40	16	[1.3]	5	--	0.940	0.339	0.219	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 3 tests; no background data
Vanadium	98	98	27.6	89.4	40	40	33.9	78.4	0.212	0.394	0.175	--	--	0.996	1	1	--	--	No	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 3 tests
Zinc	98	98	106	621	40	40	93.2	336	0.016	0.053	<0.001	--	--	<0.001	<0.001	<0.001	--	--	See Table 5-48	Yes	Greater than reference, 2 of 3 tests; greater than background, 3 of 3 tests

Table 5-29. Summary of Statistical Comparisons to Reference or Background for Riparian Soil Data Collected for the RCBRA Project. (9 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Background Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Organics (mg/kg)																					
1,2,4-Trichlorobenzene	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
1,2-Dichlorobenzene	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
1,3-Dichlorobenzene	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
1,4-Dichlorobenzene	98	1	[0.02]	[0.66]	40	0	[0.33]	[0.67]	--	--	--	0.642	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 0 of 1 test; no background data
2,4,5-Trichlorophenol	98	0	[0.05]	[1.7]	40	0	[0.83]	[1.7]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
2,4,6-Trichlorophenol	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
2,4-Dichlorophenol	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
2,4-Dimethylphenol	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
2,4-Dinitrophenol	98	0	[0.05]	[1.7]	40	0	[0.83]	[1.7]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
2,4-Dinitrotoluene	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
2,6-Dinitrotoluene	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
2-Chloronaphthalene	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
2-Chlorophenol	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
2-Methylnaphthalene	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
2-Methylphenol [cresol, o-]	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
2-Nitroaniline	98	0	[0.05]	[1.7]	40	0	[0.83]	[1.7]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
2-Nitrophenol	98	1	[0.02]	[0.66]	40	0	[0.33]	[0.67]	--	--	--	0.642	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 0 of 1 test; no background data
3+4 Methylphenol [cresol, m+p]	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
3,3'-Dichlorobenzidine	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
3-Nitroaniline	98	0	[0.05]	[1.7]	40	0	[0.83]	[1.7]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
4,6-Dinitro-2-methylphenol	98	0	[0.05]	[1.7]	40	0	[0.83]	[1.7]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
4-Bromophenylphenyl ether	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
4-Chloro-3-methylphenol	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
4-Chloroaniline	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
4-Chlorophenylphenyl ether	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
4-Nitroaniline	98	0	[0.05]	[1.7]	40	0	[0.83]	[1.7]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected

Table 5-29. Summary of Statistical Comparisons to Reference or Background for Riparian Soil Data Collected for the RCBRA Project. (9 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Background Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
4-Nitrophenol	98	0	[0.05]	[1.7]	40	0	[0.83]	[1.7]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Acenaphthene	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Acenaphthylene	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Aldrin	98	4	[4e-006]	0.0023	40	2	0.00047	[0.0013]	--	--	0.382	0.826	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 2 tests; no background data
Alpha-BHC	98	3	[4e-006]	0.0027	40	0	[0.0013]	[0.0013]	--	--	--	0.634	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 0 of 1 test; no background data
Anthracene	98	1	[0.02]	[0.66]	40	0	[0.33]	[0.67]	--	--	--	0.642	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 0 of 1 test; no background data
Aroclor-1016	98	0	[0.013]	[0.018]	40	0	[0.013]	[0.013]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Aroclor-1221	98	0	[0.013]	[0.018]	40	0	[0.013]	[0.013]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Aroclor-1232	98	0	[0.013]	[0.018]	40	0	[0.013]	[0.013]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Aroclor-1242	98	0	[0.013]	[0.018]	40	0	[0.013]	[0.013]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Aroclor-1248	98	0	[0.013]	[0.018]	40	0	[0.013]	[0.013]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Aroclor-1254	98	1	0.0069	[0.018]	40	1	[0.013]	0.018	--	--	1	0.9	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 2 tests; no background data
Aroclor-1260	98	8	0.0021	[0.018]	40	0	[0.013]	[0.013]	--	--	--	0.144	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 0 of 1 test; no background data
Benzo[a]anthracene	98	5	0.017	[0.66]	40	0	[0.33]	[0.67]	--	--	--	0.341	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 0 of 1 test; no background data
Benzo[a]pyrene	98	9	0.017	[0.66]	40	0	[0.33]	[0.67]	--	--	--	0.109	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 0 of 1 test; no background data
Benzo[b]fluoranthene	98	8	0.017	[0.66]	40	0	[0.33]	[0.67]	--	--	--	0.144	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 0 of 1 test; no background data
Benzo[ghi]perylene	98	5	0.018	[0.66]	40	0	[0.33]	[0.67]	--	--	--	0.341	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 0 of 1 test; no background data
Benzo[k]fluoranthene	98	5	0.018	[0.66]	40	0	[0.33]	[0.67]	--	--	--	0.341	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 0 of 1 test; no background data
Bis[2-Chloroethoxy] methane	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Bis[2-chloro-1-methylethyl]ether	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Bis[2-chloroethyl] ether	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected

Table 5-29. Summary of Statistical Comparisons to Reference or Background for Riparian Soil Data Collected for the RCBRA Project. (9 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Background Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Bis[2-ethylhexyl] phthalate	98	96	0.017	0.8	40	36	0.018	[0.33]	0.066	0.016	0.036	0.105	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 2 of 4 tests; no background data
Butylbenzylphthalate	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Carbazole	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Chrysene	98	12	0.017	[0.66]	40	0	[0.33]	[0.67]	--	--	--	0.047	Greater	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 1 of 1 test; no background data
Delta-BHC	98	4	[4e-006]	0.0021	40	4	0.00097	0.0019	--	--	0.71	0.343	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 2 tests; no background data
Di-n-butylphthalate	98	47	0.0168	[0.66]	40	12	0.017	[0.67]	--	0.502	0.797	0.081	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 3 tests; no background data
Di-n-octylphthalate	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Dibenz[a,h]anthracene	98	2	0.017	[0.66]	40	0	[0.33]	[0.67]	--	--	--	0.900	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 0 of 1 test; no background data
Dibenzofuran	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Dichlorodiphenyl-dichloroethane	98	5	[4e-006]	0.0027	40	2	[0.0013]	0.0019	--	--	0.71	0.687	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 2 tests; no background data
Dichlorodiphenyl-dichloroethylene	98	47	[4e-006]	0.011	40	20	0.00067	0.00363	--	0.828	0.25	0.976	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 3 tests; no background data
Dichlorodiphenyl-trichloroethane	98	20	[4e-006]	0.013	40	6	0.00037	0.00153	--	--	0.058	0.619	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 2 tests; no background data
Dieldrin	98	3	[4e-006]	0.022	40	0	[0.0013]	[0.0013]	--	--	--	0.634	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 0 of 1 test; no background data
Diethylphthalate	98	21	0.017	[0.66]	40	3	0.02	[0.67]	--	--	0.512	0.087	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 2 tests; no background data
Dimethyl phthalate	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Endosulfan I	98	30	[4e-006]	0.011	40	13	0.00056	0.0051	--	0.447	0.250	0.988	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 3 tests; no background data
Endosulfan II	98	0	[4e-006]	[0.0018]	40	0	[0.0013]	[0.0013]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Endosulfan sulfate	98	4	[4e-006]	0.13	40	1	0.00043	[0.0013]	--	--	0.600	0.959	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 2 tests; no background data
Endrin	98	0	[4e-006]	[0.0018]	40	1	[0.0013]	0.0036	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Endrin aldehyde	98	4	[4e-006]	0.12	40	4	0.00037	0.0015	--	--	0.250	0.343	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 2 tests; no background data

Table 5-29. Summary of Statistical Comparisons to Reference or Background for Riparian Soil Data Collected for the RCBRA Project. (9 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Background Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Endrin ketone	98	0	[4e-006]	[0.0018]	40	0	[0.0013]	[0.0013]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Fluoranthene	98	5	[0.02]	[0.66]	40	0	[0.33]	[0.67]	--	--	--	0.341	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 0 of 1 test; no background data
Fluorene	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Gamma-BHC (lindane)	98	2	[4e-006]	0.0026	40	0	[0.0013]	[0.0013]	--	--	--	0.9	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 0 of 1 test; no background data
Heptachlor	98	0	[4e-006]	[0.0018]	40	1	0.00047	[0.0013]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Heptachlor epoxide	98	1	[4e-006]	[0.0018]	40	0	[0.0013]	[0.0013]	--	--	--	0.642	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 0 of 1 test; no background data
Hexachlorobenzene	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Hexachlorobutadiene	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Hexachlorocyclo-pentadiene	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Hexachloroethane	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Indeno[1,2,3-cd]pyrene	98	5	0.017	[0.66]	40	0	[0.33]	[0.67]	--	--	--	0.341	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 0 of 1 test; no background data
Isophorone	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Methoxychlor	98	4	[4e-006]	0.0022	40	4	[0.0013]	0.012	--	--	1	0.343	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 2 tests; no background data
N-Nitroso-di-n-dipropylamine	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
N-Nitrosodi-phenylamine	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Naphthalene	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Nitrobenzene	98	0	[0.02]	[0.66]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Pentachlorophenol	98	0	[0.05]	[1.7]	40	0	[0.83]	[1.7]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Phenanthrene	98	4	[0.02]	[0.66]	40	0	[0.33]	[0.67]	--	--	--	0.461	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 0 of 1 test; no background data
Phenol	98	44	0.0178	[0.66]	40	21	0.018	[0.67]	--	0.135	0.006	0.533	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 1 of 3 tests; no background data
Pyrene	98	15	0.017	[0.66]	40	0	[0.33]	[0.67]	--	--	--	0.020	Greater	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 1 of 1 test; no background data
Toxaphene	98	0	[4e-005]	[0.018]	40	0	[0.013]	[0.013]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected

Table 5-29. Summary of Statistical Comparisons to Reference or Background for Riparian Soil Data Collected for the RCBRA Project. (9 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Background Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
alpha-Chlordane	98	1	[4e-006]	[0.0018]	40	0	[0.0013]	[0.0013]	--	--	--	0.642	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 0 of 1 test; no background data
beta-1,2,3,4,5,6-Hexachlorocyclo-hexane	98	2	[4e-006]	0.0021	40	1	0.0006	[0.0013]	--	--	0.750	0.634	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 2 tests; no background data
gamma-Chlordane	98	3	[4e-006]	0.0046	40	7	0.00033	0.0027	--	--	0.710	0.009	Less	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 2 tests; no background data
Total organic carbon	26	26	1,530	16,500	8	8	5,550	19,000	No test	No test	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Soil property measurement
Radionuclides (pCi/g)																					
Americium-241	88	0	[0.031]	[0.91]	35	0	[0.056]	[0.55]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Antimony-125	30	0	[0.11]	[0.28]	10	0	[0.18]	[0.25]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Barium-133	15	0	[0.069]	[0.13]	5	0	[0.088]	[0.11]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Beryllium-7	15	0	[0.55]	[1.3]	5	0	[0.86]	[1.2]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Half-life
Carbon-14	10	3	[-1.86]	112	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	No reference data ; no background data
Cesium-134	98	0	[0.037]	[0.27]	40	0	[0.083]	[0.24]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Half-life
Cesium-137	98	75	0.068	2.69	40	18	[0.08]	[0.38]	--	<0.001	<0.001	<0.001	Greater	0.966	0.941	0.104	--	--	See Table 5-48	Yes	Greater than reference, 3 of 3 tests; not greater than background, 0 of 3 tests
Cobalt-60	98	0	[0.026]	[0.24]	40	0	[0.07]	[0.2]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Europium-152	98	16	[0.059]	[1.3]	40	0	[0.096]	[0.45]	--	--	--	0.015	Greater	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 1 of 1 test; no background data
Europium-154	98	0	[0.068]	[0.75]	40	0	[0.21]	[0.69]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Europium-155	98	1	[0.07]	[0.4]	40	0	[0.075]	[0.34]	--	--	--	0.642	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 0 of 1 test; no background data
Plutonium-238	0	0	No data	No data	10	0	[-0.032]	[0.073]	No test	No test	No test	No test	No test	No test	No test	No test	No test	No test	No	No	No operational area samples
Plutonium-239/240	0	0	No data	No data	10	0	[0]	[0.048]	No test	No test	No test	No test	No test	No test	No test	No test	No test	No test	No	No	No operational area samples
Potassium-40	98	94	[0.116]	31.2	40	40	6.7	16.6	No test	No test	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-226	98	97	0.314	2.03	40	39	[0.3]	1.2	No test	No test	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-228	98	88	0.473	2.85	40	38	0.522	2.43	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Background radionuclide
Ruthenium-106	15	0	[0.37]	[0.87]	5	0	[0.66]	[0.88]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Half-life
Strontium-90	98	1	[-0.34]	0.355	40	0	[-0.137]	[0.086]	--	--	--	0.642	Equal	--	1	0.778	--	--	See Table 5-48	Yes	Greater than reference, 0 of 1 test; not greater than background, 0 of 2 tests

Table 5-29. Summary of Statistical Comparisons to Reference or Background for Riparian Soil Data Collected for the RCBRA Project. (9 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Background Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Technetium-99	20	10	[-0.214]	1.43	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	No reference data; no background data
Thorium-228	98	74	[0.061]	2.03	40	34	[0.104]	1.04	No test	No test	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-230	98	47	[-0.132]	1.08	40	23	[-0.045]	0.567	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Background radionuclide
Thorium-232	98	75	[0.106]	2.31	40	33	[0.207]	1.08	No test	No test	No test	No test	No test	No test	No test	No test	No test	No test	No	No	Background radionuclide
Uranium-233/234	98	97	0.216	4.3	40	39	[0.17]	1.41	0.998	0.895	0.020	0.900	Equal	0.495	0.078	0.001	--	--	See Table 5-48	Yes	Greater than reference, 1 of 4 tests; greater than background, 1 of 3 tests
Uranium-235	98	3	[0]	[0.272]	40	1	[0]	[0.152]	--	--	1	0.703	Equal	--	1	1	<0.001	Less	No	No	Not greater than reference, 0 of 2 tests; not greater than background, 0 of 3 tests
Uranium-238	98	92	[0.1]	2.7	40	40	0.311	1.08	0.988	0.788	0.009	--	--	0.978	0.515	0.001	--	--	See Table 5-48	Yes	Greater than reference, 1 of 3 tests; greater than background, 1 of 3 tests
Anions (mg/kg)																					
Bromide	10	0	[2.48]	[2.5]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not detected
Chloride	36	35	[0.46]	26.1	8	8	1.55	12.8	0.352	0.171	0.078	--	--	0.697	1	1	--	--	No	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 3 tests
Fluoride	36	28	0.0742	10.1	8	5	0.137	1.44	0.140	0.171	0.102	0.652	Equal	1	0.152	1	<0.001	Less	No	No	Not greater than reference, 0 of 4 tests; not greater than background, 0 of 4 tests
Nitrogen in nitrate	124	122	0.0975	48.8	43	42	[0.443]	22.5	0.464	0.088	0.221	0.717	Equal	<0.001	<0.001	1	0.435	Equal	See Table 5-48	Yes	Not greater than reference, 0 of 4 tests; Greater than background, 2 of 4 tests
Nitrogen in nitrite	36	18	0.031	[1.24]	8	7	0.0653	0.806	0.549	0.855	0.795	0.123	Equal	--	<0.001	1	<0.001	Greater	See Table 5-48	Yes	Not greater than reference, 0 of 4 tests; greater than background, 2 of 3 tests
Nitrogen in nitrite and nitrate	98	98	0.36	52.6	34	34	0.92	9.9	0.254	0.013	0.001	--	--	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See Table 5-48	Yes	Greater than reference, 2 of 3 tests; no background data
Nitrogen in ammonia	26	26	0.158	16.8	8	8	2.57	12.9	0.98	0.874	0.765	--	--	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Not greater than reference, 0 of 3 tests; no background data
Nitrogen, Kjeldahl total	26	26	200	1,580	8	8	327	1,310	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Soil property measurement
Sulfate	36	36	2.67	73	8	8	3.82	41.9	0.729	0.548	0.818	--	--	0.397	1	1	--	Equal	No	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 3 tests
Physical Properties (%)																					
Cumulative percent retained on No. 100 screen	26	26	38.1	95.9	8	8	66.7	92.5	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Physical measurement
Cumulative percent retained on No. 16 screen	26	26	0	35.9	8	8	5.43	34.8	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Physical measurement

Table 5-29. Summary of Statistical Comparisons to Reference or Background for Riparian Soil Data Collected for the RCBRA Project. (9 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Background Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Cumulative percent retained on No. 200 screen	26	26	76.5	98.8	8	8	90.9	97.7	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Physical measurement
Cumulative percent retained on No. 30 screen	26	26	0.26	65.1	8	8	12.7	59.9	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Physical measurement
Cumulative percent retained on No. 50 screen	26	26	4.04	90.2	8	8	27	78.5	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Physical measurement
Cumulative percent retained on No. 8 screen	26	26	0	7.29	8	8	0	12.2	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Physical measurement
Fraction coarse sand	26	26	0.24	39.7	8	8	6.44	25.1	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Physical measurement
Fraction coarse silt/silt/clay (less than 0.074 mm)	26	26	1.25	23.5	8	8	2.32	9.1	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Physical measurement
Fraction fine sand	26	26	5.77	67.1	8	8	13.9	41.3	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Physical measurement
Fraction granules (greater than 2.38 mm)	26	26	0	7.29	8	8	0	12.2	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Physical measurement
Fraction medium sand	26	26	3.78	47.9	8	8	12.6	41.3	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Physical measurement
Fraction total sand	26	26	76.5	98.8	8	8	85.5	96.8	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Physical measurement
Fraction very coarse sand	26	26	0	35.9	8	8	5.43	22.6	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Physical measurement
Fraction very fine sand	26	26	2.45	38.4	8	8	4.98	25.7	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Physical measurement
Percent moisture (wet sample)	26	26	0.592	22.9	8	8	0.507	1.64	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Soil property measurement
Phosphate	10	0	[2.48]	[2.5]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No test	No test	No test	No test	No test	No	No	Not detected
Other																					
pH Measurement	26	26	6.62	7.85	8	8	6.8	7.65	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	No	Soil property measurement

[a] Study vs. reference or background.
[value] = nondetect
-- = not applicable
No bkg data = no background site data available
No ref data = no reference site data available
No test = no statistical test performed
BHC = benzene hexachloride
COPC = contaminant of potential concern
RCBRA = River Corridor Baseline Risk Assessment

Table 5-30. Summary of Statistical Comparisons to Reference or Background for Riparian Soil Data Collected for the 100-B/C Pilot Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Background Comparison					Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]		
Inorganics (mg/kg)																				
Aluminum	17	17	4,210	7,620	40	40	7,560	11,800	1	1	1	--	--	1	1	1	--	--	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 3 tests
Antimony	17	5	[0.286]	0.374	40	10	[0.37]	0.83	--	0.988	1	0.986	Equal	--	--	1	0.090	Equal	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 2 tests
Arsenic	17	17	2	12.5	40	40	3.8	10	0.906	0.937	0.298	--	--	0.005	0.078	1	0.298	Equal	See text	Not greater than reference, 0 of 3 tests; greater than background, 1 of 4 tests
Barium	17	17	47.4	134	40	40	65.5	130	1	0.909	0.298	--	--	0.999	0.883	1	--	--	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 3 tests
Beryllium	17	17	0.098	0.261	40	40	0.25	0.51	1	1	1	--	--	1	1	1	0.432	Equal	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 4 tests
Bismuth	17	0	[0.619]	[0.631]	40	0	[0.58]	[0.78]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Boron	17	17	0.394	1.3	40	39	[0.36]	2.5	0.989	1	1	0.656	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not greater than reference, 0 of 4 tests; no background data
Cadmium	17	16	[0.038]	1.7	40	40	0.37	1.9	0.999	0.992	1	--	--	--	--	1	<0.001	Greater	See text	Not greater than reference, 0 of 3 tests; greater than background, 1 of 2 tests
Calcium	17	17	2,030	4,520	40	40	3,480	5,930	No test	No test	No test	No test	No test	No test	No test	No test	No test	No test	No	Essential nutrient
Chromium	17	17	11.1	38.6	40	40	14.8	32.4	0.998	0.708	0.298	--	--	<0.001	0.001	0.1	--	--	See text	Not greater than reference, 0 of 3 tests; greater than background, 2 of 3 tests
Cobalt	17	17	3.2	7.4	40	40	5.2	9.9	1	1	1	--	--	1	1	1	--	--	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 3 tests
Copper	17	17	9.1	22.1	40	40	15.6	52.2	1	1	1	--	--	0.019	0.428	1	--	--	See text	Not greater than reference, 0 of 3 tests; greater than background, 1 of 3 tests
Iron	17	17	8,360	18,500	40	40	17,100	27,600	1	1	1	--	--	1	1	1	--	--	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 3 tests
Lead	17	17	6.1	33.2	40	40	14	101	0.997	1	1	--	--	<0.001	<0.001	1	--	--	See text	Not greater than reference, 0 of 3 tests; greater than background, 2 of 3 tests
Lithium	17	17	5.2	9.8	40	40	8.4	13.8	1	1	1	--	--	--	1	1	<0.001	Greater	See text	Not greater than reference, 0 of 3 tests; greater than background, 1 of 3 tests
Magnesium	17	17	2,660	4,710	40	40	3,890	5,930	No test	No test	No test	No test	No test	No test	No test	No test	No test	No test	No	Essential nutrient
Manganese	17	17	108	789	40	40	157	675	0.884	0.708	0.085	--	--	0.996	0.454	1	--	--	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 3 tests
Mercury	9	1	[0.014]	0.036	40	36	[0.02]	0.113	--	1	1	<0.001	Less	--	--	1	0.832	Equal	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 2 tests
Molybdenum	17	17	0.191	1.3	40	39	0.3	1.9	1	0.988	1	0.656	Equal	--	<0.001	1	<0.001	Greater	See text	Not greater than reference, 0 of 4 tests; greater than background, 2 of 3 tests

Table 5-30. Summary of Statistical Comparisons to Reference or Background for Riparian Soil Data Collected for the 100-B/C Pilot Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Background Comparison					Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]		
Nickel	17	17	10.1	19.1	40	40	15.7	29.6	1	1	1	--	--	0.050	0.895	1	0.181	Equal	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 4 tests
Phosphorus	17	17	443	1,140	40	40	548	1,030	0.838	0.184	0.298	--	--	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not greater than reference, 0 of 3 tests; no background data
Potassium	17	17	522	1,410	40	40	643	1,230	No test	No test	No test	No test	No test	No test	No test	No test	No test	No test	No	Essential nutrient
Selenium	17	7	[0.409]	1	40	5	[0.62]	1.2	--	0.055	1	0.038	Greater	--	--	1	<0.001	Greater	See text	Greater than reference, 1 of 3 tests; greater than background, 1 of 2 tests
Silicon	17	17	358	1,110	40	40	236	358	No test	No test	No test	No test	No test	No test	No test	No test	No test	No test	No	Soil component, no test
Silver	17	2	[0.076]	0.187	40	1	[0.07]	0.12	--	--	0.298	0.433	Equal	--	1	1	0.139	Equal	No	Not greater than reference, 0 of 2 tests; not greater than background, 0 of 3 tests
Sodium	17	17	73.7	139	40	40	143	271	No test	No test	No test	No test	No test	No test	No test	No test	No test	No test	No	Essential nutrient
Strontium (elemental)	17	17	15.7	25.4	40	40	22.4	38.7	1	1	1	--	--	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not greater than reference, 0 of 3 tests; no background data
Thallium	17	2	[0.695]	0.75	40	2	[0.81]	1.1	--	--	1	0.728	Equal	--	--	1	0.407	Equal	No	Not greater than reference, 0 of 2 tests; not greater than background, 0 of 2 tests
Tin	17	10	[0.486]	1.6	40	23	0.62	9.5	0.9898	1	1	0.841	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not greater than reference, 0 of 4 tests; no background data
Uranium (inorganic)	17	0	[1.3]	[1.33]	40	16	[1.3]	5	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Vanadium	17	17	18.8	35.7	40	40	33.9	78.4	1	1	1	--	--	1	1	1	--	--	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 3 tests
Zinc	17	17	45.2	236	40	40	93.2	336	0.999	1	1	--	--	<0.001	<0.001	1	--	--	See text	Not greater than reference, 0 of 3 tests; greater than background, 2 of 3 tests
Zirconium	17	17	2.9	10.6	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	1	1	1	0.106	Equal	No	No reference data; not greater than background, 0 of 4 tests
Organics (mg/kg)																				
1,2,4-Trichloro-benzene	3	0	[0.032]	[0.036]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
1,2-Dichloro-benzene	3	0	[0.022]	[0.025]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
1,3-Dichloro-benzene	3	0	[0.021]	[0.024]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
1,4-Dichloro-benzene	3	0	[0.025]	[0.028]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
2,4,5-Trichloro-phenol	3	0	[0.056]	[0.062]	40	0	[0.83]	[1.7]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
2,4,6-Trichloro-phenol	3	0	[0.058]	[0.064]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
2,4-Dichloro-phenol	3	0	[0.047]	[0.052]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
2,4-Dimethyl-phenol	3	0	[0.052]	[0.058]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
2,4-Dinitro-phenol	3	0	[0.12]	[0.13]	40	0	[0.83]	[1.7]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected

Table 5-30. Summary of Statistical Comparisons to Reference or Background for Riparian Soil Data Collected for the 100-B/C Pilot Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Background Comparison					Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]		
2,4-Dinitro-toluene	3	0	[0.033]	[0.036]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
2,6-Dinitro-toluene	3	0	[0.037]	[0.041]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
2-Chloro-naphthalene	3	0	[0.029]	[0.032]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
2-Chlorophenol	3	0	[0.025]	[0.028]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
2-Methyl-naphthalene	3	0	[0.027]	[0.03]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
2-Methylphenol [cresol, o-]	3	0	[0.036]	[0.04]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
2-Nitroaniline	3	0	[0.07]	[0.077]	40	0	[0.83]	[1.7]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
2-Nitrophenol	3	0	[0.036]	[0.04]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
3,3'-Dichloro-benzidine	3	0	[0.042]	[0.047]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
3-Nitroaniline	3	0	[0.048]	[0.053]	40	0	[0.83]	[1.7]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
4,6-Dinitro-2-methylphenol	3	0	[0.11]	[0.13]	40	0	[0.83]	[1.7]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
4-Bromophenyl-phenyl ether	3	0	[0.041]	[0.046]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
4-Chloro-3-methylphenol	3	0	[0.049]	[0.055]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
4-Chloroaniline	3	0	[0.056]	[0.063]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
4-Chlorophenyl-phenyl ether	3	0	[0.033]	[0.037]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
4-Methylphenol [cresol, p-]	3	0	[0.093]	[0.1]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
4-Nitroaniline	3	0	[0.04]	[0.045]	40	0	[0.83]	[1.7]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
4-Nitrophenol	3	0	[0.078]	[0.087]	40	0	[0.83]	[1.7]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Acenaphthene	3	0	[0.03]	[0.034]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Acenaphthylene	3	0	[0.03]	[0.034]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Anthracene	3	0	[0.033]	[0.037]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Benzo[a]anthra-cene	3	0	[0.042]	[0.047]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Benzo[a]pyrene	3	0	[0.036]	[0.04]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Benzo[b]fluor-anthene	3	0	[0.071]	[0.079]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Benzo[ghi]-perylene	3	0	[0.19]	[0.21]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Benzo[k]fluor-anthene	3	0	[0.036]	[0.04]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Bis[2-Chloro-ethoxy]methane	3	0	[0.038]	[0.042]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected

Table 5-30. Summary of Statistical Comparisons to Reference or Background for Riparian Soil Data Collected for the 100-B/C Pilot Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Background Comparison					Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]		
Bis[2-chloro-1-methylethyl]-ether	3	0	[0.028]	[0.031]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Bis[2-chloro-ethyl] ether	3	0	[0.025]	[0.027]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Bis[2-ethylhexyl] phthalate	3	2	[0.07]	0.16	40	36	0.018	[0.33]	0.073	0.084	0.077	0.778	Equal	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not greater than reference, 0 of 4 tests; no background data
Butylbenzyl-phthalate	3	0	[0.048]	[0.053]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Carbazole	3	0	[0.037]	[0.041]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Chrysene	3	0	[0.026]	[0.029]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Di-n-butylphthalate	3	0	[0.051]	[0.057]	40	12	0.017	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Di-n-octylphthalate	3	0	[0.26]	[0.29]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Dibenz[a,h]-anthracene	3	0	[0.15]	[0.17]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Dibenzofuran	3	0	[0.041]	[0.046]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Diethylphthalate	3	0	[0.075]	[0.084]	40	3	0.02	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Dimethyl phthalate	3	0	[0.036]	[0.04]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Fluoranthene	3	0	[0.042]	[0.047]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Fluorene	3	0	[0.035]	[0.039]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Hexachloro-benzene	3	0	[0.033]	[0.036]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Hexachloro-butadiene	3	0	[0.023]	[0.025]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Hexachlorocy-clopentadiene	3	0	[0.13]	[0.15]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Hexachloro-ethane	3	0	[0.03]	[0.033]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Indeno[1,2,3-cd]pyrene	3	0	[0.031]	[0.035]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Isophorone	3	0	[0.034]	[0.038]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
N-Nitroso-di-n-dipropylamine	3	0	[0.036]	[0.04]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
N-Nitrosodi-phenylamine	3	0	[0.038]	[0.043]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Naphthalene	3	0	[0.027]	[0.03]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Nitrobenzene	3	0	[0.033]	[0.037]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Pentachloro-phenol	3	0	[0.22]	[0.24]	40	0	[0.83]	[1.7]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Phenanthrene	3	0	[0.03]	[0.033]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected

Table 5-30. Summary of Statistical Comparisons to Reference or Background for Riparian Soil Data Collected for the 100-B/C Pilot Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Background Comparison					Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]		
Phenol	3	0	[0.16]	[0.18]	40	21	0.018	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Pyrene	3	0	[0.041]	[0.046]	40	0	[0.33]	[0.67]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Radionuclides (pCi/g)																				
Antimony-125	16	0	[-0.327]	[0.057]	10	0	[0.18]	[0.25]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Beryllium-7	16	0	[-0.556]	[0.789]	5	0	[0.86]	[1.2]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Half-life
Carbon-14	6	0	[0.0527]	[0.563]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Cesium-134	16	0	[-0.0119]	[0.0968]	40	0	[0.083]	[0.24]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Half-life
Cesium-137	16	10	[0.0329]	1.37	40	18	[0.08]	[0.38]	--	0.156	0.005	0.375	Equal	0.998	0.982	1	--	--	See text	Greater than reference, 1 of 3 tests; not greater than background, 0 of 3 tests
Cobalt-60	16	0	[-0.0329]	[0.11]	40	0	[0.07]	[0.2]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Europium-152	16	0	[-0.0895]	[0.547]	40	0	[0.096]	[0.45]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Europium-154	16	0	[-0.223]	[0.0644]	40	0	[0.21]	[0.69]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Europium-155	16	0	[0.00649]	[0.149]	40	0	[0.075]	[0.34]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Nickel-63	6	0	[2.27]	[6.88]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Plutonium-238	12	0	[-0.000408]	[0.000892]	10	0	[-0.032]	[0.073]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Plutonium-239/240	12	11	[0.000768]	0.0131	10	0	[0]	[0.048]	--	0.068	--	<0.001	Greater	0.805	0.949	1	--	--	See text	Greater than reference, 1 of 2 tests; not greater than background, 0 of 3 tests
Potassium-40	16	16	11.7	18.2	40	40	6.7	16.6	No test	No test	No test	No test	No test	No test	No test	No test	No test	No test	No	Background radionuclide
Ruthenium-106	16	0	[-0.469]	[0.486]	5	0	[0.66]	[0.88]	No test	No test	No test	No test	No test	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Half-life
Strontium-90	16	11	[0.0297]	0.196	40	0	[-0.137]	[0.086]	--	<0.001	--	<0.001	Greater	0.916	0.920	1	--	--	See text	Greater than reference sites, 2 of 2 tests; not greater than background, 0 of 3 tests
Technetium-99	12	2	[-0.0602]	1.99	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See text	No reference data; no background data

[a] Study vs. reference or background.

[value] = nondetect
-- = not applicable
No bkg data = no background site data available
No ref data = no reference site data available
No test = no statistical test performed

Table 5-31. Summary of Statistical Comparisons to Reference or Background for Riparian Soil Data Collected for the 100-NR-2 Project. (2 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Background Comparison					Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]		
Inorganics (mg/kg)																				
Antimony	23	23	0.0506	0.241	40	10	[0.37]	0.83	--	0.978	1	<0.001	Greater	--	<0.001	1	<0.001	Greater	See text	Greater than reference, 1 of 3 tests; greater than background, 2 of 3 tests
Arsenic	23	23	1.6	12.9	40	40	3.8	10	1	0.461	0.130	--	--	0.955	0.281	1	0.186	Equal	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 4 tests
Barium	23	23	48.2	155	40	40	65.5	130	1	0.987	0.365	--	--	1	0.867	1	--	--	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 3 tests
Cadmium	23	23	0.0898	2.13	40	40	0.37	1.9	1	0.987	0.130	--	--	--	--	1	<0.001	Greater	See text	Not greater than reference, 0 of 3 tests; greater than background, 1 of 2 tests
Chromium	23	23	10.8	52.7	40	40	14.8	32.4	0.962	0.461	0.130	--	--	<0.001	<0.001	0.131	--	--	See text	Not greater than reference, 0 of 3 tests; greater than background, 2 of 3 tests
Lead	23	23	3.6	96.5	40	40	14	101	1	0.716	1	--	--	0.003	0.004	0.131	--	--	See text	Not greater than reference, 0 of 3 tests; greater than background, 2 of 3 tests
Manganese	23	23	207	736	40	40	157	675	0.149	0.978	0.365	--	--	0.521	0.882	1	--	--	No	Not greater than reference, 0 of 3 tests; not greater than background, 0 of 3 tests
Mercury	23	23	0.0002	0.0604	40	36	[0.02]	0.113	1	1	1	0.303	Equal	--	0.701	1	<0.001	Greater	See text	Not greater than reference, 0 of 4 tests; greater than background, 1 of 3 tests
Nickel	23	23	11.1	32.2	40	40	15.7	29.6	0.995	0.931	0.365	--	--	<0.001	0.005	0.131	0.272	Equal	See text	Not greater than reference, 0 of 3 tests; greater than background, 2 of 4 tests
Selenium	23	6	[0.2]	0.516	40	5	[0.62]	1.2	--	--	1	0.306	Equal	--	--	1	0.010	Greater	See text	Not greater than reference, 0 of 2 tests; greater than background, 1 of 2 tests
Uranium (inorganic)	23	23	0.54	6.22	40	16	[1.3]	5	--	0.461	0.045	<0.001	Greater	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See text	Greater than reference, 2 of 3 tests; no background data
Vanadium	23	23	29.1	69.4	40	40	33.9	78.4	0.002	0.039	1	--	--	0.466	1	1	--	--	See text	Greater than reference, 2 of 3 tests; not greater than background, 0 of 3 tests
Zinc	23	23	38	453	40	40	93.2	336	1	0.978	0.130	--	--	<0.001	<0.001	0.016	--	--	See text	Not greater than reference, 0 of 3 tests; greater than background, 3 of 3 tests
Organics (mg/kg)																				
1,1'-Biphenyl,2,3',4,4',5-pentachloro-	13	2	[0.000097]	[0.000111]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See text	No reference data; no background data
2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	13	0	[0.000097]	[0.000111]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	13	3	[0.000097]	0.00016	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See text	No reference data; no background data
2,2',3,3',4,4',5,6-Octachlorobiphenyl	13	1	[0.000097]	[0.000111]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See text	No reference data; no background data
2,2',3,3',4,4',5-Heptachlorobiphenyl	13	2	[0.000097]	0.000193	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See text	No reference data; no background data
2,2',3,3',4,4'-Hexachlorobiphenyl	13	1	[0.000097]	[0.000111]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See text	No reference data; no background data

Table 5-31. Summary of Statistical Comparisons to Reference or Background for Riparian Soil Data Collected for the 100-NR-2 Project. (2 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Background Comparison					Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]		
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	13	2	[0.000097]	0.000158	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See text	No reference data; no background data
2,2',3,4',5,5',6-Heptachlorobiphenyl	13	9	[0.000098]	0.000308	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See text	No reference data; no background data
2,2',3,4,4',5'-Hexachlorobiphenyl	13	11	[0.000101]	0.000622	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See text	No reference data; no background data
2,2',3,4,4',5,5'-Heptachlorobiphenyl	13	0	[0.000097]	[0.000111]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
2,2',3,5'-Tetrachloro-1-1'-biphenyl	13	1	[0.000097]	0.000277	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See text	No reference data; no background data
2,2',4,4',5,5',-Hexachloro-Biphenyl	13	8	[0.000102]	0.000378	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See text	No reference data; no background data
2,2',4,5,5'-Pentachlorobiphenyl	13	1	[0.000097]	0.00114	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See text	No reference data; no background data
2,2',5,5'-Tetrachlorobiphenyl	13	1	[0.000097]	0.000138	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See text	No reference data; no background data
2,2',5-Trichlorobiphenyl	13	0	[0.000097]	[0.000111]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
2,3',4,4'-Tetrachlorobiphenyl	13	1	[0.000097]	0.00122	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See text	No reference data; no background data
2,3,3',4,4'-Pentachlorobiphenyl	13	3	[0.000097]	0.000686	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See text	No reference data; no background data
2,4'-Dichlorobiphenyl	13	1	[0.000097]	0.000194	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See text	No reference data; no background data
2,4,4'-Trichlorobiphenyl	13	0	[0.000097]	[0.000111]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
3,3',4,4',5-Pentachlorobiphenyl	13	0	[0.000097]	[0.000111]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
3,3',4,4'-Tetrachlorobiphenyl	13	0	[0.000097]	[0.000111]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected
Total PCB	13	13	0.00369	0.01	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See text	No reference data; no background data
Total petroleum hydrocarbons - diesel range	2	1	[0.94]	570	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	See text	No reference data; no background data
Radionuclides (pCi/g)																				
Strontium-90	23	3	[-0.0503]	5.37	40	0	[-0.137]	[0.086]	--	--	--	0.084	Equal	--	0.999	0.451	--	--	See text	Not greater than reference, 0 of 1 tests; greater than background, 0 of 3 tests
Technetium-99	21	0	[-0.397]	[0.403]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No bkg data	No bkg data	No bkg data	No bkg data	No bkg data	No	Not detected

[a] Study vs. reference or background.

[value] = nondetect
-- = not applicable
No bkg data = no background site data available
No ref data = no reference site data available
No test = no statistical test performed
PCB = polychlorinated biphenyl

Table 5-32. Summary of Statistical Comparisons to Reference for Riparian Plant Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Inorganics (mg/kg-fw)																
Aluminum	36	27	[1.7]	296	16	10	[1.7]	470	0.632	0.965	1	0.557	Equal	No	No	Not greater than reference, 0 of 4 tests
Antimony	36	4	[0.21]	[2.4]	16	2	[0.3]	0.6	--	--	1	0.745	Equal	No	No	Not greater than reference, 0 of 2 tests
Arsenic	36	0	[0.39]	[3.3]	16	1	[0.39]	0.84	No test	No test	No test	No test	No test	No	No	Not detected
Barium	36	36	1.3	26	16	16	1.3	12	0.106	0.111	0.026	--	--	See Table 5-48	Yes	Greater than reference, 1 of 3 tests
Beryllium	36	1	[0.01]	[0.11]	16	2	[0.01]	0.03	--	--	1	0.457	Equal	No	No	Not greater than reference, 0 of 2 tests
Bismuth	36	0	[0.38]	[2.7]	16	0	[0.31]	[0.5]	No test	No test	No test	No test	No test	No	No	Not detected
Boron	36	33	0.31	39.7	16	16	0.36	25.5	0.235	0.264	0.475	--	--	No	No	Not greater than reference, 0 of 3 tests
Cadmium	36	3	[0.03]	1.1	16	2	[0.03]	[0.07]	--	--	0.258	0.969	Equal	No	No	Not greater than reference, 0 of 2 tests
Calcium	36	36	261	13,200	16	16	235	8,170	No test	No test	No test	No test	No test	No	No	Essential nutrient
Calculated total uranium	36	1	[-0.0119]	0.984	16	0	[0]	[0.155]	--	0.341	0.8	0.674	Equal	No	No	Not greater than reference, 0 of 3 tests
Chromium	36	23	0.1	3	16	9	[0.14]	1.3	0.170	0.111	0.218	0.831	Equal	No	No	Not greater than reference, 0 of 4 tests
Cobalt	36	2	[0.08]	[0.75]	16	3	[0.09]	0.32	--	--	0.628	0.327	Equal	No	No	Not greater than reference, 0 of 2 tests
Copper	36	32	[0.95]	9.8	16	16	1.3	3.4	0.282	0.016	0.016	--	--	See Table 5-48	Yes	Greater than reference, 2 of 3 tests
Iron	36	21	[10.6]	604	16	12	[16.8]	850	0.757	0.860	1	0.401	Equal	No	No	Not greater than reference, 0 of 4 tests
Lead	36	5	[0.27]	[1.7]	16	5	[0.27]	1.7	--	0.965	1	0.278	Equal	No	No	Not greater than reference, 0 of 3 tests
Lithium	36	19	0.03	0.37	16	9	0.03	0.62	0.680	0.860	1	0.945	Equal	No	No	Not greater than reference, 0 of 4 tests
Magnesium	36	36	167	3,070	16	16	164	1,670	No test	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	36	36	3	53.8	16	16	2.3	34.8	0.421	0.636	0.323	--	--	No	No	Not greater than reference, 0 of 3 tests
Mercury	36	0	[0.01]	[0.08]	16	0	[0.01]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Molybdenum	36	16	[0.15]	1.7	16	11	[0.13]	0.96	--	0.965	0.41	0.187	Equal	No	No	Not greater than reference, 0 of 3 tests
Nickel	36	32	0.26	8.4	16	13	[0.18]	2.1	0.247	0.111	0.096	0.761	Equal	No	No	Not greater than reference, 0 of 4 tests
Phosphorus	36	36	282	7,260	16	16	335	1,560	0.014	0.077	0.026	--	--	See Table 5-48	Yes	Greater than reference, 2 of 3 tests
Potassium	36	36	2,940	32,200	16	16	3,800	7,640	No test	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	36	1	[0.35]	[2.5]	16	4	[0.36]	1.1	--	--	1	0.046	Less	No	No	Not greater than reference, 0 of 2 tests
Silicon	36	36	61.4	832	16	16	66.5	437	No test	No test	No test	No test	No test	No	No	Soil Component, no test
Silver	36	1	[0.07]	[0.38]	16	1	[0.07]	0.15	--	--	1	0.857	Equal	No	No	Not greater than reference, 0 of 2 tests
Sodium	36	20	6.8	63.5	16	8	[8.6]	52.6	No test	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	36	36	1.2	48.7	16	16	1.1	28.4	0.197	0.111	0.323	--	--	No	No	Not greater than reference, 0 of 3 tests
Thallium	36	0	[0.54]	[3.8]	16	0	[0.54]	[0.69]	No test	No test	No test	No test	No test	No	No	Not detected
Tin	36	1	[1]	[5.8]	16	1	[1]	[2.4]	--	--	0.520	0.857	Equal	No	No	Not greater than reference, 0 of 2 tests
Titanium	20	20	1.1	23	10	10	2.7	32.9	0.604	0.924	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Uranium (inorganic)	36	4	[0.85]	6.3	16	0	[0.84]	[2.4]	--	--	--	0.410	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Vanadium	36	10	[0.08]	0.95	16	8	[0.09]	1.7	--	0.965	1	0.215	Equal	No	No	Not greater than reference, 0 of 3 tests
Zinc	36	36	5.9	72.6	16	16	5.3	24.8	0.048	0.016	0.016	--	--	Yes	No	Greater than reference sites, 3 of 3 tests
Zirconium	20	0	[1]	[5.7]	10	0	[1]	[1]	No test	No test	No test	No test	No test	No	No	Not detected

Table 5-32. Summary of Statistical Comparisons to Reference for Riparian Plant Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Organics (mg/kg-fw)																
1,2,4-Trichlorobenzene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
1,2-Dichlorobenzene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
1,3-Dichlorobenzene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
1,4-Dichlorobenzene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
2,4,5-Trichlorophenol	34	0	[5]	[180]	15	0	[8.6]	[50]	No test	No test	No test	No test	No test	No	No	Not detected
2,4,6-Trichlorophenol	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dichlorophenol	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dimethylphenol	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrophenol	34	0	[5]	[180]	15	0	[8.6]	[50]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrotoluene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
2,6-Dinitrotoluene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
2-Chloronaphthalene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
2-Chlorophenol	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
2-Methylnaphthalene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
2-Methylphenol [cresol, o-]	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
2-Nitroaniline	34	0	[5]	[180]	15	0	[8.6]	[50]	No test	No test	No test	No test	No test	No	No	Not detected
2-Nitrophenol	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
3+4 Methylphenol [cresol, m+p]	34	4	0.11	[74]	15	0	[3.4]	[20]	--	--	--	0.412	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
3,3'-Dichlorobenzidine	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
3-Nitroaniline	34	0	[5]	[180]	15	0	[8.6]	[50]	No test	No test	No test	No test	No test	No	No	Not detected
4,6-Dinitro-2-methylphenol	34	0	[5]	[180]	15	0	[8.6]	[50]	No test	No test	No test	No test	No test	No	No	Not detected
4-Bromophenylphenyl ether	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chloro-3-methylphenol	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chloroaniline	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chlorophenylphenyl ether	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
4-Nitroaniline	34	0	[5]	[180]	15	0	[8.6]	[50]	No test	No test	No test	No test	No test	No	No	Not detected
4-Nitrophenol	34	0	[5]	[180]	15	0	[8.6]	[50]	No test	No test	No test	No test	No test	No	No	Not detected
Acenaphthene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Acenaphthylene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Aldrin	36	4	0.0054	[0.087]	16	0	[0.02]	[0.24]	--	--	--	0.410	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Alpha-BHC	36	7	0.0024	[0.087]	16	0	[0.02]	[0.24]	--	--	--	0.145	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Anthracene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1016	36	0	[0.08]	[0.87]	16	0	[0.17]	[1.9]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1221	36	0	[0.08]	[0.87]	16	0	[0.17]	[1.9]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1232	36	0	[0.08]	[0.87]	16	0	[0.17]	[1.9]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1242	36	0	[0.08]	[0.87]	16	0	[0.17]	[1.9]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1248	36	0	[0.08]	[0.87]	16	0	[0.17]	[1.9]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1254	36	0	[0.08]	[0.87]	16	0	[0.17]	[1.9]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1260	36	0	[0.08]	[0.87]	16	0	[0.17]	[1.9]	No test	No test	No test	No test	No test	No	No	Not detected

Table 5-32. Summary of Statistical Comparisons to Reference for Riparian Plant Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Benzo[a]anthracene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[a]pyrene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[b]fluoranthene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[ghi]perylene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[k]fluoranthene	34	1	1.3	[74]	15	0	[3.4]	[20]	--	--	--	0.671	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Bis[2-Chloroethoxy]methane	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-chloro-1-methylethyl]ether	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-chloroethyl] ether	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-ethylhexyl] phthalate	34	8	0.23	[74]	16	8	[0.36]	[20]	--	0.993	0.235	0.122	Equal	No	No	Not greater than reference, 0 of 3 tests
Butylbenzylphthalate	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Carbazole	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Chrysene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Delta-BHC	36	3	0.0024	[0.087]	16	3	0.008	[0.24]	--	--	1	0.539	Equal	No	No	Not greater than reference, 0 of 2 tests
Di-n-butylphthalate	34	2	0.25	[74]	16	1	0.33	[20]	--	--	0.667	0.557	Equal	No	No	Not greater than reference, 0 of 2 tests
Di-n-octylphthalate	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Dibenz[a,h]anthracene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Dibenzofuran	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Dichlorodiphenyldichloroethane	36	0	[0.008]	[0.087]	16	1	0.011	[0.24]	No test	No test	No test	No test	No test	No	No	Not detected
DDE	36	3	[0.008]	0.15	16	2	0.0061	[0.24]	--	--	0.702	0.969	Equal	No	No	Not greater than reference, 0 of 2 tests
DDT	36	1	[0.008]	[0.087]	16	2	0.013	[0.24]	--	--	1	0.457	Equal	No	No	Not greater than reference, 0 of 2 tests
Dieldrin	36	6	0.0058	[0.087]	16	1	0.012	[0.24]	--	--	1	0.565	Equal	No	No	Not greater than reference, 0 of 2 tests
Diethylphthalate	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Dimethyl phthalate	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Endosulfan I	36	8	0.0072	[0.087]	16	6	0.0042	[0.24]	--	0.341	0.403	0.419	Equal	No	No	Not greater than reference, 0 of 3 tests
Endosulfan II	36	5	0.0026	[0.087]	16	0	[0.02]	[0.24]	--	--	--	0.290	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Endosulfan sulfate	36	2	[0.008]	[0.087]	16	0	[0.02]	[0.24]	--	--	--	0.857	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Endrin	36	6	0.0022	0.21	16	0	[0.02]	[0.24]	--	--	--	0.206	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Endrin aldehyde	36	4	0.0044	[0.087]	16	0	[0.02]	[0.24]	--	--	--	0.410	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Endrin ketone	36	4	0.0068	[0.087]	16	1	0.014	[0.24]	--	--	1	0.969	Equal	No	No	Not greater than reference, 0 of 2 tests
Fluoranthene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Fluorene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Gamma-BHC (lindane)	36	10	0.002	[0.087]	16	6	0.0051	[0.24]	--	0.965	0.214	0.707	Equal	No	No	Not greater than reference, 0 of 3 tests
Heptachlor	36	1	0.002	[0.087]	16	1	0.0067	[0.24]	--	--	1	0.857	Equal	No	No	Not greater than reference, 0 of 2 tests
Heptachlor epoxide	36	1	[0.008]	[0.087]	16	4	0.0042	[0.24]	--	--	1	0.046	Less	No	No	Not greater than reference, 0 of 2 tests
Hexachlorobenzene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorobutadiene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorocyclopentadiene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachloroethane	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Indeno[1,2,3-cd]pyrene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected

Table 5-32. Summary of Statistical Comparisons to Reference for Riparian Plant Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Isophorone	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Methoxychlor	36	4	[0.008]	[0.087]	16	5	0.0055	[0.24]	--	--	0.307	0.169	Equal	No	No	Not greater than reference, 0 of 2 tests
N-Nitroso-di-n-dipropylamine	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
N-Nitrosodiphenylamine	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Naphthalene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Nitrobenzene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Pentachlorophenol	34	1	1	[180]	15	0	[8.6]	[50]	--	--	--	0.671	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Phenanthrene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Phenol	34	4	0.58	[74]	15	0	[3.4]	[20]	--	--	--	0.412	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Pyrene	34	0	[2]	[74]	15	0	[3.4]	[20]	No test	No test	No test	No test	No test	No	No	Not detected
Toxaphene	36	0	[0.08]	[0.87]	16	0	[0.024]	[2.4]	No test	No test	No test	No test	No test	No	No	Not detected
alpha-Chlordane	36	1	[0.008]	[0.087]	16	0	[0.02]	[0.24]	--	--	--	0.674	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
beta-1,2,3,4,5,6-Hexachlorocyclohexane	36	1	[0.008]	[0.087]	16	1	0.01	[0.24]	--	--	0.938	0.857	Equal	No	No	Not greater than reference, 0 of 2 tests
gamma-Chlordane	36	8	0.0024	[0.087]	16	0	[0.02]	[0.24]	--	--	--	0.102	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Radionuclides (pCi/g-fw)																
Americium-241	36	0	[0.022]	[0.8]	16	0	[0.027]	[0.67]	No test	No test	No test	No test	No test	No	No	Not detected
Antimony-125	36	0	[0.058]	[0.52]	16	0	[0.053]	[0.26]	No test	No test	No test	No test	No test	No	No	Not detected
Beryllium-7	36	1	[-0.3]	3.11	16	0	[0]	[1.3]	No test	No test	No test	No test	No test	No	No	Half-life
Carbon-14	6	1	[-0.406]	12.5	2	0	[0.167]	[2.67]	--	0.750	--	0.537	Equal	No	No	Not greater than reference, 0 of 2 tests
Cesium-134	36	0	[0.034]	[0.26]	16	0	[0.028]	[0.13]	No test	No test	No test	No test	No test	No	No	Half-life
Cesium-137	36	0	[0.024]	[0.21]	16	0	[0.023]	[0.11]	No test	No test	No test	No test	No test	No	No	Not detected
Cobalt-60	36	0	[0.029]	[0.27]	16	0	[0.025]	[0.11]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-152	36	0	[0.061]	[0.53]	16	0	[0.055]	[0.29]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-154	36	0	[0.081]	[0.73]	16	0	[0.073]	[0.3]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-155	36	0	[0.045]	[0.53]	16	0	[0.031]	[0.23]	No test	No test	No test	No test	No test	No	No	Not detected
Potassium-40	36	25	[0]	10.4	16	11	[0]	9.05	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-226	36	0	[0.048]	[0.48]	16	0	[0.039]	[0.24]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-228	36	0	[0.1]	[0.99]	16	0	[0.077]	[0.49]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Ruthenium-106	36	0	[0.22]	[2.1]	16	0	[0.196]	[0.87]	No test	No test	No test	No test	No test	No	No	Half-life
Strontium-90	36	3	[-0.064]	10.1	16	0	[-0.104]	[0.043]	--	--	--	0.586	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Technetium-99	4	0	[-0.003]	[0.182]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Thorium-228	36	1	[-0.086]	[0.138]	16	0	[-0.146]	[0.17]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-230	36	7	[-0.137]	0.322	16	4	[-0.162]	0.417	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-232	36	0	[-0.041]	[0.042]	16	0	[-0.04]	[0.096]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Tritium	12	0	[-4.23]	[3.36]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Uranium-233/234	36	1	[-0.017]	0.225	16	0	[0]	[0.083]	--	--	--	0.674	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Uranium-235	36	0	[0]	[0.042]	16	0	[0]	[0.025]	No test	No test	No test	No test	No test	No	No	Not detected

Table 5-32. Summary of Statistical Comparisons to Reference for Riparian Plant Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Uranium-238	36	1	[-0.004]	0.326	16	0	[0]	[0.052]	--	--	--	0.674	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Anion (mg/kg-fw)																
Nitrogen in nitrite and nitrate	10	10	8.2	436	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See Table 5-48	Yes	No reference data

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
BHC = benzene hexachloride
COPC = contaminant of potential concern
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed
RCBRA = River Corridor Baseline Risk Assessment

Table 5-33. Summary of Statistical Comparisons to Reference for Riparian Plant Tissue Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]		
Inorganics (mg/kg-fw)															
Aluminum	12	12	2.06	611	16	10	[1.7]	470	0.063	0.357	0.175	0.054	Equal	No	Not greater than reference, 0 of 4 tests
Antimony	12	7	[0.00461]	0.0311	16	2	[0.3]	0.6	--	0.357	1	0.031	Greater	See text	Greater than reference sites, 1 of 3 tests
Arsenic	12	11	[0.0486]	0.287	16	1	[0.39]	0.84	--	0.089	1	<0.001	Greater	See text	Greater than reference sites, 1 of 3 tests
Barium	30	30	0.876	14.2	16	16	1.3	12	0.248	0.320	0.268	--	--	No	Not greater than reference, 0 of 3 tests
Beryllium	12	5	0.0031	0.0149	16	2	[0.01]	0.03	--	0.357	1	0.186	Equal	No	Not greater than reference, 0 of 3 tests
Cadmium	30	24	[0.00244]	0.57	16	2	[0.03]	[0.07]	--	0.013	0.004	<0.001	Greater	See text	Greater than reference sites, 3 of 3 tests
Chromium	30	30	0.0452	1.44	16	9	[0.14]	1.3	0.866	0.966	0.652	<0.001	Greater	See text	Greater than reference sites, 1 of 4 tests
Copper	12	12	1.01	4.48	16	16	1.3	3.4	0.297	0.357	0.067	--	--	No	Not greater than reference, 0 of 3 tests
Lead	30	29	[0.00488]	0.936	16	5	[0.27]	1.7	--	0.9656	1	<0.001	Greater	See text	Greater than reference sites, 1 of 3 tests
Manganese	30	30	1.31	45.8	16	16	2.3	34.8	0.468	0.857	0.652	--	--	No	Not greater than reference, 0 of 3 tests
Mercury	30	10	0.00146	[0.0143]	16	0	[0.01]	[0.02]	--	0.013	--	0.025	Greater	See text	Greater than reference sites, 2 of 2 tests
Nickel	30	30	0.0893	1.05	16	13	[0.18]	2.1	0.935	0.966	1	0.068	Equal	No	Not greater than reference, 0 of 4 tests
Selenium	30	12	[0.00671]	0.0578	16	4	[0.36]	1.1	--	0.857	1	0.489	Equal	No	Not greater than reference, 0 of 3 tests
Silver	12	0	[0.0109]	[0.0136]	16	1	[0.07]	0.15	No test	No test	No test	No test	No test	No	Not detected

Table 5-33. Summary of Statistical Comparisons to Reference for Riparian Plant Tissue Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]		
Thallium	30	17	[0.00488]	0.263	16	0	[0.54]	[0.69]	--	0.013	--	<0.001	Greater	See text	Greater than reference sites, 2 of 2 tests
Uranium (inorganic)	30	25	[0.000244]	0.196	16	0	[0.84]	[2.4]	--	0.013	--	<0.001	Greater	See text	Greater than reference sites, 2 of 2 tests
Zinc	12	12	5.9	45.4	16	16	5.3	24.8	0.236	0.357	0.067	--	--	No	Not greater than reference, 0 of 3 tests
Radionuclides (pCi/g-fw)															
Antimony-125	12	0	[-0.025]	[0.0299]	16	0	[0.053]	[0.26]	No test	No test	No test	No test	No test	No	Not detected
Beryllium-7	12	7	[0.268]	1.75	16	0	[0]	[1.3]	No test	No test	No test	No test	No test	No	Half-life
Cesium-134	12	0	[-0.00128]	[0.0202]	16	0	[0.028]	[0.13]	No test	No test	No test	No test	No test	No	Half-life
Cesium-137	12	1	[-0.00225]	[0.07]	16	0	[0.023]	[0.11]	--	--	--	0.883	Equal	See text	Not greater than reference, 0 of 1 tests
Cobalt-60	12	0	[-0.00864]	[0.0196]	16	0	[0.025]	[0.11]	No test	No test	No test	No test	No test	No	Not detected
Europium-152	12	0	[-0.0202]	[0.0473]	16	0	[0.055]	[0.29]	No test	No test	No test	No test	No test	No	Not detected
Europium-154	12	0	[-0.0354]	[0.0544]	16	0	[0.073]	[0.3]	No test	No test	No test	No test	No test	No	Not detected
Europium-155	12	0	[-0.00189]	[0.0445]	16	0	[0.031]	[0.23]	No test	No test	No test	No test	No test	No	Not detected
Potassium-40	12	12	1.76	5.37	16	11	[0]	9.05	No test	No test	No test	No test	No test	No	Background radionuclide
Ruthenium-106	12	0	[-0.0796]	[0.0702]	16	0	[0.196]	[0.87]	No test	No test	No test	No test	No test	No	Half-life
Silver-108 metastable	12	0	[-0.00744]	[0.0101]	0	0	No reference data	No reference data	No reference data	No reference data	No reference data	No reference data	No reference data	No	Not detected
Strontium-90	30	9	[-0.0216]	1.3	16	0	[-0.104]	[0.043]	--	0.013	--	0.040	Greater	See text	Greater than reference sites, 2 of 2 tests
Technetium-99	28	19	[-0.00895]	1.62	0	0	No reference data	No reference data	No reference data	No reference data	No reference data	No reference data	No reference data	See text	No reference data

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed

Table 5-34. Summary of Statistical Comparisons to Reference for Riparian Plant Tissue Data Collected for the 100-NR-2 Operable Unit Project.

Analyte	Study Site				Reference Site				Reference Comparison					Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]		
Inorganics (mg/kg-fw)															
Aluminum	1	1	0.62	0.62	16	10	[1.7]	470	--	1	1	0.751	Equal	No	Not greater than reference, 0 of 3 tests
Antimony	13	2	[0.0015]	0.006	16	2	[0.3]	0.6	--	--	1	0.751	Equal	No	Not greater than reference, 0 of 2 tests
Arsenic	13	8	[0.015]	0.1	16	1	[0.39]	0.84	--	0.107	1	0.005	Greater	See text	Greater than reference sites, 1 of 3 tests
Barium	13	13	0.64	7	16	16	1.3	12	0.945	0.764	1	--	--	No	Not greater than reference, 0 of 4 tests
Beryllium	1	0	[0.00037]	[0.00037]	16	2	[0.01]	0.03	No test	No test	No test	No test	No test	No	Not detected
Cadmium	13	9	0.0013	0.044	16	2	[0.03]	[0.07]	--	0.396	1	0.006	Greater	See text	Greater than reference sites, 1 of 3 tests
Chromium	13	13	0.023	0.33	16	9	[0.14]	1.3	0.988	1	1	0.021	Greater	See text	Greater than reference sites, 1 of 4 tests
Copper	1	1	0.37	0.37	16	16	1.3	3.4	--	1	1	--	--	No	Not greater than reference, 0 of 3 tests
Lead	13	13	0.0048	0.24	16	5	[0.27]	1.7	--	1	1	<0.001	Greater	See text	Greater than reference sites, 1 of 3 tests
Manganese	13	13	0.84	9.5	16	16	2.3	35	0.985	1	1	--	--	No	Not greater than reference, 0 of 4 tests
Mercury	13	12	[0.00037]	0.0036	16	0	[0.01]	[0.02]	--	0.011	--	<0.001	Greater	See text	Greater than reference sites, 2 of 2 tests
Nickel	13	13	0.084	0.36	16	13	[0.18]	2.1	1	1	1	0.300	Equal	No	Not greater than reference, 0 of 4 tests
Selenium	13	5	[0.018]	0.052	16	4	[0.36]	1.1	--	0.963	1	0.707	Equal	No	Not greater than reference, 0 of 3 tests
Silver	1	0	[0.00092]	[0.00092]	16	1	[0.07]	0.15	No test	No test	No test	No test	No test	No	Not detected
Thallium	1	1	0.013	0.013	16	0	[0.54]	[0.69]	--	--	--	0.053	Equal	See text	Not greater than reference, 0 of 1 tests
Thorium	1	1	0.0012	0.0012	0	0	No reference data	No reference data	No reference data	No reference data	No reference data	No reference data	No reference data	See text	No reference data
Uranium (inorganic)	13	3	[0.00028]	0.045	16	0	[0.84]	[2.4]	--	--	--	0.157	Equal	See text	Not greater than reference, 0 of 1 tests
Vanadium	12	8	[0.0084]	0.47	16	8	[0.09]	1.7	0.972	0.956	1	0.620	Equal	No	Not greater than reference, 0 of 4 tests
Zinc	13	13	2.3	13	16	16	5.3	25	0.990	0.764	1	--	--	No	Not greater than reference, 0 of 4 tests
Radionuclides (pCi/g-fw)															
Antimony-125	1	0	[-0.0038]	[-0.0038]	16	0	[0.053]	[0.26]	No test	No test	No test	No test	No test	No	Not detected
Beryllium-7	1	0	[-0.022]	[-0.022]	16	0	[0]	[1.3]	No test	No test	No test	No test	No test	No	Half-life
Cesium-134	1	0	[-0.002]	[-0.002]	16	0	[0.028]	[0.13]	No test	No test	No test	No test	No test	No	Half-life
Cesium-137	1	0	[-0.00075]	[-0.00075]	16	0	[0.023]	[0.11]	No test	No test	No test	No test	No test	No	Not detected
Cobalt-60	1	0	[0.0015]	[0.0015]	16	0	[0.025]	[0.11]	No test	No test	No test	No test	No test	No	Not detected
Europium-152	1	0	[-0.00068]	[-0.00068]	16	0	[0.055]	[0.29]	No test	No test	No test	No test	No test	No	Not detected
Europium-154	1	0	[0.0016]	[0.0016]	16	0	[0.073]	[0.3]	No test	No test	No test	No test	No test	No	Not detected
Europium-155	1	0	[-0.00093]	[-0.00093]	16	0	[0.031]	[0.23]	No test	No test	No test	No test	No test	No	Not detected
Potassium-40	1	1	0.14	0.14	16	11	[0]	9.1	No test	No test	No test	No test	No test	No	Background radionuclide
Ruthenium-106	1	0	[0.00051]	[0.00051]	16	0	[0.2]	[0.87]	No test	No test	No test	No test	No test	No	Half-life
Strontium-90	13	11	[0.00022]	2	16	0	[-0.1]	[0.043]	--	0.011	--	<0.001	Greater	See text	Greater than reference sites, 2 of 2 tests
Technetium-99	8	1	[-0.0053]	0.15	0	0	No reference data	No reference data	No reference data	No reference data	No reference data	No reference data	No reference data	See text	No reference data

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed

Table 5-35. Summary of Statistical Comparisons to Reference for Riparian Terrestrial Invertebrate Tissue Data Collected for the RCBRA Project. (2 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Inorganics (mg/kg-fw)																
Aluminum	18	18	4.5	91.2	8	8	13.3	38.9	0.62	0.130	0.130	--	--	No	No	Not greater than reference, 0 of 3 tests
Antimony	18	0	[0.21]	[0.67]	8	0	[0.21]	[0.66]	No test	No test	No test	No test	No test	No	No	Not detected
Arsenic	18	14	0.51	1.7	8	7	0.57	1.3	0.478	0.502	0.314	0.967	Equal	No	No	Not greater than reference, 0 of 4 tests
Barium	18	18	0.4	22.8	8	8	0.59	1.6	0.145	0.130	0.028	--	--	See Table 5-48	Yes	Greater than reference, 1 of 3 tests
Beryllium	18	0	[0.01]	[0.03]	8	0	[0.01]	[0.03]	No test	No test	No test	No test	No test	No	No	Not detected
Bismuth	18	0	[0.38]	[0.77]	8	0	[0.38]	[0.76]	No test	No test	No test	No test	No test	No	No	Not detected
Boron	18	17	0.24	3.9	8	8	1.1	3.9	0.835	0.502	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Cadmium	18	17	[0.07]	1.1	8	3	[0.05]	0.12	--	0.130	<0.001	0.007	Greater	See Table 5-48	Yes	Greater than reference, 2 of 3 tests
Calcium	18	18	154	8,410	8	8	232	332	No test	No test	No test	No test	No test	No	No	Essential nutrient
Calculated total uranium	9	1	[0]	0.696	3	0	[0.0000042]	[0.0863]	NA	0.382	--	0.547	Equal	No	No	Not greater than reference, 0 of 2 tests
Chromium	18	16	0.15	0.86	8	6	0.18	0.7	0.159	0.502	0.471	0.751	Equal	No	No	Not greater than reference, 0 of 4 tests
Cobalt	18	2	[0.08]	[0.21]	8	0	[0.08]	[0.21]	--	--	--	0.854	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Copper	18	18	4.1	29.5	8	8	3.8	8.5	0.003	0.13	0.004	--	--	See Table 5-48	Yes	Greater than reference, 2 of 3 tests
Iron	18	18	24.3	203	8	8	43.4	106	0.187	0.130	0.130	--	--	No	No	Not greater than reference, 0 of 3 tests
Lead	18	5	[0.3]	0.49	8	1	[0.29]	[0.46]	--	0.641	0.399	0.727	Equal	No	No	Not greater than reference, 0 of 3 tests
Lithium	18	9	0.04	[0.18]	8	5	0.04	[0.17]	0.399	0.378	0.264	0.870	Equal	No	No	Not greater than reference, 0 of 4 tests
Magnesium	18	18	244	804	8	8	352	1,030	No test	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	18	18	2.9	55.9	8	8	4.4	7.9	0.033	0.205	0.016	--	--	See Table 5-48	Yes	Greater than reference, 2 of 3 tests
Mercury	18	7	[0.01]	0.1	8	2	[0.01]	0.03	--	0.641	0.692	0.810	Equal	No	No	Not greater than reference, 0 of 3 tests
Molybdenum	18	12	0.2	0.45	8	7	0.26	[0.43]	0.758	0.502	0.474	0.531	Equal	No	No	Not greater than reference, 0 of 4 tests
Nickel	18	8	[0.23]	0.78	8	2	[0.22]	[0.36]	--	0.205	0.111	0.614	Equal	No	No	Not greater than reference, 0 of 3 tests
Phosphorus	18	18	1,380	2,820	8	8	2,010	2,840	0.500	0.502	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Potassium	18	18	1,650	3,040	8	8	2,360	3,060	No test	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	18	9	[0.45]	1.8	8	5	0.56	0.88	0.151	0.130	0.07	0.87	Equal	No	No	Not greater than reference, 0 of 4 tests
Silicon	18	18	7.5	148	8	8	27.2	84.3	No test	No test	No test	No test	No test	No	No	Soil component, no test
Silver	18	2	[0.07]	[0.11]	8	0	[0.07]	[0.1]	--	--	--	0.854	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Sodium	18	18	137	1140	8	8	259	1040	No test	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	9	9	1.7	14.4	3	3	1.1	2	0.021	0.546	0.046	--	--	See Table 5-48	Yes	Greater than reference, 2 of 3 tests
Thallium	18	0	[0.67]	[1.1]	8	0	[0.65]	[1]	No test	No test	No test	No test	No test	No	No	Not detected
Tin	18	0	[1]	[3.2]	8	3	[1]	[4]	No test	No test	No test	No test	No test	No	No	Not detected
Titanium	9	9	0.26	1.6	5	5	1.3	1.9	0.992	1	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Uranium (inorganic)	18	1	[0.85]	1.9	8	0	[0.82]	[1.4]	--	--	--	0.671	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Vanadium	18	8	[0.08]	0.28	8	3	[0.08]	[0.13]	NA	0.205	0.067	0.921	Equal	No	No	Not greater than reference, 0 of 3 tests
Zinc	18	18	28	99.4	8	8	33.5	48.6	0.011	0.130	0.004	--	--	See Table 5-48	Yes	Greater than reference, 2 of 3 tests

Table 5-35. Summary of Statistical Comparisons to Reference for Riparian Terrestrial Invertebrate Tissue Data Collected for the RCBRA Project. (2 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Zirconium	9	0	[1]	[1.6]	5	0	[0.99]	[1.6]	No test	No test	No test	No test	No test	No	No	Not detected
Organics (mg/kg-fw)																
Acenaphthene	1	0	[0.787]	[0.787]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Acenaphthylene	1	0	[0.787]	[0.787]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Anthracene	1	0	[0.0787]	[0.0787]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Benzo[a]anthracene	1	0	[0.0787]	[0.0787]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Benzo[a]pyrene	1	0	[0.0787]	[0.0787]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Benzo[b]fluoranthene	1	0	[0.0787]	[0.0787]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Benzo[ghi]perylene	1	0	[0.0787]	[0.0787]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Benzo[k]fluoranthene	1	0	[0.0787]	[0.0787]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Chrysene	1	0	[0.0787]	[0.0787]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Dibenz[a,h]anthracene	1	0	[0.0787]	[0.0787]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Fluoranthene	1	0	[0.0787]	[0.0787]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Fluorene	1	0	[0.0787]	[0.0787]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Indeno[1,2,3-cd]pyrene	1	0	[0.0787]	[0.0787]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Naphthalene	1	0	[0.787]	[0.787]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Phenanthrene	1	0	[0.0787]	[0.0787]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Pyrene	1	0	[0.0787]	[0.0787]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Radionuclides (pCi/g-fw)																
Strontium-90	8	0	[-0.18]	[0.022]	3	0	[-0.076]	[0.067]	No test	No test	No test	No test	No test	No	No	Not detected
Technetium-99	2	0	[-0.244]	[0.179]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Thorium-228	8	0	[-0.068]	[0.233]	3	0	[-0.04]	[0.069]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-230	8	0	[-0.034]	[0.252]	3	2	[0]	0.344	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-232	8	0	[-0.037]	[0.233]	3	0	[-0.04]	[-0.029]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Uranium-233/234	9	0	[0]	[0.077]	3	0	[0]	[0.065]	No test	No test	No test	No test	No test	No	No	Not detected
Uranium-235	9	0	[0]	[0.032]	3	0	[0]	[0]	No test	No test	No test	No test	No test	No	No	Not detected
Uranium-238	9	1	[0]	0.234	3	0	[0]	[0.029]	--	--	--	0.547	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
COPC = contaminant of potential concern
fw = fresh weight
NA = not available
No ref data = no reference site data available
No test = no statistical test performed
RCBRA = River Corridor Baseline Risk Assessment

Table 5-36. Summary of Statistical Comparisons to Reference for Riparian Terrestrial Invertebrate Tissue Data Collected for the 100-B/C Pilot Project.

Analyte	Study Site				Reference Site				Reference Comparison					Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]		
Inorganics (mg/kg-fw)															
Aluminum	6	6	74.2	271	8	8	13.3	38.9	0.001	0.165	<0.001	--	--	See text	Greater than reference sites, 2 of 3 tests
Antimony	6	6	0.0133	0.0396	8	0	[0.21]	[0.66]	--	0.165	--	0.001	Greater	See text	Greater than reference sites, 1 of 2 tests
Arsenic	6	6	0.261	0.435	8	7	0.57	1.3	0.997	1	1	0.881	Equal	No	Not greater than reference, 0 of 4 tests
Barium	6	6	1.43	20.8	8	8	0.59	1.6	0.003	0.165	0.015	--	--	See text	Greater than reference sites, 2 of 3 tests
Beryllium	6	0	[0.0075]	[0.0075]	8	0	[0.01]	[0.03]	No test	No test	No test	No test	No test	No	Not detected
Cadmium	6	6	0.523	2.51	8	3	[0.05]	0.12	--	0.165	<0.001	0.064	Equal	See text	Greater than reference sites, 1 of 3 tests
Chromium	6	6	0.253	0.846	8	6	0.18	0.7	0.047	0.692	0.429	0.582	Equal	See text	Greater than reference sites, 1 of 4 tests
Copper	6	6	11.7	34	8	8	3.8	8.5	0.001	0.165	<0.001	--	--	See text	Greater than reference sites, 2 of 3 tests
Lead	6	6	0.0455	0.332	8	1	[0.29]	[0.46]	--	0.692	1	0.007	Greater	See text	Greater than reference sites, 1 of 3 tests
Manganese	6	6	8.34	41.1	8	8	4.4	7.9	0.001	0.165	<0.001	--	--	See text	Greater than reference sites, 2 of 3 tests
Mercury	6	6	0.0218	0.0559	8	2	[0.01]	0.03	--	0.165	0.015	0.024	Greater	See text	Greater than reference sites, 2 of 3 tests
Nickel	6	6	0.107	0.515	8	2	[0.22]	[0.36]	--	0.165	0.273	0.024	Greater	See text	Greater than reference sites, 1 of 3 tests
Selenium	6	6	1.37	2.33	8	5	0.56	0.88	0.001	0.165	<0.001	0.301	Equal	See text	Greater than reference sites, 2 of 4 tests
Silver	6	6	0.0261	0.118	8	0	[0.07]	[0.1]	--	0.165	--	0.001	Greater	See text	Greater than reference sites, 1 of 2 tests
Thallium	6	6	0.0301	0.0842	8	0	[0.65]	[1]	--	0.165	--	0.001	Greater	See text	Greater than reference sites, 1 of 2 tests
Uranium (inorganic)	6	4	[0.0123]	0.0392	8	0	[0.82]	[1.4]	--	0.165	--	0.033	Greater	See text	Greater than reference sites, 1 of 2 tests
Zinc	6	6	72.2	151	8	8	33.5	48.6	0.001	0.165	<0.001	--	--	See text	Greater than reference sites, 2 of 3 tests

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
fw = fresh weight
No test = no statistical test performed

Table 5-37. Summary of Statistical Comparisons to Reference for Riparian Terrestrial Invertebrate Tissue Data Collected for the 100-NR-2 Operable Unit Project.

Analyte	Study Site				Reference Site				Reference Comparison					Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]		
Inorganics (mg/kg-fw)															
Antimony	9	9	0.0045	0.046	8	0	[0.21]	[0.66]	--	0.124	--	<0.001	Greater	See text	Greater than reference sites, 1 of 2 tests
Arsenic	9	9	0.28	0.94	8	7	0.57	1.3	0.820	0.918	1	0.952	Equal	No	Not greater than reference, 0 of 4 tests
Barium	9	9	1.3	3.5	8	8	0.59	1.6	<0.001	0.124	0.002	--	--	See text	Greater than reference sites, 2 of 4 tests
Cadmium	9	9	0.041	0.98	8	3	[0.05]	0.12	--	0.547	0.265	0.022	Greater	See text	Greater than reference sites, 1 of 3 tests
Chromium	9	9	0.14	0.46	8	6	0.18	0.7	0.156	0.547	1	0.399	Equal	No	Not greater than reference, 0 of 4 tests
Lead	9	9	0.024	2.2	8	1	[0.29]	[0.46]	--	0.547	0.396	0.002	Greater	See text	Greater than reference sites, 1 of 3 tests
Manganese	9	9	8.1	19	8	8	4.4	7.9	<0.001	0.124	<0.001	--	--	See text	Greater than reference sites, 2 of 4 tests
Mercury	9	9	0.012	0.025	8	2	[0.01]	0.03	--	0.918	1	0.007	Greater	See text	Greater than reference sites, 1 of 3 tests
Nickel	9	9	0.061	0.58	8	2	[0.22]	[0.36]	--	0.124	0.063	0.007	Greater	See text	Greater than reference sites, 1 of 3 tests
Selenium	9	9	0.09	0.84	8	5	0.56	0.88	0.895	0.918	1	0.165	Equal	No	Not greater than reference, 0 of 4 tests
Uranium (inorganic)	9	9	0.0035	0.014	8	0	[0.82]	[1.4]	--	0.124	--	<0.001	Greater	See text	Greater than reference sites, 1 of 2 tests
Vanadium	9	9	0.076	1.1	8	3	[0.08]	[0.13]	--	0.124	<0.001	0.022	Greater	See text	Greater than reference sites, 2 of 3 tests
Zinc	9	9	31	80	8	8	34	49	0.405	0.124	0.124	--	--	No	Not greater than reference, 0 of 4 tests
Radionuclide (pCi/g-fw)															
Strontium-90	3	3	0.051	6.3	3	0	[-0.076]	[0.067]	--	0.5	--	0.103	Equal	No	Not greater than reference, 0 of 2 tests

[a] Study vs. reference.
[value] = nondetect
-- = not applicable
fw = fresh weight

Table 5-38. Summary of Statistical Comparisons to Reference for Riparian Bird Crop Contents Data Collected for the RCBRA Project. (2 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Inorganics (mg/kg-fw)																
Aluminum	9	9	7	50.1	10	10	12.8	2,420	0.988	1	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Antimony	9	1	[0.25]	[2.2]	10	5	[0.21]	1.3	--	1	1	0.185	Equal	No	No	Not greater than reference, 0 of 3 tests
Arsenic	9	3	[0.41]	[3]	10	8	0.48	1.8	--	0.876	1	0.111	Equal	No	No	Not greater than reference, 0 of 3 tests
Barium	9	9	0.65	22.3	10	10	1.2	36.1	0.805	0.458	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Beryllium	9	4	[0.01]	0.11	10	3	[0.01]	0.08	--	0.458	0.211	0.861	Equal	No	No	Not greater than reference, 0 of 3 tests
Bismuth	9	0	[0.4]	[2.6]	10	0	[0.38]	[1.5]	No test	No test	No test	No test	No test	No	No	Not detected
Boron	9	9	1.4	12.7	10	6	[0.38]	2.6	<0.001	0.087	0.011	--	--	See Table 5-48	Yes	Greater than reference, 2 of 3 tests
Cadmium	9	5	[0.05]	0.76	10	6	[0.06]	0.42	0.703	0.876	0.474	0.788	Equal	No	No	Not greater than reference, 0 of 4 tests
Calcium	9	9	276	124,000	10	10	239	68,500	No test	No test	No test	No test	No test	No	No	Essential nutrient
Calculated total uranium	3	0	[0.000012]	[0.0199]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Chromium	9	6	0.22	[0.65]	10	6	0.28	4.5	0.961	1	1	0.861	Equal	No	No	Not greater than reference, 0 of 4 tests
Cobalt	9	0	[0.08]	[0.7]	10	3	[0.09]	0.94	No test	No test	No test	No test	No test	No	No	Not detected
Copper	9	9	1.6	12.6	10	10	3.5	14.4	0.628	0.458	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Iron	9	9	33.8	174	10	10	34.1	2,830	0.967	1	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Lead	9	0	[0.33]	[1.6]	10	1	[0.32]	[0.89]	No test	No test	No test	No test	No test	No	No	Not detected
Lithium	9	7	0.07	0.29	10	6	[0.01]	1.4	0.89	1	1	0.735	Equal	No	No	Not greater than reference, 0 of 4 tests
Magnesium	9	9	159	706	10	10	153	1,820	No test	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	9	9	3.2	14.2	10	10	3.9	225	0.874	1	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Mercury	9	2	[0.02]	[0.08]	10	0	[0.02]	[0.04]	--	--	--	0.408	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Molybdenum	9	8	0.19	16.8	10	8	0.41	0.99	0.826	0.458	0.211	0.921	Equal	No	No	Not greater than reference, 0 of 4 tests
Nickel	9	2	0.31	[1.2]	10	5	[0.29]	1.7	--	1	1	0.437	Equal	No	No	Not greater than reference, 0 of 3 tests
Phosphorus	9	9	192	1,930	10	10	610	1,770	0.973	0.458	0.474	--	--	No	No	Not greater than reference, 0 of 3 tests
Potassium	9	9	862	2,170	10	10	1,090	3,260	No test	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	9	5	[0.43]	[2.4]	10	8	[0.41]	2.2	0.827	1	1	0.516	Equal	No	No	Not greater than reference, 0 of 4 tests
Silicon	9	9	15.2	131	10	10	16.6	866	No test	No test	No test	No test	No test	No	No	Soil component, no test
Silver	9	0	[0.09]	[0.35]	10	0	[0.09]	[0.2]	No test	No test	No test	No test	No test	No	No	Not detected
Sodium	9	9	781	2,550	10	10	524	1,630	No test	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	9	9	2	119	10	10	1.1	71.6	0.056	0.458	0.211	--	--	No	No	Not greater than reference, 0 of 3 tests
Thallium	9	0	[0.8]	[3.5]	10	0	[0.77]	[2]	No test	No test	No test	No test	No test	No	No	Not detected
Tin	9	5	1.8	5.4	10	4	1.9	[6.2]	--	0.458	0.206	0.828	Equal	No	No	Not greater than reference, 0 of 3 tests
Titanium	5	5	0.83	7.5	2	2	0.82	6.6	--	0.714	0.476	--	--	No	No	Not greater than reference, 0 of 2 tests
Uranium (inorganic)	9	0	[1.4]	[4.4]	10	0	[1.4]	[3.1]	No test	No test	No test	No test	No test	No	No	Not detected
Vanadium	9	4	[0.08]	0.49	10	8	0.18	4.8	--	1	1	0.259	Equal	No	No	Not greater than reference, 0 of 3 tests
Zinc	9	9	13.3	56.4	10	10	15.4	61.3	0.973	1	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Zirconium	5	0	[1.8]	[5.3]	2	0	[3]	[3]	No test	No test	No test	No test	No test	No	No	Not detected
Radionuclides (pCi/g-fw)																
Strontium-90	4	0	[-0.225]	[-0.033]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Technetium-99	4	0	[0.026]	[1.15]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected

Table 5-38. Summary of Statistical Comparisons to Reference for Riparian Bird Crop Contents Data Collected for the RCBRA Project. (2 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Uranium-233/234	3	0	[0.071]	[0.107]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Uranium-235	3	0	[0]	[0.043]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Uranium-238	3	0	[0]	[0]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected

[a] Study vs. reference.
[value] = nondetect
-- = not applicable
COPC = contaminant of potential concern
fw = fresh weight
No ref data= no reference site data available
No test = no statistical test performed
RCBRA = River Corridor Baseline Risk Assessment

Table 5-39. Summary of Statistical Comparisons to Reference for Riparian Bird Carcass Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Inorganics (mg/kg-fw)																
Aluminum	15	11	[2.4]	66	11	10	[2.3]	56.9	0.952	0.918	0.577	0.535	Equal	No	No	Not greater than reference, 0 of 4 tests
Antimony	15	1	[0.2]	0.43	11	2	[0.2]	[0.42]	--	--	0.522	0.774	Equal	No	No	Not greater than reference, 0 of 2 tests
Arsenic	15	1	[0.37]	[0.6]	11	3	[0.38]	0.66	--	--	1	0.374	Equal	No	No	Not greater than reference, 0 of 2 tests
Barium	15	15	0.13	2.3	11	11	0.2	2.1	0.934	0.918	0.323	--	--	No	No	Not greater than reference, 0 of 3 tests
Beryllium	15	6	[0.009]	[0.02]	11	4	[0.009]	[0.02]	--	0.491	1	0.826	Equal	No	No	Not greater than reference, 0 of 3 tests
Bismuth	15	0	[0.36]	[0.5]	11	0	[0.37]	[0.49]	No test	No test	No test	No test	No test	No	No	Not detected
Boron	15	4	[0.23]	0.43	11	1	[0.23]	0.46	--	0.274	1	0.535	Equal	No	No	Not greater than reference, 0 of 3 tests
Cadmium	15	5	0.05	0.27	11	4	[0.05]	0.15	--	0.274	0.577	0.797	Equal	No	No	Not greater than reference, 0 of 3 tests
Calcium	15	15	1,340	8,700	11	11	1,620	5,710	No test	No test	No test	No test	No test	No	No	Essential nutrient
Calculated total uranium	15	1	[-0.00569]	2.51	11	0	[-0.00185]	[0.134]	--	--	0.500	0.874	Equal	No	No	Not greater than reference, 0 of 2 tests
Chromium	15	15	0.17	1.7	11	11	0.17	0.49	0.339	0.274	0.091	--	--	No	No	Not greater than reference, 0 of 3 tests
Cobalt	15	0	[0.07]	[0.14]	11	0	[0.07]	[0.13]	No test	No test	No test	No test	No test	No	No	Not detected
Copper	15	15	2.3	14.3	11	11	2	7.8	0.448	0.654	0.323	--	--	No	No	Not greater than reference, 0 of 3 tests
Iron	15	15	29.4	197	11	11	29.1	144	0.911	0.918	0.577	--	--	No	No	Not greater than reference, 0 of 3 tests
Lead	15	0	[0.3]	[0.33]	11	1	[0.29]	0.33	No test	No test	No test	No test	No test	No	No	Not detected
Lithium	15	15	0.03	0.08	11	9	[0.03]	0.09	0.769	0.619	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Magnesium	15	15	131	352	11	11	172	323	No test	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	15	15	0.5	3.3	11	11	0.61	3	0.94	0.812	0.577	--	--	No	No	Not greater than reference, 0 of 3 tests
Mercury	15	10	[0.01]	0.05	11	5	[0.01]	0.03	--	0.491	0.577	0.497	Equal	No	No	Not greater than reference, 0 of 3 tests
Molybdenum	15	6	[0.15]	[0.28]	11	4	[0.15]	[0.28]	--	0.274	0.500	0.826	Equal	No	No	Not greater than reference, 0 of 3 tests
Nickel	15	4	[0.23]	0.65	11	5	[0.23]	1	--	0.654	1	0.564	Equal	No	No	Not greater than reference, 0 of 3 tests
Phosphorus	15	15	1,960	5,820	11	11	2,030	4,630	0.25	0.274	0.323	--	--	No	No	Not greater than reference, 0 of 3 tests
Potassium	15	15	1,850	2,570	11	11	1,910	2,350	No test	No test	No test	No test	No test	No	No	Essential nutrient

Table 5-39. Summary of Statistical Comparisons to Reference for Riparian Bird Carcass Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Selenium	15	15	1.1	2.2	11	11	1.1	1.7	0.042	0.274	0.323	--	--	See Table 5-48	Yes	Greater than reference, 1 of 3 tests
Silicon	15	15	3.1	117	11	11	2.5	106	No test	No test	No test	No test	No test	No	No	Soil component, no test
Silver	15	6	0.07	0.12	11	1	[0.07]	[0.09]	--	0.046	0.083	0.191	Equal	See Table 5-48	Yes	Greater than reference, 1 of 3 tests
Sodium	15	15	1,030	2,020	11	11	1,090	1,850	No test	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	15	15	0.76	6.8	11	11	1.3	4.9	0.275	0.274	0.175	--	--	No	No	Not greater than reference, 0 of 3 tests
Thallium	15	0	[0.67]	[0.79]	11	0	[0.66]	[0.8]	No test	No test	No test	No test	No test	No	No	Not detected
Tin	15	10	0.98	2.4	11	5	0.93	[2]	--	0.274	0.206	0.497	Equal	No	No	Not greater than reference, 0 of 3 tests
Titanium	7	7	0.08	0.28	3	3	0.09	0.27	0.590	0.933	0.700	--	--	No	No	Not greater than reference, 0 of 3 tests
Uranium (inorganic)	15	1	[0.84]	[1.4]	11	0	[0.83]	[1.4]	--	--	--	0.874	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Vanadium	15	2	[0.07]	0.11	11	4	[0.07]	0.21	--	0.812	1	0.365	Equal	No	No	Not greater than reference, 0 of 3 tests
Zinc	15	15	16	69.7	11	11	14.6	33.4	0.490	0.918	0.577	--	--	No	No	Not greater than reference, 0 of 3 tests
Zirconium	7	0	[0.84]	[0.86]	3	0	[0.83]	[0.85]	No test	No test	No test	No test	No test	No	No	Not detected
Organics (mg/kg-fw)																
1,2,4-Trichlorobenzene	2	0	[1.7]	[3.2]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
1,2-Dichlorobenzene	2	0	[1.7]	[3.2]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
1,3-Dichlorobenzene	2	0	[1.7]	[3.2]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
1,4-Dichlorobenzene	2	0	[1.7]	[3.2]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
2,4,5-Trichlorophenol	1	0	[4.2]	[4.2]	1	0	[4.2]	[4.2]	No test	No test	No test	No test	No test	No	No	Not detected
2,4,6-Trichlorophenol	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dichlorophenol	2	0	[1.7]	[3.2]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dimethylphenol	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrophenol	1	0	[4.2]	[4.2]	1	0	[4.2]	[4.2]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrotoluene	2	0	[1.7]	[4]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
2,6-Dinitrotoluene	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
2-Chloronaphthalene	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
2-Chlorophenol	2	0	[1.7]	[3.2]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
2-Methylnaphthalene	2	0	[1.7]	[3.2]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
2-Methylphenol [cresol, o-]	2	0	[1.7]	[3.2]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
2-Nitroaniline	1	0	[4.2]	[4.2]	1	0	[4.2]	[4.2]	No test	No test	No test	No test	No test	No	No	Not detected
2-Nitrophenol	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
3+4 Methylphenol [cresol, m+p]	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
3,3'-Dichlorobenzidine	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
3-Nitroaniline	1	0	[4.2]	[4.2]	1	0	[4.2]	[4.2]	No test	No test	No test	No test	No test	No	No	Not detected
4,6-Dinitro-2-methylphenol	2	0	[4.2]	[10]	1	0	[4.2]	[4.2]	No test	No test	No test	No test	No test	No	No	Not detected
4-Bromophenylphenyl ether	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chloro-3-methylphenol	2	0	[1.7]	[3.2]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chloroaniline	2	0	[1.7]	[3.2]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chlorophenylphenyl ether	2	0	[1.7]	[4]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
4-Nitroaniline	2	0	[4.2]	[10]	1	0	[4.2]	[4.2]	No test	No test	No test	No test	No test	No	No	Not detected
4-Nitrophenol	1	0	[4.2]	[4.2]	1	0	[4.2]	[4.2]	No test	No test	No test	No test	No test	No	No	Not detected

Table 5-39. Summary of Statistical Comparisons to Reference for Riparian Bird Carcass Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Acenaphthene	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Acenaphthylene	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Aldrin	1	0	[0.002]	[0.002]	1	0	[0.002]	[0.002]	No test	No test	No test	No test	No test	No	No	Not detected
Alpha-BHC	1	0	[0.002]	[0.002]	1	0	[0.002]	[0.002]	No test	No test	No test	No test	No test	No	No	Not detected
Anthracene	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1016	1	0	[0.02]	[0.02]	1	0	[0.02]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1221	1	0	[0.02]	[0.02]	1	0	[0.02]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1232	1	0	[0.02]	[0.02]	1	0	[0.02]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1242	1	0	[0.02]	[0.02]	1	0	[0.02]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1248	1	0	[0.02]	[0.02]	1	0	[0.02]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1254	1	1	0.064	0.064	1	1	0.13	0.13	--	1	1	--	Equal	No	No	Not greater than reference, 0 of 2 tests
Aroclor-1260	1	0	[0.02]	[0.02]	1	0	[0.02]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[a]anthracene	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[a]pyrene	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[b]fluoranthene	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[ghi]perylene	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[k]fluoranthene	2	0	[1.7]	[4]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-Chloroethoxy]methane	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-chloro-1-methylethyl]ether	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-chloroethyl] ether	2	0	[1.7]	[3.2]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-ethylhexyl] phthalate	1	1	0.28	0.28	1	1	0.28	0.28	--	1	1	--	--	No	No	Not greater than reference, 0 of 2 tests
Butylbenzylphthalate	3	0	[1.7]	[4]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Carbazole	2	0	[1.7]	[3.2]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Chrysene	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Delta-BHC	1	0	[0.002]	[0.002]	1	0	[0.002]	[0.002]	No test	No test	No test	No test	No test	No	No	Not detected
Di-n-butylphthalate	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Di-n-octylphthalate	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Dibenz[a,h]anthracene	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Dibenzofuran	2	0	[1.7]	[4]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Dichlorodiphenyldichloroethane	1	1	0.0082	0.0082	1	1	0.01	0.01	--	1	1	--	--	No	No	Not greater than reference, 0 of 2 tests
Dichlorodiphenyldichloroethylene	1	1	0.15	0.15	1	1	0.31	0.31	--	1	1	--	--	No	No	Not greater than reference, 0 of 2 tests
Dichlorodiphenyltrichloroethane	1	0	[0.002]	[0.002]	1	0	[0.002]	[0.002]	No test	No test	No test	No test	No test	No	No	Not detected
Dieldrin	1	0	[0.002]	[0.002]	1	0	[0.002]	[0.002]	No test	No test	No test	No test	No test	No	No	Not detected
Diethylphthalate	2	0	[1.7]	[4]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Dimethyl phthalate	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Endosulfan I	1	0	[0.002]	[0.002]	1	1	0.011	0.011	No test	No test	No test	No test	No test	No	No	Not detected
Endosulfan II	1	0	[0.002]	[0.002]	1	0	[0.002]	[0.002]	No test	No test	No test	No test	No test	No	No	Not detected
Endosulfan sulfate	1	1	0.0075	0.0075	1	1	0.01	0.01	--	1	1	--	--	No	No	Not greater than reference, 0 of 2 tests
Endrin	1	0	[0.002]	[0.002]	1	0	[0.002]	[0.002]	No test	No test	No test	No test	No test	No	No	Not detected
Endrin aldehyde	1	1	0.0055	0.0055	1	1	0.0058	0.0058	--	1	1	--	--	No	No	Not greater than reference, 0 of 2 tests
Endrin ketone	1	1	0.0023	0.0023	1	0	[0.002]	[0.002]	--	1	--	--	--	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Fluoranthene	2	0	[1.7]	[3.2]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected

Table 5-39. Summary of Statistical Comparisons to Reference for Riparian Bird Carcass Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Fluorene	2	0	[1.7]	[4]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Gamma-BHC (lindane)	1	1	0.0038	0.0038	1	0	[0.002]	[0.002]	--	1	--	--	--	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Heptachlor	1	0	[0.002]	[0.002]	1	0	[0.002]	[0.002]	No test	No test	No test	No test	No test	No	No	Not detected
Heptachlor epoxide	1	0	[0.002]	[0.002]	1	0	[0.002]	[0.002]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorobenzene	2	0	[1.7]	[3.2]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorobutadiene	2	0	[1.7]	[3.2]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorocyclopentadiene	2	0	[1.7]	[3.2]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachloroethane	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Indeno[1,2,3-cd]pyrene	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Isophorone	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Methoxychlor	1	1	0.008	0.008	1	1	0.0072	0.0072	--	1	0.500	--	--	No	No	Not greater than reference, 0 of 2 tests
N-Nitroso-di-n-dipropylamine	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
N-Nitrosodiphenylamine	3	0	[1.7]	[4]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Naphthalene	2	0	[1.7]	[3.2]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Nitrobenzene	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Pentachlorophenol	1	0	[4.2]	[4.2]	1	0	[4.2]	[4.2]	No test	No test	No test	No test	No test	No	No	Not detected
Phenanthrene	2	0	[1.7]	[3.2]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Phenol	2	0	[1.7]	[3.2]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Pyrene	1	0	[1.7]	[1.7]	1	0	[1.7]	[1.7]	No test	No test	No test	No test	No test	No	No	Not detected
Toxaphene	1	0	[0.02]	[0.02]	1	0	[0.02]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
alpha-Chlordane	1	0	[0.002]	[0.002]	1	0	[0.002]	[0.002]	No test	No test	No test	No test	No test	No	No	Not detected
beta-1,2,3,4,5,6-Hexachlorocyclohexane	1	0	[0.002]	[0.002]	1	0	[0.002]	[0.002]	No test	No test	No test	No test	No test	No	No	Not detected
gamma-Chlordane	1	0	[0.002]	[0.002]	1	0	[0.002]	[0.002]	No test	No test	No test	No test	No test	No	No	Not detected
Radionuclides (pCi/g-fw)																
Americium-241	15	0	[0.058]	[1.1]	11	0	[0.056]	[0.95]	No test	No test	No test	No test	No test	No	No	Not detected
Antimony-125	15	0	[0.15]	[1.6]	11	0	[0.153]	[0.95]	No test	No test	No test	No test	No test	No	No	Not detected
Barium-133	7	0	[0.061]	[0.69]	3	0	[0.11]	[0.4]	No test	No test	No test	No test	No test	No	No	Not detected
Beryllium-7	15	0	[0]	[6.4]	11	0	[0]	[3.9]	No test	No test	No test	No test	No test	No	No	Short half-life
Cesium-134	15	0	[0.071]	[1.3]	11	0	[0.079]	[0.68]	No test	No test	No test	No test	No test	No	No	Short half-life
Cesium-137	15	0	[0.062]	[0.94]	11	0	[0.065]	[0.57]	No test	No test	No test	No test	No test	No	No	Not detected
Cobalt-60	15	0	[0.073]	[1.1]	11	0	[0.064]	[0.7]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-152	15	0	[0.15]	[1.6]	11	0	[0.151]	[0.96]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-154	15	0	[0.19]	[3.6]	11	0	[0.2]	[1.9]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-155	15	0	[0.1]	[1.3]	11	0	[0.107]	[0.87]	No test	No test	No test	No test	No test	No	No	Not detected
Potassium-40	15	11	[0]	16.2	11	7	[-0.004]	21.4	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-226	15	1	[0.125]	[1.8]	11	1	[0.124]	2.02	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-228	15	0	[0.269]	[4.6]	11	0	[0.349]	[2.5]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Ruthenium-106	15	0	[0.531]	[7.5]	11	0	[0.546]	[4.4]	No test	No test	No test	No test	No test	No	No	Short half-life
Strontium-90	15	1	[-0.131]	0.19	11	1	[-0.067]	0.376	--	--	1	0.606	Equal	No	No	Not greater than reference, 0 of 2 tests
Technetium-99	4	0	[-0.147]	[0.137]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Thorium-228	15	0	[-0.07]	[0.07]	11	0	[-0.058]	[0.066]	No test	No test	No test	No test	No test	No	No	Background radionuclide

Table 5-39. Summary of Statistical Comparisons to Reference for Riparian Bird Carcass Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Thorium-230	15	2	[-0.134]	0.272	11	1	[-0.189]	0.301	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-232	15	0	[-0.035]	[0.09]	11	0	[-0.034]	[0.047]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Uranium-233/234	15	1	[-0.004]	0.893	11	0	[-0.02]	[0.062]	--	--	--	0.874	Equal	TBD	Yes	Not greater than reference, 0 of 1 test
Uranium-235	15	1	[-0.004]	0.04	11	0	[-0.004]	[0.034]	--	--	--	0.874	Equal	TBD	Yes	Not greater than reference, 0 of 1 test
Uranium-238	15	1	[-0.003]	0.836	11	0	[0]	[0.045]	--	--	--	0.874	Equal	TBD	Yes	Not greater than reference, 0 of 1 test

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
BHC = benzene hexachloride
COPC = contaminant of potential concern
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed
RCBRA = River Corridor Baseline Risk Assessment

Table 5-40. Summary of Statistical Comparisons to Reference for Riparian Mammal Organ (Liver/Kidney) Data Collected for the RCBRA Project. (2 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Inorganics (mg/kg-fw)																
Aluminum	19	9	[1.7]	6.5	8	2	[1.7]	[2.8]	--	0.144	0.014	0.515	Equal	See Table 5-48	Yes	Greater than reference, 1 of 3 tests
Antimony	19	0	[0.21]	[0.44]	8	0	[0.21]	[0.43]	No test	No test	No test	No test	No test	No	No	Not detected
Arsenic	19	11	0.42	0.75	8	3	0.58	0.73	--	0.864	0.487	0.585	Equal	No	No	Not greater than reference, 0 of 3 tests
Barium	19	19	0.07	0.16	8	8	0.06	0.24	0.130	0.528	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Beryllium	19	6	0.01	0.03	8	2	[0.01]	[0.02]	--	0.221	0.294	0.905	Equal	No	No	Not greater than reference, 0 of 3 tests
Bismuth	19	0	[0.38]	[0.51]	8	0	[0.38]	[0.5]	No test	No test	No test	No test	No test	No	No	Not detected
Boron	19	7	[0.22]	0.87	8	0	[0.23]	[0.36]	--	0.144	--	0.130	Equal	No	No	Not greater than reference, 0 of 2 tests
Cadmium	19	19	0.05	0.93	8	8	0.06	0.44	0.316	0.528	0.487	--	--	No	No	Not greater than reference, 0 of 3 tests
Calcium	19	19	84.9	145	8	8	63	107	No test	No test	No test	No test	No test	No	No	
Chromium	19	18	[0.12]	0.47	8	8	0.15	0.24	0.168	0.528	0.487	--	--	No	No	Not greater than reference, 0 of 3 tests
Cobalt	19	0	[0.08]	[0.14]	8	0	[0.08]	[0.14]	No test	No test	No test	No test	No test	No	No	Not detected
Copper	19	19	4.9	7.2	8	8	4.8	11.3	0.605	0.864	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Iron	19	19	90	182	8	8	101	173	0.955	0.999	0.704	--	--	No	No	Not greater than reference, 0 of 3 tests
Lead	19	0	[0.29]	[0.32]	8	1	[0.3]	1	No test	No test	No test	No test	No test	No	No	Not detected
Lithium	19	14	[0.03]	0.16	8	1	[0.03]	[0.03]	--	0.092	0.003	0.013	Greater	See Table 5-48	Yes	Greater than reference, 2 of 3 tests
Magnesium	19	19	158	245	8	8	111	242	No test	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	19	19	1.9	3	8	8	1.8	2.9	0.269	0.663	0.704	--	--	No	No	Not greater than reference, 0 of 3 tests
Mercury	19	6	[0.01]	0.13	8	5	0.02	0.07	--	0.864	0.704	0.287	Equal	No	No	Not greater than reference, 0 of 3 tests
Molybdenum	19	19	0.96	1.9	8	8	1.2	1.8	0.648	0.773	0.704	--	--	No	No	Not greater than reference, 0 of 3 tests

Table 5-40. Summary of Statistical Comparisons to Reference for Riparian Mammal Organ (Liver/Kidney) Data Collected for the RCBRA Project. (2 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Nickel	19	1	[0.22]	[0.26]	8	0	[0.23]	[0.27]	--	--	--	0.649	Equal	See Table 5-48	Yes	Not greater than reference, 0 of 1 test
Phosphorus	19	19	2,840	3,510	8	8	2,720	3,670	0.056	0.528	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Potassium	19	19	2,300	3,110	8	8	2,300	3,200	No test	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	19	19	0.69	2.4	8	8	1.4	2.6	0.890	0.773	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Silicon	19	19	4.5	17.9	8	8	2.6	9.8	No test	No test	No test	No test	No test	No	No	Soil component, no test
Silver	19	3	[0.07]	0.17	8	0	[0.07]	[0.09]	--	--	--	0.602	Equal	See Table 5-48	Yes	Not greater than reference, 0 of 1 test
Sodium	19	19	978	1,350	8	8	905	1,430	No test	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	10	10	0.08	0.15	3	3	0.08	0.17	0.432	0.962	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Thallium	19	0	[0.65]	[0.78]	8	0	[0.68]	[0.79]	No test	No test	No test	No test	No test	No	No	Not detected
Tin	19	9	[1]	2.6	8	4	[1]	2.4	--	0.864	0.487	0.767	Equal	No	No	Not greater than reference, 0 of 3 tests
Titanium	9	2	[0.03]	0.04	5	2	[0.03]	0.06	--	1	1	0.930	Equal	No	No	Not greater than reference, 0 of 3 tests
Uranium (inorganic)	19	1	[0.82]	[1.4]	8	1	[0.85]	[1.4]	--	--	1	0.882	Equal	No	No	Not greater than reference, 0 of 2 tests
Vanadium	19	0	[0.08]	[0.09]	8	0	[0.08]	[0.09]	No test	No test	No test	No test	No test	No	No	Not detected
Zinc	19	19	25.9	35.9	8	8	25.5	38.8	0.953	0.983	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Zirconium	9	9	0.43	0.81	5	5	0.71	0.78	0.946	0.890	0.643	--	--	No	No	Not greater than reference, 0 of 3 tests

[a] Study vs. reference.
[value] = nondetect
-- = not applicable
COPC = contaminant of potential concern
fw = fresh weight
No test = no statistical test performed
RCBRA = River Corridor Baseline Risk Assessment

Table 5-41. Summary of Statistical Comparisons to Reference for Riparian Mammal Carcass Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Inorganics (mg/kg-fw)																
Aluminum	19	19	15.2	176	8	8	17	115	0.176	0.864	0.704	--	--	No	No	Not greater than reference, 0 of 3 tests
Antimony	19	0	[0.21]	[0.43]	8	0	[0.21]	[0.43]	No test	No test	No test	No test	No test	No	No	Not detected
Arsenic	19	5	[0.39]	[0.6]	8	2	[0.39]	[0.6]	--	0.406	0.509	0.682	Equal	No	No	Not greater than reference, 0 of 3 tests
Barium	19	19	0.54	4.1	8	8	1.5	3.7	0.595	0.864	0.331	--	--	No	No	Not greater than reference, 0 of 3 tests
Beryllium	19	0	[0.01]	[0.02]	8	0	[0.01]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Bismuth	19	0	[0.38]	[0.5]	8	0	[0.38]	[0.5]	No test	No test	No test	No test	No test	No	No	Not detected
Boron	19	13	[0.34]	2.2	8	8	0.44	0.9	0.605	0.144	0.057	--	--	No	No	Not greater than reference, 0 of 3 tests
Cadmium	19	2	[0.05]	[0.07]	8	0	[0.05]	[0.07]	--	--	--	0.882	Equal	See Table 5-48	Yes	Not greater than reference, 0 of 1 test
Calcium	19	19	2,230	18,100	8	8	6,220	14,000	No test	No test	No test	No test	No test	No	No	Essential nutrient
Calculated total uranium	19	1	[0]	2.87	8	0	[0]	[0.0952]	--	0.450	0.778	0.649	Equal	No	No	Not greater than reference, 0 of 3 tests

Table 5-41. Summary of Statistical Comparisons to Reference for Riparian Mammal Carcass Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Chromium	19	19	0.13	0.87	8	8	0.42	0.91	0.837	0.773	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Cobalt	19	1	[0.08]	[0.14]	8	0	[0.08]	[0.14]	--	--	--	0.649	Equal	See Table 5-48	Yes	Not greater than reference, 0 of 1 test
Copper	19	19	2	15.3	8	8	2.9	6.4	0.271	0.144	0.144	--	--	No	No	Not greater than reference, 0 of 3 tests
Iron	19	19	32.5	188	8	8	82.4	216	0.850	0.864	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Lead	19	16	[0.32]	0.69	8	8	0.33	1.2	0.365	0.864	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Lithium	19	3	[0.03]	[0.1]	8	0	[0.07]	[0.16]	--	--	--	0.602	Equal	See Table 5-48	Yes	Not greater than reference, 0 of 1 test
Magnesium	19	19	121	788	8	8	339	564	No test	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	19	19	1	5.9	8	8	2.1	4.4	0.046	0.092	0.034	--	--	See Table 5-48	Yes	Greater than reference, 2 of 3 tests
Mercury	19	2	[0.01]	0.02	8	3	[0.01]	0.03	--	0.983	1	0.269	Equal	No	No	Not greater than reference, 0 of 3 tests
Molybdenum	19	13	0.16	0.39	8	3	0.25	0.42	--	0.528	1	0.287	Equal	No	No	Not greater than reference, 0 of 3 tests
Nickel	19	15	[0.23]	2.8	8	8	0.24	1.4	0.615	0.528	0.331	--	--	No	No	Not greater than reference, 0 of 3 tests
Phosphorus	19	19	1,730	11,900	8	8	4,850	8,640	0.163	0.144	0.144	--	--	No	No	Not greater than reference, 0 of 3 tests
Potassium	19	19	731	3,540	8	8	2,650	2,990	No test	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	19	18	[0.41]	1.1	8	8	0.5	1.1	0.183	0.864	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Silicon	19	19	18.9	76.1	8	8	25.3	74.6	No test	No test	No test	No test	No test	No	No	Soil component, no test
Silver	19	0	[0.07]	[0.09]	8	0	[0.07]	[0.09]	No test	No test	No test	No test	No test	No	No	Not detected
Sodium	19	19	331	3,400	8	8	1,270	1,640	No test	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	10	10	1.3	10.6	3	3	4	7.4	0.336	0.577	0.577	--	--	No	No	Not greater than reference, 0 of 3 tests
Thallium	19	0	[0.66]	[0.79]	8	0	[0.66]	[0.79]	No test	No test	No test	No test	No test	No	No	Not detected
Tin	19	8	[0.63]	[3.4]	8	3	[1]	[2.8]	--	0.864	0.485	0.836	Equal	No	No	Not greater than reference, 0 of 3 tests
Titanium	11	11	0.44	4.1	5	5	0.51	2	0.695	0.295	0.295	--	--	No	No	Not greater than reference, 0 of 3 tests
Uranium (inorganic)	19	4	[0.84]	1.4	8	2	[0.83]	1.5	--	0.864	1	0.778	Equal	No	No	Not greater than reference, 0 of 3 tests
Vanadium	19	6	[0.08]	0.13	8	3	[0.08]	0.14	--	0.663	1	0.882	Equal	No	No	Not greater than reference, 0 of 3 tests
Zinc	19	19	17.7	130	8	8	56.5	120	0.271	0.528	0.704	--	--	No	No	Not greater than reference, 0 of 3 tests
Zirconium	11	9	0.63	[1]	5	5	0.7	1.1	0.789	0.982	1	--	--	No	No	Not greater than reference, 0 of 3 tests
Organics (mg/kg-fw)																
1,2,4-Trichlorobenzene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
1,2-Dichlorobenzene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
1,3-Dichlorobenzene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
1,4-Dichlorobenzene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
2,4,5-Trichlorophenol	19	0	[7.1]	[12]	8	0	[6.8]	[11]	No test	No test	No test	No test	No test	No	No	Not detected
2,4,6-Trichlorophenol	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dichlorophenol	17	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dimethylphenol	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrophenol	18	0	[7.1]	[12]	8	0	[6.8]	[11]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrotoluene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
2,6-Dinitrotoluene	18	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
2-Chloronaphthalene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
2-Chlorophenol	17	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
2-Methylnaphthalene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected

Table 5-41. Summary of Statistical Comparisons to Reference for Riparian Mammal Carcass Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
2-Methylphenol [cresol, o-]	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
2-Nitroaniline	18	0	[7.1]	[12]	8	0	[6.8]	[11]	No test	No test	No test	No test	No test	No	No	Not detected
2-Nitrophenol	18	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
3+4 Methylphenol [cresol, m+p]	19	6	0.15	[4.3]	8	4	0.18	[4.5]	--	0.528	0.600	0.639	Equal	No	No	Not greater than reference, 0 of 3 tests
3,3'-Dichlorobenzidine	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
3-Nitroaniline	18	0	[7.1]	[12]	8	0	[6.8]	[11]	No test	No test	No test	No test	No test	No	No	Not detected
4,6-Dinitro-2-methylphenol	19	0	[7.1]	[12]	8	0	[6.8]	[11]	No test	No test	No test	No test	No test	No	No	Not detected
4-Bromophenylphenyl ether	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chloro-3-methylphenol	17	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chloroaniline	18	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chlorophenylphenyl ether	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
4-Nitroaniline	18	0	[7.1]	[12]	8	0	[6.8]	[11]	No test	No test	No test	No test	No test	No	No	Not detected
4-Nitrophenol	19	0	[7.1]	[12]	8	0	[6.8]	[11]	No test	No test	No test	No test	No test	No	No	Not detected
Acenaphthene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Acenaphthylene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Aldrin	19	3	[0.015]	0.047	8	1	[0.017]	0.028	--	--	0.487	0.709	Equal	No	No	Not greater than reference, 0 of 2 tests
Alpha-BHC	19	0	[0.015]	[0.019]	8	0	[0.016]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Anthracene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1016	19	0	[0.093]	[0.19]	8	0	[0.16]	[0.2]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1221	19	0	[0.093]	[0.19]	8	0	[0.16]	[0.2]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1232	19	0	[0.093]	[0.19]	8	0	[0.16]	[0.2]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1242	19	0	[0.093]	[0.19]	8	0	[0.16]	[0.2]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1248	19	0	[0.093]	[0.19]	8	0	[0.16]	[0.2]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1254	19	0	[0.093]	[0.19]	8	0	[0.16]	[0.2]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1260	19	1	[0.093]	0.24	8	0	[0.16]	[0.2]	--	--	--	0.649	Equal	See Table 5-48	Yes	Greater than reference, 0 of 1 test
Benzo[a]anthracene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[a]pyrene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[b]fluoranthene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[ghi]perylene	19	0	[2.9]	[4.8]	8	1	0.22	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[k]fluoranthene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-Chloroethoxy]methane	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-chloro-1-methylethyl]ether	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-chloroethyl] ether	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-ethylhexyl] phthalate	19	11	0.23	14	8	5	0.41	1.6	0.739	0.864	0.453	0.836	Equal	No	No	Not greater than reference, 0 of 4 tests
Butylbenzylphthalate	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Carbazole	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Chrysene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Delta-BHC	19	6	[0.015]	0.04	8	3	0.016	0.033	--	0.528	0.331	0.882	Equal	No	No	Not greater than reference, 0 of 3 tests
Di-n-butylphthalate	19	5	0.18	[4.8]	8	3	0.27	[4.5]	--	0.983	1	0.905	Equal	No	No	Not greater than reference, 0 of 3 tests
Di-n-octylphthalate	19	8	0.3	[3.9]	8	2	0.42	[4.3]	--	0.528	0.333	0.686	Equal	No	No	Not greater than reference, 0 of 3 tests

Table 5-41. Summary of Statistical Comparisons to Reference for Riparian Mammal Carcass Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Dibenz[a,h]anthracene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Dibenzofuran	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Dichlorodiphenyl-dichloroethane	19	0	[0.015]	[0.019]	8	0	[0.016]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
DDE	19	0	[0.015]	[0.019]	8	0	[0.016]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
DDT	19	0	[0.015]	[0.019]	8	0	[0.016]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Dieldrin	19	0	[0.015]	[0.019]	8	0	[0.016]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Diethylphthalate	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Dimethyl phthalate	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Endosulfan I	19	0	[0.015]	[0.019]	8	0	[0.016]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Endosulfan II	19	0	[0.015]	[0.019]	8	0	[0.016]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Endosulfan sulfate	19	0	[0.015]	[0.019]	8	0	[0.016]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Endrin	19	0	[0.015]	[0.019]	8	0	[0.016]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Endrin aldehyde	19	0	[0.015]	[0.019]	8	0	[0.016]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Endrin ketone	19	0	[0.015]	[0.019]	8	0	[0.016]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Fluoranthene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Fluorene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Gamma-BHC (lindane)	19	0	[0.015]	[0.019]	8	0	[0.016]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Heptachlor	19	0	[0.015]	[0.019]	8	0	[0.016]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Heptachlor epoxide	19	0	[0.015]	[0.019]	8	0	[0.016]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorobenzene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorobutadiene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorocyclopentadiene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachloroethane	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Indeno[1,2,3-cd]pyrene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Isophorone	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Methoxychlor	19	0	[0.015]	[0.019]	8	0	[0.016]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
N-Nitroso-di-n-dipropylamine	18	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
N-Nitrosodiphenylamine	18	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Naphthalene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Nitrobenzene	18	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Pentachlorophenol	19	0	[7.1]	[12]	8	0	[6.8]	[11]	No test	No test	No test	No test	No test	No	No	Not detected
Phenanthrene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Phenol	19	15	0.19	[4.3]	8	5	0.17	[4.5]	0.415	0.528	1	0.682	Equal	No	No	Not greater than reference, 0 of 4 tests
Pyrene	19	0	[2.9]	[4.8]	8	0	[2.7]	[4.5]	No test	No test	No test	No test	No test	No	No	Not detected
Toxaphene	19	0	[0.15]	[0.19]	8	0	[0.16]	[0.2]	No test	No test	No test	No test	No test	No	No	Not detected
alpha-Chlordane	19	0	[0.015]	[0.019]	8	0	[0.016]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
beta-1,2,3,4,5,6-Hexachlorocyclohexane	19	0	[0.015]	[0.019]	8	0	[0.016]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
gamma-Chlordane	19	0	[0.015]	[0.019]	8	0	[0.016]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Radionuclides (pCi/g-fw)																
Americium-241	19	0	[0.046]	[0.35]	8	0	[0.072]	[2.2]	No test	No test	No test	No test	No test	No	No	Not detected

Table 5-41. Summary of Statistical Comparisons to Reference for Riparian Mammal Carcass Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]			
Antimony-125	19	0	[0.082]	[0.296]	8	0	[0.095]	[1.4]	No test	No test	No test	No test	No test	No	No	Not detected
Beryllium-7	19	0	[0]	[0.82]	8	0	[0]	[8.1]	No test	No test	No test	No test	No test	No	No	Short half-life
Carbon-14	2	0	[-0.23]	[-0.106]	3	0	[-1.92]	[-0.622]	No test	No test	No test	No test	No test	No	No	Not detected
Cesium-134	19	0	[0.042]	[0.162]	8	0	[0.046]	[0.69]	No test	No test	No test	No test	No test	No	No	Short half-life
Cesium-137	19	0	[0.037]	[0.14]	8	0	[0.04]	[0.65]	No test	No test	No test	No test	No test	No	No	Not detected
Cobalt-60	19	0	[0.04]	[0.2]	8	0	[0.046]	[0.64]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-152	19	0	[0.092]	[0.365]	8	0	[0.103]	[1.5]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-154	19	0	[0.113]	[0.409]	8	0	[0.128]	[1.8]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-155	19	0	[0.073]	[0.29]	8	0	[0.089]	[1.4]	No test	No test	No test	No test	No test	No	No	Not detected
Potassium-40	19	7	[0]	4.15	8	4	[0]	[11]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-226	19	0	[0.077]	[0.286]	8	0	[0.079]	[1.1]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-228	19	0	[0.152]	[0.619]	8	0	[0.174]	[2.7]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Ruthenium-106	19	0	[0.3]	[1.02]	8	0	[0.318]	[5.7]	No test	No test	No test	No test	No test	No	No	Short half-life
Strontium-90	19	0	[-0.075]	[0.132]	8	0	[-0.067]	[0.096]	No test	No test	No test	No test	No test	No	No	Not detected
Technetium-99	2	0	[0.067]	[0.155]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Thorium-228	19	2	[-0.07]	0.18	8	0	[-0.007]	[0.186]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-230	19	4	[-0.136]	0.392	8	3	[-0.112]	0.786	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-232	19	2	[-0.038]	0.15	8	0	[-0.042]	[0.04]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Uranium-233/234	19	1	[0]	1.16	8	0	[0]	[0.064]	--	--	--	0.649	Equal	See Table 5-48	Yes	Not greater than reference, 0 of 1 test
Uranium-235	19	0	[0]	[0.034]	8	0	[0]	[0]	No test	No test	No test	No test	No test	No	No	Not detected
Uranium-238	19	1	[0]	0.96	8	0	[0]	[0.032]	--	--	--	0.649	Equal	See Table 5-48	Yes	Not greater than reference, 0 of 1 test

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
BHC = benzene hexachloride
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed
RCBRA = River Corridor Baseline Risk Assessment

Table 5-42. Summary of Statistical Comparisons to Reference for Riparian Mammal Organ (Brain or Liver) Data Collected for the 100-B/C Pilot Project.

Analyte	Study Site				Reference Site				Reference Comparison					Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]		
Inorganics (mg/kg-fw) in Liver															
Aluminum	5	4	[0.366]	1.27	8	2	[1.7]	[2.8]	--	1	1	0.173	Equal	No	Not greater than reference, 0 of 3 tests
Antimony	5	5	0.00732	0.0115	8	0	[0.21]	[0.43]	--	0.128	--	0.003	Greater	See text	Greater than reference sites, 1 of 2 tests
Arsenic	5	3	[0.0569]	0.195	8	3	0.58	0.73	--	1	1	0.826	Equal	No	Not greater than reference, 0 of 3 tests
Barium	8	5	0.0186	0.163	8	8	0.06	0.24	0.995	0.900	1	--	--	No	Not greater than reference, 0 of 3 tests
Beryllium	5	0	[0.00538]	[0.00538]	8	2	[0.01]	[0.02]	No test	No test	No test	No test	No test	No	Not detected
Cadmium	8	8	0.0423	0.117	8	8	0.06	0.44	0.993	1	1	--	--	No	Not greater than reference, 0 of 3 tests
Chromium	8	8	0.0871	0.195	8	8	0.15	0.24	0.994	0.900	1	--	--	No	Not greater than reference, 0 of 3 tests
Copper	5	5	4.07	5.72	8	8	4.8	11.3	0.983	1	1	--	--	No	Not greater than reference, 0 of 3 tests
Lead	8	1	[0.00887]	1.54	8	1	[0.3]	1	--	--	0.500	0.450	Equal	No	Not greater than reference, 0 of 2 tests
Manganese	8	7	1.6	2.61	8	8	1.8	2.9	0.937	0.900	1	--	--	No	Not greater than reference, 0 of 3 tests
Mercury	8	8	0.00529	0.0271	8	5	0.02	0.07	0.815	0.900	1	0.200	Equal	No	Not greater than reference, 0 of 4 tests
Nickel	8	2	[0.0128]	0.0222	8	0	[0.23]	[0.27]	--	--	--	0.450	Equal	See text	Not greater than reference, 0 of 1 tests
Selenium	8	8	1.09	2.51	8	8	1.4	2.6	0.563	0.900	1	--	--	No	Not greater than reference, 0 of 3 tests
Silver	5	0	[0.0127]	[0.0127]	8	0	[0.07]	[0.09]	No test	No test	No test	No test	No test	No	Not detected
Thallium	8	7	[0.00143]	0.0452	8	0	[0.68]	[0.79]	--	0.100	--	0.002	Greater	See text	Greater than reference sites, 1 of 2 tests
Uranium (inorganic)	8	0	[0.000858]	[0.00884]	8	1	[0.85]	[1.4]	No test	No test	No test	No test	No test	No	Not detected
Zinc	5	5	22	35.8	8	8	25.5	38.8	0.976	0.641	1	--	--	No	Not greater than reference, 0 of 3 tests
Organics (mg/kg-fw) in Brain															
Aroclor-1254	5	0	[0.0426]	[0.0625]	0	0	No reference data	No reference data	No reference data	No reference data	No reference data	No reference data	No reference data	No	Not detected
Aroclor-1260	5	0	[0.0426]	[0.0625]	0	0	No reference data	No reference data	No reference data	No reference data	No reference data	No reference data	No reference data	No	Not detected

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
fw = fresh weight
No ref data = no reference site data available

Table 5-43. Summary of Statistical Comparisons to Reference for Riparian Mammal Carcass Data Collected for the 100-B/C Pilot Project.

Analyte	Study Site				Reference Site				Reference Comparison					Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]		
Inorganics (mg/kg-fw)															
Barium	5	3	[0.228]	2.56	8	8	1.5	3.7	0.976	1	1	--	--	no	Not greater than reference, 0 of 3 tests
Cadmium	5	5	0.00818	0.0864	8	0	[0.05]	[0.07]	--	0.128	--	0.003	Greater	See text	Greater than reference sites, 1 of 2 tests
Chromium	5	5	0.137	0.255	8	8	0.42	0.91	0.999	1	1	--	--	no	Not greater than reference, 0 of 3 tests
Lead	5	4	[0.00902]	62.3	8	8	0.33	1.2	0.864	0.641	0.385	--	--	no	Not greater than reference, 0 of 3 tests
Manganese	5	4	[1.3]	4.04	8	8	2.1	4.4	0.983	1	1	--	--	no	Not greater than reference, 0 of 3 tests
Mercury	5	5	0.00727	0.0179	8	3	[0.01]	0.03	--	1	1	0.095	Equal	no	Not greater than reference, 0 of 3 tests
Nickel	5	3	[0.0146]	0.591	8	8	0.24	1.4	0.976	1	1	--	--	no	Not greater than reference, 0 of 3 tests
Selenium	5	3	[0.331]	2.1	8	8	0.5	1.1	0.967	0.641	0.385	--	--	no	Not greater than reference, 0 of 3 tests
Thallium	5	5	0.00231	0.00978	8	0	[0.66]	[0.79]	--	0.128	--	0.003	Greater	See text	Greater than reference sites, 1 of 2 tests
Uranium (inorganic)	5	4	[0.000873]	0.00326	8	2	[0.83]	1.5	--	1	1	0.173	Equal	no	Not greater than reference, 0 of 3 tests
Radionuclides (pCi/g-fw)															
Antimony-125	2	0	[0.00176]	[0.00448]	8	0	[0.095]	[1.4]	No test	No test	No test	No test	No test	no	Not detected
Beryllium-7	2	0	[-0.163]	[0.139]	8	0	[0]	[8.1]	No test	No test	No test	No test	No test	no	Half-life
Cesium-134	2	0	[-0.00223]	[0.00834]	8	0	[0.046]	[0.69]	No test	No test	No test	No test	No test	no	Half-life
Cesium-137	2	0	[-0.0228]	[0.0203]	8	0	[0.04]	[0.65]	No test	No test	No test	No test	No test	no	Not detected
Cobalt-60	2	0	[0.00556]	[0.0121]	8	0	[0.046]	[0.64]	No test	No test	No test	No test	No test	no	Not detected
Europium-152	2	0	[-0.000819]	[0.0133]	8	0	[0.103]	[1.5]	No test	No test	No test	No test	No test	no	Not detected
Europium-154	2	0	[-0.0232]	[0.0102]	8	0	[0.128]	[1.8]	No test	No test	No test	No test	No test	no	Not detected
Europium-155	2	0	[-0.0124]	[0.00872]	8	0	[0.089]	[1.4]	No test	No test	No test	No test	No test	no	Not detected
Potassium-40	2	2	2.63	3.3	8	4	[0]	[11]	No test	No test	No test	No test	No test	no	Background radionuclide
Ruthenium-106	2	0	[-0.0525]	[0.0305]	8	0	[0.318]	[5.7]	No test	No test	No test	No test	No test	no	Half-life
Strontium-90	9	4	[-0.000133]	0.0778	8	0	[-0.067]	[0.096]	--	--	--	0.712	Equal	See text	Not greater than reference, 0 of 1 tests
Technetium-99	9	1	[-0.0894]	0.194	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed

Table 5-44. Summary of Statistical Comparisons to Reference for Riparian Mammal Organ (Brain or Liver) Data Collected for the 100-NR-2 Operable Unit Project. (2 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]		
Inorganics (mg/kg-fw) in Liver															
Antimony	6	6	0.005	0.018	8	0	[0.21]	[0.43]	--	0.165	--	0.001	Greater	See text	Greater than reference sites, 1 of 2 tests
Arsenic	6	6	0.46	0.68	8	3	0.58	0.73	--	0.692	1	0.064	Equal	No	Not greater than reference, 0 of 3 tests
Barium	6	6	0.011	0.076	8	8	0.06	0.24	0.997	1	1	--	--	No	Not greater than reference, 0 of 3 tests
Cadmium	6	6	0.026	0.092	8	8	0.06	0.44	0.997	1	1	--	--	No	Not greater than reference, 0 of 3 tests
Chromium	6	6	0.033	0.068	8	8	0.15	0.24	0.999	1	1	--	--	No	Not greater than reference, 0 of 3 tests
Lead	6	6	0.04	14	8	1	[0.3]	1	--	0.165	0.165	0.007	Greater	See text	Greater than reference sites, 1 of 3 tests
Manganese	6	6	1.9	4.3	8	8	1.8	2.9	0.109	0.165	0.015	--	--	See text	Greater than reference sites, 1 of 3 tests
Mercury	6	6	0.0095	0.024	8	5	0.02	0.07	0.474	1	1	0.301	Equal	No	Not greater than reference, 0 of 4 tests
Nickel	6	1	[0.016]	0.017	8	0	[0.23]	[0.27]	--	--	--	0.881	Equal	See text	Not greater than reference, 0 of 1 tests
Selenium	6	6	1.50	2.7	8	8	1.4	2.6	0.239	0.692	0.429	--	--	No	Not greater than reference, 0 of 3 tests
Uranium (inorganic)	6	0	[0.0029]	[0.0029]	8	1	[0.85]	[1.4]	No test	No test	No test	No test	No test	No	Not detected
Vanadium	6	0	[0.013]	[0.013]	8	0	[0.08]	[0.09]	No test	No test	No test	No test	No test	No	Not detected
Zinc	6	6	29	41	8	8	26	39	0.110	0.165	0.165	--	--	No	Not greater than reference, 0 of 3 tests
PCB Congeners (mg/kg-fw) in Brain															
1,1',2,3',4,4',5-Pentachlorobiphenyl	9	0	[0.00059]	[0.00083]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	9	0	[0.00059]	[0.00083]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	9	1	[0.00059]	0.0011	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
2,2',3,3',4,4',5,6-Octachlorobiphenyl	9	0	[0.00059]	[0.00083]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,2',3,3',4,4',5-Heptachlorobiphenyl	9	0	[0.00059]	[0.00083]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,2',3,3',4,4'-Hexachlorobiphenyl	9	0	[0.00059]	[0.00083]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	9	0	[0.00059]	[0.00083]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,2',3,4',5,5',6-Heptachlorobiphenyl	9	2	[0.00059]	0.0016	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
2,2',3,4,4',5'-Hexachlorobiphenyl	9	5	[0.00064]	0.0022	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
2,2',3,4,4',5,5'-Heptachlorobiphenyl	9	0	[0.00059]	[0.00083]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,2',3,5'-Tetrachloro-1-1'-biphenyl	9	0	[0.00059]	[0.00083]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected

Table 5-44. Summary of Statistical Comparisons to Reference for Riparian Mammal Organ (Brain or Liver) Data Collected for the 100-NR-2 Operable Unit Project. (2 Pages)

Analyte	Study Site				Reference Site				Reference Comparison					Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]		
2,2',4,4',5,5',-Hexachlorobiphenyl	9	1	[0.00059]	0.00087	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
2,2',4,5,5'-Pentachlorobiphenyl	9	0	[0.00059]	[0.00083]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,2',5,5'-Tetrachlorobiphenyl	9	0	[0.00059]	[0.00083]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,2',5-Trichlorobiphenyl	9	0	[0.00059]	[0.00083]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,3',4,4'-Tetrachlorobiphenyl	9	1	[0.00059]	[0.00083]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
2,3,3',4,4'-Pentachlorobiphenyl	9	0	[0.00059]	[0.00083]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,4'-Dichlorobiphenyl	9	0	[0.00059]	[0.00083]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,4,4'-Trichlorobiphenyl	9	2	[0.00064]	0.0012	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
3,3',4,4',5-Pentachlorobiphenyl	9	0	[0.00059]	[0.001]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
3,3',4,4'-Tetrachlorobiphenyl	9	6	[0.00059]	0.0025	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
Total PCB	9	9	0.024	0.031	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
fw = fresh weight
No test = no statistical test performed
PCB = polychlorinated biphenyl

Table 5-45. Summary of Statistical Comparisons to Reference for Riparian Mammal Carcass Data Collected for the 100-NR-2 Operable Unit Project.

Analyte	Study Site				Reference Site				Reference Comparison					Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value	Detect Rate Difference [a]		
Radionuclides (pCi/g-fw)															
Strontium-90	6	5	[0.011]	7.8	8	0	[-0.067]	[0.096]	--	0.165	--	0.008	Greater	See text	Greater than reference, 1 of 2 tests
Technetium-99	6	4	[0.029]	0.075	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data

[a] Study vs. reference.
[value] = nondetect
-- = not applicable
fw = fresh weight
No ref data = no reference site data available

Table 5-46. Overview of Statistical Comparisons for Riparian Soil, Plant, and Invertebrate Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Soil Study Area Summary				Plant Study Area Summary				Invertebrate Study Area Summary				COPC for Riparian?
	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	
Inorganics (mg/kg or mg/kg-fw)													
Aluminum	98	1	11,700	No	36	0.75	296	No	18	1	91.2	No	No, see Table 5-48
Antimony	93	0.054	[0.9]	No	36	0.11	[2.4]	No	18	0	[0.67]	No	No
Arsenic	98	1	19.3	TBD	36	0	[3.3]	No	18	0.78	1.7	No	Yes, see Table 5-48
Barium	98	1	206	No	36	1	26	TBD	18	1	22.8	TBD	Yes, see Table 5-48
Beryllium	98	0.97	0.81	TBD	36	0.028	[0.11]	No	18	0	[0.03]	No	No, see Table 5-48
Bismuth	98	0	[1.8]	No	36	0	[2.7]	No	18	0	[0.77]	No	No
Boron	98	0.91	3.1	No	36	0.92	39.7	No	18	0.94	3.9	No	No, see Table 5-48
Cadmium	98	1	2.9	TBD	36	0.083	1.1	No	18	0.94	1.1	TBD	Yes, see Table 5-48
Calcium	98	1	6,250	No	36	1	13,200	No	18	1	8,410	No	No
Calculated total uranium	98	0.94	8.1	TBD	36	0.028	0.984	No	9	0.11	0.696	No	Yes, see Table 5-48
Chromium	98	1	190	Yes	36	0.64	3	No	18	0.89	0.86	No	Yes, see Table 5-48
Cobalt	98	1	8.8	No	36	0.056	[0.75]	No	18	0.11	[0.21]	TBD	No, see Table 5-48
Copper	98	1	75.7	TBD	36	0.89	9.8	TBD	18	1	29.5	TBD	Yes, see Table 5-48
Hexavalent chromium	96	0.25	[2]	No	--	--	--	--	--	--	--	--	Yes, see Table 5-48
Iron	98	1	29,900	No	36	0.58	604	No	18	1	203	No	No
Lead	98	1	125	TBD	36	0.14	[1.7]	No	18	0.28	0.49	No	Yes, see Table 5-48
Lithium	98	1	14.5	TBD	36	0.53	0.37	No	18	0.5	[0.18]	No	No, see Table 5-48
Magnesium	98	1	5,830	No	36	1	3,070	No	18	1	804	No	No
Manganese	98	1	458	No	36	1	53.8	No	18	1	55.9	TBD	No, see Table 5-48
Mercury	98	0.94	0.184	TBD	36	0	[0.08]	No	18	0.39	0.1	No	Yes, see Table 5-48
Molybdenum	98	0.9	1.3	TBD	36	0.44	1.7	No	18	0.67	0.45	No	No, see Table 5-48
Nickel	98	1	28.5	TBD	36	0.89	8.4	No	18	0.44	0.78	No	No, see Table 5-48
Phosphorus	98	1	1,180	No	36	1	7,260	TBD	18	1	2,820	No	No, see Table 5-48
Potassium	98	1	1,770	No	36	1	32,200	No	18	1	3,040	No	No
Selenium	98	0.031	[1.8]	No	36	0.028	[2.5]	No	18	0.5	1.8	No	Yes, see Table 5-48
Silicon	98	1	3,640	No	36	1	832	No	18	1	148	No	No

Table 5-46. Overview of Statistical Comparisons for Riparian Soil, Plant, and Invertebrate Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Soil Study Area Summary				Plant Study Area Summary				Invertebrate Study Area Summary				COPC for Riparian?
	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	
Silver	98	0.082	[0.36]	No	36	0.028	[0.38]	No	18	0.11	[0.11]	TBD	Yes, see Table 5-48
Sodium	98	1	307	No	36	0.56	63.5	No	18	1	1140	No	No
Strontium (elemental)	98	1	35.9	No	36	1	48.7	No	9	1	14.4	TBD	No, see Table 5-48
Thallium	98	0.02	[3.2]	No	36	0	[3.8]	No	18	0	[1.1]	No	Yes, see Table 5-48
Tin	98	0.74	10.2	No	36	0.028	[5.8]	No	18	0	[3.2]	No	No
Titanium	--	--	--	--	20	1	23	No	9	1	1.6	No	No
Uranium (inorganic)	98	0.28	[15]	No	36	0.11	6.3	TBD	18	0.056	1.9	TBD	Yes, see Table 5-48
Vanadium	98	1	89.4	No	36	0.28	0.95	No	18	0.44	0.28	No	Yes, see Table 5-48
Zinc	98	1	621	TBD	36	1	72.6	Yes	18	1	99.4	TBD	Yes, see Table 5-48
Zirconium	--	--	--	--	20	0	[5.7]	No	9	0	[1.6]	No	No
Polycyclic Aromatic Hydrocarbons (mg/kg or mg/kg-fw)													
2-Methylnaphthalene	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
Acenaphthene	98	0	[0.66]	No	34	0	[74]	No	1	0	[0.787]	No	No
Acenaphthylene	98	0	[0.66]	No	34	0	[74]	No	1	0	[0.787]	No	No
Anthracene	98	0.01	[0.66]	TBD	34	0	[74]	No	1	0	[0.0787]	No	No, see Table 5-48
Benzo[a]anthracene	98	0.051	[0.66]	TBD	34	0	[74]	No	1	0	[0.0787]	No	No, see Table 5-48
Benzo[a]pyrene	98	0.092	[0.66]	TBD	34	0	[74]	No	1	0	[0.0787]	No	No, see Table 5-48
Benzo[b]fluoranthene	98	0.082	[0.66]	TBD	34	0	[74]	No	1	0	[0.0787]	No	No, see Table 5-48
Benzo[ghi]perylene	98	0.051	[0.66]	TBD	34	0	[74]	No	1	0	[0.0787]	No	No, see Table 5-48
Benzo[k]fluoranthene	98	0.051	[0.66]	TBD	34	0.029	[74]	TBD	1	0	[0.0787]	No	No, see Table 5-48
Chrysene	98	0.12	[0.66]	TBD	34	0	[74]	No	1	0	[0.0787]	No	No, see Table 5-48
Dibenz[a,h]anthracene	98	0.02	[0.66]	TBD	34	0	[74]	No	1	0	[0.0787]	No	No, see Table 5-48
Fluoranthene	98	0.051	[0.66]	TBD	34	0	[74]	No	1	0	[0.0787]	No	Yes, see Table 5-48
Fluorene	98	0	[0.66]	No	34	0	[74]	No	1	0	[0.0787]	No	No
Indeno[1,2,3-cd]pyrene	98	0.051	[0.66]	TBD	34	0	[74]	No	1	0	[0.0787]	No	No, see Table 5-48
Naphthalene	98	0	[0.66]	No	34	0	[74]	No	1	0	[0.787]	No	No
Phenanthrene	98	0.041	[0.66]	TBD	34	0	[74]	No	1	0	[0.0787]	No	No, see Table 5-48
Pyrene	98	0.15	[0.66]	TBD	34	0	[74]	No	1	0	[0.0787]	No	Yes, see Table 5-48
Polychlorinated Biphenyls (mg/kg or mg/kg-fw)													
Aroclor-1016	98	0	[0.018]	No	36	0	[0.87]	No	--	--	--	--	No
Aroclor-1221	98	0	[0.018]	No	36	0	[0.87]	No	--	--	--	--	No
Aroclor-1232	98	0	[0.018]	No	36	0	[0.87]	No	--	--	--	--	No
Aroclor-1242	98	0	[0.018]	No	36	0	[0.87]	No	--	--	--	--	No
Aroclor-1248	98	0	[0.018]	No	36	0	[0.87]	No	--	--	--	--	No
Aroclor-1254	98	0.01	[0.018]	No	36	0	[0.87]	No	--	--	--	--	No
Aroclor-1260	98	0.082	[0.018]	TBD	36	0	[0.87]	No	--	--	--	--	Yes, see Table 5-48
Pesticides (mg/kg or mg/kg-fw)													
Aldrin	98	0.041	0.0023	No	36	0.11	[0.087]	TBD	--	--	--	--	Yes, see Table 5-48
Dieldrin	98	0.031	0.022	TBD	36	0.17	[0.087]	No	--	--	--	--	Yes, see Table 5-48
Methoxychlor	98	0.041	0.0022	No	36	0.11	[0.087]	No	--	--	--	--	No
Pesticides - Benzene Hexachloride (mg/kg or mg/kg-fw)													
Alpha-BHC	98	0.031	0.0027	TBD	36	0.19	[0.087]	TBD	--	--	--	--	No, see Table 5-48
beta-1,2,3,4,5,6-Hexachlorocyclohexane	98	0.02	0.0021	No	36	0.028	[0.087]	No	--	--	--	--	No

Table 5-46. Overview of Statistical Comparisons for Riparian Soil, Plant, and Invertebrate Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Soil Study Area Summary				Plant Study Area Summary				Invertebrate Study Area Summary				COPC for Riparian?
	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	
Delta-BHC	98	0.041	0.0021	No	36	0.083	[0.087]	No	--	--	--	--	No, see Table 5-48
Gamma-BHC (lindane)	98	0.02	0.0026	TBD	36	0.28	[0.087]	No	--	--	--	--	No, see Table 5-48
Pesticides - Chlordane (mg/kg or mg/kg-fw)													
alpha-Chlordane	98	0.01	[0.0018]	TBD	36	0.028	[0.087]	TBD	--	--	--	--	No, see Table 5-48
gamma-Chlordane	98	0.031	0.0046	No	36	0.22	[0.087]	TBD	--	--	--	--	No, see Table 5-48
Pesticides - DDT (mg/kg or mg/kg-fw)													
Dichlorodiphenyldichloroethane	98	0.051	0.0027	No	36	0	[0.087]	No	--	--	--	--	Yes, see Table 5-48
Dichlorodiphenyldichloroethylene	98	0.48	0.011	No	36	0.083	0.15	No	--	--	--	--	No
Dichlorodiphenyltrichloroethane	98	0.2	0.013	No	36	0.028	[0.087]	No	--	--	--	--	No, see Table 5-48
Pesticides - Endosulfan (mg/kg or mg/kg-fw)													
Endosulfan I	98	0.31	0.011	No	36	0.22	[0.087]	No	--	--	--	--	No
Endosulfan II	98	0	[0.0018]	No	36	0.14	[0.087]	TBD	--	--	--	--	No, see Table 5-48
Endosulfan sulfate	98	0.041	0.13	No	36	0.056	[0.087]	TBD	--	--	--	--	Yes, see Table 5-48
Pesticides - Endrin (mg/kg or mg/kg-fw)													
Endrin	98	0	[0.0018]	No	36	0.17	0.21	TBD	--	--	--	--	No
Endrin aldehyde	98	0.041	0.12	No	36	0.11	[0.087]	TBD	--	--	--	--	Yes, see Table 5-48
Endrin ketone	98	0	[0.0018]	No	36	0.11	[0.087]	No	--	--	--	--	No
Pesticides - Heptachlor (mg/kg or mg/kg-fw)													
Heptachlor	98	0	[0.0018]	No	36	0.028	[0.087]	No	--	--	--	--	No
Heptachlor epoxide	98	0.01	[0.0018]	TBD	36	0.028	[0.087]	No	--	--	--	--	Yes, see Table 5-48
Phthalates (mg/kg or mg/kg-fw)													
Bis[2-ethylhexyl] phthalate	98	0.98	0.8	TBD	34	0.24	[74]	No	--	--	--	--	Yes, see Table 5-48
Butylbenzylphthalate	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	Yes, see Table 5-48
Di-n-butylphthalate	98	0.48	[0.66]	No	34	0.059	[74]	No	--	--	--	--	No
Di-n-octylphthalate	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
Diethylphthalate	98	0.21	[0.66]	No	34	0	[74]	No	--	--	--	--	No, see Table 5-48
Dimethyl phthalate	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
Semivolatile Organic Compounds (mg/kg or mg/kg-fw)													
1,2-Dichlorobenzene	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
1,2,4-Trichlorobenzene	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
1,3-Dichlorobenzene	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
1,4-Dichlorobenzene	98	0.01	[0.66]	TBD	34	0	[74]	No	--	--	--	--	No, see Table 5-48
2-Chloronaphthalene	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
2-Chlorophenol	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
2-Methylphenol [cresol, o-]	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
2-Nitroaniline	98	0	[1.7]	No	34	0	[180]	No	--	--	--	--	No
2-Nitrophenol	98	0.01	[0.66]	TBD	34	0	[74]	No	--	--	--	--	No, see Table 5-48
2,4-Dichlorophenol	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
2,4-Dimethylphenol	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
2,4-Dinitrophenol	98	0	[1.7]	No	34	0	[180]	No	--	--	--	--	No
2,4-Dinitrotoluene	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
2,4,5-Trichlorophenol	98	0	[1.7]	No	34	0	[180]	No	--	--	--	--	No
2,4,6-Trichlorophenol	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No

Table 5-46. Overview of Statistical Comparisons for Riparian Soil, Plant, and Invertebrate Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Soil Study Area Summary				Plant Study Area Summary				Invertebrate Study Area Summary				COPC for Riparian?
	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	
2,6-Dinitrotoluene	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
3-Nitroaniline	98	0	[1.7]	No	34	0	[180]	No	--	--	--	--	No
3,3'-Dichlorobenzidine	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
3+4 Methylphenol [cresol, m+p]	98	0	[0.66]	No	34	0.12	[74]	TBD	--	--	--	--	No, see Table 5-48
4-Bromophenylphenyl ether	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
4-Chloro-3-methylphenol	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
4-Chloroaniline	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
4-Chlorophenylphenyl ether	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
4-Nitroaniline	98	0	[1.7]	No	34	0	[180]	No	--	--	--	--	No
4-Nitrophenol	98	0	[1.7]	No	34	0	[180]	No	--	--	--	--	No
4,6-Dinitro-2-methylphenol	98	0	[1.7]	No	34	0	[180]	No	--	--	--	--	No
Bis[2-chloro-1-methylethyl]ether	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
Bis[2-Chloroethoxy]methane	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
Bis[2-chloroethyl] ether	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
Carbazole	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
Dibenzofuran	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
Hexachlorobenzene	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
Hexachlorobutadiene	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
Hexachlorocyclopentadiene	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
Hexachloroethane	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
Isophorone	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
N-Nitroso-di-n-dipropylamine	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
N-Nitrosodiphenylamine	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
Nitrobenzene	98	0	[0.66]	No	34	0	[74]	No	--	--	--	--	No
Pentachlorophenol	98	0	[1.7]	No	34	0.029	[180]	TBD	--	--	--	--	No, see Table 5-48
Phenol	98	0.45	[0.66]	TBD	34	0.12	[74]	TBD	--	--	--	--	Yes, see Table 5-48
Toxaphene	98	0	[0.018]	No	36	0	[0.87]	No	--	--	--	--	No
Anions (mg/kg)													
Bromide	10	0	[2.5]	No	--	--	--	--	--	--	--	--	No
Nitrogen in nitrate	124	0.98	48.8	No	--	--	--	--	--	--	--	--	No, see Table 5-48
Nitrogen in nitrite	36	0.5	[1.24]	No	--	--	--	--	--	--	--	--	No, see Table 5-48
Nitrogen in nitrite and nitrate	98	1	52.6	TBD	--	--	--	--	--	--	--	--	No, see Table 5-48
Phosphate	10	0	[2.5]	No	--	--	--	--	--	--	--	--	No
Radionuclides (pCi/g or pCi/g-fw)													
Americium-241	88	0	[0.91]	No	36	0	[0.8]	No	--	--	--	--	No
Antimony-125	30	0	[0.28]	No	36	0	[0.52]	No	--	--	--	--	No
Barium-133	15	0	[0.13]	No	--	--	--	--	--	--	--	--	No
Beryllium-7	15	0	[1.3]	No	36	0.028	3.11	No	--	--	--	--	No
Carbon-14	10	0.3	112	TBD	6	0.17	12.5	No	--	--	--	--	Yes, see Table 5-48
Cesium-134	98	0	[0.27]	No	36	0	[0.26]	No	--	--	--	--	No
Cesium-137	98	0.77	2.69	TBD	36	0	[0.21]	No	--	--	--	--	Yes, see Table 5-48
Cobalt-60	98	0	[0.24]	No	36	0	[0.27]	No	--	--	--	--	No
Europium-152	98	0.16	[1.3]	TBD	36	0	[0.53]	No	--	--	--	--	Yes, see Table 5-48

Table 5-46. Overview of Statistical Comparisons for Riparian Soil, Plant, and Invertebrate Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Soil Study Area Summary				Plant Study Area Summary				Invertebrate Study Area Summary				COPC for Riparian?
	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	
Europium-154	98	0	[0.75]	No	36	0	[0.73]	No	--	--	--	--	No
Europium-155	98	0.01	[0.4]	TBD	36	0	[0.53]	No	--	--	--	--	No, see Table 5-48
Potassium-40	98	0.96	31.2	No	36	0.69	10.4	No	--	--	--	--	No
Radium-226	98	0.99	2.03	No	36	0	[0.48]	No	--	--	--	--	No
Radium-228	98	0.9	2.85	No	36	0	[0.99]	No	--	--	--	--	No
Ruthenium-106	15	0	[0.87]	No	36	0	[2.1]	No	--	--	--	--	No
Strontium-90	98	0.01	0.355	TBD	36	0.083	10.1	TBD	8	0	[0.022]	No	Yes, see Table 5-48
Technetium-99	20	0.5	1.43	TBD	4	0	[0.182]	No	2	0	[0.179]	No	Yes, see Table 5-48
Thorium-228	98	0.76	2.03	No	36	0.028	[0.138]	No	8	0	[0.233]	No	No
Thorium-230	98	0.48	1.08	No	36	0.19	0.322	No	8	0	[0.252]	No	No
Thorium-232	98	0.77	2.31	No	36	0	[0.042]	No	8	0	[0.233]	No	No
Tritium	--	--	--	--	12	0	[3.36]	No	--	--	--	--	No
Uranium-233/234	98	0.99	4.3	TBD	36	0.028	0.225	TBD	9	0	[0.077]	No	Yes, see Table 5-48
Uranium-235	98	0.031	[0.272]	No	36	0	[0.042]	No	9	0	[0.032]	No	No, see Table 5-48
Uranium-238	98	0.94	2.7	TBD	36	0.028	0.326	TBD	9	0.11	0.234	TBD	Yes, see Table 5-48

-- = not applicable
BHC = benzene hexachloride
COPEC = contaminant of potential ecological concern
DDT = dichlorodiphenyltrichloroethane
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment
TBD = to be determined

Table 5-47. Overview of Statistical Comparisons for Riparian Bird and Mammal Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Bird Crop Study Area Summary				Bird Study Area Summary				Mammal Organs Study Area Summary				Mammal Study Area Summary				COPC for Riparian?
	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	
Inorganics (mg/kg-fw)																	
Aluminum	9	1	50.1	No	15	0.73	66	No	19	0.47	6.5	TBD	19	1	176	No	No, see Table 5-48
Antimony	9	0.11	[2.2]	No	15	0.067	0.43	No	19	0	[0.44]	No	19	0	[0.43]	No	No
Arsenic	9	0.33	[3]	No	15	0.067	[0.6]	No	19	0.58	0.75	No	19	0.26	[0.6]	No	Yes, see Table 5-48
Barium	9	1	22.3	No	15	1	2.3	No	19	1	0.16	No	19	1	4.1	No	Yes, see Table 5-48
Beryllium	9	0.44	0.11	No	15	0.4	[0.02]	No	19	0.32	0.03	No	19	0	[0.02]	No	No, see Table 5-48
Bismuth	9	0	[2.6]	No	15	0	[0.5]	No	19	0	[0.51]	No	19	0	[0.5]	No	No
Boron	9	1	12.7	TBD	15	0.27	0.43	No	19	0.37	0.87	No	19	0.68	2.2	No	No, see Table 5-48
Cadmium	9	0.56	0.76	No	15	0.33	0.27	No	19	1	0.93	No	19	0.11	[0.07]	TBD	Yes, see Table 5-48
Calcium	9	1	124,000	No	15	1	8,700	No	19	1	145	No	19	1	18,100	No	No
Calculated total uranium	3	0	[0.0199]	No	15	0.067	2.51	No	--	--	--	--	19	0.053	2.87	No	Yes, see Table 5-48
Chromium	9	0.67	[0.65]	No	15	1	1.7	No	19	0.95	0.47	No	19	1	0.87	No	Yes, see Table 5-48
Cobalt	9	0	[0.7]	No	15	0	[0.14]	No	19	0	[0.14]	No	19	0.053	[0.14]	TBD	No, see Table 5-48
Copper	9	1	12.6	No	15	1	14.3	No	19	1	7.2	No	19	1	15.3	No	Yes, see Table 5-48
Iron	9	1	174	No	15	1	197	No	19	1	182	No	19	1	188	No	No
Lead	9	0	[1.6]	No	15	0	[0.33]	No	19	0	[0.32]	No	19	0.84	0.69	No	Yes, see Table 5-48
Lithium	9	0.78	0.29	No	15	1	0.08	No	19	0.74	0.16	TBD	19	0.16	[0.1]	TBD	No, see Table 5-48

Table 5-47. Overview of Statistical Comparisons for Riparian Bird and Mammal Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Bird Crop Study Area Summary				Bird Study Area Summary				Mammal Organs Study Area Summary				Mammal Study Area Summary				COPC for Riparian?
	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	
Magnesium	9	1	706	No	15	1	352	No	19	1	245	No	19	1	788	No	No
Manganese	9	1	14.2	No	15	1	3.3	No	19	1	3	No	19	1	5.9	TBD	No, see Table 5-48
Mercury	9	0.22	[0.08]	TBD	15	0.67	0.05	No	19	0.32	0.13	No	19	0.11	0.02	No	Yes, see Table 5-48
Molybdenum	9	0.89	16.8	No	15	0.4	[0.28]	No	19	1	1.9	No	19	0.68	0.39	No	No, see Table 5-48
Nickel	9	0.22	[1.2]	No	15	0.27	0.65	No	19	0.053	[0.26]	TBD	19	0.79	2.8	No	No, see Table 5-48
Phosphorus	9	1	1,930	No	15	1	5,820	No	19	1	3,510	No	19	1	11,900	No	No, see Table 5-48
Potassium	9	1	2,170	No	15	1	2,570	No	19	1	3,110	No	19	1	3,540	No	No
Selenium	9	0.56	[2.4]	No	15	1	2.2	TBD	19	1	2.4	No	19	0.95	1.1	No	Yes, see Table 5-48
Silicon	9	1	131	No	15	1	117	No	19	1	17.9	No	19	1	76.1	No	No
Silver	9	0	[0.35]	No	15	0.4	0.12	TBD	19	0.16	0.17	TBD	19	0	[0.09]	No	Yes, see Table 5-48
Sodium	9	1	2,550	No	15	1	2,020	No	19	1	1,350	No	19	1	3,400	No	No
Strontium (elemental)	9	1	119	No	15	1	6.8	No	10	1	0.15	No	10	1	10.6	No	No, see Table 5-48
Thallium	9	0	[3.5]	No	15	0	[0.79]	No	19	0	[0.78]	No	19	0	[0.79]	No	Yes, see Table 5-48
Tin	9	0.56	5.4	No	15	0.67	2.4	No	19	0.47	2.6	No	19	0.42	[3.4]	No	No
Titanium	5	1	7.5	No	7	1	0.28	No	9	0.22	0.04	No	11	1	4.1	No	No
Uranium (inorganic)	9	0	[4.4]	No	15	0.067	[1.4]	TBD	19	0.053	[1.4]	No	19	0.21	1.4	No	Yes, see Table 5-48
Vanadium	9	0.44	0.49	No	15	0.13	0.11	No	19	0	[0.09]	No	19	0.32	0.13	No	Yes, see Table 5-48
Zinc	9	1	56.4	No	15	1	69.7	No	19	1	35.9	No	19	1	130	No	Yes, see Table 5-48
Zirconium	5	0	[5.3]	No	7	0	[0.86]	No	9	1	0.81	No	11	0.82	[1]	No	No
Polycyclic Aromatic Hydrocarbons (mg/kg-fw)																	
2-Methylnaphthalene	--	--	--	--	2	0	[3.2]	No	--	--	--	--	19	0	[4.8]	No	No
Acenaphthene	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No
Acenaphthylene	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No
Anthracene	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No, see Table 5-48
Benzo[a]anthracene	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No, see Table 5-48
Benzo[a]pyrene	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No, see Table 5-48
Benzo[b]fluoranthene	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No, see Table 5-48
Benzo[ghi]perylene	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No, see Table 5-48
Benzo[k]fluoranthene	--	--	--	--	2	0	[4]	No	--	--	--	--	19	0	[4.8]	No	No, see Table 5-48
Chrysene	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No, see Table 5-48
Dibenz[a,h]anthracene	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No, see Table 5-48
Fluoranthene	--	--	--	--	2	0	[3.2]	No	--	--	--	--	19	0	[4.8]	No	Yes, see Table 5-48
Fluorene	--	--	--	--	2	0	[4]	No	--	--	--	--	19	0	[4.8]	No	No
Indeno[1,2,3-cd]pyrene	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No, see Table 5-48
Naphthalene	--	--	--	--	2	0	[3.2]	No	--	--	--	--	19	0	[4.8]	No	No
Phenanthrene	--	--	--	--	2	0	[3.2]	No	--	--	--	--	19	0	[4.8]	No	No, see Table 5-48
Pyrene	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	Yes, see Table 5-48
Polychlorinated Biphenyls (mg/kg-fw)																	
Aroclor-1016	--	--	--	--	1	0	[0.02]	No	--	--	--	--	19	0	[0.19]	No	No
Aroclor-1221	--	--	--	--	1	0	[0.02]	No	--	--	--	--	19	0	[0.19]	No	No
Aroclor-1232	--	--	--	--	1	0	[0.02]	No	--	--	--	--	19	0	[0.19]	No	No
Aroclor-1242	--	--	--	--	1	0	[0.02]	No	--	--	--	--	19	0	[0.19]	No	No
Aroclor-1248	--	--	--	--	1	0	[0.02]	No	--	--	--	--	19	0	[0.19]	No	No
Aroclor-1254	--	--	--	--	1	1	0.064	No	--	--	--	--	19	0	[0.19]	No	No
Aroclor-1260	--	--	--	--	1	0	[0.02]	No	--	--	--	--	19	0.053	0.24	TBD	Yes, see Table 5-48
Pesticides (mg/kg-fw)																	
Aldrin	--	--	--	--	1	0	[0.002]	No	--	--	--	--	19	0.16	0.047	No	Yes, see Table 5-48
Dieldrin	--	--	--	--	1	0	[0.002]	No	--	--	--	--	19	0	[0.019]	No	Yes, see Table 5-48
Methoxychlor	--	--	--	--	1	1	0.008	No	--	--	--	--	19	0	[0.019]	No	No

Table 5-47. Overview of Statistical Comparisons for Riparian Bird and Mammal Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Bird Crop Study Area Summary				Bird Study Area Summary				Mammal Organs Study Area Summary				Mammal Study Area Summary				COPC for Riparian?
	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	
Pesticides - Benzene Hexachloride (mg/kg-fw)																	
Alpha-BHC	--	--	--	--	1	0	[0.002]	No	--	--	--	--	19	0	[0.019]	No	No, see Table 5-48
beta-1,2,3,4,5,6-Hexachlorocyclohexane	--	--	--	--	1	0	[0.002]	No	--	--	--	--	19	0	[0.019]	No	No
Delta-BHC	--	--	--	--	1	0	[0.002]	No	--	--	--	--	19	0.32	0.04	No	No
Gamma-BHC (lindane)	--	--	--	--	1	1	0.0038	TBD	--	--	--	--	19	0	[0.019]	No	No, see Table 5-48
Pesticides - Chlordane (mg/kg-fw)																	
alpha-Chlordane	--	--	--	--	1	0	[0.002]	No	--	--	--	--	19	0	[0.019]	No	No, see Table 5-48
gamma-Chlordane	--	--	--	--	1	0	[0.002]	No	--	--	--	--	19	0	[0.019]	No	No, see Table 5-48
Pesticides - DDT (mg/kg-fw)																	
Dichlorodiphenyldichloroethane	--	--	--	--	1	1	0.0082	No	--	--	--	--	19	0	[0.019]	No	No
Dichlorodiphenyldichloro-ethylene	--	--	--	--	1	1	0.15	No	--	--	--	--	19	0	[0.019]	No	No
Dichlorodiphenyltrichloroethane	--	--	--	--	1	0	[0.002]	No	--	--	--	--	19	0	[0.019]	No	No
Pesticides - Endosulfan (mg/kg-fw)																	
Endosulfan I	--	--	--	--	1	0	[0.002]	No	--	--	--	--	19	0	[0.019]	No	No
Endosulfan II	--	--	--	--	1	0	[0.002]	No	--	--	--	--	19	0	[0.019]	No	No, see Table 5-48
Endosulfan sulfate	--	--	--	--	1	1	0.0075	No	--	--	--	--	19	0	[0.019]	No	Yes, see Table 5-48
Pesticides - Endrin (mg/kg-fw)																	
Endrin	--	--	--	--	1	0	[0.002]	No	--	--	--	--	19	0	[0.019]	No	No, see Table 5-48
Endrin aldehyde	--	--	--	--	1	1	0.0055	No	--	--	--	--	19	0	[0.019]	No	Yes, see Table 5-48
Endrin ketone	--	--	--	--	1	1	0.0023	TBD	--	--	--	--	19	0	[0.019]	No	No, see Table 5-48
Pesticide - Heptachlor (mg/kg-fw)																	
Heptachlor	--	--	--	--	1	0	[0.002]	No	--	--	--	--	19	0	[0.019]	No	No
Heptachlor epoxide	--	--	--	--	1	0	[0.002]	No	--	--	--	--	19	0	[0.019]	No	No, see Table 5-48
Phthalates (mg/kg-fw)																	
Bis[2-ethylhexyl] phthalate	--	--	--	--	1	1	0.28	No	--	--	--	--	19	0.58	14	No	Yes, see Table 5-48
Butylbenzylphthalate	--	--	--	--	3	0	[4]	No	--	--	--	--	19	0	[4.8]	No	No
Di-n-butylphthalate	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0.26	[4.8]	No	No
Di-n-octylphthalate	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0.42	[3.9]	No	No
Diethylphthalate	--	--	--	--	2	0	[4]	No	--	--	--	--	19	0	[4.8]	No	No
Dimethyl phthalate	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No
Semivolatile Organic Compounds (mg/kg-fw)																	
1,2-Dichlorobenzene	--	--	--	--	2	0	[3.2]	No	--	--	--	--	19	0	[4.8]	No	No
1,2,4-Trichlorobenzene	--	--	--	--	2	0	[3.2]	No	--	--	--	--	19	0	[4.8]	No	No
1,3-Dichlorobenzene	--	--	--	--	2	0	[3.2]	No	--	--	--	--	19	0	[4.8]	No	No
1,4-Dichlorobenzene	--	--	--	--	2	0	[3.2]	No	--	--	--	--	19	0	[4.8]	No	No, see Table 5-48
2-Chloronaphthalene	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No
2-Chlorophenol	--	--	--	--	2	0	[3.2]	No	--	--	--	--	17	0	[4.8]	No	No
2-Methylphenol [cresol, o-]	--	--	--	--	2	0	[3.2]	No	--	--	--	--	19	0	[4.8]	No	No
2-Nitroaniline	--	--	--	--	1	0	[4.2]	No	--	--	--	--	18	0	[12]	No	No
2-Nitrophenol	--	--	--	--	1	0	[1.7]	No	--	--	--	--	18	0	[4.8]	No	No, see Table 5-48
2,4-Dichlorophenol	--	--	--	--	2	0	[3.2]	No	--	--	--	--	17	0	[4.8]	No	No
2,4-Dimethylphenol	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No
2,4-Dinitrophenol	--	--	--	--	1	0	[4.2]	No	--	--	--	--	18	0	[12]	No	No
2,4-Dinitrotoluene	--	--	--	--	2	0	[4]	No	--	--	--	--	19	0	[4.8]	No	No
2,4,5-Trichlorophenol	--	--	--	--	1	0	[4.2]	No	--	--	--	--	19	0	[12]	No	No
2,4,6-Trichlorophenol	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No
2,6-Dinitrotoluene	--	--	--	--	1	0	[1.7]	No	--	--	--	--	18	0	[4.8]	No	No

Table 5-47. Overview of Statistical Comparisons for Riparian Bird and Mammal Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Bird Crop Study Area Summary				Bird Study Area Summary				Mammal Organs Study Area Summary				Mammal Study Area Summary				COPC for Riparian?
	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	
3-Nitroaniline	--	--	--	--	1	0	[4.2]	No	--	--	--	--	18	0	[12]	No	No
3,3'-Dichlorobenzidine	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No
3+4 Methylphenol [cresol, m+p]	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0.32	[4.3]	No	No, see Table 5-48
4-Bromophenylphenyl ether	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No
4-Chloro-3-methylphenol	--	--	--	--	2	0	[3.2]	No	--	--	--	--	17	0	[4.8]	No	No
4-Chloroaniline	--	--	--	--	2	0	[3.2]	No	--	--	--	--	18	0	[4.8]	No	No
4-Chlorophenylphenyl ether	--	--	--	--	2	0	[4]	No	--	--	--	--	19	0	[4.8]	No	No
4-Nitroaniline	--	--	--	--	2	0	[10]	No	--	--	--	--	18	0	[12]	No	No
4-Nitrophenol	--	--	--	--	1	0	[4.2]	No	--	--	--	--	19	0	[12]	No	No
4,6-Dinitro-2-methylphenol	--	--	--	--	2	0	[10]	No	--	--	--	--	19	0	[12]	No	No
Bis[2-chloro-1-methylethyl]ether	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No
Bis[2-Chloroethoxy]methane	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No
Bis[2-chloroethyl] ether	--	--	--	--	2	0	[3.2]	No	--	--	--	--	19	0	[4.8]	No	No
Carbazole	--	--	--	--	2	0	[3.2]	No	--	--	--	--	19	0	[4.8]	No	No
Dibenzofuran	--	--	--	--	2	0	[4]	No	--	--	--	--	19	0	[4.8]	No	No
Hexachlorobenzene	--	--	--	--	2	0	[3.2]	No	--	--	--	--	19	0	[4.8]	No	No
Hexachlorobutadiene	--	--	--	--	2	0	[3.2]	No	--	--	--	--	19	0	[4.8]	No	No
Hexachlorocyclopentadiene	--	--	--	--	2	0	[3.2]	No	--	--	--	--	19	0	[4.8]	No	No
Hexachloroethane	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No
Isophorone	--	--	--	--	1	0	[1.7]	No	--	--	--	--	19	0	[4.8]	No	No
N-Nitroso-di-n-dipropylamine	--	--	--	--	1	0	[1.7]	No	--	--	--	--	18	0	[4.8]	No	No
N-Nitrosodiphenylamine	--	--	--	--	3	0	[4]	No	--	--	--	--	18	0	[4.8]	No	No
Nitrobenzene	--	--	--	--	1	0	[1.7]	No	--	--	--	--	18	0	[4.8]	No	No
Pentachlorophenol	--	--	--	--	1	0	[4.2]	No	--	--	--	--	19	0	[12]	No	No, see Table 5-48
Phenol	--	--	--	--	2	0	[3.2]	No	--	--	--	--	19	0.79	[4.3]	No	Yes, see Table 5-48
Toxaphene	--	--	--	--	1	0	[0.02]	No	--	--	--	--	19	0	[0.19]	No	No
Radionuclides (pCi/g-fw)																	
Americium-241	--	--	--	--	15	0	[1.1]	No	--	--	--	--	19	0	[0.35]	No	No
Antimony-125	--	--	--	--	15	0	[1.6]	No	--	--	--	--	19	0	[0.296]	No	No
Barium-133	--	--	--	--	7	0	[0.69]	No	--	--	--	--	--	--	--	--	No
Beryllium-7	--	--	--	--	15	0	[6.4]	No	--	--	--	--	19	0	[0.82]	No	No
Carbon-14	--	--	--	--	--	--	--	--	--	--	--	--	2	0	[-0.106]	No	Yes, see Table 5-48
Cesium-134	--	--	--	--	15	0	[1.3]	No	--	--	--	--	19	0	[0.162]	No	No
Cesium-137	--	--	--	--	15	0	[0.94]	No	--	--	--	--	19	0	[0.14]	No	Yes, see Table 5-48
Cobalt-60	--	--	--	--	15	0	[1.1]	No	--	--	--	--	19	0	[0.2]	No	No
Europium-152	--	--	--	--	15	0	[1.6]	No	--	--	--	--	19	0	[0.365]	No	Yes, see Table 5-48
Europium-154	--	--	--	--	15	0	[3.6]	No	--	--	--	--	19	0	[0.409]	No	No
Europium-155	--	--	--	--	15	0	[1.3]	No	--	--	--	--	19	0	[0.29]	No	No, see Table 5-48
Potassium-40	--	--	--	--	15	0.73	16.2	No	--	--	--	--	19	0.37	4.15	No	No
Radium-226	--	--	--	--	15	0.067	[1.8]	No	--	--	--	--	19	0	[0.286]	No	No
Radium-228	--	--	--	--	15	0	[4.6]	No	--	--	--	--	19	0	[0.619]	No	No
Ruthenium-106	--	--	--	--	15	0	[7.5]	No	--	--	--	--	19	0	[1.02]	No	No
Strontium-90	4	0	[-0.033]	No	15	0.067	0.19	No	--	--	--	--	19	0	[0.132]	No	Yes, see Table 5-48
Technetium-99	4	0	[1.15]	No	4	0	[0.137]	No	--	--	--	--	2	0	[0.155]	No	Yes, see Table 5-48
Thorium-228					15	0	[0.07]	No	--	--	--	--	19	0.11	0.18	No	No
Thorium-230					15	0.13	0.272	No	--	--	--	--	19	0.21	0.392	No	No
Thorium-232					15	0	[0.09]	No	--	--	--	--	19	0.11	0.15	No	No

Table 5-47. Overview of Statistical Comparisons for Riparian Bird and Mammal Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Bird Crop Study Area Summary				Bird Study Area Summary				Mammal Organs Study Area Summary				Mammal Study Area Summary				COPC for Riparian?
	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	Number of Samples	Detect Frequency	Maximum Value	COPC?	
Uranium-233/234	3	0	[0.107]	No	15	0.067	0.893	TBD	--	--	--	--	19	0.053	1.16	TBD	Yes, see Table 5-48
Uranium-235	3	0	[0.043]	No	15	0.067	0.04	TBD	--	--	--	--	19	0	[0.034]	No	No, see Table 5-48
Uranium-238	3	0	[0]	No	15	0.067	0.836	TBD	--	--	--	--	19	0.053	0.96	TBD	Yes, see Table 5-48

-- = not applicable
BHC = benzene hexachloride
COPC = contaminant of potential concern
DDT = dichlorodiphenyltrichloroethane
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment
TBD = to be determined

Table 5-48. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status for the Riparian Environment. (6 Pages)

Analyte Name	COPC?	Explanation
Inorganics		
Aluminum	No	Soil, plant, invertebrate, bird offal, and mammal carcass not different from reference sites or background. RCBRA mammal organ was greater than reference with a low magnitude. 100-B/C Pilot invertebrate tissue was greater than RCBRA reference but bounded by 100-B/C Pilot reference (see plots in Appendix E-3). Not retained as COPC based on lack of difference for soil and most biotic tissues.
Antimony	No	100-NR-2 soil has higher detection frequency than RCBRA reference, but concentrations are not greater than RCBRA reference. 100-B/C Pilot plant, invertebrate, and mammal-organ have higher detection frequency than RCBRA reference, but concentrations in 100-B/C Pilot tissues are not greater than 100-B/C Pilot reference (see plots in Appendix E-3).
Arsenic	Yes	On inclusion list, retained as a COPC because concentrations greater than reference and background in RCBRA soil. Based primarily on concentrations measured at riparian site 1. Also, 100-B/C Pilot soil samples were not greater than background (slippage test not significant). No difference of tissues from RCBRA reference.
Barium	Yes	Retained because plant and invertebrate tissue concentration ranges were greater than reference (slippage test). Soil not different from reference sites or background but concentrations at riparian site 6 were greater than reference (see plots in Appendix E-2). Mammal tissues also not different from reference. 100-B/C Pilot and 100-NR-2 invertebrate tissues were greater than RCBRA reference but the range of concentrations was not different from 100-B/C Pilot reference (see plots in Appendix E-3).
Beryllium	No	Soil not different from background and the concentration range was not different from reference (slippage test). The four higher soil concentrations were from riparian site 3 but the other sample result from riparian site 3 was consistent with other beryllium soil concentrations. Tissues not different from reference sites or background.
Boron	No	Soil, plant, invertebrate, bird offal, and mammal not different from reference sites or background. Only bird crop greater than reference. Not retained as COPC based on lack of difference for soil and most biotic tissues.
Cadmium	Yes	Retained because soil concentration range is greater than reference (slippage test) based on concentration measures at riparian sites 1, 2c, 2j. Not greater than background in 100-B/C Pilot soil samples (slippage test not significant). RCBRA invertebrate tissue range greater than reference (slippage test). 100-B/C Pilot and 100-NR-2 greater than RCBRA reference but within range on 100-B/C Pilot reference (see plots in Appendix E-3). Mammal tissues not different from reference.
Calculated total uranium	Yes	Uranium is on inclusion list. Retained because soil maximum greater than reference and background (slippage test) based on concentrations at riparian sites 6 and 4a. Tissue concentrations not different from reference.
Chromium	Yes	Soil was greater than reference and background and thus identified as a COPC. RCBRA tissues are not different from reference.
Cobalt	No	Soil not different from reference sites or background. Tissue concentrations not different from reference based on a lack of statistically significant tests and by reviewing the concentrations of detects in the box plots (Appendices E-2 and E-3).
Copper	Yes	Range of RCBRA plant and invertebrate tissue concentrations is greater than reference (slippage test) and 100-B/C Pilot invertebrate is greater than both RCBRA reference and 100-B/C Pilot reference (see plots in Appendix D-3). Soil is not different from reference.
Hexavalent chromium	Yes	On inclusion list. Samples results for hexavalent chromium were reviewed because total chromium (above) was identified as a COPC. Soil not statistically different from reference sites but retained as a COPC because the three highest detects are from riparian site 10. Not measured in tissues.

Table 5-48. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status for the Riparian Environment. (6 Pages)

Analyte Name	COPC?	Explanation
Lead	Yes	On inclusion list. Soil maximum is not different from reference and no differences in any site from reference but retained because there is a shift in the interquartile range of concentrations in 100-K and 100-F/100-IU-2/100-IU-6 Areas. RCBRA tissues are not different from reference (slippage test). Outliers noted for 100-NR-2 liver and 100-B/C Pilot carcass that were greater than maximum RCBRA and 100-B/C Pilot reference concentrations (see plots in Appendix E-3). Lead is retained as a COPC based on soil and mammal observations noted above. No statistical differences from reference noted for plant and invertebrate tissues.
Lithium	No	Soil not different from reference or background. No difference from reference for plant, invertebrate, or mammal-carcass tissues. Greater than reference in mammal-organ tissue (slippage test). Eliminated as COPC because soil and most tissues are not different from reference.
Manganese	No	Soil not different from reference sites or background and no difference in any site from reference. RCBRA plant and mammal-organ not different from reference. 100-B/C Pilot and 100-NR-2 invertebrate are greater than RCBRA reference but concentrations in these tissues are not greater than 100-B/C Pilot reference (see plots in Appendix E-3). Invertebrate and mammal carcass greater than RCBRA reference but not retained due to magnitude of difference for mammal carcass and the invertebrate concentration was bounded by the 100-B/C Pilot reference (see plots in Appendix E-3).
Mercury	Yes	On inclusion list. Retained as a COPC because soil maximum is statistically greater than reference (slippage test) and two riparian sites (2j and 4a) show a partial shift above reference (see plots in Appendix E-2). 100-B/C Pilot invertebrate is greater than reference and 100-B/C pilot reference (slippage test and see plots in Appendix E-3). No statistical differences from reference noted for plant and mammal tissues.
Molybdenum	No	Maximum soil concentrations are not greater than reference (slippage test). No statistical difference noted for tissues. Thus, not retained as COPC.
Nickel	No	Maximum soil and invertebrate concentrations are not greater than reference (slippage test). No statistical difference noted for other RCBRA tissues. 100-B/C Pilot and 100-NR-2 invertebrate and mammal-organ are greater than RCBRA reference but concentrations in these tissues are not greater than 100-B/C Pilot reference (see plots in Appendix E-3). Thus, not retained as COPC.
Phosphorus	No	Plant is greater than reference (some high concentrations reported for grass and shrub, see plots in Appendix E-3). Soil is not different from background or reference. Invertebrate and mammal tissue are not different from reference. Not retained as a COPC based on the lack of difference for soil and most tissues. Phosphorus likely exists in the environment as phosphate that is evaluated as a potential confounding factor for the bioassays.
Selenium	Yes	Not different from background or reference for RCBRA soil. 100-B/C Pilot and 100-NR-2 soil have greater detection frequency but maximum concentrations do not differ from reference (slippage test). RCBRA tissue not different from reference. Retained as COPC because 100-B/C Pilot invertebrate tissues are greater than RCBRA and 100-B/C Pilot reference (slippage test and see plots in Appendix E-3).
Silver	Yes	Soil not different from reference sites or background. Plant, invertebrate, and mammal tissues (carcass and organ) not different from reference. Bird-carcass range not different from reference. Retained as COPC because 100-B/C Pilot invertebrate tissues are greater than RCBRA and 100-B/C Pilot reference (see plots in Appendix E-3).
Strontium (elemental)	No	Soil not different from reference sites or background. Plant, bird, mammal not different from reference. Invertebrate greater than reference but inconsistent with soil and other tissues. Not retained based on the lack of difference for soil and most tissues.

Table 5-48. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status for the Riparian Environment. (6 Pages)

Analyte Name	COPC?	Explanation
Thallium	Yes	100-B/C Pilot plant, invertebrate, mammal-organ, and mammal-carcass have higher detection frequency than RCBRA reference. Retained as COPC because 100-B/C Pilot plant tissue concentrations are greater than 100-B/C Pilot reference (see plots in Appendix E-3).
Thorium	No	Only a single 100-NR-2 plant sample result – no reference site data. Insufficient sample results for further evaluation and isotopic thorium was on the exclusion list.
Uranium (inorganic)	Yes	On inclusion list. Retained because calculated total uranium was retained as a COPC. Uranium in soil is not different from background or reference. No consistent differences of any sites. No notable statistical differences of tissue from reference.
Vanadium	Yes	No statistical differences for RCBRA soil or tissues. 100-NR-2 soil concentration range does not differ from RCBRA reference (slippage test). Retained as COPC because 100-NR-2 invertebrate tissue concentrations are greater than RCBRA reference.
Zinc	Yes	Retained as a COPC because soil is greater than background and reference with multiple tests. RCBRA plant and invertebrate maxima are also greater than reference (slippage test). 100-B/C Pilot invertebrate are greater than RCBRA reference but are less than the 100-B/C Pilot reference (see plots in Appendix E-3). RCBRA mammal tissues are not greater than reference.
Polycyclic Aromatic Hydrocarbons		
Anthracene	No	PAHs are TPH constituents and are on the inclusion list in the 100 Area, specifically 100-N. None were detected in riparian soil 100-N. The single detect in the 100-D/100-H Area was roughly 10 times less than the detection limit in most samples. No detections in tissues.
Benzo[a]anthracene	No	PAHs are TPH constituents and are on the inclusion list in the 100 Area, specifically 100-N. None were detected in riparian soil 100-N. There are five soil detects with four detects 10 times less than detection limit and one detect in the 100-D/100-H Area was roughly equal to the detection limit in most samples. No detections in tissues.
Benzo[a]pyrene	No	PAHs are TPH constituents and are on the inclusion list in the 100 Area, specifically 100-N. None were detected in riparian soil 100-N. There are nine soil detects with eight detects 10 times less than detection limit, and one detect in the 100-D/100-H Area was roughly equal to the detection limit in most samples. No detections in tissues.
Benzo[b]fluoranthene	No	PAHs are TPH constituents and are on the inclusion list in the 100 Area, specifically 100-N. None were detected in riparian soil 100-N. There are eight soil detects with seven detects 10 times less than detection limit, and one detect in the 100-D/100-H Area was roughly equal to the detection limit in most samples. No detections in tissues.
Benzo[ghi]perylene	No	PAHs are TPH constituents and are on the inclusion list in the 100 Area, specifically 100-N. None were detected in riparian soil 100-N. There are five soil detects with four detects 10 times less than detection limit, and one detect in the 100-D/100-H Area was roughly equal to the detection limit in most samples. No detections in tissues.
Benzo[k]fluoranthene	No	PAHs are TPH constituents and are on the inclusion list in the 100 Area, specifically 100-N. None were detected in riparian soil 100-N. There are five soil detects with four detects 10 times less than detection limit, and one detect in the 100-D/100-H Area was roughly equal to the detection limit in most samples. One detection in plant tissues.
Chrysene	No	PAHs are TPH constituents and are on the inclusion list in the 100 Area, specifically 100-N. None were detected in riparian soil 100-N. There are 12 soil detects with 11 detects 10 times less than detection limit, and 1 detect in the 100-D/100-H Area was roughly equal to the detection limit in most samples. No detections in tissues.
Dibenz[a,h]anthracene	No	PAHs are TPH constituents and are on the inclusion list in the 100 Area, specifically 100-N. None were detected in riparian soil 100-N. There are two soil detects with one detect 10 times less than detection limit, and one detect in the 100-D/100-H Area was about 5 times less than the detection limit in most samples. No detections in tissues.

Table 5-48. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status for the Riparian Environment. (6 Pages)

Analyte Name	COPC?	Explanation
Fluoranthene	Yes	PAHs are TPH constituents and are on the inclusion list in the 100 Area, specifically 100-N. None were detected in riparian soil 100-N. There are five soil detects with four detects 10 times less than detection limit and retained as COPCs because one detect in the 100-D/100-H Area was greater than the detection limit in most samples. No detections in tissues.
Indeno[1,2,3-cd]-pyrene	No	PAHs are TPH constituents and are on the inclusion list in the 100 Area, specifically 100-N. None were detected in riparian soil 100-N. There are five soil detects with four detects 10 times less than detection limit, and one detect in the 100-D/100-H Area was roughly equal to the detection limit in most samples. No detections in tissues.
Phenanthrene	No	PAHs are TPH constituents and are on the inclusion list in the 100 Area, specifically 100-N. One detect in riparian soil 100-N at 10 times less than detection limits of other samples. There are four soil detects with three detects less than detection limit and one detect in the 100-D/100-H Area was about 3 times less than the detection limit in most samples. No detections in tissues.
Pyrene	Yes	PAHs are TPH constituents and are on the inclusion list in the 100 Area, specifically 100-N. Two detects at 10 times less than the detection limits of other samples in riparian soil 100-N. There are 15 soil detects with 14 detects 10 times less than detection limit and retained as a COPC because 1 detect in the 100-D/100-H Area was greater than the detection limit in most samples; no detections in tissues.
Total petroleum hydrocarbons - diesel range	Yes	Detected in 100-NR-2 soil; no reference data for TPH.
Polychlorinated Biphenyls		
Aroclor-1260	Yes	Detected in soil and mammal-carcass. Not statistically different from reference but retained as a COPC because total PCBs was identified as a COPC (see below) and all eight soil detects came from two sites (6 and 9) at concentrations less than the detection limit in other samples. In addition, the detected concentration in mammal carcass was greater than the nondetect results in other samples. Not detected in reference soil or mammal tissue. Not greater than reference in plant or bird tissues.
Total PCBs (congeners)	Yes	Detected in 100-NR-2 soil and mammal-organ; no reference data for PCB congeners.
Pesticides		
Aldrin	Yes	Tissues were not different from reference; detected values were within the range of nondetects. Retained as a COPC because all soil detects from riparian site 5c at concentrations greater than reference.
Dieldrin	Yes	There were only 3 detects in soil out of 98 samples and the detected values were at 3 different sites (2a, 2f, 2j). Retained as a COPC because the magnitude of the detection at 2a was 17 times the typical detection limit and 3 times greater than other detects. Tissues were not different from reference; detected values were within the range of nondetects.
Pesticides - Benzene Hexachloride		
Alpha-BHC	No	Detected in soil and plant but detected values are similar or less than detection limits in other samples. Not detected in bird/mammal tissues.
Gamma-BHC (lindane)	No	Detected in soil, plant, bird but detected values are similar or less than detection limits in other samples. Not detected in mammal tissues.
Pesticides – Chlordane		
alpha-Chlordane	No	Detected in soil but detected values are similar or less than detection limits in other samples. Not detected in tissues.
gamma-Chlordane	No	Detected in soil and plant but detected values are similar or less than detection limits in other samples. Not detected in bird/mammal tissues.

Table 5-48. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status for the Riparian Environment. (6 Pages)

Analyte Name	COPC?	Explanation
Pesticides – Endosulfan		
Endosulfan II	No	Detected in plant but detected values are similar or less than detection limits in other samples. Not detected in soil/bird/mammal tissues.
Endosulfan sulfate	Yes	There were only 4 detects in soil out of 98 samples and the detected values were at 4 different sites (2a, 2f, 2j, 5c). The magnitude of the detection at 2a warrants retaining as a COPC. Detected in plant, but detected values are similar or less than detection limits in other samples. Not greater than reference in bird or mammal tissues.
Pesticides - Endrin		
Endrin	No	Detected in plant, but detected values are similar or less than detection limits in other samples. Not detected in soil/bird/mammal tissues.
Endrin aldehyde	Yes	There were only 4 detects in soil out of 98 samples and the detected values were at 4 different sites (2a, 2f, 2j, 5c). The magnitude of the detection at 2a warrants retaining as a COPC. Detected in plant, but detected values are similar or less than detection limits in other samples. Not greater than reference in bird or mammal tissues.
Endrin ketone	No	Detected in plant/bird but detected values are similar or less than detection limits in other samples. Not detected in soil/mammal tissues.
Pesticide - Heptachlor		
Heptachlor epoxide	No	Detected in soil and plant, but detected values are similar or less than detection limits in other samples. Not detected in bird/mammal tissues.
Phthalate		
Bis[2-ethylhexyl] phthalate	Yes	Soil concentrations are greater than reference (slippage test) primarily due to riparian site 2c having higher concentrations than other sites. Not greater than reference in tissues.
Semivolatile Organic Compounds		
1,4-Dichlorobenzene	No	Detected in soil, but detected values are similar or less than detection limits in other samples. Not detected in tissues.
2-Nitrophenol	No	Detected in soil, but detected values are similar or less than detection limits in other samples. Not detected in tissues.
3+4 Methylphenol [cresol, m+p]	No	Detected in plant and mammal, but detected values are similar or less than detection limits in other samples. Not detected in soil/bird tissues.
Pentachlorophenol	No	Detected in plant, but detected values are similar or less than detection limits in other samples. Not detected in soil/bird/mammal tissues.
Phenol	Yes	Detected in soil and tissue. Range of soil concentrations greater than reference (slippage test). Difference is mainly due to soil concentrations at two sites (4a and 5c). Retained as a COPC based on soil concentrations. Not greater than reference in tissues.
Radionuclides		
Carbon-14	Yes	On inclusion list. Detected in soil and no reference site data.
Cesium-137	Yes	Greater than reference in RCBRA soil and 100-B/C Pilot soil samples and on inclusion list. Not detected in tissue.
Europium-152	Yes	On inclusion list. Soil concentrations at riparian site 2j are greater than detection limits at reference sites.
Europium-155	No	On inclusion list. A single detected soil concentration at riparian site 4a is within the detection limits for other samples.
Plutonium-239/240	No	Greater than reference in 100-B/C Pilot soil but not greater than background. Not measured at RCBRA study sites.
Strontium-90	Yes	Greater than reference in 100-B/C Pilot soil samples and on inclusion list.
Technetium-99	Yes	On inclusion list. Detected in soil and no reference site data.
Uranium-233/234	Yes	On inclusion list. Soil range is greater than reference.

Table 5-48. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status for the Riparian Environment. (6 Pages)

Analyte Name	COPC?	Explanation
Uranium-235	No	Soil not different from reference sites or background. Tissue not different from reference. On inclusion list.
Uranium-238	Yes	On inclusion list. Soil range is greater than reference.
Anions		
Nitrogen in nitrate	No	Soil is not different from reference.
Nitrogen in nitrite	No	Soil is not different from reference.
Nitrogen in nitrite and nitrate	No	Soil concentration range is different from reference; therefore results are inconsistent with other nitrogen measures. No plant reference data but no other nitrogen compounds are greater than reference. Not retained as a COPC because the range of concentrations is the same as nitrogen in nitrate and the other nitrogen measures were not different from reference.

BHC = benzene hexachloride
COPC = contaminant of potential concern
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
RCBRA = River Corridor Baseline Risk Assessment
TPH = total petroleum hydrocarbon

Table 5-49. Summary of Representative Concentration Types for Riparian Contaminants of Potential Concern by Media and Data Source.

Data Source	Total Number of Measurements	Number of Nondetect Measurements; No CTE or RME	Representative Concentration Calculation Based on Number of Detects (n)		
			n = 1 or 2; Maximum = CTE CTE = RME	n = 3 or 4; Mean [a] = CTE Maximum = RME	n = 5 or More; Mean [b] = CTE UCL [b] = RME
Soil					
100-B/C Pilot	22	6	4	0	12
100-NR-2 Operable Unit	14	1	1	0	12
RCBRA	905	377	130	53	345
Plant					
100-B/C Pilot	16	2	0	0	14
100-NR-2 Operable Unit	17	3	2	1	11
RCBRA	702	533	166	3	0
Terrestrial Invertebrate					
100-B/C Pilot	12	0	0	1	11
100-NR-2 Operable Unit	11	0	0	1	10
RCBRA	376	196	180	0	0
Bird					
RCBRA	531	280	251	0	0
Mouse					
100-B/C Pilot	27	6	1	6	14
100-NR-2 Operable Unit	13	2	0	0	11
RCBRA	1,032	633	399	0	0

NOTE: Summary applies to contaminants of potential concern only.
[a] Using student's t statistics.
[b] Using three different methods.

CTE = central tendency exposure
n = number of detects
RCBRA = River Corridor Baseline Risk Assessment
RME = reasonable maximum exposure
UCL = upper confidence limit

Table 5-50. Comparison of Maximum Detected Sample Result to the Reasonable Maximum Exposure.

Media	Number Where the Ratio of Maximum Divided by RME is Less than 0.5	Number Where the Ratio of Maximum Divided by RME is Between 0.5 and 0.8	Number Where the Ratio of Maximum Divided by RME is Between 0.8 and 1.2	Number Where the Ratio of Maximum Divided by RME is Between 1.2 and 1.5	Number Where the Ratio of Maximum Divided by RME is Between 1.5 and 2	Number Where the Ratio of Maximum Divided by RME is Greater than 2
Soil	0	2	524	11	11	9
Plant	0	0	174	6	7	10
Terrestrial invertebrate	0	0	191	9	2	1
Bird	0	0	251	0	0	0
Mouse	0	1	427	2	1	0
Total	0	3	1,567	28	21	20

NOTE: Summary applies to contaminants of potential concern only.
RME = reasonable maximum exposure

Table 5-51. Cases Where the Reasonable Maximum Exposure is Very Different from the Maximum. (2 Pages)

Site Name	Contaminant of Potential Concern	Number of Sample Results	Number of Detects	RME	Maximum Detect	Maximum Divided by RME
Soil Discrete						
100-NR-2	Chromium (mg/kg)	23	23	24.6	52.7	2.14
100-NR-2	Arsenic (mg/kg)	23	23	5.70	12.9	2.27
100-NR-2	Uranium (inorganic) (mg/kg)	23	23	2.74	6.22	2.27
100-B/C Pilot	Strontium-90 (pCi/g)	16	16	0.0845	0.196	2.32
100-NR-2	Cadmium (mg/kg)	23	23	0.804	2.13	2.65
100-NR-2	Zinc (mg/kg)	23	23	159	453	2.84
100-B/C Pilot	Cesium-137 (pCi/g)	16	16	0.414	1.37	3.31
100-NR-2	Lead (mg/kg)	23	23	27.6	96.5	3.49
100-NR-2	Strontium-90 (pCi/g)	23	23	1.19	5.37	4.50
Plant						
100-B/C Pilot	Selenium (mg/kg)	30	12	0.0261	0.0578	2.21
100-B/C Pilot	Technetium-99 (pCi/g)	28	28	0.631	1.62	2.56
100-B/C Pilot	Uranium (inorganic) (mg/kg)	30	25	0.0698	0.196	2.80
100-B/C Pilot	Cadmium mg/kg	30	24	0.198	0.570	2.88
100-B/C Pilot	Thallium (mg/kg)	30	17	0.0836	0.263	3.15
100-NR-2	Chromium (mg/kg)	13	13	0.102	0.332	3.25

Table 5-51. Cases Where the Reasonable Maximum Exposure is Very Different from the Maximum. (2 Pages)

Site Name	Contaminant of Potential Concern	Number of Sample Results	Number of Detects	RME	Maximum Detect	Maximum Divided by RME
100-B/C Pilot	Strontium-90 (pCi/g)	30	30	0.388	1.30	3.34
100-NR-2	Lead (mg/kg)	13	13	0.0610	0.236	3.86
100-B/C Pilot	Chromium (mg/kg)	30	30	0.349	1.44	4.12
100-B/C Pilot	Lead (mg/kg)	30	29	0.225	0.936	4.16
Terrestrial Invertebrate						
100-NR-2	Lead (mg/kg)	9	9	1.02	2.16	2.11

= Higher value between RME and maximum detect.

RME = reasonable maximum exposure

Table 5-52. Soil Ecological Risk Screening Values. (4 Pages)

Analyte Name	Analyte Code	Soil Screening Value	Source
Screening Values for Chemical COPECs (mg/kg)			
Plant Receptors			
Aldrin	309-00-2	0.5	LA-UR-08-6673
Aroclor-1260	11096-82-5	40	WAC 173-340-900, Table 749-3
Arsenic	7440-38-2	10	WAC 173-340-900, Table 749-3 value for Arsenic V
Barium	7440-39-3	110	LA-UR-08-6673
Bis[2-ethylhexyl] phthalate	117-81-7	NA	NA
Cadmium	7440-43-9	4	WAC 173-340-900, Table 749-3
Calculated total uranium	--	250	Sheppard et al. 2005
Chromium	7440-47-3	2.4	LA-UR-08-6673
Copper	7440-50-8	70	OSWER 9285.7-68
Dieldrin	60-57-1	10	LA-UR-08-6673
Endosulfan sulfate	1031-07-8	--	--
Endrin aldehyde	7421-93-4	0.0034	LA-UR-08-6673, used endrin as surrogate
Hexavalent chromium	18540-29-9	0.35	LA-UR-08-6673
Lead	7439-92-1	50	WAC 173-340-900, Table 749-3
Mercury	7439-97-6	0.3	WAC 173-340-900, Table 749-3
Phenol	108-95-2	0.79	LA-UR-08-6673
Selenium	7782-49-2	0.52	OSWER 9285.7-72
Silver	7440-22-4	2	WAC 173-340-900, Table 749-3
Thallium	7440-28-0	0.1	LA-UR-08-6673
Total PCBs	--	40	WAC 173-340-900, Table 749-3
Total petroleum hydrocarbons - diesel range	--	--	--

Table 5-52. Soil Ecological Risk Screening Values. (4 Pages)

Analyte Name	Analyte Code	Soil Screening Value	Source
Uranium (inorganic)	7440-61-1	250	Sheppard et al. 2005 substituted for WAC Table 749-3 value
Vanadium	7440622	0.025	LA-UR-08-6673
Zinc	7440-66-6	86	WAC 173-340-900, Table 749-3
Terrestrial Invertebrate Receptors			
Aldrin	309-00-2	--	--
Aroclor-1260	11096-82-5	--	--
Arsenic	7440-38-2	6.8	LA-UR-08-6673
Barium	7440-39-3	330	OSWER 9285.7-63
Bis[2-ethylhexyl] phthalate	117-81-7	--	--
Cadmium	7440-43-9	20	WAC 173-340-900, Table 749-3
Calculated total uranium	--	100	Sheppard et al. 2005
Chromium	7440-47-3	2.3	LA-UR-08-6673
Copper	7440-50-8	50	WAC 173-340-900, Table 749-3
Dieldrin	60-57-1	--	--
Endosulfan sulfate	1031-07-8	--	--
Endrin aldehyde	7421-93-4	--	--
Hexavalent chromium	18540-29-9	0.34	LA-UR-08-6673
Lead	7439-92-1	500	WAC 173-340-900, Table 749-3
Mercury	7439-97-6	0.05	LA-UR-08-6673
Phenol	108-95-2	1.8	LA-UR-08-6673
Selenium	7782-49-2	4.1	OSWER 9285.7-72
Silver	7440-22-4	--	--
Thallium	7440-28-0	--	--
Total PCBs	--	--	--
Total petroleum hydrocarbons - diesel range	--	200	Diesel-range, WAC 173-340-900, Table 749-3
Uranium (inorganic)	7440-61-1	100	Sheppard et al. 2005
Vanadium	7440622	NA	NA
Zinc	7440-66-6	120	OSWER 9285.7-73
Wildlife Receptors			
Aldrin	309-00-2	0.037	LA-UR-08-6673
Aroclor-1260	11096-82-5	0.14	LA-UR-08-6673
Arsenic	7440-38-2	7	WAC 173-340-900, Table 749-3 value for arsenic III
Barium	7440-39-3	102	OSWER 9285.7-63
Bis[2-ethylhexyl] phthalate	117-81-7	0.02	LA-UR-08-6673
Cadmium	7440-43-9	0.27	LA-UR-08-6673
Calculated total uranium	--	3	Calculated with CHPRC EcoPRG NOAEL and WAC Table 749-4 model (shrew)
Chromium	7440-47-3	26	OSWER 9285.7-66
Copper	7440-50-8	15	LA-UR-08-6673
Dieldrin	60-57-1	0.0045	LA-UR-08-6673

Table 5-52. Soil Ecological Risk Screening Values. (4 Pages)

Analyte Name	Analyte Code	Soil Screening Value	Source
Endosulfan sulfate	1031-07-8	0.64	LA-UR-08-6673, used endosulfan as surrogate
Endrin aldehyde	7421-93-4	0.0014	LA-UR-08-6673, used endrin as surrogate
Hexavalent chromium	18540-29-9	130	OSWER 9285.7-66
Lead	7439-92-1	11	OSWER 9285.7-70
Mercury	7439-97-6	0.013	LA-UR-08-6673
Phenol	108-95-2	38	LA-UR-08-6673
Selenium	7782-49-2	0.3	WAC 173-340-900, Table 749-3
Silver	7440-22-4	2.6	LA-UR-08-6673
Thallium	7440-28-0	0.032	LA-UR-08-6673
Total PCBs	--	0.65	WAC 173-340-900, Table 749-3
Total petroleum hydrocarbons - diesel range	--	6,000	Diesel-range, WAC 173-340-900, Table 749-3
Uranium (inorganic)	7440-61-1	3	Calculated with CHPRC EcoPRG NOAEL and WAC Table 749-4 model (shrew)
Vanadium	7440622	6.7	LA-UR-08-6673
Zinc	7440-66-6	46	OSWER 9285.7-73
Screening Values for PAH COPECs (mg/kg)			
Plant Receptors			
Fluoranthene	206-44-0	--	--
Pyrene	129-00-0	--	--
Terrestrial Invertebrate Receptors			
Fluoranthene	206-44-0	29	OSWER 9285.7-78
Pyrene	129-00-0	18	OSWER 9285.7-78
Wildlife Receptors			
Fluoranthene	206-44-0	100	OSWER 9285.7-78
Pyrene	129-00-0	1.1	OSWER 9285.7-78
Screening Values for Radionuclide COPECs (pCi/g)			
Plant BCGs			
Carbon-14	14762-75-5	60,700	DOE 2006
Cesium-137	10045-97-3	2,210	DOE 2006
Europium-152	14683-23-9	14,700	DOE 2006
Strontium-90	10098-97-2	3,580	DOE 2006
Technetium-99	14133-76-7	21,900	DOE 2006
Uranium-233/234	13966-29-5	51,600	DOE 2006
Uranium-238	U-238	15,700	DOE 2006
Wildlife BCGs			
Carbon-14	14762-75-5	4,760	DOE 2006
Cesium-137	10045-97-3	20.8	DOE 2006
Europium-152	14683-23-9	1,520	DOE 2006
Strontium-90	10098-97-2	22.5	DOE 2006
Technetium-99	14133-76-7	4,490	DOE 2006

Table 5-52. Soil Ecological Risk Screening Values. (4 Pages)

Analyte Name	Analyte Code	Soil Screening Value	Source
Uranium-233/234	13966-29-5	5,130	DOE 2006
Uranium-238	U-238	1,580	DOE 2006

-- = not applicable
BCG = biota concentration guide
CHPRC = CH2M HILL Plateau Remediation Company
COPEC = contaminant of potential ecological concern
DOE = U.S. Department of Energy
EcoPRG = ecological preliminary remediation goal
EPA = U.S. Environmental Protection Agency
NA = not available
NOAEL = no observable adverse effect level
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
WAC = *Washington Administrative Code*

DOE, 2006, RESRAD-BIOTA computer code, Release 1.2, developed by Argonne National Laboratory, U.S. Department of Energy, Office of Environment, Safety and Health, Washington, D.C.

LA-UR-08-6673, 2008, Ecorisk Database (Release 2.3), Los Alamos National Laboratory, Los Alamos, New Mexico.

OSWER Directive 9285.7-56, 2006, *Ecological Soil Screening Levels for Dieldren: Interim Final*, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-63, 2005, *Ecological Soil Screening Levels for Barium: Interim Final*, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-66, 2005, *Ecological Soil Screening Levels for Chromium: Interim Final*, revised 2008, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-68, 2006, *Ecological Soil Screening Levels for Copper: Interim Final*, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-70, 2005, *Ecological Soil Screening Levels for Lead: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-72, 2007, *Ecological Soil Screening Levels for Selenium: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-73, 2007, *Ecological Soil Screening Levels for Zinc: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-77, 2006, *Ecological Soil Screening Levels for Silver: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-78, 2007, *Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs): Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

Sheppard, S. C., M. I. Sheppard, M. O. Gallerand, and B. Sanipelli, 2005, "Derivation of Ecotoxicity Thresholds for Uranium," *Journal Environmental Radioactivity* 79:55-83.

WAC 173-340-900, "Tables," *Washington Administrative Code*, as amended.

Table 5-53. Screening Results for Riparian Contaminants of Potential Concern for all Study Sites (Except Radionuclides and Polycyclic Aromatic Hydrocarbons). (2 Pages)

Contaminant of Potential Concern	Number of Analyses	Number of Nonzero Results	Maximum RME (mg/kg)	Soil Screening Value (mg/kg)			COPEC?	Reason
				Plant	Invertebrate	Wildlife		
Arsenic	20	20	13.1	10	6.8	7	Yes	RME > all SSV
Barium	20	20	159	110	330	102	Yes	RME > plant and wildlife SSV
Cadmium	20	20	2.7	4	20	0.27	Yes	RME > wildlife SSV
Calculated total uranium	18	18	5.5	250	100	3	Yes	RME > wildlife SSV
Chromium	20	20	171	2.4	2.3	26	Yes	RME > all SSV
Copper	19	19	60.1	70	50	15	Yes	RME > terrestrial invertebrate and wildlife SSV
Hexavalent chromium	18	6	0.8	0.35	0.34	130	Yes	RME > plant and terrestrial invertebrate SSV
Lead	20	20	88	50	500	11	Yes	RME > plant and wildlife SSV
Mercury	20	20	0.16	0.3	0.05	0.013	Yes	RME > terrestrial invertebrate and wildlife SSV
Selenium	20	5	0.9	0.52	4.1	0.3	Yes	RME > plant and wildlife SSV
Silver	19	6	0.2	2	NA	2.6	Yes	Data gap (terrestrial invertebrate)
Thallium	19	3	1.1	0.1	NA	0.032	Yes	RME > plant and wildlife SSV
Uranium (inorganic)	20	9	7.1	250	100	3	Yes	RME > wildlife SSV
Vanadium	20	20	89.1	0.025	NA	6.7	Yes	RME > all SSV
Zinc	20	20	411	86	120	46	Yes	RME > all SSV
Aroclor-1260	18	2	0.0095	40	NA	0.14	Yes	Data gap (terrestrial invertebrate)
Aldrin	18	1	0.0023	0.5	NA	0.037	Yes	Data gap (terrestrial invertebrate)
Dieldrin	18	0	ND	10	NA	0.0045	No	Not detected
Endosulfan sulfate	18	0	ND	NA	NA	0.64	No	Not detected
Endrin aldehyde	18	0	ND	0.0034	NA	0.0014	No	Not detected
Bis[2-ethylhexyl] phthalate	19	19	0.66	NA	NA	0.02	Yes	RME > all SSV
Phenol	19	12	0.37	0.79	1.8	38	No	RME < all SSV
Total PCBs (congeners)	1	1	0.0057	40	NA	0.65	Yes	Data gap (terrestrial invertebrate); maximum from 100-NR-2
Total petroleum hydrocarbons–diesel range	1	1	570	NA	200	6,000	Yes	RME > plant SSV; maximum from 100-NR-2
Discrete Soil Samples in Rare Plant Habitat								
Arsenic	6	6	19.3	10	--	--	Yes	RME > plant SSV
Barium	6	6	206	110	--	--	Yes	RME > plant SSV
Cadmium	6	6	2.7	4	--	--	No	RME < plant SSV
Calculated total uranium	6	6	8.1	250	--	--	No	RME < plant SSV
Chromium	6	6	18.5	2.4	--	--	Yes	RME > plant SSV
Copper	6	6	53.6	70	--	--	No	RME < plant SSV
Hexavalent chromium	6	3	0.28	0.35	--	--	No	RME < plant SSV

Table 5-53. Screening Results for Riparian Contaminants of Potential Concern for all Study Sites (Except Radionuclides and Polycyclic Aromatic Hydrocarbons). (2 Pages)

Contaminant of Potential Concern	Number of Analyses	Number of Nonzero Results	Maximum RME (mg/kg)	Soil Screening Value (mg/kg)			COPEC?	Reason
				Plant	Invertebrate	Wildlife		
Lead	6	6	125	50	--	--	Yes	RME > plant SSV
Mercury	6	5	0.06	0.3	--	--	No	RME < plant SSV
Selenium	6	0	--	0.52	--	--	No	Not detected in discrete samples
Silver	6	0	--	2	--	--	No	Not detected in discrete samples
Thallium	6	0	--	0.1	--	--	No	Not detected in discrete samples
Uranium (inorganic)	6	0	--	250	--	--	No	Not detected in discrete samples
Vanadium	6	6	58.4	0.025	--	--	Yes	RME > plant SSV
Zinc	6	6	621	86	--	--	Yes	RME > plant SSV
Aroclor-1260	6	0	--	40	--	--	No	Not detected in discrete samples
Aldrin	6	0	--	0.5	--	--	No	Not detected in discrete samples
Dieldrin	6	3	0.022	10	--	--	No	RME < plant SSV
Endosulfan sulfate	6	4	0.13	NA	--	--	Yes	Data gap
Endrin aldehyde	6	4	0.12	0.003	--	--	Yes	RME > plant SSV
Bis[2-ethylhexyl] phthalate	6	6	0.11	NA	--	--	Yes	Data gap
Phenol	6	0	--	0.79	--	--	No	Not detected in discrete samples
Total PCBs (congeners)	0	--	--	40	--	--	No	Not detected in discrete samples
Total petroleum hydrocarbons – diesel range	0	--	--	NA	--	--	No	Not detected in discrete samples

-- = not applicable
COPEC = contaminant of potential ecological concern
NA = not available
ND = not detected
PCB = polychlorinated biphenyl
RME = reasonable maximum exposure
SSV = soil screening value

Table 5-54. Evaluation of Hazard Index for Polycyclic Aromatic Hydrocarbons at 19 Study Sites.

COPC	Number of RME Analyses	Number of Nonzero RME Results	Maximum RME (mg/kg)	Plant SSV (mg/kg)	Terrestrial Invertebrate SSV (mg/kg)	Wildlife SSV (mg/kg)	Maximum Ratio			COPEC?		
							RME/ Plant SSV	RME/ Invertebrate SSV	RME/ Wildlife SSV	Plant	Invertebrate	Wildlife
PAH Type: HMW												
Pyrene	19	7	0.44	NA	18	1.1	--	0.13	0.40	No	No	No
HMW Hazard Index								**0.22**	**0.40**	**No**	**No**	**No**
PAH Type: LMW												
Fluoranthene	19	5	0.54	NA	29	100	--	0.02	<0.01	No	No	No
LMW Hazard Index								**0.02**	**<0.01**	**No**	**No**	**No**

NOTE: Neither pyrene nor fluoranthene were detected in discrete soil samples collected from rare plant habitat.

-- = not applicable
NA = not available
COPC = constituent of potential concern
COPEC = contaminant of potential ecological concern
HMW = high molecular weight
LMW = low molecular weight
PAH = polycyclic aromatic hydrocarbons
RME = reasonable maximum exposure
SSV = soil screening value

Table 5-55. Evaluations of Sum of Fractions and Dose for Radionuclides at 20 Study Sites.

Analyte	Number of RME Analyses	Number of Nonzero RME Results	Maximum CTE (pCi/g)	Maximum RME (pCi/g)	Plant BCG (pCi/g)	Wildlife BCG (pCi/g)	Maximum Plant Ratio of RME to BCG	Maximum Terrestrial Animal Ratio of RME to BCG
Soil MIS or Discrete Samples from 100-B/C Pilot or 100-NR-2								
Carbon-14	3	2	27.2	118.5	60,700	4,760	<0.01	0.03
Cesium-137	19	16	2.24	2.54	2,210	20.8	<0.01	0.12
Europium-152	19	5	0.87	1.1	14,700	1,520	<0.01	<0.01
Strontium-90	20	3	0.264	1.19	3,580	22.5	<0.01	0.01
Technetium-99	6	3	1.21	1.38	21,900	4,490	<0.01	<0.01
Uranium-233/234	18	18	1.99	2.2	51,600	5,130	<0.01	<0.01
Uranium-238	18	18	1.51	1.81	15,700	1,580	<0.01	<0.01
Sum of Fractions:							<0.01	0.16
Dose (rad/day):							<0.01	0.016
Dose Threshold (rad/day):							1	0.1
Discrete Soil Samples in Rare Plant Habitat								
Carbon-14	NM	--	--	--	60,700	--	--	--
Cesium-137	6	3	0.408	0.602	2,210	--	<0.01	--
Europium-152	6	1	0.23	0.23	14,700	--	<0.01	--
Strontium-90	6	0	--	--	3,580	--	--	--
Technetium-99	NM	--	--	--	21,900	--	--	--
Uranium-233/234	6	6	4.3	4.3	51,600	--	<0.01	--
Uranium-238	6	6	2.7	2.7	15,700	--	<0.01	--
Sum of Fractions:							<0.01	--
Dose (rad/day):							<0.01	--
Dose Threshold (rad/day):							1	--

-- = not applicable
BCG = biota concentration guide
CTE = central tendency exposure
MIS = *MULTI INCREMENT*® sampling
NM = not measured
RME = reasonable maximum exposure

Table 5-56. Plant Benchmarks. (3 Pages)

COPEC	Form/Surrogate Analyte	Primary Source	Test Species	Duration	Soil pH	Organic Matter (%)	General Effect Endpoint	Specific Effect Endpoint	Effect Level (mg/kg)	Confidence	Secondary Source	Notes	Selected Plant Benchmark (mg/kg)
Arsenic	As(V)	WAC 173-340-900, Table 749-3	Multiple species	Multiple duration	5 - 7	1 - 6	Multiple effects	Multiple endpoints	10	Moderate	ES/ER/TM-85-R3	Studies considered growth (weight, height) and reproduction (yield). Lowest value with at least moderate confidence.	10
Arsenic	Unspecified in primary source	Eco-SSL OSWER Directive 9285.7-62	Multiple species	Chronic	5.6 - 7.9	0.7 - 1.1	Growth	MATC based on multiple endpoints	18	Moderate-high	Multiple studies	Not selected because WAC 173-340-900, Table 749-3 value of moderate confidence available.	--
Barium	Barium nitrate	WAC 173-340-900, Table 749-3	Barley	14 days	7.1 - 8.4	1.0 - 2.4	Growth	Shoot growth reduced 38%	500	Low	ES/ER/TM-85/R3	Based on Chaudhry et al. (1977), lowest low effect level between two species (barley and bush beans), low effect range: 500 – 2,000 mg/kg, no effect for beans at 1,000 mg/kg. No higher confidence value available.	500
Barium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Cadmium	Multiple forms	WAC 173-340-900, Table 749-3	Multiple species	Multiple durations	Multiple pH and unspecified pH	Multiple OM and unspecified OM in secondary source	Multiple effects	Multiple endpoints	4	High	ES/ER/TM-85/R3	Confidence in a benchmark value of 4 mg/kg Cd is high because of the high number (74) of values available for its derivation. Approximately 40% of the concentrations responsible for greater than 20% reductions in plant growth parameters fall between 1 and 10 mg/kg Cd added to soil. Lowest value with at least moderate confidence.	4
Cadmium	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-65	Multiple species	Chronic	4.2 - 6.9	0.1 - 4.43	Growth	MATC	32	Moderate-high	Multiple studies	GMM of MATC values. Not selected because WAC 173-340-900, Table 749-3 value of high confidence available.	--
Calculated total uranium	Uranyl nitrate	WAC 173-340-900, Table 749-3	Swiss chard	Chronic	3 - 6	Unspecified and 92%	Growth	Root weight	5	Low	ES/ER/TM-85/R3	WAC value of 5 mg/kg, as reported in ES/ER/TM-85/R3 (based on Sheppard et al. 1983) is in error and therefore not used.	--
Calculated total uranium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Calculated total uranium	Multiple forms	Sheppard et al. 2005	Multiple species	Chronic	Unspecified	Unspecified	Multiple effects	Multiple endpoints	250	High	Multiple studies	Sheppard et al. (2005) report probable no effects concentration.	250
Chromium	--	WAC 173-340-900, Table 749-3	--	--	--	--	--	--	42	--	--	WAC value is Washington state background concentration. Selected because only low confidence benchmark available from preferred sources.	42
Chromium	Cr(VI)	ES/ER/TM-85/R3	Multiple species	Multiple durations	Multiple pH and unspecified pH in secondary source	Multiple OM and unspecified OM in secondary source	Growth effects and unspecified effects in secondary source	Multiple endpoints	1	Low	Multiple studies	Not selected due to low confidence level.	--
Chromium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Copper	Copper sulfate	WAC 173-340-900, Table 749-3	Bush bean	17 days	Unspecified	Unspecified	Growth	No effect on leaf weight	100	Low	ES/ER/TM-85-R3	Not selected due to low confidence level because based on less than 10 values.	--
Copper	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-68	Multiple species	Chronic	4.4 - 6.4	0.98 - 2.8	Growth and reproduction	EC_{10} and MATC	70	Moderate-high	Multiple studies	GMM of MATC and EC_{10} values. Lowest value with at least moderate confidence.	70
Hexavalent chromium	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Hexavalent chromium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--

Table 5-56. Plant Benchmarks. (3 Pages)

COPEC	Form/Surrogate Analyte	Primary Source	Test Species	Duration	Soil pH	Organic Matter (%)	General Effect Endpoint	Specific Effect Endpoint	Effect Level (mg/kg)	Confidence	Secondary Source	Notes	Selected Plant Benchmark (mg/kg)
Lead	Multiple forms	WAC 173-340-900, Table 749-3	Multiple species	17 days	3 - 8	1.5 – 45.3	Multiple endpoints	Reduced shoot, root weight, transpiration	50	Moderate	ES/ER/TM-85-R3	Moderate confidence is assumed for the 50 mg/kg benchmark for lead because it is based on 17 values from experiments conducted with a range of different plant species. Lowest value with at least moderate confidence.	50
Lead	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-70	Multiple species	Chronic	4 - 6.7	0.1 - 3.11	Growth	MATC	120	Moderate-high	Multiple studies	Not selected because WAC 173-340-900, Table 749-3 value of moderate confidence available.	--
Mercury	Unspecified	WAC 173-340-900, Table 749-3	Unspecified	Unspecified	Unspecified	Unspecified	Unspecified	Unspecified	0.3	Low	ES/ER/TM-85-R3	No higher confidence value available.	0.3
Mercury	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Selenium	Sodium selenate	WAC 173-340-900, Table 749-3	Sorgrass	42 days	6	18.5	Growth	53% reduction in shoot weight	1	Low	ES/ER/TM-85/R3	Based on one study, Carlson et al. (1991), and therefore attributed low confidence. Not selected due to low confidence level.	--
Selenium	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-72	Multiple species	Chronic	6.3 - 8	0.1 - 1.1	Growth	EC_{20} and MATC	0.52	Moderate-high	Multiple studies	GMM of EC_{20} and MATC values. Lowest value with at least moderate confidence.	0.52
Silver	Unspecified in primary source	WAC 173-340-900, Table 749-3	Unspecified	Unspecified	Unspecified	Unspecified	Unspecified	Unspecified	2	Low	ES/ER/TM-85-R3	Based on one study, Kabata-Pendias and Pendias (1984), and therefore attributed low confidence. Not selected due to low confidence level.	--
Silver	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-77	Multiple species	Chronic	7.4	0.17 - 2.8	Growth	MATC	560	Moderate-high	Weaver and Klarich 1973	Based on GMM of MATC values from Weaver and Klarich (1973). GMM is the lowest value with at least moderate confidence.	560
Thallium	Unspecified in primary source	WAC 173-340-900, Table 749-3	Unspecified in primary source	Unspecified in primary source	Unspecified in primary source	Unspecified in primary source	Phytotoxic	Unspecified in primary source	1	Low	ES/ER/TM-85-R3	Based on one study, Kabata-Pendias and Pendias (1984), and therefore attributed low confidence. No higher confidence value available.	1
Thallium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Uranium	Uranyl nitrate	WAC 173-340-900, Table 749-3	Swiss chard	Chronic	3 - 6	Unspecified and 92% in secondary source	Growth	Root weight	5	Low	ES/ER/TM-85/R3	WAC value of 5 mg/kg, as reported in ES/ER/TM-85/R3 (based on Sheppard et al. 1983) is in error and therefore not used.	--
Uranium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Uranium	Multiple forms	Sheppard et al. 2005	Multiple species	Chronic	Unspecified in secondary source	Unspecified in secondary source	Multiple effects	Multiple endpoints	250	High	Multiple studies	Sheppard et al. (2005) report probable no effects concentration.	250
Vanadium	Unspecified in primary source	WAC 173-340-900, Table 749-3	Unspecified in primary source	Unspecified in primary source	Unspecified in primary source	Unspecified in primary source	Phytotoxic	Unspecified in primary source	2	Low	ES/ER/TM-85-R3	No higher confidence value available. EPA 450/2-81-078 reported toxicity at 2.5 mg/kg, but 2 mg/kg was presented in Table 1 of ES/ER/TM-126/R2 and recommended as a benchmark	2
Vanadium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Zinc	--	WAC 173-340-900, Table 749-3	--	--	--	--	--	--	86	--	--	WAC value is Washington state background concentration.	--
Zinc	Multiple forms	ES/ER/TM-85/R3	Multiple species	Chronic	Multiple pH	Unspecified	Multiple	Multiple	50	Moderate	Multiple studies	Lowest value with at least moderate confidence.	50
Zinc	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-73	Multiple species	Chronic	4.3 - 6.5	0.8 - 2.6	Growth	MATC	160	Moderate-high	Multiple studies	Not selected because WAC 173-340-900, Table 749-3 value of moderate confidence available.	--
Aldrin	--	NA	--	--	--	--	--	--	--	--	--	No WAC 173-340-900, Table 749-3 value or EPA Eco-SSL available.	--

Table 5-56. Plant Benchmarks. (3 Pages)

COPEC	Form/Surrogate Analyte	Primary Source	Test Species	Duration	Soil pH	Organic Matter (%)	General Effect Endpoint	Specific Effect Endpoint	Effect Level (mg/kg)	Confidence	Secondary Source	Notes	Selected Plant Benchmark (mg/kg)
Aroclor-1260	Aroclor-1254	WAC 173-340-900, Table 749-3	Multiple species	Chronic	4 - 8	1	Growth	Multiple	40	Low	ES/ER/TM-85/R3	Based on Aroclor-1254. No higher confidence value available.	40
Aroclor-1260	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Bis[2-ethylhexyl] phthalate	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Bis[2-ethylhexyl] phthalate	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Endosulfan sulfate	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Endosulfan sulfate	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Endrin aldehyde	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Endrin aldehyde	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Total PCBs	Aroclor-1254	WAC 173-340-900, Table 749-3	Multiple species	Chronic	4 - 8	1	Growth	Multiple	40	Low	ES/ER/TM-85/R3	No higher confidence value available from preferred benchmark source.	40
Total PCBs	--	No EPA Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
TPH	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
TPH	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--

-- = not applicable
MATC = maximum acceptable toxicant concentration
EC = effective concentration x % of the test population
Eco-SSL = ecological soil screening level
EPA = U.S. Environmental Protection Agency
GMM = geometric mean
NA = not available
OM = organic matter
PCB = polychlorinated biphenyl
TPH = total petroleum hydrocarbons
WAC = *Washington Administrative Code*

Carlson, C. L., D. C. Adriano, K. S. Sajwan, S. L. Abels, D. P. Thoma, and J. T. Driver, 1991, "Effects of Selected Trace Metals on Germinating Seeds of Six Plant Species," *Water Air Soil Pollut.* 59:231-240.

Chaudhry, F. M., A. Wallace, and R. T. Meuller, 1977, "Barium Toxicity in Plants," *Commun Soil Sci Plan* 8(9):795-797.

ES/ER/TM-85/R3, 1997, *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision*, Prepared for the U.S. Department of Energy Office of Environmental Management by Lockheed Martin Energy Systems, Inc., Oak Ridge, Tennessee.

Kabata-Pendias, A., and H. Pendias, 1984, *Trace Elements in Soils and Plants*, CRC Press, Inc. Boca Raton, Florida.

OSWER 9285.7-62, 2005, *Ecological Soil Screening Levels for Arsenic: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER 9285.7-65, 2005, *Ecological Soil Screening Levels for Cadmium: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER 9285.7-68, 2006, *Ecological Soil Screening Levels for Copper: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER 9285.7-70, 2005, *Ecological Soil Screening Levels for Lead: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER 9285.7-72, 2007, *Ecological Soil Screening Levels for Selenium: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER 9285.7-73, 2007, *Ecological Soil Screening Levels for Zinc: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER 9285.7-77, 2006, *Ecological Soil Screening Levels for Silver: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

Sheppard, S. C., M. I. Sheppard, M. O. Gallerand, and B. Sanipelli, 2005, "Derivation of Ecotoxicity Thresholds for Uranium," *J Environ Radioactiv* 79:55-83.

WAC 173-340-900, "Tables," Washington Administrative Code, as amended.

Weaver, T. W., III and D. Klarich, 1973, "Ecological Effects of Silver Iodide in Terrestrial Ecosystems: A Preliminary Study, Section 3," In: Final Res Rep No.42, *Impacts of Induced Rainfall on the Great Plains of Montana*, Mont.Agric.Exp Stn., Montana State University, Montana: 18.

Table 5-57. Invertebrate Benchmarks. (3 Pages)

COPEC	Form/Surrogate Analyte	Primary Source	Test Species	Duration	Soil pH	Organic Matter (%)	General Effect Endpoint	Specific Effect Endpoint	Effect Level (mg/kg)	Confidence	Secondary Source	Notes	Selected Invertebrate Benchmark (mg/kg)
Arsenic	Potassium arsenate	WAC 173-340-900, Table 749-3	Earthworm	56 days	Unspecified	Unspecified	Reproduction	Progeny count	60	Low	ES/ER/TM-126/R2	68 mg/kg is lowest concentration tested in Fischer and Koszorus (1992). It was not stated how the concentration of 60 was derived for an effect level in ES/ER/TM-126/R2. No higher confidence value available.	60
Arsenic	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Barium	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Barium	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-63	Multiple species	Chronic	4.26 - 5.29	1.2	Reproduction	EC_{20}	330	Moderate-high	Multiple studies	GMM of three EC_{20} values, lowest value of at least moderate confidence.	330
Cadmium	Multiple forms	WAC 173-340-900, Table 749-3	Multiple species	Chronic	Multiple and unspecified pH	Multiple and unspecified OM	Multiple	Multiple	20	Moderate	ES/ER/TM-126/R2	A benchmark of 20 mg/kg was computed for Cd on the basis of the 18 available concentrations causing toxicity; therefore, confidence in this benchmark is moderate. Lowest value of at least moderate confidence.	20
Cadmium	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-65	Multiple species	Chronic	4.5 - 6	10	Reproduction, growth and population effects	Multiple	140	Moderate-high	Multiple studies	Not selected because WAC 173-340-900, Table 749-3 value of moderate confidence available	--
Calculated total uranium	--	WAC 173-340-900, Table 749-3	--	--	--	--	--	--	--	--	--	--	--
Calculated total uranium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Calculated total uranium	Expressed as U	Sheppard et al. 2005	Multiple species	Chronic	Unspecified	Unspecified	Multiple effects	Multiple endpoints	100	NA	Multiple studies	Not selected but presented as additional information.	--
Chromium	--	WAC 173-340-900, Table 749-3	--	--	--	--	--	--	42	--	--	WAC value is Washington state background concentration. Selected because only low confidence benchmark available from preferred sources.	42
Chromium	Multiple forms	ES/ER/TM-126/R2	Multiple species	Multiple duration	Multiple and unspecified pH	Multiple and unspecified OM	Multiple	Multiple	0.4	Low	Abbasi and Soni (1983)	A safety factor of 5 was applied to the 2 ppm LOEC from Abbasi and Soni (1983) because it caused a 75% reduction in earthworm survival.	--
Chromium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Copper	Multiple forms	WAC 173-340-900, Table 749-3	Multiple species	Multiple duration	Multiple and unspecified pH	Multiple and unspecified OM	Multiple	Multiple	50	NA	ES/ER/TM-126/R2	Secondary source recommended 60 mg/kg, but 50 mg/kg was presented in Table 1 in ES/ER/TM-126/R2. Selected because assumed that confidence rating was moderate.	50
Copper	Multiple forms	ES/ER/TM-126/R2	Multiple species	Multiple duration	Multiple and unspecified pH	Multiple and unspecified OM	Multiple	Multiple	60	Moderate	Multiple studies	Moderate confidence benchmark based on multiple studies.	--
Copper	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-68	Multiple species	Chronic	4 - 5.6	<1 - 5.7	Reproduction, growth and population effects	EC_{10} and MATC	80	Moderate-high	Multiple studies	GMM of EC_{10} and MATC values for at least six test species under different test conditions (pH and OM%). Not selected because WAC 173-340-900, Table 749-3 value of moderate confidence available.	--
Hexavalent chromium	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Hexavalent chromium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Lead	Multiple forms	WAC 173-340-900, Table 749-3	Earthworm	4 months	4.5, 5.5, 6.5	Unspecified	Reproduction	No effect on cocoons/worm, hatchlings/cocoon, % hatched cocoons at pH 5.5 and 6.5	500	Low	ES/ER/TM-126/R2	Based on Bengtson et al. 1986, not selected due to low confidence level.	--

Table 5-57. Invertebrate Benchmarks. (3 Pages)

COPEC	Form/Surrogate Analyte	Primary Source	Test Species	Duration	Soil pH	Organic Matter (%)	General Effect Endpoint	Specific Effect Endpoint	Effect Level (mg/kg)	Confidence	Secondary Source	Notes	Selected Invertebrate Benchmark (mg/kg)
Lead	Unspecified in primary source	EPA Eco-SSL OSWER Directive 9285.7-70	Collembola	Chronic	4.5 - 6.0	10	Reproduction	MATC	1,700	Moderate-high	Multiple studies	GMM of four MATC values for one test species under three different test conditions (pH). Selected because lowest value of at least moderate confidence.	1,700
Mercury	Mercuric chloride	WAC 173-340-900, Table 749-3	Earthworm	60 days	Unspecified in primary source	Unspecified in primary source	Survival	65% reduction	0.1	Low	ES/ER/TM-126/R2	Oak Ridge applied safety factor of 5 applied to 0.5 mg/kg LOEC in Abbasi and Soni (1983). No higher confidence value available.	0.1
Mercury	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Selenium	Sodium selenite	WAC 173-340-900, Table 749-3	Earthworm	56 days	Unspecified in primary source	Unspecified in primary source	Reproduction	Cocoon production	70	Low	ES/ER/TM-126/R2	Lowest tested concentration was 77 mg/kg from Fischer and Koszorus (1992). Not selected due to low confidence level.	--
Selenium	Unspecified in secondary source	EPA Eco-SSL OSWER Directive 9285.7-72	Multiple species	Chronic	7.1	1	Reproduction	EC20	4.1	Moderate-high	Multiple studies	GMM of three EC_{20} values for three test species. Lowest value of at least moderate confidence.	4.1
Silver	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Silver	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Uranium	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Uranium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Vanadium	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Vanadium	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Zinc	Multiple forms	WAC 173-340-900, Table 749-3	Multiple species	Chronic	4 - 7.05	2.5 - 10.8	Multiple	Multiple	200	NA	ES/ER/TM-85/R3	ES/ER/TM-85/R3 listed 200 mg/kg in Table 1 but the narrative recommended 100 mg/kg zinc as benchmark.	--
Zinc	Multiple forms	ES/ER/TM-85/R3	Multiple species	Chronic	4 - 7.05	2.5 - 10.8	Multiple	Multiple	100	High	Multiple studies	The benchmark of 100 mg/kg Zn is the 10th percentile of the 46 reported effective values. Confidence in this benchmark is high because of the relatively large amount of data available for a variety of functional response factors. Selected because this is lowest value with at least moderate confidence.	100
Zinc	Multiple forms	EPA Eco-SSL OSWER Directive 9285.7-73	Multiple species	Chronic	4.1 - 4.8	1.9 - 4.0	Population reproduction	EC_{10} and MATC	120	Moderate-high	Multiple studies	GMM is EC_{10} and MATC values for at least three test species under different test conditions (pH and OM%). Not selected because high confidence benchmark is available from ES/ER/TM-85/R3.	--
Aldrin	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Aldrin	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Bis[2-ethylhexyl] phthalate	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Bis[2-ethylhexyl] phthalate	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Endosulfan sulfate	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--

Table 5-57. Invertebrate Benchmarks. (3 Pages)

COPEC	Form/Surrogate Analyte	Primary Source	Test Species	Duration	Soil pH	Organic Matter (%)	General Effect Endpoint	Specific Effect Endpoint	Effect Level (mg/kg)	Confidence	Secondary Source	Notes	Selected Invertebrate Benchmark (mg/kg)
Endosulfan sulfate	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Endosulfan sulfate	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Endrin aldehyde	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
Endrin aldehyde	--	NA	--	--	--	--	--	--	--	--	--	No WAC 173-340-900, Table 749-3 value or EPA Eco-SSL available.	--
Total PCBs	--	No WAC 173-340-900, Table 749-3 available	--	--	--	--	--	--	--	--	--	--	--
Total PCBs	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--
TPH-DRO	--	WAC 173-340-900, Table 749-3	--	--	--	--	--	--	200	NA	NA	Used gasoline-range TPH benchmark. No source for benchmark provided. No other benchmark available.	200
TPH-DRO	--	No Eco-SSL available	--	--	--	--	--	--	--	--	--	--	--

-- = not applicable
COPEC = contaminant of potential ecological concern
EC = effective concentration x % of the test population
Eco-SSL = ecological soil screening level
EPA = U.S. Environmental Protection Agency
GMM = geometric mean
LOEC = lowest observed effect concentration
MATC = maximum acceptable toxicant concentration
NA = not available
OM = organic matter
TPH = total petroleum hydrocarbons
WAC = *Washington Administrative Code*

Abbasi, S. A. and R. Soni, 1983, "Stress-Induced Enhancement of Reproduction in Earthworm Octochaetus pattoni Exposed to Chromium (VI) and Mercury (II) - Implications in Environmental Management," *Intern J Environ Stud* 22:43-47.

Bengtsson G, Gunnarsson T, Rundgren S, 1986, Effects of Metal Pollution on the Earthworm *Dendrobaena rubida* (Sav.) in Acidified Soils, Water Air Soil Pollution 28:361-383.

ES/ER/TM-126/R2, 1997, *Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Processes: 1997 Revision*, Lockheed Martin Energy systems, Inc., Oak Ridge, Tennessee.

Fischer, E. and L. Koszorus, 1992, "Sublethal Effects, Accumulation Capacities, and Elimination Rates of As, Hg, and Se in the Manure Worm, Eisenia fetida (Oligochaeta, Lumbricidae)," *Pedobiologia* 36:172-178.

OSWER Directive 9285.7-63, 2005, *Ecological Soil Screening Levels for Barium: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-65, 2005, *Ecological Soil Screening Levels for Cadmium: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-68, 2006, *Ecological Soil Screening Levels for Copper: Interim Fina* , revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-70, 2005, *Ecological Soil Screening Levels for Lead: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-72, 2007, *Ecological Soil Screening Levels for Selenium: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER 9285.7-73, 2007, *Ecological Soil Screening Levels for Zinc: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C. Sheppard, S. C., M. I. Sheppard, M. O. Gallerand, and B. Sanipelli, 2005, "Derivation of Ecotoxicity Thresholds for Uranium," *Journal Environmental Radioactivity* 79:55-83.

WAC 173-340-900, "Tables," Washington Administrative Code, as amended.

Table 5-58. Avian Wildlife Toxicity Reference Values. (2 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Avian NOAEL TRV (mg/kg/d)	Selected Avian LOAEL TRV (mg/kg/d)
Arsenic	Arsenic oxide	Holcman and Stibilj 1997 [a]	Chicken	1.6	19 days during reproduction	Oral in diet	Reproduction	Progeny count	--	--	2.24	--	OSWER Directive 9285.7-62	--	--	--
Arsenic	Sodium arsenate	Stanley et al. 1994	Mallard	1	>10 weeks	Oral in diet	Reproduction	--	--	--	9.3	40.3	--	--	9.3	40.3
Barium	Barium hydroxide	Johnson et al. 1960	1-day-old chicks	0.121	4 weeks	Oral in diet	Mortality	--	0.1	Subchronic-chronic	20.8	41.7	ES/ER/TM-86/R3	--	20.8	41.7
Cadmium	Multiple forms	Multiple studies [a]	Multiple species	--	--	--	--	--	--	--	1.47	--	OSWER Directive 9285.7-65	Geometric mean of NOAELs for reproduction and growth	1.47	--
Cadmium	Cadmium sulfate	Leach et al. 1979 [a]	Chicken	1.6	12 weeks during egg laying	Oral in diet	Reproduction	Egg production, progeny count	--	--	0.593	2.37	OSWER Directive 9285.7-65	--	--	2.37
Chromium (3+)	Multiple forms	Multiple studies [a]	Chicken	--	--	--	Reproduction and growth	--	--	--	2.66	--	OSWER Directive 9285.7-66	Geometric mean of NOAELs for reproduction and growth	2.66	--
Chromium (3+)	Chrome alum doceahydrate	Haseltine et al. unpublished [a]	Black duck	1.17	180 to 190 days	Oral in diet	Reproduction	Reproductive success	--	--	0.569	2.78	OSWER Directive 9285.7-66	Field study	--	2.78
Copper	Copper	al Ankari et al. 1998 [a]	Chicken	1.52	84 days during egg laying	Oral in diet	Reproduction	Eggs per nest	--	--	4.05	12.1	OSWER Directive 9285.7-68	--	4.05	12.1
Hexavalent chromium	Dichromate, sodium or potassium	Multiple studies	Chicken	--	1 to 11 days	Oral in diet	Multiple	Multiple	--	--	0.4	--	OSWER Directive 9285.7-66	GMM NOAEL one species	**0.4**	**--**
Hexavalent chromium	Dichromate, sodium or potassium	Asmatullah et al. 1999	Chicken	2.02	32	Oral in diet	Reproduction and growth	Multiple	--	--	--	4.02	OSWER Directive 9285.7-66	Lowest LOAEL for one species	**--**	**4.02**
Lead	Lead acetate	Edens and Garlich 1983 [a]	Chicken	1.81	4 weeks during egg laying	Oral in diet	Reproduction	Progeny count	--	--	1.63	3.26	OSWER Directive 9285.7-70	--	1.63	3.26
Mercury	Methyl mercury	Heinz and Hoffman 1998; Heinz 1976	Mallard	1	2.5 months to 2 generations	Oral in diet	Reproduction	--	--	--	0.068	0.37	--	--	0.068	0.37
Selenium	Sodium selenite	El-Begearmi and Combs 1982 [a]	Chicken	0.328	2 weeks	Oral in diet	Survival	Mortality	--	--	0.29	0.579	OSWER Directive 9285.7-72	--	0.29	0.579
Silver	Silver acetate	Jensen et al. 1974 [a]	Turkey	0.662	5 weeks	Oral in diet	--	Growth	0.1	LOAEL-NOAEL	2.02	20.2	OSWER Directive 9285.7-77	--	2.02	20.2
Thallium	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium	Depleted metallic	Haseltine and Sileo 1983	Black duck	1.25	6 weeks	Oral in diet	Growth, mortality, organ pathology	Mortality, body weight, blood chemistry, liver or kidney effects	0.1	Subchronic-chronic	16	--	ES/ER/TM-86/R3	--	16	--
Vanadium	Sodium metavanadate	Hill 1979 [a]	Chicken	1.042	5 weeks	Oral in diet	Growth	Body weight	--	--	0.344	0.688	OSWER Directive 9285.7-75	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	0.344	0.688
Zinc	Multiple forms	Multiple studies [a]	Multiple species	--	--	--	Reproduction and growth	--	--	--	66.1	--	OSWER Directive 9285.7-73	Geometric mean of reproduction and growth studies	66.1	--
Zinc	Zinc acetate	Gibson et al. 1986 [a]	Chicken	2	10 weeks	Oral in diet	Reproduction	Progeny count	--	--	57.3	66.5	OSWER Directive 9285.7-73	--	--	66.5
Aldrin	NA	Hall et al. 1971	Ring-necked pheasant	--	6 weeks	Oral via gelatin capsule	Growth	--	0.1 (for NOAEL) 0.25 (for LOAEL)	Subchronic-chronic	0.007	0.035	CHPPM 2005	Study and value selected based on an extensive review of available literature - documented in CHPPM 2005	0.007	0.035

Table 5-58. Avian Wildlife Toxicity Reference Values. (2 Pages)

Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Avian NOAEL TRV (mg/kg/d)	Selected Avian LOAEL TRV (mg/kg/d)
Aroclor 1260	Aroclor 1254	Dahlgren et al. 1972	Ring-necked pheasant	1	17 weeks during egg laying	Oral via gelatin capsule	Reproduction	Reduced egg hatchability	0.1	LOAEL-NOAEL	0.18	1.8	ES/ER/TM-86/R3	--	0.18	1.8
Total PCBs	Total PCBs	Dahlgren et al. 1972	Ring-necked pheasant	1	17 weeks during egg laying	Oral via gelatin capsule	Reproduction	Reduced egg hatchability	0.1	LOAEL-NOAEL	0.18	1.8	ES/ER/TM-86/R3	--	0.18	1.8
Bis[2-ethylhexyl] phthalate	NA	Peakall 1974	Ringed dove	0.155	4 weeks (during reproduction)	Oral in diet	Reproduction	--	NA	--	1.1	--	ES/ER/TM-86/R3	--	1.1	---
TPH - diesel	No. 2 fuel	Szaro et al. 1981	Mallard	1	18 weeks	Oral in diet	Mortality and growth	Reduced growth	--	--	500	5,000	--	--	500	5,000

NOTE: Uncertainty factors were used to adjust all measured effect concentrations to chronic NOAELs and chronic LOAELs as follows: LOAEL to NOAEL = 0.1; subchronic to chronic = 0.1 where: chronic = >12 weeks or during critical lifestage, subchronic = 4 to 12 weeks.
[a] Study information and calculated NOAELs and LOAELs for these sources were taken directly from the cited Eco-SSL report developed by the EPA. All other primary sources were obtained, reviewed, and TRVs were extracted or developed from the study.

-- = not applicable
Eco-SSL = ecological soil screening level
EPA = U.S. Environmental Protection Agency
GMM = geometric mean
LOAEL = lowest observable adverse effect level
NA = not available
NOAEL = no observable adverse effect level
PCB = polychlorinated biphenyl
TPH = total petroleum hydrocarbon
TRV = toxicity reference value

al Ankari, A., H. Najib, and A. al Hozab, 1998, "Yolk and Serum Cholesterol and Production Traits, As Affected by Incorporating a Supraoptimal Amount of Copper in the Diet of the Leghorn Hen," Br. Poult. Sci. 39(3): 393-397.
Asmatullah, Asma, A., A. Latif, and A. R. Shakoori, 1999, *Effect of Hexavalent Chromium on Egg Laying Capacity, Hatchability of Eggs, Thickness of Egg Shell and Post-Hatching Development of Gallus Domesticus*, Asian-Australasian Journal of Animal Sciences. 12(6): 944-950.
CHPPM, 2005, Wildlife Toxicity Assessment for Aldrin, USACHPPM Document No: 39-EJ1138-01J, U.S. Army Center for Health Promotion and Preventive Medicine, Aberdeen Proving Ground, Maryland.
Dahlgren, R. B., R. L. Linder, and C. W. Carlson, 1972, "Polychlorinated Biphenyls: Their Effects on Penned Pheasants," Environ. Health Perspect, 1: 89-101.
Edens, F.W. and J. D. Garlich, 1983, "Lead-Induced Egg Production Decrease in Leghorn and Japanese Quail Hens," Poult Sci 62: 1757-1763.
El-Begearmi, M. M. and G. F. Combs Jr., 1982, "Dietary Effects on Selenite Toxicity in the Chick," Poult. Sci. 61(4): 770-776.
ES/ER/TM-86/R3, 1996, Toxicological Benchmarks for Wildlife: 1996 Revision, Oak Ridge National Laboratory, Environmental Sciences Division, Oak Ridge, Tennessee.
Gibson, S. W., M. H. Stevenson, and N. Jackson, 1986, "Comparison of the Effects of Feeding Diets Supplemented with Zinc Oxide or Zinc Acetate on the Performance and Tissue Mineral Content of Mature Female Fowls," Br. Poult. Sci. (1986) 27(3): 391-402.
Hall, J. E., Y. A. Greichus, and K. E. Severson, 1971, "Effects of Aldrin on Young Pen-Reared Pheasants," J. Wildlife Manage., 35: 429-434.
Haseltine, S. D. and L. Sileo, 1983, "Response of American Black Ducks to Dietary Uranium: A Proposed Substitute for Lead Shot," J. Wildl. Manage., 47: 1124-1129.
Heinz, G. H., 1976, "Methylmercury: Second-Year Feeding Effects on Mallard Reproduction and Duckling Behavior," J Wildl Manage 4: 82-90.
Heinz, G. H. and D. J. Hoffman, 1998, "Methylmercury Chloride and Selenomethionine Interactions on Health and Reproduction in Mallards," Environ Toxicol Chem 17: 139-145.
Hill, C. H., 1979, "The Effect of Dietary Protein Levels on Mineral Toxicity in Chicks," J Nutr. 109 (3): 501-7.
Holcman, A. and V. Stibilj, 1997, "Arsenic Residues in Eggs from Laying Hens Fed with a Diet Containing Arsenic (iii) Oxide," Arch. Environ. Contam. Toxicol., (1997) 32(4): 407-410.
Jensen, L. S., R. P. Peterson, and L. Falen, 1974, "Inducement of Enlarged Hearts and Muscular Dystrophy in Turkey Poults with Dietary Silver," Poultry Science 53(1): 57-64.
Johnson, D., Jr., A. L. Mehring, Jr., and H. W. Titus, 1960, "Tolerance of Chickens for Barium," Proc. Soc. Exp. Biol. Med., 104: 436-438.
Leach, R. M. Jr, K. W. Wang, and D. E. Baker, 1979, "Cadmium and the Food Chain: The Effect of Dietary Cadmium on Tissue Composition in Chicks and Laying Hens," J. Nutr. 109(3): 437-43.
OSWER Directive 9285.7-62, 2005, Ecological Soil Screening Levels for Arsenic: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-65, 2005, Ecological Soil Screening Levels for Cadmium: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-66, 2008, Ecological Soil Screening Levels for Chromium: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-68, 2007, Ecological Soil Screening Levels for Copper: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-70, 2005, Ecological Soil Screening Levels for Lead: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-72, 2007, Ecological Soil Screening Levels for Selenium: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-73, 2007, Ecological Soil Screening Levels for Zinc: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-75, 2005, Ecological Soil Screening Levels for Vanadium: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-77, 2006, Ecological Soil Screening Levels for Silver: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
Peakall, D. B., 1974, "Effects of di-N-Buylphthalate and di-2-Ethylhexylphthalate on the Eggs of Ring Doves," Bull. Environ. Contam. Toxicol., 12: 698-702.
Stanley, T. R. Jr., J. W. Spann, G. J. Smith, and R. Rosscoe, 1994, "Main and Interactive Effects of Arsenic and Selenium on Mallard Reproduction and Duckling Growth and Survival," Arch Environ Contam Toxicol, 26: 444-451.
Szaro, R. C., G. Hensler, and G. H. Heinz, 1981, "Effects of Chronic Ingestion of No. 2 Fuel Oil on Mallard Ducklings," J. Toxicol. and Env. Hlth, 7:789-799.
WAC 173-340-900, "Tables," Washington Administrative Code, as amended.

Table 5-59. Mammalian Wildlife Toxicity Reference Values. (3 Pages)

Soil Constituent	Form/ Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
Arsenic	Sodium arsenite	Neiger and Osweiler 1989 [a]	Dog	10.1	8 weeks	Oral in diet	Growth	Reduced body weight	--	--	1.04	1.66	OSWER Directive 9285.7-62	--	1.04	1.66
Barium	Multiple forms	Multiple studies [a]	Multiple species	--	--	--	--	--	--	--	51.8	--	OSWER Directive 9285.7-63	Geometric mean of NOAELs for reproduction and growth	--	--
Barium	Barium chloride dihydrate	Dietz et al. 1992 [a]	Rat	0.34	92 days	Oral in water	Growth	Reduced body weight	--	--	61	121	OSWER Directive 9285.7-63	Lowest LOAEL in growth or reproduction endpoints below the geomean NOAEL (Eco-SSL)	--	--
Barium	Barium chloride	NTP 1994	Rat	0.35	105 weeks	Oral in water	Nephrotoxicity	Increased kidney weight	--	--	45	75	--	Study selected because NOAEL is similar to Eco-SSL, study is of long duration, and a LOAEL was identified	45	75
Cadmium	Cadmium acetate	Yuhas et al. 1979	Rat	0.43	2 weeks	Oral in water	Growth	Body weight	--	--	0.77	7.7	OSWER Directive 9285.7-65	--	--	--
Cadmium	Cadmium chloride	Sutou et al. 1980	Rat	0.303	6 weeks during reproduction	Oral gavage	Reproduction	Reduced fetal survival	--	--	1	10	ES/ER/TM-86/R3	The ORNL TRV for cadmium was selected as it represents reproductive effects, is a longer study, and is comparable to the TRV used for Eco-SSLs	1	10
Chromium (6+)	Multiple forms	Multiple studies [a]	Multiple species	--	--	--	Reproduction and growth	--	--	--	9.24	--	OSWER Directive 9285.7-66	Geometric mean of NOAELs for reproduction and growth	9.24	--
Chromium (6+)	Potassium dichromate	R.O.W. Scientists, Inc. [a]	Mouse	0.2036	3 weeks	Oral in diet	Growth	Body weight	--	--	5.66	12	OSWER Directive 9285.7-66	--	--	--
Chromium (6+)	Sodium dichromate	Chowdhury and Mitra 1995	Rat	0.3084	90 days	Oral gavage	Reproduction	Testes weight	--	--	20	40	OSWER Directive 9285.7-66	Lowest bounded reproductive LOAEL above the geometric mean NOAEL from EPA (2008)	--	40
Chromium (3+)	Multiple forms	Multiple studies [a]	Multiple species	--	--	--	Reproduction and growth	--	--	--	2.4	--	OSWER Directive 9285.7-66	Geometric mean of NOAELs for reproduction and growth	2.4	--
Chromium (3+)	Chromium sulfate	Zahid et al. 1990 [a]	Mouse	0.0249	35 days	Oral in diet	Reproduction	Sperm cell counts	0.1	LOAEL-NOAEL	0.962	9.62	OSWER Directive 9285.7-66	--	--	9.62
Copper	Copper sulfate pentahydrate	Allcroft et al. 1961 [a]	Pig	100	4 weeks	Oral in diet	Growth	Body weight	--	--	5.6	9.34	OSWER Directive 9285.7-68	--	5.6	9.34
Lead	Lead acetate	Kimmel et al. 1980 [a]	Rat	0.3	7 weeks during gestation	Oral in water	Growth	Body weight	--	--	4.7	8.9	OSWER Directive 9285.7-70	--	4.7	8.9
Mercury	Methylmercury chloride	Verschuuren et al. 1976 [a]	Rat	0.35	3 generations	Oral in diet	Reproduction	Pup viability	--	--	0.032	0.16	ES/ER/TM-86/R3	--	0.032	0.16
Selenium	Sodium selenite	Mahan and Moxon 1984 [a]	Pig	17.8	37 days	Oral in diet	Growth	Body weight	--	--	0.143	0.215	OSWER Directive 9285.7-72	--	0.143	0.215
Silver	Silver acetate	Van Vleet 1976 [a]	Pig	8.86	40 days	Oral in diet	Growth	Body weight	0.1	LOAEL-NOAEL	6.02	60.2	OSWER Directive 9285.7-77	--	6.02	60.2
Thallium	Thallium sulfate	Formigli et al. 1986	Rat	0.365	60 days	Drinking water	Reproduction	Sperm motility	0.05 and 0.25	Subchronic LOAEL-chronic NOAEL; subchronic LOAEL-chronic LOAEL	0.015	0.075	ES/ER/TM-86/R3; CHPPM 2007	Study and value selected based on an extensive review of available literature - documented in CHPPM 2007	0.015	0.075

Table 5-59. Mammalian Wildlife Toxicity Reference Values. (3 Pages)

Soil Constituent	Form/ Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
Uranium	Uranyl acetate (61.32% U)	Paternain et al. 1989	Mouse	0.028	60 days prior to gestation, gestation, delivery, and lactation	Oral intubation	Reproduction	Pup survival and body weight	--	--	3.07	6.13	ES/ER/TM-86/R3	--	3.07	6.13
Vanadium	Sodium orthovanadate	Sanchez et al. 1991 [a]	Mouse	0.047	12 days during gestation	Gavage	Reproduction	Offspring development	--	--	4.16	8.31	OSWER Directive 9285.7-75	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	4.16	8.31
Zinc	Various forms	Multiple studies [a]	Multiple species	--	--	--	Reproduction and growth	--	--	--	75.4	--	OSWER Directive 9285.7-73	Geometric mean of NOAELs for reproduction and growth	75.4	--
Zinc	Zinc sulfate	Miller et al. 1989 [a]	Cattle	580	14 weeks	Oral in diet	Reproduction	Progeny body weight	--	--	37.9	75.9	OSWER Directive 9285.7-73	This is lowest LOAEL above geometric mean NOAEL	--	75.9
Aldrin	NA	Treon and Cleveland 1955	Rat	0.35	3 generations	Oral in diet	Reproduction	Number of litters and offspring mortality	NA	---	0.2	1	ES/ER/TM-86/R3		0.2	1
Aroclor 1260	Aroclor 1254	McCoy et al. 1995	Oldfield mouse	0.014	12 months	Oral in diet	Reproduction	Reduced number of litters, pup body weight, and pup survival	0.1	LOAEL-NOAEL	0.068	0.68	ES/ER/TM-86/R3	--	0.068	0.68
Total PCBs	Aroclor 1254	McCoy et al. 1995	Oldfield mouse	0.014	12 months	Oral in diet	Reproduction	Reduced number of litters, pup body weight, and pup survival	0.1	LOAEL-NOAEL	0.068	0.68	ES/ER/TM-86/R3	--	0.068	0.68
Bis[2-ethylhexyl] phthalate	NA	Lamb et al. 1987	Mouse	0.03	105 days (during reproduction)	Oral in diet	Reproduction	--	NA	--	18.3	183	ES/ER/TM-86/R3	--	18.3	183
TPH - diesel	JP-8 jet fuel	Cooper and Mattie 1996	Rat	0.35	Gestation days 6 to 15	Oral gavage	Reproduction	Adult and fetal weight; fetal mortality	--	--	1,000	1,500	--	--	1,000	1,500

NOTE: Uncertainty factors were used to adjust all measured effect concentrations to chronic NOAELS and chronic LOAELs as follows: LOAEL to NOAEL = 0.1; subchronic to chronic = 0.1 where: chronic = >12 weeks or during critical lifestage, subchronic = 4 to 12 weeks.

[a] Study information and calculated NOAELs and LOAELs for these sources were taken directly from the cited Eco-SSL report developed by the EPA. All other primary sources were obtained, reviewed, and TRVs were extracted or developed from the study.

-- = not applicable
Eco-SSL = ecological soil screening level
EPA = U.S. Environmental Protection Agency
LOAEL = lowest observable adverse effect level
NA = not available
NOAEL = no observable adverse effect level
ORNL = Oak Ridge National Laboratory
PCB = polychlorinated biphenyl
TPH = total petroleum hydrocarbon
TRV = toxicity reference value

Allcroft, R., K. N. Burns, and G. Lewis, 1961, "The Effects of High Levels of Copper in Rations for Pigs," Vet. Rec. 73: 714.

Chowdhury, A. R. and C. Mitra, 1995, "Spermatogenic and Steroidogenic Impairment After Chromium Treatment in Rats," Indian Journal of Experimental Biology 33(7): 480-484.

CHPPM, 2007, Wildlife Toxicity Assessment for Thallium, USACHPPM Document No. 37-EJ1138-01O, U.S. Army Center for Health Promotion and Preventive Medicine, Aberdeen Proving Ground, Maryland.

Cooper, J. R. and D. R. Mattie, 1996, "Developmental Toxicity of JP-8 Jet Fuel in the Rat," J. App. Tox. 16: 197-200.

Dietz, D. D., M. R. Elwell, W. E. Davis Jr., and E. F. Meirhenry, 1992, "Subchronic Toxicity of Barium Chloride Dihydrate Administered to Rats and Mice in the Drinking Water," Fundam. Appl. Toxicol., 19(4):527-37.

ES/ER/TM-86/R3, 1996, Toxicological Benchmarks for Wildlife: 1996 Revision, Oak Ridge National Laboratory, Environmental Sciences Division, Oak Ridge, Tennessee.

Formigli, L., R. Scelsi, P. Poggi, C. Gregotti, A. DiNucci, E. Sabbioni, L. Gottardi, and L. Manzo, 1986, "Thallium-Induced Testicular Toxicity in the Rat," Environ. Res. 40: 531-539.

Kimmel, C.A., L. D. Grant, C. S. Sloan, and B. C. Gladen, 1980, "Chronic Low-Level Lead Toxicity in the Rat. I. Maternal Toxicity and Perinatal Effects," Toxicol. Appl. Pharmacol. 56: 28-41.

Lamb, J. C., IV, R. E. Chapin, J. Teague, A. D. Lawton, and J. R. Reel, 1987, "Reproductive Effects of Four Phthalic Acid Esters in the Mouse," Toxicol. Appl. Pharmacol. 88: 255-269.

McCoy, G, M. F. Finlay, A. Rhone, K. James, and G. P. Cobb, 1995, "Chronic Polychlorinated Biphenyls Exposure on Three Generations of Oldfield Mice (Permyscus polionotus): Effects on Reproduction, Growth, and Body Residues," Arch. Environ. Contam. Toxicol. 28: 431-435.

Mahan, D. C. and A. L. Moxon, 1984, Effect of Inorganic Selenium Supplementation on Selenosis in Postweaning Swine,. Journal of Animal Science. 58(5): 1216-1221

Miller, W. J., H. E. Amos, R. P. Gentry, D. M. Blackmon, R. M. Durrance, C. T. Crowe, A. S. Fielding, and M. W. Neathery, 1989, "Long-Term Feeding of High Zinc Sulfate Diets to Lactating and Gestating Dairy Cows," J Dairy Sci. 72(6): 1499-508.

Neiger, R. D. and G. D. Osweiler, 1989, "Effect of Subacute Low Level Dietary Sodium Arsenite on Dogs," Fund. Appl. Toxicol., 13: 439-451.

NTP, 1994, NTP Technical Report on the Toxicology and Carcinogenesis Studies of Barium Chloride Dihydrate (CAS no.10326-27-9) in F344/N Rats and B6C3F1 Mice (Drinking Water Studies), National Toxicity Program, Research Triangle Park, North Carolina.

Table 5-59. Mammalian Wildlife Toxicity Reference Values. (3 Pages)

Soil Constituent	Form/ Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
OSWER Directive 9285.7-62, 2005, Ecological Soil Screening Levels for Arsenic: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.																
OSWER Directive 9285.7-63, 2005, Ecological Soil Screening Levels for Barium: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.																
OSWER Directive 9285.7-65, 2005, Ecological Soil Screening Levels for Cadmium: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.																
OSWER Directive 9285.7-66, 2008, Ecological Soil Screening Levels for Chromium: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.																
OSWER Directive 9285.7-68, 2007, Ecological Soil Screening Levels for Copper: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.																
OSWER Directive 9285.7-70, 2005, Ecological Soil Screening Levels for Lead: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.																
OSWER Directive 9285.7-72, 2007, Ecological Soil Screening Levels for Selenium: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.																
OSWER Directive 9285.7-73, 2007, Ecological Soil Screening Levels for Zinc: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.																
OSWER Directive 9285.7-75, 2005, Ecological Soil Screening Levels for Vanadium: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.																
OSWER Directive 9285.7-77, 2006, Ecological Soil Screening Levels for Silver: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.																
Paternain, J. L., J. L. Domingo, A. Ortega, and J. M. Llobet, 1989, "The Effects of Uranium on Reproduction, Gestation, and Postnatal Survival in Mice," Ecotoxicol. Environ. Saf., 17: 291-296.																
ROW Scientists, Inc. 1996. Final report on the reproductive toxicity of potassium dichromate (hexavalent) (CAS NO. 7778-50-9) administered in diet to SD rats. 26 Dec 1996. PB97125355. National Toxicology Program RACB95001. 177 p																
Sanchez, D., A. Ortega, J. L. Domingo, and J. Corbella, 1991, "Development Toxicity Evaluation of Orthovanadate in the Mouse," Biol. Trace Elem. Res. (1991) 30(3): 219-26.																
Sutou, S., K. Yamamoto, H. Sendota, and M. Sugiyama, 1980, "Toxicity, Fertility, Teratogenicity, and Dominant Lethal Tests in Rats Administered Cadmium Subchronically, I. Toxicity Studies," Ecotoxicol Environ Saf., 4(1):39-50.																
Treon, J. F. and F. P. Cleveland, 1955. Toxicity of Certain Chlorinated Hydrocarbon Insecticides for Laboratory Animals, With Special Reference to Aldrin and Dieldrin," Ag. Food Chem. 3: 402-408.																
Van Vleet, J. F., 1974, "Induction of Lesions of Selenium Vitamin E Deficiency in Pigs Fed Silver," American Journal of Veterinary Research 37(12): 1415-1420.																
Verschuuren, H. G., R. Kroes, E. M. Den Tonkelaar, J. M. Berkvens, P. W. Helleman, A. G. Rauws, P. L. Schuller, and G. J. Van Esch, 1976, "Toxicity of Methyl Mercury Chloride in Rats. II. Reproduction Study," Toxicol., 6: 97-106.																
WAC 173-340-900, "Tables," Washington Administrative Code, as amended.																
Yuhas, E. M., R. C. Schnell, and T. S. Miya, 1979, "Dose-Related Alterations in Growth and Mineral Disposition by Chronic Oral Cadmium Administration in the Male Rat," Toxicology 12(1): 19-29.																
Zahid, Z. R., Z. S. Al Hakkak, A. H. H. Kadhim, E. A. Elias, and I. S. Al Jumaily, 1990, "Comparative Effects of Trivalent and Hexavalent Chromium on Spermatogenesis of the Mouse," Toxicol. Environ. Chem. 25(2-3): 131-136.																

Table 5-60. Summary of Maximum Benchmark Hazard Quotients for All Plant Contaminant of Potential Ecological Concern. (2 Pages)

COPEC	Plant Benchmark (mg/kg)	Study Sites				Reference Sites				Area with Maximum RME
		Maximum CTE (mg/kg)	Maximum RME (mg/kg)	CTE HQ (Maximum CTE/ Benchmark)	RME HQ (Maximum RME/ Benchmark)	Maximum CTE (mg/kg)	Maximum RME (mg/kg)	CTE HQ (Maximum CTE/ Benchmark)	RME HQ (Maximum RME/ Benchmark)	
Aldrin	NA	0.00187	0.0023	--	--	0.0009	0.0009	--	--	300 Area
Aroclor-1260	40	0.0069	0.0095	<0.01	<0.01	ND	ND	--	--	300 Area
Arsenic	10	12.2	13.1	1.2	1.3	9.74	9.90	0.97	0.99	100-D/100-H
Barium	500	152	159	0.30	0.32	121	127	0.24	0.26	300 Area
Bis[2-ethylhexyl] phthalate	NA	0.48	0.66	--	--	0.084	0.141	--	--	100-K
Cadmium	4	2.54	2.75	0.64	0.69	1.71	1.78	0.43	0.45	100-F/100-IU-2/100-IU-6
Calculated total uranium	250	4.53	5.45	0.02	0.02	2.66	2.92	0.01	0.01	100-F/100-IU-2/100-IU-6
Chromium	42	149	171	3.6	4.1	26.9	28.6	0.64	0.68	100-F/100-IU-2/100-IU-6
Copper	70	43	60.1	0.61	0.86	39	44.5	0.56	0.64	100-F/100-IU-2/100-IU-6
Endosulfan sulfate	NA	ND	ND	--	--	0.00043	0.00043	--	--	Reference
Endrin aldehyde	NA	ND	ND	--	--	0.0015	0.0015	--	--	Reference
Hexavalent chromium	NA	0.596	0.801	--	--	0.284	0.326	--	--	100-D/100-H
Lead	50	83.5	87.9	1.7	1.8	61	67.9	1.2	1.4	100-D/100-H
Mercury	0.3	0.126	0.157	0.42	0.52	0.075	0.106	0.25	0.35	100-F/100-IU-2/100-IU-6
Selenium	0.52	0.9	0.9	1.7	1.7	0.973	1.2	1.9	2.3	Reference
Silver	560	0.187	0.2	<0.01	<0.01	0.12	0.12	<0.01	<0.01	100-D/100-H
Thallium	1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	Reference and 100-DH
Total PCB	40	0.00493	0.00573	<0.01	<0.01	--	--	--	--	100-N
Total petroleum hydrocarbons – diesel range	NA	570	570	--	--	--	--	--	--	100-N
Uranium (inorganic)	250	5.54	7.06	0.02	0.03	3.9	5	0.02	0.02	300 Area
Vanadium	2	84.7	89.1	42	45	72	77.4	36	39	100-F/100-IU-2/100-IU-6
Zinc	50	393	411	7.9	8.2	305	326	6.1	6.5	100-D/100-H
Discrete Soil Samples in Rare Plant Habitat										
Aldrin	NA	ND	ND	--	--	--	--	--	--	--
Aroclor-1260	40	ND	ND	--	--	--	--	--	--	--
Arsenic	10	19.3	19.3	1.9	1.9	--	--	--	--	100-F/100-IU-2/100-IU-6
Barium	500	206	206	0.41	0.41	--	--	--	--	100-B/C
Bis[2-ethylhexyl] phthalate	NA	0.11	0.11	--	--	--	--	--	--	100-D/100-H
Cadmium	4	2.7	2.7	0.68	0.68	--	--	--	--	100-D/100-H
Calculated total uranium	250	8.10	8.10	0.03	0.03	--	--	--	--	100-B/C
Chromium	42	18.5	18.5	0.44	0.44	--	--	--	--	100-B/C
Copper	70	53.6	53.6	0.77	0.77	--	--	--	--	100-F/100-IU-2/100-IU-6
Endosulfan sulfate	NA	0.13	0.13	--	--	--	--	--	--	100-B/C
Endrin aldehyde	NA	0.12	0.12	--	--	--	--	--	--	100-B/C
Hexavalent chromium	NA	0.28	0.28	--	--	--	--	--	--	100-F/100-IU-2/100-IU-6
Lead	50	125	125	2.5	2.5	--	--	--	--	100-F/100-IU-2/100-IU-6
Mercury	0.3	0.06	0.06	0.20	0.20	--	--	--	--	100-D/100-H
Selenium	0.52	ND	ND	--	--	--	--	--	--	--
Silver	560	ND	ND	--	--	--	--	--	--	--
Thallium	1	ND	ND	--	--	--	--	--	--	--
Total PCB	40	NM	NM	--	--	--	--	--	--	--
Total petroleum hydrocarbons - diesel range	NA	NM	NM	--	--	--	--	--	--	--

Table 5-60. Summary of Maximum Benchmark Hazard Quotients for All Plant Contaminant of Potential Ecological Concern. (2 Pages)

COPEC	Plant Benchmark (mg/kg)	Study Sites				Reference Sites				Area with Maximum RME
		Maximum CTE (mg/kg)	Maximum RME (mg/kg)	CTE HQ (Maximum CTE/ Benchmark)	RME HQ (Maximum RME/ Benchmark)	Maximum CTE (mg/kg)	Maximum RME (mg/kg)	CTE HQ (Maximum CTE/ Benchmark)	RME HQ (Maximum RME/ Benchmark)	
Uranium (inorganic)	250	ND	ND	--	--	--	--	--	--	--
Vanadium	2	58.4	58.4	29	29	--	--	--	--	100-B/C
Zinc	50	621	621	12	12	--	--	--	--	100-F/100-IU-2/100-IU-6

= Benchmark hazard quotient greater than 1.0.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
HQ = hazard quotient
NA = not available
ND = not detected
NM = not measured
PCB = polychlorinated biphenyl
RME= reasonable maximum exposure

Table 5-61. Summary of Locations and COPECs with Soil Concentrations Greater than Plant Benchmarks and Reference. (3 Pages)

Site Name	COPEC	Plant Benchmark (mg/kg)	Soil Concentration (mg/kg)	
			CTE	RME
Reference Sites				
Beverly Ref 1	Vanadium	2	72	77.4
	Zinc	50	153	164
Beverly Ref 2	Vanadium	2	36.1	38.3
	Zinc	50	105	116
Ref 11	Vanadium	2	39.9	40.5
	Zinc	50	124	130
Ref 12	Vanadium	2	41.6	43.3
	Zinc	50	170	179
Ref 13	Lead	50	61	67.9
	Vanadium	2	50.8	55
	Zinc	50	299	326
Ref 14	Lead	50	47.4	58.8
	Vanadium	2	52	53.2
	Zinc	50	305	316
Ref 16	Vanadium	2	36.8	38.3
	Zinc	50	168	174
Study Sites				
Discrete Sample Results				
100-B/C Decision Area				
100-B/C Pilot	Vanadium	2	27.1	29.3
	Zinc	50	127	151
2a	Arsenic	10	12.3	12.3
	Vanadium	2	58.4	58.4
	Zinc	50	176	176
100-N Decision Area				
100-NR-2	Vanadium	2	54.2	57.9
	Zinc	50	118	159
100-D/100-H Decision Area				
2f	Lead	50	50.9	50.9
	Vanadium	2	33.9	33.9
	Zinc	50	288	288
100-F/100-IU-2/100-IU-6 Decision Area				
2j	Vanadium	2	27.6	27.6
	Zinc	50	258	258
2l	Arsenic	10	19.3	19.3
	Lead	50	125	125
	Vanadium	2	30.7	30.7
	Zinc	50	621	621

Table 5-61. Summary of Locations and COPECs with Soil Concentrations Greater than Plant Benchmarks and Reference. (3 Pages)

Site Name	COPEC	Plant Benchmark (mg/kg)	Soil Concentration (mg/kg)	
			CTE	RME
3b	Arsenic	10	6.4	10.2
	Lead	50	53.5	97.8
	Vanadium	2	29.2	30.5
	Zinc	50	302	492
300 Area Decision Area				
5c	Vanadium	2	49.2	49.2
	Zinc	50	192	192
MIS Sample Results				
100-B/C Decision Area				
2a	Chromium	42	39.3	42.4
	Vanadium	2	33.0	33.8
	Zinc	50	118	134
100-K Decision Area				
2c	Lead	50	55.4	59.3
	Vanadium	2	40.5	43
	Zinc	50	337	363
Rip 5	Vanadium	2	44.2	45.5
	Zinc	50	306	317
100-N Decision Area				
Rip 4	Chromium	42	66.7	68.8
	Vanadium	2	52.1	55.1
	Zinc	50	214	231
100-D/100-H Decision Area				
2f	Vanadium	2	52.3	54.9
	Zinc	50	207	233
Rip 1	Arsenic	10	12.2	13.1
	Lead	50	83.5	87.9
	Vanadium	2	41.2	43.3
	Zinc	50	393	411
Rip 2	Chromium	42	48	52.1
	Vanadium	2	43.1	44.8
	Zinc	50	123	127
Rip 3	Vanadium	2	56	59.7
	Zinc	50	129	135
Rip 8	Vanadium	2	43.5	46.8
	Zinc	50	218	231
Rip 9	Vanadium	2	41.1	41.7
	Zinc	50	201	207
Rip 10	Vanadium	2	48.8	52.3
	Zinc	50	209	223

Table 5-61. Summary of Locations and COPECs with Soil Concentrations Greater than Plant Benchmarks and Reference. (3 Pages)

Site Name	COPEC	Plant Benchmark (mg/kg)	Soil Concentration (mg/kg)	
			CTE	RME
100-F/100-IU-2/100-IU-6 Decision Area				
2j	Lead	50	67.7	73.7
	Vanadium	2	41.2	42.4
	Zinc	50	379	390
2l	Vanadium	2	84.7	89.1
	Zinc	50	138	143
3b	Lead	50	57.7	67.6
	Vanadium	2	44.7	46.5
	Zinc	50	352	399
4a	Arsenic	10	9.66	10.9
	Lead	50	60.6	66.3
	Vanadium	2	51.8	54.3
	Zinc	50	325	349
Rip 7	Chromium	42	149	171
	Lead	50	55	71.7
	Vanadium	2	54.1	57.7
	Zinc	50	207	211
300 Area Decision Area				
5c	Vanadium	2	67.2	70.8
	Zinc	50	119	129
Rip 6	Arsenic	10	9.56	10
	Vanadium	2	52.7	54.2
	Zinc	50	201	206

= Concentration exceeds benchmark.

COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
MIS = *MULTI INCREMENT*® sampling
RME = reasonable maximum exposure

Table 5-62. Summary of Plant Cover and Diversity Measures by Site.

Site Name	Diversity	Species Richness	Bare Ground (%)	Annual Cover (%)	Alien Species Cover (%)	Native Species Cover (%)	Grass Cover (%)	Litter Cover (%)	Shrub Cover (%)	Crytogamic Cover (%)	Total Cover (%)
Study Site											
2a	2.5	26	14	6.6	27	21	20	25	0.5	13	48
2c	2.2	23	0.33	41	52	15	41	33	NA	0.21	67
2f	2.1	25	13	15	58	24	30	11	NA	0	82
2j	0.72	7	0	NA	52	7.1	49	49	NA	0	60
2l	2.3	22	0	0.67	18	46	44	29	NA	0	64
3b	2.2	26	0	9	34	35	33	14	NA	0.13	72
4a	1.1	12	0	NA	66	15	66	53	NA	0	81
5c	2.6	27	2	5.2	41	20	14	57	NA	4.2	62
Rip 1	2.2	17	0.25	5.4	29	48	23	27	10	NA	80
Rip 2	2.1	17	15	0.75	42	12	19	12	NA	13	64
Rip 3	1.7	19	31	2.5	36	8	17	23	0.083	NA	45
Rip 4	2.3	24	2.4	11	34	6.4	46	23	NA	0.42	70
Rip 5	2.4	20	24	18	20	18	38	12	NA	NA	62
Rip 6	1.3	19	38	1.9	97	12	10	23	2.7	0.13	110
Rip 7	2.3	25	28	3.3	12	30	17	6.8	0.17	2.6	53
Rip 8	2.7	28	15	1.3	13	24	12	12	2.3	7.1	45
Rip 9	1.6	12	13	0.21	43	8.1	34	11	1.3	NA	62
Rip 10	2.6	22	17	23	21	21	20	12	NA	8.2	51
Reference Site											
Beverly Reference 1	2.8	31	20	2.9	27	38	9.9	21	0.21	0.83	64
Beverly Reference 2	2.9	34	6.5	14	25	42	21	25	NA	0	68
Reference 11	1.7	11	2.4	0.042	56	13	12	23	NA	NA	73
Reference 12	1.9	20	27	0.42	7.6	19	11	31	NA	5.2	40
Reference 13	1.3	16	19	0.38	59	1.8	10	46	NA	NA	67
Reference 14	2.4	22	9.5	3.1	19	30	26	27	NA	1.8	66
Reference 16	2.5	24	3.3	16	24	32	21	39	NA	0.21	61

= Less 80% of the average measure in reference sites.
= Greater than 120% of average measure in reference sites.
NA = not available

Table 5-63. Summary of Plant-to-Soil Regression Results. (2 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Ref.)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Plant Concentration (fw) to Average Soil Concentration	Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Aldrin	Soil only	1	--	None, insufficient data	--	--	None, insufficient data	--	--
Aroclor-1260	Soil only	0	--	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Arsenic	Soil only	1	--	None, insufficient data	--	--	None, insufficient data	--	--
Barium	Soil and plant	25	0.091	Plant = -3.4 + 0.13 soil	0.12	0.085	ln(Plant) = -5.2 + 1.6 ln(soil)	0.14	0.062
Bis[2-ethylhexyl] phthalate	Soil only	13	14	Plant = 1.4 - 7.5 soil	0.16	0.17	ln(Plant) = -2.2 - 0.64 ln(soil)	0.23	0.096
Cadmium	Soil only	4	--	Insufficient data to determine if there is a biologically significant relationship	--	--	Insufficient data to determine if there is a biologically significant relationship	--	--
Calculated total uranium	Soil only	1	--	None, insufficient data	--	--	None, insufficient data	--	--
Chromium	Soil only	18	0.029	Plant = 1.1 - 0.0025 soil	0.011	0.68	ln(Plant) = 0.031 - 0.097 ln(soil)	0.0043	0.8
Copper	Plant only	25	0.12	Plant = 5.4 - 0.064 soil	0.037	0.35	ln(Plant) = 2.2 - 0.34 ln(soil)	0.027	0.43
Endosulfan sulfate	Soil only	--	--	None, not detected in soil and tissue at the same site	--	--	None, not detected in soil and tissue at the same site	--	--
Endrin aldehyde	Soil only	--	--	None, not detected in soil and tissue at the same site	--	--	None, not detected in soil and tissue at the same site	--	--
Hexavalent chromium	Soil only	0	--	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Lead	Soil only	9	0.019	Plant = 0.39 + 0.0085 soil	0.11	0.38	ln(Plant) = -1.3 + 0.24 ln(soil)	0.052	0.56
Mercury	Soil only	0	--	None, no detects in tissue	--	--	None, no detects in tissue	--	--

Table 5-63. Summary of Plant-to-Soil Regression Results. (2 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Ref.)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Plant Concentration (fw) to Average Soil Concentration	Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Selenium	Neither	1	--	None, insufficient data	--	--	None, insufficient data	--	--
Silver	Neither	0	--	None, not detected in soil and tissue at the same site	--	--	None, not detected in soil and tissue at the same site	--	--
Thallium	Plant only*	0	--	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Total PCB	Soil only	0	--	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Total petroleum hydrocarbons - diesel range	Soil only	0	--	None, not measured in tissue	--	--	None, not measured in tissue	--	--
Uranium (inorganic)	Neither	0	--	None, no detects in tissue	--	--	None, no detects in tissue	--	--
Vanadium	Neither	14	0.012	Plant = 1.3 - 0.015 soil	0.047	0.46	ln(Plant) = 9.1 - 2.6 ln(soil)	0.17	0.14
Zinc	Soil and plant	25	0.09	Plant = 21 - 0.0042 soil	<0.001	0.92	ln(Plant) = 2.8 - 0.01 ln(soil)	<0.001	0.98

-- = not applicable
* identified as a plant COPC because of BC-Pilot plant tissue only, not detected in RCBRA plant tissues
COPEC = contaminant of potential ecological concern
PCB = polychlorinated biphenyl

Table 5-64. Summary of Regression Analyses of Phytotoxicity Measures versus Soil Concentrations. (6 Pages)

Analyte	Number of Sites with Detects [a]	Minimum of P-Value	Maximum of P-Value	Number of Significant Regressions [b]	Maximum CTE Tested with Bioassay (mg/kg) [c]	Maximum CTE Evaluated for Benchmarks (mg/kg) [d]
Contaminant of Potential Ecological Concern						
Aldrin [e]	1	--	--	0	0.0019	0.0019
Aroclor-1260 [e]	0	--	--	0	--	0.0069
Arsenic [e]	17	<0.001	0.21	8	19.3	19.3
• Bluegrass average root biomass (dry) = -0.11 + 0.094 arsenic, n = 17, r^2=0.3, p = 0.023 • Bluegrass average root biomass (wet) = -0.0026 + 0.63 arsenic, n = 17, r^2 = 0.26, p = 0.038 • Bluegrass average root length = 12 + 2.6 arsenic, n = 17, r^2 = 0.4, p = 0.0061 • Bluegrass average shoot biomass (dry) = -0.11 + 0.12 arsenic, n = 17, r^2 = 0.56, p<0.001 • Bluegrass average shoot biomass (wet) = -0.7 + 0.91 arsenic, n = 17, r^2 = 0.57, p<0.001 • Bluegrass average stem height = 22 + 2.6 arsenic, n = 17, r^2 = 0.34, p = 0.015 • Total average root shoot mass (dry) = -0.22 + 0.22 arsenic, n = 17, r^2 = 0.45, p = 0.0034 • Total average root shoot mass (wet) = -0.65 + 1.5 arsenic, n = 17, r^2 = 0.45, p = 0.0031						
Barium [e]	17	0.031	0.96	1	206	206
• Bluegrass average root length = 9.2 + 0.25 barium, n = 17, r^2 = 0.28, p = 0.031						
Bis[2-ethylhexyl] phthalate [e]	17	0.41	0.87	0	0.48	0.48
Cadmium [e]	17	0.19	0.98	0	2.7	2.7
Calculated total uranium [e]	17	0.0033	0.55	1	8.10	8.10
• Bluegrass average root length = 17 + 6.2 calculated total uranium, n = 17, r^2 = 0.45, p = 0.003						
Chromium [e]	17	0.025	0.73	1	39.3	149
• Bluegrass 14-day germination = 91 + -2 chromium, n = 17, r^2 = 0.29, p = 0.025						
Copper	17	0.016	0.85	4	53.6	53.6
• Bluegrass average shoot biomass (dry) = -0.48 + 0.039 copper, n = 17, r^2 = 0.33, p = 0.016 • Bluegrass average shoot biomass (wet) = -2.5 + 0.26 copper, n = 17, r^2 = 0.27, p = 0.034 • Total average root shoot mass (dry) = -0.95 + 0.071 copper, n = 17, r^2 = 0.28, p = 0.031 • Total average root shoot mass (wet) = -5.8 + 0.5 copper, n = 17, r^2 = 0.28, p = 0.03						
Endosulfan sulfate [e]	4	--	--	0	0.13	0.13
Endrin aldehyde [e]	5	0.021	0.96	1	0.12	0.12
• Bluegrass average root length = 23 + 360 endrin aldehyde, n = 5, r^2 = 0.87, p = 0.021						
Hexavalent chromium [e]	11	0.19	0.98	0	0.3	0.596

Table 5-64. Summary of Regression Analyses of Phytotoxicity Measures versus Soil Concentrations. (6 Pages)

Analyte	Number of Sites with Detects [a]	Minimum of P-Value	Maximum of P-Value	Number of Significant Regressions [b]	Maximum CTE Tested with Bioassay (mg/kg) [c]	Maximum CTE Evaluated for Benchmarks (mg/kg) [d]
Lead [e]	17	<0.001	0.62	6	125	125
• Bluegrass average root biomass (dry) = -0.11 + 0.016 lead, n = 17, r^2 = 0.39, p = 0.008 • Bluegrass average root biomass (wet) = 0.24 + 0.099 lead, n = 17, r^2 = 0.3, p = 0.023 • Bluegrass average shoot biomass (dry) = 0.0043 + 0.018 lead, n = 17, r^2 = 0.56, p<0.001 • Bluegrass average shoot biomass (wet) = 0.12 + 0.13 lead, n = 17, r^2 = 0.57, p = <0.001 • Total average root shoot mass (dry) = -0.1 + 0.033 lead, n = 17, r^2 = 0.5, p = 0.002 • Total average root shoot mass (wet) = 0.4 + 0.23 lead, n = 17, r^2 = 0.48, p = 0.002						
Mercury [e]	16	0.14	0.91	0	0.126	0.126
Selenium	2	--	--	0	0.9	0.973
Silver	3	--	--	0	0.12	0.187 [f]
Thallium	1	--	--	0	1.1	1.1
Total PCB [e]	0	--	--	0	--	0.005
Total petroleum hydrocarbons-diesel [e]	0	--	--	0	--	570
Uranium	6	0.023	0.95	1	3.66	5.54
• Bluegrass 14-day germination = -67 + 34 uranium, n = 6, r^2 = 0.77, p = 0.023						
Vanadium	17	0.02	0.18	2	84.7	84.7
• Bluegrass average shoot biomass (wet) = 14 - 0.16 vanadium, n = 17, r^2 = 0.31, p = 0.020 • Total average root shoot mass (wet) = 24 - 0.29 vanadium, n = 17, r^2 = .28, p = 0.029						
Zinc [e]	17	0.001	0.72	5	621	621
• Bluegrass average root biomass (dry) = -0.17 + 0.0029 zinc, n = 17, r^2 = 0.32, p = 0.018 • Bluegrass average shoot biomass (dry) = -0.083 + 0.0034 zinc, n = 17, r^2 = 0.49, p = 0.002 • Bluegrass average shoot biomass (wet) = -0.57 + 0.026 zinc, n = 17, r^2 = 0.51, p = 0.001 • Total average root shoot mass (dry) = -0.25 + 0.0063 zinc, n = 17, r^2 = 0.42, p = 0.005 • Total average root shoot mass (wet) = -0.47 + 0.043 zinc, n = 17, r^2 = 0.4, p = 0.006						
Confounding Factors						
Calcium	17	0.005	0.96	4	6,250	6,250
• Bluegrass average shoot biomass (dry) = -1.6 + 0.00056 calcium, n = 17, r^2 = 0.42, p = 0.005 • Bluegrass average shoot biomass (wet) = -11 + 0.0039 calcium, n = 17, r^2 = 0.37, p = 0.010 • Total average root shoot mass (dry) = -2.6 + 0.00093 calcium, n = 17, r^2 = 0.29, p = 0.027 • Total average root shoot mass (wet) = -16 + 0.0063 calcium, n = 17, r^2 = 0.26, p = 0.035						
Chloride	17	0.27	0.98	0	13.3	16.1

Table 5-64. Summary of Regression Analyses of Phytotoxicity Measures versus Soil Concentrations. (6 Pages)

Analyte	Number of Sites with Detects [a]	Minimum of P-Value	Maximum of P-Value	Number of Significant Regressions [b]	Maximum CTE Tested with Bioassay (mg/kg) [c]	Maximum CTE Evaluated for Benchmarks (mg/kg) [d]
Cumulative percent retained on No. 100 screen	17	0.008	0.16	4	91.7	95.9
• Bluegrass 14-day germination = 120 + -0.93 cumulative percent retained on No. 100 screen, n = 17, r^2 = 0.24, p = 0.044 • Bluegrass average shoot biomass (dry) = 2.4 + -0.022 cumulative percent retained on No. 100 screen, n = 17, r^2 = 0.27, p = 0.033 • Bluegrass average shoot biomass (wet) = 21 + -0.2 cumulative percent retained on No. 100 screen, n = 17, r^2 = 0.38, p = 0.008 • Total average root shoot mass (wet) = 35 + -0.33 cumulative percent retained on No. 100 screen, n = 17, r^2 = 0.3, p = 0.022						
Cumulative percent retained on No. 16 screen	17	0.25	0.96	0	35.9	35.9
Cumulative percent retained on No. 200 screen	17	0.002	0.14	5	97.1	98.6
• Bluegrass average root length = 170 + -1.5 cumulative percent retained on No. 200 screen, n = 17, r^2 = 0.27, p = 0.032 • Bluegrass average shoot biomass (dry) = 7.5 + -0.073 cumulative percent retained on No. 200 screen, n = 17, r^2 = 0.38, p = 0.009 • Bluegrass average shoot biomass (wet) = 61 + -0.6 cumulative percent retained on No. 200 screen, n = 17, r^2 = 0.47, p = 0.002 • Total average root shoot mass (dry) = 12 + -0.12 cumulative percent retained on No. 200 screen, n = 17, r^2 = 0.26, p = 0.037 • Total average root shoot mass (wet) = 100 + -1 cumulative percent retained on No. 200 screen, n = 17, r^2 = 0.37, p = 0.009						
Cumulative percent retained on No. 30 screen	17	0.1	0.92	0	55.7	65.1
Cumulative percent retained on No. 50 screen	17	0.026	0.34	4	68.1	90.2
• Bluegrass 14-day germination = 76 + -0.7 cumulative percent retained on No. 50 screen, n = 17, r^2 = 0.26, p = 0.035 • Bluegrass average root biomass (dry) = 1.3 + -0.016 cumulative percent retained on No. 50 screen, n = 17, r^2 = 0.24, p = 0.048 • Bluegrass average shoot biomass (wet) = 11 + -0.12 cumulative percent retained on No. 50 screen, n = 17, r^2 = 0.29, p = 0.026 • Total average root shoot mass (wet) = 20 + -0.21 cumulative percent retained on No. 50 screen, n = 17, r^2 = 0.24, p = 0.046						
Cumulative percent retained on No. 8 screen	17	0.015	0.97	1	0.14	12.2
• Bluegrass 14-day germination = 54 + -400 cumulative percent retained on No. 8 screen, n = 17, r^2 = 0.34, p = 0.015						
Fluoride	17	0.006	0.99	1	1.05	7.07
• Bluegrass 14-day germination = 11 + 65.9 fluoride, n = 17, r^2 = 0.40, p = 0.006						
Fraction coarse sand	17	0.034	0.6	2	20.7	39.7
• Bluegrass average root biomass (dry) = 1.2 + -0.052 fraction coarse sand, n = 17, r^2 = 0.27, p = 0.034 • Bluegrass average shoot biomass (wet) = 9.8 + -0.34 fraction coarse sand, n = 17, r^2 = 0.24, p = 0.048						

Table 5-64. Summary of Regression Analyses of Phytotoxicity Measures versus Soil Concentrations. (6 Pages)

Analyte	Number of Sites with Detects [a]	Minimum of P-Value	Maximum of P-Value	Number of Significant Regressions [b]	Maximum CTE Tested with Bioassay (mg/kg) [c]	Maximum CTE Evaluated for Benchmarks (mg/kg) [d]
Fraction coarse silt/silt/clay (less than 0.074 mm)	17	0.002	0.25	6	23.5	23.5
• Bluegrass average root length = 19 + 1.5 fraction coarse silt/silt/clay (less than 0.074 mm), n = 17, r^2 = 0.25, p = 0.04 • Bluegrass average shoot biomass (dry) = 0.12 + 0.081 fraction coarse silt/silt/clay (less than 0.074 mm), n = 17, r^2 = 0.45, p = 0.003 • Bluegrass average shoot biomass (wet) = 0.77 + 0.63 fraction coarse silt/silt/clay (less than 0.074 mm), n = 17, r^2 = 0.5, p = 0.002 • Bluegrass average stem height = 28 + 1.6 fraction coarse silt/silt/clay (less than 0.074 mm), n = 17, r^2 = 0.24, p = 0.047 • Total average root shoot mass (dry) = 0.3 + 0.13 fraction coarse silt/silt/clay (less than 0.074 mm), n = 17, r^2 = 0.29, p = 0.026 • Total average root shoot mass (wet) = 2.1 + 1 fraction coarse silt/silt/clay (less than 0.074 mm), n = 17, r^2 = 0.37, p = 0.009						
Fraction fine sand	17	0.12	0.78	0	60.2	60.2
Fraction granules (greater than 2.38 mm)	17	0.015	0.97	1	0.14	12.2
• Bluegrass 14-day germination = 54 + -400 fraction granules (greater than 2.38 mm), n = 17, r^2 = 0.34, p = 0.015						
Fraction medium sand	17	0.029	0.31	1	44.5	47.9
• Bluegrass 14-day germination = 71 + -1.1 fraction medium sand, n = 17, r^2 = 0.28, p = 0.029						
Fraction total sand	17	0.002	0.14	5	97.1	98.6
• Bluegrass average root length = 170 + -1.5 fraction total sand, n = 17, r^2 = 0.27, p = 0.032 • Bluegrass average shoot biomass (dry) = 7.5 + -0.073 fraction total sand, n = 17, r^2 = 0.38, p = 0.009 • Bluegrass average shoot biomass (wet) = 61 + -0.6 fraction total sand, n = 17, r^2 = 0.47, p = 0.002 • Total average root shoot mass (dry) = 12 + -0.12 fraction total sand, n = 17, r^2 = 0.26, p = 0.037 • Total average root shoot mass (wet) = 100 + -1 fraction total sand, n = 17, r^2 = 0.38, p = 0.009						
Fraction very coarse sand	17	0.25	0.96	0	35.9	35.9
Fraction very fine sand	17	0.019	0.21	2	38.4	38.4
• Bluegrass average shoot biomass (wet) = 1.3 + 0.27 fraction very fine sand, n = 17, r^2 = 0.32, p = 0.019 • Total average root shoot mass (wet) = 2.9 + 0.44 fraction very fine sand, n = 17, r^2 = 0.24, p = 0.047						
Magnesium	17	0.43	0.92	0	5,830	5,830
Nitrogen in ammonia	17	0.015	0.96	1	16.8	16.8
• Bluegrass 14-day germination = 61 + -3.7 nitrogen in ammonia, n = 17, r^2 = 0.34, p = 0.015						
Nitrogen in nitrate	16	0.008	0.72	5	25.7	25.7
• Bluegrass average shoot biomass (dry) = 0.52 + 0.05 nitrogen in nitrate, n = 16, r^2 = 0.39, p = 0.01 • Bluegrass average shoot biomass (wet) = 4 + 0.38 nitrogen in nitrate, n = 16, r^2 = 0.4, p = 0.008 • Bluegrass average stem height = 35 + 1.2 Nitrogen in Nitrate, n = 16, r^2 = 0.3, p = 0.027 • Total average root shoot mass (dry) = 0.89 + 0.091 nitrogen in nitrate, n = 16, r^2 = 0.32, p = 0.023 • Total average root shoot mass (wet) = 6.9 + 0.6 nitrogen in nitrate, n = 16, r^2 = 0.32, p = 0.022						

Table 5-64. Summary of Regression Analyses of Phytotoxicity Measures versus Soil Concentrations. (6 Pages)

Analyte	Number of Sites with Detects [a]	Minimum of P-Value	Maximum of P-Value	Number of Significant Regressions [b]	Maximum CTE Tested with Bioassay (mg/kg) [c]	Maximum CTE Evaluated for Benchmarks (mg/kg) [d]
Nitrogen in nitrite	13	0.082	0.95	0	0.806	1.11
Nitrogen in nitrite and nitrate	17	0.11	0.97	0	52.6	52.6
Nitrogen, Kjeldahl total	17	0.18	0.97	0	1,580	1,580
pH Measurement	17	0.016	0.18	6	7.85	7.85
• Bluegrass 14-day germination = -230 + 39 pH measurement, n = 17, r^2 = 0.24, p = 0.046 • Bluegrass average root biomass (dry) = -7.2 + 1.1 pH measurement, n = 17, r^2 = 0.33, p = 0.016 • Bluegrass average shoot biomass (dry) = -5.5 + 0.89 pH measurement, n = 17, r^2 = 0.24, p = 0.045 • Bluegrass average shoot biomass (wet) = -44 + 7.1 pH measurement, n = 17, r^2 = 0.28, p = 0.029 • Total average root shoot mass (dry) = -13 + 2 pH measurement, n = 17, r^2 = 0.31, p = 0.021 • Total average root shoot mass (wet) = -78 + 13 pH measurement, n = 17, r^2 = 0.25, p = 0.043						
Phosphorus	17	0.48	0.90	0	1,010	1,140
Potassium	17	0.009	0.65	2	1,770	1,770
• Bluegrass average shoot biomass (wet) = -2.2 + 0.0082 potassium, n = 17, r^2 = 0.23, p = 0.049 • Bluegrass average stem height = 2.6 + 0.038 potassium, n = 17, r^2 = 0.38, p = 0.009						
Silicon	17	<0.001	0.022	9	3,070	3,070
• Bluegrass 14-day germination = 33 + 0.017 silicon, n = 17, r^2 = 0.3, p = 0.022 • Bluegrass average root biomass (dry) = 0.063 + 0.00065 silicon, n = 17, r^2 = 0.8, p<0.001 • Bluegrass average root biomass (wet) = 2.1 + 0.0031 silicon, n = 17, r^2 = 0.36, p = 0.011 • Bluegrass average root length = 21 + 0.012 silicon, n = 17, r^2 = 0.5, p = 0.0014 • Bluegrass average shoot biomass (dry) = 0.33 + 0.00058 silicon, n = 17, r^2 = 0.71, p<0.001 • Bluegrass average shoot biomass (wet) = 2.4 + 0.0045 silicon, n = 17, r^2 = 0.78, p<0.001 • Bluegrass average stem height = 32 + 0.011 silicon, n = 17, r^2 = 0.37, p = 0.010 • Total average root shoot mass (dry) = 0.39 + 0.0012 silicon, n = 17, r^2 = 0.81, p<0.001 • Total average root shoot mass (wet) = 4.6 + 0.0076 silicon, n = 17, r^2 = 0.62, p<0.001						
Sodium	17	<0.001	0.98	6	307	307
• Bluegrass average root biomass (dry) = -1.4 + 0.0098 sodium, n = 17, r^2 = 0.44, p = 0.004 • Bluegrass average root biomass (wet) = -5.7 + 0.052 sodium, n = 17, r^2 = 0.24, p = 0.047 • Bluegrass average shoot biomass (dry) = -1.2 + 0.01 sodium, n = 17, r^2 = 0.54, p<0.001 • Bluegrass average shoot biomass (wet) = -8.3 + 0.072 sodium, n = 17, r^2 = 0.49, p = 0.002 • Total average root shoot mass (dry) = -2.6 + 0.02 sodium, n = 17, r^2 = 0.52, p = 0.001 • Total average root shoot mass (wet) = -14 + 0.12 sodium, n = 17, r^2 = 0.4, p = 0.007						
Sulfate	17	0.054	0.98	0	73	73

Table 5-64. Summary of Regression Analyses of Phytotoxicity Measures versus Soil Concentrations. (6 Pages)

Analyte	Number of Sites with Detects [a]	Minimum of P-Value	Maximum of P-Value	Number of Significant Regressions [b]	Maximum CTE Tested with Bioassay (mg/kg) [c]	Maximum CTE Evaluated for Benchmarks (mg/kg) [d]
Total organic carbon	17	0.095	0.88	0	19,000	19,000

= Statistically significant regression, p-value <0.05.

[a] Number of sites with detects for both soil and phytotoxicity measurements, out of 17 sites with paired soil and toxicity measurements.
[b] Number of significant regression relationships out of nine phytotoxicity endpoints measured.
[c] "Tested" are samples with useable phytoxicity testing results; tests were conducted in 2007 on samples collected from eight study sites (RCBRA 2a, 2c, 2f, 2j, 2l, 3b, 4a, and 5c Rip) and three reference sites (RCBRA Bev Ref 1, Bev Ref 2, and Ref 14 Rip)
[d] "Evaluated" are the samples evaluated versus benchmarks in Table 5-60 (RCBRA,100-B/C Pilot, and 100-NR-2 soil samples) and the associated confounding factor values.
[e] Study site concentrations are statistically greater than reference.
[f] Value from 100-B/C Pilot sample.

-- = not applicable
CTE = central tendency exposure
PCB = polychlorinated biphenyl

Table 5-65. Summary of Phytotoxicity Results, Contaminant of Potential Ecological Concern, and Confounding Factor Measures.

Site Name	Sample Type	Bluegrass Average							Root Shoot Mass (dry)	Root Shoot Mass (wet)	COPEC (CTE)		Confounding Factor (CTE)															
		14-Day Germination (%)	Root Biomass (dry; mg)	Root Biomass (wet; mg)	Root Length (mm)	Shoot Biomass (dry; mg)	Shoot Biomass (wet; mg)	Stem Height (mm)			Cr (mg/kg)	V (mg/kg)	Calcium (mg/kg)	No. 100 Screen (% Retained)	No. 200 Screen (% Retained)	No. 50 Screen (% Retained)	No. 8 Screen (% Retained)	Fraction Coarse Sand	Fraction Coarse Silt/Clay (<0.074 mm)	Fraction Granules (>2.38 mm)	Fraction Medium Sand	Fraction Total Sand	Fraction Very Fine Sand	Nitrogen in Ammonia (mg/kg)	pH	Potassium (mg/kg)	Silicon (mg/kg)	Sodium (mg/kg)
Study Site																												
2a	Discrete	84	0.66	5.11	68	0.85	6.6	62.1	1.51	11.7	18.5	58.4	3,600	77.4	90.1	47.2	0	9.53	9.86	0	35.1	90.1	12.8	0.158	7.22	777	1,460	172
	MIS	44	0.26	4.88	32.8	0.65	5.8	36.2	0.91	10.7	39.3	33	3,230	88.2	92.2	60.2	0.04	15.3	7.78	0.04	30.7	92.2	4.05	1.4	6.94	864	231	133
2c	MIS	12	0.18	0.2	15.3	0.31	3.23	24.5	0.49	3.43	23.8	40.5	4,470	70.2	91.4	35.4	0.04	10.8	8.65	0.04	20.8	91.3	21.1	2.43	6.86	1,110	323	204
2f	Discrete	80	0.28	3.02	42.4	0.99	8.7	72.6	1.27	11.7	16.8	33.9	4,840	49.1	84.8	18.1	0	6.76	15.2	0	8.95	84.8	35.7	1.21	6.98	1,770	1,280	198
	MIS	20	0.82	5.03	23.4	0.55	3.57	43.3	1.37	8.6	26.9	52.3	4,230	87.3	95.7	61	0	18.8	4.34	0	35	95.7	8.33	2.9	6.95	893	331	177
2j	Discrete	68	0.72	7.28	35.5	0.68	6.75	44.3	1.4	14	12	27.6	3,850	62.1	92.5	4.04	0	0.24	7.54	0	3.78	92.5	30.4	0.41	7.85	1,020	890	200
	MIS	56	0.31	2.62	26.8	0.44	4.46	36.3	0.75	7.08	32.6	41.2	4,830	69.3	88.5	45.5	0	14.9	11.5	0	14.5	88.5	19.2	2.03	6.87	1,160	402	231
2l	Discrete	76	2.11	12.9	53.9	2.68	20.2	62.4	4.78	32.9	14.4	30.7	6,250	38.1	76.5	4.63	0	0.48	23.5	0	4.09	76.5	38.4	4.89	7.62	1,350	3,050	307
	MIS	28	0.03	0.12	17	0.18	1.15	17.5	0.21	1.27	16.6	84.7	3,900	89.1	97.1	50.8	0	5.93	2.9	0	44.5	97.1	8.03	5.24	6.62	789	249	169
3b	Discrete	65.3	2.37	12.2	49.1	1.7	12.6	52	4.07	24.8	12.7	29.2	4,000	82	96.2	21.8	0	0.887	3.77	0	20.7	96.2	14.2	3.41	7.53	789	3,070	251
	MIS	44	0.08	0.79	16.3	0.25	2.1	26.2	0.33	2.89	23.8	44.7	4,240	75.4	92.4	34.9	0	7.94	7.6	0	22.1	92.4	17	1.96	7.03	886	310	226
4a	MIS	12	0.83	16.3	44	1.19	7.58	42	2.02	23.9	31.6	51.8	4,850	68.3	88.9	50.4	0.14	13.3	11.1	0.14	9.82	88.7	20.6	16.8	6.8	1,140	288	213
5c	Discrete	72	0.3	2.38	28.9	0.73	6.43	63.8	1.03	8.81	16.9	49.2	4,320	84.2	96.8	67.3	0	19.8	3.16	0	11.6	96.8	12.7	1.62	7	1,120	661	174
	MIS	64	0.13	0.9	26.6	0.31	2.54	29.9	0.44	3.44	19.2	67.2	3,550	83.4	96.7	54.7	0	18.4	3.34	0	14	96.7	13.2	2.12	6.95	636	211	125
Reference Site																												
Beverly Reference 1	MIS	4	0.1	0.12	9	0.41	1.79	15	0.51	1.91	26.9	72	3,800	88.1	96.2	57	0	13.7	3.76	0	32.4	96.2	8.14	3.25	6.8	722	320	186
Beverly Reference 2	MIS	60	0.29	2.91	17.2	0.35	2.6	23.5	0.64	5.5	21.4	36.1	4,400	66.7	92.3	27	0	8.96	7.66	0	12.6	92.3	25.7	3.09	7.65	842	287	160
Reference 14	MIS	4	0.5	2.42	24	1.18	6.33	46	1.68	8.75	25.5	52.0	5,250	91.7	96.7	68.1	0.1	20.7	9.1	0.1	41.3	96.7	11.7	12.9	7.28	1,110	300	246

= Less 80% of the average measure in reference sites.
= Greater than 120% of average measure in reference sites.

COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
MIS = *MULTI INCREMENT®* sampling

Table 5-66. Summary of Risk Characterization for Riparian Plants.

Receptor	Line of Evidence	Weight	Result	Summary and Recommendation
Plants	Rare plant surveys (and associated toxicity tests)	High	Documented presence of sensitive species, suggesting the potential for exposure for these species. Potential for adverse effects was evaluated with bioassays on discrete soil samples.	Available data show evidence for risk with uncertainty based on the riparian bioassay data (based on two COPECs and confounding factors) and the comparison of soil concentrations to plant benchmarks. Usable data do not represent the full contaminant gradient for toxicity test results versus chromium and hexavalent chromium concentrations.
	Bioassays (Sandberg's bluegrass)	Medium	No difference of study sites from reference, but tests conducted in 2006 are compromised and those results were not used. There are correlations with two COPECs (chromium and vanadium) and many confounding factors.	
	Benchmarks	Low	Benchmarks and reference concentrations are exceeded for five COPECs (arsenic, chromium, lead, vanadium, and zinc), suggesting the potential for adverse effects.	
	Tissue concentrations	Low	Some detections and differences of study site concentrations from reference site concentrations, no correlation to soil.	

COPEC = contaminant of potential ecological concern

Table 5-67. Uncertainty Analysis for Plants.

Attributes	Risk Questions	Observations	Impact on Assessment
Literature toxicity information	Are mean soil concentrations greater than adverse effect levels?	Toxicity information is lacking for some COPECs. The effect levels for metals are based on bioavailable forms of this metal and. For example, Menzie et al. (2008) present an example study involving barium toxicity and chemical form showing that the most stable form in the environment is also the least toxic.	Risks could be underestimated for certain COPECs. Bioavailability could be greatly overestimated as would be the potential for adverse effects in the riparian environment.
Measured tissue concentrations	Are mean plant concentrations greater than reference sites or increase along a COPEC gradient?	Exposure is based on the average for the study site. Few COPECs are identified in plants compared to soil. Detection limits for organics may have limited the ability to detect these chemicals in plants.	Elevated detection limits can lead to underestimating risks. Only current-year plant growth was sampled. This might underestimate or overestimate exposure and therefore risks.
Survival and growth from plant bioassay	Is germination/growth lower at study sites compared to reference or decrease along a COPEC gradient?	Generally, fewer uncertainties for bioassays compared to other measures. However, bioassay results for approximately half of the riparian sites (those sampled in 2006) were invalidated and not used to form risk conclusions. Uncertainties relate to selection of a test species and its representativeness of all plants at riparian sites and the test duration and life stage. For example, the test is not a life-cycle test. Statistical analyses evaluated single COPEC trends but did not evaluate the potential for additive or synergistic effects of COPECs and/or confounding factors.	Life-cycle tests could identify lower effect levels, and thus the single generation test could underestimate risk. This is also true of most literature toxicity data. The interactions among COPECs or confounding factors are not well documented, and there are insufficient data from these studies to adequately define a statistical model that includes all potential factors. The potential for COPEC effects is therefore uncertain when accounting for such potential interactions.

COPEC = contaminant of potential ecological concern

Menzie, C. A., B. Southworth, G. Stephenson, and N. Feisthauer, 2008, "The Importance of Understanding the Chemical Form of a Metal in the Environment: The Case of Barium Sulfate (Barite)," *Human and Ecological Risk Assessment* 14-974-991.

Table 5-68. Summary of Riparian Plant Risk Results for all Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status (Table 5-48)		Soil Concentrations Compared to Benchmarks (Table 5-60)	Plant vs. Soil Regression (Table 5-63)	Phytotoxicity - Measures Related to COPECs in Soil (Table 5-64)	Notes
	Soil	Plant Tissue				
Inorganics						
Arsenic	Yes	No	Soil concentrations greater than the benchmark	Insufficient data	Eight of nine significant. However, positive relationship between COPEC concentrations and endpoints, thus no evidence for adverse effects	Identified as key COPEC based on benchmark comparison
Barium	Yes	Yes	Soil concentrations less than the benchmark	No relationship	One of nine significant. However, positive relationship between COPEC concentrations and endpoint, thus no evidence for adverse effects	No significant findings
Cadmium	Yes	No	Soil concentrations less than the benchmark	Insufficient data	No relationships	No significant findings
Calculated total uranium	Yes	No	Soil concentrations less than the benchmark	Insufficient data	One of nine significant. However, positive relationship between COPEC concentrations and endpoint, thus no evidence for adverse effects	No significant findings
Chromium	Yes	No	Soil concentrations greater than the benchmark	No relationship	One of nine significant and negative, suggesting potential for adverse effects	Identified as key COPEC based on benchmark comparison and bioassay results. Range of soil concentrations is not captured in the useable phytotoxicity tests
Copper	No	Yes	Soil concentrations less than the benchmark	No relationship	Four of nine significant. However, positive relationship between COPEC concentrations and endpoints, thus no evidence for adverse effects	No significant findings
Hexavalent chromium	Yes	Not measured	Not available	Not measured in tissue	No relationship	Although the range of soil concentrations is not captured in the useable phytotoxicity tests there are no significant finding with the available information

Table 5-68. Summary of Riparian Plant Risk Results for all Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status (Table 5-48)		Soil Concentrations Compared to Benchmarks (Table 5-60)	Plant vs. Soil Regression (Table 5-63)	Phytotoxicity - Measures Related to COPECs in Soil (Table 5-64)	Notes
	Soil	Plant Tissue				
Lead	Yes	No	Soil concentrations greater than the benchmark	No relationship	Six of nine significant. However, positive relationship between COPEC concentrations and endpoints, thus no evidence for adverse effects	Identified as key COPEC based on benchmark comparison
Mercury	Yes	No	Soil concentrations less than the benchmark	No plant detects	No relationships	No significant findings
Selenium	No	No	Soil concentrations greater than the benchmark at both study sites and reference sites	Insufficient data	Insufficient data	Maximum concentrations at reference sites; no statistical difference of soil or plant concentrations from reference. Therefore not identified as a key COPEC for plants
Silver	No	No	Soil concentrations less than the benchmark	Insufficient data	Insufficient data	No significant findings
Thallium	No	Yes	Soil concentrations greater than the benchmark	No plant detects	Insufficient data	Maximum concentrations at study site equal to reference sites. Identified as a COPC based on 100-B/C Pilot plant tissues only. Therefore not identified as a key COPEC for plants
Uranium (inorganic)	No	No	Soil concentrations less than the benchmark	No plant detects	One of nine significant. However, positive relationship between COPEC concentrations and endpoints, thus no evidence for adverse effects	No significant findings
Vanadium	No	No	Soil concentrations greater than the benchmark	No relationship	Two (fresh weight shoot and root) of nine significant and negative, suggesting potential for adverse effects, but no relationships with any dry weight measures	Identified as key COPEC based on benchmark comparison and bioassay results

Table 5-68. Summary of Riparian Plant Risk Results for all Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status (Table 5-48)		Soil Concentrations Compared to Benchmarks (Table 5-60)	Plant vs. Soil Regression (Table 5-63)	Phytotoxicity - Measures Related to COPECs in Soil (Table 5-64)	Notes
	Soil	Plant Tissue				
Zinc	Yes	Yes	Soil concentrations greater than the benchmark	No relationship	Five of nine significant. However, positive relationship between COPEC concentrations and endpoints, thus no evidence for adverse effects	Identified as key COPEC based on benchmark comparison
Polychlorinated Biphenyls						
Aroclor-1260	Yes	No	Soil concentrations less than the benchmark.	No plant detects	Insufficient data	No significant findings
Total PCB (congeners)	Yes	Not measured	Soil concentrations less than the benchmark	No plant detects	Insufficient data	No significant findings
Pesticides						
Aldrin	Yes	No	Not available	Insufficient data	Insufficient data	No significant findings
Endosulfan sulfate	Yes	No	Not available	Insufficient data	Insufficient data	No significant findings
Endrin aldehyde	Yes	No	Not available	Insufficient data	One of nine significant. However, positive relationship between COPEC concentrations and endpoints, thus no evidence for adverse effects	No significant findings
Phthalate						
Bis[2-ethylhexyl] phthalate	Yes	No	Not available	No relationship	No relationships	No significant findings
Semivolatile Organic						
Total petroleum hydrocarbons - diesel range	Yes	Not measured	Not available	Not measured in tissue	Insufficient data	No significant findings

= COPECs have soil concentrations greater than the benchmark and reference concentrations or significant bioassay trend.

COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern
PCB = polychlorinated biphenyl

Table 5-69. Summary of Maximum Benchmark Hazard Quotients for All Terrestrial Invertebrate Contaminants of Potential Ecological Concern.

COPEC	Terrestrial Invertebrate Benchmark (mg/kg)	Study Sites				Reference Sites				Area with Maximum RME
		Maximum CTE (mg/kg)	Maximum RME (mg/kg)	CTE HQ (Maximum CTE/ Benchmark)	RME HQ (Maximum RME/ Benchmark)	Maximum CTE (mg/kg)	Maximum RME (mg/kg)	CTE HQ (Maximum CTE/ Benchmark)	RME HQ (Maximum RME/ Benchmark)	
Aldrin	NA	0.00187	0.0023	--	--	0.0009	0.0009	--	--	300 Area
Aroclor-1260	NA	0.0069	0.0095	--	--	--	--	--	--	300 Area
Arsenic	60	12.2	13.1	0.20	0.22	9.74	9.90	0.16	0.16	100-D/100-H
Barium	330	152	159	0.46	0.48	121	127	0.37	0.39	300 Area
Bis[2-ethylhexyl] phthalate	NA	0.48	0.664	--	--	0.084	0.141	--	--	100-K
Cadmium	20	2.54	2.75	0.13	0.14	1.71	1.78	0.086	0.089	100-F/100-IU-2/100-IU-6
Calculated total uranium	NA	4.53	5.45	--	--	2.66	2.92	--	--	100-F/100-IU-2/100-IU-6
Chromium	42	149	171	3.6	4.1	26.9	28.6	0.64	0.68	100-F/100-IU-2/100-IU-6
Copper	50	43	60.1	0.86	1.2	39	44.5	0.78	0.89	100-F/100-IU-2/100-IU-6
Hexavalent chromium	NA	0.596	0.801	--	--	0.284	0.326	--	--	100-D/100-H
Lead	1,700	83.5	87.9	0.05	0.05	61.0	67.9	0.036	0.04	100-D/100-H
Mercury	0.1	0.126	0.157	1.3	1.6	0.075	0.106	0.75	1.1	100-F/100-IU-2/100-IU-6
Selenium	4.1	0.9	0.9	0.22	0.22	0.973	1.2	0.24	0.29	Reference
Silver	NA	0.187	0.2	--	--	0.12	0.12	--	--	100-D/100-H
Thallium	NA	1.1	1.1	--	--	1.1	1.1	--	--	Reference and 100-D/100-H
Total PCB	NA	0.00493	0.00573	--	--	--	--	--	--	100-N
Total petroleum hydrocarbons - diesel range	200	570	570	2.9	2.9	--	--	--	--	100-N
Uranium (inorganic)	NA	5.54	7.06	--	--	3.9	5	--	--	300 Area
Vanadium	NA	84.7	89.1	--	--	72	77.4	--	--	100-F/100-IU-2/100-IU-6
Zinc	100	393	411	3.9	4.1	305	326	3.1	3.3	100-D/100-H

= Benchmark hazard quotient greater than 1.0.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
HQ = hazard quotient
NA = not available
PCB = polychlorinated biphenyl
RME = reasonable maximum exposure

Table 5-70. Summary of Locations and Contaminants of Potential Ecological Concern With Soil Concentrations Greater than Terrestrial Invertebrate Benchmarks and Reference. (2 Pages)

Site Name	COPEC	Terrestrial Invertebrate Benchmark (mg/kg)	Soil Concentration (mg/kg)	
			CTE	RME
Reference				
Beverly Ref 1	Zinc	100	153	164
Beverly Ref 2	Zinc	100	105	116
Ref 11	Zinc	100	124	130
Ref 12	Zinc	100	170	179
Ref 13	Zinc	100	299	326
Ref 14	Zinc	100	305	316
Ref 16	Mercury	0.1	0.0745	0.106
	Zinc	100	168	174
Study Site				
100-B/C Decision Area				
100-B/C Pilot	Zinc	100	127	151
2a	Chromium	42	39.3	42.4
	Zinc	100	118	134
100-K Decision Area				
2c	Zinc	100	337	363
Rip 5	Zinc	100	306	317
100-N Decision Area				
100-NR-2	Total petroleum hydrocarbons - diesel range	200	570	570
	Zinc	100	118	159
Rip 4	Chromium	42	66.7	68.8
	Zinc	100	214	231
100-D/100-H Decision Area				
2f	Zinc	100	207	233
Rip 1	Zinc	100	393	411
Rip 2	Chromium	42	48	52.1
	Zinc	100	123	127
Rip 3	Zinc	100	129	135
Rip 8	Zinc	100	218	231
Rip 9	Zinc	100	201	207
Rip 10	Mercury	0.1	0.0624	0.124
	Zinc	100	209	223

Table 5-70. Summary of Locations and Contaminants of Potential Ecological Concern With Soil Concentrations Greater than Terrestrial Invertebrate Benchmarks and Reference. (2 Pages)

Site Name	COPEC	Terrestrial Invertebrate Benchmark (mg/kg)	Soil Concentration (mg/kg)	
			CTE	RME
100-F/100-IU-2/100-IU-6 Decision Area				
2j	Mercury	0.1	0.126	0.145
	Zinc	100	379	390
2l	Mercury	0.1	0.0527	0.129
	Zinc	100	138	143
3b	Copper	50	43	51.3
	Mercury	0.1	0.0888	0.106
	Zinc	100	352	399
4a	Mercury	0.1	0.124	0.157
	Zinc	100	325	349
Rip 7	Chromium	42	149	171
	Copper	50	41.3	60.1
	Zinc	100	207	211
300 Area Decision Area				
5c	Zinc	100	119	129
Rip 6	Mercury	0.1	0.0867	0.112
	Zinc	100	201	206

= Concentration exceeds benchmark.

COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
RME = reasonable maximum exposure

Table 5-71. Summary of Terrestrial Invertebrate to Soil Regression Results. (2 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Reference)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Invertebrate Concentration (fw) to Average Soil Concentration	Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Aldrin	Soil only	0	--	None, not measured in tissue	--	--	--	--	--
Aroclor-1260	Soil only	0	--	None, not measured in tissue	--	--	--	--	--
Arsenic	Soil only	20	0.16	Invertebrate = 0.63 + 0.052 soil	0.11	0.16	ln(Invertebrate) = -0.7 + 0.34 ln(soil)	0.13	0.12
Barium	Soil and invertebrate	25	0.032	Invertebrate = 5.1 - 0.026 soil	0.012	0.6	ln(Invertebrate) = 1.8 - 0.3 ln(soil)	0.0041	0.76
Bis[2-ethylhexyl] phthalate	Soil only	0	--	None, not measured in tissue	--	--	--	--	--
Cadmium	Soil and invertebrate	20	0.28	Invertebrate = 0.33 - 0.0014 soil	<0.001	0.99	ln(Invertebrate) = -1.5 + 0.02 ln(soil)	<0.001	0.96
Calculated total uranium	Soil only	1	--	None, insufficient data	--	--	--	--	--
Chromium	Soil only	21	0.012	Invertebrate = 0.43 - 0.0007 soil	0.0091	0.68	ln(Invertebrate) = -1.3 + 0.071 ln(soil)	0.0054	0.75
Copper	Invertebrate only	25	0.37	Invertebrate = 3.3 + 0.26 soil	0.11	0.1	ln(Invertebrate) = 0.13 + 0.64 ln(soil)	0.12	0.096
Hexavalent chromium	Soil only	0	--	None, not measured in tissue	--	--	--	--	--
Lead	Soil only	6	0.0093	Invertebrate = 0.45 - 0.0015 soil	0.18	0.4	ln(Invertebrate) = -0.44 - 0.14 ln(soil)	0.22	0.35
Mercury	Soil and invertebrate	9	0.5	Invertebrate = 0.026 + 0.094 soil	0.011	0.79	ln(Invertebrate) = -2.8 + 0.27 ln(soil)	0.047	0.58

Table 5-71. Summary of Terrestrial Invertebrate to Soil Regression Results. (2 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Reference)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Invertebrate Concentration (fw) to Average Soil Concentration	Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Selenium	Invertebrate only	4	--	Insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
Silver	Invertebrate only	0	--	None, not detected in soil and tissue at the same site	--	--	--	--	--
Thallium	Neither	0	--	None, no detects in tissue	--	--	--	--	--
Total PCB	Soil only	0	--	none, not measured in tissue	--	--	--	--	--
Total petroleum hydrocarbons - diesel range	Soil only	0	--	None, not measured in tissue	--	--	--	--	--
Uranium (inorganic)	Neither	1	--	None, insufficient data	--	--	--	--	--
Vanadium	Invertebrate only	10	0.003	Invertebrate = 0.012 + 0.0027 soil	0.28	0.12	ln(Invertebrate) = -5.3 + 0.86 ln(soil)	0.24	0.15
Zinc	Soil and invertebrate	25	0.24	Invertebrate = 48 + 0.017 soil	0.0069	0.69	ln(Invertebrate) = 3.5 + 0.081 ln(soil)	0.011	0.62

-- = not applicable
COPEC = contaminant of potential ecological concern
fw = fresh weight
PCB = polychlorinated biphenyl

Table 5-72. Summary of Regression Analyses of Nematode Survival versus Soil Concentrations. (3 Pages)

Analyte	Equation	Number of Sites with Detects	R-Squared Value	P-Value	Maximum CTE Tested With Bioassay (mg/kg) [a]	Maximum CTE Evaluated for Benchmarks (mg/kg) [b]
Contaminant of Potential Ecological Concern						
Aldrin [c]	Insufficient detections	2	--	--	0.0019	0.0019
Aroclor-1260 [c]	Insufficient detections	2	--	--	0.0069	0.0069
Arsenic [c]	Not statistically significant	25	0.027	0.43	12.2	12.2
Barium [c]	Not statistically significant	25	0.0024	0.82	152	152
Bis[2-ethylhexyl] phthalate [c]	Not statistically significant	25	0.00051	0.92	0.48	0.48
Cadmium [c]	Not statistically significant	25	0.12	0.089	2.54	2.54
Calculated total uranium [c]	Not statistically significant	25	0.017	0.54	4.53	4.53
Chromium [c]	Not statistically significant	25	0.0053	0.73	149	149
Copper	Not statistically significant	25	0.015	0.56	43.0	43.0
Hexavalent chromium [c]	Not statistically significant	12	0.016	0.7	0.596	0.596
Lead [c]	Not statistically significant	25	0.068	0.21	83.5	83.5
Mercury [c]	Not statistically significant	25	0.65	0.22	0.126	0.126
Selenium	Not statistically significant	5	0.12	0.57	0.973	0.973
Silver	Not statistically significant	6	0.033	0.73	0.16	0.187 [d]
Thallium	Insufficient detections	4	--	--	1.1	1.1
Total PCBs [c]	Not paired with bioassay	--	--	--	--	0.005 [e]
Total petroleum hydrocarbons – diesel range [c]	Not paired with bioassay	--	--	--	--	570 [e]
Uranium	Not statistically significant	13	0.11	0.26	5.54	5.54
Vanadium	Not statistically significant	25	0.12	0.093	84.7	84.7
Zinc [c]	Not statistically significant	25	0.07	0.2	393	393
Confounding Factors						
Calcium	Not statistically significant	25	0.096	0.13	5,640	5,640
Chloride	Not statistically significant	24	0.08	0.18	16.1	16.1
Cumulative percent retained on No. 100 screen	Not statistically significant	25	0.12	0.086	95.9	95.9
Cumulative percent retained on No. 16 screen	Not statistically significant	25	0.0054	0.73	34.8	34.8
Cumulative percent retained on No. 200 screen	Not statistically significant	25	0.13	0.08	98.6	98.6
Cumulative percent retained on No. 30 screen	Not statistically significant	25	0.0012	0.87	65.1	65.1

Table 5-72. Summary of Regression Analyses of Nematode Survival versus Soil Concentrations. (3 Pages)

Analyte	Equation	Number of Sites with Detects	R-Squared Value	P-Value	Maximum CTE Tested With Bioassay (mg/kg) [a]	Maximum CTE Evaluated for Benchmarks (mg/kg) [b]
Cumulative percent retained on No. 50 screen	Not statistically significant	25	0.034	0.38	90.2	90.2
Cumulative percent retained on No. 8 screen	Not statistically significant	25	0.011	0.62	12.2	12.2
Fluoride	Not statistically significant	16	0.00015	0.96	7.07	7.07
Fraction coarse sand	Not statistically significant	25	0.015	0.55	39.7	39.7
Fraction coarse silt/silt/clay (<0.074 mm)	Fraction coarse silt/silt/clay (<0.074 mm) = -0.058 * nematode survival + 9.1	25	0.16	0.049	11.5	11.5
Fraction fine sand	Not statistically significant	25	0.0015	0.86	41.3	41.3
Fraction granules (>2.38 mm)	Not statistically significant	25	0.011	0.62	12.2	12.2
Fraction medium sand	Not statistically significant	25	0.042	0.32	47.9	47.9
Fraction total sand	Not statistically significant	25	0.046	0.3	98.5	98.5
Fraction very coarse sand	Not statistically significant	25	0.019	0.52	27.2	27.2
Fraction very fine sand	Not statistically significant	25	0.13	0.08	25.7	25.7
Magnesium	Not statistically significant	25	0.10	0.12	5,730	5,730
Nitrogen in ammonia	Not statistically significant	25	0.13	0.082	16.8	16.8
Nitrogen in nitrate	Not statistically significant	24	0.0022	0.83	22.5	22.5
Nitrogen in nitrite	Not statistically significant	21	0.018	0.56	1.11	1.11
Nitrogen in nitrite and nitrate	Not statistically significant	24	0.016	0.56	20.3	20.3
Nitrogen, Kjeldahl total	Nitrogen, Kjeldahl total = -7.1 * nematode survival + 1,200	25	0.2	0.026	1,580	1,580
Percent moisture (wet sample)	Not statistically significant	25	<0.001	0.99	3.54	3.54
pH Measurement	Not statistically significant	25	0.00028	0.94	7.65	7.65
Phosphorus	Not statistically significant	25	0.0016	0.85	1,140	1,140
Potassium	Not statistically significant	25	0.036	0.36	1,490	1,490
Silicon	Not statistically significant	25	0.098	0.13	417	654[d]
Sodium	Not statistically significant	25	0.15	0.054	246	246

Table 5-72. Summary of Regression Analyses of Nematode Survival versus Soil Concentrations. (3 Pages)

Analyte	Equation	Number of Sites with Detects	R-Squared Value	P-Value	Maximum CTE Tested With Bioassay (mg/kg) [a]	Maximum CTE Evaluated for Benchmarks (mg/kg) [b]
Sulfate	Not statistically significant	25	0.085	0.16	41.9	41.9
Total organic carbon	Not statistically significant	25	0.14	0.068	19,000	19,000

= Statistically significant regression, p-value <0.05.

[a] "Tested" refer to samples paired with bioassay or only RCBRA *MULTI INCREMENT*® sampling.
[b] "Evaluated" are the samples evaluated versus benchmarks in Table 5-69 (RCBRA, 100-B/C Pilot, and 100-NR-2 soil samples) and the associated confounding factor values.
[c] Study site concentrations are statistically greater than reference.
[d] Value from 100-B/C Pilot sample.
[e] Value from 100-NR-2 sample.

-- = not applicable
CTE = central tendency exposure
PCB = polychlorinated biphenyl
RCBRA = River Corridor Baseline Risk Assessment

Table 5-73. Nematode Survival Summary Results.

Site Name	Nematode Survival %
Study Site	
2a	73.3
2c	76.7
2f	80
2j	40
2l	90
3b	90
4a	33.3
5c	96.7
Rip 1	46.7
Rip 2	83.3
Rip 3	56.7
Rip 4	30
Rip 5	63.3
Rip 6	90
Rip 7	70
Rip 8	50
Rip 9	76.7
Rip 10	80
Reference Site	
Bev Ref 1	83.3
Bev Ref 2	66.7
R Ref 11	26.7
R Ref 12	50
R Ref 13	76.7
R Ref 14	53.3
R Ref 16	76.7

= Less than 80% of the average measure in reference sites.
= Greater than 120% of average measure in reference sites.

Table 5-74. Summary of Risk Characterization for Riparian Invertebrates.

Receptor	Line of Evidence	Weight	Effect	Summary and Recommendation
Invertebrates	Nematode bioassays	High	No difference of survival at study sites compared to reference sites, suggesting no adverse effects	Risks with uncertainties based on concentrations greater than benchmarks
	Benchmarks	Low	Benchmarks and reference concentrations are exceeded for five COPECs (chromium, copper, mercury, TPH, and zinc) suggesting the potential for adverse effects	
	Tissue concentrations	Low	Some detections and differences of study site concentrations from reference site, no correlation to soil	
	Diversity and abundance from pitfall traps	None	Precluded as line of evidence; invertebrates were handpicked for tissue analysis	

COPEC = contaminant of potential ecological concern
TPH = total petroleum hydrocarbons

Table 5-75. Uncertainty Analysis for Invertebrates.

Attributes	Risk Questions	Observations	Impact on Assessment
Literature toxicity information	Are mean soil concentrations greater than adverse effect levels?	Toxicity information is lacking for some COPECs. The effect levels for metals are based on bioavailable forms of this metal. For example, Menzie et al. (2008) present an example study involving barium toxicity and chemical form showing that the most stable form in the environment is also the least toxic.	Risks could be underestimated for certain COPECs. Bioavailability could be greatly overestimated as would be the potential for adverse effects in the riparian environment.
Measured tissue concentrations	Are mean study site tissue concentrations greater than at reference sites or increase along an increasing COPEC gradient?	Tissue concentrations in soil biota are subject to the following: • Exposure is based on the average for the study site • Analytical measurement uncertainties (e.g., detection limits typically are elevated in tissues because of matrix interferences) • Pitfall-collected invertebrate tissues representing contaminant concentrations in all invertebrate matrices/compartments (e.g., flying insects) at study sites or reference sites • Considering the mobility of receptors, whether pitfall-collected invertebrate tissues represent contaminant concentrations for organisms within study sites or reference sites (vs. offsite organisms) • Hand collecting invertebrates introduces a bias into the type of invertebrates collected – larger, slower species are more likely to be caught.	High and low concentrations are integrated. Detection limits can lead to underestimating risks. Hand collecting invertebrates is a taxonomic and size bias - could lead to over or underestimating concentrations and therefore risk.
Survival from nematode test	Is survival lower at study sites compared to reference or decrease along a COPEC gradient?	Nematode survival is subject to the following: • Test duration and endpoint reflects one of many time scales for effects • Test species reflects one kind of invertebrate organism – there is uncertainty in applying these results to all riparian invertebrates. Statistical analyses evaluated single COPEC trends but did not evaluate the potential for additive or synergistic effects of COPECs and/or confounding factors. 100-NR-2 soils with the highest concentrations of total petroleum hydrocarbons - diesel range were not tested for nematode survival.	Effects could be underestimated. The interactions among COPECs or confounding factors are not well documented and there are insufficient data from these studies to adequately define a statistical model that includes all potential factors. The potential for COPEC effects is therefore uncertain when accounting for such potential interactions.

COPEC = contaminant of potential ecological concern

Menzie, C. A., B. Southworth, G. Stephenson, and N. Feisthauer, 2008, "The Importance of Understanding the Chemical Form of a Metal in the Environment: The Case of Barium Sulfate (Barite)," *Human and Ecological Risk Assessment* 14-974-991.

Table 5-76. Summary of Riparian Terrestrial Invertebrate Risk Results for All Contaminants of Potential Ecological Concern. (2 Pages)

COPEC	COPC Refinement Status (Table 5-46)		Soil Concentrations Compared to Benchmarks (Table 5-69)	Invertebrate vs. Soil Regression (Table 5-71)	Nematode Survival Related to COPECs in Soil (Table 5-72)	Notes
	Soil	Invertebrate Tissue				
Inorganics (mg/kg)						
Arsenic	Yes	No	Soil concentrations less than the benchmark	No relationship	No relationship	No significant findings
Barium	Yes	Yes	Soil concentrations less than the benchmark	No relationship	No relationship	No significant findings
Cadmium	Yes	Yes	Soil concentrations less than the benchmark	No relationship	No relationship	No significant findings
Calculated total uranium	Yes	No	No information	Insufficient data	No relationship	No significant findings
Chromium	Yes	No	Soil concentrations greater than the benchmark	No relationship	No relationship	Identified as key COPEC based on benchmark comparison
Copper	No	Yes	Soil concentrations greater than the benchmark	No relationship	No relationship	Identified as key COPEC based on benchmark comparison
Hexavalent chromium	Yes	Not measured	No information	Not measured in tissue	No relationship	No significant findings
Lead	Yes	No	Soil concentrations less than the benchmark	No relationship	No relationship	No significant findings
Mercury	Yes	Yes	Soil concentrations greater than the benchmark	No relationship	No relationship	Identified as key COPEC based on benchmark comparison
Selenium	No	Yes	Soil concentrations less than the benchmark	Insufficient data	No relationship	No significant findings. In addition, soil and invertebrate concentrations not different from reference at RCBRA sites; invertebrate concentrations are greater than reference at the 100-B/C Pilot
Silver	No	Yes	No information	Insufficient data	No relationship	No significant findings. In addition, soil and invertebrate concentrations not different from reference at RCBRA sites; invertebrate concentrations are greater than reference at the 100-B/C Pilot
Thallium	No	No	No information	Not detected in tissue	Insufficient data	No significant findings
Uranium (inorganic)	No	No	No information.	Insufficient data	No relationship	No significant findings

Table 5-76. Summary of Riparian Terrestrial Invertebrate Risk Results for All Contaminants of Potential Ecological Concern. (2 Pages)

COPEC	COPC Refinement Status (Table 5-46)		Soil Concentrations Compared to Benchmarks (Table 5-69)	Invertebrate vs. Soil Regression (Table 5-71)	Nematode Survival Related to COPECs in Soil (Table 5-72)	Notes
	Soil	Invertebrate Tissue				
Vanadium	No	Yes	No information	No relationship	No relationship	No significant findings. In addition, soil and invertebrate concentrations not different from reference at RCBRA sites; invertebrate concentrations are greater than reference at the 100-NR-2
Zinc	Yes	Yes	Soil concentrations greater than the benchmark	No relationship	No relationship	Identified as key COPEC based on benchmark comparison
Polychlorinated Biphenyls (mg/kg)						
Aroclor-1260	Yes	Not measured	No information	Not measured in tissue	Insufficient data	No significant findings
Total PCB (congeners)	Yes	Not measured	No information	Not measured in tissue	Nematode survival not measured for 100-NR-2 soil	No significant findings
Pesticide (mg/kg)						
Aldrin	Yes	Not measured	No information	Not measured in tissue	Insufficient data	No significant findings
Phthalate (mg/kg)						
Bis[2-ethylhexyl] phthalate	Yes	Not measured	No information	Not measured in tissue	No relationship	No significant findings
Semivolatile Organic (mg/kg)						
Total petroleum hydrocarbons - diesel range	Yes	Not measured	Soil concentrations greater than the benchmark	Not measured in tissue	Nematode survival not measured for 100-NR-2 soil	Identified as key COPEC based on benchmark comparison. Soil from 100-NR-2 with the highest concentration of total petroleum hydrocarbons-diesel range were not tested for nematode survival

= Shaded COPECs have soil concentrations greater than the benchmark and reference concentrations.

COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern
PCB = polychlorinated biphenyl
RCBRA = River Corridor Baseline Risk Assessment

Table 5-77. Summary of Mammal Organ to Soil Regression Results. (2 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Reference)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Organ Concentration (fw) to Average Soil Concentration	Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Aldrin	Soil only	0	--	None, not measured in tissue	--	--	--	--	--
Aroclor-1260	Soil only	0	--	None, not measured in tissue	--	--	--	--	--
Arsenic	Soil only	14	0.097	Mouse kidney/liver = 0.58 + 0.0037 soil	0.0097	0.74	ln(Mouse kidney/liver) = -0.57 + 0.024 ln(soil)	0.0038	0.83
Barium	Soil only	25	0.0012	Mouse kidney/liver = 0.035 + 0.00079 soil	0.18	0.034	ln(Mouse kidney/liver) = -5.1 + 0.62 ln(soil)	0.17	0.038
Bis[2-ethylhexyl] phthalate	Soil only	0	--	None, not measured in tissue	--	--	--	--	--
Cadmium	Soil only	25	0.22	Mouse kidney/liver = 0.29 - 0.031 soil	0.01	0.63	ln(Mouse kidney/liver) = -1.6 - 0.02 ln(soil)	<0.001	0.94
Calculated total uranium	Soil only	0	--	None, not measured in tissue	--	--	--	--	--
Chromium	Soil only	25	0.0064	Mouse kidney/liver = 0.22 - 0.0003 soil	0.017	0.53	ln(Mouse kidney/liver) = -1.4 - 0.059 ln(soil)	0.016	0.54
Copper	Neither	25	0.21	Mouse kidney/liver = 5.6 + 0.02 soil	0.017	0.53	ln(Mouse kidney/liver) = 1.4 + 0.12 ln(soil)	0.042	0.33
Hexavalent chromium	Soil only	0	--	None, not measured in tissue	--	--	--	--	--
Lead	Soil and organ	1	--	None, insufficient data	--	--	--	--	--

Table 5-77. Summary of Mammal Organ to Soil Regression Results. (2 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Reference)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Organ Concentration (fw) to Average Soil Concentration	Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Mercury	Soil only	11	0.74	Mouse kidney/liver = 0.1 - 1 soil	0.33	0.065	ln(Mouse kidney/liver) = -6 - 0.92 ln(soil)	0.27	0.1
Selenium	Neither	5	2.5	Mouse kidney/liver = 2.6 – 0.54 soil	0.032	0.77	ln(Mouse kidney/liver) = 0.69 - 0.28 ln(soil)	0.058	0.7
Silver	Neither	1	--	None, insufficient data	--	--	--	--	--
Thallium	Neither	0	--	None, no detects in tissue	--	--	--	--	--
Total PCB	Soil and organ	0	--	None, not measured in RCBRA tissues	--	--	--	--	--
Total petroleum hydrocarbons - diesel range	Soil only	0	--	None, not measured in tissue	--	--	--	--	--
Uranium (inorganic)	Neither	1	--	None, insufficient data	--	--	--	--	--
Vanadium	Neither	0	--	None, no detects in tissue	--	--	--	--	--
Zinc	Soil only	25	0.14	Mouse kidney/liver = 30 - 0.00023 soil	<0.001	0.98	ln(Mouse kidney/liver) = 3.4 - 0.0031 ln(soil)	<0.001	0.95

= Statistically significant regression, p-value <0.05.

-- = not applicable
COPEC = contaminant of potential ecological concern
fw = fresh weight
PCB = polychlorinated biphenyl

Table 5-78. Summary of Mammal Carcass to Soil Regression Results. (2 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Reference)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Carcass Concentration (fw) to Average Soil Concentration	Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Aldrin	Soil only	0	--	None, not detected in soil and tissue at the same site	--	--	--	--	--
Aroclor-1260	Soil and carcass	1	--	None, insufficient data	--	--	--	--	--
Arsenic	Soil only	7	0.07	Mouse carcass = 0.61 - 0.024 soil	0.62	0.036	ln(Mouse carcass) = -0.22 - 0.32 ln(soil)	0.71	0.018
Barium	Neither	25	0.029	Mouse carcass = 2.7 - 0.0014 soil	<0.001	0.89	ln(Mouse carcass) = 1 - 0.032 ln(soil)	<0.001	0.95
Bis[2-ethylhexyl] phthalate	Soil only	16	26	Mouse carcass = 3 - 25 soil	0.045	0.43	ln(Mouse carcass) = -0.47 - 0.024 ln(soil)	<0.001	0.97
Cadmium	Soil only	2	--	Insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
Calculated total uranium	Soil only	1	--	None, insufficient data	--	--	--	--	--
Chromium	Soil only	25	0.019	Mouse carcass = 0.56 + 0.0019 soil	0.078	0.18	ln(Mouse carcass) = -0.82 + 0.085 ln(soil)	0.011	0.62
Copper	Neither	25	0.18	Mouse carcass = 2.3 + 0.1 soil	0.07	0.2	ln(Mouse carcass) = 0.44 + 0.33 ln(soil)	0.039	0.34
Hexavalent chromium	Soil only	0	--	None, not measured in tissue	--	--	--	--	--
Lead	Soil and carcass	22	0.014	Mouse carcass = 0.55 - 0.00023 soil	<0.001	0.91	ln(Mouse carcass) = -0.6 - 0.018 ln(soil)	0.001	0.89
Mercury	Soil only	5	0.41	Mouse carcass = 0.019 + 0.08 soil	0.081	0.64	ln(Mouse carcass) = -3.3 + 0.17 ln(soil)	0.1	0.6
Selenium	Neither	5	0.9	Mouse carcass = 0.9 - 0.16 soil	0.013	0.86	ln(Mouse carcass) = -0.32 - 0.2 ln(soil)	0.018	0.83

Table 5-78. Summary of Mammal Carcass to Soil Regression Results. (2 Pages)

COPEC	Statistical Difference for Soil or Tissue (Study Site vs. Reference)	Number of Sites with Detects for Soil and Tissue	Ratio of Average Carcass Concentration (fw) to Average Soil Concentration	Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Silver	Neither	0	--	None, no detects in tissue	--	--	--	--	--
Thallium	Neither	0	--	None, no detects in tissue	--	--	--	--	--
Total PCB	Soil only	0	--	None, not measured in tissue	--	--	--	--	--
Total petroleum hydrocarbons - diesel range	Soil only	0	--	None, not measured in tissue	--	--	--	--	--
Uranium (inorganic)	Neither	3	--	Insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
Vanadium	Neither	9	0.0022	Mouse carcass = 0.082 + 0.0005 soil	0.12	0.35	ln(Mouse carcass) = -3.2 + 0.24 ln(soil)	0.094	0.42
Zinc	Soil only	25	0.36	Mouse carcass = 73 + 0.027 soil	0.011	0.62	ln(Mouse carcass) = 4.1 + 0.043 ln(soil)	0.0022	0.82

= Statistically significant regression, p-value <0.05.

-- = not applicable
COPEC = contaminant of potential ecological concern
fw = fresh weight
PCB = polychlorinated biphenyl

Table 5-79. Exposure Parameters for Riparian Middle Trophic-Level Receptors. (4 Pages)

Diet	Parameter	Value	Units	Reference	Notes
Bird Receptors					
Kingbird					
Insectivore	Body weight	0.0399	kg	Median weight from one source; see notes on gender and counts	http://bna.birds.cornell.edu/bna/species/414/articles/species/414/galleries/data/tab1 0.0373 (F, n = 9), 0.0385 (M, n = 9), 0.0458 (F, n = 5), 0.0412 (M, n = 2).
Insectivore	Diet composition soil	7.3	%	Beyer et al. 1994	Data regarding soil ingestion of kingbird are unavailable. For the purposes of this ERA, it was assumed that soil ingestion for kingbird is similar to that of the least sandpiper. However, it should be noted that this value is likely somewhat higher than the actual soil ingestion for kingbird because kingbird do not probe in the soil/sediment.
Insectivore	Ingestion soil	0.013	kg/kg/d	NA	Soil ingestion is equal to the percent soil in diet multiplied by the food ingestion rate as follows: soil ingestion = (diet composition soil/100 * Intake food dry weight).
Insectivore	Ingestion water	0	L/kg/d	--	No water consumed at riparian sites.
Insectivore	Intake food dry weight	0.182	kg/kg/d	Nagy 2001	Allometric estimation for "Charadriiformes" (Nagy 2001) normalized to kg/kg-bw/d dry weight.
Insectivore	Conversion factor (fresh from dry intake)	3.23	NA	EPA/600/R-93/187	Fresh from dry intake conversion factor based on 69% moisture in diet (grasshoppers and crickets), calculated as 1 divided dry fraction.
Insectivore	Intake food fresh weight	0.588	kg/kg/d	--	Intake food dry weight * conversion factor.
Insectivore	Diet composition terrestrial invertebrate	1	Proportion	Assumed	--
Meadowlark					
Omnivore	Body weight	0.0995	kg	Median weight from two papers; see notes on gender and counts	Wiens and Rotenberry 1981: 0.0894 (F n = 32), 0.106 (M n = 51). Maher 1979: 0.1153 (M n = 76), 0.093 (F n = 53).
Omnivore	Diet composition soil	2.08	%	Sample and Suter 1994	Data regarding soil ingestion of western meadowlarks are unavailable. For the purposes of this ERA, it was assumed that soil ingestion for meadowlarks is similar to that derived for the American robin.
Omnivore	Ingestion soil	0.0025	kg/kg/d	EPA/600/R-93/187	Soil ingestion is equal to the percent soil in diet multiplied by the food ingestion rate as follows: soil ingestion = (diet composition soil/100 * food ingestion rate).
Omnivore	Ingestion water	0	L/kg/d	--	No water consumed at riparian sites.
Omnivore	Intake food	0.12	kg/kg/d	Nagy 2001	Allometric estimation for "omnivorous birds" normalized to kg/kg-bw/d.

Table 5-79. Exposure Parameters for Riparian Middle Trophic-Level Receptors. (4 Pages)

Diet	Parameter	Value	Units	Reference	Notes
Omnivore	Conversion factor (fresh from dry intake)	3.66	NA	EPA/600/R-93/187	Fresh from dry intake conversion factor based on weighted mean of 72.7% moisture in diet (69% moisture in grasshoppers and crickets [63.3% of diet], 79% moisture in young grasses [36.7% of diet]), calculated as 1 divided dry fraction.
Omnivore	Intake food fresh weight	0.439	kg/kg/d	--	Intake food dry weight * conversion factor.
Omnivore	Diet composition terrestrial invertebrate	0.63	Proportion	Bryant 1914	Diet consists of 63.3% invert.
Omnivore	Diet composition plant	0.37	Proportion	Bryant 1914	Diet consists of 36.7% mixed seeds/veg.
California Quail					
Granivore	Body weight	0.18	kg	Median weight from three papers; see notes on gender and counts	Robel 1969: 0.1899 (A B Fall), 0.1939 (A B Winter), 0.19 (A B spring). Roseberry and Klimstra 1971: 0.181 (M winter), 0.163 (M summer), 0.183 (F winter), 0.18 (F summer). Guthrey et al. 1988: 0.161 (M winter), 0.154 (M summer), 0.157 (F winter), 0.157 (F summer).
Granivore	Diet composition soil	6.1	%	OSWER 9285.7-55, Attachment 4-1, Revised April 2007	Median soil ingestion rate estimated for mourning dove in Table 3 of the Eco-SSL guidance. The median was selected as the best measure of central tendency that is unbiased by outliers.
Granivore	Ingestion soil	0.0048	kg/kg/d	EPA/600/R-93/187	Soil ingestion is equal to the percent soil in diet multiplied by the food ingestion rate as follows: soil ingestion = (diet composition soil/100 * food ingestion rate).
Granivore	Ingestion water	0	L/kg/d	--	No water consumed at riparian sites.
Granivore	Intake food dry weight	0.078	kg/kg/d	Koerth and Guthery 1990	Average of food ingestion rates over four seasons from exposure factors handbook (EPA/600/R-93/187). Rate based on diet of commercial game food with only 5% to 10% water content; therefore, assumed dry weight.
Granivore	Conversion factor (fresh from dry intake)	1.1	NA	EPA/600/R-93/187	Fresh from dry intake conversion factor based on 9.3% moisture in diet (seeds), calculated as 1 divided dry fraction
Granivore	Intake food fresh weight	0.086	kg/kg/d	--	Intake food dry weight * conversion factor.
Granivore	Diet composition plant	1	Proportion	Assumed	--
Mammal Receptors					
Deer Mouse					
Omnivore	Body weight	0.0194	kg	Median weight from two papers; see notes on gender and counts	O'Farrel 1975: 0.0217 (M, n = 2), 0.018 (M, n = 2), 0.0212 (M, n = 6), 0.0203 (M n = 11), 0.0184 (M). Silva and Downing 1995: 0.0166 (mean of males and females from Washington).
Omnivore	Diet composition soil	2	%	Beyer et al. 1994	Assumed to be similar to the white-footed mouse because of similar dietary and foraging habits.

Table 5-79. Exposure Parameters for Riparian Middle Trophic-Level Receptors. (4 Pages)

Diet	Parameter	Value	Units	Reference	Notes
Omnivore	Ingestion soil	0.003	kg/kg/d	EPA/600/R-93/187	Soil ingestion is equal to the percent soil in diet multiplied by the food ingestion rate as follows: soil ingestion = (diet composition soil/100 * food ingestion rate).
Omnivore	Ingestion water	0	L/kg/d	--	No water consumed at riparian sites.
Omnivore	Intake food dry weight	0.166	kg/kg/d	Nagy 2001	Allometric estimation for "omnivorous mammals" normalized to kg/kg-bw/d.
Omnivore	Conversion factor (fresh from dry intake)	3.85	NA	EPA/600/R-93/187	Fresh from dry intake conversion factor based on mean of 74% moisture in diet (69% moisture in grasshoppers and crickets, 79% moisture in young grasses), calculated as 1 divided dry fraction.
Omnivore	Intake food fresh weight	0.639	kg/kg/d	--	Intake food dry weight * conversion factor.
Omnivore	Diet composition terrestrial invertebrate	0.5	Proportion	Assumed	--
Omnivore	Diet composition plant	0.5	Proportion	Assumed	--
Pocket Mouse					
Granivore	Body weight	0.0175	kg	Median weight from three papers; see notes on gender and counts	O'Farrel 1975: 0.0174 (M n = 18), 0.0183 (M n = 12), 0.0176 (M n = 11), 0.0191 (M n = 12). Scheffer 1938: 0.0175 (M n = 10), 0.0143 (F n = 10). Schreiber 1978: 0.0174 (M n = 4), 0.016 (F n = 4).
Granivore	Diet composition soil	2	%	Beyer et al. 1994	Assumed to be similar to the white-footed mouse because of similar dietary and foraging habits.
Granivore	Ingestion soil	0.002	kg/kg/d	EPA/600/R-93/187	Soil ingestion is equal to the percent soil in diet multiplied by the food ingestion rate as follows: soil ingestion = (diet composition soil/100 * food ingestion rate).
Granivore	Ingestion water	0	L/kg/d	--	No water consumed at riparian sites.
Granivore	Intake food dry weight	0.123	kg/kg/d	EPA/600/R-93/187	Allometric estimation for "granivorous mammals" normalized to kg/kg-bw/d using mean weight as reported by Scheffer 1938, O'Farrell et al. 1975, and Schreiber 1978.
Granivore	Conversion factor (fresh from dry intake)	4.76	NA	EPA/600/R-93/187	Fresh from dry intake conversion factor based on 79% moisture in diet (young grasses), calculated as 1 divided dry fraction.
Granivore	Intake food fresh weight	0.585	kg/kg/d	--	Intake food dry weight * conversion factor.
Granivore	Diet composition plant	1	Proportion	Assumed	--
Grasshopper Mouse					
Insectivore	Body weight	0.0346	kg	Median weight from three papers, see notes on gender and counts	Wied and Prinz 1841: 0.026 (low end of range), 0.049 (high end of range), McKinney and Pasley 1974: 0.0347 (F, n = 9, 60-80 d), 0.0346 (F, n = 13, 100-108 d) BHI-01757: 0.026 (Mitchell, R., pers com).

Table 5-79. Exposure Parameters for Riparian Middle Trophic-Level Receptors. (4 Pages)

Diet	Parameter	Value	Units	Reference	Notes
Insectivore	Diet composition soil	0.9	%	OSWER 9285.7-55, Attachment 4-1, Revised April 2007	Assumed to be similar to the short-tailed shrew because of similar dietary and foraging habits. Median soil ingestion rate estimated for short-tailed shrew in Table 3 of the Eco-SSL guidance. The median was selected as the best measure of central tendency that is unbiased by outliers.
Insectivore	Ingestion soil	0.0009	kg/kg/d	EPA/600/R-93/187	Soil ingestion is equal to the percent soil in diet multiplied by the food ingestion rate as follows: soil ingestion = (diet composition soil/100 * food ingestion rate).
Insectivore	Ingestion water	0	L/kg/d	--	No water consumed at riparian sites.
Insectivore	Intake food dry weight	0.0977	kg/kg/d	EPA/600/R-93/187	Allometric estimation for "insectivorous mammals" normalized to kg/kg-bw/d using mean weight as reported by BHI-01757.
Insectivore	Conversion factor (fresh from dry intake)	3.23	NA	EPA/600/R-93/187	Fresh from dry intake conversion factor based on 69% moisture in diet (grasshoppers and crickets), calculated as 1 divided dry fraction
Insectivore	Intake food fresh weight	0.316	kg/kg/d	--	Intake food dry weight * conversion factor.
Insectivore	Diet composition terrestrial invertebrate	1	Proportion	Assumed	--

-- = not applicable
Eco-SSL = ecological soil screening level
EPA = U.S. Environmental Protection Agency
ERA = ecological risk assessment
NA = not available

Beyer, W. N., E. E. Connor, and S. Gerould, 1994, "Estimates of Soil Ingestion by Wildlife," *J. Wildlife Management* 58:375-382.

BHI-01757, 2005, *DQO Summary Report for the 100 Area and 300 Area Component of the River Corridor Baseline Risk Assessment,* Rev. 0, Bechtel Hanford, Inc., Richland, Washington.

Bryant, H. C., 1914, "A Determination of the Economic Status of the Western Meadowlark (*Stunella neglecta)* in California," *Univ. Calif. Publ. Zool.* 11(14):377-510.

EPA/600/R-93/187, 1993, *Wildlife Exposure Factors Handbook*, U.S. Environmental Protection Agency, Washington, D.C.

Guthery, F. S., N. E. Koerth, and D. S. Smith, 1988, "Reproduction of Northern Bobwhites in Semiarid Environments," *J. Wildl. Manage.* 42:144-149.

Koerth, N. E. and F. S. Guthery, 1990, "Water Requirements of Captive Northern Bobwhites Under Subtropical Seasons," *J. Wildl. Manage.* 54:667-672.

Maher, W. J., 1979, "Nestling Diets of Prairie Passerine Birds at Matador, Saskatchewan, Canada," *Ibis* 121:437-452.

McKinney, T. D. and J. N. Pasley, 1974, "Effects of ACTH on Reproductive Organs of Immature Female Northern Grasshopper Mice *(Onychomys leucogaster),"J Reprod Fertiy* 41:467-470.

Nagy, K. A., 2001, "Food Requirements for Wild Animals: Predictive Equations for Free-Living Mammals, Reptiles, and Birds," *Nutrition Abstracts and Reviews*, Series B 71, 21R-31R.

O'Farrel, T. P., 1975, "Seasonal and Altitudinal Variation in Populations of Small Mammals on Rattlesnake Mountain, Washington," *Am Midl Nat* 94:190-207.

OSWER Directive 9285.7-55, 2003, *Guidance for Developing Ecological Soil Screening Levels*, Attachment 4-1 Revised April 2007, U.S. Environmental Protection Agency, Washington, D.C.

Robel, R. J., 1969, "Food Habits, Weight Dynamics and Fat Content of Bobwhites in Relation to Food Plantings in Kansas," *J Wildlife Management* 38:653-664.

Roseberry, J. L. and W. D. Klimstra, 1971, "Annual Weight Cycles in Male and Female Bobwhite Quail," *Auk* 88:116-123.

Sample, B. and G. W. Suter, 1994, "Ecological Risk Assessment in a Large River Reservoir: 4, Piscivorous Wildlife," *Environmental Toxicology and Chemistry*, Vol. 18, No. 4, pp. 610-62.

Scheffer, T. H., 1938, *Pocket Mice of Washington and Oregon in Relation to Agriculture*, 347 USDA Tech. Bull. No. 608, U.S. Department of Agriculture.

Schrieber, R. K., 1978, "Bioenergetics of the Great Basin Pocket Mouse *Perognathus parvus*," *Acta Theriologica* 23:469-487.

Silva, M. and J. A. Downing, 1995, *CRC Handbook of Mammalian Body Masses,* CRC Press, Boca Raton, Florida.

Wied, M. and zu Prinz, 1841, "Reise in Das Innere Nort-America in Den Jahren 1832 bis 1834," *J. Holscher*, Coblenz, p. 99, xxiv + 687 pp.

Wiens, J. A. and J. T. Rotenberry, 1981, "Habitat Associations and Community Structure of Birds in Shrubsteppe Environments," *Ecol Monogr* 51:21-41.

Table 5-80. Riparian Receptors and Exposure Pathways for Hazard Quotient Calculations.

Receptor	HQ Pathway Parameters	Representative Concentrations
Kingbird (invertivore)	Soil	Five MIS samples – used mean
	Invertebrates	One composite sample
California quail (herbivore)	Soil	Five MIS samples – used mean
	Plants	Two composite samples – used maximum
Meadowlark (omnivore)	Soil	Five MIS samples – used mean
	Plants	Two composite samples – used maximum
	Invertebrates	One composite sample
Deer mouse (omnivore)	Soil	Five MIS samples – used mean
	Plants	Two composite samples – used maximum
	Invertebrates	One composite sample
Pocket mouse (herbivore)	Soil	Five MIS samples – used mean
	Plants	Two composite samples – used maximum
Grasshopper mouse (omnivore)	Soil	Five MIS samples – used mean
	Invertebrates	One composite sample

HQ = hazard quotient
MIS = *MULTI INCREMENT*® sampling

Table 5-81. Summary of Riparian Middle Trophic-Level Exceedance for all Contaminants of Potential Ecological Concern.

COPEC	Study Sites				Reference Sites			
	NOAEL		LOAEL		NOAEL		LOAEL	
	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ
Aldrin	<0.01	0.28	<0.01	0.06	<0.01	<0.01	<0.01	<0.01
Aroclor-1260	<0.01	<0.01	<0.01	<0.01	--	--	--	--
Arsenic	<0.01	0.55	<0.01	0.34	<0.01	0.58	<0.01	0.36
Barium	<0.01	0.70	<0.01	0.35	<0.01	0.16	<0.01	0.1
Bis[2-ethylhexyl] phthalate	<0.01	0.34	<0.01	<0.01	<0.01	0.16	<0.01	<0.01
Cadmium	<0.01	1.2 [a]	<0.01	0.7 [a]	<0.01	0.06	<0.01	0.04 [a]
Calculated total uranium	<0.01	0.19	<0.01	0.09	<0.01	<0.01	<0.01	<0.01
Chromium	<0.01	0.92	<0.01	0.88	<0.01	0.34	<0.01	0.28
Copper	<0.01	4.5	<0.01	1.5	0.06	1.4	0.02	0.46
Hexavalent chromium	<0.01	0.03	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
Lead	<0.01	0.72	<0.01	0.36	<0.01	0.61	<0.01	0.3
Mercury	<0.01	1.0	<0.01	0.20	<0.01	0.31	<0.01	0.06
Selenium	<0.01	5.2 [a]	<0.01	3.4 [a]	0.01	4.5	<0.01	3.0 [a]
Silver	<0.01	0.03 [a]	<0.01	<0.01	<0.01	0.01	<0.01	<0.01 [a]
Thallium	<0.01	3.4 [a]	<0.01	0.67 [a]	<0.01	0.22	<0.01	0.04 [a]
Total PCB	<0.01	<0.01	<0.01	<0.01	--	--	--	--
Total petroleum hydrocarbons - diesel range	<0.01	0.02	<0.01	<0.01	--	--	--	--
Uranium (inorganic)	<0.01	1.2	<0.01	0.60	<0.01	<0.01	<0.01	<0.01
Vanadium	<0.01	5.0	<0.01	2.5	<0.01	3.0	<0.01	1.5
Zinc	0.02	1.1 [a]	0.02	1.1 [a]	0.02	0.46	0.02	0.45 [a]

= Hazard quotient greater than 1.0.

[a] Maximum value from 100-B/C Pilot sample.

= = not applicable
COPEC = contaminant of potential ecological concern
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
NOAEL = no observable adverse effect level
PCB = polychlorinated biphenyl

Table 5-82. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for California Quail (Herbivore).

Site	COPEC	Concentration (mg/kg) [a]				NOAEL HQ						LOAEL HQ					
		Soil		Plant		CTE			RME			CTE			RME		
		CTE	RME	CTE	RME	Soil	Plant	Sum [b]	Soil	Plant	Sum [b]	Soil	Plant	Sum [b]	Soil	Plant	Sum [b]
Reference																	
Beverly Ref 1	Vanadium	72	77.4	ND	ND	1.0	--	1.0	1.1	--	1.1	0.50	--	0.50	0.54	--	0.54
Ref 13	Vanadium	50.8	55	1.7	1.7	0.70	0.42	1.1	0.76	0.42	1.2	0.35	0.21	0.56	0.38	0.21	0.59
Study Site																	
100-NR-2	Vanadium	88.5	97.8	0.14	0.54	1.2	0.03	1.3	1.4	0.14	1.5	0.62	0.02	0.63	0.68	0.07	0.75
100-F/100-IU-2/100-IU-6 Decision Area																	
2I	Vanadium	84.7	89.1	ND	ND	1.2	--	1.2	1.2	--	1.2	0.59	--	0.59	0.62	--	0.62

= Hazard quotient greater than 1.0.

[a] The pathway HQs use soil and food concentrations to calculate dose based on Equation 5-6 and then convert dose to HQ based on Equation 5-7.
[b] Soil HQ + plant HQ.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
ND = not detected
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 5-83. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for Pocket Mouse (Herbivore).

Site Name	COPEC	Concentration (mg/kg) [a]				NOAEL HQ						LOAEL HQ					
		Soil		Plant		CTE			RME			CTE			RME		
		CTE	RME	CTE	RME	Soil	Plant	Sum [b]	Soil	Plant	Sum [b]	Soil	Plant	Sum [b]	Soil	Plant	Sum [b]
Study Site																	
100-B/C Decision Area																	
BC Pilot	Thallium	0.75	0.75	0.034	0.084	0.10	1.3	1.4	0.10	3.3	3.4	0.02	0.27	0.29	0.02	0.65	0.67
100-D/100-H Decision Area																	
Rip 1	Uranium (inorganic)	ND	ND	6.3	6.3	--	1.2	1.2	--	1.2	1.2	--	0.60	0.60	--	0.60	0.60
Rip 2	Copper	19.9	20.5	9.8	9.8	<0.01	1.0	1.0	<0.01	1.0	1.0	<0.01	0.61	0.62	<0.01	0.61	0.62
Rip 8	Copper	27.2	28.7	9.8	9.8	<0.01	1.0	1.0	0.01	1.0	1.0	<0.01	0.61	0.62	<0.01	0.61	0.62
Rip 9	Uranium (inorganic)	ND	ND	5.7	5.7	--	1.1	1.1	--	1.1	1.1	--	0.54	0.54	--	0.54	0.54

= Hazard quotient greater than 1.0.

[a] The pathway HQs use soil and food concentrations to calculate dose based on Equation 5-6 and then convert dose to HQ based on Equation 5-7.
[b] Soil HQ + plant HQ.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
ND = not detected
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 5-84. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for Meadowlark (Omnivore).

Site Name	COPEC	Concentration (mg/kg) [a]						NOAEL HQ								LOAEL HQ							
		Soil		Plant		Invertebrate		CTE				RME				CTE				RME			
		CTE	RME	CTE	RME	CTE	RME	Soil	Plant	Invertebrate	Sum [b]	Soil	Plant	Invertebrate	Sum [b]	Soil	Plant	Invertebrate	Sum [b]	Soil	Plant	Invertebrate	Sum [b]
Reference																							
Ref 13	Selenium	ND	ND	1.1	1.1	0.78	0.78	--	0.62	0.74	1.4	--	0.62	0.74	1.4	--	0.31	0.37	0.68	--	0.31	0.37	0.68
	Vanadium	50.8	55	1.7	1.7	ND	ND	0.37	0.8	--	1.2	0.4	0.8	--	1.2	0.19	0.4	--	0.59	0.2	0.4	--	0.6
Study Site																							
100-B/C Decision Area																							
100-B/C Pilot	Copper	16.8	18.2	2.41	3	22.7	29.4	0.01	0.1	1.6	1.7	0.01	0.12	2.0	2.1	<0.01	0.03	0.52	0.56	<0.01	0.04	0.67	0.72
	Selenium	0.398	0.623	0.0218	0.0261	1.98	2.28	<0.01	0.01	1.9	1.9	<0.01	0.02	2.2	2.2	<0.01	<0.01	0.95	0.96	<0.01	<0.01	1.1	1.1
100-N Decision Area																							
100-NR-2	Vanadium	88.5	97.8	0.14	0.54	0.47	0.71	0.65	0.06	0.38	1.1	0.71	0.26	0.57	1.5	0.32	0.03	0.19	0.54	0.71	0.13	0.3	0.77
100-D/100-H Decision Area																							
2f	Copper	32.2	38.5	2.4	2.4	14.9	14.9	0.02	0.1	1.0	1.1	0.02	0.1	1.0	1.1	<0.01	0.03	0.34	0.38	<0.01	0.03	0.34	0.38
Rip 1	Copper	34.4	36	9	9	20.1	20.1	0.02	0.36	1.4	1.8	0.02	0.36	1.4	1.8	<0.01	0.12	0.46	0.59	<0.01	0.12	0.46	0.59
Rip 2	Copper	19.9	20.5	9.8	9.8	13	13	0.01	0.39	0.89	1.3	0.01	0.39	0.89	1.3	<0.01	0.13	0.3	0.43	<0.01	0.13	0.3	0.43
	Selenium	ND	ND	ND	ND	1.2	1.2	--	--	1.1	1.1	--	--	1.1	1.1	--	--	0.57	0.57	--	--	0.57	0.57
Rip 9	Copper	23	24.1	7.7	7.7	20.2	20.2	0.01	0.31	1.4	1.7	0.02	0.31	1.4	1.7	<0.01	0.1	0.46	0.57	<0.01	0.1	0.46	0.57
	Selenium	ND	ND	ND	ND	1.8	1.8	--	--	1.7	1.7	--	--	1.7	1.7	--	--	0.86	0.86	--	--	0.86	0.86
Rip 10	Copper	25	27.9	2.5	2.5	21.2	21.2	0.02	0.1	1.4	1.6	0.02	0.1	1.4	1.6	<0.01	0.03	0.48	0.52	<0.01	0.03	0.48	0.52
	Selenium	ND	ND	ND	ND	1.1	1.1	--	--	1.0	1.0	--	--	1.0	1.0	--	--	0.53	0.53	--	--	0.53	0.53
100-F/100-IU-2/100-IU-6 Decision Area																							
Rip 7	Copper	41.3	60.1	1.9	1.9	29.5	29.5	0.03	0.08	2.0	2.1	0.04	0.08	2.0	2.1	<0.01	0.03	0.67	0.71	0.01	0.03	0.67	0.71
3b	Copper	43	51.3	1.7	1.7	13.3	13.3	0.03	0.07	0.91	1.0	0.03	0.07	0.91	1.0	<0.01	0.02	0.3	0.34	0.01	0.02	0.3	0.34
4a	Copper	42.7	46	1.8	1.8	16	16	0.03	0.07	1.1	1.2	0.03	0.07	1.1	1.2	<0.01	0.02	0.37	0.4	<0.01	0.02	0.37	0.4

= Hazard quotient greater than 1.0.

[a] The pathway HQs use soil and food concentrations to calculate dose based on Equation 5-6 and then convert dose to HQ based on Equation 5-7.

[b] Soil HQ + plant HQ + invertebrate HQ.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
ND = not detected
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 5-85. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for Deer Mouse (Omnivore).

Site Name	COPEC	Concentration (mg/kg) [a]						NOAEL HQ								LOAEL HQ							
		Soil		Plant		Invertebrate		CTE				RME				CTE				RME			
		CTE	RME	CTE	RME	CTE	RME	Soil	Plant	Invertebrate	Sum [b]	Soil	Plant	Invertebrate	Sum [b]	Soil	Plant	Invertebrate	Sum [b]	Soil	Plant	Invertebrate	Sum [b]
Reference																							
Ref 11	Selenium	0.973	1.2	ND	ND	0.88	0.88	0.02	--	2.0	2.0	0.02	--	2.0	2.0	0.01	--	1.3	1.3	0.02	--	1.3	1.3
Ref 12	Selenium	ND	ND	ND	ND	0.65	0.65	--	--	1.5	1.5	--	--	1.5	1.5	--	--	0.97	0.97	--	--	0.97	0.97
Ref 13	Selenium	ND	ND	1.1	1.1	0.78	0.78	--	2.5	1.7	4.2	--	2.5	1.7	4.2	--	1.6	1.2	2.8	--	1.6	1.2	2.8
Ref 14	Selenium	0.84	0.84	0.64	0.64	0.6	0.6	0.02	1.4	1.3	2.8	0.02	1.4	1.3	2.8	0.01	0.95	0.89	1.9	0.01	0.95	0.89	1.9
Ref 16	Selenium	ND	ND	0.59	0.59	0.56	0.56	--	1.3	1.3	2.6	--	1.3	1.3	2.6	--	0.88	0.83	1.7	--	0.88	0.83	1.7
Study Site																							
100-B/C Decision Area																							
100-B/C Pilot	Cadmium	0.599	1.17	0.0937	0.198	1.7	2.94	<0.01	0.03	0.54	0.58	<0.01	0.06	0.94	1.0	<0.01	<0.01	0.05	0.06	<0.01	<0.01	0.09	0.1
	Copper	16.8	18.2	2.41	3	22.7	29.4	<0.01	0.14	1.3	1.4	<0.01	0.17	1.7	1.9	<0.01	0.08	0.78	0.87	<0.01	0.10	1.0	1.1
	Selenium	0.398	0.623	0.0218	0.0261	1.98	2.28	<0.01	0.05	4.4	4.5	0.01	0.06	5.1	5.2	<0.01	0.03	2.9	3.0	<0.01	0.04	3.4	3.4
	Thallium	0.75	0.75	0.034	0.084	0.046	0.062	0.15	0.73	0.97	1.9	0.15	1.8	1.3	3.3	0.03	0.15	0.19	0.37	0.15	0.36	0.26	0.65
100-K Decision Area																							
Rip 5	Selenium	ND	ND	ND	ND	1	1	--	--	2.2	2.2	--	--	2.2	2.2	--	--	1.5	1.5	--	--	1.5	1.5
100-N Decision Area																							
100-NR-2	Selenium	0.167	0.284	0.0326	0.0374	0.277	0.533	<0.01	0.07	0.57	0.64	<0.01	0.8	0.96	1.0	<0.01	0.05	0.38	0.43	<0.01	0.05	0.64	0.7
Rip 4	Selenium	ND	ND	ND	ND	0.75	0.75	--	--	1.7	1.7	--	--	1.7	1.7	--	--	1.1	1.1	--	--	1.1	1.1
100-D/100-H Decision Area																							
2f	Copper	32.2	38.5	2.4	2.4	14.9	14.9	0.02	0.14	0.85	1.0	0.02	0.14	0.85	1.01	0.01	0.08	0.51	0.6	0.01	0.08	0.51	0.6
Rip 1	Copper	34.4	36	9	9	20.1	20.1	0.02	0.51	1.1	1.7	0.02	0.51	1.1	1.7	0.01	0.31	0.69	1.0	0.01	0.31	0.69	1.0
	Selenium	0.86	0.86	ND	ND	1	1	0.02	--	2.2	2.3	0.02	--	2.2	2.3	0.01	--	1.5	1.5	0.01	--	1.5	1.5
Rip 2	Copper	19.9	20.5	9.8	9.8	13	13	0.01	0.56	0.74	1.3	0.01	0.56	0.74	1.3	<0.01	0.34	0.44	0.8	<0.01	0.34	0.44	0.8
	Selenium	ND	ND	ND	ND	1.2	1.2	--	--	2.7	2.7	--	--	2.7	2.7	--	--	1.8	1.8	--	--	1.8	1.8
Rip 3	Selenium	0.67	0.67	ND	ND	0.66	0.66	0.01	--	1.5	1.5	0.01	--	1.5	1.5	<0.01	--	0.98	0.99	<0.01	--	0.98	0.99
Rip 8	Selenium	ND	ND	ND	ND	0.87	0.87	--	--	1.9	1.9	--	--	1.9	1.9	--	--	1.3	1.3	--	--	1.3	1.3
Rip 9	Copper	23	24.1	7.7	7.7	20.2	20.2	0.01	0.44	1.2	1.6	0.01	0.44	1.2	1.6	<0.01	0.26	0.69	0.96	<0.01	0.26	0.69	0.96
	Selenium	ND	ND	ND	ND	1.8	1.8	--	--	4.0	4.0	--	--	4.0	4.0	--	--	2.7	2.7	--	--	2.7	2.7
Rip 10	Copper	25	27.9	2.5	2.5	21.2	21.2	0.01	0.14	1.2	1.4	0.02	0.14	1.2	1.4	<0.01	0.09	0.73	0.82	<0.01	0.09	0.73	0.82
	Selenium	ND	ND	ND	ND	1.1	1.1	--	--	2.5	2.5	--	--	2.5	2.5	--	--	1.6	1.6	--	--	1.6	1.6
100-F/100-IU-2/100-IU-6 Decision Area																							
4a	Copper	42.7	46	1.8	1.8	16	16	0.02	0.1	0.91	1.0	0.02	0.1	0.91	1.0	0.01	0.06	0.55	0.62	0.02	0.06	0.55	0.62
Rip 7	Copper	41.3	60.1	1.9	1.9	29.5	29.5	0.02	0.11	1.7	1.8	0.03	0.11	1.7	1.8	0.01	0.07	1.0	1.1	0.02	0.07	1.0	1.1
	Mercury	0.067	0.083	ND	ND	0.1	0.1	<0.01	--	1.0	1.0	<0.01	--	1.0	1.0	<0.01	--	0.20	0.20	<0.01	--	0.20	0.20
	Selenium	ND	ND	ND	ND	0.99	0.99	--	--	2.2	2.2	--	--	2.2	2.2	--	--	1.5	1.5	--	--	1.5	1.5
300 Area Decision Area																							
5c	Selenium	ND	ND	0.6	0.6	ND	ND	--	1.3	--	1.3	--	1.3	--	1.3	--	0.89	--	0.89	--	0.89	--	0.89

= Hazard quotient greater than 1.0.

[a] The pathway HQs use soil and food concentrations to calculate dose based on Equation 5-6 and then convert dose to HQ based on Equation 5-7.

[b] Soil HQ + plant HQ + invertebrate HQ.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
ND = not detected
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 5-86. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for Kingbird (Insectivore). (2 Pages)

Site Name	COPEC	Concentration (mg/kg) [a]				NOAEL HQ						LOAEL HQ					
		Soil		Invertebrate		CTE			RME			CTE			RME		
		CTE	RME	CTE	RME	Soil	Invertebrate	Sum [b]	Soil	Invertebrate	Sum [b]	Soil	Invertebrate	Sum [b]	Soil	Invertebrate	Sum [b]
Reference																	
Beverly Ref 1	Copper	30.7	36.1	8	8	0.10	1.2	1.3	0.12	1.2	1.3	0.03	0.39	0.42	0.04	0.39	0.43
	Vanadium	72	77.4	ND	ND	2.8	--	2.8	3.0	--	3.0	1.4	--	1.4	1.5	--	1.5
Beverly Ref 2	Copper	28.3	32.8	7.7	7.7	0.09	1.1	1.2	0.11	1.1	1.2	0.03	0.37	0.41	0.04	0.37	0.41
	Vanadium	36.1	38.3	ND	ND	1.4	--	1.4	1.5	--	1.5	0.7	--	0.70	0.74	--	0.74
Ref 11	Copper	16.8	17.5	7.7	7.7	0.06	1.1	1.2	0.06	1.1	1.2	0.02	0.37	0.39	0.02	0.37	0.39
	Selenium	0.973	1.2	0.88	0.88	0.05	1.8	1.8	0.06	1.8	1.8	0.02	0.89	0.92	0.03	0.89	0.92
	Vanadium	39.9	40.5	ND	ND	1.5	--	1.5	1.6	--	1.6	0.77	--	0.77	0.78	--	0.78
Ref 12	Selenium	ND	ND	0.65	0.65	--	1.3	1.3	--	1.3	1.3	--	0.66	0.66	--	0.66	0.66
	Vanadium	41.6	43.3	ND	ND	1.6	--	1.6	1.7	--	1.7	0.80	--	0.80	0.84	--	0.84
Ref 13	Selenium	ND	ND	0.78	0.78	--	1.6	1.6	--	1.6	1.6	--	0.79	0.79	--	0.79	0.79
	Vanadium	50.8	55	ND	ND	2.0	--	2.0	2.1	--	2.1	0.98	--	0.98	1.1	--	1.1
Ref 14	Copper	39	44.5	8.5	8.5	0.13	1.2	1.4	0.15	1.2	1.4	0.04	0.41	0.46	0.05	0.41	0.46
	Selenium	0.84	0.84	0.6	0.6	0.04	1.2	1.3	0.04	1.2	1.3	0.02	0.61	0.63	0.02	0.61	0.63
	Vanadium	52	53.2	0.11	0.11	2.0	0.19	2.2	2.1	0.19	2.2	1.0	0.09	1.1	1.0	0.09	1.1
Ref 16	Selenium	ND	ND	0.56	0.56	--	1.1	1.1	--	1.1	1.1	--	0.57	0.57	--	0.57	0.57
	Vanadium	36.8	38.3	0.09	0.09	1.4	0.15	1.6	1.5	0.15	1.6	0.71	0.08	0.79	0.74	0.08	0.82
Study Site																	
100-B/C Decision Area																	
100-B/C Pilot	Cadmium	0.599	1.17	1.7	2.94	<0.01	0.68	0.69	0.01	1.2	1.2	<0.01	0.42	0.43	<0.01	0.73	0.74
	Copper	16.8	18.2	22.7	29.4	0.06	3.3	3.4	0.06	4.3	4.3	0.02	1.1	1.1	0.02	1.4	1.4
	Selenium	0.398	0.623	1.98	2.28	0.02	4.0	4.0	0.03	4.6	4.6	<0.01	2.0	2.0	0.01	2.3	2.3
	Vanadium	27.1	29.3	ND	ND	1.0	--	1.0	1.1	--	1.1	0.52	--	0.52	0.57	--	0.57
	Zinc	127	151	95	118	0.03	0.84	0.87	0.03	1.1	1.1	0.03	0.84	0.86	0.03	1.0	1.1
2a	Copper	25.4	29.5	8.1	8.1	0.08	1.2	1.3	0.1	1.2	1.3	0.03	0.39	0.42	0.03	0.39	0.43
	Vanadium	33	33.8	ND	ND	1.3	--	1.3	1.3	--	1.3	0.64	--	0.64	0.65	--	0.65
100-K Decision Area																	
2c	Copper	34	36.2	7.9	7.9	0.11	1.1	1.3	0.12	1.1	1.3	0.03	0.38	0.42	0.04	0.38	0.42
	Vanadium	40.5	43	0.12	0.12	1.6	0.21	1.8	1.7	0.21	1.9	0.78	0.10	0.89	0.83	0.10	0.93
Rip 5	Copper	30.2	30.9	10.9	10.9	0.10	1.6	1.7	0.1	1.6	1.7	0.03	0.53	0.56	0.03	0.53	0.56
	Selenium	ND	ND	1	1	--	2.0	2.0	--	2.0	2.0	--	1.0	1.0	--	1.0	1.0
	Vanadium	44.2	45.5	0.09	0.09	1.7	0.15	1.9	1.8	0.15	1.9	0.85	0.08	0.93	0.88	0.08	0.96
100-N Decision Area																	
100-NR-2	Selenium	0.2	0.23	0.26	0.43	<0.01	0.52	0.53	0.01	0.87	0.88	<0.01	0.26	0.26	<0.01	0.44	0.44
	Vanadium	88	98	0.47	0.71	3.4	0.8	4.2	3.8	1.2	5.0	1.7	0.40	2.1	1. 9	0.61	2.5
Rip 4	Copper	29.9	32.8	6.4	6.4	0.1	0.93	1.0	0.11	0.93	1.0	0.03	0.31	0.34	0.04	0.31	0.35
	Selenium	ND	ND	0.75	0.75	--	1.5	1.5	--	1.5	1.5	--	0.76	0.76	--	0.76	0.76
	Vanadium	52.1	55.1	ND	ND	2.0	--	2.0	2.1	--	2.1	1.0	--	1.0	1.1	--	1.1
100-D/100-H Decision Area																	
2f	Copper	32.2	38.5	14.9	14.9	0.11	2.2	2.3	0.13	2.2	2.3	0.04	0.72	0.76	0.04	0.72	0.77
	Vanadium	52.3	54.9	0.21	0.21	2.0	0.36	2.4	2.1	0.36	2.5	1.0	0.18	1.2	1.1	0.18	1.2

Table 5-86. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for Kingbird (Insectivore). (2 Pages)

Site Name	COPEC	Concentration (mg/kg) [a]				NOAEL HQ						LOAEL HQ					
		Soil		Invertebrate		CTE			RME			CTE			RME		
		CTE	RME	CTE	RME	Soil	Invertebrate	Sum [b]	Soil	Invertebrate	Sum [b]	Soil	Invertebrate	Sum [b]	Soil	Invertebrate	Sum [b]
Rip 1	Copper	34.4	36	20.1	20.1	0.11	2.9	3.0	0.12	2.9	3.0	0.04	0.98	1.0	0.04	0.98	1.0
	Selenium	0.86	0.86	1	1	0.04	2.0	2.1	0.04	2.0	2.1	0.02	1.0	1.0	0.02	1.0	1.0
	Vanadium	41.2	43.3	ND	ND	1.6	--	1.6	1.7	--	1.7	0.80	--	0.80	0.84	--	0.84
Rip 2	Copper	19.9	20.5	13	13	0.07	1.9	2.0	0.07	1.9	2.0	0.02	0.63	0.65	0.02	0.63	0.65
	Selenium	ND	ND	1.2	1.2	--	2.4	2.4	--	2.4	2.4	--	1.2	1.2	--	1.2	1.2
	Vanadium	43.1	44.8	ND	ND	1.7	--	1.7	1.7	--	1.7	0.83	--	0.83	0.87	--	0.87
Rip 3	Selenium	0.67	0.67	0.66	0.66	0.03	1.3	1.4	0.03	1.3	1.4	0.02	0.67	0.69	0.02	0.67	0.69
	Vanadium	56	59.7	ND	ND	2.2	--	2.2	2.3	--	2.3	1.1	--	1.1	1.2	--	1.2
Rip 8	Selenium	ND	ND	0.87	0.87	--	1.8	1.8	--	1.8	1.8	--	0.88	0.88	--	0.88	0.88
	Vanadium	43.5	46.8	ND	ND	1.7	--	1.7	1.8	--	1.8	0.84	--	0.84	0.90	--	0.90
Rip 9	Copper	23	24.1	20.2	20.2	0.08	2.9	3.0	0.08	2.9	3.0	0.03	0.98	1.0	0.03	0.98	1.0
	Selenium	ND	ND	1.8	1.8	--	3.6	3.6	--	3.6	3.6	--	1.8	1.8	--	1.8	1.8
	Vanadium	41.1	41.7	ND	ND	1.6	--	1.6	1.6	--	1.6	0.79	--	0.79	0.81	--	0.81
Rip 10	Copper	25	27.9	21.2	21.2	0.08	3.1	3.2	0.09	3.1	3.2	0.03	1.0	1.1	0.03	1.0	1.1
	Selenium	ND	ND	1.1	1.1	--	2.2	2.2	--	2.2	2.2	--	1.1	1.1	--	1.1	1.1
	Vanadium	48.8	52.3	ND	ND	1.9	--	1.9	2.0	--	2.0	0.94	--	0.94	1.01	--	1.0
100-F/100-IU-2/100-IU-6 Decision Area																	
2j	Copper	40.3	42.8	8.5	8.5	0.13	1.2	1.4	0.14	1.2	1.4	0.04	0.41	0.46	0.05	0.41	0.46
	Vanadium	41.2	42.4	0.16	0.16	1.6	0.27	1.9	1.6	0.27	1.9	0.8	0.14	0.93	0.82	0.14	0.96
2l	Copper	17.9	19.2	9.6	9.6	0.06	1.4	1.5	0.06	1.4	1.5	0.02	0.47	0.49	0.02	0.47	0.49
	Vanadium	84.7	89.1	0.28	0.28	3.3	0.48	3.8	3.4	0.48	3.9	1.6	0.24	1.9	1.7	0.24	2.0
3b	Copper	43	51.3	13.3	13.3	0.14	1.9	2.1	0.17	1.9	2.1	0.05	0.65	0.69	0.06	0.65	0.70
	Vanadium	44.7	46.5	ND	ND	1.7	--	1.7	1.8	--	1.8	0.86	--	0.86	0.90	--	0.90
4a	Copper	42.7	46	16	16	0.14	2.3	2.5	0.15	2.3	2.5	0.05	0.78	0.82	0.05	0.78	0.83
	Vanadium	51.8	54.3	0.28	0.28	2.0	0.48	2.5	2.1	0.48	2.6	1.0	0.24	1.2	1.1	0.24	1.3
Rip 7	Copper	41.3	60.1	29.5	29.5	0.14	4.3	4.4	0.2	4.3	4.5	0.05	1.4	1.5	0.07	1.4	1.5
	Selenium	ND	ND	0.99	0.99	--	2.0	2.0	--	2.0	2.0	--	1.0	1.0	--	1.0	1.0
	Vanadium	54.1	57.7	ND	ND	2.1	--	2.1	2.2	--	2.2	1.0	--	1.1	1.1	--	1.1
300 Area Decision Area																	
5c	Copper	22.9	25.3	9.5	9.5	0.08	1.4	1.5	0.08	1.4	1.5	0.03	0.46	0.49	0.03	0.46	0.49
	Vanadium	67.2	70.8	0.1	0.1	2.6	0.17	2.8	2.7	0.17	2.9	1.3	0.09	1.4	1.4	0.09	1.5
Rip 6	Copper	30	31.3	7.7	7.7	0.1	1.1	1.2	0.1	1.1	1.2	0.03	0.37	0.41	0.03	0.37	0.41
	Vanadium	52.7	54.2	0.12	0.12	2.0	0.21	2.2	2.1	0.21	2.3	1.0	0.1	1.1	1.0	0.1	1.2

= Hazard quotient greater than 1.0.

[a] The pathway HQs use soil and food concentrations to calculate dose based on Equation 5-6 and then convert dose to HQ based on Equation 5-7.
[b] Soil HQ + invertebrate HQ.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
ND = not detected
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 5-87. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for Grasshopper Mouse (Insectivore).

Site Name	COPEC	Concentration (mg/kg) [a]				NOAEL HQ						LOAEL HQ					
		Soil		Invertebrate		CTE			RME			CTE			RME		
		CTE	RME	CTE	RME	Soil	Invertebrate	Sum [b]	Soil	Invertebrate	Sum [b]	Soil	Invertebrate	Sum [b]	Soil	Invertebrate	Sum [b]
Reference																	
Ref 11	Selenium	0.973	1.2	0.88	0.88	<0.01	1.9	1.9	<0.01	1.9	1.9	<0.01	1.3	1.3	<0.01	1.3	1.3
Ref 12	Selenium	ND	ND	0.65	0.65	--	1.4	1.4	--	1.4	1.4	--	0.95	0.95	--	0.95	0.95
Ref 13	Selenium	ND	ND	0.78	0.78	--	1.7	1.7	--	1.7	1.7	--	1.1	1.1	--	1.1	1.1
Ref 14	Selenium	0.84	0.84	0.6	0.6	<0.01	1.3	1.3	<0.01	1.3	1.3	<0.01	0.88	0.88	<0.01	0.88	0.88
Ref 16	Selenium	ND	ND	0.56	0.56	--	1.2	1.2	--	1.2	1.2	--	0.82	0.82	--	0.82	0.82
Study Site																	
100-B/C Decision Area																	
100-B/C Pilot	Copper	16.8	18.2	22.7	29.4	<0.01	1.3	1.3	<0.01	1.7	1.7	<0.01	0.77	0.77	<0.01	0.99	0.99
	Selenium	0.398	0.623	1.98	2.28	<0.01	4.4	4.4	<0.01	5.0	5.0	<0.01	2.9	2.9	<0.01	3.3	3.3
	Thallium	0.75	0.75	0.046	0.062	0.05	0.96	1.0	0.05	1.3	1.4	<0.01	0.19	0.20	<0.01	0.26	0.27
100-K Decision Area																	
Rip 5	Selenium	ND	ND	1	1	--	2.2	2.2	--	2.2	2.2	--	1.5	1.5	--	1.5	1.5
100-N Decision Area																	
100-NR-2	Selenium	0.167	0.284	0.277	0.533	<0.01	0.56	0.57	<0.01	0.95	0.95	<0.01	0.38	0.38	<0.01	0.63	0.63
Rip 4	Selenium	ND	ND	0.75	0.75	--	1.7	1.7	--	1.7	1.7	--	1.1	1.1	--	1.1	1.1
100-D/100-H Decision Area																	
Rip 1	Copper	34.4	36	20.1	20.1	<0.01	1.1	1.1	<0.01	1.1	1.1	<0.01	0.68	0.68	<0.01	0.68	0.68
	Selenium	0.86	0.86	1	1	<0.01	2.2	2.2	<0.01	2.2	2.2	<0.01	1.5	1.5	<0.01	1.5	1.5
Rip 2	Selenium	ND	ND	1.2	1.2	--	2.6	2.6	--	2.6	2.6	--	1.8	1.8	--	1.8	1.8
Rip 3	Selenium	0.67	0.67	0.66	0.66	<0.01	1.5	1.5	<0.01	1.5	1.5	<0.01	0.97	0.97	<0.01	0.97	0.97
Rip 8	Selenium	ND	ND	0.87	0.87	--	1.9	1.9	--	1.9	1.9	--	1.3	1.3	--	1.3	1.3
Rip 9	Copper	23	24.1	20.2	20.2	<0.01	1.1	1.1	<0.01	1.1	1.1	<0.01	0.68	0.68	<0.01	0.68	0.68
	Selenium	ND	ND	1.8	1.8	--	4.0	4.0	--	4.0	4.0	--	2.6	2.6	--	2.6	2.6
Rip 10	Copper	25	27.9	21.2	21.2	<0.01	1.2	1.2	<0.01	1.2	1.2	<0.01	0.72	0.72	<0.01	0.72	0.72
	Selenium	ND	ND	1.1	1.1	--	2.4	2.4	--	2.4	2.4	--	1.6	1.6	--	1.6	1.6
100-F/100-IU-2/100-IU-6 Decision Area																	
Rip 7	Copper	41.3	60.1	29.5	29.5	<0.01	1.7	1.7	<0.01	1.7	1.7	<0.01	1.0	1.0	<0.01	1.0	1.0
	Selenium	ND	ND	0.99	0.99	--	2.2	2.2	--	2.2	2.2	--	1.5	1.5	--	1.5	1.5

= Hazard quotient greater than 1.0.

[a] The pathway HQs use soil and food concentrations to calculate dose based on Equation 5-6 and then convert dose to HQ based on Equation 5-7.

[b] Soil HQ + invertebrate HQ.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
ND = not detected
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 5-88. Summary of Risk Characterization for Riparian Middle Trophic-Level Vertebrates.

Receptor	Line of Evidence	Weight	Effect	Summary and Recommendation
Birds	Measured concentration in bird crops	Low	Inorganic chemicals were measured in bird crops; concentrations were more consistent with aquatic than terrestrial invertebrates. Thus, dietary exposure to birds is primarily from the near-shore aquatic macroinvertebrates.	Potential for adverse effects at study sites and reference sites based on the exposure evaluation.
	Exposure evaluation of kingbirds (insectivore)	Medium	LOAEL-based HQs are greater than 1 for four COPECs (copper, selenium, vanadium, and zinc), thus potential for adverse effects.	
	Exposure evaluation of quail (herbivore)	Medium	NOAEL-based HQs are greater than 1 but LOAEL-based HQs are less than 1, thus a low potential for adverse effects.	
	Exposure evaluation of meadowlark (omnivore)	Medium	LOAEL-based HQ is greater than 1 for one COPEC at one study site (selenium), thus has potential for adverse effects.	
Mammals	Gross morphological anomalies	Low	Low frequency; no differences of study sites compared to reference sites.	Potential for adverse effects at study sites and reference sites based on exposure evaluation. No indication of unacceptable ecological risk based on multiple lines of evidence.
	Tissue concentrations	Low	Some detections and differences from reference site, no correlation to soil except for barium in organs.	
	Tissue benchmarks for livers	Low	Effect levels exceeded for lead in organs, thus providing an indication of adverse effects.	
	Exposure evaluation of pocket mouse (herbivore)	Medium	LOAEL-based HQs are greater than 1 for one COPEC (selenium), but the maximum HQs were at reference sites.	
	Exposure evaluation of deer mouse (omnivore)	Medium	LOAEL-based HQs are greater than 1 for two COPECs (copper, and selenium), thus potential for adverse effects.	
	Exposure evaluation of grasshopper mouse (insectivore)	Medium	LOAEL-based HQs are greater than 1 for two COPECs (copper and selenium), thus potential for adverse effects.	

COPEC = contaminant of potential ecological concern
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
NOAEL = no observable adverse effect level

Table 5-89. Uncertainty Analysis for Middle Trophic-Level Vertebrates.

Attributes	Risk Questions	Observations	Impact on Assessment
Literature toxicity information	Are mean soil concentrations greater than adverse effect levels?	Toxicity information is lacking for some COPECs. The effect levels for metals are based on bioavailable forms of this metal and. For example, Menzie et al. (2008) present an example study involving barium toxicity and chemical form showing that the most stable form in the environment is also the least toxic.	Risks could be underestimated for certain COPECs. Bioavailability could be greatly overestimated as would the potential for adverse effects in the riparian environment.
Measured tissue concentrations in mice	Are study site tissue concentrations greater than at reference sites or increase along an increasing COPEC gradient?	Tissue concentrations are subject to the following: • Exposure is based on the average for the study site • Analytical measurement uncertainties (e.g., detection limits typically are elevated in tissues because of matrix interferences) • Considering the mobility of small mammals, whether tissues of trapped animals represent contaminant concentrations for organisms within study sites or reference sites (vs. offsite organisms) • Whether small mammals represent contaminant concentrations in all middle trophic-level vertebrates (e.g., birds) at study sites or reference sites • Uncertainties associated with measured exposure include small sample sizes for some groups at some sites.	High and low concentrations are integrated. Detection limits can lead to underestimating risks.

COPEC = contaminant of potential ecological concern

Menzie, C. A., B. Southworth, G. Stephenson, and N. Feisthauer, 2008, "The Importance of Understanding the Chemical Form of a Metal in the Environment: The Case of Barium Sulfate (Barite)," *Human and Ecological Risk Assessment* 14-974-991.

Table 5-90. Summary of Riparian Terrestrial Vertebrate Risk Results for All Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status (Table 5-48)					Exposure Evaluation Based on Soil and Food (Table 5-81)	Mammal Tissue vs. Soil Regression (Tables 5-79 and 5-80)	Notes
	Plant Tissue	Invertebrate Tissue	Bird Crop	Mammal Organ	Mammal Tissue			
Inorganics								
Arsenic	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	No relationship for organs, negative relationship with carcass	No significant findings
Barium	Yes	Yes	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Significant relationship in organs, no relationship for carcass	No significant findings
Cadmium	No	Yes	No	No	No	NOAEL-based HQ greater than 1, but LOAEL-based HQ less than 1	No relationship for organs, insufficient detects in carcass	Identified as key COPEC based on NOAEL comparison
Calculated total uranium	No	No	No	Not measured	No	NOAEL- and LOAEL-based HQs are less than 1	Not measured in organs and insufficient detections in carcass	No significant findings
Chromium	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	No relationship for organs or carcass	No significant findings
Copper	Yes	Yes	No	No	No	NOAEL- and LOAEL-based HQs are greater than 1	No relationship for organs or carcass	Identified as key COPEC based on LOAEL comparison
Hexavalent chromium	Not measured	Not measured	Not measured	Not measured	Not measured	NOAEL- and LOAEL-based HQs are less than 1	Not measured in organs or carcass	No significant findings
Lead	No	No	No	Yes	Yes	NOAEL- and LOAEL-based HQs are less than 1	Insufficient detects in organs, no relationship for carcass	Lead was greater than tissue effect levels for 100-NR-2 mouse liver only; no other findings
Mercury	No	Yes	No	No	No	NOAEL-based HQ greater than 1, but LOAEL-based HQ less than 1	No relationship for organs or carcass	Maximum NOAEL-based HQ=1.0

Table 5-90. Summary of Riparian Terrestrial Vertebrate Risk Results for All Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status (Table 5-48)					Exposure Evaluation Based on Soil and Food (Table 5-81)	Mammal Tissue vs. Soil Regression (Tables 5-79 and 5-80)	Notes
	Plant Tissue	Invertebrate Tissue	Bird Crop	Mammal Organ	Mammal Tissue			
Selenium	No	Yes	No	No	No	NOAEL- and LOAEL-based HQs are greater than 1	Insufficient detections in organs, no relationship for carcass	Identified as key COPEC based on LOAEL comparison. In addition, invertebrate greater than reference at 100-B/C Pilot only
Silver	No	Yes	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Insufficient detections in organs or carcass	Invertebrate greater than reference at 100-B/C Pilot only. No other findings
Thallium	Yes	No	No	No	No	NOAEL-based HQ greater than 1, but LOAEL-based HQ less than 1	Insufficient detections in organs or carcass	Identified as key COPEC based on NOAEL comparison. In addition, plant greater than reference at 100-B/C Pilot only
Uranium (inorganic)	No	No	No	No	No	NOAEL-based HQ greater than 1, but LOAEL-based HQ less than 1	Insufficient detections in organs or carcass	Identified as key COPEC based on NOAEL comparison
Vanadium	No	No	No	No	No	NOAEL- and LOAEL-based HQs are greater than 1	Insufficient detects in organs, no relationship for carcass	Identified as key COPEC based on LOAEL comparison. In addition, invertebrate greater than reference at 100-NR-2 only
Zinc	Yes	Yes	No	No	No	NOAEL- and LOAEL-based HQs are greater than 1	No relationship for organs or carcass	Identified as key COPEC based on LOAEL comparison
Polychlorinated Biphenyls								
Aroclor-1260	No	Not measured	Not measured	Not measured	Yes	NOAEL- and LOAEL-based HQs are less than 1	Not measured in organs, insufficient detections in carcass	No significant findings
Total PCBs	Not measured	Not measured	Not measured	Yes	Not measured	NOAEL- and LOAEL-based HQs are less than 1	Not measured in organs or carcass	No significant findings

Table 5-90. Summary of Riparian Terrestrial Vertebrate Risk Results for All Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status (Table 5-48)					Exposure Evaluation Based on Soil and Food (Table 5-81)	Mammal Tissue vs. Soil Regression (Tables 5-79 and 5-80)	Notes
	Plant Tissue	Invertebrate Tissue	Bird Crop	Mammal Organ	Mammal Tissue			
Pesticide								
Aldrin	No	Not measured	Not measured	Not measured	No	NOAEL- and LOAEL-based HQs are less than 1	Not measured in organs, not detected in soil and carcass at same site	No significant findings
Phthalate								
Bis[2-ethylhexyl] phthalate	Yes	Not measured	Not measured	Not measured	No	NOAEL- and LOAEL-based HQs are less than 1	Not measured in organs, no relationship for carcass	No significant findings
Semivolatile Organic								
Total petroleum hydrocarbons - diesel range	Not measured	Not measured	Not measured	Not measured	Not measured	NOAEL- and LOAEL-based HQs are less than 1	Not measured in organs or carcass	No significant findings

= COPECs have HQ >1 for NOAEL or HQ >1 for LOAEL and HQ at study sites is greater than reference sites.

COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
NOAEL = no observable adverse effect level
PCB = polychlorinated biphenyl

Table 5-91. Summary of Riparian Risk Results for Contaminants of Potential Ecological Concern. (4 Pages)

COPEC	COPC Refinement Results				Plant Risk Results	Invertebrate Risk Results	Wildlife Risk Results	Conclusions
	Soil	Plant	Invertebrate	Mammal				
Arsenic	Yes	No	No	No	Soil concentrations were greater than the benchmark and thus a potential for adverse effects. No adverse trends with phytotoxicity measures.	Soil concentrations were less than the benchmark, thus adverse effects were unlikely. No trends with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggested adverse effects are unlikely.	Based on soil concentrations greater than the plant benchmark evaluate this COPEC further in Section 8.0.
Barium	Yes	Yes	Yes	No	Soil concentrations were less than the benchmark and thus a potential for adverse effects. No adverse trends with phytotoxicity measures.	Soil concentrations were less than the benchmark, thus adverse effects were unlikely. No trends with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggested adverse effects are unlikely.	Further evaluation is not indicated by the riparian risk results.
Cadmium	Yes	No	Yes	No	Soil concentrations were less than benchmark, and thus adverse effects were unlikely. No trends with phytotoxicity measures.	Soil concentrations were less than the benchmark, thus adverse effects were unlikely. No trends with nematode survival.	NOAEL-based HQs were greater than 1 but LOAEL-based HQs were less than 1 for the kingbird and deer mouse and suggested a low potential for adverse effects. Other HQs were less than 1.	Further evaluation is not indicated by the riparian risk results.
Calculated total uranium	Yes	No	No	No	Soil concentrations were less than the benchmark and thus a potential for adverse effects. No adverse trends with phytotoxicity measures.	No toxicity information. No trends with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggested adverse effects are unlikely.	Further evaluation is not indicated by the riparian risk results.
Chromium	Yes	No	No	No	Soil concentrations were greater than benchmark and suggested a potential for adverse effects. Adverse trend with seed germination.	Soil concentrations were greater than benchmark and suggested a potential for adverse effects. No trends with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggested adverse effects were unlikely.	Based on soil concentrations greater than the plant and invertebrate benchmarks evaluate this COPEC further in Section 8.0.

Table 5-91. Summary of Riparian Risk Results for Contaminants of Potential Ecological Concern. (4 Pages)

COPEC	COPC Refinement Results				Plant Risk Results	Invertebrate Risk Results	Wildlife Risk Results	Conclusions
	Soil	Plant	Invertebrate	Mammal				
Copper	No	Yes	Yes	No	Soil concentrations were less than the benchmark, thus adverse effects were unlikely. No adverse trends with phytotoxicity measures.	Soil concentrations were greater than benchmark, and thus a potential for adverse effects. No trends with nematode survival.	NOAEL- and LOAEL-based HQs were greater than 1 and suggested the potential for adverse effects.	Based on soil concentrations greater than the invertebrate benchmark and wildlife LOAEL-based HQs greater than 1 evaluate this COPEC further in Section 8.0.
Hexavalent chromium	Yes	Not measured	Not measured	Not measured	No toxicity information. No trend with phytotoxicity measures.	No toxicity information. No trends with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggested adverse effects are unlikely.	Further evaluation is not indicated by the riparian risk results.
Lead	Yes	No	No	Organ, carcass	Soil concentrations were greater than the benchmark and thus a potential for adverse effects. No adverse trends with phytotoxicity measures.	Soil concentrations were less than the benchmark, and thus adverse effects were unlikely. No trends with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggested adverse effects were unlikely. Tissue effect level exceeded for 100-NR-2 only.	Based on soil concentrations greater than the plant benchmark evaluate this COPEC further in Section 8.0.
Mercury	Yes	No	Yes	No	Soil concentrations were less than the benchmark, and thus adverse effects were unlikely. No trends with phytotoxicity measures.	Soil concentrations were greater than the benchmark and suggested the potential for adverse effects. No trend with nematode survival.	NOAEL-based HQs were greater than 1 but LOAEL-based HQs were less than 1 for the deer mouse and suggested a low potential for adverse effects. Other HQs were less than 1.	Based on soil concentrations greater than the plant and invertebrate benchmarks evaluate this COPEC further in Section 8.0.
Selenium	No	No	Yes	No	Soil concentrations were greater than the benchmark at reference sites and study sites but the highest concentrations were at reference sites.	Soil concentrations were less than benchmark, and thus adverse effects were unlikely. No trends with nematode survival.	NOAEL- and LOAEL-based HQs were greater than 1 and suggested the potential for adverse effects.	Based on wildlife LOAEL-based HQs greater than 1 evaluate this COPEC further in Section 8.0.

Table 5-91. Summary of Riparian Risk Results for Contaminants of Potential Ecological Concern. (4 Pages)

COPEC	COPC Refinement Results				Plant Risk Results	Invertebrate Risk Results	Wildlife Risk Results	Conclusions
	Soil	Plant	Invertebrate	Mammal				
Silver	No	No	Yes	No	Soil concentrations were less than benchmark and suggested adverse effects were unlikely	No toxicity information.	NOAEL- and LOAEL-based HQs were less than 1 and suggested adverse effects are unlikely.	Further evaluation is not indicated by the riparian risk results.
Thallium	No	Yes	No	No	Soil concentrations were greater than the benchmark at reference sites and study sites but the maximum concentrations at reference sites were equal to that at study sites.	No toxicity information.	NOAEL-based HQs were greater than 1 but LOAEL-based HQs were less than 1 for all three mammals and suggested a low potential for adverse effects. Bird HQs were less than 1.	Further evaluation is not indicated by the riparian risk results.
Uranium (inorganic)	No	No	No	No	Soil concentrations were less than benchmark and suggested adverse effects were unlikely. No adverse trends with phytotoxicity measures.	No toxicity information. No trends with nematode survival.	NOAEL-based HQs were greater than 1 but LOAEL-based HQs were less than 1 for the pocket mouse and suggested a low potential for adverse effects. Other HQs were less than 1.	Further evaluation is not indicated by the riparian risk results.
Vanadium	No	No	Yes	No	Soil concentrations were greater than the benchmark and suggested the potential for adverse effects. Trends with fresh shoot and root growth, but not with any dry weight measures.	No toxicity information. No trends with nematode survival.	NOAEL- and LOAEL-based HQs were greater than 1 and suggested the potential for adverse effects.	Based on soil concentrations greater than the plant benchmark and wildlife LOAEL-based HQs greater than 1 evaluate this COPEC further in Section 8.0.
Zinc	Yes	Yes	Yes	No	Soil concentrations were greater than benchmark and suggested a potential for adverse effects. No adverse trends with phytotoxicity measures.	Soil concentrations were greater than the benchmark and suggested the potential for adverse effects. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were greater than 1 for the kingbird at the 100-B/C Pilot sites only. Other HQs were less than 1.	Based on soil concentrations greater than the plant and invertebrate benchmarks and wildlife LOAEL-based HQs greater than 1 evaluate this COPEC further in Section 8.0.

Table 5-91. Summary of Riparian Risk Results for Contaminants of Potential Ecological Concern. (4 Pages)

COPEC	COPC Refinement Results				Plant Risk Results	Invertebrate Risk Results	Wildlife Risk Results	Conclusions
	Soil	Plant	Invertebrate	Mammal				
Aldrin	Yes	No	Not measured	No	No toxicity information.	No toxicity information.	NOAEL- and LOAEL-based HQs were less than 1 and suggested adverse effects are unlikely.	Further evaluation is not indicated by the riparian risk results.
Aroclor-1260	Yes	No	Not measured	Carcass	Soil concentrations less than the benchmark.	No toxicity information.	NOAEL- and LOAEL-based HQs were less than 1 and suggested adverse effects are unlikely.	Further evaluation is not indicated by the riparian risk results.
Bis[2-ethylhexyl] phthalate	Yes	No	Not measured	No	No toxicity information. No trends with phytotoxicity measures.	No toxicity information. No trend with nematode survival.	NOAEL- and LOAEL-based HQs were less than 1 and suggested adverse effects are unlikely.	Further evaluation is not indicated by the riparian risk results.
Endosulfan sulfate	Yes	No	Not measured	No	No toxicity information.	Not applicable, COPEC in rare plant habitat only.	Not applicable, COPEC in rare plant habitat only.	Further evaluation is not indicated by the riparian risk results.
Endrin aldehyde	Yes	No	Not measured	No	No toxicity information. No adverse trends with phytotoxicity measures.	Not applicable, COPEC in rare plant habitat only.	Not applicable, COPEC in rare plant habitat only.	Further evaluation is not indicated by the riparian risk results.
Total PCBs	Yes	Not measured	Not measured	Organ	Soil concentrations less than the benchmark.	No toxicity information.	NOAEL- and LOAEL-based HQs were less than 1 and suggested adverse effects are unlikely.	Further evaluation is not indicated by the riparian risk results.
Total petroleum hydrocarbons - diesel range	Yes	Not measured	Not measured	Not measured	No effect levels and no information from bioassay.	Soil concentrations were greater than the benchmark and suggested the potential for adverse effects. No information from bioassay.	NOAEL- and LOAEL-based HQs were less than 1 and suggested adverse effects are unlikely.	Based on soil concentrations greater than the invertebrate benchmark evaluate this COPEC further in Section 8.0.

COPECs are recommended for further evaluation in Section 8.0 based on the highlighted receptor results.

COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
NOAEL = no observable adverse effect level
PCB = polychlorinated biphenyl

Table 5-92. Summary of Riparian Risk Results for Assessment Endpoints. (2 Pages)

Comparison Type	Results	Key Uncertainties
Plants		
Evidence for adverse effects based on comparison of study sites to reference sites	• Zero of nine phytotoxicity measures differed between study sites and reference sites and, therefore, no evidence for adverse effects.	• 15 sites were not sampled for phytotoxicity using the seedling germination test. • Full range of concentrations for two COPECs (chromium and hexavalent chromium) was not obtained.
Trends with COPEC concentrations	• No relationship of soil to plant tissue concentrations. • Two COPECs (chromium and vanadium) had relationships with phytotoxicity measures but many confounding factors also were correlated with phytotoxicity measures. • Cause-effect relationships based on COPECs are not evident.	
Potential for adverse effects based on comparisons of soil concentrations to benchmarks	• Benchmarks and reference concentrations were exceeded for five COPECs (arsenic, chromium, lead, vanadium, and zinc) suggesting a potential for adverse effects from these analytes.	
Terrestrial Invertebrates		
Evidence for adverse effects based on comparison of study sites to reference sites	Nematode survival did not differ between study sites and reference sites, thus no evidence for adverse effects.	• Relative abundance measures for terrestrial invertebrates were not obtained, but adequate sample mass was obtained for contaminant tissue analyses. • TPH-diesel was detected in 100-NR-2 soil samples at concentrations greater than the benchmark. Nematode bioassays were not conducted on 100-NR-2 soils so the gradient for TPH was not evaluated.
Trends with COPEC concentrations	• No COPECs had relationships with nematode survival. • No relationships of terrestrial invertebrate tissue concentrations to soil concentrations. • Cause-effect relationships based on COPECs are not evident.	
Potential for adverse effects based on comparisons of soil concentrations to benchmarks	• Benchmarks and reference concentrations were exceeded for five COPECs (chromium, copper, mercury, TPH-diesel, and zinc) suggesting a potential for adverse effects from these analytes.	

Table 5-92. Summary of Riparian Risk Results for Assessment Endpoints. (2 Pages)

Comparison Type	Results	Key Uncertainties
Middle Trophic-Level Wildlife		
Evidence for adverse effects based on comparison of study sites to reference sites	There is generally no difference in exposure to from because both reference sites and study sites had HQ >1.	Lead was measured above tissue effect levels in 100-NR-2 small mammal tissues, but lead was not elevated in 100-NR-2 soil or mouse food.
Trends with COPEC concentrations	Relationships of soil and tissue concentrations are not indicated with the exception of barium in mammal organs.	
Potential for adverse effects based on comparisons of soil and food exposure doses to NOAELs/LOAELs	• NOAEL-based HQs are greater than 1 and greater than reference for eight COPECs, thus there is a low potential for adverse effects from these analytes. • LOAEL-based HQs are greater than 1 and greater than reference for four COPECs (copper, selenium, vanadium, and zinc), suggesting a potential for adverse effects.	

COPEC = contaminant of potential ecological concern
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
NOAEL = no observable adverse effect level
TPH = total petroleum hydrocarbons

Table 6-1. Analytical Suites for All Near-Shore Sediment, Water, and Biological Tissues.

Analyte Group	Analytical Methods [a]	Analyzed in			Indicator Contaminants [c]
		Sediment	Water	Tissues [b]	
Inorganic chemicals	6010/6020	Yes	Yes	Yes	Al, Sb, As [d], Ba, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, Ag, Sn, U, V, Zn
	7196A	Yes	Yes	No	Cr-VI
	7471	Yes	Yes	Yes	Hg [e]
	300.0	No	Yes	No	NO_3 [d]
PCBs and pesticides	8081A	Yes	Yes	Yes	Methoxychlor
	8082	Yes	Yes	Yes	None, but PCBs in fish have been risk drivers in previous risk assessments (EPA 910-R-02-006)
Semivolatile organic chemicals	418.1	Yes	Yes	No	Total petroleum hydrocarbon
	WTPH-G and WTPH-D	Yes	Yes	No	TPH gasoline and diesel range
	8270A	Yes	Yes	Yes	None, but needed to evaluate risk from TPH constituents
Radionuclides	Carbon-14 [f]	Yes	Yes	Yes	C-14
	Gamma energy analysis	Yes	Yes	Yes	Cs-137, Co-60, Ra-226 [g], Ra-228 [g]
	Isotopic thorium	Yes	Yes	Yes	Th-232
	Isotopic uranium	Yes	Yes	Yes	U-233/234, U-235, U-238
	Total radioactive strontium	Yes	Yes	Yes	Sr-90
	Tritium	No	Yes	No	H-3 [d]

[a] All analytes obtained by these methods.
[b] Analyses are subject to obtaining a sufficient amount of these media. Tissues include riparian plants, riparian small mammals, riparian small mammal liver/kidney, riparian soil invertebrates and birds. Small mammal liver/kidney and invertebrates will be measured for metals and uranium (as a metal, not isotopic) only.
[c] Indicator contaminants were used to identify analytical suites for the risk assessment and were the contaminants that are the focus in the soil sampling, multi-increment performance assessment.
[d] Of the analytes presented, there is overlap among several ecological and human health contaminants of interest; however, "d" footnoted analytes are of human health interest only.
[e] Mercury was not identified as an indicator contaminant in the near-shore environment but was investigated for completeness and for human health analysis.
[f] Carbon-14 was measured in samples collected from the 100-K Area only.
[g] Radium concentrations in water were measured by total radium isotopic analysis. Gamma energy analysis was used for all other media types.

PCB = polychlorinated biphenyl
TPH = total petroleum hydrocarbon
WTPH-D = Washington total petroleum hydrocarbon-diesel
WTPH-G = Washington total petroleum hydrocarbon-gasoline

EPA 910-R-02-006, 2002, *Columbia River Basin Fish Contaminant Survey 1996-1998*, U.S. Environmental Protection Agency, Region 10, Seattle, Washington. Available online at: http://yosemite.epa.gov/r10/oea.nsf/0703BC6B0C5525B088256BDC0076FC44/C3A9164ED269353788256C09005D36B7?OpenDocument.

Table 6-2. Summary of Reference Data Resources.

Category	Resource	Description of Relevant Data
Reference	RCBRA Project (this report)	Media: Sediment, pore water, surface water, biota, ecological measures, bioassays, histopathology.
Reference comparison	Data originating from PNNL database.	Media: Sediment, surface water, biota data provided by PNNL from their database. Coordinates were provided for some locations and converted to a common coordinate system.
Reference comparison	Hanford Site-relevant data from WCH-91, *Columbia River Component Data Evaluation Summary Report*, Rev. 0, Washington Closure Hanford, Richland Washington, July 2006	Media: Biota, surface water, and sediment data from a variety of sources.

PNNL = Pacific Northwest National Laboratory
RCBRA = River Corridor Baseline Risk Assessment

Table 6-3. Near-Shore Abiotic Media Sampled, Analyses Performed, and Other Measurements Collected.

Media Sampled	Laboratory Analyses Performed	Other Measurements
Sediment	Metals (including mercury) Radionuclides (including gamma energy analysis, isotopic uranium, plutonium, thorium, tritium, and total beta radiostrontium) Semivolatile organic analytes Pesticides/polychlorinated biphenyl compounds Particle size, pH, organic matter	Conductivity pH Temperature Turbidity
Pore water Surface water		

Table 6-4. Near-Shore Biotic Media Sampled, Analyses Performed, and Other Measurements Collected.

Media Sampled	Laboratory Analyses Performed	Other Measurements
Aquatic invertebrates	Metals (including mercury) Radionuclides (gamma energy analysis, isotopic uranium and thorium, and total beta radiostrontium) Semivolatile organic analytes Pesticides/polychlorinated biphenyl compounds	Species abundance and diversity Community indices
Aquatic invertebrates (insects, crustaceans, clams, mussels [soft tissue, shells]), amphibians Sculpin, sucker (whole organism, liver, and kidney)		Organism histopathology

Table 6-5. Aquatic Invertebrate Habitat Conditions Determined for each RCBRA Aquatic Community Study Site.

Substrate Category	100 and 300 RCBRA Areas Sites (2006)	Inter-Areas RCBRA Sites (2007)	RCBRA Reference Sites (2006 – 2007)
Sediment with springs	Cr6, U1	2a, 5d	Bev Ref 2
Sediment without springs	--	2j	Ref 12, Ref 16
Clean cobble with springs	Cr4, Cr5, U2, U3, U4, U5, U6, U7	--	--
Clean cobble without springs	Cr7, Cr9, Cr10	2i	Ref 13, Ref 14, 300 Ref 1, A Ref 16 [a]
Silty cobble with springs	Cr1, Cr2, Cr3, U8, U9, U10	2b, 2c, 2m, 3b, 4a, 5c	Ref 11, 300 Ref 2
Silty cobble without springs	--	2f, 2l	Bev Ref 1
Boulder-bedrock with springs	--	2e	--

[a] Aquatic reference site 16 was sampled in two consecutive years and the riverbed substrate was different between years.

-- = not applicable

RCBRA = River Corridor Baseline Risk Assessment

Table 6-6. Summary of Near-Shore Sediment Data Collected for the RCBRA Project. (7 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-dry weight)								
Aluminum	69	69	0	1.00	2,320	13,000	--	--
Antimony	69	1	68	0.01	0.47	0.47	0.39	1.7
Arsenic	69	69	0	1.00	1.1	18	--	--
Barium	69	69	0	1.00	25.6	209	--	--
Beryllium	69	67	2	0.97	0.08	0.9	0.05	0.06
Bismuth	69	1	68	0.01	1.6	1.6	0.5	2.7
Boron	69	45	24	0.65	0.31	5.1	0.24	1.1
Cadmium	69	54	15	0.78	0.07	2.4	0.07	0.15
Calcium	69	69	0	1.00	1,510	6,810	--	--
Calculated total uranium	57	56	1	0.98	0.734	15.4	0.482	0.482
Chromium	69	69	0	1.00	3.3	286	--	--
Cobalt	69	69	0	1.00	2.7	12.4	--	--
Copper	69	69	0	1.00	4.2	64	--	--
Hexavalent chromium	65	5	60	0.08	0.41	8.41	0.05	0.5
Iron	69	69	0	1.00	7,870	29,400	--	--
Lead	69	69	0	1.00	1.8	158	--	--
Lithium	69	69	0	1.00	2.4	14.8	--	--
Magnesium	69	69	0	1.00	1,950	7,320	--	--
Manganese	69	69	0	1.00	87	924	--	--
Mercury	69	18	51	0.26	0.02	0.2	0.01	0.04
Molybdenum	69	40	29	0.58	0.23	1.5	0.29	0.7
Nickel	69	69	0	1.00	5.6	32.1	--	--
Phosphorus	69	69	0	1.00	333	1,390	--	--
Potassium	69	69	0	1.00	255	1,620	--	--
Selenium	69	8	61	0.12	0.42	4.3	0.37	4.6
Silicon	69	69	0	1.00	261	3,100	--	--
Silver	69	3	66	0.04	0.14	0.844	0.07	0.34
Sodium	69	69	0	1.00	48.2	289	--	--

Table 6-6. Summary of Near-Shore Sediment Data Collected for the RCBRA Project. (7 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Strontium (elemental)	69	69	0	1.00	9.4	45.6	--	--
Thallium	69	2	67	0.03	1.4	2.4	0.65	3.8
Tin	69	35	34	0.51	0.83	17.1	0.95	2.4
Titanium	21	21	0	1.00	379	2,030	--	--
Uranium (inorganic)	69	7	62	0.10	1.2	6.8	0.87	9.1
Vanadium	69	69	0	1.00	15.7	66	--	--
Zinc	69	69	0	1.00	26.8	800	--	--
Zirconium	21	21	0	1.00	3.4	33.6	--	--
Organics (mg/kg-dry weight)								
1,2,4-Trichlorobenzene	57	0	57	0.00	--	--	0.33	1.1
1,2-Dichlorobenzene	57	0	57	0.00	--	--	0.33	1.1
1,3-Dichlorobenzene	57	0	57	0.00	--	--	0.33	1.1
1,4-Dichlorobenzene	57	0	57	0.00	--	--	0.33	1.1
2,4,5-Trichlorophenol	57	0	57	0.00	--	--	0.83	2.6
2,4,6-Trichlorophenol	57	0	57	0.00	--	--	0.33	1.1
2,4-Dichlorophenol	57	0	57	0.00	--	--	0.33	1.1
2,4-Dimethylphenol	57	0	57	0.00	--	--	0.33	1.1
2,4-Dinitrophenol	57	0	57	0.00	--	--	0.83	2.6
2,4-Dinitrotoluene	57	0	57	0.00	--	--	0.33	1.1
2,6-Dinitrotoluene	57	0	57	0.00	--	--	0.33	1.1
2-Chloronaphthalene	57	0	57	0.00	--	--	0.33	1.1
2-Chlorophenol	57	0	57	0.00	--	--	0.33	1.1
2-Methylnaphthalene	57	0	57	0.00	--	--	0.33	1.1
2-Methylphenol [cresol, o-]	57	0	57	0.00	--	--	0.33	1.1
2-Nitroaniline	57	0	57	0.00	--	--	0.83	2.6
2-Nitrophenol	57	0	57	0.00	--	--	0.33	1.1
3,3'-Dichlorobenzidine	57	0	57	0.00	--	--	0.33	1.1
3+4 Methylphenol [cresol, m+p]	57	0	57	0.00	--	--	0.33	1.1
3-Nitroaniline	57	0	57	0.00	--	--	0.83	2.6
4,6-Dinitro-2-methylphenol	57	0	57	0.00	--	--	0.83	2.6

Table 6-6. Summary of Near-Shore Sediment Data Collected for the RCBRA Project. (7 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
4-Bromophenylphenyl ether	57	0	57	0.00	--	--	0.33	1.1
4-Chloro-3-methylphenol	57	0	57	0.00	--	--	0.33	1.1
4-Chloroaniline	57	0	57	0.00	--	--	0.33	1.1
4-Chlorophenylphenyl ether	57	0	57	0.00	--	--	0.33	1.1
4-Nitroaniline	57	0	57	0.00	--	--	0.83	2.6
4-Nitrophenol	57	0	57	0.00	--	--	0.83	2.6
Acenaphthene	57	0	57	0.00	--	--	0.33	1.1
Acenaphthylene	57	0	57	0.00	--	--	0.33	1.1
Aldrin	57	1	56	0.02	0.00061	0.00061	0.00047	0.0033
Alpha-BHC	57	2	55	0.04	0.0017	0.0031	0.00047	0.0033
alpha-Chlordane	57	1	56	0.02	0.00091	0.00091	0.00047	0.0033
Anthracene	57	2	55	0.04	0.028	0.095	0.33	1.1
Aroclor-1016	57	0	57	0.00	--	--	0.014	0.047
Aroclor-1221	57	0	57	0.00	--	--	0.014	0.047
Aroclor-1232	57	0	57	0.00	--	--	0.014	0.047
Aroclor-1242	57	0	57	0.00	--	--	0.014	0.047
Aroclor-1248	57	0	57	0.00	--	--	0.014	0.047
Aroclor-1254	57	2	55	0.04	0.0085	0.024	0.014	0.047
Aroclor-1260	57	1	56	0.02	0.011	0.011	0.014	0.047
Benzo[a]anthracene	57	2	55	0.04	0.23	0.37	0.33	1.1
Benzo[a]pyrene	57	2	55	0.04	0.22	0.31	0.33	1.1
Benzo[b]fluoranthene	57	2	55	0.04	0.18	0.26	0.33	1.1
Benzo[ghi]perylene	57	2	55	0.04	0.1	0.1	0.33	1.1
Benzo[k]fluoranthene	57	2	55	0.04	0.21	0.36	0.33	1.1
beta-1,2,3,4,5,6-Hexachlorocyclohexane	57	4	53	0.07	0.0018	0.008	0.00047	0.0033
Bis[2-chloro-1-methylethyl]ether	57	0	57	0.00	--	--	0.33	1.1
Bis[2-Chloroethoxy]methane	57	0	57	0.00	--	--	0.33	1.1
Bis[2-chloroethyl] ether	57	0	57	0.00	--	--	0.33	1.1
Bis[2-ethylhexyl] phthalate	57	53	4	0.93	0.026	3.3	0.4	1.1
Butylbenzylphthalate	57	0	57	0.00	--	--	0.33	1.1

Table 6-6. Summary of Near-Shore Sediment Data Collected for the RCBRA Project. (7 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Carbazole	57	0	57	0.00	--	--	0.33	1.1
Chrysene	57	2	55	0.04	0.3	0.45	0.33	1.1
Delta-BHC	57	1	56	0.02	0.0015	0.0015	0.00047	0.0033
Dibenz[a,h]anthracene	57	1	56	0.02	0.062	0.062	0.33	1.1
Dibenzofuran	57	0	57	0.00	--	--	0.33	1.1
Dichlorodiphenyldichloroethane	57	2	55	0.04	0.0017	0.0023	0.00047	0.0033
Dichlorodiphenyldichloroethylene	57	12	45	0.21	0.00038	0.0035	0.00047	0.0033
Dichlorodiphenyltrichloroethane	57	5	52	0.09	0.00051	0.11	0.00047	0.0033
Dieldrin	57	0	57	0.00	--	--	0.00047	0.0033
Diethylphthalate	57	0	57	0.00	--	--	0.33	1.1
Dimethyl phthalate	57	0	57	0.00	--	--	0.33	1.1
Di-n-butylphthalate	57	6	51	0.11	0.022	0.044	0.33	1.1
Di-n-octylphthalate	57	0	57	0.00	--	--	0.33	1.1
Endosulfan I	57	7	50	0.12	0.00039	0.0054	0.00047	0.0033
Endosulfan II	57	0	57	0.00	--	--	0.00047	0.0033
Endosulfan sulfate	57	0	57	0.00	--	--	0.00047	0.0033
Endrin	57	1	56	0.02	0.0011	0.0011	0.00047	0.0033
Endrin aldehyde	57	1	56	0.02	0.00182	0.00182	0.00047	0.0033
Endrin ketone	57	0	57	0.00	--	--	0.00047	0.0033
Fluoranthene	57	2	55	0.04	0.19	0.55	0.33	1.1
Fluorene	57	0	57	0.00	--	--	0.33	1.1
Gamma-BHC (lindane)	57	1	56	0.02	0.0039	0.0039	0.00047	0.0033
gamma-Chlordane	57	2	55	0.04	0.00062	0.0023	0.00047	0.0033
Heptachlor	57	0	57	0.00	--	--	0.00047	0.0033
Heptachlor epoxide	57	0	57	0.00	--	--	0.00047	0.0033
Hexachlorobenzene	57	0	57	0.00	--	--	0.33	1.1
Hexachlorobutadiene	57	0	57	0.00	--	--	0.33	1.1
Hexachlorocyclopentadiene	57	0	57	0.00	--	--	0.33	1.1
Hexachloroethane	57	0	57	0.00	--	--	0.33	1.1
Indeno[1,2,3-cd]pyrene	57	2	55	0.04	0.1	0.12	0.33	1.1

Table 6-6. Summary of Near-Shore Sediment Data Collected for the RCBRA Project. (7 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Isophorone	57	0	57	0.00	--	--	0.33	1.1
Methoxychlor	57	0	57	0.00	--	--	0.00047	0.0033
Naphthalene	57	0	57	0.00	--	--	0.33	1.1
Nitrobenzene	57	0	57	0.00	--	--	0.33	1.1
N-Nitroso-di-n-dipropylamine	57	0	57	0.00	--	--	0.33	1.1
N-Nitrosodiphenylamine	57	0	57	0.00	--	--	0.33	1.1
Pentachlorophenol	57	0	57	0.00	--	--	0.83	2.6
Phenanthrene	57	1	56	0.02	0.33	0.33	0.33	1.1
Phenol	57	0	57	0.00	--	--	0.33	1.1
Pyrene	57	2	55	0.04	0.3	0.5	0.33	1.1
Toxaphene	57	0	57	0.00	--	--	0.0047	0.033
Total organic carbon	64	64	0	1.00	120	45,200	--	--
Total petroleum hydrocarbons	57	1	56	0.02	287	287	138	323
Total petroleum hydrocarbons - diesel range	57	47	10	0.82	1.5	50	2.9	7.64
Total petroleum hydrocarbons - gasoline range	57	9	48	0.16	0.0066	0.21	0.03	0.2
Total petroleum hydrocarbons - motor oil (high boiling)	1	1	0	1.00	8.7	8.7	--	--
Radionuclides (pCi/g-dry weight)								
Americium-241	57	0	57	0.00	--	--	0.01	0.47
Antimony-125	57	0	57	0.00	--	--	0.014	0.23
Beryllium-7	57	9	48	0.16	0.363	1.21	-0.625	1.3
Carbon-14	5	3	2	0.60	3.61	230	-0.625	0.143
Cesium-134	57	0	57	0.00	--	--	0.01	0.19
Cesium-137	57	41	16	0.72	0.031	0.775	0.011	0.14
Cobalt-60	57	7	50	0.12	0.028	0.109	0.007	0.18
Europium-152	57	9	48	0.16	0.025	0.598	0.022	0.25
Europium-154	57	1	56	0.02	0.083	0.083	0.023	0.52
Europium-155	57	0	57	0.00	--	--	0.029	0.24
Plutonium-238	2	0	2	0.00	--	--	-0.006	0
Plutonium-239/240	2	1	1	0.50	0.521	0.521	0	0
Potassium-40	57	57	0	1.00	5.02	25.3	--	--

Table 6-6. Summary of Near-Shore Sediment Data Collected for the RCBRA Project. (7 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Radium-226	57	57	0	1.00	0.298	1.2	--	--
Radium-228	57	57	0	1.00	0.434	2.83	--	--
Ruthenium-106	57	0	57	0.00	--	--	0.056	1
Strontium-90	57	7	50	0.12	0.278	5.5	-0.083	0.174
Technetium-99	3	0	3	0.00	--	--	0.0047	0.12
Thorium-228	57	44	13	0.77	0.378	2.14	0.047	1.13
Thorium-230	57	35	22	0.61	0.261	0.908	-0.062	0.83
Thorium-232	57	47	10	0.82	0.232	1.92	0.215	1.12
Uranium-233/234	57	56	1	0.98	0.22	4.31	0.217	0.217
Uranium-235	57	6	51	0.11	0.05	0.252	0	0.111
Uranium-238	57	56	1	0.98	0.241	5.12	0.162	0.162
Anions (mg/kg-dry weight)								
Chloride	64	64	0	1.00	0.125	11.6	--	--
Fluoride	64	20	44	0.31	0.0786	2.12	0.25	2.4
Nitrogen in ammonia	64	57	7	0.89	0.376	12.2	1.54	2.64
Nitrogen in nitrate	64	61	3	0.95	0.0831	26.3	0.698	0.904
Nitrogen in nitrite	64	33	31	0.52	0.0405	1.69	0.25	1.52
Nitrogen, Kjeldahl total	64	64	0	1.00	47.1	3,290	--	--
Sulfate	64	64	0	1.00	0.799	53.1	--	--
Physical Properties (%-dry weight)								
Cumulative percent retained on No. 100 screen	64	64	0	1.00	13.3	99.8	--	--
Cumulative percent retained on No. 16 screen	64	64	0	1.00	0	89.4	--	--
Cumulative percent retained on No. 200 screen	64	64	0	1.00	72.8	100	--	--
Cumulative percent retained on No. 30 screen	64	64	0	1.00	0.28	94.4	--	--
Cumulative percent retained on No. 0 screen	64	64	0	1.00	3.95	97.3	--	--
Cumulative percent retained on No. 8 screen	64	64	0	1.00	0	73.7	--	--
Fraction coarse sand	64	64	0	1.00	0.25	39.3	--	--
Fraction coarse silt/silt/clay (less than 0.074 mm)	64	64	0	1.00	0	27.2	--	--
Fraction fine sand	64	64	0	1.00	1.55	79.2	--	--
Fraction granules (greater than 2.38 mm)	64	64	0	1.00	0	73.7	--	--

Table 6-6. Summary of Near-Shore Sediment Data Collected for the RCBRA Project. (7 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Fraction medium sand	64	64	0	1.00	1.59	73	--	--
Fraction total sand	64	64	0	1.00	25.7	100	--	--
Fraction very coarse sand	64	64	0	1.00	0	39.1	--	--
Fraction very fine sand	64	64	0	1.00	0.17	59.5	--	--
Percent moisture (wet sample)	64	64	0	1.00	1.15	67.3	--	--
Other								
Dissolved oxygen (µg/L)	1	1	0	1.00	12,300	12,300	--	--
pH Measurement (pH)	65	65	0	1.00	6.6	8.74	--	--
Specific conductance (µS/cm)	1	1	0	1.00	159	159	--	--
Temperature (° C)	1	1	0	1.00	4.5	4.5	--	--

-- = not applicable
BHC = benzene hexachloride
RCBRA = River Corridor Baseline Risk Assessment

Table 6-7. Summary of Near-Shore Sediment Data Collected for the 100-B/C Pilot Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-dry weight)								
Antimony	2	2	0	1.00	0.428	0.649	--	--
Arsenic	2	2	0	1.00	3.22	6.87	--	--
Barium	2	2	0	1.00	766	869	--	--
Beryllium	2	2	0	1.00	1.36	1.5	--	--
Cadmium	2	2	0	1.00	0.64	0.743	--	--
Chromium	2	2	0	1.00	68.4	96.3	--	--
Copper	2	2	0	1.00	15.1	17.4	--	--
Lead	2	2	0	1.00	20.4	28.4	--	--
Manganese	2	2	0	1.00	561	603	--	--
Mercury	2	2	0	1.00	0.0139	0.0161	--	--
Nickel	2	2	0	1.00	18	21.1	--	--
Selenium	2	2	0	1.00	0.1	0.22	--	--
Silver	2	2	0	1.00	0.0231	0.0385	--	--
Thallium	2	2	0	1.00	7.36	7.91	--	--
Uranium (inorganic)	2	2	0	1.00	2.08	2.57	--	--
Zinc	2	2	0	1.00	151	184	--	--
Radionuclides (pCi/g-dry weight)								
Antimony-125	2	0	2	0.00	--	--	-0.026	0.00294
Beryllium-7	2	0	2	0.00	--	--	0.0107	0.089
Cesium-134	2	0	2	0.00	--	--	0.0426	0.0715
Cesium-137	2	2	0	1.00	0.0423	0.0671	--	--
Cobalt-60	2	0	2	0.00	--	--	-0.00487	0.0168
Europium-152	2	0	2	0.00	--	--	-0.0228	0.00926
Europium-154	2	0	2	0.00	--	--	-0.086	-0.0343
Europium-155	2	0	2	0.00	--	--	0.046	0.0568
Plutonium-238	2	0	2	0.00	--	--	0.000208	0.000262
Plutonium-239/240	2	0	2	0.00	--	--	0.000414	0.000786
Potassium-40	2	2	0	1.00	15.3	17.5	--	--
Ruthenium-106	2	0	2	0.00	--	--	-0.0281	-0.0195
Strontium-90	2	0	2	0.00	--	--	0.0257	0.032
Technetium-99	2	1	1	0.50	1.14	1.14	0.438	0.438

-- = not applicable

Table 6-8. Summary of Near-Shore Sediment Data Collected for the 100-NR-2 Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-dry weight)								
Antimony	3	3	0	1.00	0.0839	0.114	--	--
Arsenic	3	3	0	1.00	2.31	4.08	--	--
Barium	3	3	0	1.00	58.6	102	--	--
Cadmium	3	3	0	1.00	0.509	1.34	--	--
Chromium	3	3	0	1.00	13.8	23.4	--	--
Lead	3	3	0	1.00	9.87	23.9	--	--
Manganese	3	3	0	1.00	262	406	--	--
Mercury	3	3	0	1.00	0.0116	0.0288	--	--
Nickel	3	3	0	1.00	12.3	22.2	--	--
Selenium	3	1	2	0.33	0.257	0.257	0.200	0.200
Uranium (inorganic)	3	3	0	1.00	0.539	1.37	--	--
Vanadium	3	3	0	1.00	45.6	54.3	--	--
Zinc	3	3	0	1.00	118	233	--	--
Organics (mg/kg-dry weight)								
1,1'-Biphenyl,2,3',4,4',5-pentachloro-	3	0	3	0.00	--	--	0.00014	0.0002
2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	3	1	2	0.33	0.000441	0.000441	0.00014	0.00015
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	3	2	1	0.67	0.000172	0.000314	0.00015	0.00015
2,2',3,3',4,4',5,6-Octachlorobiphenyl	3	0	3	0.00	--	--	0.00014	0.0002
2,2',3,3',4,4',5-Heptachlorobiphenyl	3	0	3	0.00	--	--	0.00014	0.0002
2,2',3,3',4,4'-Hexachlorobiphenyl	3	0	3	0.00	--	--	0.00014	0.0002
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	3	0	3	0.00	--	--	0.00014	0.0002
2,2',3,4',5,5',6-Heptachlorobiphenyl	3	0	3	0.00	--	--	0.00014	0.0002
2,2',3,4,4',5'-Hexachlorobiphenyl	3	3	0	1.00	0.000416	0.000707	--	--
2,2',3,4,4',5,5'-Heptachlorobiphenyl	3	0	3	0.00	--	--	0.00014	0.0002
2,2',3,5'-Tetrachloro-1-1'-biphenyl	3	0	3	0.00	--	--	0.00014	0.0002
2,2',4,4',5,5',-Hexachloro-Biphenyl	3	0	3	0.00	--	--	0.00014	0.0002
2,2',4,5,5'-Pentachlorobiphenyl	3	0	3	0.00	--	--	0.00014	0.0002

Table 6-8. Summary of Near-Shore Sediment Data Collected for the 100-NR-2 Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
2,2',5,5'-Tetrachlorobiphenyl	3	0	3	0.00	--	--	0.00014	0.0002
2,2',5-Trichlorobiphenyl	3	0	3	0.00	--	--	0.00014	0.0002
2,3',4,4'-Tetrachlorobiphenyl	3	0	3	0.00	--	--	0.00015	0.0002
2,3,3',4,4'-Pentachlorobiphenyl	3	0	3	0.00	--	--	0.00014	0.0002
2,4'-Dichlorobiphenyl	3	1	2	0.33	0.000632	0.000632	0.00014	0.00015
2,4,4'-Trichlorobiphenyl	3	1	2	0.33	0.000234	0.000234	0.00015	0.0002
3,3',4,4',5-Pentachlorobiphenyl	3	1	2	0.33	0.00021	0.00021	0.00015	0.0002
3,3',4,4'-Tetrachlorobiphenyl	3	2	1	0.67	0.00063	0.00096	0.00014	0.00014
PCB 126 calculated TEC bird	1	1	0	1.00	0.0000207	0.0000207	--	--
PCB 126 calculated TEC fish	1	1	0	1.00	0.00000104	0.00000104	--	--
PCB 126 calculated TEC mammal	1	1	0	1.00	0.0000207	0.0000207	--	--
PCB calculated TEC mammal	2	2	0	1.00	6.26E-08	9.59E-08	--	--
PCB calculated TEC bird	2	2	0	1.00	0.0000313	0.0000479	--	--
PCB calculated TEC fish	2	2	0	1.00	6.26E-08	9.59E-08	--	--
TEC bird	3	3	0	1.00	0.0000207	0.0000479	--	--
TEC fish	3	3	0	1.00	6.26E-08	0.00000104	--	--
TEC mammal	3	3	0	1.00	6.26E-08	0.0000207	--	--
Radionuclides (pCi/g-dry weight)								
Strontium-90	4	4	0	1.00	3.87	31.4	--	--
Technetium-99	3	0	3	0.00	--	--	-0.213	-0.0479

-- = not applicable
PCB = polychlorinated biphenyl
TEC = TCDD (2,3,7,8-Tetrachlorodibenzo-*p*-Dioxin) equivalent concentration

Table 6-9. Summary of Unfiltered Pore-Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (µg/L)								
Aluminum	61	31	30	0.51	24.6	399	18.3	129
Antimony	61	1	60	0.02	2.6	2.6	2.5	4
Arsenic	61	14	47	0.23	3.2	210	3.1	35.8
Barium	61	61	0	1.00	17.4	104	--	--
Beryllium	61	1	60	0.02	0.13	0.13	0.1	0.2
Bismuth	61	2	59	0.03	4.9	5	4	6.1
Boron	61	61	0	1.00	3.1	31.3	--	--
Cadmium	61	2	59	0.03	0.72	0.85	0.3	0.7
Calcium	61	61	0	1.00	18,700	65,300	--	--
Calculated total uranium	60	39	21	0.65	0.429	141	0.117	0.881
Chromium	61	16	45	0.26	1.4	43.8	0.7	1.6
Cobalt	61	1	60	0.02	1.9	1.9	0.5	1.2
Copper	61	25	36	0.41	0.81	8.9	0.7	2.9
Hexavalent chromium	71	35	36	0.49	3	42	2	3
Iron	61	31	30	0.51	26.4	10,100	24.3	32.1
Lead	61	5	56	0.08	1.5	5.1	1.2	3.1
Lithium	61	57	4	0.93	0.97	4.3	0.91	1.6
Magnesium	61	61	0	1.00	4,270	18,000	--	--
Manganese	61	61	0	1.00	0.69	1,640	--	--
Mercury	61	0	61	0.00	--	--	0.1	0.1
Molybdenum	61	32	29	0.52	1.3	6.7	1	2.2
Nickel	61	5	56	0.08	1.7	2.6	1.3	2.2
Phosphorus	61	30	31	0.49	8.5	98,300	8.3	12.5
Potassium	61	58	3	0.95	636	4,120	540	540
Selenium	61	3	58	0.05	4.1	9.8	2.6	4.3
Silicon	61	61	0	1.00	2,170	13,000	--	--
Silver	61	1	60	0.02	0.63	0.63	0.5	1.4
Sodium	61	60	1	0.98	2,060	16,400	2,420	2,420
Strontium (elemental)	61	61	0	1.00	90.2	326	--	--
Thallium	61	3	58	0.05	6.4	10	5.5	6.4

Table 6-9. Summary of Unfiltered Pore-Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Tin	61	4	57	0.07	5.5	10.1	3.5	5.2
Uranium (inorganic)	61	3	58	0.05	22.8	137	13.6	21.4
Vanadium	61	21	40	0.34	0.65	5.3	0.5	0.9
Zinc	61	54	7	0.89	0.86	39.2	0.5	3.1
Organics (µg/L)								
1,2,4-Trichlorobenzene	60	0	60	0.00	--	--	10	12
1,2-Dichlorobenzene	60	0	60	0.00	--	--	10	12
1,3-Dichlorobenzene	60	0	60	0.00	--	--	10	12
1,4-Dichlorobenzene	60	0	60	0.00	--	--	10	12
2,4,5-Trichlorophenol	60	0	60	0.00	--	--	25	31
2,4,6-Trichlorophenol	60	0	60	0.00	--	--	10	12
2,4-Dichlorophenol	60	0	60	0.00	--	--	10	12
2,4-Dimethylphenol	60	0	60	0.00	--	--	10	12
2,4-Dinitrophenol	60	0	60	0.00	--	--	25	31
2,4-Dinitrotoluene	60	0	60	0.00	--	--	10	12
2,6-Dinitrotoluene	60	0	60	0.00	--	--	10	12
2-Chloronaphthalene	60	0	60	0.00	--	--	10	12
2-Chlorophenol	60	0	60	0.00	--	--	10	12
2-Methylnaphthalene	60	0	60	0.00	--	--	10	12
2-Methylphenol [cresol, o-]	60	0	60	0.00	--	--	10	12
2-Nitroaniline	60	0	60	0.00	--	--	25	31
2-Nitrophenol	60	1	59	0.02	9	9	10	12
3,3'-Dichlorobenzidine	60	0	60	0.00	--	--	10	12
3+4 Methylphenol [cresol, m+p]	60	2	58	0.03	11	20	10	12
3-Nitroaniline	60	0	60	0.00	--	--	25	31
4,6-Dinitro-2-methylphenol	60	0	60	0.00	--	--	25	31
4-Bromophenylphenyl ether	60	0	60	0.00	--	--	10	12
4-Chloro-3-methylphenol	60	0	60	0.00	--	--	10	12
4-Chloroaniline	60	0	60	0.00	--	--	10	12
4-Chlorophenylphenyl ether	60	0	60	0.00	--	--	10	12
4-Nitroaniline	60	0	60	0.00	--	--	25	31

Table 6-9. Summary of Unfiltered Pore-Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
4-Nitrophenol	60	0	60	0.00	--	--	25	31
Acenaphthene	60	0	60	0.00	--	--	10	12
Acenaphthylene	60	0	60	0.00	--	--	10	12
Aldrin	60	0	60	0.00	--	--	0.05	0.5
Alpha-BHC	60	0	60	0.00	--	--	0.05	0.5
alpha-Chlordane	60	0	60	0.00	--	--	0.05	0.5
Anthracene	60	0	60	0.00	--	--	10	12
Aroclor-1016	60	0	60	0.00	--	--	0.4	0.5
Aroclor-1221	60	0	60	0.00	--	--	0.4	0.5
Aroclor-1232	60	0	60	0.00	--	--	0.4	0.5
Aroclor-1242	60	0	60	0.00	--	--	0.4	0.5
Aroclor-1248	60	0	60	0.00	--	--	0.4	0.5
Aroclor-1254	60	0	60	0.00	--	--	0.4	0.5
Aroclor-1260	60	0	60	0.00	--	--	0.4	0.5
Benzo[a]anthracene	60	0	60	0.00	--	--	10	12
Benzo[a]pyrene	60	0	60	0.00	--	--	10	12
Benzo[b]fluoranthene	60	0	60	0.00	--	--	10	12
Benzo[ghi]perylene	60	0	60	0.00	--	--	10	12
Benzo[k]fluoranthene	60	0	60	0.00	--	--	10	12
beta-1,2,3,4,5,6-Hexachlorocyclohexane	60	0	60	0.00	--	--	0.05	0.5
Bis[2-chloro-1-methylethyl]ether	60	0	60	0.00	--	--	10	12
Bis[2-Chloroethoxy]methane	60	0	60	0.00	--	--	10	12
Bis[2-chloroethyl] ether	60	0	60	0.00	--	--	10	12
Bis[2-ethylhexyl] phthalate	60	58	2	0.97	0.5	36.6	10	10
Butylbenzylphthalate	60	0	60	0.00	--	--	10	12
Carbazole	60	0	60	0.00	--	--	10	12
Chrysene	60	0	60	0.00	--	--	10	12
Delta-BHC	60	0	60	0.00	--	--	0.05	0.5
Dibenz[a,h]anthracene	60	0	60	0.00	--	--	10	12
Dibenzofuran	60	0	60	0.00	--	--	10	12
Dichlorodiphenyldichloroethane	60	0	60	0.00	--	--	0.05	0.5

Table 6-9. Summary of Unfiltered Pore-Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Dichlorodiphenyldichloroethylene	60	0	60	0.00	--	--	0.05	0.5
Dichlorodiphenyltrichloroethane	60	0	60	0.00	--	--	0.05	0.5
Dieldrin	60	0	60	0.00	--	--	0.05	0.5
Diethylphthalate	60	0	60	0.00	--	--	10	12
Dimethyl phthalate	60	2	58	0.03	0.771	0.8	10	12
Di-n-butylphthalate	60	26	34	0.43	0.5	3	10	10
Di-n-octylphthalate	60	0	60	0.00	--	--	10	12
Endosulfan I	60	0	60	0.00	--	--	0.05	0.5
Endosulfan II	60	0	60	0.00	--	--	0.05	0.5
Endosulfan sulfate	60	0	60	0.00	--	--	0.05	0.5
Endrin	60	0	60	0.00	--	--	0.05	0.5
Endrin aldehyde	60	1	59	0.02	0.25	0.25	0.05	0.5
Endrin ketone	60	0	60	0.00	--	--	0.05	0.5
Fluoranthene	60	0	60	0.00	--	--	10	12
Fluorene	60	0	60	0.00	--	--	10	12
Gamma-BHC (lindane)	60	0	60	0.00	--	--	0.05	0.5
gamma-Chlordane	60	0	60	0.00	--	--	0.05	0.5
Heptachlor	60	0	60	0.00	--	--	0.05	0.5
Heptachlor epoxide	60	0	60	0.00	--	--	0.05	0.5
Hexachlorobenzene	60	0	60	0.00	--	--	10	12
Hexachlorobutadiene	60	0	60	0.00	--	--	10	12
Hexachlorocyclopentadiene	60	0	60	0.00	--	--	10	12
Hexachloroethane	60	0	60	0.00	--	--	10	12
Indeno[1,2,3-cd]pyrene	60	0	60	0.00	--	--	10	12
Isophorone	60	0	60	0.00	--	--	10	12
Methoxychlor	60	1	59	0.02	1	1	0.05	0.5
Naphthalene	60	0	60	0.00	--	--	10	12
Nitrobenzene	60	0	60	0.00	--	--	10	12
N-Nitroso-di-n-dipropylamine	60	0	60	0.00	--	--	10	12
N-Nitrosodiphenylamine	60	0	60	0.00	--	--	10	12
Pentachlorophenol	60	0	60	0.00	--	--	25	31

Table 6-9. Summary of Unfiltered Pore-Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Phenanthrene	60	0	60	0.00	--	--	10	12
Phenol	60	3	57	0.05	0.7	2	10	12
Pyrene	60	0	60	0.00	--	--	10	12
Toxaphene	60	0	60	0.00	--	--	0.05	0.62
Total organic carbon	56	56	0	1.00	610	7,800	--	--
Total petroleum hydrocarbons	60	0	60	0.00	--	--	1,000	2,000
Total petroleum hydrocarbons - diesel range	60	8	52	0.13	27	120	100	122
Total petroleum hydrocarbons - gasoline range	60	2	58	0.03	6.1	6.4	8.9	30
Total Suspended Solids	60	11	49	0.18	5,200	25,700	5,000	5,000
Radionuclides (pCi/L)								
Americium-241	60	0	60	0.00	--	--	6.4	270
Antimony-125	60	0	60	0.00	--	--	11	73
Beryllium-7	60	0	60	0.00	--	--	-2.35	320
Carbon-14	8	0	8	0.00	--	--	-19.8	75.5
Cesium-134	60	0	60	0.00	--	--	6.8	37
Cesium-137	60	0	60	0.00	--	--	5	29
Cobalt-60	60	0	60	0.00	--	--	5.5	32
Europium-152	60	0	60	0.00	--	--	13	86
Europium-154	60	0	60	0.00	--	--	16	92
Europium-155	60	0	60	0.00	--	--	9.9	100
Potassium-40	60	0	60	0.00	--	--	0	1,900
Radium-226	60	1	59	0.02	0.908	0.908	-0.244	0.534
Radium-228	60	0	60	0.00	--	--	-1.54	1.65
Ruthenium-106	60	0	60	0.00	--	--	45	260
Strontium-90	61	6	55	0.10	0.569	6.23	-0.282	0.568
Technetium-99	2	1	1	0.50	45.9	45.9	1.02	1.02
Thorium-228	60	0	60	0.00	--	--	-0.169	0.2
Thorium-230	60	0	60	0.00	--	--	-0.095	0.595
Thorium-232	60	1	59	0.02	0.283	0.283	-0.037	0.099
Tritium	60	14	46	0.23	286	16,600	-126	129
Uranium-233/234	60	46	14	0.77	0.167	51.4	0.033	0.274

Table 6-9. Summary of Unfiltered Pore-Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Uranium-235	60	5	55	0.08	0.022	5.76	0	0.125
Uranium-238	60	39	21	0.65	0.141	46.4	0.033	0.296
Anions (µg/L)								
Bromide	60	1	59	0.02	1,300	1,300	250	250
Chloride	60	60	0	1.00	920	19,000	--	--
Chlorine	57	26	31	0.46	10	66,000	20	20
Fluoride	60	1	59	0.02	650	650	250	250
Nitrogen in ammonia	117	49	68	0.42	10	1,300	100	200
Nitrogen in nitrate	60	58	2	0.97	72.3	12,500	56.5	56.5
Nitrogen in nitrite	56	0	56	0.00	--	--	76.1	152
Nitrogen in nitrite and nitrate	60	59	1	0.98	33	12,900	20	20
Nitrogen, Kjeldahl total	59	19	40	0.32	100	2,300	100	100
Phosphate	56	0	56	0.00	--	--	250	500
Sulfate	60	60	0	1.00	1,700	91,400	--	--
Physical Properties (µg/L)								
Alkalinity	118	117	1	0.99	800	140,000	500	500
Hardness	57	57	0	1.00	190	170,000	--	--
Total dissolved solids	60	60	0	1.00	48,000	380,000	--	--
Dissolved oxygen	183	183	0	1.00	7,750	16,600	--	--
Other								
pH Measurement (pH)	183	183	0	1.00	7.13	9.77	--	--
Specific conductance (µS/cm)	183	183	0	1.00	135	590	--	--
Temperature (° C)	183	183	0	1.00	2.7	19.9	--	--

-- = not applicable
RCBRA = River Corridor Baseline Risk Assessment

Table 6-10. Summary of Near-Shore Filtered and Unfiltered Seep Data Collected for the 100-B/C Pilot Project. (3 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (µg/L)								
Aluminum	5	1	4	0.20	144	144	17.0	89.9
Antimony	19	14	5	0.74	0.091	0.311	2.20	29.5
Arsenic	14	14	0	1.00	0.319	1.83	--	--
Barium	9	9	0	1.00	21.2	94.1	--	--
Beryllium	19	0	19	0.00	--	--	0.00980	0.68
Cadmium	19	11	8	0.58	0.00958	0.0329	0.010	4.30
Calcium	5	5	0	1.00	41,700	51,100	--	--
Chromium	19	19	0	1.00	1.85	20.3	--	--
Cobalt	5	0	5	0.00	--	--	1.40	5.00
Copper	19	15	4	0.79	0.268	14.2	0.860	4.10
Iron	5	4	1	0.80	16.6	243	31.5	31.5
Lead	14	11	3	0.79	0.0121	0.887	0.004	0.011
Magnesium	5	5	0	1.00	7,840	10,200	--	--
Manganese	9	8	1	0.89	0.037	27.8	0.500	0.500
Mercury	12	12	0	1.00	0.000389	0.00133	--	--
Nickel	19	15	4	0.79	0.141	3.90	1.50	19.9
Potassium	5	5	0	1.00	3,310	5,030	--	--
Selenium	14	12	2	0.86	0.230	2.61	0.496	0.496
Silver	19	5	14	0.26	0.00527	0.0147	0.004	5.20
Sodium	5	5	0	1.00	8,970	10,700	--	--
Strontium (elemental)	5	5	0	1.00	186	224	--	--
Thallium	14	4	10	0.29	0.00518	0.0145	0.00353	0.111
Uranium (inorganic)	4	4	0	1.00	0.121	2.35	--	--
Vanadium	5	5	0	1.00	6.10	12.7	--	--
Zinc	19	16	3	0.84	0.480	25.6	0.140	14.3
Organics (µg/L)								
1,1,1-Trichloroethane	9	0	9	0.00	--	--	0.170	0.310
1,1,2-Trichloroethane	9	1	8	0.11	0.720	0.720	0.050	0.310

Table 6-10. Summary of Near-Shore Filtered and Unfiltered Seep Data Collected for the 100-B/C Pilot Project. (3 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
1,1-Dichloroethane	9	0	9	0.00	--	--	0.190	0.250
1,2-Dichloroethane	9	1	8	0.11	0.920	0.920	0.080	0.270
1,4-Dichlorobenzene	9	0	9	0.00	--	--	0.110	0.250
1-Butanol	9	0	9	0.00	--	--	4.60	6.60
Acetone	9	4	5	0.44	0.690	1.30	0.300	4.00
Benzene	9	0	9	0.00	--	--	0.070	0.230
Carbon tetrachloride	9	0	9	0.00	--	--	0.150	0.330
Chlorobenzene	1	0	1	0.00	--	--	0.280	0.280
Chloroform	9	5	4	0.56	0.190	4.00	0.070	0.230
cis-1,2-Dichloroethylene	9	0	9	0.00	--	--	0.060	0.24
Dichloroethylene	1	0	1	0.00	--	--	0.230	0.230
Dimedone	9	0	9	0.00	--	--	0.290	0.700
Ethyl cyanide	9	0	9	0.00	--	--	1.30	2.60
Ethylbenzene	3	0	3	0.00	--	--	0.140	0.240
Methoxychlor	9	1	8	0.11	0.680	0.680	0.240	0.370
Methyl isobutyl ketone	9	0	9	0.00	--	--	0.350	1.30
Tetrachloroethene	9	0	9	0.00	--	--	0.170	0.570
Tetrahydrofuran	9	0	9	0.00	--	--	1.50	2.30
Toluene	9	1	8	0.11	0.490	0.490	0.120	0.330
trans-1,2-Dichloroethylene	9	0	9	0.00	--	--	0.170	0.260
Trichloroethene	9	5	4	0.56	0.310	0.610	0.160	0.290
Vinyl chloride	9	0	9	0.00	--	--	0.170	0.320
Xylenes (total)	9	1	8	0.11	0.660	0.660	0.280	0.660
Other (µg/L)								
Calcium carbide	9	0	9	0.00	--	--	0.290	0.430
Anions (µg/L)								
Nitrogen in nitrate	11	11	0	1.00	1,100	3,000	--	--
Nitrogen in nitrite	15	0	15	0.00	--	--	2.00	11.0
Chloride	15	15	0	1.00	1,100	13,400	--	--

Table 6-10. Summary of Near-Shore Filtered and Unfiltered Seep Data Collected for the 100-B/C Pilot Project. (3 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Fluoride	15	15	0	1.00	89.0	310	--	--
Sulfate	15	15	0	1.00	9,700	41,800	--	--
Radionuclides (pCi/L)								
Antimony-125	13	0	13	0.00	--	--	-3.65	4.01
Beryllium-7	13	0	13	0.00	--	--	-38.2	11.1
Carbon-14	3	0	3	0.00	--	--	2.22	7.25
Cesium-134	13	0	13	0.00	--	--	-2.73	2.03
Cesium-137	13	0	13	0.00	--	--	-2.08	2.03
Cobalt-60	13	0	13	0.00	--	--	-2.04	2.66
Europium-152	7	0	7	0.00	--	--	-3.29	3.31
Europium-154	13	0	13	0.00	--	--	-2.71	4.54
Europium-155	13	0	13	0.00	--	--	-4.17	3.95
Gross alpha	13	7	6	0.54	2.05	9.45	0.506	1.59
Gross beta	13	13	0	1.00	4.09	23.9	--	--
Nickel-63	3	0	3	0.00	--	--	-0.276	3.40
Plutonium-238	4	0	4	0.00	--	--	--	0.000926
Plutonium-239/240	4	0	4	0.00	--	--	-0.000926	0.000941
Potassium-40	13	1	12	0.077	120	120	-80.2	41.8
Ruthenium-106	13	0	13	0.00	--	--	-21.1	17.1
Strontium-90	17	6	11	0.35	0.094	4.53	-0.121	0.0696
Technetium-99	11	10	1	0.91	0.697	10.8	0.118	0.118
Tritium	18	17	1	0.94	264	19,600	66.5	66.5

-- = not applicable

Table 6-11. Summary of Filtered and Unfiltered Shallow Aquifer Tube and Seep Water Data Collected for the 100-NR-2 Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (µg/L)								
Aluminum	4	4	0	1.00	0.660	6.69	--	--
Antimony	14	14	0	1.00	0.0295	0.455	--	--
Arsenic	14	14	0	1.00	0.537	3.03	--	--
Barium	14	14	0	1.00	20.2	53.2	--	--
Beryllium	4	0	4	0.00	--	--	0.0300	0.0300
Cadmium	14	14	0	1.00	0.0144	0.0344	--	--
Chromium	18	18	0	1.00	0.0645	17.1	--	--
Copper	4	4	0	1.00	0.217	0.395	--	--
Iron	10	10	0	1.00	38.8	3,100	--	--
Lead	14	13	1	0.93	0.00654	1.41	0.00520	0.00520
Manganese	14	14	0	1.00	0.306	1,140	--	--
Mercury	13	13	0	1.00	0.00046	0.00452	--	--
Nickel	14	14	0	1.00	0.221	1.46	--	--
Selenium	18	17	1	0.94	0.118	0.870	0.0964	0.0964
Silver	4	0	4	0.00	--	--	0.00280	0.00280
Thallium	4	4	0	1.00	0.00583	0.0174	--	--
Thorium	4	0	4	0.00	--	--	0.00310	0.00310
Uranium (inorganic)	14	14	0	1.00	0.0799	1.63	--	--
Vanadium	10	10	0	1.00	0.155	7.85	--	--
Zinc	14	14	0	1.00	1.01	15.4	--	--
Organic (µg/L)								
Total petroleum hydrocarbons - diesel range	2	0	2	0.00	--	--	50.0	50.0
Radionuclides (pCi/L)								
Antimony-125	4	0	4	0.00	--	--	-1.93	9.13
Beryllium-7	4	0	4	0.00	--	--	-0.624	13.3
Cesium-134	4	0	4	0.00	--	--	-1.47	1.39
Cesium-137	4	0	4	0.00	--	--	0.0584	0.885
Cobalt-60	4	0	4	0.00	--	--	-1.21	1.68

Table 6-11. Summary of Filtered and Unfiltered Shallow Aquifer Tube and Seep Water Data Collected for the 100-NR-2 Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Europium-152	4	0	4	0.00	--	--	-4.02	3.26
Europium-154	4	0	4	0.00	--	--	-5.39	0.632
Europium-155	4	0	4	0.00	--	--	-1.23	2.75
Plutonium-238	4	3	1	0.75	0.00520	0.0274	-0.0000283	-0.0000283
Plutonium-239/240	4	0	4	0.00	--	--	-0.000536	0.00338
Potassium-40	4	0	4	0.00	--	--	-81.5	12.6
Ruthenium-106	4	0	4	0.00	--	--	-15.3	17.1
Strontium-90	14	4	10	0.29	0.0433	30.6	-0.109	0.048
Technetium-99	14	5	9	0.36	0.582	1.06	0.0101	0.336
Tritium	4	4	0	1.00	10,200	11,900	--	--

-- = not applicable

Table 6-12. Summary of Unfiltered Surface Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (µg/L)								
Aluminum	52	32	20	0.62	20.1	254	18.3	111
Antimony	52	4	48	0.08	2.9	5.7	2.5	4
Arsenic	52	7	45	0.13	3.4	6.3	3.1	35.8
Barium	52	52	0	1.00	25.2	39.9	--	--
Beryllium	52	2	50	0.04	0.11	0.13	0.1	0.21
Bismuth	52	2	50	0.04	4	6.1	4	6.1
Boron	52	52	0	1.00	5.1	22.8	--	--
Cadmium	52	2	50	0.04	0.37	0.38	0.3	0.7
Calcium	52	52	0	1.00	19,500	32,000	--	--
Calculated total uranium	52	31	21	0.60	0.368	3.69	0.0982	0.914
Chromium	52	3	49	0.06	1.2	15.1	1.2	1.6
Cobalt	52	0	52	0.00	--	--	0.5	1.2
Copper	52	20	32	0.38	0.88	4.4	0.7	2.9
Hexavalent chromium	54	15	39	0.28	3.2	6.2	2	3
Iron	52	28	24	0.54	24.4	294	32.1	32.1
Lead	52	1	51	0.02	3.9	3.9	1.6	3.1
Lithium	52	49	3	0.94	1.1	2.6	1.3	1.6
Magnesium	52	52	0	1.00	4,730	6,880	--	--
Manganese	52	52	0	1.00	1.5	15.6	--	--
Mercury	52	0	52	0.00	--	--	0.1	0.1
Molybdenum	52	20	32	0.38	1.3	5.3	1.3	1.6
Nickel	52	4	48	0.08	1.3	2	1.3	2.2
Phosphorus	52	13	39	0.25	8.4	23	8.3	12.5
Potassium	52	52	0	1.00	644	2,070	--	--
Selenium	52	2	50	0.04	4	5.9	3.6	4.3
Silicon	52	52	0	1.00	2,140	5,700	--	--
Silver	52	3	49	0.06	0.57	1.4	0.5	1.4
Sodium	52	52	0	1.00	2,010	5,220	--	--
Strontium (elemental)	52	52	0	1.00	88.7	145	--	--
Thallium	52	3	49	0.06	6.5	8.3	5.6	6.4
Tin	52	2	50	0.04	5.3	6.9	3.6	5.2

Table 6-12. Summary of Unfiltered Surface Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Uranium (inorganic)	52	0	52	0.00	--	--	13.6	20.6
Vanadium	52	7	45	0.13	0.76	2.4	0.6	0.98
Zinc	52	50	2	0.96	0.97	13.8	1.5	1.7
Organics (µg/L)								
1,2,4-Trichlorobenzene	52	0	52	0.00	--	--	10	11
1,2-Dichlorobenzene	52	0	52	0.00	--	--	10	11
1,3-Dichlorobenzene	52	0	52	0.00	--	--	10	11
1,4-Dichlorobenzene	52	0	52	0.00	--	--	10	11
2,4,5-Trichlorophenol	52	0	52	0.00	--	--	25	28
2,4,6-Trichlorophenol	52	0	52	0.00	--	--	10	11
2,4-Dichlorophenol	52	0	52	0.00	--	--	10	11
2,4-Dimethylphenol	52	0	52	0.00	--	--	10	11
2,4-Dinitrophenol	52	0	52	0.00	--	--	25	28
2,4-Dinitrotoluene	52	0	52	0.00	--	--	10	11
2,6-Dinitrotoluene	52	0	52	0.00	--	--	10	11
2-Chloronaphthalene	52	0	52	0.00	--	--	10	11
2-Chlorophenol	52	0	52	0.00	--	--	10	11
2-Methylnaphthalene	52	0	52	0.00	--	--	10	11
2-Methylphenol [cresol, o-]	52	0	52	0.00	--	--	10	11
2-Nitroaniline	52	0	52	0.00	--	--	25	28
2-Nitrophenol	52	0	52	0.00	--	--	10	11
3,3'-Dichlorobenzidine	52	0	52	0.00	--	--	10	11
3+4 Methylphenol [cresol, m+p]	52	0	52	0.00	--	--	10	11
3-Nitroaniline	52	0	52	0.00	--	--	25	28
4,6-Dinitro-2-methylphenol	52	0	52	0.00	--	--	25	28
4-Bromophenylphenyl ether	52	0	52	0.00	--	--	10	11
4-Chloro-3-methylphenol	52	0	52	0.00	--	--	10	11
4-Chloroaniline	52	0	52	0.00	--	--	10	11
4-Chlorophenylphenyl ether	52	0	52	0.00	--	--	10	11
4-Nitroaniline	52	0	52	0.00	--	--	25	28
4-Nitrophenol	52	0	52	0.00	--	--	25	28
Acenaphthene	52	0	52	0.00	--	--	10	11
Acenaphthylene	52	0	52	0.00	--	--	10	11

Table 6-12. Summary of Unfiltered Surface Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Aldrin	52	0	52	0.00	--	--	0.05	0.062
Alpha-BHC	52	0	52	0.00	--	--	0.05	0.062
alpha-Chlordane	52	0	52	0.00	--	--	0.05	0.062
Anthracene	52	0	52	0.00	--	--	10	11
Aroclor-1016	53	0	52	0.00	--	--	0.04	0.5
Aroclor-1221	53	0	52	0.00	--	--	0.04	0.5
Aroclor-1232	53	0	52	0.00	--	--	0.04	0.5
Aroclor-1242	53	0	52	0.00	--	--	0.04	0.5
Aroclor-1248	53	0	52	0.00	--	--	0.04	0.5
Aroclor-1254	53	0	52	0.00	--	--	0.04	0.5
Aroclor-1260	53	0	52	0.00	--	--	0.04	0.5
Benzo[a]anthracene	52	0	52	0.00	--	--	10	11
Benzo[a]pyrene	52	0	52	0.00	--	--	10	11
Benzo[b]fluoranthene	52	0	52	0.00	--	--	10	11
Benzo[ghi]perylene	52	0	52	0.00	--	--	10	11
Benzo[k]fluoranthene	52	0	52	0.00	--	--	10	11
beta-1,2,3,4,5,6-Hexachlorocyclohexane	52	0	52	0.00	--	--	0.05	0.062
Bis[2-chloro-1-methylethyl]ether	52	0	52	0.00	--	--	10	11
Bis[2-Chloroethoxy]methane	52	0	52	0.00	--	--	10	11
Bis[2-chloroethyl] ether	52	0	52	0.00	--	--	10	11
Bis[2-ethylhexyl] phthalate	52	49	3	0.94	0.5	31.2	10	10
Butylbenzylphthalate	52	0	52	0.00	--	--	10	11
Carbazole	52	0	52	0.00	--	--	10	11
Chrysene	52	0	52	0.00	--	--	10	11
Delta-BHC	52	0	52	0.00	--	--	0.05	0.062
Dibenz[a,h]anthracene	52	0	52	0.00	--	--	10	11
Dibenzofuran	52	0	52	0.00	--	--	10	11
Dichlorodiphenyldichloroethane	52	0	52	0.00	--	--	0.05	0.062
Dichlorodiphenyldichloroethylene	52	0	52	0.00	--	--	0.05	0.062
Dichlorodiphenyltrichloroethane	52	0	52	0.00	--	--	0.05	0.062
Dieldrin	52	0	52	0.00	--	--	0.05	0.062
Diethylphthalate	52	0	52	0.00	--	--	10	11
Dimethyl phthalate	52	2	50	0.04	0.947	3	10	11

Table 6-12. Summary of Unfiltered Surface Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Di-n-butylphthalate	52	14	38	0.27	0.5	1.1	10	10
Di-n-octylphthalate	52	0	52	0.00	--	--	10	11
Endosulfan I	52	0	52	0.00	--	--	0.05	0.062
Endosulfan II	52	0	52	0.00	--	--	0.05	0.062
Endosulfan sulfate	52	0	52	0.00	--	--	0.05	0.062
Endrin	52	0	52	0.00	--	--	0.05	0.062
Endrin aldehyde	52	0	52	0.00	--	--	0.05	0.062
Endrin ketone	52	0	52	0.00	--	--	0.05	0.062
Fluoranthene	52	0	52	0.00	--	--	10	11
Fluorene	52	0	52	0.00	--	--	10	11
Gamma-BHC (lindane)	52	0	52	0.00	--	--	0.05	0.062
gamma-Chlordane	52	0	52	0.00	--	--	0.05	0.062
Heptachlor	52	0	52	0.00	--	--	0.05	0.062
Heptachlor epoxide	52	0	52	0.00	--	--	0.05	0.062
Hexachlorobenzene	52	0	52	0.00	--	--	10	11
Hexachlorobutadiene	52	0	52	0.00	--	--	10	11
Hexachlorocyclopentadiene	52	0	52	0.00	--	--	10	11
Hexachloroethane	52	0	52	0.00	--	--	10	11
Indeno[1,2,3-cd]pyrene	52	0	52	0.00	--	--	10	11
Isophorone	52	0	52	0.00	--	--	10	11
Methoxychlor	52	0	52	0.00	--	--	0.05	0.062
Naphthalene	52	0	52	0.00	--	--	10	11
Nitrobenzene	52	0	52	0.00	--	--	10	11
N-Nitroso-di-n-dipropylamine	52	0	52	0.00	--	--	10	11
N-Nitrosodiphenylamine	52	0	52	0.00	--	--	10	11
Pentachlorophenol	52	0	52	0.00	--	--	25	28
Phenanthrene	52	0	52	0.00	--	--	10	11
Phenol	52	0	52	0.00	--	--	10	11
Pyrene	52	0	52	0.00	--	--	10	11
Toxaphene	52	0	52	0.00	--	--	0.05	0.52
Total organic carbon	27	27	0	1.00	910	1,500	--	--
Total petroleum hydrocarbons	52	0	52	0.00	--	--	1,000	2,000

Table 6-12. Summary of Unfiltered Surface Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Total petroleum hydrocarbons - diesel range	52	3	49	0.06	31	200	100	105
Total petroleum hydrocarbons - gasoline range	51	6	45	0.12	6.4	390	30	42
Radionuclides (pCi/L)								
Americium-241	52	0	52	0.00	--	--	6.8	200
Antimony-125	52	0	52	0.00	--	--	12	58
Beryllium-7	52	0	52	0.00	--	--	-23	270
Carbon-14	5	0	5	0.00	--	--	-23	20
Cesium-134	52	0	52	0.00	--	--	6.4	28
Cesium-137	52	0	52	0.00	--	--	5.3	25
Cobalt-60	52	0	52	0.00	--	--	5.2	26
Europium-152	52	0	52	0.00	--	--	15	68
Europium-154	52	0	52	0.00	--	--	14	72
Europium-155	52	0	52	0.00	--	--	11	87
Potassium-40	52	0	52	0.00	--	--	0	730
Radium-226	52	1	51	0.02	3.6	3.6	-0.361	0.521
Radium-228	52	0	52	0.00	--	--	-1.64	0.994
Ruthenium-106	52	0	52	0.00	--	--	46	220
Strontium-90	52	0	52	0.00	--	--	-0.334	0.359
Technetium-99	4	0	4	0.00	--	--	-0.181	1.98
Thorium-228	52	0	52	0.00	--	--	-0.102	0.264
Thorium-230	52	0	52	0.00	--	--	-0.102	0.179
Thorium-232	52	0	52	0.00	--	--	-0.064	0.069
Tritium	52	2	50	0.04	245	269	-150	139
Uranium-233/234	52	39	13	0.75	0.12	1.29	0.065	0.358
Uranium-235	52	0	52	0.00	--	--	-0.008	0.081
Uranium-238	52	31	21	0.60	0.12	1.23	0.033	0.307
Anions (µg/L)								
Bromide	52	0	52	0.00	--	--	250	250
Chloride	52	52	0	1.00	910	5,100	--	--
Chlorine	1	1	0	1.00	20	20	--	--
Fluoride	52	0	52	0.00	--	--	250	250

Table 6-12. Summary of Unfiltered Surface Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Nitrogen in ammonia	1	0	1	0.00	--	--	200	200
Nitrogen in nitrate	52	50	2	0.96	90.3	2,140	56.5	56.5
Nitrogen in nitrite	49	2	47	0.04	198	429	76.1	76.1
Nitrogen in nitrite and nitrate	52	52	0	1.00	120	3,400	--	--
Phosphate	49	0	49	0.00	--	--	250	250
Sulfate	52	52	0	1.00	9,500	42,300	--	--
Physical Properties (µg/L)								
Alkalinity	1	1	0	1.00	82,000	82,000	--	--
Hardness	1	1	0	1.00	104,000	104,000	--	--
Dissolved oxygen	106	106	0	1.00	7,330	14,800	--	--
Other								
pH Measurement (pH)	106	106	0	1.00	7.39	9.72	--	--
Specific conductance (µS/cm)	106	106	0	1.00	134	267	--	--
Temperature (° C)	106	106	0	1.00	2.2	7.1	--	--

-- = not applicable
BHC = benzene hexachloride
RCBRA = River Corridor Baseline Risk Assessment

Table 6-13. Summary of Filtered and Unfiltered Surface Water Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (µg/L)								
Antimony	16	16	0	1.00	0.175	0.231	--	--
Arsenic	16	16	0	1.00	0.497	0.573	--	--
Barium	16	16	0	1.00	23.2	24.7	--	--
Beryllium	16	3	13	0.19	0.00983	0.0125	0.0098	0.0098
Cadmium	16	16	0	1.00	0.00877	0.0163	--	--
Chromium	16	16	0	1.00	0.171	1.23	--	--
Copper	16	16	0	1.00	0.543	1.25	--	--
Lead	16	16	0	1.00	0.0186	0.0747	--	--
Manganese	16	16	0	1.00	0.848	1.64	--	--
Mercury	16	16	0	1.00	0.000291	0.000509	--	--
Nickel	16	16	0	1.00	1.04	1.45	--	--
Nitrogen in nitrate	1	1	0	1.00	92	92	--	--
Nitrogen in nitrite	17	1	16	0.059	8.1	8.1	7.4	7.4
Selenium	16	16	0	1.00	0.168	0.321	--	--
Silver	16	0	16	0.00	--	--	0.004	0.004
Thallium	16	0	16	0.00	--	--	0.111	0.111
Uranium (inorganic)	16	16	0	1.00	0.483	0.554	--	--
Zinc	16	16	0	1.00	0.508	1.03	--	--
Organics (µg/L)								
1,1,1-Trichloroethane	17	0	17	0.00	--	--	0.17	0.17
1,1,2-Trichloroethane	17	0	17	0.00	--	--	0.05	0.05
1,1-Dichloroethane	17	0	17	0.00	--	--	0.2	0.2
1,2-Dichloroethane	17	0	17	0.00	--	--	0.08	0.08
1,4-Dichlorobenzene	17	0	17	0.00	--	--	0.11	0.11
1-Butanol	17	0	17	0.00	--	--	4.6	4.6
Acetone	17	5	12	0.29	0.96	1.8	0.66	0.66
Benzene	17	1	16	0.06	0.14	0.14	0.07	0.07
Carbon tetrachloride	17	0	17	0.00	--	--	0.15	0.15
Chloroform	17	0	17	0.00	--	--	0.07	0.07
cis-1,2-Dichloroethylene	17	0	17	0.00	--	--	0.06	0.06

Table 6-13. Summary of Filtered and Unfiltered Surface Water Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Dimedone	17	0	17	0.00	--	--	0.29	0.29
Ethyl cyanide	17	0	17	0.00	--	--	1.3	1.3
Methoxychlor	17	0	17	0.00	--	--	0.3	0.3
Methyl isobutyl ketone	17	0	17	0.00	--	--	0.35	0.35
Tetrachloroethene	17	0	17	0.00	--	--	0.17	0.17
Tetrahydrofuran	17	0	17	0.00	--	--	1.7	1.7
Toluene	17	8	9	0.47	0.13	0.52	0.12	0.12
trans-1,2-Dichloroethylene	17	0	17	0.00	--	--	0.17	0.17
Trichloroethene	17	0	17	0.00	--	--	0.16	0.16
Vinyl chloride	17	0	17	0.00	--	--	0.25	0.25
Xylenes (total)	17	1	16	0.06	0.52	0.52	0.28	0.28
Radionuclides (pCi/L)								
Antimony-125	8	0	8	0.00	--	--	-2.38	5.49
Beryllium-7	8	0	8	0.00	--	--	-129	5.17
Cesium-134	8	0	8	0.00	--	--	-2.41	3.91
Cesium-137	8	1	7	0.13	8.54	8.54	-2.92	1.35
Cobalt-60	8	0	8	0.00	--	--	-0.776	1.51
Europium-152	8	0	8	0.00	--	--	-1.55	1.76
Europium-154	8	0	8	0.00	--	--	-4.93	7.04
Europium-155	8	0	8	0.00	--	--	-4.81	4.62
Potassium-40	8	1	7	0.13	126	126	-44.8	41.9
Ruthenium-106	8	0	8	0.00	--	--	-32.2	14.5
Strontium-90	7	7	0	1.00	0.0721	0.184	--	--
Technetium-99	19	1	18	0.05	0.49	0.49	-0.000424	0.445
Tritium	19	19	0	1.00	32.3	248	--	--
Anions (µg/L)								
Calcium carbide	17	0	17	0.00	--	--	0.43	0.43
Chloride	17	17	0	1.00	840	1,100	--	--
Fluoride	17	17	0	1.00	88	98	--	--
Sulfate	17	17	0	1.00	9,200	10,100	--	--

-- = not applicable

Table 6-14. Summary of Surface Water Data Collected for the 100-NR-2 Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (µg/L)								
Antimony	3	3	0	1.00	0.146	0.206	--	--
Arsenic	3	3	0	1.00	0.617	0.717	--	--
Barium	3	3	0	1.00	30.5	32.2	--	--
Cadmium	3	3	0	1.00	0.0188	0.0369	--	--
Chromium	3	3	0	1.00	0.278	0.779	--	--
Iron	3	3	0	1.00	72.7	164	--	--
Lead	3	3	0	1.00	0.108	0.284	--	--
Manganese	3	3	0	1.00	5.07	18.9	--	--
Mercury	2	2	0	1.00	0.000667	0.00101	--	--
Nickel	3	3	0	1.00	0.232	0.401	--	--
Selenium	3	3	0	1.00	0.162	0.212	--	--
Uranium (inorganic)	3	3	0	1.00	0.518	0.524	--	--
Vanadium	3	3	0	1.00	0.37	1.20	--	--
Zinc	3	3	0	1.00	1.57	5.05	--	--
Radionuclides (pCi/L)								
Strontium-90	3	2	1	0.67	39.1	65.6	-0.0428	-0.0428
Technetium-99	2	0	2	0.00	--	--	-0.118	0.0769

-- = not applicable

Table 6-15. Summary of Near-Shore Aquatic Invertebrate Data Collected for the RCBRA Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	28	28	0	1.00	10.9	152	--	--
Antimony	28	6	22	0.21	0.35	0.85	0.31	0.42
Arsenic	28	27	1	0.96	0.46	1.2	0.59	0.59
Barium	28	28	0	1.00	2.1	79.4	--	--
Beryllium	28	1	27	0.04	0.02	0.02	0.02	0.02
Bismuth	28	1	27	0.04	0.6	0.6	0.31	0.52
Boron	28	5	23	0.18	0.24	0.46	0.23	0.38
Cadmium	28	27	1	0.96	0.03	1	0.07	0.07
Calcium	28	28	0	1.00	1,930	126,000	--	--
Calculated total uranium	11	0	11	0.00	--	--	0.1	0.345
Chromium	28	7	21	0.25	0.27	2.5	0.21	0.76
Cobalt	28	15	13	0.54	0.09	0.33	0.09	0.14
Copper	28	28	0	1.00	4.7	32.6	--	--
Iron	28	28	0	1.00	28.1	485	--	--
Lead	28	13	15	0.46	0.29	1.1	0.27	0.3
Lithium	28	6	22	0.21	0.09	0.32	0.04	0.3
Magnesium	28	28	0	1.00	194	1,010	--	--
Manganese	28	28	0	1.00	6.4	103	--	--
Mercury	28	1	27	0.04	0.06	0.06	0.01	0.02
Molybdenum	28	2	26	0.07	0.2	0.58	0.12	0.28
Nickel	28	21	7	0.75	0.25	7.8	0.18	0.27
Phosphorus	28	28	0	1.00	798	4,820	--	--
Potassium	28	28	0	1.00	468	2,240	--	--
Selenium	28	23	5	0.82	0.4	2.3	0.36	0.45
Silicon	28	28	0	1.00	22.6	106	--	--
Silver	28	6	22	0.21	0.07	0.13	0.07	0.09
Sodium	28	28	0	1.00	535	2,290	--	--
Strontium (elemental)	28	28	0	1.00	4	240	--	--

Table 6-15. Summary of Near-Shore Aquatic Invertebrate Data Collected for the RCBRA Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Thallium	28	0	28	0.00	--	--	0.55	0.79
Tin	28	3	25	0.11	1.4	2.7	0.33	1.1
Titanium	11	11	0	1.00	0.83	2.8	--	--
Uranium (inorganic)	28	1	27	0.04	1.3	1.3	0.84	2.5
Vanadium	28	21	7	0.75	0.12	0.75	0.09	0.1
Zinc	28	28	0	1.00	16.6	52.5	--	--
Zirconium	11	0	11	0.00	--	--	1	1
Radionuclides (pCi/g-fw)								
Carbon-14	1	0	1	0.00	--	--	-2.64	-2.64
Strontium-90	18	1	17	0.06	2.6	2.6	-0.106	0.23
Technetium-99	1	0	1	0.00	--	--	0.304	0.304
Thorium-228	2	0	2	0.00	--	--	0	0.0975
Thorium-230	2	0	2	0.00	--	--	-0.181	-0.152
Thorium-232	2	0	2	0.00	--	--	-0.0417	0
Uranium-233/234	11	0	11	0.00	--	--	-0.047	0.151
Uranium-235	11	0	11	0.00	--	--	0	0.0569
Uranium-238	11	0	11	0.00	--	--	0.028	0.116

-- = not applicable
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 6-16. Summary of Near-Shore Aquatic Invertebrate Data Collected for the 100-B/C Pilot Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	6	6	0	1.00	17.9	85.5	--	--
Antimony	6	5	1	0.83	0.0120	0.0312	0.006126	0.00613
Arsenic	6	5	1	0.83	0.0716	0.479	0.0314	0.0315
Barium	19	19	0	1.00	1.54	123	--	--
Beryllium	6	2	4	0.33	0.00570	0.00690	0.00486	0.00486
Cadmium	19	19	0	1.00	.03408	0.330	--	--
Chromium	19	19	0	1.00	0.0648	0.87756	--	--
Copper	6	6	0	1.00	8.46	12.5	--	--
Lead	19	19	0	1.00	0.0551	0.616	--	--
Manganese	19	19	0	1.00	5.93	81.8	--	--
Mercury	19	15	4	0.79	0.0126	0.105	--	--
Nickel	19	19	0	1.00	0.0434	47.6	--	--
Selenium	19	19	0	1.00	0.13916	0.687	--	--
Silver	19	19	0	1.00	0.0106	0.08577	--	--
Thallium	19	15	4	0.79	0.00761	0.173	0.00568	0.00648
Uranium (inorganic)	19	18	1	0.95	0.0121	0.0582	0.0100	0.0100
Zinc	6	6	0	1.00	47.0	63.8	--	--
Radionuclides (pCi/g-fw)								
Antimony-125	3	0	3	0.00	--	--	-0.016	0.089
Beryllium-7	3	0	3	0.00	--	--	-0.147	2.71
Cesium-134	3	0	3	0.00	--	--	-0.0338	0.0277
Cesium-137	3	0	3	0.00	--	--	-0.00697	0.0199
Cobalt-60	3	0	3	0.00	--	--	0.0141	0.0305
Europium-152	3	0	3	0.00	--	--	-0.0969	0.0335
Europium-154	3	0	3	0.00	--	--	-0.0512	0.0513
Europium-155	3	0	3	0.00	--	--	-0.0108	0.00866
Potassium-40	3	2	1	0.67	1.02	2.46	0.495	0.495
Ruthenium-106	3	0	3	0.00	--	--	-0.104	0.196
Strontium-90	5	0	5	0.00	--	--	-0.00616	0.0205
Technetium-99	4	0	4	0.00	--	--	-0.0141	0.145

-- = not applicable
fw = fresh weight

Table 6-17. Summary of Near-Shore Clam Soft Tissue Data Collected for the RCBRA Project. (4 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	51	49	2	0.96	4.6	68.2	5.6	14.3
Antimony	51	22	29	0.43	0.33	0.65	0.3	0.94
Arsenic	51	44	7	0.86	0.66	2.9	0.59	1.2
Barium	51	51	0	1.00	0.89	71.6	--	--
Beryllium	51	0	51	0.00	--	--	0.01	0.03
Bismuth	51	0	51	0.00	--	--	0.3	1.5
Boron	51	11	40	0.22	0.24	0.47	0.22	1.1
Cadmium	51	48	3	0.94	0.08	0.57	0.07	0.07
Calcium	51	51	0	1.00	504	40,100	--	--
Calculated total uranium	25	0	25	0.00	--	--	<0.0001	0.44
Chromium	51	35	16	0.69	0.25	15.4	0.41	0.74
Cobalt	51	8	43	0.16	0.09	0.14	0.09	0.26
Copper	51	51	0	1.00	4.8	27.8	--	--
Iron	51	51	0	1.00	28.1	162	--	--
Lead	51	29	22	0.57	0.3	0.76	0.27	0.82
Lithium	51	10	41	0.20	0.06	0.3	0.03	0.19
Magnesium	51	51	0	1.00	75.2	612	--	--
Manganese	51	51	0	1.00	2	78.8	--	--
Mercury	51	2	49	0.04	0.02	0.41	0.01	0.03
Molybdenum	51	9	42	0.18	0.2	0.43	0.13	0.51
Nickel	51	22	29	0.43	0.2	0.72	0.23	0.56
Phosphorus	51	51	0	1.00	818	3,460	--	--
Potassium	51	51	0	1.00	110	2,200	--	--
Selenium	51	49	2	0.96	0.59	1.6	0.44	0.44
Silicon	51	51	0	1.00	8	60.2	--	--
Silver	51	7	44	0.14	0.07	0.3	0.07	0.26
Sodium	51	51	0	1.00	97.2	1,760	--	--
Strontium (elemental)	51	51	0	1.00	0.9	141	--	--

Table 6-17. Summary of Near-Shore Clam Soft Tissue Data Collected for the RCBRA Project. (4 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Thallium	51	0	51	0.00	--	--	0.54	1.7
Tin	51	4	47	0.08	1.1	1.3	0.63	2.5
Titanium	41	41	0	1.00	0.34	6.5	--	--
Uranium (inorganic)	51	5	46	0.10	0.86	1.1	0.82	7.4
Vanadium	51	39	12	0.76	0.09	0.28	0.08	0.29
Zinc	51	51	0	1.00	16.1	49.6	--	--
Zirconium	41	0	41	0.00	--	--	0.99	1
Organics (mg/kg-fw)								
Acenaphthene	2	0	2	0.00	--	--	0.847	1
Acenaphthylene	2	0	2	0.00	--	--	0.847	1
Aldrin	26	0	26	0.00	--	--	0.26	0.5
Alpha-BHC	26	0	26	0.00	--	--	0.26	0.5
alpha-Chlordane	26	0	26	0.00	--	--	0.26	0.5
Anthracene	2	0	2	0.00	--	--	0.084	0.1
Aroclor-1016	27	0	27	0.00	--	--	0.2	4
Aroclor-1221	27	0	27	0.00	--	--	0.2	4
Aroclor-1232	27	0	27	0.00	--	--	0.2	4
Aroclor-1242	27	0	27	0.00	--	--	0.2	4
Aroclor-1248	27	0	27	0.00	--	--	0.2	4
Aroclor-1254	27	0	27	0.00	--	--	0.2	4
Aroclor-1260	27	0	27	0.00	--	--	0.2	4
Benzo[a]anthracene	2	1	1	0.50	0.079	0.079	0.1	0.1
Benzo[a]pyrene	2	1	1	0.50	0.075	0.075	0.1	0.1
Benzo[b]fluoranthene	2	1	1	0.50	0.061	0.061	0.1	0.1
Benzo[ghi]perylene	2	0	2	0.00	--	--	0.0847	0.1
Benzo[k]fluoranthene	2	1	1	0.50	0.033	0.033	0.1	0.1
beta-1,2,3,4,5,6-Hexachlorocyclohexane	26	5	21	0.19	0.1	0.2	0.26	0.5
Chrysene	2	2	0	1.00	0.032	0.086	--	--
Delta-BHC	26	2	24	0.08	0.099	0.14	0.26	0.5
Dibenz[a,h]anthracene	2	0	2	0.00	--	--	0.0847	0.1

Table 6-17. Summary of Near-Shore Clam Soft Tissue Data Collected for the RCBRA Project. (4 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Dichlorodiphenyldichloroethane	26	0	26	0.00	--	--	0.26	0.5
Dichlorodiphenyldichloroethylene	26	8	18	0.31	0.081	0.15	0.26	0.5
Dichlorodiphenyltrichloroethane	26	3	23	0.12	0.098	0.12	0.26	0.5
Dieldrin	26	0	26	0.00	--	--	0.26	0.5
Endosulfan I	26	23	3	0.88	0.092	0.5	0.29	0.46
Endosulfan II	26	0	26	0.00	--	--	0.26	0.5
Endosulfan sulfate	26	0	26	0.00	--	--	0.26	0.5
Endrin	26	0	26	0.00	--	--	0.26	0.5
Endrin aldehyde	26	0	26	0.00	--	--	0.26	0.5
Endrin ketone	26	0	26	0.00	--	--	0.26	0.5
Fluoranthene	2	2	0	1.00	0.093	0.1	--	--
Fluorene	2	0	2	0.00	--	--	0.00847	0.1
Gamma-BHC (lindane)	26	1	25	0.04	0.095	0.095	0.26	0.5
gamma-Chlordane	26	0	26	0.00	--	--	0.26	0.5
Heptachlor	26	8	18	0.31	0.085	0.19	0.26	0.5
Heptachlor epoxide	26	0	26	0.00	--	--	0.26	0.5
Indeno[1,2,3-cd]pyrene	2	0	2	0.00	--	--	0.084	0.1
Methoxychlor	26	11	15	0.42	0.056	0.39	0.37	0.5
Naphthalene	2	0	2	0.00	--	--	0.847	1
Phenanthrene	2	2	0	1.00	0.032	0.077	--	--
Pyrene	2	2	0	1.00	0.054	0.066	--	--
Toxaphene	26	0	26	0.00	--	--	2.6	5
Radionuclides (pCi/g-fw)								
Americium-241	2	0	2	0.00	--	--	0.19	0.63
Antimony-125	2	0	2	0.00	--	--	0.58	0.8
Beryllium-7	2	0	2	0.00	--	--	0.0349	0.203
Carbon-14	10	1	9	0.10	93.1	93.1	-4.26	2.54
Cesium-134	2	0	2	0.00	--	--	0.36	0.5
Cesium-137	2	0	2	0.00	--	--	0.26	0.35
Cobalt-60	2	0	2	0.00	--	--	0.29	0.38

Table 6-17. Summary of Near-Shore Clam Soft Tissue Data Collected for the RCBRA Project. (4 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Europium-152	2	0	2	0.00	--	--	0.69	0.91
Europium-154	2	0	2	0.00	--	--	0.79	1.1
Europium-155	2	0	2	0.00	--	--	0.47	0.65
Potassium-40	2	0	2	0.00	--	--	0	8.1
Radium-226	2	0	2	0.00	--	--	0.6	0.75
Radium-228	2	0	2	0.00	--	--	1.2	1.6
Ruthenium-106	2	0	2	0.00	--	--	2.2	3.1
Strontium-90	22	2	20	0.09	0.489	3.38	-0.0803	0.136
Technetium-99	1	0	1	0.00	--	--	0.225	0.225
Thorium-228	7	0	7	0.00	--	--	-0.0921	0.181
Thorium-230	7	0	7	0.00	--	--	-0.118	0.0805
Thorium-232	7	0	7	0.00	--	--	-0.0336	0.0322
Uranium-233/234	25	0	25	0.00	--	--	0	0.134
Uranium-235	25	0	25	0.00	--	--	-0.033	0.063
Uranium-238	25	0	25	0.00	--	--	0	0.149

-- = not applicable
BHC = benzene hexachloride
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 6-18. Summary of Near-Shore Clam Soft Tissue Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	6	6	0	1.00	49.6	373	--	--
Antimony	6	3	3	0.50	0.00668	0.00988	0.00476	0.00476
Arsenic	6	6	0	1.00	1.54	2.39	--	--
Barium	9	9	0	1.00	1.98	6.58	--	--
Beryllium	6	6	0	1.00	0.0107	0.0199	--	--
Cadmium	9	9	0	1.00	0.428	0.62	--	--
Chromium	9	9	0	1.00	0.645	3.7	--	--
Copper	6	6	0	1.00	7.16	11.7	--	--
Lead	9	9	0	1.00	0.125	0.69	--	--
Manganese	9	9	0	1.00	4.96	14.7	--	--
Mercury	9	7	2	0.78	0.00905	0.0407	0.0126	0.0126
Nickel	9	9	0	1.00	0.191	0.542	--	--
Selenium	9	9	0	1.00	0.554	0.834	--	--
Silver	9	9	0	1.00	0.0107	0.0226	--	--
Thallium	9	9	0	1.00	0.00663	0.0882	--	--
Uranium (inorganic)	9	9	0	1.00	0.0335	0.0864	--	--
Zinc	6	6	0	1.00	24.1	55.9	--	--
Organics (mg/kg-fw)								
Aroclor-1254	6	0	6	0.00	--	--	0.00573	0.00755
Aroclor-1260	6	0	6	0.00	--	--	0.00573	0.00755
Radionuclides (pCi/g-fw)								
Antimony-125	1	0	1	0.00	--	--	-0.0899	-0.0899
Beryllium-7	1	0	1	0.00	--	--	0.00775	0.00775
Cesium-134	1	0	1	0.00	--	--	0.00393	0.00393
Cesium-137	1	0	1	0.00	--	--	0.00788	0.00788
Cobalt-60	1	0	1	0.00	--	--	-0.031	-0.031
Europium-152	1	0	1	0.00	--	--	0.11	0.11
Europium-154	1	0	1	0.00	--	--	0.0509	0.0509
Europium-155	1	0	1	0.00	--	--	-0.0135	-0.0135
Potassium-40	1	0	1	0.00	--	--	0.0513	0.0513
Ruthenium-106	1	0	1	0.00	--	--	-0.134	-0.134

Table 6-18. Summary of Near-Shore Clam Soft Tissue Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Strontium-90	6	0	6	0.00	--	--	-0.00346	0.0281
Technetium-99	6	1	5	0.17	0.163	0.163	-0.0168	0.109

-- = not applicable
fw= fresh weight

Table 6-19. Summary of Near-Shore Clam Soft Tissue Data Collected for the 100-NR-2 Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	7	7	0	1.00	3.64	52.9	--	--
Antimony	27	25	2	0.93	0.00198	0.0068	0.0018	0.0018
Arsenic	27	27	0	1.00	0.898	2	--	--
Barium	27	27	0	1.00	1.31	3.29	--	--
Beryllium	7	0	7	0.00	--	--	0.00072	0.00072
Cadmium	27	27	0	1.00	0.324	0.817	--	--
Chromium	27	27	0	1.00	0.239	2.72	--	--
Copper	7	7	0	1.00	4.68	8.71	--	--
Lead	27	27	0	1.00	0.0508	0.159	--	--
Manganese	27	27	0	1.00	1.91	5.44	--	--
Mercury	11	11	0	1.00	0.00319	0.011	--	--
Nickel	27	27	0	1.00	0.0952	0.702	--	--
Selenium	27	27	0	1.00	0.407	0.634	--	--
Silver	7	7	0	1.00	0.0061	0.0152	--	--
Thallium	7	7	0	1.00	0.00436	0.00851	--	--
Thorium	7	7	0	1.00	0.00193	0.0117	--	--
Uranium (inorganic)	27	27	0	1.00	0.015	0.0538	--	--
Vanadium	20	20	0	1.00	0.0383	0.139	--	--
Zinc	27	27	0	1.00	20.9	31.5	--	--

-- = not applicable
fw = fresh weight

Table 6-20. Summary of Near-Shore Clam Shell Data Collected for the RCBRA Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Radionuclide (pCi/g)								
Strontium-90	36	16	20	0.44	0.16	0.47	-0.02	0.236

RCBRA = River Corridor Baseline Risk Assessment

Table 6-21. Summary of Near-Shore Clam Shell Data Collected for the 100-B/C Pilot Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Radionuclides (pCi/g)								
Strontium-90	6	6	0	1.00	0.261	0.691	--	--
Technetium-99	6	1	5	0.17	0.18	0.18	0.032	0.0817

-- = not applicable

Table 6-22. Summary of Near-Shore Clam Shell Data Collected for the 100-NR-2 Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Radionuclides (pCi/g)								
Strontium-90	30	30	0	1.00	0.212	216	--	--
Technetium-99	5	0	5	0.00	--	--	0.0472	0.215

-- = not applicable

Table 6-23. Summary of Near-Shore Mussel Soft Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	9	9	0	1.00	9.6	23.2	--	--
Antimony	9	2	7	0.22	0.32	0.32	0.3	0.32
Arsenic	9	9	0	1.00	0.61	1.4	--	--
Barium	9	9	0	1.00	57.1	143	--	--
Beryllium	9	5	4	0.56	0.02	0.03	0.02	0.02
Bismuth	9	0	9	0.00	--	--	0.49	0.51
Boron	9	3	6	0.33	0.36	0.55	0.36	0.38
Cadmium	9	9	0	1.00	0.15	0.91	--	--
Calcium	9	9	0	1.00	1,550	10,200	--	--
Calculated total uranium	9	0	9	0.00	--	--	0	0.20
Chromium	9	5	4	0.56	0.44	0.72	0.19	0.27
Cobalt	9	7	2	0.78	0.09	0.17	0.09	0.09
Copper	9	9	0	1.00	0.54	3.1	--	--
Iron	9	9	0	1.00	241	653	--	--
Lead	9	8	1	0.89	0.32	0.47	0.28	0.28
Lithium	9	5	4	0.56	0.04	0.07	0.07	0.08
Magnesium	9	9	0	1.00	66.2	160	--	--
Manganese	9	9	0	1.00	340	1,060	--	--
Mercury	9	0	9	0.00	--	--	0.01	0.02
Molybdenum	9	6	3	0.67	0.13	0.23	0.13	0.13
Nickel	9	4	5	0.44	0.18	0.2	0.18	0.19
Phosphorus	9	9	0	1.00	963	4,000	--	--
Potassium	9	9	0	1.00	53.8	276	--	--
Selenium	9	3	6	0.33	0.47	0.57	0.35	0.37
Silicon	9	9	0	1.00	15.3	34.9	NA	NA
Silver	9	0	9	0.00	--	--	0.08	0.09
Sodium	9	9	0	1.00	263	441	--	--
Strontium (elemental)	9	9	0	1.00	8.3	35.1	--	--
Thallium	9	0	9	0.00	--	--	0.54	0.56
Tin	9	5	4	0.56	0.33	0.75	0.37	0.63
Uranium (inorganic)	9	0	9	0.00	--	--	2.4	2.5

Table 6-23. Summary of Near-Shore Mussel Soft Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Vanadium	9	5	4	0.56	0.01	0.13	0.01	0.1
Zinc	9	9	0	1.00	11.8	60	--	--
Organics (mg/kg-fw)								
1,2,4-Trichlorobenzene	1	0	1	0.00	--	--	4.7	4.7
1,2-Dichlorobenzene	1	0	1	0.00	--	--	4.7	4.7
1,3-Dichlorobenzene	1	0	1	0.00	--	--	4.7	4.7
1,4-Dichlorobenzene	1	0	1	0.00	--	--	4.7	4.7
2,4,5-Trichlorophenol	1	0	1	0.00	--	--	12	12
2,4,6-Trichlorophenol	1	0	1	0.00	--	--	4.7	4.7
2,4-Dichlorophenol	1	0	1	0.00	--	--	4.7	4.7
2,4-Dimethylphenol	1	0	1	0.00	--	--	4.7	4.7
2,4-Dinitrophenol	1	0	1	0.00	--	--	12	12
2,4-Dinitrotoluene	1	0	1	0.00	--	--	4.7	4.7
2,6-Dinitrotoluene	1	0	1	0.00	--	--	4.7	4.7
2-Chloronaphthalene	1	0	1	0.00	--	--	4.7	4.7
2-Chlorophenol	1	0	1	0.00	--	--	4.7	4.7
2-Methylnaphthalene	1	0	1	0.00	--	--	4.7	4.7
2-Methylphenol [cresol, o-]	1	0	1	0.00	--	--	4.7	4.7
2-Nitroaniline	1	0	1	0.00	--	--	12	12
2-Nitrophenol	1	0	1	0.00	--	--	4.7	4.7
3,3'-Dichlorobenzidine	1	0	1	0.00	--	--	4.7	4.7
3+4 Methylphenol [cresol, m+p]	1	0	1	0.00	--	--	4.7	4.7
3-Nitroaniline	1	0	1	0.00	--	--	12	12
4,6-Dinitro-2-methylphenol	1	0	1	0.00	--	--	12	12
4-Bromophenylphenyl ether	1	0	1	0.00	--	--	4.7	4.7
4-Chloro-3-methylphenol	1	0	1	0.00	--	--	4.7	4.7
4-Chloroaniline	1	0	1	0.00	--	--	4.7	4.7
4-Chlorophenylphenyl ether	1	0	1	0.00	--	--	4.7	4.7
4-Nitroaniline	1	0	1	0.00	--	--	12	12
4-Nitrophenol	1	0	1	0.00	--	--	12	12
Acenaphthene	1	0	1	0.00	--	--	4.7	4.7
Acenaphthylene	1	0	1	0.00	--	--	4.7	4.7
Aldrin	8	0	8	0.00	--	--	0.021	0.025

Table 6-23. Summary of Near-Shore Mussel Soft Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Alpha-BHC	8	0	8	0.00	--	--	0.021	0.025
alpha-Chlordane	8	0	8	0.00	--	--	0.021	0.025
Anthracene	1	0	1	0.00	--	--	4.7	4.7
Aroclor-1016	9	0	9	0.00	--	--	0.17	0.2
Aroclor-1221	9	0	9	0.00	--	--	0.17	0.2
Aroclor-1232	9	0	9	0.00	--	--	0.17	0.2
Aroclor-1242	9	0	9	0.00	--	--	0.17	0.2
Aroclor-1248	9	0	9	0.00	--	--	0.17	0.2
Aroclor-1254	9	0	9	0.00	--	--	0.17	0.2
Aroclor-1260	9	0	9	0.00	--	--	0.17	0.2
Benzo[a]anthracene	1	0	1	0.00	--	--	4.7	4.7
Benzo[a]pyrene	1	0	1	0.00	--	--	4.7	4.7
Benzo[b]fluoranthene	1	0	1	0.00	--	--	4.7	4.7
Benzo[ghi]perylene	1	0	1	0.00	--	--	4.7	4.7
Benzo[k]fluoranthene	1	0	1	0.00	--	--	4.7	4.7
beta-1,2,3,4,5,6-Hexachlorocyclohexane	8	0	8	0.00	--	--	0.021	0.025
Bis[2-chloro-1-methylethyl]ether	1	0	1	0.00	--	--	4.7	4.7
Bis[2-Chloroethoxy]methane	1	0	1	0.00	--	--	4.7	4.7
Bis[2-chloroethyl] ether	1	0	1	0.00	--	--	4.7	4.7
Bis[2-ethylhexyl] phthalate	1	1	0	1.00	0.41	0.41	--	--
Butylbenzylphthalate	1	0	1	0.00	--	--	4.7	4.7
Carbazole	1	0	1	0.00	--	--	4.7	4.7
Chrysene	1	0	1	0.00	--	--	4.7	4.7
Delta-BHC	8	1	7	0.13	0.0065	0.0065	0.021	0.025
Dibenz[a,h]anthracene	1	0	1	0.00	--	--	4.7	4.7
Dibenzofuran	1	0	1	0.00	--	--	4.7	4.7
Dichlorodiphenyldichloroethane	8	3	5	0.38	0.008	0.01	0.021	0.024
Dichlorodiphenyldichloroethylene	8	4	4	0.50	0.0066	0.022	0.023	0.024
Dichlorodiphenyltrichloroethane	8	0	8	0.00	--	--	0.021	0.025
Dieldrin	8	0	8	0.00	--	--	0.021	0.025
Diethylphthalate	1	0	1	0.00	--	--	4.7	4.7
Dimethyl phthalate	1	0	1	0.00	--	--	4.7	4.7
Di-n-butylphthalate	1	0	1	0.00	--	--	4.7	4.7

Table 6-23. Summary of Near-Shore Mussel Soft Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Di-n-octylphthalate	1	0	1	0.00	--	--	4.7	4.7
Endosulfan I	8	0	8	0.00	--	--	0.021	0.025
Endosulfan II	8	1	7	0.13	0.006	0.006	0.021	0.025
Endosulfan sulfate	8	1	7	0.13	0.012	0.012	0.021	0.025
Endrin	8	0	8	0.00	--	--	0.021	0.025
Endrin aldehyde	8	0	8	0.00	--	--	0.021	0.025
Endrin ketone	8	0	8	0.00	--	--	0.021	0.025
Fluoranthene	1	0	1	0.00	--	--	4.7	4.7
Fluorene	1	0	1	0.00	--	--	4.7	4.7
Gamma-BHC (lindane)	8	0	8	0.00	--	--	0.021	0.025
gamma-Chlordane	8	0	8	0.00	--	--	0.021	0.025
Heptachlor	8	0	8	0.00	--	--	0.021	0.025
Heptachlor epoxide	8	0	8	0.00	--	--	0.021	0.025
Hexachlorobenzene	1	0	1	0.00	--	--	4.7	4.7
Hexachlorobutadiene	1	0	1	0.00	--	--	4.7	4.7
Hexachlorocyclopentadiene	1	0	1	0.00	--	--	4.7	4.7
Hexachloroethane	1	0	1	0.00	--	--	4.7	4.7
Indeno[1,2,3-cd]pyrene	1	0	1	0.00	--	--	4.7	4.7
Isophorone	1	0	1	0.00	--	--	4.7	4.7
Methoxychlor	8	4	4	0.50	0.019	0.025	0.023	0.024
Naphthalene	1	0	1	0.00	--	--	4.7	4.7
Nitrobenzene	1	0	1	0.00	--	--	4.7	4.7
N-Nitroso-di-n-dipropylamine	1	0	1	0.00	--	--	4.7	4.7
N-Nitrosodiphenylamine	1	0	1	0.00	--	--	4.7	4.7
Pentachlorophenol	1	1	0	1.00	2.3	2.3	NA	NA
Phenanthrene	1	0	1	0.00	--	--	4.7	4.7
Phenol	1	0	1	0.00	--	--	4.7	4.7
Pyrene	1	0	1	0.00	--	--	4.7	4.7
Toxaphene	8	0	8	0.00	--	--	0.21	0.25
Radionuclides (pCi/g-fw)								
Americium-241	9	0	9	0.00	--	--	0.044	0.24
Antimony-125	9	0	9	0.00	--	--	0.082	0.54
Beryllium-7	9	0	9	0.00	--	--	0	0.25

Table 6-23. Summary of Near-Shore Mussel Soft Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Cesium-134	9	0	9	0.00	--	--	0.041	0.27
Cesium-137	9	0	9	0.00	--	--	0.035	0.22
Cobalt-60	9	0	9	0.00	--	--	0.034	0.21
Europium-152	9	0	9	0.00	--	--	0.084	0.56
Europium-154	9	0	9	0.00	--	--	0.098	0.75
Europium-155	9	0	9	0.00	--	--	0.08	0.3
Potassium-40	9	0	9	0.00	--	--	0	1.3
Radium-226	9	0	9	0.00	--	--	0.083	0.41
Radium-228	9	1	8	0.11	0.18	0.18	0.24	0.89
Ruthenium-106	9	0	9	0.00	--	--	0.29	1.9
Strontium-90	9	1	8	0.11	0.276	0.276	-0.072	0.0714
Technetium-99	1	0	1	0.00	--	--	0.0345	0.0345
Thorium-228	9	5	4	0.56	0.13	0.295	0	0.144
Thorium-230	9	0	9	0.00	--	--	-0.11	-0.009
Thorium-232	9	0	9	0.00	--	--	-0.0404	0.0463
Uranium-233/234	9	0	9	0.00	--	--	0	0.0367
Uranium-235	9	0	9	0.00	--	--	0	0.0262
Uranium-238	9	0	9	0.00	--	--	0	0.0655

-- = not applicable
BHC = benzene hexachloride
fw = fresh weight
NA = not available
RCBRA = River Corridor Baseline Risk Assessment

Table 6-24. Summary of Near-Shore Mussel Shell Data Collected for the RCBRA Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Radionuclide (pCi/g)								
Strontium-90	9	9	--	1.00	0.215	0.347	--	--

-- = not applicable
RCBRA = River Corridor Baseline Risk Assessment

Table 6-25. Summary of Near-Shore Sculpin Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	38	38	0	1.00	6.2	58.9	--	--
Antimony	38	1	37	0.03	0.31	0.31	0.22	0.43
Arsenic	38	4	34	0.11	0.65	1	0.39	0.59
Barium	38	38	0	1.00	2.3	6.2	--	--
Beryllium	38	3	35	0.08	0.01	0.03	0.01	0.04
Bismuth	38	0	38	0.00	--	--	0.4	0.59
Boron	38	3	35	0.08	0.3	1.2	0.22	0.44
Cadmium	38	33	5	0.87	0.04	0.41	0.03	0.2
Calcium	38	38	0	1.00	6,080	20,600	--	--
Calculated total uranium	35	2	33	0.06	0.066	0.085	0.0001	0.478
Chromium	38	29	9	0.76	0.15	0.96	0.34	0.63
Cobalt	38	0	38	0.00	--	--	0.08	0.17
Copper	38	30	8	0.79	1	10.7	0.91	1.6
Iron	38	38	0	1.00	19.6	152	--	--
Lead	38	15	23	0.39	0.28	0.77	0.27	0.33
Lithium	38	19	19	0.50	0.04	0.2	0.05	0.1
Magnesium	38	38	0	1.00	222	586	--	--
Manganese	38	38	0	1.00	1.9	11.3	--	--
Mercury	38	29	9	0.76	0.003	0.18	0.01	0.02
Molybdenum	38	3	35	0.08	0.14	0.33	0.12	0.28
Nickel	38	23	15	0.61	0.26	67.1	0.13	0.23
Phosphorus	38	38	0	1.00	4,520	11,400	--	--
Potassium	38	38	0	1.00	1,570	2,910	--	--
Selenium	38	34	4	0.89	0.49	1.1	0.44	0.45
Silicon	38	31	7	0.82	14.3	94.5	21.2	37.4
Silver	38	1	37	0.03	0.07	0.07	0.07	0.14
Sodium	38	38	0	1.00	752	1,400	--	--
Strontium (elemental)	35	35	0	1.00	12.7	30.7	--	--

Table 6-25. Summary of Near-Shore Sculpin Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Thallium	38	0	38	0.00	--	--	0.5	0.79
Tin	38	6	32	0.16	0.94	1.2	0.62	1.2
Titanium	26	26	0	1.00	0.18	6	--	--
Total inorganic arsenic	11	0	11	0.00	--	--	0.014	0.075
Uranium (inorganic)	38	2	36	0.05	0.86	1.1	0.82	2.4
Vanadium	38	28	10	0.74	0.09	0.38	0.08	0.1
Zinc	38	38	0	1.00	19.8	53.2	--	--
Zirconium	25	0	25	0.00	--	--	0.49	1
Organics (mg/kg-fw)								
1,2,4-Trichlorobenzene	35	0	35	0.00	--	--	3.9	42
1,2-Dichlorobenzene	35	0	35	0.00	--	--	3.9	42
1,3-Dichlorobenzene	35	0	35	0.00	--	--	3.9	42
1,4-Dichlorobenzene	35	0	35	0.00	--	--	3.9	42
2,4,5-Trichlorophenol	35	0	35	0.00	--	--	9.8	81
2,4,6-Trichlorophenol	35	0	35	0.00	--	--	3.9	42
2,4-Dichlorophenol	35	0	35	0.00	--	--	3.9	42
2,4-Dimethylphenol	35	0	35	0.00	--	--	3.9	42
2,4-Dinitrophenol	35	0	35	0.00	--	--	9.8	81
2,4-Dinitrotoluene	35	0	35	0.00	--	--	3.9	42
2,6-Dinitrotoluene	35	0	35	0.00	--	--	3.9	42
2-Chloronaphthalene	35	0	35	0.00	--	--	3.9	42
2-Chlorophenol	35	0	35	0.00	--	--	3.9	42
2-Methylnaphthalene	35	0	35	0.00	--	--	3.9	42
2-Methylphenol [cresol, o-]	35	0	35	0.00	--	--	3.9	42
2-Nitroaniline	35	3	32	0.09	2.7	3.6	9.8	81
2-Nitrophenol	35	0	35	0.00	--	--	3.9	42
3,3'-Dichlorobenzidine	35	1	34	0.03	0.86	0.86	3.9	42
3+4 Methylphenol [cresol, m+p]	35	32	3	0.91	0.29	130	4.3	32
3-Nitroaniline	35	0	35	0.00	--	--	9.8	81
4,6-Dinitro-2-methylphenol	35	0	35	0.00	--	--	9.8	81

Table 6-25. Summary of Near-Shore Sculpin Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
4-Bromophenylphenyl ether	35	0	35	0.00	--	--	3.9	42
4-Chloro-3-methylphenol	35	0	35	0.00	--	--	3.9	42
4-Chloroaniline	35	0	35	0.00	--	--	3.9	42
4-Chlorophenylphenyl ether	35	0	35	0.00	--	--	3.9	42
4-Nitroaniline	35	0	35	0.00	--	--	9.8	81
4-Nitrophenol	35	0	35	0.00	--	--	9.8	81
Acenaphthene	35	0	35	0.00	--	--	3.9	42
Acenaphthylene	35	0	35	0.00	--	--	3.9	42
Aldrin	35	5	30	0.14	0.0069	0.0089	0.018	0.21
Alpha-BHC	35	1	34	0.03	0.00591	0.00591	0.018	0.21
alpha-Chlordane	35	0	35	0.00	--	--	0.018	0.21
Anthracene	35	0	35	0.00	--	--	3.9	42
Aroclor-1016	42	0	42	0.00	--	--	0.02	1.7
Aroclor-1221	42	0	42	0.00	--	--	0.02	1.7
Aroclor-1232	42	0	42	0.00	--	--	0.02	1.7
Aroclor-1242	42	0	42	0.00	--	--	0.02	1.7
Aroclor-1248	42	0	42	0.00	--	--	0.02	1.7
Aroclor-1254	42	3	39	0.07	0.024	0.25	0.02	1.7
Aroclor-1260	42	1	41	0.02	0.015	0.015	0.02	1.7
Benzo[a]anthracene	35	0	35	0.00	--	--	3.9	42
Benzo[a]pyrene	35	0	35	0.00	--	--	3.9	42
Benzo[b]fluoranthene	35	0	35	0.00	--	--	3.9	42
Benzo[ghi]perylene	35	0	35	0.00	--	--	3.9	42
Benzo[k]fluoranthene	35	0	35	0.00	--	--	3.9	42
beta-1,2,3,4,5,6-Hexachlorocyclohexane	35	7	28	0.20	0.0058	0.018	0.018	0.21
Bis[2-chloro-1-methylethyl]ether	35	0	35	0.00	--	--	3.9	42
Bis[2-Chloroethoxy]methane	35	0	35	0.00	--	--	3.9	42
Bis[2-chloroethyl] ether	35	0	35	0.00	--	--	3.9	42
Bis[2-ethylhexyl] phthalate	35	33	2	0.94	0.3	7.7	4.4	6.8
Butylbenzylphthalate	35	0	35	0.00	--	--	3.9	42

Table 6-25. Summary of Near-Shore Sculpin Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Carbazole	35	0	35	0.00	--	--	3.9	42
Chrysene	35	0	35	0.00	--	--	3.9	42
Delta-BHC	35	10	25	0.29	0.0067	0.021	0.018	0.21
Dibenz[a,h]anthracene	35	0	35	0.00	--	--	3.9	42
Dibenzofuran	35	0	35	0.00	--	--	3.9	42
Dichlorodiphenyldichloroethane	35	16	19	0.46	0.0045	0.051	0.021	0.15
Dichlorodiphenyldichloroethylene	35	34	1	0.97	0.0055	0.29	0.034	0.034
Dichlorodiphenyltrichloroethane	35	5	30	0.14	0.0051	0.016	0.018	0.21
Dieldrin	35	2	33	0.06	0.0073	0.0074	0.018	0.21
Diethylphthalate	35	1	34	0.03	2.2	2.2	3.9	42
Dimethyl phthalate	35	0	35	0.00	--	--	3.9	42
Di-n-butylphthalate	35	17	18	0.49	0.21	13	4.1	7
Di-n-octylphthalate	35	0	35	0.00	--	--	3.9	42
Endosulfan I	35	1	34	0.03	0.0078	0.0078	0.018	0.21
Endosulfan II	35	0	35	0.00	--	--	0.018	0.21
Endosulfan sulfate	35	0	35	0.00	--	--	0.018	0.21
Endrin	35	6	29	0.17	0.0069	0.016	0.018	0.21
Endrin aldehyde	35	1	34	0.03	0.0078	0.0078	0.018	0.21
Endrin ketone	35	9	26	0.26	0.005	0.023	0.018	0.21
Fluoranthene	35	0	35	0.00	--	--	3.9	42
Fluorene	35	0	35	0.00	--	--	3.9	42
Gamma-BHC (lindane)	35	1	34	0.03	0.0055	0.0055	0.018	0.21
gamma-Chlordane	35	7	28	0.20	0.0056	0.011	0.019	0.21
Heptachlor	35	2	33	0.06	0.011	0.02	0.018	0.21
Heptachlor epoxide	35	0	35	0.00	--	--	0.018	0.21
Hexachlorobenzene	35	0	35	0.00	--	--	3.9	42
Hexachlorobutadiene	35	0	35	0.00	--	--	3.9	42
Hexachlorocyclopentadiene	35	0	35	0.00	--	--	3.9	42
Hexachloroethane	35	0	35	0.00	--	--	3.9	42
Indeno[1,2,3-cd]pyrene	35	0	35	0.00	--	--	3.9	42

Table 6-25. Summary of Near-Shore Sculpin Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Isophorone	35	0	35	0.00	--	--	3.9	42
Methoxychlor	35	6	29	0.17	0.0046	0.023	0.019	0.21
Naphthalene	35	0	35	0.00	--	--	3.9	42
Nitrobenzene	35	0	35	0.00	--	--	3.9	42
N-Nitroso-di-n-dipropylamine	35	0	35	0.00	--	--	3.9	42
N-Nitrosodiphenylamine	35	0	35	0.00	--	--	3.9	42
Pentachlorophenol	35	6	29	0.17	0.46	25	9.8	18
Phenanthrene	35	0	35	0.00	--	--	3.9	42
Phenol	35	13	22	0.37	0.25	5.2	3.9	42
Pyrene	35	0	35	0.00	--	--	3.9	42
Toxaphene	35	0	35	0.00	--	--	0.18	21
Radionuclides (pCi/g-fw)								
Americium-241	36	0	36	0.00	--	--	0.036	0.44
Antimony-125	36	0	36	0.00	--	--	0.073	0.47
Beryllium-7	36	1	35	0.03	8.11	8.11	0	1.4
Carbon-14	7	1	6	0.14	8.11	8.11	-8.13	0.538
Cesium-134	36	0	36	0.00	--	--	0.039	0.21
Cesium-137	36	0	36	0.00	--	--	0.035	0.2
Cobalt-60	36	0	36	0.00	--	--	0.035	0.25
Europium-152	36	0	36	0.00	--	--	0.077	0.43
Europium-154	36	0	36	0.00	--	--	0.1	0.61
Europium-155	36	0	36	0.00	--	--	0.061	0.43
Potassium-40	36	15	21	0.42	1.19	4.23	0	9.4
Radium-226	36	0	36	0.00	--	--	0.062	0.38
Radium-228	36	0	36	0.00	--	--	0.14	0.88
Ruthenium-106	36	0	36	0.00	--	--	0.26	1.8
Strontium-90	35	2	33	0.06	0.325	0.506	-0.09	0.133
Technetium-99	2	0	2	0.00	--	--	-0.0537	0.164
Thorium-228	36	0	36	0.00	--	--	-0.275	0.303
Thorium-230	34	1	33	0.03	0.776	0.776	-0.201	0.647

Table 6-25. Summary of Near-Shore Sculpin Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Thorium-232	36	0	36	0.00	--	--	-0.0378	0.158
Uranium-233/234	35	2	33	0.06	0.033	0.035	-0.02	0.113
Uranium-235	37	0	37	0.00	--	--	-0.0041	0.13
Uranium-238	35	2	33	0.06	0.0218	0.029	0	0.151
Polychlorinated Biphenyl Total (mg/kg-fw)								
Total PCB	11	11	0	1.00	0.0344	0.196	--	--
Polychlorinated Biphenyl Congeners (µg/kg-fw)								
1,1'-Biphenyl,2,2',3',4,5-pentachloro-	11	11	0	1.00	0.2	0.8	--	--
1,1'-Biphenyl,2,2',3,3',6-pentachloro-	11	11	0	1.00	0.01	0.048	--	--
1,1'-Biphenyl,2,2',3,4'-tetrachloro-	11	11	0	1.00	0.012	0.035	--	--
1,1'-Biphenyl,2,2',3,4-tetrachloro-	11	11	0	1.00	0.0038	0.0077	--	--
1,1'-Biphenyl,2,2',3,5,5'-pentachloro-	11	11	0	1.00	0.11	0.52	--	--
1,1'-Biphenyl,2,2',6,6'-tetrachloro-	11	0	11	0.00	--	--	0.01	0.015
1,1'-Biphenyl,2,3',4',5,5'-pentachloro-	11	11	0	1.00	0.012	0.081	--	--
1,1'-Biphenyl,2,3',4',5-tetrachloro-	11	11	0	1.00	0.35	1.3	--	--
1,1'-Biphenyl,2,3',4,4',5-pentachloro-	11	11	0	1.00	1.2	12	--	--
1,1'-Biphenyl,2,3',4,5,5'-pentachloro-	11	7	4	0.64	0.0031	0.027	0.01	0.015
1,1'-Biphenyl,2,3,3',4',6-pentachloro-	11	10	1	0.91	0.32	1.4	0.011	0.011
2',3,3',4,5-Pentachlorobiphenyl	11	4	7	0.36	0.0029	0.0087	0.01	0.011
2',3,4,4',5-Pentachlorobiphenyl	11	11	0	1.00	0.013	0.16	--	--
2',3,4,5,6'-Pentachlorobiphenyl	11	11	0	1.00	0.2	0.8	--	--
2',3,4,5-Tetrachlorobiphenyl	11	11	0	1.00	0.35	1.3	--	--
2',3,4-Trichlorobiphenyl	11	11	0	1.00	0.0098	0.026	--	--
2',3,5-Trichlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,2',3',4,6-Pentachlorobiphenyl	11	2	9	0.18	0.0038	0.0053	0.01	0.015
2,2',3,3',4',5,6-Heptachlorobiphenyl	11	11	0	1.00	0.012	0.079	--	--
2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	11	11	0	1.00	0.0039	0.03	--	--
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	11	11	0	1.00	0.014	0.08	--	--
2,2',3,3',4,4',5,5'-Octachlorobiphenyl	11	11	0	1.00	0.044	0.22	--	--
2,2',3,3',4,4',5,6'-Octachlorobiphenyl	11	11	0	1.00	0.013	0.089	--	--

Table 6-25. Summary of Near-Shore Sculpin Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	11	9	2	0.82	0.0023	0.0065	0.01	0.015
2,2',3,3',4,4',5,6-Octachlorobiphenyl	11	11	0	1.00	0.025	0.19	--	--
2,2',3,3',4,4',5-Heptachlorobiphenyl	11	11	0	1.00	0.14	1.3	--	--
2,2',3,3',4,4',6,6'-Octachlorobiphenyl	11	9	2	0.82	0.0025	0.007	0.01	0.015
2,2',3,3',4,4',6-Heptachlorobiphenyl	11	11	0	1.00	0.058	0.27	--	--
2,2',3,3',4,4'-Hexachlorobiphenyl	11	11	0	1.00	0.32	2.4	--	--
2,2',3,3',4,5',6,6'-Octachlorobiphenyl	11	10	1	0.91	0.0031	0.0087	0.01	0.01
2,2',3,3',4,5',6-Heptachlorobiphenyl	11	10	1	0.91	0.0032	0.013	0.015	0.015
2,2',3,3',4,5'-Hexachlorobiphenyl	11	11	0	1.00	0.039	0.16	--	--
2,2',3,3',4,5,5',6'-Octachlorobiphenyl	11	11	0	1.00	0.032	0.15	--	--
2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	11	10	1	0.91	0.0035	0.016	0.015	0.015
2,2',3,3',4,5,5',6-Octachlorobiphenyl	11	11	0	1.00	0.032	0.15	--	--
2,2',3,3',4,5,5'-Heptachlorobiphenyl	11	11	0	1.00	0.024	0.14	--	--
2,2',3,3',4,5,6'-Heptachlorobiphenyl	11	11	0	1.00	0.012	0.034	--	--
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,2',3,3',4,5,6-Heptachlorobiphenyl	11	11	0	1.00	0.058	0.27	--	--
2,2',3,3',4,5-Hexachlorobiphenyl	11	11	0	1.00	1.9	12	--	--
2,2',3,3',4,6'-Hexachlorobiphenyl	11	11	0	1.00	0.017	0.089	--	--
2,2',3,3',4,6,6'-Heptachlorobiphenyl	11	4	7	0.36	0.002	0.0037	0.01	0.015
2,2',3,3',4,6-Hexachlorobiphenyl	11	5	6	0.45	0.0027	0.0054	0.01	0.015
2,2',3,3',4-Pentachlorobiphenyl	11	11	0	1.00	0.0065	0.033	--	--
2,2',3,3',5,5',6,6'-Octachlorobiphenyl	11	11	0	1.00	0.014	0.052	--	--
2,2',3,3',5,5',6-Heptachloro-1,1'-Biphenyl	11	11	0	1.00	0.048	0.13	--	--
2,2',3,3',5,5'-Hexachlorobiphenyl	11	11	0	1.00	0.021	0.16	--	--
2,2',3,3',5,6'-Hexachlorobiphenyl	11	11	0	1.00	0.1	0.44	--	--
2,2',3,3',5,6,6'-Heptachlorobiphenyl	11	11	0	1.00	0.0088	0.054	--	--
2,2',3,3',5,6-Hexachlorobiphenyl	11	11	0	1.00	0.0042	0.025	--	--
2,2',3,3',5-Pentachlorobiphenyl	11	11	0	1.00	0.68	4.6	--	--
2,2',3,3',6,6'-Hexachlorobiphenyl	11	11	0	1.00	0.013	0.065	--	--
2,2',3,3'-Tetrachlorobiphenyl	11	11	0	1.00	0.011	0.045	--	--

Table 6-25. Summary of Near-Shore Sculpin Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
2,2',3,4',5',6-Hexachlorobiphenyl	11	11	0	1.00	0.05	0.21	--	--
2,2',3,4',5,5',6-Heptachlorobiphenyl	11	11	0	1.00	0.16	0.76	--	--
2,2',3,4',5,5'-Hexachlorobiphenyl	11	11	0	1.00	0.25	1.5	--	--
2,2',3,4',5,6'-Hexachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,2',3,4',5,6,6'-Heptachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,2',3,4',5,6-Hexachlorobiphenyl	11	11	0	1.00	0.05	0.21	--	--
2,2',3,4',5-Pentachlorobiphenyl	11	11	0	1.00	0.48	2	--	--
2,2',3,4',6,6'-Hexachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,2',3,4',6-Pentachlorobiphenyl	11	10	1	0.91	0.012	0.041	0.01	0.01
2,2',3,4,4',5',6-Heptachlorobiphenyl	11	11	0	1.00	0.12	0.52	--	--
2,2',3,4,4',5'-Hexachlorobiphenyl	11	11	0	1.00	1.9	12	--	--
2,2',3,4,4',5,5',6-Octachlorobiphenyl	11	11	0	1.00	0.039	0.2	--	--
2,2',3,4,4',5,5'-Heptachlorobiphenyl	11	11	0	1.00	0.32	2.7	--	--
2,2',3,4,4',5,6'-Heptachlorobiphenyl	11	4	7	0.36	0.0035	0.0083	0.01	0.015
2,2',3,4,4',5,6,6'-Octachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,2',3,4,4',5,6-Heptachlorobiphenyl	11	10	1	0.91	0.0022	0.029	0.015	0.015
2,2',3,4,4',5-Hexachlorobiphenyl	11	11	0	1.00	0.058	0.95	--	--
2,2',3,4,4',6'-Hexachlorobiphenyl	11	11	0	1.00	0.02	0.17	--	--
2,2',3,4,4',6,6'-Heptachlorobiphenyl	11	2	9	0.18	0.0014	0.002	0.01	0.015
2,2',3,4,4',6-Hexachlorobiphenyl	11	11	0	1.00	0.02	0.17	--	--
2,2',3,4,4'-Pentachlorobiphenyl	11	10	1	0.91	0.19	1.2	0.011	0.011
2,2',3,4,5',6-Hexachlorobiphenyl	11	11	0	1.00	0.0081	0.028	--	--
2,2',3,4,5'-Pentachlorobiphenyl	11	11	0	1.00	0.2	0.8	--	--
2,2',3,4,5,5',6-Heptachlorobiphenyl	11	10	1	0.91	0.0082	0.022	0.015	0.015
2,2',3,4,5,5'-Hexachlorobiphenyl	11	11	0	1.00	0.12	0.59	--	--
2,2',3,4,5,6'-Hexachlorobiphenyl	11	11	0	1.00	0.0042	0.025	--	--
2,2',3,4,5,6,6'-Heptachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,2',3,4,5,6-Hexachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,2',3,4,5-Pentachlorobiphenyl	11	11	0	1.00	0.2	0.8	--	--
2,2',3,4,6'-Pentachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015

Table 6-25. Summary of Near-Shore Sculpin Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
2,2',3,4,6,6'-Hexachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,2',3,4,6-Pentachlorobiphenyl	11	1	10	0.09	0.013	0.013	0.01	0.015
2,2',3,5',6-Pentachlorobiphenyl	11	11	0	1.00	0.11	0.49	--	--
2,2',3,5'-Tetrachloro-1-1'-biphenyl	11	11	0	1.00	0.1	0.22	--	--
2,2',3,5,5',6-Hexachlorobiphenyl	11	11	0	1.00	0.1	0.44	--	--
2,2',3,5,6'-Pentachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,2',3,5,6,6'-Hexachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,2',3,5,6-Pentachlorobiphenyl	11	3	8	0.27	0.003	0.011	0.01	0.015
2,2',3,5-Tetrachlorobiphenyl	11	10	1	0.91	0.003	0.011	0.015	0.015
2,2',3,6'-Tetrachlorobiphenyl	11	2	9	0.18	0.0017	0.0017	0.01	0.015
2,2',3,6,6'-Pentachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,2',3,6-Tetrachlorobiphenyl	11	10	1	0.91	0.003	0.0083	0.015	0.015
2,2',3-Trichlorobiphenyl	11	9	2	0.82	0.0037	0.011	0.01	0.015
2,2',4,4',5,5',-Hexachloro-Biphenyl	11	11	0	1.00	1.7	14	--	--
2,2',4,4',5,6'-Hexachlorobiphenyl	11	11	0	1.00	0.1	0.44	--	--
2,2',4,4',5-Pentachloro-1,1'-Biphenyl	11	11	0	1.00	0.68	4.6	--	--
2,2',4,4',6,6'-Hexachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,2',4,4',6-Pentachlorobiphenyl	11	11	0	1.00	0.11	0.49	--	--
2,2',4,4'-Tetrachlorobiphenyl	11	11	0	1.00	0.1	0.22	--	--
2,2',4,5',6-Pentachlorobiphenyl	11	4	7	0.36	0.0026	0.0035	0.01	0.015
2,2',4,5'-Tetrachlorobiphenyl	11	11	0	1.00	0.11	0.25	--	--
2,2',4,5,5'-Pentachlorobiphenyl	11	11	0	1.00	0.48	2	--	--
2,2',4,5,6-Pentachlorobiphenyl	11	2	9	0.18	0.0038	0.0053	0.01	0.015
2,2',4,5-Tetrachlorobiphenyl	11	11	0	1.00	0.012	0.037	--	--
2,2',4,6'-Tetrachlorobiphenyl	11	10	1	0.91	0.003	0.0083	0.015	0.015
2,2',4,6,6'-Pentachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,2',4,6-Tetrachlorobiphenyl	11	8	3	0.73	0.003	0.0051	0.01	0.015
2,2',4-Trichlorobiphenyl	11	11	0	1.00	0.0068	0.017	--	--
2,2',5,5'-Tetrachlorobiphenyl	11	11	0	1.00	0.19	0.69	--	--
2,2',5,6'-Tetrachlorobiphenyl	11	8	3	0.73	0.003	0.0051	0.01	0.015

Table 6-25. Summary of Near-Shore Sculpin Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
2,2',5-Trichlorobiphenyl	11	11	0	1.00	0.019	0.045	--	--
2,2',6-Trichlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,2'-Dichlorobiphenyl	11	11	0	1.00	0.0029	0.0067	--	--
2,3',4',6-Tetrachlorobiphenyl	11	11	0	1.00	0.011	0.045	--	--
2,3',4,4',5',6-Hexachlorobiphenyl	11	11	0	1.00	1.7	14	--	--
2,3',4,4',5,5'-Hexachlorobiphenyl	11	11	0	1.00	0.041	0.5	--	--
2,3',4,4',6-Pentachlorobiphenyl	11	11	0	1.00	0.2	0.8	--	--
2,3',4,4'-Tetrachlorobiphenyl	11	11	0	1.00	0.24	1.5	--	--
2,3',4,5',6-Pentachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,3',4,5'-Tetrachlorobiphenyl	11	8	3	0.73	0.0018	0.0037	0.01	0.015
2,3',4,5-Tetrachlorobiphenyl	11	8	3	0.73	0.0018	0.0056	0.01	0.015
2,3',4,6-Tetrachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,3',4-Trichlorobiphenyl	11	11	0	1.00	0.0018	0.0045	--	--
2,3',5',6-Tetrachlorobiphenyl	11	10	1	0.91	0.003	0.011	0.015	0.015
2,3',5,5'-Tetrachlorobiphenyl	11	9	2	0.82	0.0025	0.0095	0.01	0.015
2,3',5-Trichlorobiphenyl	11	11	0	1.00	0.0072	0.014	--	--
2,3',6-Trichlorobiphenyl	11	8	3	0.73	0.0018	0.0033	0.01	0.015
2,3'-Dichlorobiphenyl	11	10	1	0.91	0.0014	0.0028	0.015	0.015
2,3,3',4',5',6-Hexachlorobiphenyl	11	11	0	1.00	0.034	0.15	--	--
2,3,3',4',5,5',6-Heptachlorobiphenyl	11	11	0	1.00	0.32	2.7	--	--
2,3,3',4',5,5'-Hexachlorobiphenyl	11	11	0	1.00	0.0063	0.064	--	--
2,3,3',4',5,6-Hexachlorobiphenyl	11	11	0	1.00	1.9	12	--	--
2,3,3',4',5-Pentachlorobiphenyl	11	11	0	1.00	0.083	0.63	--	--
2,3,3',4'-Tetrachlorobiphenyl	11	11	0	1.00	0.0076	0.091	--	--
2,3,3',4,4',5',6-Heptachlorobiphenyl	11	10	1	0.91	0.0098	0.059	0.015	0.015
2,3,3',4,4',5'-Hexachlorobiphenyl	11	11	0	1.00	0.14	2.1	--	--
2,3,3',4,4',5,5',6-Octachlorobiphenyl	11	11	0	1.00	0.0036	0.015	--	--
2,3,3',4,4',5,5'-Heptachlorobiphenyl	11	10	1	0.91	0.0072	0.051	0.015	0.015
2,3,3',4,4',5,6-Heptachlorobiphenyl	11	11	0	1.00	0.044	0.32	--	--
2,3,3',4,4',5-Hexachlorobiphenyl	11	11	0	1.00	0.14	2.1	--	--

Table 6-25. Summary of Near-Shore Sculpin Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
2,3,3',4,4',6-Hexachlorobiphenyl	11	11	0	1.00	0.16	1.1	--	--
2,3,3',4,4'-Pentachlorobiphenyl	11	11	0	1.00	0.42	3.2	--	--
2,3,3',4,5',6-Hexachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,3,3',4,5'-Pentachlorobiphenyl	11	11	0	1.00	0.012	0.081	--	--
2,3,3',4,5,5',6-Heptachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,3,3',4,5,5'-Hexachlorobiphenyl	11	3	8	0.27	0.0025	0.0031	0.01	0.015
2,3,3',4,5,6-Hexachlorobiphenyl	11	11	0	1.00	1.9	12	--	--
2,3,3',4,5-Pentachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,3,3',4,6-Pentachlorobiphenyl	11	11	0	1.00	0.2	0.8	--	--
2,3,3',4-Tetrachlorobiphenyl	11	9	2	0.82	0.0054	0.018	0.01	0.011
2,3,3',5',6-Pentachlorobiphenyl	11	11	0	1.00	0.48	2	--	--
2,3,3',5'-Tetrachloro-1-1'-biphenyl	11	9	2	0.82	0.003	0.014	0.01	0.015
2,3,3',5,5',6-Hexachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,3,3',5,5'-Pentachlorobiphenyl	11	4	7	0.36	0.002	0.0047	0.01	0.015
2,3,3',5,6-Pentachlorobiphenyl	11	1	10	0.09	0.0026	0.0026	0.01	0.015
2,3,3',5-Tetrachlorobiphenyl	11	3	8	0.27	0.0015	0.0017	0.01	0.015
2,3,3',6-Tetrachlorobiphenyl	11	11	0	1.00	0.0081	0.019	--	--
2,3,3'-Trichlorobiphenyl	11	11	0	1.00	0.07	0.14	--	--
2,3,4',5,6-Pentachlorobiphenyl	11	10	1	0.91	0.19	1.2	0.011	0.011
2,3,4',5-Tetrachlorobiphenyl	11	11	0	1.00	0.011	0.058	--	--
2,3,4',6-Tetrachlorobiphenyl	11	11	0	1.00	0.043	0.27	--	--
2,3,4'-Trichlorobiphenyl	11	11	0	1.00	0.0085	0.028	--	--
2,3,4,4',5,6-Hexachlorobiphenyl	11	11	0	1.00	0.0079	0.094	--	--
2,3,4,4',5-Pentachlorobiphenyl	11	11	0	1.00	0.026	0.27	--	--
2,3,4,4',6-Pentachlorobiphenyl	11	10	1	0.91	0.32	1.4	0.011	0.011
2,3,4,4'-Tetrachlorobiphenyl	11	11	0	1.00	0.057	0.26	--	--
2,3,4,5,6-Pentachlorobiphenyl	11	10	1	0.91	0.19	1.2	0.011	0.011
2,3,4,5-Tetrachlorobiphenyl	11	0	11	0.00	--	--	0.02	0.03
2,3,4,6-Tetrachlorobiphenyl	11	11	0	1.00	0.0081	0.019	--	--
2,3,4-Trichlorobiphenyl	11	11	0	1.00	0.0098	0.026	--	--

Table 6-25. Summary of Near-Shore Sculpin Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
2,3,5,6-Tetrachlorobiphenyl	11	11	0	1.00	0.1	0.22	--	--
2,3,5-Trichlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
2,3,6-Trichlorobiphenyl	11	2	9	0.18	0.0011	0.0011	0.01	0.015
2,3-Dichlorobiphenyl	11	2	9	0.18	0.00093	0.0012	0.01	0.015
2,4',5-Trichlorobiphenyl-1',1	11	11	0	1.00	0.039	0.11	--	--
2,4',6-Trichlorobiphenyl	11	10	1	0.91	0.0023	0.0067	0.011	0.011
2,4'-Dichlorobiphenyl	11	11	0	1.00	0.0052	0.01	--	--
2,4,4',5-Tetrachlorobiphenyl	11	11	0	1.00	0.35	1.3	--	--
2,4,4',6-Tetrachlorobiphenyl	11	11	0	1.00	0.0081	0.019	--	--
2,4,4'-Trichlorobiphenyl	11	11	0	1.00	0.07	0.14	--	--
2,4,5-Trichlorobiphenyl	11	11	0	1.00	0.0072	0.014	--	--
2,4,6-Trichlorobiphenyl	11	0	11	0.00	--	--	0.02	0.03
2,4-Dichlorobiphenyl	11	3	8	0.27	0.00062	0.0023	0.01	0.015
2,5-Dichlorobiphenyl	11	4	7	0.36	0.001	0.004	0.01	0.011
2,6-Dichlorobiphenyl	11	6	5	0.55	0.00086	0.0042	0.01	0.011
2-Monochlorobiphenyl	11	2	9	0.18	0.0013	0.0025	0.01	0.015
3,3',4,4',5,5'-Hexachlorobiphenyl	11	5	6	0.45	0.0019	0.0066	0.01	0.015
3,3',4,4',5-Pentachlorobiphenyl	11	11	0	1.00	0.0035	0.029	--	--
3,3',4,4'-Tetrachlorobiphenyl	11	10	1	0.91	0.0036	0.044	0.015	0.015
3,3',4,5'-Tetrachlorobiphenyl	11	8	3	0.73	0.0014	0.0038	0.01	0.015
3,3',4,5,5'-Pentachlorobiphenyl	11	9	2	0.82	0.0015	0.023	0.01	0.015
3,3',4,5-Tetrachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
3,3',4-Trichlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
3,3',5,5'-Tetrachlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
3,3',5-Trichlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
3,3'-Dichlorobiphenyl	11	11	0	1.00	0.0026	0.0087	--	--
3,4',5-Trichlorobiphenyl	11	1	10	0.09	0.0013	0.0013	0.01	0.015
3,4'-Dichlorobiphenyl	11	4	7	0.36	0.0013	0.0017	0.01	0.015
3,4,4',5-Tetrachlorobiphenyl	11	3	8	0.27	0.00086	0.0011	0.01	0.015
3,4,4'-Trichlorobiphenyl	11	9	2	0.82	0.0019	0.0059	0.01	0.015

Table 6-25. Summary of Near-Shore Sculpin Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
3,4,5-Trichlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
3,4-Dichlorobiphenyl	11	4	7	0.36	0.0013	0.0017	0.01	0.015
3,5-Dichlorobiphenyl	11	1	10	0.09	0.00087	0.00087	0.01	0.015
3-Monochlorobiphenyl	11	0	11	0.00	--	--	0.01	0.015
4,4'-Dichlorobiphenyl	11	10	1	0.91	0.0016	0.0039	0.01	0.01
4-Monochlorobiphenyl	11	1	10	0.09	0.0017	0.0017	0.01	0.015
Co-elution of PCB 107 (IUPAC) & 124	11	11	0	1.00	0.012	0.081	--	--
Co-elution of PCB 110 & 115	11	10	1	0.91	0.32	1.4	0.011	0.011
Co-elution of PCB 12 & 13	11	4	7	0.36	0.0013	0.0017	0.01	0.015
Co-elution of PCB 128 & 166	11	11	0	1.00	0.0079	0.094	--	--
Co-elution of PCB 129, 138, 160, & 163	11	11	0	1.00	1.9	12	--	--
Co-elution of PCB 134 & 143	11	11	0	1.00	0.0042	0.025	--	--
Co-elution of PCB 134 &140	11	11	0	1.00	0.02	0.17	--	--
Co-elution of PCB 135 & 151	11	11	0	1.00	0.1	0.44	--	--
Co-elution of PCB 137 & 164	11	11	0	1.00	0.058	0.95	--	--
Co-elution of PCB 147 & 149	11	11	0	1.00	0.05	0.21	--	--
Co-elution of PCB 153 & 168	11	11	0	1.00	1.7	14	--	--
Co-elution of PCB 156 & 157	11	11	0	1.00	0.14	2.1	--	--
Co-elution of PCB 171 & 173	11	11	0	1.00	0.058	0.27	--	--
Co-elution of PCB 18 & 30	11	0	11	0.00	--	--	0.02	0.03
Co-elution of PCB 180 & 193	11	11	0	1.00	0.32	2.7	--	--
Co-elution of PCB 183 & 185	11	11	0	1.00	0.12	0.52	--	--
Co-elution of PCB 197 & 200	11	9	2	0.82	0.0025	0.007	0.01	0.015
Co-elution of PCB 198 & 199 (IUPAC)	11	11	0	1.00	0.032	0.15	--	--
Co-elution of PCB 20 & 28	11	11	0	1.00	0.07	0.14	--	--
Co-elution of PCB 21 & 33	11	11	0	1.00	0.0098	0.026	--	--
Co-elution of PCB 26 & 29	11	11	0	1.00	0.0072	0.014	--	--
Co-elution of PCB 40, 41, & 71	11	11	0	1.00	0.0038	0.0077	--	--
Co-elution of PCB 43 & 73	11	10	1	0.91	0.003	0.011	0.015	0.015
Co-elution of PCB 44, 47, & 65	11	11	0	1.00	0.1	0.22	--	--

Table 6-25. Summary of Near-Shore Sculpin Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Co-elution of PCB 45 & 51	11	10	1	0.91	0.003	0.0083	0.015	0.015
Co-elution of PCB 49 & 69	11	0	11	0.00	--	--	0.01	0.015
Co-elution of PCB 50 & 53	11	8	3	0.73	0.003	0.0051	0.01	0.015
Co-elution of PCB 59, 62, & 75	11	11	0	1.00	0.0081	0.019	--	--
Co-elution of PCB 61, 70, 76, & 74	11	0	11	0.00	--	--	0.02	0.03
Co-elution of PCB 83 & 99	11	11	0	1.00	0.68	4.6	--	--
Co-elution of PCB 85, 116, & 117	11	10	1	0.91	0.19	1.2	0.011	0.011
Co-elution of PCB 86, 87, 97, 108 (IUPAC), 119, & 125	11	11	0	1.00	0.2	0.8	--	--
Co-elution of PCB 88 & 91	11	1	10	0.09	0.013	0.013	0.01	0.015
Co-elution of PCB 90, 101, & 113	11	11	0	1.00	0.48	2	--	--
Co-elution of PCB 93 & 100	11	11	0	1.00	0.11	0.49	--	--
Co-elution of PCB 98 & 102	11	2	9	0.18	0.0038	0.0053	0.01	0.015

-- = not applicable
BHC = benzene hexachloride
fw = fresh weight
IUPAC = International Union of Pure and Applied Chemistry
PCB = polychlorinated biphenyl
RCBRA = River Corridor Baseline Risk Assessment

Table 6-26. Summary of Near-Shore Sculpin Tissue Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	6	6	0	1.00	2.49	45.5	--	--
Antimony	6	2	4	0.33	0.00273	0.00357	0.00222	0.00222
Arsenic	6	5	1	0.83	0.0253	0.12	0.0222	0.0222
Barium	8	8	0	1.00	1.15	5.57	--	--
Beryllium	6	0	6	0.00	--	--	0.00444	0.00444
Cadmium	8	8	0	1.00	0.00617	0.172	--	--
Chromium	8	8	0	1.00	0.215	0.406	--	--
Copper	6	6	0	1.00	0.497	0.69	--	--
Lead	8	8	0	1.00	0.0216	0.143	--	--
Manganese	8	8	0	1.00	0.717	4.66	--	--
Mercury	8	8	0	1.00	0.0136	0.0491	--	--
Nickel	8	8	0	1.00	0.193	0.695	--	--
Selenium	8	8	0	1.00	0.366	0.579	--	--
Silver	8	0	8	0.00	--	--	0.00222	0.00222
Thallium	8	7	1	0.88	0.00679	0.0309	0.00444	0.00444
Uranium (inorganic)	8	7	1	0.88	0.00284	0.00884	0.00222	0.00222
Zinc	6	6	0	1.00	13.8	32	--	--
Organics (mg/kg-fw)								
Aroclor-1254	9	2	7	0.22	14.5	18.2	2.93	6.1
Aroclor-1260	9	0	9	0.00	--	--	2.48	6.1
Radionuclides (pCi/g-fw)								
Antimony-125	1	0	1	0.00	--	--	-0.0928	-0.0928
Beryllium-7	1	0	1	0.00	--	--	0.281	0.281
Cesium-134	1	0	1	0.00	--	--	0.0394	0.0394
Cesium-137	1	0	1	0.00	--	--	-0.00996	-0.00996
Cobalt-60	1	0	1	0.00	--	--	0.0515	0.0515
Europium-152	1	0	1	0.00	--	--	0.06	0.06
Europium-154	1	0	1	0.00	--	--	0.121	0.121

Table 6-26. Summary of Near-Shore Sculpin Tissue Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Europium-155	1	0	1	0.00	--	--	-0.000993	-0.000993
Potassium-40	1	1	0	1.00	2.36	2.36	--	--
Ruthenium-106	1	0	1	0.00	--	--	0.128	0.128
Strontium-90	1	1	0	1.00	0.0811	0.0811	--	--
Technetium-99	1	1	0	1.00	0.389	0.389	--	--

-- = not applicable
fw = fresh weight

Table 6-27. Summary of Near-Shore Sculpin Tissue Data Collected for the 100-NR-2 Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Organics (mg/kg-fw)								
1,1'-Biphenyl,2,3',4,4',5-pentachloro-	5	4	1	0.80	0.00046	0.00076	0.00035	0.00035
2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	5	0	5	0.00	--	--	0.00025	0.00035
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	5	0	5	0.00	--	--	0.00025	0.00035
2,2',3,3',4,4',5,6-Octachlorobiphenyl	5	0	5	0.00	--	--	0.00025	0.00035
2,2',3,3',4,4',5-Heptachlorobiphenyl	5	0	5	0.00	--	--	0.00025	0.00035
2,2',3,3',4,4'-Hexachlorobiphenyl	5	0	5	0.00	--	--	0.00025	0.00035
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	5	0	5	0.00	--	--	0.00025	0.00035
2,2',3,4',5,5',6-Heptachlorobiphenyl	5	3	2	0.60	0.0005	0.00099	0.00025	0.00035
2,2',3,4,4',5'-Hexachlorobiphenyl	5	5		1.00	0.0011	0.0014	--	--
2,2',3,4,4',5,5'-Heptachlorobiphenyl	5	0	5	0.00	--	--	0.00025	0.00035
2,2',3,5'-Tetrachloro-1-1'-biphenyl	5	0	5	0.00	--	--	0.00025	0.00035
2,2',4,4',5,5',-Hexachloro-Biphenyl	5	3	2	0.60	0.0019	0.004	0.00025	0.00035
2,2',4,5,5'-Pentachlorobiphenyl	5	0	5	0.00	--	--	0.00025	0.00035
2,2',5,5'-Tetrachlorobiphenyl	5	0	5	0.00	--	--	0.00025	0.00035
2,2',5-Trichlorobiphenyl	5	0	5	0.00	--	--	0.00025	0.00035
2,3',4,4'-Tetrachlorobiphenyl	5	0	5	0.00	--	--	0.00025	0.00035
2,3,3',4,4'-Pentachlorobiphenyl	5	2	3	0.40	0.00086	0.00086	0.0003	0.00035
2,4'-Dichlorobiphenyl	5	0	5	0.00	--	--	0.00025	0.00035

Table 6-27. Summary of Near-Shore Sculpin Tissue Data Collected for the 100-NR-2 Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
2,4,4'-Trichlorobiphenyl	5	2	3	0.40	0.00041	0.0012	0.00027	0.00032
3,3',4,4',5-Pentachlorobiphenyl	5	0	5	0.00	--	--	0.00025	0.00035
3,3',4,4'-Tetrachlorobiphenyl	5	1	4	0.20	0.00082	0.00082	0.00025	0.00032
PCB calculated TEQ bird	2	2	0	1.00	8.6E-08	8.6E-08	--	--
PCB calculated TEQ fish	2	2	0	1.00	4.3E-09	4.3E-09	--	--
PCB calculated TEQ mammal	2	2	0	1.00	2.58E-08	2.58E-08	--	--
PCB calculated TEQ bird	4	4	0	1.00	4.6E-09	7.6E-09	--	--
PCB calculated TEQ fish	4	4	0	1.00	2.3E-09	3.8E-09	--	--
PCB calculated TEQ mammal	4	4	0	1.00	1.38E-08	2.28E-08	--	--
PCB calculated TEQ mammal	1	1	0	1.00	8.2E-08	8.2E-08	--	--
PCB calculated TEQ bird	1	1	0	1.00	0.000041	0.000041	--	--
PCB calculated TEQ fish	1	1	0	1.00	8.2E-08	8.2E-08	--	--
TEC bird	5	5	0	1.00	6.5E-09	0.000041	--	--
TEC fish	5	5	0	1.00	3.25E-09	8.2E-08	--	--
TEC mammal	5	5	0	1.00	1.95E-08	8.2E-08	--	--
Total PCB	5	5	0	1.00	0.0127	0.0223	--	--
Radionuclides (pCi/g-fw)								
Strontium-90	4	1	3	0.25	0.0114	0.0114	-0.01073	0.00375
Technetium-99	4	0	4	0	--	--	0.02075	0.0495

-- = not applicable
fw = fresh weight
PCB = polychlorinated biphenyl
TEC = TCDD (2,3,7,8-Tetrachlorodibenzo-p-Dioxin) equivalent concentration
TEQ = toxicity equivalent quotient

Table 6-28. Summary of Near-Shore Sculpin Kidney Tissue Data Collected for the RCBRA Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	35	16	19	0.46	5.9	37.8	5.9	36.4
Antimony	35	4	31	0.11	0.94	3.3	0.4	4.9
Arsenic	35	3	32	0.09	0.77	1.7	1.2	6.8
Barium	35	34	1	0.97	0.24	1.9	0.91	0.91
Beryllium	35	2	33	0.06	0.02	0.04	0.03	0.45
Bismuth	35	0	35	0.00	--	--	0.6	5.7
Boron	35	3	32	0.09	2.5	5.4	0.27	4.5
Cadmium	35	34	1	0.97	0.42	2.7	0.58	0.58
Calcium	35	35	0	1.00	118	1,190	--	--
Chromium	35	33	2	0.94	0.31	3.7	0.67	1.8
Cobalt	35	0	35	0.00	--	--	0.12	1.8
Copper	35	27	8	0.77	1.1	59.5	0.85	2.4
Iron	35	35	0	1.00	32.8	149	--	--
Lead	35	3	32	0.09	1.3	3.1	0.31	3.4
Lithium	35	17	18	0.49	0.07	0.67	0.11	0.36
Magnesium	35	35	0	1.00	136	343	--	--
Manganese	35	32	3	0.91	0.42	3.7	1.3	3.6
Mercury	29	2	27	0.07	0.05	0.12	0.02	0.17
Molybdenum	35	4	31	0.11	0.19	2.4	0.37	3.2
Nickel	35	2	33	0.06	0.18	3.2	0.19	2.7
Phosphorus	35	35	0	1.00	1,940	5,170	--	--
Potassium	35	35	0	1.00	1,840	5,410	--	--
Selenium	35	18	17	0.51	1.5	4.7	1.4	5.5
Silicon	35	27	8	0.77	7.5	73.6	8.7	22.7
Silver	35	0	35	0.00	--	--	0.14	0.909
Sodium	35	35	0	1.00	894	2,950	--	--
Strontium (elemental)	35	35	0	1.00	0.25	3.1	--	--
Thallium	35	0	35	0.00	--	--	0.63	7.8

Table 6-28. Summary of Near-Shore Sculpin Kidney Tissue Data Collected for the RCBRA Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Tin	35	17	18	0.49	1.8	10.7	0.6	11.9
Titanium	23	21	2	0.91	0.18	2.2	0.12	0.15
Uranium (inorganic)	35	2	33	0.06	2.9	4.6	2	22.8
Vanadium	35	7	28	0.20	0.09	0.75	0.13	1.3
Zinc	35	35	0	1.00	26.6	204	--	--
Zirconium	23	0	23	0.00	--	--	0.53	11.8

-- = not applicable
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 6-29. Summary of Near-Shore Sculpin Liver Tissue Data Collected for the RCBRA Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	35	17	18	0.49	2.5	67.3	1.8	8
Antimony	35	7	28	0.20	0.46	4.6	0.21	2.1
Arsenic	35	4	31	0.11	0.72	1.6	0.39	4.1
Barium	35	33	2	0.94	0.09	3.6	0.09	0.16
Beryllium	35	2	33	0.06	0.01	0.03	0.01	0.1
Bismuth	35	0	35	0.00	--	--	0.38	4
Boron	35	8	27	0.23	0.3	6.5	0.23	3.6
Cadmium	35	35	0	1.00	0.33	4	--	--
Calcium	35	35	0	1.00	66	728	--	--
Chromium	35	34	1	0.97	0.16	9.2	0.4	0.4
Cobalt	35	3	32	0.09	0.14	0.62	0.11	0.8
Copper	35	35	0	1.00	1.2	19	--	--
Iron	35	35	0	1.00	19.8	237	--	--
Lead	35	5	30	0.14	0.3	0.75	0.3	3.3
Lithium	35	22	13	0.63	0.05	2.8	0.05	0.18
Magnesium	35	35	0	1.00	108	360	--	--

Table 6-29. Summary of Near-Shore Sculpin Liver Tissue Data Collected for the RCBRA Project. (2 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Manganese	35	35	0	1.00	0.53	3.5	--	--
Mercury	35	29	6	0.83	0.02	0.19	0.02	0.03
Molybdenum	35	8	27	0.23	0.16	1.1	0.15	1.6
Nickel	35	1	34	0.03	4.4	4.4	0.13	2.7
Phosphorus	35	35	0	1.00	1,880	5,820	--	--
Potassium	35	35	0	1.00	1,480	4,180	--	--
Selenium	35	30	5	0.86	1.2	5.9	1	2.5
Silicon	35	33	2	0.94	4.6	1,670	6.2	16.1
Silver	35	3	32	0.09	0.12	0.63	0.07	0.9
Sodium	35	35	0	1.00	743	2,210	--	--
Strontium (elemental)	35	35	0	1.00	0.16	1.7	--	--
Thallium	35	0	35	0.00	--	--	0.63	8
Tin	35	22	13	0.63	0.62	10.7	1	3
Titanium	23	19	4	0.83	0.04	0.93	0.03	0.14
Uranium (inorganic)	35	2	33	0.06	1.7	4.3	0.83	16.7
Vanadium	35	10	25	0.29	0.1	0.29	0.08	0.8
Zinc	35	35	0	1.00	16.9	98	--	--
Zirconium	21	1	20	0.05	0.71	0.71	0.53	3.4

-- = not applicable
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 6-30. Summary of Near-Shore Sculpin Liver Tissue Data Collected for the 100-B/C Pilot Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	7	7	0	1.00	0.371	2.31	--	--
Antimony	7	7	0	1.00	0.00466	0.0179	--	--
Arsenic	7	3	4	0.43	0.111	0.473	0.0222	0.0222
Barium	12	10	2	0.83	0.0169	0.124	0.0222	0.0222
Beryllium	7	2	5	0.29	0.00875	0.0673	0.00444	0.00444
Cadmium	12	12	0	1.00	0.161	3.35	--	--
Chromium	12	12	0	1.00	0.087	0.97	--	--
Copper	7	7	0	1.00	1.52	6.02	--	--
Lead	12	12	0	1.00	0.00804	0.0597	--	--
Manganese	12	12	0	1.00	0.269	1.3	--	--
Mercury	12	12	0	1.00	0.024	0.164	--	--
Nickel	12	9	3	0.75	0.0163	0.0781	0.00992	0.00992
Selenium	12	12	0	1.00	1.08	1.85	--	--
Silver	12	10	2	0.83	0.00226	0.028	0.00222	0.00988
Thallium	12	7	5	0.58	0.018	0.0799	0.00444	0.00466
Uranium (inorganic)	12	0	12	0.00	--	--	0.00222	0.00686
Zinc	7	7	0	1.00	19.4	45.5	--	--

-- = not applicable
fw = fresh weight

Table 6-31. Summary of Near-Shore Sculpin Liver Tissue Data Collected for the 100-NR-2 Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Antimony	4	4	0	1.00	0.0300	0.0535	--	--
Arsenic	4	1	3	0.25	0.0477	0.0477	0.0250	0.0250
Barium	4	4	0	1.00	0.120	0.280	--	--
Cadmium	4	4	0	1.00	0.303	2.28	--	--
Chromium	4	4	0	1.00	0.0420	0.152	--	--
Lead	4	4	0	1.00	0.00990	0.0323	--	--
Manganese	4	4	0	1.00	0.505	2.16	--	--
Mercury	4	4	0	1.00	0.0193	0.0893	--	--
Nickel	4	4	0	1.00	0.02295	0.128	--	--
Selenium	4	4	0	1.00	0.803	2.22	--	--
Uranium (inorganic)	4	1	3	0.25	0.00273	0.00273	0.00225	0.00225
Vanadium	4	4	0	1.00	0.0151	0.305	--	--
Zinc	4	4	0	1.00	15.0	35.3	--	--

-- = not applicable
fw = fresh weight

Table 6-32. Summary of Near-Shore Sucker Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	8	8	0	1.00	10.6	39.8	--	--
Antimony	8	1	7	0.13	0.38	0.38	0.28	0.31
Arsenic	8	0	8	0.00	--	--	0.39	0.46
Barium	8	8	0	1.00	3	4.9	--	--
Beryllium	8	0	8	0.00	--	--	0.02	0.05
Bismuth	8	0	8	0.00	--	--	0.5	0.56
Boron	8	0	8	0.00	--	--	0.36	0.46
Cadmium	8	1	7	0.13	0.05	0.05	0.03	0.03
Calcium	8	8	0	1.00	9,000	10,600	--	--
Calculated total uranium	8	0	8	0.00	--	--	-0.00726	0.185
Chromium	8	8	0	1.00	0.24	0.47	--	--
Cobalt	8	1	7	0.13	0.19	0.19	0.09	0.09
Copper	8	8	0	1.00	1.5	4.9	--	--
Iron	8	8	0	1.00	33.6	92.5	--	--
Lead	8	1	7	0.13	0.28	0.28	0.27	0.28
Lithium	8	1	7	0.13	0.11	0.11	0.07	0.11
Magnesium	8	8	0	1.00	332	464	--	--
Manganese	8	8	0	1.00	7.6	11.6	--	--
Mercury	8	3	5	0.38	0.01	0.02	0.01	0.02
Molybdenum	8	1	7	0.13	0.14	0.14	0.12	0.28
Nickel	8	2	6	0.25	0.19	0.21	0.18	0.18
Phosphorus	8	8	0	1.00	5,570	6,860	--	--
Potassium	8	8	0	1.00	1,950	2,510	--	--
Selenium	8	8	0	1.00	0.64	0.89	--	--
Silicon	8	8	0	1.00	23.5	59.3	--	--
Silver	8	0	8	0.00	--	--	0.09	0.09
Sodium	8	8	0	1.00	678	785	--	--
Strontium (elemental)	8	8	0	1.00	14.3	23.1	--	--

Table 6-32. Summary of Near-Shore Sucker Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Thallium	8	0	8	0.00	--	--	0.54	0.56
Tin	8	1	7	0.13	2.1	2.1	0.69	1.4
Total inorganic arsenic	1	0	1	0.00	--	--	0.015	0.015
Uranium (inorganic)	8	0	8	0.00	--	--	1.9	2.4
Vanadium	8	5	3	0.63	0.11	0.2	0.1	0.13
Zinc	8	8	0	1.00	22.5	27.4	--	--
Organics (mg/kg-fw)								
1,2,4-Trichlorobenzene	7	0	7	0.00	--	--	4.1	4.8
1,2-Dichlorobenzene	7	0	7	0.00	--	--	4.1	4.8
1,3-Dichlorobenzene	7	0	7	0.00	--	--	4.1	4.8
1,4-Dichlorobenzene	7	0	7	0.00	--	--	4.1	4.8
2,4,5-Trichlorophenol	7	0	7	0.00	--	--	10	12
2,4,6-Trichlorophenol	7	0	7	0.00	--	--	4.1	4.8
2,4-Dichlorophenol	7	0	7	0.00	--	--	4.1	4.8
2,4-Dimethylphenol	7	0	7	0.00	--	--	4.1	4.8
2,4-Dinitrophenol	7	0	7	0.00	--	--	10	12
2,4-Dinitrotoluene	7	0	7	0.00	--	--	4.1	4.8
2,6-Dinitrotoluene	7	0	7	0.00	--	--	4.1	4.8
2-Chloronaphthalene	7	0	7	0.00	--	--	4.1	4.8
2-Chlorophenol	7	0	7	0.00	--	--	4.1	4.8
2-Methylnaphthalene	7	0	7	0.00	--	--	4.1	4.8
2-Methylphenol [cresol, o-]	7	0	7	0.00	--	--	4.1	4.8
2-Nitroaniline	7	0	7	0.00	--	--	10	12
2-Nitrophenol	7	0	7	0.00	--	--	4.1	4.8
3,3'-Dichlorobenzidine	7	0	7	0.00	--	--	4.1	4.8
3+4 Methylphenol [cresol, m+p]	7	2	5	0.29	0.23	0.25	4.1	4.8
3-Nitroaniline	7	0	7	0.00	--	--	10	12
4,6-Dinitro-2-methylphenol	7	0	7	0.00	--	--	10	12
4-Bromophenylphenyl ether	7	0	7	0.00	--	--	4.1	4.8
4-Chloro-3-methylphenol	7	0	7	0.00	--	--	4.1	4.8

Table 6-32. Summary of Near-Shore Sucker Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
4-Chloroaniline	7	0	7	0.00	--	--	4.1	4.8
4-Chlorophenylphenyl ether	7	0	7	0.00	--	--	4.1	4.8
4-Nitroaniline	7	0	7	0.00	--	--	10	12
4-Nitrophenol	7	0	7	0.00	--	--	10	12
Acenaphthene	7	0	7	0.00	--	--	4.1	4.8
Acenaphthylene	7	0	7	0.00	--	--	4.1	4.8
Aldrin	8	1	7	0.13	0.009	0.009	0.0013	0.023
Alpha-BHC	8	0	8	0.00	--	--	0.0013	0.023
alpha-Chlordane	8	0	8	0.00	--	--	0.0013	0.023
Anthracene	7	0	7	0.00	--	--	4.1	4.8
Aroclor-1016	8	0	8	0.00	--	--	0.013	0.19
Aroclor-1221	8	0	8	0.00	--	--	0.013	0.19
Aroclor-1232	8	0	8	0.00	--	--	0.013	0.19
Aroclor-1242	8	0	8	0.00	--	--	0.013	0.19
Aroclor-1248	8	0	8	0.00	--	--	0.013	0.19
Aroclor-1254	8	1	7	0.13	0.0057	0.0057	0.16	0.19
Aroclor-1260	8	0	8	0.00	--	--	0.013	0.19
Benzo[a]anthracene	7	0	7	0.00	--	--	4.1	4.8
Benzo[a]pyrene	7	0	7	0.00	--	--	4.1	4.8
Benzo[b]fluoranthene	7	0	7	0.00	--	--	4.1	4.8
Benzo[ghi]perylene	7	0	7	0.00	--	--	4.1	4.8
Benzo[k]fluoranthene	7	0	7	0.00	--	--	4.1	4.8
beta-1,2,3,4,5,6-Hexachlorocyclohexane	8	2	6	0.25	0.014	0.015	0.0013	0.023
Bis[2-chloro-1-methylethyl]ether	7	0	7	0.00	--	--	4.1	4.8
Bis[2-Chloroethoxy]methane	7	0	7	0.00	--	--	4.1	4.8
Bis[2-chloroethyl] ether	7	0	7	0.00	--	--	4.1	4.8
Bis[2-ethylhexyl] phthalate	7	7	0	1.00	0.31	1.4	--	--
Butylbenzylphthalate	7	0	7	0.00	--	--	4.1	4.8
Carbazole	7	0	7	0.00	--	--	4.1	4.8
Chrysene	7	0	7	0.00	--	--	4.1	4.8

Table 6-32. Summary of Near-Shore Sucker Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Delta-BHC	8	1	7	0.13	0.0089	0.0089	0.0013	0.023
Dibenz[a,h]anthracene	7	0	7	0.00	--	--	4.1	4.8
Dibenzofuran	7	0	7	0.00	--	--	4.1	4.8
Dichlorodiphenyldichloroethane	8	8	0	1.00	0.0045	0.032	--	--
Dichlorodiphenyldichloroethylene	8	7	1	0.88	0.013	0.071	0.022	0.022
Dichlorodiphenyltrichloroethane	8	3	5	0.38	0.0053	0.011	0.0013	0.023
Dieldrin	8	1	7	0.13	0.0069	0.0069	0.0013	0.023
Diethylphthalate	7	0	7	0.00	--	--	4.1	4.8
Dimethyl phthalate	7	0	7	0.00	--	--	4.1	4.8
Di-n-butylphthalate	7	2	5	0.29	0.33	1.5	4.1	4.8
Di-n-octylphthalate	7	0	7	0.00	--	--	4.1	4.8
Endosulfan I	8	2	6	0.25	0.0044	0.0069	0.0013	0.023
Endosulfan II	8	1	7	0.13	0.0067	0.0067	0.0013	0.023
Endosulfan sulfate	8	0	8	0.00	--	--	0.0013	0.023
Endrin	8	1	7	0.13	0.0055	0.0055	0.0013	0.023
Endrin aldehyde	8	0	8	0.00	--	--	0.0013	0.023
Endrin ketone	8	4	4	0.50	0.0043	0.0073	0.0013	0.023
Fluoranthene	7	0	7	0.00	--	--	4.1	4.8
Fluorene	7	0	7	0.00	--	--	4.1	4.8
Gamma-BHC (lindane)	8	0	8	0.00	--	--	0.0013	0.023
gamma-Chlordane	8	4	4	0.50	0.0073	0.0087	0.0013	0.023
Heptachlor	8	1	7	0.13	0.0076	0.0076	0.0013	0.023
Heptachlor epoxide	8	0	8	0.00	--	--	0.0013	0.023
Hexachlorobenzene	7	0	7	0.00	--	--	4.1	4.8
Hexachlorobutadiene	7	0	7	0.00	--	--	4.1	4.8
Hexachlorocyclopentadiene	7	0	7	0.00	--	--	4.1	4.8
Hexachloroethane	7	0	7	0.00	--	--	4.1	4.8
Indeno[1,2,3-cd]pyrene	7	0	7	0.00	--	--	4.1	4.8
Isophorone	7	0	7	0.00	--	--	4.1	4.8
Methoxychlor	8	2	6	0.25	0.013	0.014	0.0013	0.023

Table 6-32. Summary of Near-Shore Sucker Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Naphthalene	7	0	7	0.00	--	--	4.1	4.8
Nitrobenzene	7	0	7	0.00	--	--	4.1	4.8
N-Nitroso-di-n-dipropylamine	7	0	7	0.00	--	--	4.1	4.8
N-Nitrosodiphenylamine	7	0	7	0.00	--	--	4.1	4.8
Pentachlorophenol	7	0	7	0.00	--	--	10	12
Phenanthrene	7	0	7	0.00	--	--	4.1	4.8
Phenol	7	0	7	0.00	--	--	4.1	4.8
Pyrene	7	0	7	0.00	--	--	4.1	4.8
Toxaphene	8	0	8	0.00	--	--	0.013	0.23
Radionuclides (pCi/g-fw)								
Americium-241	7	0	7	0.00	--	--	0.046	0.31
Antimony-125	7	0	7	0.00	--	--	0.12	0.22
Beryllium-7	7	1	6	0.14	3.52	3.52	0	0.0838
Carbon-14	2	0	2	0.00	--	--	-11.4	3.52
Cesium-134	7	0	7	0.00	--	--	0.068	0.14
Cesium-137	7	0	7	0.00	--	--	0.058	0.11
Cobalt-60	7	0	7	0.00	--	--	0.061	0.12
Europium-152	7	0	7	0.00	--	--	0.13	0.27
Europium-154	7	0	7	0.00	--	--	0.18	0.38
Europium-155	7	0	7	0.00	--	--	0.079	0.24
Potassium-40	7	1	6	0.14	2.9	2.9	0	0.0461
Radium-226	7	0	7	0.00	--	--	0.11	0.22
Radium-228	7	0	7	0.00	--	--	0.24	0.51
Ruthenium-106	7	0	7	0.00	--	--	0.44	0.93
Strontium-90	8	0	8	0.00	--	--	-0.109	0.086
Technetium-99	2	0	2	0.00	--	--	-0.114	0.136
Thorium-228	8	0	8	0.00	--	--	-0.0892	0.254
Thorium-230	8	1	7	0.13	0.324	0.324	-0.194	0.114
Thorium-232	8	0	8	0.00	--	--	-0.0379	0.0292
Uranium-233/234	8	0	8	0.00	--	--	-0.003	0.0761

Table 6-32. Summary of Near-Shore Sucker Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Uranium-235	8	0	8	0.00	--	--	0	0.0461
Uranium-238	8	0	8	0.00	--	--	-0.003	0.062
Polychlorinated Biphenyl Total (mg/kg-fw)								
Total PCB	1	1	0	1.00	0.0332	0.0332	--	--
Polychlorinated Biphenyl Congeners (µg/kg-fw)								
1,1'-Biphenyl,2,2',3',4,5-pentachloro-	1	1	0	1.00	0.4	0.4	--	--
1,1'-Biphenyl,2,2',3,3',6-pentachloro-	1	1	0	1.00	0.093	0.093	--	--
1,1'-Biphenyl,2,2',3,4'-tetrachloro-	1	1	0	1.00	0.02	0.02	--	--
1,1'-Biphenyl,2,2',3,4-tetrachloro-	1	1	0	1.00	0.0055	0.0055	--	--
1,1'-Biphenyl,2,2',3,5,5'-pentachloro-	1	1	0	1.00	0.13	0.13	--	--
1,1'-Biphenyl,2,2',6,6'-tetrachloro-	1	0	1	0.00	--	--	0.012	0.012
1,1'-Biphenyl,2,3',4',5,5'-pentachloro-	1	1	0	1.00	0.026	0.026	--	--
1,1'-Biphenyl,2,3',4',5-tetrachloro-	1	1	0	1.00	0.36	0.36	--	--
1,1'-Biphenyl,2,3',4,4',5-pentachloro-	1	1	0	1.00	0.9	0.9	--	--
1,1'-Biphenyl,2,3',4,5,5'-pentachloro-	1	1	0	1.00	0.0048	0.0048	--	--
1,1'-Biphenyl,2,3,3',4',6-pentachloro-	1	1	0	1.00	0.7	0.7	--	--
2',3,3',4,5-Pentachlorobiphenyl	1	1	0	1.00	0.0067	0.0067	--	--
2',3,4,4',5-Pentachlorobiphenyl	1	1	0	1.00	0.0095	0.0095	--	--
2',3,4,5,6'-Pentachlorobiphenyl	1	1	0	1.00	0.4	0.4	--	--
2',3,4,5-Tetrachlorobiphenyl	1	1	0	1.00	0.36	0.36	--	--
2',3,4-Trichlorobiphenyl	1	1	0	1.00	0.016	0.016	--	--
2',3,5-Trichlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',3',4,6-Pentachlorobiphenyl	1	1	0	1.00	0.01	0.01	--	--
2,2',3,3',4',5,6-Heptachlorobiphenyl	1	1	0	1.00	0.099	0.099	--	--
2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	1	1	0	1.00	0.0049	0.0049	--	--
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	1	1	0	1.00	0.013	0.013	--	--
2,2',3,3',4,4',5,5'-Octachlorobiphenyl	1	1	0	1.00	0.029	0.029	--	--
2,2',3,3',4,4',5,6'-Octachlorobiphenyl	1	1	0	1.00	0.0087	0.0087	--	--
2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',3,3',4,4',5,6-Octachlorobiphenyl	1	1	0	1.00	0.023	0.023	--	--

Table 6-32. Summary of Near-Shore Sucker Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
2,2',3,3',4,4',5-Heptachlorobiphenyl	1	1	0	1.00	0.094	0.094	--	--
2,2',3,3',4,4',6,6'-Octachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',3,3',4,4',6-Heptachlorobiphenyl	1	1	0	1.00	0.045	0.045	--	--
2,2',3,3',4,4'-Hexachlorobiphenyl	1	1	0	1.00	0.23	0.23	--	--
2,2',3,3',4,5',6,6'-Octachlorobiphenyl	1	1	0	1.00	0.004	0.004	--	--
2,2',3,3',4,5',6-Heptachlorobiphenyl	1	1	0	1.00	0.0044	0.0044	--	--
2,2',3,3',4,5'-Hexachlorobiphenyl	1	1	0	1.00	0.08	0.08	--	--
2,2',3,3',4,5,5',6'-Octachlorobiphenyl	1	1	0	1.00	0.032	0.032	--	--
2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	1	1	0	1.00	0.0053	0.0053	--	--
2,2',3,3',4,5,5',6-Octachlorobiphenyl	1	1	0	1.00	0.032	0.032	--	--
2,2',3,3',4,5,5'-Heptachlorobiphenyl	1	1	0	1.00	0.015	0.015	--	--
2,2',3,3',4,5,6'-Heptachlorobiphenyl	1	1	0	1.00	0.067	0.067	--	--
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	1	1	0	1.00	0.0029	0.0029	--	--
2,2',3,3',4,5,6-Heptachlorobiphenyl	1	1	0	1.00	0.045	0.045	--	--
2,2',3,3',4,5-Hexachlorobiphenyl	1	1	0	1.00	1.5	1.5	--	--
2,2',3,3',4,6'-Hexachlorobiphenyl	1	1	0	1.00	0.21	0.21	--	--
2,2',3,3',4,6,6'-Heptachlorobiphenyl	1	1	0	1.00	0.011	0.011	--	--
2,2',3,3',4,6-Hexachlorobiphenyl	1	1	0	1.00	0.01	0.01	--	--
2,2',3,3',4-Pentachlorobiphenyl	1	1	0	1.00	0.059	0.059	--	--
2,2',3,3',5,5',6,6'-Octachlorobiphenyl	1	1	0	1.00	0.016	0.016	--	--
2,2',3,3',5,5',6-Heptachloro-1,1'-Biphenyl	1	1	0	1.00	0.044	0.044	--	--
2,2',3,3',5,5'-Hexachlorobiphenyl	1	1	0	1.00	0.018	0.018	--	--
2,2',3,3',5,6'-Hexachlorobiphenyl	1	1	0	1.00	0.21	0.21	--	--
2,2',3,3',5,6,6'-Heptachlorobiphenyl	1	1	0	1.00	0.054	0.054	--	--
2,2',3,3',5,6-Hexachlorobiphenyl	1	1	0	1.00	0.045	0.045	--	--
2,2',3,3',5-Pentachlorobiphenyl	1	1	0	1.00	0.51	0.51	--	--
2,2',3,3',6,6'-Hexachlorobiphenyl	1	1	0	1.00	0.053	0.053	--	--
2,2',3,3'-Tetrachlorobiphenyl	1	1	0	1.00	0.026	0.026	--	--
2,2',3,4',5',6-Hexachlorobiphenyl	1	1	0	1.00	0.66	0.66	--	--
2,2',3,4',5,5',6-Heptachlorobiphenyl	1	1	0	1.00	0.27	0.27	--	--

Table 6-32. Summary of Near-Shore Sucker Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
2,2',3,4',5,5'-Hexachlorobiphenyl	1	1	0	1.00	0.2	0.2	--	--
2,2',3,4',5,6'-Hexachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',3,4',5,6,6'-Heptachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',3,4',5,6-Hexachlorobiphenyl	1	1	0	1.00	0.66	0.66	--	--
2,2',3,4',5-Pentachlorobiphenyl	1	1	0	1.00	0.72	0.72	--	--
2,2',3,4',6,6'-Hexachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',3,4',6-Pentachlorobiphenyl	1	1	0	1.00	0.066	0.066	--	--
2,2',3,4,4',5',6-Heptachlorobiphenyl	1	1	0	1.00	0.086	0.086	--	--
2,2',3,4,4',5'-Hexachlorobiphenyl	1	1	0	1.00	1.5	1.5	--	--
2,2',3,4,4',5,5',6-Octachlorobiphenyl	1	1	0	1.00	0.026	0.026	--	--
2,2',3,4,4',5,5'-Heptachlorobiphenyl	1	1	0	1.00	0.21	0.21	--	--
2,2',3,4,4',5,6'-Heptachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',3,4,4',5,6,6'-Octachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',3,4,4',5,6-Heptachlorobiphenyl	1	1	0	1.00	0.0026	0.0026	--	--
2,2',3,4,4',5-Hexachlorobiphenyl	1	1	0	1.00	0.041	0.041	--	--
2,2',3,4,4',6'-Hexachlorobiphenyl	1	1	0	1.00	0.02	0.02	--	--
2,2',3,4,4',6,6'-Heptachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',3,4,4',6-Hexachlorobiphenyl	1	1	0	1.00	0.02	0.02	--	--
2,2',3,4,4'-Pentachlorobiphenyl	1	1	0	1.00	0.14	0.14	--	--
2,2',3,4,5',6-Hexachlorobiphenyl	1	1	0	1.00	0.025	0.025	--	--
2,2',3,4,5'-Pentachlorobiphenyl	1	1	0	1.00	0.4	0.4	--	--
2,2',3,4,5,5',6-Heptachlorobiphenyl	1	1	0	1.00	0.013	0.013	--	--
2,2',3,4,5,5'-Hexachlorobiphenyl	1	1	0	1.00	0.1	0.1	--	--
2,2',3,4,5,6'-Hexachlorobiphenyl	1	1	0	1.00	0.045	0.045	--	--
2,2',3,4,5,6,6'-Heptachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',3,4,5,6-Hexachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',3,4,5-Pentachlorobiphenyl	1	1	0	1.00	0.4	0.4	--	--
2,2',3,4,6'-Pentachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',3,4,6,6'-Hexachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',3,4,6-Pentachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012

Table 6-32. Summary of Near-Shore Sucker Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
2,2',3,5',6-Pentachlorobiphenyl	1	1	0	1.00	0.32	0.32	--	--
2,2',3,5'-Tetrachloro-1-1'-biphenyl	1	1	0	1.00	0.12	0.12	--	--
2,2',3,5,5',6-Hexachlorobiphenyl	1	1	0	1.00	0.21	0.21	--	--
2,2',3,5,6'-Pentachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',3,5,6,6'-Hexachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',3,5,6-Pentachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',3,5-Tetrachlorobiphenyl	1	1	0	1.00	0.0054	0.0054	--	--
2,2',3,6'-Tetrachlorobiphenyl	1	1	0	1.00	0.0032	0.0032	--	--
2,2',3,6,6'-Pentachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',3,6-Tetrachlorobiphenyl	1	1	0	1.00	0.008	0.008	--	--
2,2',3-Trichlorobiphenyl	1	1	0	1.00	0.0066	0.0066	--	--
2,2',4,4',5,5',-Hexachloro-Biphenyl	1	1	0	1.00	1.3	1.3	--	--
2,2',4,4',5,6'-Hexachlorobiphenyl	1	1	0	1.00	0.21	0.21	--	--
2,2',4,4',5-Pentachloro-1,1'-Biphenyl	1	1	0	1.00	0.51	0.51	--	--
2,2',4,4',6,6'-Hexachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',4,4',6-Pentachlorobiphenyl	1	1	0	1.00	0.32	0.32	--	--
2,2',4,4'-Tetrachlorobiphenyl	1	1	0	1.00	0.12	0.12	--	--
2,2',4,5',6-Pentachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',4,5'-Tetrachlorobiphenyl	1	1	0	1.00	0.076	0.076	--	--
2,2',4,5,5'-Pentachlorobiphenyl	1	1	0	1.00	0.72	0.72	--	--
2,2',4,5,6-Pentachlorobiphenyl	1	1	0	1.00	0.01	0.01	--	--
2,2',4,5-Tetrachlorobiphenyl	1	1	0	1.00	0.019	0.019	--	--
2,2',4,6'-Tetrachlorobiphenyl	1	1	0	1.00	0.008	0.008	--	--
2,2',4,6,6'-Pentachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,2',4,6-Tetrachlorobiphenyl	1	1	0	1.00	0.0068	0.0068	--	--
2,2',4-Trichlorobiphenyl	1	1	0	1.00	0.0085	0.0085	--	--
2,2',5,5'-Tetrachlorobiphenyl	1	1	0	1.00	0.21	0.21	--	--
2,2',5,6'-Tetrachlorobiphenyl	1	1	0	1.00	0.0068	0.0068	--	--
2,2',5-Trichlorobiphenyl	1	1	0	1.00	0.019	0.019	--	--
2,2',6-Trichlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012

Table 6-32. Summary of Near-Shore Sucker Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
2,2'-Dichlorobiphenyl	1	1	0	1.00	0.0034	0.0034	--	--
2,3',4',6-Tetrachlorobiphenyl	1	1	0	1.00	0.026	0.026	--	--
2,3',4,4',5',6-Hexachlorobiphenyl	1	1	0	1.00	1.3	1.3	--	--
2,3',4,4',5,5'-Hexachlorobiphenyl	1	1	0	1.00	0.043	0.043	--	--
2,3',4,4',6-Pentachlorobiphenyl	1	1	0	1.00	0.4	0.4	--	--
2,3',4,4'-Tetrachlorobiphenyl	1	1	0	1.00	0.2	0.2	--	--
2,3',4,5',6-Pentachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,3',4,5'-Tetrachlorobiphenyl	1	1	0	1.00	0.002	0.002	--	--
2,3',4,5-Tetrachlorobiphenyl	1	1	0	1.00	0.0022	0.0022	--	--
2,3',4,6-Tetrachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,3',4-Trichlorobiphenyl	1	1	0	1.00	0.0027	0.0027	--	--
2,3',5',6-Tetrachlorobiphenyl	1	1	0	1.00	0.0054	0.0054	--	--
2,3',5,5'-Tetrachlorobiphenyl	1	1	0	1.00	0.0024	0.0024	--	--
2,3',5-Trichlorobiphenyl	1	1	0	1.00	0.0054	0.0054	--	--
2,3',6-Trichlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,3'-Dichlorobiphenyl	1	1	0	1.00	0.0012	0.0012	--	--
2,3,3',4',5',6-Hexachlorobiphenyl	1	1	0	1.00	0.049	0.049	--	--
2,3,3',4',5,5',6-Heptachlorobiphenyl	1	1	0	1.00	0.21	0.21	--	--
2,3,3',4',5,5'-Hexachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,3,3',4',5,6-Hexachlorobiphenyl	1	1	0	1.00	1.5	1.5	--	--
2,3,3',4',5-Pentachlorobiphenyl	1	1	0	1.00	0.067	0.067	--	--
2,3,3',4'-Tetrachlorobiphenyl	1	1	0	1.00	0.039	0.039	--	--
2,3,3',4,4',5',6-Heptachlorobiphenyl	1	1	0	1.00	0.0046	0.0046	--	--
2,3,3',4,4',5'-Hexachlorobiphenyl	1	1	0	1.00	0.1	0.1	--	--
2,3,3',4,4',5,5',6-Octachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,3,3',4,4',5,5'-Heptachlorobiphenyl	1	1	0	1.00	0.0028	0.0028	--	--
2,3,3',4,4',5,6-Heptachlorobiphenyl	1	1	0	1.00	0.029	0.029	--	--
2,3,3',4,4',5-Hexachlorobiphenyl	1	1	0	1.00	0.1	0.1	--	--
2,3,3',4,4',6-Hexachlorobiphenyl	1	1	0	1.00	0.11	0.11	--	--
2,3,3',4,4'-Pentachlorobiphenyl	1	1	0	1.00	0.29	0.29	--	--

Table 6-32. Summary of Near-Shore Sucker Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
2,3,3',4,5',6-Hexachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,3,3',4,5'-Pentachlorobiphenyl	1	1	0	1.00	0.026	0.026	--	--
2,3,3',4,5,5',6-Heptachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,3,3',4,5,5'-Hexachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,3,3',4,5,6-Hexachlorobiphenyl	1	1	0	1.00	1.5	1.5	--	--
2,3,3',4,5-Pentachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,3,3',4,6-Pentachlorobiphenyl	1	1	0	1.00	0.4	0.4	--	--
2,3,3',4-Tetrachlorobiphenyl	1	1	0	1.00	0.0058	0.0058	--	--
2,3,3',5',6-Pentachlorobiphenyl	1	1	0	1.00	0.72	0.72	--	--
2,3,3',5'-Tetrachloro-1-1'-biphenyl	1	1	0	1.00	0.012	0.012	--	--
2,3,3',5,5',6-Hexachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,3,3',5,5'-Pentachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,3,3',5,6-Pentachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,3,3',5-Tetrachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,3,3',6-Tetrachlorobiphenyl	1	1	0	1.00	0.01	0.01	--	--
2,3,3'-Trichlorobiphenyl	1	1	0	1.00	0.061	0.061	--	--
2,3,4',5,6-Pentachlorobiphenyl	1	1	0	1.00	0.14	0.14	--	--
2,3,4',5-Tetrachlorobiphenyl	1	1	0	1.00	0.0092	0.0092	--	--
2,3,4',6-Tetrachlorobiphenyl	1	1	0	1.00	0.06	0.06	--	--
2,3,4'-Trichlorobiphenyl	1	1	0	1.00	0.013	0.013	--	--
2,3,4,4',5,6-Hexachlorobiphenyl	1	1	0	1.00	0.0059	0.0059	--	--
2,3,4,4',5-Pentachlorobiphenyl	1	1	0	1.00	0.019	0.019	--	--
2,3,4,4',6-Pentachlorobiphenyl	1	1	0	1.00	0.7	0.7	--	--
2,3,4,4'-Tetrachlorobiphenyl	1	1	0	1.00	0.044	0.044	--	--
2,3,4,5,6-Pentachlorobiphenyl	1	1	0	1.00	0.14	0.14	--	--
2,3,4,5-Tetrachlorobiphenyl	1	0	1	0.00	--	--	0.024	0.024
2,3,4,6-Tetrachlorobiphenyl	1	1	0	1.00	0.01	0.01	--	--
2,3,4-Trichlorobiphenyl	1	1	0	1.00	0.016	0.016	--	--
2,3,5,6-Tetrachlorobiphenyl	1	1	0	1.00	0.12	0.12	--	--
2,3,5-Trichlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012

Table 6-32. Summary of Near-Shore Sucker Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
2,3,6-Trichlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
2,3-Dichlorobiphenyl	1	1	0	1.00	0.00073	0.00073	--	--
2,4',5-Trichlorobiphenyl-1,1'	1	1	0	1.00	0.031	0.031	--	--
2,4',6-Trichlorobiphenyl	1	1	0	1.00	0.0025	0.0025	--	--
2,4'-Dichlorobiphenyl	1	1	0	1.00	0.0062	0.0062	--	--
2,4,4',5-Tetrachlorobiphenyl	1	1	0	1.00	0.36	0.36	--	--
2,4,4',6-Tetrachlorobiphenyl	1	1	0	1.00	0.01	0.01	--	--
2,4,4'-Trichlorobiphenyl	1	1	0	1.00	0.061	0.061	--	--
2,4,5-Trichlorobiphenyl	1	1	0	1.00	0.0054	0.0054	--	--
2,4,6-Trichlorobiphenyl	1	0	1	0.00	--	--	0.024	0.024
2,4-Dichlorobiphenyl	1	1	0	1.00	0.0012	0.0012	--	--
2,5-Dichlorobiphenyl	1	1	0	1.00	0.0013	0.0013	--	--
2,6-Dichlorobiphenyl	1	1	0	1.00	0.001	0.001	--	--
2-Monochlorobiphenyl	1	1	0	1.00	0.0056	0.0056	--	--
3,3',4,4',5,5'-Hexachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
3,3',4,4',5-Pentachlorobiphenyl	1	1	0	1.00	0.0035	0.0035	--	--
3,3',4,4'-Tetrachlorobiphenyl	1	1	0	1.00	0.012	0.012	--	--
3,3',4,5'-Tetrachlorobiphenyl	1	1	0	1.00	0.0037	0.0037	--	--
3,3',4,5,5'-Pentachlorobiphenyl	1	1	0	1.00	0.001	0.001	--	--
3,3',4,5-Tetrachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
3,3',4-Trichlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
3,3',5,5'-Tetrachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
3,3',5-Trichlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
3,3'-Dichlorobiphenyl	1	1	0	1.00	0.0071	0.0071	--	--
3,4',5-Trichlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
3,4'-Dichlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
3,4,4',5-Tetrachlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
3,4,4'-Trichlorobiphenyl	1	1	0	1.00	0.004	0.004	--	--
3,4,5-Trichlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
3,4-Dichlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012

Table 6-32. Summary of Near-Shore Sucker Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
3,5-Dichlorobiphenyl	1	1	0	1.00	0.00076	0.00076	--	--
3-Monochlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
4,4'-Dichlorobiphenyl	1	1	0	1.00	0.0011	0.0011	--	--
4-Monochlorobiphenyl	1	0	1	0.00	--	--	0.012	0.012
Co-elution of PCB 107 (IUPAC) & 124	1	1	0	1.00	0.026	0.026	--	--
Co-elution of PCB 110 & 115	1	1	0	1.00	0.7	0.7	--	--
Co-elution of PCB 12 & 13	1	0	1	0.00	--	--	0.012	0.012
Co-elution of PCB 128 & 166	1	1	0	1.00	0.0059	0.0059	--	--
Co-elution of PCB 129, 138, 160, & 163	1	1	0	1.00	1.5	1.5	--	--
Co-elution of PCB 134 & 143	1	1	0	1.00	0.045	0.045	--	--
Co-elution of PCB 134 &140	1	1	0	1.00	0.02	0.02	--	--
Co-elution of PCB 135 & 151	1	1	0	1.00	0.21	0.21	--	--
Co-elution of PCB 137 & 164	1	1	0	1.00	0.041	0.041	--	--
Co-elution of PCB 147 & 149	1	1	0	1.00	0.66	0.66	--	--
Co-elution of PCB 153 & 168	1	1	0	1.00	1.3	1.3	--	--
Co-elution of PCB 156 & 157	1	1	0	1.00	0.1	0.1	--	--
Co-elution of PCB 171 & 173	1	1	0	1.00	0.045	0.045	--	--
Co-elution of PCB 18 & 30	1	0	1	0.00	--	--	0.024	0.024
Co-elution of PCB 180 & 193	1	1	0	1.00	0.21	0.21	--	--
Co-elution of PCB 183 & 185	1	1	0	1.00	0.086	0.086	--	--
Co-elution of PCB 197 & 200	1	0	1	0.00	--	--	0.012	0.012
Co-elution of PCB 198 & 199 (IUPAC)	1	1	0	1.00	0.032	0.032	--	--
Co-elution of PCB 20 & 28	1	1	0	1.00	0.061	0.061	--	--
Co-elution of PCB 21 & 33	1	1	0	1.00	0.016	0.016	--	--
Co-elution of PCB 26 & 29	1	1	0	1.00	0.0054	0.0054	--	--
Co-elution of PCB 40, 41, & 71	1	1	0	1.00	0.0055	0.0055	--	--
Co-elution of PCB 43 & 73	1	1	0	1.00	0.0054	0.0054	--	--
Co-elution of PCB 44, 47, & 65	1	1	0	1.00	0.12	0.12	--	--
Co-elution of PCB 45 & 51	1	1	0	1.00	0.008	0.008	--	--
Co-elution of PCB 49 & 69	1	0	1	0.00	--	--	0.012	0.012

Table 6-32. Summary of Near-Shore Sucker Tissue Data Collected for the RCBRA Project. (14 Pages)

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Co-elution of PCB 50 & 53	1	1	0	1.00	0.0068	0.0068	--	--
Co-elution of PCB 59, 62, & 75	1	1	0	1.00	0.01	0.01	--	--
Co-elution of PCB 61, 70, 76, & 74	1	0	1	0.00	--	--	0.024	0.024
Co-elution of PCB 83 & 99	1	1	0	1.00	0.51	0.51	--	--
Co-elution of PCB 85, 116, & 117	1	1	0	1.00	0.14	0.14	--	--
Co-elution of PCB 86, 87, 97, 108 (IUPAC), 119, & 125	1	1	0	1.00	0.4	0.4	--	--
Co-elution of PCB 88 & 91	1	0	1	0.00	--	--	0.012	0.012
Co-elution of PCB 90, 101, & 113	1	1	0	1.00	0.72	0.72	--	--
Co-elution of PCB 93 & 100	1	1	0	1.00	0.32	0.32	--	--
Co-elution of PCB 98 & 102	1	1	0	1.00	0.01	0.01	--	--

-- = not applicable
fw = fresh weight
IUPAC = International Union of Pure and Applied Chemistry
PCB = polychlorinated biphenyl
RCBRA = River Corridor Baseline Risk Assessment

Table 6-33. Summary of Near-Shore Sucker Tissue Data Collected for the 100-B/C Pilot Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	1	1	0	1.00	145	145	--	--
Antimony	1	1	0	1.00	0.00491	0.00491	--	--
Arsenic	1	1	0	1.00	0.105	0.105	--	--
Barium	6	6	0	1.00	0.269	4.95	--	--
Beryllium	1	1	0	1.00	0.012	0.012	--	--
Cadmium	6	6	0	1.00	0.00333	0.032	--	--
Chromium	6	6	0	1.00	0.03	0.952	--	--
Copper	1	1	0	1.00	0.728	0.728	--	--
Lead	6	6	0	1.00	0.0101	0.222	--	--
Manganese	6	6	0	1.00	0.821	12.1	--	--
Mercury	6	3	3	0.50	0.0102	0.026	0.0111	0.0111
Nickel	6	6	0	1.00	0.0262	0.342	--	--
Selenium	6	5	1	0.83	0.0775	0.548	0.0444	0.0444
Silver	6	2	4	0.33	0.00291	0.00397	0.00222	0.00988
Thallium	6	5	1	0.83	0.00477	0.395	0.00444	0.00444
Uranium (inorganic)	6	4	2	0.67	0.00699	0.0408	0.00222	0.00222
Zinc	1	1	0	1.00	20.3	20.3	--	--
Organics (mg/kg-fw)								
Aroclor-1254	3	0	3	0.00	--	--	1.98	3.3
Aroclor-1260	3	0	3	0.00	--	--	1.98	3.3
Radionuclides (pCi/g-fw)								
Strontium-90	1	0	1	0.00	--	--	0.0107	0.0107
Technetium-99	1	0	1	0.00	--	--	0.153	0.153

-- = not applicable
fw = fresh weight

Table 6-34. Summary of Near-Shore Sucker Kidney Tissue Data Collected for the RCBRA Project.

Analyte Name	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	9	7	2	0.78	8.7	47.1	19.9	133
Antimony	9	0	9	0.00	--	--	1.3	10
Arsenic	9	2	7	0.22	3.2	4.1	1.7	16.7
Barium	9	9	0	1.00	0.27	11.7	--	--
Beryllium	9	0	9	0.00	--	--	0.04	1.7
Bismuth	9	0	9	0.00	--	--	2.2	20
Boron	9	0	9	0.00	--	--	1.6	16.7
Cadmium	9	8	1	0.89	0.18	2.8	1.7	1.7
Calcium	9	9	0	1.00	72.8	1,170	--	--
Chromium	9	8	1	0.89	0.36	3.6	6.7	6.7
Cobalt	9	0	9	0.00	--	--	0.38	6.7
Copper	9	8	1	0.89	1.7	10.4	6.7	6.7
Iron	9	9	0	1.00	51.6	238	--	--
Lead	9	0	9	0.00	--	--	1.2	10
Lithium	9	2	7	0.22	0.29	0.74	0.17	1.3
Magnesium	9	9	0	1.00	194	418	--	--
Manganese	9	9	0	1.00	2.5	8.5	--	--
Mercury	5	0	5	0.00	--	--	0.02	0.1
Molybdenum	9	0	9	0.00	--	--	0.54	10
Nickel	9	0	9	0.00	--	--	0.79	6.7
Phosphorus	9	9	0	1.00	2,970	6,930	--	--
Potassium	9	9	0	1.00	2,460	5,360	--	--
Selenium	9	5	4	0.56	2.2	5.4	2.6	20
Silicon	9	6	3	0.67	15	79.9	10.6	133
Silver	9	1	8	0.11	0.38	0.38	0.38	3.3
Sodium	9	9	0	1.00	835	2,950	--	--
Strontium (elemental)	9	9	0	1.00	0.27	15.5	--	--
Thallium	9	0	9	0.00	--	--	2.4	20
Tin	9	7	2	0.78	3.6	56.8	2.8	3.8
Uranium (inorganic)	9	0	9	0.00	--	--	10.5	66.7
Vanadium	9	0	9	0.00	--	--	0.42	4.7
Zinc	9	9	0	1.00	36.6	216	--	--

-- = not applicable
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 6-35. Summary of Near-Shore Sucker Liver Tissue Data Collected for the RCBRA Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	7	6	1	0.86	20.4	139	14.8	14.8
Antimony	7	0	7	0.00	--	--	1.1	2.9
Arsenic	7	0	7	0.00	--	--	1.6	3.7
Barium	7	7	0	1.00	0.66	3.9	--	--
Beryllium	7	0	7	0.00	--	--	0.04	0.19
Bismuth	7	0	7	0.00	--	--	2.1	4.7
Boron	7	0	7	0.00	--	--	1.5	3.5
Cadmium	7	4	3	0.57	0.14	0.36	0.16	0.27
Calcium	7	7	0	1.00	66.1	3,570	--	--
Chromium	7	6	1	0.86	0.56	1.6	0.74	0.74
Cobalt	7	0	7	0.00	--	--	0.36	0.82
Copper	7	6	1	0.86	4.1	11.2	0.74	0.74
Iron	7	6	1	0.86	48.7	271	16.7	16.7
Lead	7	0	7	0.00	--	--	1.1	2.5
Lithium	7	1	6	0.14	0.39	0.39	0.16	0.36
Magnesium	7	7	0	1.00	52	350	--	--
Manganese	7	7	0	1.00	1.1	12	--	--
Mercury	7	0	7	0.00	--	--	0.01	0.1
Molybdenum	7	1	6	0.14	1.1	1.1	0.52	1.2
Nickel	7	0	7	0.00	--	--	0.74	1.7
Phosphorus	7	7	0	1.00	653	4,250	--	--
Potassium	7	7	0	1.00	597	3,790	--	--
Selenium	7	3	4	0.43	2.1	3.6	1.5	3.4
Silicon	7	6	1	0.86	12.9	188	14.8	14.8
Silver	7	0	7	0.00	--	--	0.36	0.82
Sodium	7	7	0	1.00	183	1,590	--	--
Strontium (elemental)	7	7	0	1.00	0.27	5.3	--	--
Thallium	7	0	7	0.00	--	--	2.2	5.2
Tin	7	6	1	0.86	2.9	7.8	2.6	2.6
Uranium (inorganic)	7	0	7	0.00	--	--	7.4	22.8
Vanadium	7	0	7	0.00	--	--	0.4	0.91
Zinc	7	7	0	1.00	12.3	59.7	--	--

-- = not applicable
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 6-36. Summary of Near-Shore Amphibian Tissue Data Collected for the RCBRA Project.

Analyte	Number of Samples	Number of Detects	Number of Nondetects	Detect Frequency	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect
Inorganics (mg/kg-fw)								
Aluminum	4	4	0	1.00	12	32	--	--
Antimony	4	0	4	0.00	--	--	0.22	0.22
Arsenic	4	2	2	0.50	0.49	0.57	0.4	0.4
Barium	4	4	0	1.00	1.6	3.1	--	--
Beryllium	4	1	3	0.25	0.01	0.01	0.01	0.01
Bismuth	4	0	4	0.00	--	--	0.39	0.4
Boron	4	2	2	0.50	0.4	0.98	0.35	0.36
Cadmium	4	4	0	1.00	0.11	0.16	--	--
Calcium	4	4	0	1.00	1,960	4,440	--	--
Chromium	4	0	4	0.00	--	--	0.14	0.29
Cobalt	4	3	1	0.75	0.12	0.17	0.08	0.08
Copper	4	4	0	1.00	0.62	1.1	--	--
Iron	4	4	0	1.00	28.1	64.3	--	--
Lead	4	3	1	0.75	0.37	0.48	0.33	0.33
Lithium	4	3	1	0.75	0.06	0.22	0.03	0.03
Magnesium	4	4	0	1.00	156	257	--	--
Manganese	4	4	0	1.00	4.3	9.8	--	--
Molybdenum	4	3	1	0.75	0.21	0.29	0.16	0.16
Nickel	4	0	4	0.00	--	--	0.26	0.27
Phosphorus	4	4	0	1.00	608	926	--	--
Potassium	4	4	0	1.00	739	1,100	--	--
Selenium	4	4	0	1.00	1.3	2.6	--	--
Silicon	4	4	0	1.00	44.5	103	--	--
Silver	4	0	4	0.00	--	--	0.09	0.09
Sodium	4	4	0	1.00	1,020	1,420	--	--
Strontium (elemental)	4	4	0	1.00	3.9	7.8	--	--
Thallium	4	0	4	0.00	--	--	0.78	0.8
Tin	4	0	4	0.00	--	--	1.1	2.4
Uranium (inorganic)	4	0	4	0.00	--	--	1.4	1.4
Vanadium	4	3	1	0.75	0.19	0.22	0.08	0.08
Zinc	4	4	0	1.00	10.4	15.6	--	--

-- = not applicable
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 6-37. Summary of Analytes That Did Not Meet Target Sediment Practical Quantitation Limits in Near-Shore Samples.

Analyte	Performance Requirements [a]		Highest Nondetect Value	Consider as Uncertainty?	Reason
	Target PQL	Sediment Ecological Protection Value			
Polychlorinated Biphenyls (mg/kg)					
Aroclor-1232	0.0165	0.021	0.047	Yes	Greater than target PQL and ecological protection level
Aroclor-1242	0.0165	0.021	0.047	Yes	
Semivolatile Organics (mg/kg)					
2-Nitroaniline	1.61	NA	2.6	Yes	Greater than target PQL and no ecological protection level
2,4-Dinitrophenol	1.61	NA	2.6	Yes	
2,4,5-Trichlorophenol	1.61	NA	2.6	Yes	
3-Nitroaniline	1.61	NA	2.6	Yes	
4-Nitroaniline	1.61	NA	2.6	Yes	
4-Nitrophenol	1.61	NA	2.6	Yes	
4,6-Dinitro-2-methylphenol	1.61	NA	2.6	Yes	
Pentachlorophenol	1.61	NA	2.6	Yes	

= Exceeds ecological protection value.

[a] Values from Table 2-4 of DOE/RL-2005-42, *100 Area and 300 Area Component of the RCBRA Sampling and Analysis Plan*, Rev. 1, U.S. Department of Energy, Richland Operations, Richland, Washington.

NA = not available
PQL = practical quantitation limit

Table 6-38. Summary of Analytes That Did Not Meet Target Water Practical Quantitation Limits in Near-Shore Samples. (4 Pages)

Analyte	Performance Requirements [a]		Highest Nondetect Value		Consider as Uncertainty?	Reason
	Target PQL	Water Ecological Protection Value	Pore Water	Surface Water		
Pesticide (µg/L)						
Methoxychlor	0.05	0.03	0.5	0.3	Yes	Greater than target PQL and ecological protection level
Radionuclides (pCi/L)						
Carbon-14	50	2,000	75.5	Met PQL	No	Greater than target PQL but less than ecological protection level
Cesium-137	15	42.6	29	25	No	Greater than target PQL but less than ecological protection level
Cobalt-60	25	3,760	32	26	No	Greater than target PQL but less than ecological protection level

Table 6-38. Summary of Analytes That Did Not Meet Target Water Practical Quantitation Limits in Near-Shore Samples. (4 Pages)

Analyte	Performance Requirements [a]		Highest Nondetect Value		Consider as Uncertainty?	Reason
	Target PQL	Water Ecological Protection Value	Pore Water	Surface Water		
Semivolatile Organics (µg/L)						
1,2-Dichlorobenzene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
1,2,4-Trichlorobenzene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
1,3-Dichlorobenzene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
1,4-Dichlorobenzene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
2-Chloronaphthalene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
2-Chlorophenol	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
2-Methylnaphthalene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
2-Methylphenol [cresol, o-]	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
2-Nitroaniline	26	NA	31	28	Yes	Greater than target PQL and no ecological protection level
2-Nitrophenol	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
2,4-Dichlorophenol	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
2,4-Dimethylphenol	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
2,4-Dinitrophenol	26	NA	31	28	Yes	Greater than target PQL and no ecological protection level
2,4-Dinitrotoluene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
2,4,5-Trichlorophenol	26	NA	31	28	Yes	Greater than target PQL and no ecological protection level
2,4,6-Trichlorophenol	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
2,6-Dinitrotoluene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
3-Nitroaniline	26	NA	31	28	Yes	Greater than target PQL and no ecological protection level
3,3'-Dichlorobenzidine	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
4-Bromophenylphenyl ether	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level

Table 6-38. Summary of Analytes That Did Not Meet Target Water Practical Quantitation Limits in Near-Shore Samples. (4 Pages)

Analyte	Performance Requirements [a]		Highest Nondetect Value		Consider as Uncertainty?	Reason
	Target PQL	Water Ecological Protection Value	Pore Water	Surface Water		
4-Chloro-3-methylphenol	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
4-Chloroaniline	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
4-Chlorophenyl-phenyl ether	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
4-Nitroaniline	26	NA	31	28	Yes	Greater than target PQL and no ecological protection level
4-Nitrophenol	26	NA	31	28	Yes	Greater than target PQL and no ecological protection level
4,6-Dinitro-2-methylphenol	26	NA	31	28	Yes	Greater than target PQL and no ecological protection level
Acenaphthene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Acenaphthylene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Anthracene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Benzo[a]anthracene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Benzo[a]pyrene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Benzo[b]fluoranthene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Benzo[ghi]perylene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Benzo[k]fluoranthene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Bis[2-chloro-1-methylethyl]ether	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Bis[2-Chloroethoxy] methane	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Bis[2-chloroethyl] ether	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Butylbenzylphthalate	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Carbazole	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Chrysene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level

Table 6-38. Summary of Analytes That Did Not Meet Target Water Practical Quantitation Limits in Near-Shore Samples. (4 Pages)

Analyte	Performance Requirements [a]		Highest Nondetect Value		Consider as Uncertainty?	Reason
	Target PQL	Water Ecological Protection Value	Pore Water	Surface Water		
Di-n-octylphthalate	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Dibenz[a,h] anthracene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Dibenzofuran	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Diethylphthalate	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Fluoranthene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Fluorene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Hexachlorobutadiene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Hexachlorocyclo-pentadiene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Hexachloroethane	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Indeno[1,2,3-cd] pyrene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Isophorone	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
N-Nitroso-di-n-dipropylamine	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Naphthalene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Nitrobenzene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Pentachlorophenol	26	NA	31	28	Yes	Greater than target PQL and no ecological protection level
Phenanthrene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Phenol	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level
Pyrene	10	NA	12	11	Yes	Greater than target PQL and no ecological protection level

= Exceeds ecological protection value.

[a] Values from Table 2-3 of DOE/RL-2005-42, *100 Area and 300 Area Component of the RCBRA Sampling and Analysis Plan*, Rev. 1, U.S. Department of Energy, Richland Operations, Richland, Washington.

NA = not available
PQL = practical quantitation limit

Table 6-39. Summary of Analytes That Did Not Meet Target Tissue Practical Quantitation Limits in Near-Shore Samples. (2 Pages)

Analyte	Performance Requirements [a]			Highest Nondetect Value				Consider as Uncertainty?	Reason
				Invertebrates		Vertebrates			
	Target PQL	Invertebrate Ecological Protection Value	Vertebrate Ecological Protection Value	Clam	Mussel	Fish	Amphibian		
Inorganics (mg/kg-fw)									
Antimony	0.6	0.39	1.27	0.94	0.32	10	Met target PQL	Yes	Greater than target PQL and ecological protection level
Arsenic	1	289	668	1.2	All detects	16.7	Met target PQL	No	Greater than target PQL but less than ecological protection level
Beryllium	0.05	NA	NA	Met target PQL	Met target PQL	1.7	Met target PQL	Yes	Greater than target PQL and no ecological protection level
Chromium	0.2	22.1	45.4	0.74	0.27	6.7	0.29	No	Greater than target PQL but less than ecological protection level
Lead	0.5	50.1	102	0.82	Met target PQL	10	Met target PQL	No	Greater than target PQL but less than ecological protection level
Silver	0.2	24.1	49.4	0.26	Met target PQL	3.3	Met target PQL	No	Greater than target PQL but less than ecological protection level
Uranium (inorganic)	5	40.6	129	7.4	Met target PQL	66.7	Met target PQL	No	Greater than target PQL but less than ecological protection level
Vanadium	2.5	4.87	10	Met target PQL	Met target PQL	4.7	Met target PQL	No	Greater than target PQL but less than ecological protection level
Radionuclides (pCi/g-fw)									
Cesium-137	0.1	840	840	0.35	0.22	0.2	Not measured	No	Greater than target PQL but less than ecological protection level
Cobalt-60	0.05	14	14	0.38	0.21	0.25	Not measured	No	Greater than target PQL but less than ecological protection level
Europium-152	0.1	NA	NA	0.91	0.56	0.43	Not measured	Yes	Greater than target PQL and no ecological protection level
Europium-154	0.1	NA	NA	1.1	0.75	0.61	Not measured	Yes	Greater than target PQL and no ecological protection level
Polychlorinated Biphenyl Aroclor Mixtures (mg/kg-fw)									
Aroclor-1016	0.0017	NA	NA	4	0.2	1.7	Not measured	Yes	Greater than target PQL and no ecological protection level
Aroclor-1221	0.0017	NA	NA	4	0.2	1.7	Not measured	Yes	Greater than target PQL and no ecological protection level

Table 6-39. Summary of Analytes That Did Not Meet Target Tissue Practical Quantitation Limits in Near-Shore Samples. (2 Pages)

Analyte	Performance Requirements [a]			Highest Nondetect Value				Consider as Uncertainty?	Reason
				Invertebrates		Vertebrates			
	Target PQL	Invertebrate Ecological Protection Value	Vertebrate Ecological Protection Value	Clam	Mussel	Fish	Amphibian		
Aroclor-1232	0.0017	NA	NA	4	0.2	1.7	Not measured	Yes	Greater than target PQL and no ecological protection level
Aroclor-1242	0.0017	NA	NA	4	0.2	1.7	Not measured	Yes	Greater than target PQL and no ecological protection level
Aroclor-1248	0.0017	NA	NA	4	0.2	1.7	Not measured	Yes	Greater than target PQL and no ecological protection level
Aroclor-1254	0.0017	NA	NA	4	0.2	6.1	Not measured	Yes	Greater than target PQL and no ecological protection level
Aroclor-1260	0.0017	NA	NA	4	0.2	6.1	Not measured	Yes	Greater than target PQL and no ecological protection level
Polychlorinated Biphenyl Congeners (µg/kg-fw)									
2,3,4,5-Tetrachlorobiphenyl	0.01	NA	NA	Not measured	Not measured	0.00003	Not measured	Yes	Greater than target PQL and no ecological protection level
2,4,6-Trichlorobiphenyl	0.01	NA	NA	Not measured	Not measured	0.00003	Not measured	Yes	Greater than target PQL and no ecological protection level
Co-elution of PCB 18 & 30	0.01	NA	NA	Not measured	Not measured	0.00003	Not measured	Yes	Greater than target PQL and no ecological protection level
Co-elution of PCB 61, 70, 76, & 74	0.01	NA	NA	Not measured	Not measured	0.00003	Not measured	Yes	Greater than target PQL and no ecological protection level

= Exceeds ecological protection value.

[a] Values from Table 2-5 of DOE/RL-2005-42, *100 Area and 300 Area Component of the RCBRA Sampling and Analysis Plan*, Rev. 1, U.S. Department of Energy, Richland Operations, Richland, Washington; and Table 5-13 of BHI-01757, *DQO Summary Report for the 100 Area and 300 Area Component of the RCBRA*, Rev. 0, January 2005, Bechtel Hanford, Inc., Richland, Washington.

fw = fresh weight
NA = not available
PCB = polychlorinated biphenyl
PQL = practical quantitation limit

Table 6-40. Summary of Statistical Comparisons to Reference Sediment Data Collected for the RCBRA Project. (6 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Inorganics (mg/kg)																
Aluminum	57	57	2,320	13,000	12	12	3,000	8,260	0.713	0.598	0.198	--	--	No	No	Not greater than reference, 3 of 3 tests
Antimony	57	0	[0.41]	[1.7]	12	1	[0.39]	[0.98]	No test	No test	No test	No test	No test	No	No	Not detected
Arsenic	57	57	1.1	18	12	12	1.7	10.2	0.887	0.943	0.680	--	--	No	No	Not greater than reference, 3 of 3 tests
Barium	57	57	25.6	209	12	12	35.3	142	0.591	0.844	0.373	--	--	No	No	Not greater than reference, 3 of 3 tests
Beryllium	57	55	[0.05]	0.9	12	12	0.08	0.71	0.3847	0.240	0.101	--	--	No	No	Not greater than reference, 3 of 3 tests
Bismuth	57	1	[0.5]	[2.7]	12	0	[0.58]	[1.6]	--	--	--	0.386	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Boron	57	38	[0.24]	5.1	12	7	0.31	1.9	0.183	0.655	0.303	0.828	Equal	No	No	Not greater than reference, 4 of 4 tests
Cadmium	57	43	[0.07]	2.4	12	11	[0.08]	2.2	0.829	0.331	0.559	0.393	Equal	No	No	Not greater than reference, 4 of 4 tests
Calcium	57	57	1,510	6,810	12	12	2,180	4,800	No test	No test	No test	No test	No test	No	No	Essential nutrient
Calculated total uranium	47	46	[0.482]	15.4	10	10	1.01	2.93	0.841	0.707	0.19	--	--	No	No	Not greater than reference, 3 of 3 tests
Chromium	57	57	3.3	286	12	12	6.4	21	0.428	0.0633	0.0389	--	--	See Table 6-74	Yes	Greater than reference based on 1 of 3 tests
Cobalt	57	57	2.7	12.4	12	12	3.5	8.2	0.459	0.804	0.559	--	--	No	No	Not greater than reference, 3 of 3 tests
Copper	57	57	4.2	64	12	12	7	24.7	0.516	0.959	0.245	--	--	No	No	Not greater than reference, 3 of 3 tests
Hexavalent chromium	55	5	[0.05]	8.41	10	0	[0.05]	[0.5]	--	--	--	0.728	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Iron	57	57	7,870	29,400	12	12	8,600	25,300	0.309	0.844	0.680	--	--	No	No	Not greater than reference, 3 of 3 tests
Lead	57	57	1.8	158	12	12	5.2	63.7	0.806	0.598	0.826	--	--	No	No	Not greater than reference, 3 of 3 tests
Lithium	57	57	2.4	14.8	12	12	3.6	12.9	0.946	0.959	0.680	--	--	No	No	Not greater than reference, 3 of 3 tests
Magnesium	57	57	1,950	7,320	12	12	2,120	4,530	No test	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	57	57	87	924	12	12	128	577	0.648	0.844	0.680	--	--	No	No	Not greater than reference, 3 of 3 tests
Mercury	57	15	[0.01]	0.2	12	3	[0.01]	0.08	--	0.761	0.826	0.789	Equal	No	No	Not greater than reference, 3 of 3 tests
Molybdenum	57	32	0.23	1.5	12	8	0.3	1.2	0.694	0.844	0.826	0.727	Equal	No	No	Not greater than reference, 4 of 4 tests
Nickel	57	57	5.6	32.1	12	12	9.3	23.3	0.967	0.844	0.457	--	--	No	No	Not greater than reference, 3 of 3 tests
Phosphorus	57	57	364	1,300	12	12	333	1,390	0.116	0.283	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Potassium	57	57	255	1,620	12	12	302	1,450	No test	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	57	8	[0.37]	[4.6]	12	0	[0.38]	[4.1]	--	--	--	0.377	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Silicon	57	57	261	3,100	12	12	336	1,690	No test	No test	No test	No test	No test	No	No	Sediment property measurement
Silver	57	3	[0.07]	0.844	12	0	[0.08]	[0.2]	--	--	--	0.973	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Sodium	57	57	48.2	289	12	12	82.1	158	No test	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	57	57	9.4	45.6	12	12	12.5	28.8	0.582	0.598	0.373	--	--	No	No	Not greater than reference, 3 of 3 tests
Thallium	57	1	[0.65]	[3.8]	12	1	[0.68]	[2.2]	--	--	0.778	0.773	Equal	No	No	Not greater than reference, 2 of 2 tests
Tin	57	26	0.83	3.7	12	9	0.83	17.1	--	0.655	1	0.125	Equal	No	No	Not greater than reference, 3 of 3 tests
Titanium	18	18	408	2,030	3	3	379	828	0.035	0.511	0.0421	--	--	See Table 6-74	Yes	Greater than reference based on 2 of 3 tests
Uranium (inorganic)	57	7	[0.87]	[9.1]	12	0	[1]	[5.4]	--	--	--	0.450	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Vanadium	57	57	15.7	66	12	12	15.9	58.9	0.136	0.598	0.680	--	--	No	No	Not greater than reference, 3 of 3 tests
Zinc	57	57	26.8	800	12	12	49.7	358	0.821	0.844	0.680	--	--	No	No	Not greater than reference, 3 of 3 tests
Zirconium	18	18	4.5	33.6	3	3	3.4	7.7	0.134	0.511	0.165	--	--	No	No	Not greater than reference, 3 of 3 tests

Table 6-40. Summary of Statistical Comparisons to Reference Sediment Data Collected for the RCBRA Project. (6 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Organics (mg/kg)																
1,2-Dichlorobenzene	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
1,2,4-Trichlorobenzene	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
1,3-Dichlorobenzene	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
1,4-Dichlorobenzene	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
2-Chloronaphthalene	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
2-Chlorophenol	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
2-Methylnaphthalene	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
2-Methylphenol [cresol, o-]	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
2-Nitroaniline	47	0	[0.83]	[2.6]	10	0	[0.96]	[1.2]	No test	No test	No test	No test	No test	No	No	Not detected
2-Nitrophenol	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dichlorophenol	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dimethylphenol	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrophenol	47	0	[0.83]	[2.6]	10	0	[0.96]	[1.2]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrotoluene	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
2,4,5-Trichlorophenol	47	0	[0.83]	[2.6]	10	0	[0.96]	[1.2]	No test	No test	No test	No test	No test	No	No	Not detected
2,4,6-Trichlorophenol	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
2,6-Dinitrotoluene	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
3-Nitroaniline	47	0	[0.83]	[2.6]	10	0	[0.96]	[1.2]	No test	No test	No test	No test	No test	No	No	Not detected
3,3'-Dichlorobenzidine	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
3+4 Methylphenol [cresol, m+p]	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
4-Bromophenylphenyl ether	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chloro-3-methylphenol	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chloroaniline	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chlorophenylphenyl ether	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
4-Nitroaniline	47	0	[0.83]	[2.6]	10	0	[0.96]	[1.2]	No test	No test	No test	No test	No test	No	No	Not detected
4-Nitrophenol	47	0	[0.83]	[2.6]	10	0	[0.96]	[1.2]	No test	No test	No test	No test	No test	No	No	Not detected
4,6-Dinitro-2-methylphenol	47	0	[0.83]	[2.6]	10	0	[0.96]	[1.2]	No test	No test	No test	No test	No test	No	No	Not detected
Acenaphthene	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Acenaphthylene	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Aldrin	47	0	[0.0013]	[0.0033]	10	1	[0.00047]	[0.0019]	No test	No test	No test	No test	No test	No	No	Not detected
Alpha-BHC	47	2	[0.0013]	[0.0033]	10	0	[0.00047]	[0.0019]	--	--	--	0.778	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
alpha-Chlordane	47	1	0.00091	[0.0033]	10	0	[0.00047]	[0.0019]	--	--	--	0.389	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Anthracene	47	2	0.028	[1.1]	10	0	[0.38]	[0.47]	--	--	--	0.778	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Aroclor-1016	47	0	[0.014]	[0.044]	10	0	[0.016]	[0.047]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1221	47	0	[0.014]	[0.044]	10	0	[0.016]	[0.047]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1232	47	0	[0.014]	[0.044]	10	0	[0.016]	[0.047]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1242	47	0	[0.014]	[0.044]	10	0	[0.016]	[0.047]	No test	No test	No test	No test	No test	No	No	Not detected

Table 6-40. Summary of Statistical Comparisons to Reference Sediment Data Collected for the RCBRA Project. (6 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Aroclor-1248	47	0	[0.014]	[0.044]	10	0	[0.016]	[0.047]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1254	47	2	0.0085	[0.044]	10	0	[0.016]	[0.047]	--	--	--	0.778	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Aroclor-1260	47	1	0.011	[0.044]	10	0	[0.016]	[0.047]	--	--	--	0.389	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Benzo[a]anthracene	47	2	0.23	[1.1]	10	0	[0.38]	[0.47]	--	--	--	0.778	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Benzo[a]pyrene	47	2	0.22	[1.1]	10	0	[0.38]	[0.47]	--	--	--	0.778	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Benzo[b]fluoranthene	47	2	0.18	[1.1]	10	0	[0.38]	[0.47]	--	--	--	0.778	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Benzo[ghi]perylene	47	2	0.1	[1.1]	10	0	[0.38]	[0.47]	--	--	--	0.778	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Benzo[k]fluoranthene	47	2	0.21	[1.1]	10	0	[0.38]	[0.47]	--	--	--	0.778	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
beta-1,2,3,4,5,6-Hexachlorocyclohexane	47	4	[0.0013]	0.008	10	0	[0.00047]	[0.0019]	--	--	--	0.783	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Bis[2-chloro-1-methylethyl]ether	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-Chloroethoxy]methane	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-chloroethyl] ether	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-ethylhexyl] phthalate	47	45	0.026	3.3	10	8	0.041	[0.45]	0.228	0.375	0.243	0.277	Equal	No	No	Not greater than reference, 4 of 4 tests
Butylbenzylphthalate	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Carbazole	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Chrysene	47	2	0.3	[1.1]	10	0	[0.38]	[0.47]	--	--	--	0.778	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Delta-BHC	47	1	[0.0013]	[0.0033]	10	0	[0.00047]	[0.0019]	--	--	--	0.389	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Di-n-butylphthalate	47	4	0.031	[1.1]	10	2	0.022	[0.47]	--	--	1	0.612	Equal	No	No	Not greater than reference, 2 of 2 tests
Di-n-octylphthalate	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Dibenz[a,h]anthracene	47	1	0.062	[1.1]	10	0	[0.38]	[0.47]	--	--	--	0.389	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Dibenzofuran	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Dichlorodiphenyl-dichloroethane	47	2	[0.0013]	[0.0033]	10	0	[0.00047]	[0.0019]	--	--	--	0.778	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Dichlorodiphenyl-dichloroethylene	47	11	0.00038	0.0035	10	1	[0.00047]	0.0022	--	0.375	0.429	0.605	Equal	No	No	Not greater than reference, 3 of 3 tests
Dichlorodiphenyl-trichloroethane	47	4	0.00051	0.11	10	1	[0.00047]	0.0022	--	--	0.649	0.642	Equal	No	No	Not greater than reference, 2 of 2 tests
Dieldrin	47	0	[0.0013]	[0.0033]	10	0	[0.00047]	[0.0019]	No test	No test	No test	No test	No test	No	No	Not detected
Diethylphthalate	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Dimethyl phthalate	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Endosulfan I	47	6	0.00039	0.0054	10	1	[0.00047]	0.0027	--	--	0.541	0.773	Equal	No	No	Not greater than reference, 2 of 2 tests
Endosulfan II	47	0	[0.0013]	[0.0033]	10	0	[0.00047]	[0.0019]	No test	No test	No test	No test	No test	No	No	Not detected
Endosulfan sulfate	47	0	[0.0013]	[0.0033]	10	0	[0.00047]	[0.0019]	No test	No test	No test	No test	No test	No	No	Not detected
Endrin	47	1	0.0011	[0.0033]	10	0	[0.00047]	[0.0019]	--	--	--	0.389	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Endrin aldehyde	47	1	[0.0013]	[0.0033]	10	0	[0.00047]	[0.0019]	--	--	--	0.389	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Endrin ketone	47	0	[0.0013]	[0.0033]	10	0	[0.00047]	[0.0019]	No test	No test	No test	No test	No test	No	No	Not detected
Fluoranthene	47	2	0.19	[1.1]	10	0	[0.38]	[0.47]	--	--	--	0.778	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Fluorene	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected

Table 6-40. Summary of Statistical Comparisons to Reference Sediment Data Collected for the RCBRA Project. (6 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Gamma-BHC (lindane)	47	1	[0.0013]	0.0039	10	0	[0.00047]	[0.0019]	--	--	--	0.389	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
gamma-Chlordane	47	2	0.00062	[0.0033]	10	0	[0.00047]	[0.0019]	--	--	--	0.778	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Heptachlor	47	0	[0.0013]	[0.0033]	10	0	[0.00047]	[0.0019]	No test	No test	No test	No test	No test	No	No	Not detected
Heptachlor epoxide	47	0	[0.0013]	[0.0033]	10	0	[0.00047]	[0.0019]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorobenzene	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorobutadiene	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorocyclo-pentadiene	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachloroethane	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Indeno[1,2,3-cd]pyrene	47	2	0.1	[1.1]	10	0	[0.38]	[0.47]	--	--	--	0.778	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Isophorone	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Methoxychlor	47	0	[0.0013]	[0.0033]	10	0	[0.00047]	[0.0019]	No test	No test	No test	No test	No test	No	No	Not detected
N-Nitroso-di-n-dipropylamine	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
N-Nitrosodiphenylamine	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Naphthalene	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Nitrobenzene	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Pentachlorophenol	47	0	[0.83]	[2.6]	10	0	[0.96]	[1.2]	No test	No test	No test	No test	No test	No	No	Not detected
Phenanthrene	47	1	0.33	[1.1]	10	0	[0.38]	[0.47]	--	--	--	0.389	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Phenol	47	0	[0.33]	[1.1]	10	0	[0.38]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Pyrene	47	2	0.3	[1.1]	10	0	[0.38]	[0.47]	--	--	--	0.778	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Toxaphene	47	0	[0.013]	[0.033]	10	0	[0.0047]	[0.019]	No test	No test	No test	No test	No test	No	No	Not detected
Total organic carbon	52	52	120	45200	12	12	1660	13700	No test	No test	No test	No test	No test	No	No	Sediment property measurement
Total petroleum hydrocarbons	47	1	[138]	[323]	10	0	[154]	[188]	--	--	--	0.389	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Total petroleum hydrocarbons - diesel range	47	37	1.5	50	10	10	1.9	20	0.723	0.912	0.366	--	--	No	No	Not greater than reference, 3 of 3 tests
Total petroleum hydrocarbons - gasoline range	47	9	0.0066	0.21	10	0	[0.033]	[0.12]	--	--	--	0.303	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Total petroleum hydrocarbons - motor oil (high boiling)	1	1	8.7	8.7	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See Table 6-74	Yes	No reference data
Radionuclides (pCi/g)																
Americium-241	47	0	[0.01]	[0.36]	10	0	[0.031]	[0.47]	No test	No test	No test	No test	No test	No	No	Not detected
Antimony-125	47	0	[0.014]	[0.23]	10	0	[0.036]	[0.13]	No test	No test	No test	No test	No test	No	No	Not detected
Beryllium-7	47	7	[-0.625]	[1.3]	10	2	[0.17]	[0.7]	No test	No test	No test	No test	No test	No	No	Short half-life
Carbon-14	5	3	[-0.625]	230	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See Table 6-74	Yes	No reference data
Cesium-134	47	0	[0.01]	[0.19]	10	0	[0.019]	[0.078]	No test	No test	No test	No test	No test	No	No	Short half-life
Cesium-137	47	37	[0.011]	0.775	10	4	[0.028]	0.566	--	0.375	0.677	0.0369	Greater	See Table 6-74	Yes	Greater than reference based on 1 of 3 tests
Cobalt-60	47	6	[0.007]	[0.18]	10	1	[0.02]	[0.059]	--	--	0.697	0.773	Equal	No	No	Not greater than reference, 2 of 2 tests
Europium-152	47	8	[0.022]	0.541	10	1	[0.047]	0.598	--	--	1	0.934	Equal	No	No	Not greater than reference, 3 of 3 tests
Europium-154	47	1	[0.023]	[0.52]	10	0	[0.067]	[0.2]	--	--	--	0.389	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Europium-155	47	0	[0.029]	[0.24]	10	0	[0.073]	[0.2]	No test	No test	No test	No test	No test	No	No	Not detected

Table 6-40. Summary of Statistical Comparisons to Reference Sediment Data Collected for the RCBRA Project. (6 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Plutonium-238	2	0	[-0.006]	[0]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Plutonium-239/240	2	1	[0]	0.521	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See Table 6-74	Yes	No reference data
Potassium-40	47	47	5.02	25.3	10	10	7.36	23.7	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-226	47	47	0.298	1.15	10	10	0.529	1.2	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-228	47	47	0.434	2.83	10	10	0.567	2.33	No test	No test	No test	No test	No test	No	No	Background radionuclide
Ruthenium-106	47	0	[0.056]	[1]	10	0	[0.12]	[0.47]	No test	No test	No test	No test	No test	No	No	Short half-life
Strontium-90	47	6	[-0.083]	1.49	10	1	[-0.066]	5.5	--	--	1	0.773	Equal	No	No	Not greater than reference, 2 of 2 tests
Technetium-99	3	0	[0.0047]	[0.12]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Thorium-228	47	35	[0.047]	2.14	10	9	0.602	1.39	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-230	47	28	[-0.062]	0.908	10	7	[0.315]	0.754	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-232	47	38	[0.215]	1.92	10	9	[0.378]	1.1	No test	No test	No test	No test	No test	No	No	Background radionuclide
Uranium-233/234	47	46	[0.217]	4.31	10	10	0.251	1.08	0.725	0.375	0.152	--	--	No	No	Not greater than reference, 3 of 3 tests
Uranium-235	47	5	[0]	0.252	10	1	[0]	[0.076]	--	--	0.42	0.612	Equal	No	No	Not greater than reference, 2 of 2 tests
Uranium-238	47	46	[0.162]	5.12	10	10	0.329	0.975	0.851	0.707	0.190	--	--	No	No	Not greater than reference, 3 of 3 tests
Anions (mg/kg)																
Chloride	52	52	0.125	11.6	12	12	0.298	11.2	0.3784	0.848	0.813	--	--	No	No	Not greater than reference, 3 of 3 tests
Fluoride	52	17	0.0904	[2.4]	12	3	0.0786	[1.38]	--	0.0628	0.0175	0.863	Equal	See Table 6-74	Yes	Greater than reference based on 1 of 3 tests
Nitrogen in ammonia	52	46	0.447	10.4	12	11	0.376	12.2	0.0707	0.284	1	0.847	Equal	No	No	Not greater than reference, 4 of 4 tests
Nitrogen in nitrate	52	51	0.0831	26.3	12	10	0.158	19.2	0.2707	0.602	0.658	0.156	Equal	No	No	Not greater than reference, 4 of 4 tests
Nitrogen in nitrite	52	31	0.0405	1.69	12	2	0.0797	[1.38]	--	0.0628	0.0177	0.0181	Greater	See Table 6-74	Yes	Greater than reference based on 2 of 3 tests
Nitrogen, Kjeldahl total	52	52	47.1	3,290	12	12	164	1,140	No test	No test	No test	No test	No test	No	No	Sediment property measurement
Sulfate	52	52	0.799	51.9	12	12	2.14	53.1	0.6378	0.602	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Physical Properties (%)																
Cumulative percent retained on No. 100 screen	52	52	13.3	99.8	12	12	44.4	98.9	No test	No test	No test	No test	No test	No	No	Physical measurement
Cumulative percent retained on No. 16 screen	52	52	0	78.5	12	12	0	89.4	No test	No test	No test	No test	No test	No	No	Physical measurement
Cumulative percent retained on No. 200 screen	52	52	72.8	100	12	12	88.3	99.7	No test	No test	No test	No test	No test	No	No	Physical measurement
Cumulative percent retained on No. 30 screen	52	52	0.28	85.8	12	12	0.37	94.3	No test	No test	No test	No test	No test	No	No	Physical measurement
Cumulative percent retained on No. 50 screen	52	52	3.95	94.8	12	12	6.74	97.3	No test	No test	No test	No test	No test	No	No	Physical measurement
Cumulative percent retained on No. 8 screen	52	52	0	71	12	12	0	73.7	No test	No test	No test	No test	No test	No	No	Physical measurement
Fraction coarse sand	52	52	0.25	39.3	12	12	0.37	11.2	No test	No test	No test	No test	No test	No	No	Physical measurement
Fraction coarse silt/silt/clay (less than 0.074 mm)	52	52	0	27.2	12	12	0.27	11.7	No test	No test	No test	No test	No test	No	No	Physical measurement
Fraction fine sand	52	52	3.64	79.2	12	12	1.55	69.3	No test	No test	No test	No test	No test	No	No	Physical measurement

Table 6-40. Summary of Statistical Comparisons to Reference Sediment Data Collected for the RCBRA Project. (6 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Fraction granules (greater than 2.38 mm)	52	52	0	71	12	12	0	73.7	No test	No test	No test	No test	No test	No	No	Physical measurement
Fraction medium sand	52	52	2.59	73	12	12	1.59	69.4	No test	No test	No test	No test	No test	No	No	Physical measurement
Fraction total sand	52	52	27.9	100	12	12	25.7	99.3	No test	No test	No test	No test	No test	No	No	Physical measurement
Fraction very coarse sand	52	52	0	39.1	12	12	0	15.7	No test	No test	No test	No test	No test	No	No	Physical measurement
Fraction very fine sand	52	52	0.17	59.5	12	12	0.53	43.9	No test	No test	No test	No test	No test	No	No	Physical measurement
Percent moisture (wet sample)	52	52	1.15	67.3	12	12	10.1	33.9	No test	No test	No test	No test	No test	No	No	Sediment property measurement
Other																
Dissolved oxygen (µg/L)	1	1	12,300	12,300	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Physical measurement
pH Measurement (pH)	53	53	6.6	8.74	12	12	6.99	7.89	No test	No test	No test	No test	No test	No	No	Physical measurement
Specific conductance (µS/cm)	1	1	159	159	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Physical measurement
Temperature (° C)	1	1	4.5	4.5	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Physical measurement

[a] Study vs. reference.

[value] = nondetect
BHC = benzene hexachloride
COPC = contaminant of potential concern
NA = not available
No ref data = no reference site data available
No test = no statistical test performed
RCBRA = River Corridor Baseline Risk Assessment

Table 6-41. Summary of Statistical Comparisons to Reference Sediment of the 100-B/C Pilot Project. (2 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Inorganics (mg/kg)															
Antimony	2	2	0.43	0.65	12	1	[0.39]	[0.98]	--	0.275	0.286	0.046	Greater	See text	Greater than reference, 1 of 3 tests
Arsenic	2	2	3.2	6.9	12	12	1.7	10	--	1	1	--	Equal	No	Not greater than reference, 2 of 2 tests
Barium	2	2	770	870	12	12	35	140	--	0.011	0.011	--	Equal	See text	Greater than reference, 2 of 2 tests
Beryllium	2	2	1.4	1.5	12	12	0.08	0.71	--	0.011	0.011	--	Equal	See text	Greater than reference, 2 of 2 tests
Cadmium	2	2	0.64	0.74	12	11	[0.08]	2.2	--	1	1	0.290	Equal	No	Not greater than reference, 3 of 3 tests
Chromium	2	2	68	96	12	12	6.4	21	--	0.011	0.011	--	Equal	See text	Greater than reference, 2 of 2 tests
Copper	2	2	15	17	12	12	7	25	--	1	1	--	Equal	No	Not greater than reference, 2 of 2 tests
Lead	2	2	20	28	12	12	5.2	64	--	1	1	--	Equal	No	Not greater than reference, 2 of 2 tests
Manganese	2	2	560	600	12	12	130	580	--	0.275	0.143	--	Equal	No	Not greater than reference, 2 of 2 tests
Mercury	2	2	0.014	0.016	12	3	[0.01]	0.08	--	1	1	0.210	Equal	No	Not greater than reference, 3 of 3 tests
Nickel	2	2	18	21	12	12	9.3	23	--	0.275	1	--	Equal	No	Not greater than reference, 2 of 2 tests
Selenium	2	2	0.1	0.22	12	0	[0.38]	[4.1]	--	0.011	--	0.008	Greater	See text	Greater than reference, 2 of 2 tests
Silver	2	2	0.023	0.039	12	0	[0.08]	[0.2]	--	0.011	--	0.008	Greater	See text	Greater than reference, 2 of 2 tests
Thallium	2	2	7.4	7.9	12	1	[0.68]	[2.2]	--	0.011	0.022	0.046	Greater	See text	Greater than reference, 3 of 3 tests
Uranium (inorganic)	2	2	2.1	2.6	12	0	[1]	[5.4]	--	0.011	--	0.008	Greater	See text	Greater than reference, 2 of 2 tests
Zinc	2	2	150	180	12	12	50	360	--	1	1	--	Equal	No	Not greater than reference, 2 of 2 tests
Radionuclides (pCi/g)															
Antimony-125	2	0	[-0.026]	[0.0029]	10	0	[0.036]	[0.13]	No test	No test	No test	No test	No test	No	Not detected
Beryllium-7	2	0	[0.011]	[0.089]	10	2	[0.17]	[0.7]	No test	No test	No test	No test	No test	No	Not detected
Cesium-134	2	0	[0.043]	[0.071]	10	0	[0.019]	[0.078]	No test	No test	No test	No test	No test	No	Not detected
Cesium-137	2	2	0.042	0.067	10	4	[0.028]	0.57	--	1	1	0.439	Equal	No	Not greater than reference, 3 of 3 tests
Cobalt-60	2	0	[-0.0049]	[0.017]	10	1	[0.02]	[0.059]	No test	No test	No test	No test	No test	No	Not detected
Europium-152	2	0	[-0.023]	[0.0093]	10	1	[0.047]	0.6	No test	No test	No test	No test	No test	No	Not detected
Europium-154	2	0	[-0.086]	[-0.034]	10	0	[0.067]	[0.2]	No test	No test	No test	No test	No test	No	Not detected
Europium-155	2	0	[0.046]	[0.057]	10	0	[0.073]	[0.2]	No test	No test	No test	No test	No test	No	Not detected
Plutonium-238	2	0	[0.00021]	[0.00026]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected

Table 6-41. Summary of Statistical Comparisons to Reference Sediment of the 100-B/C Pilot Project. (2 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Plutonium-239/240	2	0	[0.00041]	[0.00079]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Potassium-40	2	2	15	18	10	10	7.4	24	No test	No test	No test	No test	No test	No	Background radionuclide
Ruthenium-106	2	0	[-0.028]	[-0.02]	10	0	[0.12]	[0.47]	No test	No test	No test	No test	No test	No	Not detected
Strontium-90	2	0	[0.026]	[0.032]	10	1	[-0.066]	5.5	No test	No test	No test	No test	No test	No	Not detected
Technetium-99	2	1	[0.44]	1.1	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data

[a] Study vs. reference.
[value] = nondetect
-- = not applicable
no ref data = no reference site data available
no test = no statistical test performed

Table 6-42. Summary of Statistical Comparisons to Reference Sediment Data Collected for the 100-NR-2 Project. (3 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Inorganics (mg/kg)															
Antimony	3	3	0.084	0.11	12	1	[0.39]	[0.98]	--	0.081	1	0.013	Greater	See text	Greater than reference, 1 of 3 tests
Arsenic	3	3	2.3	4.1	12	12	1.7	10	0.890	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Barium	3	3	59	100	12	12	35	140	0.332	0.516	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Cadmium	3	3	0.51	1.3	12	11	[0.08]	2.2	0.139	0.371	1	0.438	Equal	No	Not greater than reference, 4 of 4 tests
Chromium	3	3	14	23	12	12	6.4	21	0.036	0.081	0.029	--	Equal	See text	Greater than reference, 2 of 3 tests
Lead	3	3	9.9	24	12	12	5.2	64	0.359	0.516	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Manganese	3	3	260	410	12	12	130	580	0.258	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Mercury	3	3	0.012	0.029	12	3	[0.01]	0.08	--	1	1	0.087	Equal	No	Not greater than reference, 3 of 3 tests
Nickel	3	3	12	22	12	12	9.3	23	0.214	0.516	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Selenium	3	1	[0.2]	0.26	12	0	[0.38]	[4.1]	--	--	--	0.438	Equal	See text	Not greater than reference, 1 of 1 test
Uranium (inorganic)	3	3	0.54	1.4	12	0	[1]	[5.4]	--	0.002	--	0.002	Greater	See text	Greater than reference, 2 of 2 tests
Vanadium	3	3	46	54	12	12	16	59	0.026	0.081	1	--	Equal	See text	Greater than reference, 1 of 3 tests
Zinc	3	3	120	230	12	12	50	360	0.214	0.516	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Organics (mg/kg)															
1,1'-Biphenyl,2,3',4,4',5-pentachloro-	3	0	[0.00014]	[0.0002]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	3	1	[0.00014]	0.00044	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	3	2	[0.00015]	0.00031	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
2,2',3,3',4,4',5,6-Octachlorobiphenyl	3	0	[0.00014]	[0.0002]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,2',3,3',4,4',5-Heptachlorobiphenyl	3	0	[0.00014]	[0.0002]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected

Table 6-42. Summary of Statistical Comparisons to Reference Sediment Data Collected for the 100-NR-2 Project. (3 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
2,2',3,3',4,4'-Hexachlorobiphenyl	3	0	[0.00014]	[0.0002]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,2',3,3',4,5,5',6-Octachlorobiphenyl	3	3	73	100	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	3	0	[0.00014]	[0.0002]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,2',3,4',5,5',6-Heptachlorobiphenyl	3	0	[0.00014]	[0.0002]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,2',3,4,4',5'-Hexachlorobiphenyl	3	3	0.00042	0.00071	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
2,2',3,4,4',5,5'-Heptachlorobiphenyl	3	0	[0.00014]	[0.0002]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,2',3,5'-Tetrachloro-1-1'-biphenyl	3	0	[0.00014]	[0.0002]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,2',4,4',5,5',-Hexachloro-Biphenyl	3	0	[0.00014]	[0.0002]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,2',4,5',6-Pentachlorobiphenyl	3	3	64	77	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
2,2',4,5,5'-Pentachlorobiphenyl	3	0	[0.00014]	[0.0002]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,2',5,5'-Tetrachlorobiphenyl	3	0	[0.00014]	[0.0002]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,2',5-Trichlorobiphenyl	3	0	[0.00014]	[0.0002]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,3',4,4'-Tetrachlorobiphenyl	3	0	[0.00015]	[0.0002]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,3,3',4,4'-Pentachlorobiphenyl	3	0	[0.00014]	[0.0002]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
2,4'-Dichlorobiphenyl	3	1	[0.00014]	0.00063	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
2,4,4'-Trichlorobiphenyl	3	1	[0.00015]	0.00023	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
3,3',4,4',5-Pentachlorobiphenyl	3	1	[0.00015]	0.00021	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
3,3',4,4'-Tetrachlorobiphenyl	3	2	[0.00014]	0.00096	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
Total PCB	3	3	0.049	0.072	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data

Table 6-42. Summary of Statistical Comparisons to Reference Sediment Data Collected for the 100-NR-2 Project. (3 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Radionuclides (pCi/g)															
Strontium-90	4	4	3.9	31	10	1	[-0.066]	5.5	--	0.066	0.011	0.011	Greater	See text	Greater than reference, 2 of 3 tests
Technetium-99	3	0	[-0.21]	[-0.048]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected

[a] Study vs. reference.
[value] = nondetect
-- = not applicable
No ref data = no reference site data available
No test = no statistical test performed
PCB = polychlorinated biphenyl

Table 6-43. Summary of Statistical Comparisons to Reference Pore-Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Inorganics (µg/L)																
Aluminum	51	24	[18.3]	399	10	7	30.3	130	--	0.904	0.579	0.327	Equal	No	No	Not greater than reference, 3 of 3 tests
Antimony	51	0	[2.5]	[4]	10	1	[2.5]	[4]	No test	No test	No test	No test	No test	No	No	Not detected
Arsenic	51	12	[3.1]	[35.8]	10	2	[3.1]	210	--	0.695	1	0.866	Equal	No	No	Not greater than reference, 3 of 3 tests
Barium	51	51	17.4	104	10	10	25.2	79.2	0.694	0.695	0.579	--	--	No	No	Not greater than reference, 3 of 3 tests
Beryllium	51	0	[0.1]	[0.2]	10	1	[0.1]	[0.2]	No test	No test	No test	No test	No test	No	No	Not detected
Bismuth	51	2	[4]	[6.1]	10	0	[4]	[6.1]	--	--	--	0.738	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Boron	51	51	3.1	31.3	10	10	7.4	23.2	0.765	0.930	0.324	--	--	No	No	Not greater than reference, 3 of 3 tests
Cadmium	51	1	[0.3]	0.72	10	1	[0.3]	0.85	--	--	1	0.738	Equal	No	No	Not greater than reference, 2 of 2 tests
Calcium	51	51	18,700	46,500	10	10	19,700	65,300	No test	No test	No test	No test	No test	No	No	Essential nutrient
Calculated total uranium	50	33	[0.149]	141	10	6	[0.117]	4.35	0.417	0.684	0.573	1	Equal	No	No	Not greater than reference, 4 of 4 tests
Chromium	51	15	[0.7]	43.8	10	1	[1.2]	[1.6]	--	0.091	0.110	0.377	Equal	No	No	Not greater than reference, 3 of 3 tests
Cobalt	51	1	[0.5]	1.9	10	0	[0.5]	[1.2]	--	--	--	0.360	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Copper	51	20	[0.7]	6.9	10	5	1	8.9	--	0.695	1	0.778	Equal	No	No	Not greater than reference, 3 of 3 tests
Hexavalent chromium	59	35	[2]	42	12	0	[2]	[3]	--	0.055	--	<0.001	Greater	See Table 6-74	Yes	Greater than reference, 1 of 2 tests
Iron	51	27	[24.3]	8,270	10	4	[24.4]	10,100	--	0.904	1	0.687	Equal	No	No	Not greater than reference, 3 of 3 tests
Lead	51	4	[1.2]	5.1	10	1	[1.6]	[3.1]	--	--	0.697	0.687	Equal	No	No	Not greater than reference, 2 of 2 tests
Lithium	51	47	[0.91]	4.3	10	10	0.97	3.5	0.642	0.747	0.836	--	--	No	No	Not greater than reference, 3 of 3 tests
Magnesium	51	51	4,270	10,400	10	10	4,740	18,000	No test	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	51	51	0.9	1,640	10	10	0.69	1,210	0.378	0.904	0.836	--	--	No	No	Not greater than reference, 3 of 3 tests
Mercury	51	0	[0.1]	[0.1]	10	0	[0.1]	[0.1]	No test	No test	No test	No test	No test	No	No	Not detected
Molybdenum	51	24	[1]	5.9	10	8	[1.3]	6.7	--	0.988	1	0.119	Equal	No	No	Not greater than reference, 3 of 3 tests
Nickel	51	5	[1.3]	2.6	10	0	[1.3]	[2.2]	--	--	--	0.687	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Phosphorus	51	26	[8.3]	98,300	10	4	[8.3]	214	--	0.695	0.836	0.772	Equal	No	No	Not greater than reference, 3 of 3 tests
Potassium	51	49	[540]	3,000	10	9	[540]	4,120	No test	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	51	2	[2.6]	4.9	10	1	[3.6]	9.8	--	--	1	0.990	Equal	No	No	Not greater than reference, 2 of 2 tests
Silicon	51	51	2,190	11,900	10	10	2,170	13,000	No test	No test	No test	No test	No test	No	No	Water property measurement
Silver	51	1	[0.5]	[1.4]	10	0	[0.5]	[1.4]	--	--	--	0.360	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Sodium	51	50	2,120	14,200	10	10	2,060	16,400	No test	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	51	51	90.2	214	10	10	91.2	326	0.450	0.365	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Thallium	51	1	[5.5]	[6.4]	10	2	[5.6]	10	--	--	1	0.107	Equal	No	No	Not greater than reference, 2 of 2 tests
Tin	51	4	[3.5]	10.1	10	0	[3.6]	[5.2]	--	--	--	0.828	Equal	See Table 6-74	Yes	Not greater than reference, 1 test

Table 6-43. Summary of Statistical Comparisons to Reference Pore-Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Uranium (inorganic)	51	3	[13.6]	137	10	0	[13.6]	[20.6]	--	--	--	0.990	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Vanadium	51	18	[0.5]	5.3	10	3	[0.6]	4.3	--	0.904	0.697	0.967	Equal	No	No	Not greater than reference, 3 of 3 tests
Zinc	51	44	[0.5]	39.2	10	10	2	11.8	0.977	0.981	0.697	--	--	No	No	Not greater than reference, 3 of 3 tests
Organics (µg/L)																
1,2-Dichlorobenzene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
1,2,4-Trichlorobenzene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
1,3-Dichlorobenzene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
1,4-Dichlorobenzene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
2-Chloronaphthalene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
2-Chlorophenol	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
2-Methylnaphthalene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
2-Methylphenol [cresol, o-]	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
2-Nitroaniline	50	0	[25]	[31]	10	0	[25]	[26]	No test	No test	No test	No test	No test	No	No	Not detected
2-Nitrophenol	50	1	9	[12]	10	0	[10]	[10]	--	--	--	0.367	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
2,4-Dichlorophenol	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dimethylphenol	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrophenol	50	0	[25]	[31]	10	0	[25]	[26]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrotoluene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
2,4,5-Trichlorophenol	50	0	[25]	[31]	10	0	[25]	[26]	No test	No test	No test	No test	No test	No	No	Not detected
2,4,6-Trichlorophenol	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
2,6-Dinitrotoluene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
3-Nitroaniline	50	0	[25]	[31]	10	0	[25]	[26]	No test	No test	No test	No test	No test	No	No	Not detected
3,3'-Dichlorobenzidine	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
3+4 Methylphenol [cresol, m+p]	50	1	[10]	20	10	1	[10]	11	--	--	0.825	0.748	Equal	No	No	Not greater than reference, 2 of 2 tests
4-Bromophenylphenyl ether	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chloro-3-methylphenol	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chloroaniline	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chlorophenylphenyl ether	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
4-Nitroaniline	50	0	[25]	[31]	10	0	[25]	[26]	No test	No test	No test	No test	No test	No	No	Not detected
4-Nitrophenol	50	0	[25]	[31]	10	0	[25]	[26]	No test	No test	No test	No test	No test	No	No	Not detected
4,6-Dinitro-2-methylphenol	50	0	[25]	[31]	10	0	[25]	[26]	No test	No test	No test	No test	No test	No	No	Not detected
Acenaphthene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Acenaphthylene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Aldrin	50	0	[0.05]	[0.5]	10	0	[0.05]	[0.052]	No test	No test	No test	No test	No test	No	No	Not detected
Alpha-BHC	50	0	[0.05]	[0.5]	10	0	[0.05]	[0.052]	No test	No test	No test	No test	No test	No	No	Not detected

Table 6-43. Summary of Statistical Comparisons to Reference Pore-Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
alpha-Chlordane	50	0	[0.05]	[0.5]	10	0	[0.05]	[0.052]	No test	No test	No test	No test	No test	No	No	Not detected
Anthracene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1016	50	0	[0.0004]	[0.41]	10	0	[0.0004]	[0.41]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1221	50	0	[0.0004]	[0.41]	10	0	[0.0004]	[0.41]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1232	50	0	[0.0004]	[0.41]	10	0	[0.0004]	[0.41]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1242	50	0	[0.0004]	[0.41]	10	0	[0.0004]	[0.41]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1248	50	0	[0.0004]	[0.41]	10	0	[0.0004]	[0.41]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1254	50	0	[0.0004]	[0.41]	10	0	[0.0004]	[0.41]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1260	50	0	[0.0004]	[0.41]	10	0	[0.0004]	[0.41]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[a]anthracene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[a]pyrene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[b]fluoranthene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[ghi]perylene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[k]fluoranthene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
beta-1,2,3,4,5,6-Hexachlorocyclohexane	50	0	[0.05]	[0.5]	10	0	[0.05]	[0.052]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-chloro-1-methylethyl]ether	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-Chloroethoxy]methane	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-chloroethyl] ether	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-ethylhexyl] phthalate	50	48	0.5	36.6	10	10	0.56	1.73	0.020	0.259	0.012	--	--	See Table 6-74	Yes	Greater than reference, 2 of 3 tests
Butylbenzylphthalate	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Carbazole	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Chrysene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Delta-BHC	50	0	[0.05]	[0.5]	10	0	[0.05]	[0.052]	No test	No test	No test	No test	No test	No	No	Not detected
Di-n-butylphthalate	50	23	0.5	[10]	10	3	0.5	[10]	--	0.354	0.592	0.560	Equal	No	No	Not greater than reference, 3 of 3 tests
Di-n-octylphthalate	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Dibenz[a,h]anthracene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Dibenzofuran	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Dichlorodiphenyl-dichloroethane	50	0	[0.05]	[0.5]	10	0	[0.05]	[0.052]	No test	No test	No test	No test	No test	No	No	Not detected
Dichlorodiphenyl-dichloroethylene	50	0	[0.05]	[0.5]	10	0	[0.05]	[0.052]	No test	No test	No test	No test	No test	No	No	Not detected
Dichlorodiphenyl-trichloroethane	50	0	[0.05]	[0.5]	10	0	[0.05]	[0.052]	No test	No test	No test	No test	No test	No	No	Not detected
Dieldrin	50	0	[0.05]	[0.5]	10	0	[0.05]	[0.052]	No test	No test	No test	No test	No test	No	No	Not detected
Diethylphthalate	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected

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Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Dimethyl phthalate	50	2	0.771	[12]	10	0	[10]	[10]	--	--	--	0.748	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Endosulfan I	50	0	[0.05]	[0.5]	10	0	[0.05]	[0.052]	No test	No test	No test	No test	No test	No	No	Not detected
Endosulfan II	50	0	[0.05]	[0.5]	10	0	[0.05]	[0.052]	No test	No test	No test	No test	No test	No	No	Not detected
Endosulfan sulfate	50	0	[0.05]	[0.5]	10	0	[0.05]	[0.052]	No test	No test	No test	No test	No test	No	No	Not detected
Endrin	50	0	[0.05]	[0.5]	10	0	[0.05]	[0.052]	No test	No test	No test	No test	No test	No	No	Not detected
Endrin aldehyde	50	1	[0.05]	[0.5]	10	0	[0.05]	[0.052]	--	--	--	0.367	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Endrin ketone	50	0	[0.05]	[0.5]	10	0	[0.05]	[0.052]	No test	No test	No test	No test	No test	No	No	Not detected
Fluoranthene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Fluorene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Gamma-BHC (lindane)	50	0	[0.05]	[0.5]	10	0	[0.05]	[0.052]	No test	No test	No test	No test	No test	No	No	Not detected
gamma-Chlordane	50	0	[0.05]	[0.5]	10	0	[0.05]	[0.052]	No test	No test	No test	No test	No test	No	No	Not detected
Heptachlor	50	0	[0.05]	[0.5]	10	0	[0.05]	[0.052]	No test	No test	No test	No test	No test	No	No	Not detected
Heptachlor epoxide	50	0	[0.05]	[0.5]	10	0	[0.05]	[0.052]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorobenzene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorobutadiene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorocyclopentadiene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachloroethane	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Indeno[1,2,3-cd]pyrene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Isophorone	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Methoxychlor	50	1	[0.05]	1	10	0	[0.05]	[0.052]	--	--	--	0.367	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
N-Nitroso-di-n-dipropylamine	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
N-Nitrosodiphenylamine	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Naphthalene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Nitrobenzene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Pentachlorophenol	50	0	[25]	[31]	10	0	[25]	[26]	No test	No test	No test	No test	No test	No	No	Not detected
Phenanthrene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Phenol	50	2	0.7	[12]	10	1	0.8	[10]	--	--	0.667	1	Equal	No	No	Not greater than reference, 2 of 2 tests
Pyrene	50	0	[10]	[12]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Toxaphene	50	0	[0.05]	[0.62]	10	0	[0.5]	[0.52]	No test	No test	No test	No test	No test	No	No	Not detected
Total organic carbon	46	46	690	3,800	10	10	610	7,800	No test	No test	No test	No test	No test	No	No	Water property measurement
Total dissolved solids	50	50	48,000	288,000	10	10	81,000	380,000	No test	No test	No test	No test	No test	No	No	Water property measurement
Total petroleum hydrocarbons	50	0	[1,000]	[2,000]	10	0	[1,000]	[2,000]	No test	No test	No test	No test	No test	No	No	Not detected
Total petroleum hydrocarbons - diesel range	50	7	27	[122]	10	1	29	[103]	--	--	0.250	0.865	Equal	No	No	Not greater than reference, 2 of 2 tests
Total petroleum hydrocarbons - gasoline range	50	0	[0.03]	[30]	10	2	0.0061	[30]	No test	No test	No test	No test	No test	No	No	Not detected

Table 6-43. Summary of Statistical Comparisons to Reference Pore-Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Total suspended solids	50	9	[5,000]	25,700	10	2	[5,000]	13,000	No test	No test	No test	No test	No test	No	No	Water property measurement
Radionuclides (pCi/L)																
Americium-241	50	0	[6.4]	[270]	10	0	[47]	[210]	No test	No test	No test	No test	No test	No	No	Not detected
Antimony-125	50	0	[11]	[73]	10	0	[22]	[70]	No test	No test	No test	No test	No test	No	No	Not detected
Beryllium-7	50	0	[-2.35]	[320]	10	0	[0.056]	[250]	No test	No test	No test	No test	No test	No	No	Not detected
Carbon-14	8	0	[-19.8]	[75.5]	0	0	No ref data	No ref data	No test	No test	No test	No test	No test	No	No	Not detected
Cesium-134	50	0	[6.8]	[35]	10	0	[11]	[37]	No test	No test	No test	No test	No test	No	No	Short half-life
Cesium-137	50	0	[5]	[29]	10	0	[8.3]	[29]	No test	No test	No test	No test	No test	No	No	Not detected
Cobalt-60	50	0	[5.5]	[32]	10	0	[9]	[31]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-152	50	0	[13]	[86]	10	0	[25]	[78]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-154	50	0	[16]	[91]	10	0	[24]	[92]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-155	50	0	[9.9]	[100]	10	0	[30]	[88]	No test	No test	No test	No test	No test	No	No	Not detected
Potassium-40	50	0	[0]	[1,900]	10	0	[0]	[730]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-226	50	1	[-0.244]	0.908	10	0	[-0.122]	[0.172]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-228	50	0	[-1.54]	[1.65]	10	0	[-0.126]	[0.435]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Ruthenium-106	50	0	[45]	[260]	10	0	[84]	[260]	No test	No test	No test	No test	No test	No	No	Short half-life
Strontium-90	51	6	[-0.282]	6.23	10	0	[-0.167]	[0.279]	--	--	--	0.574	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Technetium-99	2	1	[1.02]	45.9	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See Table 6-74	Yes	No reference data
Thorium-228	50	0	[-0.169]	[0.2]	10	0	[0]	[0.086]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-230	50	0	[-0.093]	[0.595]	10	0	[-0.095]	[0.088]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-232	50	1	[-0.02]	0.283	10	0	[-0.037]	[0.024]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Tritium	50	13	[-126]	16,600	10	1	[-118]	1,970	--	0.354	0.259	0.495	Equal	No	No	Not greater than reference, 3 of 3 tests
Uranium-233/234	50	39	[0.057]	51.4	10	7	[0.033]	2.02	0.375	0.684	0.573	0.891	Equal	No	No	Not greater than reference, 4 of 4 tests
Uranium-235	50	5	[0]	5.76	10	0	[0]	[0.069]	--	--	--	0.676	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Uranium-238	50	33	[0.05]	46.4	10	6	[0.033]	1.45	0.421	0.684	0.573	1	Equal	No	No	Not greater than reference, 4 of 4 tests
Anions (µg/L)																
Bromide	50	0	[250]	[250]	10	1	[250]	1,300	No test	No test	No test	No test	No test	No	No	Not detected
Chloride	50	50	960	13,200	10	10	920	19,000	0.644	0.684	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Chlorine	47	23	10	66,000	10	3	10	[20]	--	0.120	0.120	0.458	Equal	No	No	Not greater than reference, 3 of 3 tests
Fluoride	50	0	[250]	[250]	10	1	[250]	650	No test	No test	No test	No test	No test	No	No	Not detected
Nitrogen in ammonia	97	39	10	1,100	20	10	10	1,300	--	0.976	1	0.576	Equal	No	No	Not greater than reference, 3 of 3 tests
Nitrogen in nitrate	50	48	[56.5]	4,950	10	10	72.3	12,500	0.606	0.684	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Nitrogen in nitrite	46	0	[76.1]	[76.1]	10	0	[76.1]	[152]	No test	No test	No test	No test	No test	No	No	Not detected
Nitrogen in nitrite and nitrate	50	50	33	5,200	10	9	[20]	12,900	0.492	0.684	1	0.367	Equal	No	No	Not greater than reference, 3 of 3 tests
Nitrogen, Kjeldahl total	50	17	[100]	1,400	9	2	[100]	2,300	No test	No test	No test	No test	No test	No	No	Water property measurement

Table 6-43. Summary of Statistical Comparisons to Reference Pore-Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Phosphate	46	0	[250]	[250]	10	0	[250]	[500]	No test	No test	No test	No test	No test	No	No	Not detected
Sulfate	50	50	8,200	51,700	10	10	1,700	91,400	0.417	0.354	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Physical Properties (µg/L)																
Alkalinity	98	97	[500]	116,000	20	20	56,400	140,000	0.917	0.840	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Dissolved oxygen	151	151	7,750	16,600	32	32	8,690	13,500	No test	No test	No test	No test	No test	No	No	Water property measurement
Hardness	48	48	190	170,000	9	9	76,000	148,000	0.991	0.769	0.591	--	--	No	No	Not greater than reference, 3 of 3 tests
Other																
pH Measurement (pH)	151	151	7.13	9.77	32	32	7.66	9.43	No test	No test	No test	No test	No test	No	No	Water property measurement
Specific conductance (µS/cm)	151	151	135	347	32	32	137	590	No test	No test	No test	No test	No test	No	No	Water property measurement
Temperature (° C)	151	151	2.7	19.9	32	32	3.2	5.9	No test	No test	No test	No test	No test	No	No	Water property measurement

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
BHC = benzene hexachloride
COPC = contaminant of potential concern
No ref data = no reference site data available
No test = no statistical test performed
RCBRA = River Corridor Baseline Risk Assessment

Table 6-44. Summary of Statistical Comparisons to Reference Seep Water Data Collected for the 100-B/C Pilot Project. (3 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison			Chi-Square P-Value	Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value				
Inorganics (µg/L)															
Aluminum	5	1	[17]	140	10	7	30	130	--	0.736	0.333	0.200	Equal	No	Not greater than reference, 3 of 3 tests
Antimony	19	14	0.091	[30]	10	1	[2.5]	[4]	--	0.424	1	0.004	Greater	See text	Greater than reference, 1 of 3 tests
Arsenic	14	14	0.32	1.8	10	2	[3.1]	210	--	0.822	1	<0.001	Greater	See text	Greater than reference, 1 of 3 tests
Barium	9	9	21	94	10	10	25	79	0.056	0.458	0.474	--	Equal	No	Not greater than reference, 3 of 3 tests
Beryllium	19	0	[0.0098]	[0.68]	10	1	[0.1]	[0.2]	No test	No test	No test	No test	No test	No	Not detected
Cadmium	19	11	0.0096	[4.3]	10	1	[0.3]	0.85	--	0.424	1	0.036	Greater	See text	Greater than reference, 1 of 3 tests
Calcium	5	5	42,000	51,000	10	10	20,000	65,000	No test	No test	No test	No test	No test	No	Essential nutrient
Chloride	15	15	1,100	13,000	10	10	920	19,000	0.002	0.313	1	--	Equal	See text	Greater than reference, 1 of 4 tests
Chromium	19	19	1.9	20	10	1	[1.2]	[1.6]	--	0.098	<0.001	<0.001	Greater	See text	Greater than reference, 2 of 3 tests
Cobalt	5	0	[1.4]	[5]	10	0	[0.5]	[1.2]	No test	No test	No test	No test	No test	No	Not detected
Copper	19	15	0.27	14	10	5	1	8.9	0.809	0.424	0.655	0.238	Equal	No	Not greater than reference, 4 of 4 tests
Fluoride	15	15	89	310	10	1	[250]	650	--	0.313	1	<0.001	Greater	See text	Greater than reference, 1 of 3 tests
Iron	5	4	17	240	10	4	[24]	10,000	--	0.736	1	0.360	Equal	No	Not greater than reference, 3 of 3 tests
Lead	14	11	[0.004]	0.89	10	1	[1.6]	[3.1]	--	0.437	1	0.004	Greater	See text	Greater than reference, 1 of 3 tests
Magnesium	5	5	7,800	10,000	10	10	4,700	18,000	No test	No test	No test	No test	No test	No	Essential nutrient
Manganese	9	8	0.037	28	10	10	0.69	1,200	0.924	0.876	1	--	Less	No	Not greater than reference, 0 of 4 tests
Mercury	12	12	0.00039	0.0013	10	0	[0.1]	[0.1]	--	0.068	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Nickel	19	15	0.14	[20]	10	0	[1.3]	[2.2]	--	0.098	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Nitrogen in nitrate	11	11	1,100	3,000	10	10	72	12,000	0.001	0.538	1	--	Equal	See text	Greater than reference, 1 of 4 tests
Nitrogen in nitrite	15	0	[2]	[11]	10	0	[76]	[150]	No test	No test	No test	No test	No test	No	Not detected
Potassium	5	5	3,300	5,000	10	9	[540]	4,100	No test	No test	No test	No test	No test	No	Essential nutrient
Selenium	14	12	0.23	2.6	10	1	[3.6]	9.8	--	0.437	1	0.001	Greater	See text	Greater than reference, 1 of 3 tests
Silver	19	5	[0.004]	[5.2]	10	0	[0.5]	[1.4]	--	0.098	--	0.205	Equal	No	Not greater than reference, 2 of 2 tests
Sodium	5	5	9,000	11,000	10	10	2,100	16,000	No test	No test	No test	No test	No test	No	Essential nutrient
Strontium (elemental)	5	5	190	220	10	10	91	330	0.008	0.242	1	--	Equal	See text	Greater than reference, 1 of 3 tests
Sulfate	15	15	9,700	42,000	10	10	1,700	91,000	0.003	0.313	1	--	Equal	See text	Greater than reference, 1 of 3 tests
Thallium	14	4	[0.0035]	[0.11]	10	2	[5.6]	10	--	0.822	1	1	Equal	No	Not greater than reference, 3 of 3 tests

Table 6-44. Summary of Statistical Comparisons to Reference Seep Water Data Collected for the 100-B/C Pilot Project. (3 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison			Chi-Square P-Value	Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value				
Uranium (inorganic)	4	4	0.12	2.4	10	0	[14]	[21]	--	0.066	--	0.002	Greater	See text	Greater than reference, 1 of 2 tests
Vanadium	5	5	6.1	13	10	3	[0.6]	4.3	--	0.022	<0.001	0.044	Greater	See text	Greater than reference, 3 of 3 tests
Zinc	19	16	[0.14]	26	10	10	2	12	0.965	0.791	0.249	--	Less	No	Not greater than reference, 3 of 3 tests
Organics (µg/L)															
1,1,1-Trichloroethane	9	0	[0.17]	[0.31]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
1,1,2-Trichloroethane	9	1	[0.05]	0.72	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
1,1-Dichloroethane	9	0	[0.19]	[0.25]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
1,2-Dichloroethane	9	1	[0.08]	0.92	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
1,4-Dichlorobenzene	9	0	[0.11]	[0.25]	10	0	[10]	[10]	No test	No test	No test	No test	No test	No	Not detected
1-Butanol	9	0	[4.6]	[6.6]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Acetone	9	4	[0.3]	[4]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
Benzene	9	0	[0.07]	[0.23]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Carbon tetrachloride	9	0	[0.15]	[0.33]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Chlorobenzene	1	0	[0.28]	[0.28]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Chloroform	9	5	[0.07]	4	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
Dichloroethylene	1	0	[0.23]	[0.23]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Dimedone	9	0	[0.29]	[0.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Ethyl cyanide	9	0	[1.3]	[2.6]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Ethylbenzene	3	0	[0.14]	[0.24]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Methoxychlor	9	1	[0.24]	0.68	10	0	[0.05]	[0.052]	--	--	--	0.957	Equal	See text	Not greater than reference, 1 of 1 test
Methyl isobutyl ketone	9	0	[0.35]	[1.3]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Tetrachloroethene	9	0	[0.17]	[0.57]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Tetrahydrofuran	9	0	[1.5]	[2.3]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Toluene	9	1	[0.12]	0.49	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
Trichloroethene	9	5	[0.16]	0.61	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
Vinyl chloride	9	0	[0.17]	[0.32]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Xylenes (total)	9	1	[0.28]	[0.66]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
cis-1,2-Dichloroethylene	9	0	[0.06]	[0.24]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
trans-1,2-Dichloroethylene	9	0	[0.17]	[0.26]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected

Table 6-44. Summary of Statistical Comparisons to Reference Seep Water Data Collected for the 100-B/C Pilot Project. (3 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison			Chi-Square P-Value	Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value				
Other (µg/L)															
Calcium carbide	9	0	[0.29]	[0.43]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Radionuclides (pCi/L)															
Antimony-125	13	0	[-3.6]	[4]	10	0	[22]	[70]	No test	No test	No test	No test	No test	No	Not detected
Beryllium-7	13	0	[-38]	[11]	10	0	[0.056]	[250]	No test	No test	No test	No test	No test	No	Not detected
Carbon-14	3	0	[2.2]	[7.3]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Cesium-134	13	0	[-2.7]	[2]	10	0	[11]	[37]	No test	No test	No test	No test	No test	No	Not detected
Cesium-137	13	0	[-2.1]	[2]	10	0	[8.3]	[29]	No test	No test	No test	No test	No test	No	Not detected
Cobalt-60	13	0	[-2]	[2.7]	10	0	[9]	[31]	No test	No test	No test	No test	No test	No	Not detected
Europium-152	7	0	[-3.3]	[3.3]	10	0	[25]	[78]	No test	No test	No test	No test	No test	No	Not detected
Europium-154	13	0	[-2.7]	[4.5]	10	0	[24]	[92]	No test	No test	No test	No test	No test	No	Not detected
Europium-155	13	0	[-4.2]	[4]	10	0	[30]	[88]	No test	No test	No test	No test	No test	No	Not detected
Gross alpha	13	7	[0.51]	9.4	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
Gross beta	13	13	4.1	24	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
Nickel-63	3	0	[-0.28]	[3.4]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Plutonium-238	4	0	[0]	[0.00093]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Plutonium-239/240	4	0	[-0.00093]	[0.00094]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Potassium-40	13	1	[-80]	120	10	0	[0]	[730]	No test	No test	No test	No test	No test	No	Background radionuclide
Ruthenium-106	13	0	[-21]	[17]	10	0	[84]	[260]	No test	No test	No test	No test	No test	No	Not detected
Strontium-90	17	6	[-0.12]	4.5	10	0	[-0.17]	[0.28]	--	0.077	--	0.099	Equal	No	Not greater than reference, 2 of 2 tests
Technetium-99	11	10	[0.12]	11	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
Tritium	18	17	[67]	20,000	10	1	[-120]	2,000	--	0.087	<0.001	<0.001	Greater	See text	Greater than reference, 2 of 3 tests

[a] Study vs. reference.
[value] = nondetect
-- = not applicable
No ref data = no reference site data available
No test = no statistical test performed

Table 6-45. Summary of Statistical Comparisons to Reference Shallow Aquifer Tube and Seep Water Data Collected for the 100-NR-2 Project. (2 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Inorganics (µg/L)															
Aluminum	4	4	0.66	6.7	10	7	30	130	0.980	1	1	0.607	Equal	No	Not greater than reference, 4 of 4 tests
Antimony	14	14	0.029	0.46	10	1	[2.5]	[4]	--	0.437	1	<0.001	Greater	See text	Greater than reference, 1 of 3 tests
Arsenic	14	14	0.54	3	10	2	[3.1]	210	--	0.822	1	<0.001	Greater	See text	Greater than reference, 1 of 3 tests
Barium	14	14	20	53	10	10	25	79	0.115	0.822	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Beryllium	4	0	[0.03]	[0.03]	10	1	[0.1]	[0.2]	No test	No test	No test	No test	No test	No	Not detected
Cadmium	14	14	0.014	0.034	10	1	[0.3]	0.85	--	0.437	1	<0.001	Greater	See text	Greater than reference, 1 of 3 tests
Chromium	18	18	0.065	17	10	1	[1.2]	[1.6]	--	0.087	0.165	<0.001	Greater	See text	Greater than reference, 1 of 3 tests
Copper	4	4	0.22	0.4	10	5	1	8.9	0.939	1	1	0.252	Equal	No	Not greater than reference, 4 of 4 tests
Iron	10	10	39	3,100	10	4	[24]	10,000	--	0.709	1	0.015	Greater	See text	Greater than reference, 1 of 3 tests
Lead	14	13	[0.0052]	1.4	10	1	[1.6]	[3.1]	--	0.437	1	<0.001	Greater	See text	Greater than reference, 1 of 3 tests
Manganese	14	14	0.31	1,100	10	10	0.69	1,200	0.115	0.437	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Mercury	13	13	0.00046	0.0045	10	0	[0.1]	[0.1]	--	0.081	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Nickel	14	14	0.22	1.5	10	0	[1.3]	[2.2]	--	0.094	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Selenium	18	17	[0.096]	0.87	10	1	[3.6]	9.8	--	0.399	1	<0.001	Greater	See text	Greater than reference, 1 of 3 tests
Silver	4	0	[0.0028]	[0.0028]	10	0	[0.5]	[1.4]	No test	No test	No test	No test	No test	No	Not detected
Thallium	4	4	0.0058	0.017	10	2	[5.6]	10	--	1	1	0.033	Greater	See text	Greater than reference, 1 of 3 tests
Thorium	4	0	[0.0031]	[0.0031]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Uranium (inorganic)	14	14	0.08	1.6	10	0	[14]	[21]	--	0.094	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Vanadium	10	10	0.16	7.8	10	3	[0.6]	4.3	--	0.709	0.500	0.005	Greater	See text	Greater than reference, 1 of 3 tests
Zinc	14	14	1	15	10	10	2	12	0.986	0.980	0.583	--	Equal	No	Not greater than reference, 3 of 3 tests
Organic (µg/L)															
Total petroleum hydrocarbons - diesel range	2	0	[50]	[50]	10	1	29	[100]	No test	No test	No test	No test	No test	No	Not detected
Radionuclides (pCi/L)															
Antimony-125	4	0	[-1.9]	[9.1]	10	0	[22]	[70]	No test	No test	No test	No test	No test	No	Not detected
Beryllium-7	4	0	[-0.62]	[13]	10	0	[0.056]	[250]	No test	No test	No test	No test	No test	No	Not detected
Cesium-134	4	0	[-1.5]	[1.4]	10	0	[11]	[37]	No test	No test	No test	No test	No test	No	Not detected
Cesium-137	4	0	[0.058]	[0.89]	10	0	[8.3]	[29]	No test	No test	No test	No test	No test	No	Not detected
Cobalt-60	4	0	[-1.2]	[1.7]	10	0	[9]	[31]	No test	No test	No test	No test	No test	No	Not detected
Europium-152	4	0	[-4]	[3.3]	10	0	[25]	[78]	No test	No test	No test	No test	No test	No	Not detected
Europium-154	4	0	[-5.4]	[0.63]	10	0	[24]	[92]	No test	No test	No test	No test	No test	No	Not detected
Europium-155	4	0	[-1.2]	[2.8]	10	0	[30]	[88]	No test	No test	No test	No test	No test	No	Not detected

Table 6-45. Summary of Statistical Comparisons to Reference Shallow Aquifer Tube and Seep Water Data Collected for the 100-NR-2 Project. (2 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Plutonium-238	4	3	[-2.8e-005]	0.027	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
Plutonium-239/240	4	0	[-0.00054]	[0.0034]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Potassium-40	4	0	[-82]	[13]	10	0	[0]	[730]	No test	No test	No test	No test	No test	No	Not detected
Ruthenium-106	4	0	[-15]	[17]	10	0	[84]	[260]	No test	No test	No test	No test	No test	No	Not detected
Strontium-90	14	4	[-0.11]	31	10	0	[-0.17]	[0.28]	--	0.094	--	0.195	Equal	No	Not greater than reference, 2 of 2 tests
Technetium-99	14	5	[0.01]	1.1	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
Tritium	4	4	10,000	12,000	10	1	[-120]	2000	--	0.066	<0.001	0.011	Greater	See text	Greater than reference, 2 of 3 tests

[a] Study vs. reference.
[value] = nondetect
-- = not applicable
No ref data = no reference site data available
No test = no statistical test performed

Table 6-46. Summary of Statistical Comparisons to Reference Surface Water Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Inorganics (µg/L)																
Aluminum	43	23	[18.3]	254	9	9	28.6	109	0.988	0.992	0.675	--	--	No	No	Not greater than reference, 3 of 3 tests
Antimony	43	3	[2.5]	5.7	9	1	[2.5]	[4]	--	--	0.686	0.791	Equal	No	No	Not greater than reference, 2 of 2 tests
Arsenic	43	7	[3.1]	[35.8]	9	0	[3.1]	[3.4]	--	--	--	0.445	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Barium	43	43	25.2	39.9	9	9	29.5	33.4	0.755	0.121	0.074	--	--	No	No	Not greater than reference, 3 of 3 tests
Beryllium	43	0	[0.1]	[0.21]	9	2	[0.1]	[0.2]	No test	No test	No test	No test	No test	No	No	Not detected
Bismuth	43	2	[4]	[6.1]	9	0	[4]	[6.1]	--	--	--	0.769	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Boron	43	43	5.1	22.6	9	9	6.3	22.8	0.933	0.943	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Cadmium	43	2	[0.3]	[0.7]	9	0	[0.3]	[0.7]	--	--	--	0.769	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Calcium	43	43	19,500	32,000	9	9	19,600	21,100	No test	No test	No test	No test	No test	No	No	Essential nutrient
Calculated total uranium	43	26	[0.0982]	3.69	9	5	[0.237]	0.824	0.447	0.121	0.109	0.92	Equal	No	No	Not greater than reference, 4 of 4 tests
Chromium	43	3	[1.2]	15.1	9	0	[1.2]	[1.6]	--	--	--	0.976	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Cobalt	43	0	[0.5]	[1.2]	9	0	[0.5]	[1.2]	No test	No test	No test	No test	No test	No	No	Not detected
Copper	43	17	[0.7]	4.4	9	3	[0.7]	2.3	--	0.578	0.494	0.977	Equal	No	No	Not greater than reference, 3 of 3 tests
Hexavalent chromium	43	15	[2]	6.2	11	0	[2]	[3]	--	0.060	--	0.054	Equal	No	No	Not greater than reference, 2 of 2 tests
Iron	43	24	24.4	294	9	4	[32.1]	56.8	--	0.442	0.153	0.799	Equal	No	No	Not greater than reference, 3 of 3 tests
Lead	43	1	[1.6]	3.9	9	0	[1.6]	[3.1]	--	--	--	0.383	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Lithium	43	40	1.1	2.6	9	9	1.3	1.9	0.447	0.153	0.153	--	--	No	No	Not greater than reference, 3 of 3 tests
Magnesium	43	43	4,730	6,880	9	9	4,770	5,050	No test	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	43	43	1.5	15.6	9	9	2	4.3	0.932	0.943	0.558	--	--	No	No	Not greater than reference, 3 of 3 tests
Mercury	43	0	[0.1]	[0.1]	9	0	[0.1]	[0.1]	No test	No test	No test	No test	No test	No	No	Not detected
Molybdenum	43	15	[1.3]	5.3	9	5	[1.3]	4.6	--	0.943	0.827	0.434	Equal	No	No	Not greater than reference, 3 of 3 tests
Nickel	43	4	[1.3]	[2.2]	9	0	[1.3]	[2.2]	--	--	--	0.791	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Phosphorus	43	12	[8.3]	23	9	1	[8.3]	[12.5]	--	0.121	0.076	0.526	Equal	No	No	Not greater than reference, 3 of 3 tests
Potassium	43	43	644	2,070	9	9	716	1,140	No test	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	43	2	[3.6]	5.9	9	0	[3.6]	[4.3]	--	--	--	0.769	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Silicon	43	43	2,150	5,700	9	9	2,140	2,660	No test	No test	No test	No test	No test	No	No	Water property measurement
Silver	43	3	[0.5]	[1.4]	9	0	[0.5]	[1.4]	--	--	--	0.976	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Sodium	43	43	2,010	5,220	9	9	2,060	2,400	No test	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	43	43	88.7	145	9	9	91.3	106	0.279	0.651	0.456	--	--	No	No	Not greater than reference, 3 of 3 tests
Thallium	43	2	[5.6]	8.3	9	1	[5.6]	6.8	--	--	0.827	0.976	Equal	No	No	Not greater than reference, 2 of 2 tests
Tin	43	2	[3.6]	6.9	9	0	[3.6]	[5.2]	--	--	--	0.770	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Uranium (inorganic)	43	0	[13.6]	[20.6]	9	0	[13.6]	[20.6]	No test	No test	No test	No test	No test	No	No	Not detected
Vanadium	43	7	[0.6]	2.4	9	0	[0.6]	[0.9]	--	--	--	0.445	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Zinc	43	41	0.97	13.8	9	9	1.1	5.8	0.409	0.442	0.241	--	--	No	No	Not greater than reference, 3 of 3 tests
Organics (µg/L)																
1,2-Dichlorobenzene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
1,2,4-Trichlorobenzene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
1,3-Dichlorobenzene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected

Table 6-46. Summary of Statistical Comparisons to Reference Surface Water Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
1,4-Dichlorobenzene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
2-Chloronaphthalene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
2-Chlorophenol	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
2-Methylnaphthalene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
2-Methylphenol [cresol, o-]	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
2-Nitroaniline	43	0	[25]	[28]	9	0	[25]	[26]	No test	No test	No test	No test	No test	No	No	Not detected
2-Nitrophenol	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dichlorophenol	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dimethylphenol	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrophenol	43	0	[25]	[28]	9	0	[25]	[26]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrotoluene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
2,4,5-Trichlorophenol	43	0	[25]	[28]	9	0	[25]	[26]	No test	No test	No test	No test	No test	No	No	Not detected
2,4,6-Trichlorophenol	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
2,6-Dinitrotoluene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
3-Nitroaniline	43	0	[25]	[28]	9	0	[25]	[26]	No test	No test	No test	No test	No test	No	No	Not detected
3,3'-Dichlorobenzidine	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
3+4 Methylphenol [cresol, m+p]	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
4-Bromophenylphenyl ether	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chloro-3-methylphenol	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chloroaniline	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chlorophenylphenyl ether	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
4-Nitroaniline	43	0	[25]	[28]	9	0	[25]	[26]	No test	No test	No test	No test	No test	No	No	Not detected
4-Nitrophenol	43	0	[25]	[28]	9	0	[25]	[26]	No test	No test	No test	No test	No test	No	No	Not detected
4,6-Dinitro-2-methylphenol	43	0	[25]	[28]	9	0	[25]	[26]	No test	No test	No test	No test	No test	No	No	Not detected
Acenaphthene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Acenaphthylene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Aldrin	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
Alpha-BHC	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
alpha-Chlordane	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
Anthracene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1016	44	0	[0.0004]	[0.41]	9	0	[0.0004]	[0.41]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1221	44	0	[0.0004]	[0.41]	9	0	[0.0004]	[0.41]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1232	44	0	[0.0004]	[0.41]	9	0	[0.0004]	[0.41]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1242	44	0	[0.0004]	[0.41]	9	0	[0.0004]	[0.41]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1248	44	0	[0.0004]	[0.41]	9	0	[0.0004]	[0.41]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1254	44	0	[0.0004]	[0.41]	9	0	[0.0004]	[0.41]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1260	44	0	[0.0004]	[0.41]	9	0	[0.0004]	[0.41]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[a]anthracene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[a]pyrene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected

Table 6-46. Summary of Statistical Comparisons to Reference Surface Water Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Benzo[b]fluoranthene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[ghi]perylene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[k]fluoranthene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
beta-1,2,3,4,5,6-Hexachlorocyclohexane	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-chloro-1-methylethyl]ether	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-Chloroethoxy]methane	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-chloroethyl] ether	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-ethylhexyl] phthalate	43	41	0.5	31.2	9	8	0.667	[10]	0.200	0.651	0.393	0.976	Equal	No	No	Not greater than reference, 4 of 4 tests
Butylbenzylphthalate	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Carbazole	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Chrysene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Delta-BHC	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
Di-n-butylphthalate	43	12	0.5	[10]	9	2	0.6	[10]	--	0.660	0.231	0.949	Equal	No	No	Not greater than reference, 3 of 3 tests
Di-n-octylphthalate	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Dibenz[a,h]anthracene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Dibenzofuran	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Dichlorodiphenyl-dichloroethane	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
Dichlorodiphenyl-dichloroethylene	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
Dichlorodiphenyl-trichloroethane	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
Dieldrin	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
Diethylphthalate	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Dimethyl phthalate	43	1	3	[11]	9	1	0.947	[10]	--	--	0.500	0.769	Equal	No	No	Not greater than reference, 2 of 2 tests
Endosulfan I	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
Endosulfan II	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
Endosulfan sulfate	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
Endrin	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
Endrin aldehyde	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
Endrin ketone	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
Fluoranthene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Fluorene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Gamma-BHC (lindane)	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
gamma-Chlordane	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
Heptachlor	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
Heptachlor epoxide	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorobenzene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorobutadiene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected

Table 6-46. Summary of Statistical Comparisons to Reference Surface Water Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Hexachlorocyclo-pentadiene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachloroethane	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Indeno[1,2,3-cd]pyrene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Isophorone	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Methoxychlor	43	0	[0.05]	[0.062]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	No	Not detected
N-Nitroso-di-n-dipropylamine	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
N-Nitrosodiphenylamine	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Naphthalene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Nitrobenzene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Pentachlorophenol	43	0	[25]	[28]	9	0	[25]	[26]	No test	No test	No test	No test	No test	No	No	Not detected
Phenanthrene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Phenol	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Pyrene	43	0	[10]	[11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	No	Not detected
Toxaphene	43	0	[0.05]	[0.52]	9	0	[0.5]	[0.51]	No test	No test	No test	No test	No test	No	No	Not detected
Total organic carbon	20	20	910	1,500	7	7	1,200	1,500	No test	No test	No test	No test	No test	No	No	Water property measurement
Total petroleum hydrocarbons	43	0	[1,000]	[2,000]	9	0	[1,000]	[2,000]	No test	No test	No test	No test	No test	No	No	Not detected
Total petroleum hydrocarbons - diesel range	43	3	31	200	9	0	[100]	[102]	--	--	--	0.976	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Total petroleum hydrocarbons - gasoline range	42	4	0.0067	390	9	2	0.0064	[30]	--	--	0.200	0.615	Equal	No	No	Not greater than reference, 2 of 2 tests
Radionuclides (pCi/L)																
Americium-241	43	0	[6.8]	[200]	9	0	[20]	[200]	No test	No test	No test	No test	No test	No	No	Not detected
Antimony-125	43	0	[12]	[58]	9	0	[21]	[57]	No test	No test	No test	No test	No test	No	No	Not detected
Beryllium-7	43	0	[-23]	[270]	9	0	[-0.118]	[260]	No test	No test	No test	No test	No test	No	No	Not detected
Carbon-14	5	0	[-23]	[20]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Cesium-134	43	0	[6.4]	[28]	9	0	[10]	[27]	No test	No test	No test	No test	No test	No	No	Short half-life
Cesium-137	43	0	[5.3]	[25]	9	0	[8.8]	[24]	No test	No test	No test	No test	No test	No	No	Not detected
Cobalt-60	43	0	[5.2]	[26]	9	0	[8.1]	[25]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-152	43	0	[15]	[64]	9	0	[25]	[68]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-154	43	0	[14]	[71]	9	0	[21]	[72]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-155	43	0	[11]	[87]	9	0	[29]	[82]	No test	No test	No test	No test	No test	No	No	Not detected
Potassium-40	43	0	[0]	[730]	9	0	[0]	[690]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-226	43	1	[-0.361]	3.6	9	0	[-0.247]	[0.23]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-228	43	0	[-1.64]	[0.994]	9	0	[-0.592]	[0.338]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Ruthenium-106	43	0	[46]	[220]	9	0	[74]	[210]	No test	No test	No test	No test	No test	No	No	Short half-life
Strontium-90	43	0	[-0.334]	[0.359]	9	0	[-0.061]	[0.193]	No test	No test	No test	No test	No test	No	No	Not detected
Technetium-99	4	0	[-0.181]	[1.98]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Thorium-228	43	0	[-0.102]	[0.264]	9	0	[-0.072]	[0.136]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-230	43	0	[-0.102]	[0.179]	9	0	[-0.093]	[0.149]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-232	43	0	[-0.039]	[0.069]	9	0	[-0.064]	[0.045]	No test	No test	No test	No test	No test	No	No	Background radionuclide

Table 6-46. Summary of Statistical Comparisons to Reference Surface Water Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Tritium	43	2	[-150]	269	9	0	[-91.4]	[139]	--	--	--	0.769	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Uranium-233/234	43	35	[0.065]	1.29	9	4	[0.107]	0.347	--	0.442	0.233	0.057	Equal	No	No	Not greater than reference, 3 of 3 tests
Uranium-235	43	0	[-0.008]	[0.081]	9	0	[0]	[0.05]	No test	No test	No test	No test	No test	No	No	Not detected
Uranium-238	43	26	[0.033]	1.23	9	5	[0.075]	0.271	0.447	0.121	0.109	0.920	Equal	No	No	Not greater than reference, 4 of 4 tests
Anions (µg/L)																
Bromide	43	0	[250]	[250]	9	0	[250]	[250]	No test	No test	No test	No test	No test	No	No	Not detected
Chloride	43	43	910	5,100	9	9	970	1,300	0.203	0.121	0.044	--	--	See Table 6-74	Yes	Greater than reference, 1 of 3 tests
Chlorine	1	1	20	20	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See Table 6-74	Yes	No reference data
Fluoride	43	0	[250]	[250]	9	0	[250]	[250]	No test	No test	No test	No test	No test	No	No	Not detected
Nitrogen in ammonia	1	0	[200]	[200]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Nitrogen in nitrate	43	41	[56.5]	2,140	9	9	90.3	479	0.238	0.442	0.193	--	--	No	No	Not greater than reference, 3 of 3 tests
Nitrogen in nitrite	40	2	[76.1]	429	9	0	[76.1]	[76.1]	--	--	--	0.805	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Nitrogen in nitrite and nitrate	43	43	120	3,400	9	9	120	420	0.058	0.442	0.153	--	--	No	No	Not greater than reference, 3 of 3 tests
Phosphate	40	0	[250]	[250]	9	0	[250]	[250]	No test	No test	No test	No test	No test	No	No	Not detected
Sulfate	43	43	9,500	42,300	9	9	10,000	16,100	0.367	0.442	0.558	--	--	No	No	Not greater than reference, 3 of 3 tests
Other																
Alkalinity (µg/L)	1	1	82,000	82,000	0	0	No ref data	No ref data	No test	No test	No test	No test	No test	No	No	Water property measurement
Dissolved oxygen (µg/L)	86	86	7,330	14,800	20	20	10,500	14,200	No test	No test	No test	No test	No test	No	No	Water property measurement
Hardness (µg/L)	1	1	104,000	104,000	0	0	No ref data	No ref data	No test	No test	No test	No test	No test	No	No	Water property measurement
pH Measurement (pH)	86	86	7.54	9.72	20	20	7.39	8.93	No test	No test	No test	No test	No test	No	No	Water property measurement
Specific conductance (µS/cm)	86	86	134	267	20	20	138	165	No test	No test	No test	No test	No test	No	No	Water property measurement
Temperature (° C)	86	86	2.2	7.1	20	20	3.3	6.3	No test	No test	No test	No test	No test	No	No	Water property measurement

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
BHC = benzene hexachloride
COPC = contaminant of potential concern
No ref data = no reference site data available
No test = no statistical test performed
RCBRA = River Corridor Baseline Risk Assessment

Table 6-47. Summary of Statistical Comparisons to Reference Surface Water Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Inorganics (µg/L)															
Antimony	16	16	0.17	0.23	9	1	[2.5]	[4]	--	0.391	1	<0.001	Greater	See text	Greater than reference, 1 of 3 tests
Arsenic	16	16	0.5	0.57	9	0	[3.1]	[3.4]	--	0.082	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Barium	16	16	23	25	9	9	30	33	1	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Beryllium	16	3	[0.0098]	0.013	9	2	[0.1]	[0.2]	--	0.770	1	0.755	Equal	No	Not greater than reference, 3 of 3 tests
Cadmium	16	16	0.0088	0.016	9	0	[0.3]	[0.7]	--	0.082	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Chloride	17	17	840	1,100	9	9	970	1300	1	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Chromium	16	16	0.17	1.2	9	0	[1.2]	[1.6]	--	0.082	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Copper	16	16	0.54	1.3	9	3	[0.7]	2.3	--	0.960	1	0.00112	Greater	See text	Greater than reference, 1 of 3 tests
Fluoride	17	17	88	98	9	0	[250]	[250]	--	0.054	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Lead	16	16	0.019	0.075	9	0	[1.6]	[3.1]	--	0.082	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Manganese	16	16	0.85	1.6	9	9	2	4.3	1	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Mercury	16	16	0.00029	0.00051	9	0	[0.1]	[0.1]	--	0.082	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Nickel	16	16	1	1.5	9	0	[1.3]	[2.2]	--	0.144	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Nitrogen in nitrate	1	1	92	92	9	9	90	480	--	1	1	--	Equal	No	Not greater than reference, 2 of 2 tests
Nitrogen in nitrite	17	1	[7.4]	8.1	9	0	[76]	[76]	--	--	--	0.742	Equal	See text	Not greater than reference, 1 of 1 test
Selenium	16	16	0.17	0.32	9	0	[3.6]	[4.3]	--	0.082	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Silver	16	0	[0.004]	[0.004]	9	0	[0.5]	[1.4]	No test	No test	No test	No test	No test	No	Not detected
Sulfate	17	17	9,200	10,000	9	9	10000	16000	1	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Thallium	16	0	[0.11]	[0.11]	9	1	[5.6]	6.8	No test	No test	No test	No test	No test	No	Not detected
Uranium (inorganic)	16	16	0.48	0.55	9	0	[14]	[21]	--	0.082	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Zinc	16	16	0.51	1	9	9	1.1	5.8	1	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Organics (µg/L)															
1,1,1-Trichloroethane	17	0	[0.17]	[0.17]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
1,1,2-Trichloroethane	17	0	[0.05]	[0.05]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
1,1-Dichloroethane	17	0	[0.2]	[0.2]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
1,2-Dichloroethane	17	0	[0.08]	[0.08]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
1,4-Dichlorobenzene	17	0	[0.11]	[0.11]	9	0	[10]	[10]	No test	No test	No test	No test	No test	No	Not detected
1-Butanol	17	0	[4.6]	[4.6]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Acetone	17	5	[0.66]	1.8	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
Benzene	17	1	[0.07]	0.14	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
Carbon tetrachloride	17	0	[0.15]	[0.15]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected

Table 6-47. Summary of Statistical Comparisons to Reference Surface Water Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Chloroform	17	0	[0.07]	[0.07]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Dimedone	17	0	[0.29]	[0.29]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Ethyl cyanide	17	0	[1.3]	[1.3]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Methoxychlor	17	0	[0.3]	[0.3]	9	0	[0.05]	[0.051]	No test	No test	No test	No test	No test	No	Not detected
Methyl isobutyl ketone	17	0	[0.35]	[0.35]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Tetrachloroethene	17	0	[0.17]	[0.17]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Tetrahydrofuran	17	0	[1.7]	[1.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Toluene	17	8	[0.12]	0.52	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
Trichloroethene	17	0	[0.16]	[0.16]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Vinyl chloride	17	0	[0.25]	[0.25]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Xylenes (total)	17	1	[0.28]	0.52	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
cis-1,2-Dichloroethylene	17	0	[0.06]	[0.06]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
trans-1,2-Dichloroethylene	17	0	[0.17]	[0.17]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Other (µg/L)															
Calcium carbide	17	0	[0.43]	[0.43]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Radionuclides (pCi/L)															
Antimony-125	8	0	[-2.4]	[5.5]	9	0	[21]	[57]	No test	No test	No test	No test	No test	No	Not detected
Beryllium-7	8	0	[-130]	[5.2]	9	0	[-0.12]	[260]	No test	No test	No test	No test	No test	No	Not detected
Cesium-134	8	0	[-2.4]	[3.9]	9	0	[10]	[27]	No test	No test	No test	No test	No test	No	Not detected
Cesium-137	8	1	[-2.9]	8.5	9	0	[8.8]	[24]	--	--	--	0.952	Equal	See text	Not greater than reference, 1 of 1 test
Cobalt-60	8	0	[-0.78]	[1.5]	9	0	[8.1]	[25]	No test	No test	No test	No test	No test	No	Not detected
Europium-152	8	0	[-1.6]	[1.8]	9	0	[25]	[68]	No test	No test	No test	No test	No test	No	Not detected
Europium-154	8	0	[-4.9]	[7]	9	0	[21]	[72]	No test	No test	No test	No test	No test	No	Not detected
Europium-155	8	0	[-4.8]	[4.6]	9	0	[29]	[82]	No test	No test	No test	No test	No test	No	Not detected
Potassium-40	8	1	[-45]	130	9	0	[0]	[690]	No test	No test	No test	No test	No test	No	Background radionuclide
Ruthenium-106	8	0	[-32]	[15]	9	0	[74]	[210]	No test	No test	No test	No test	No test	No	Not detected
Strontium-90	7	7	0.072	0.18	9	0	[-0.061]	[0.19]	--	0.063	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Technetium-99	19	1	[-0.00042]	0.49	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
Tritium	19	19	32	250	9	0	[-91]	[140]	--	0.118	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests

[a] Study vs. reference.
[value] = nondetect
-- = not applicable
No ref data = no reference site data available
No test = no statistical test performed

Table 6-48. Summary of Statistical Comparisons to Reference Surface Water Data Collected for the 100-NR-2 Project.

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Inorganics (µg/L)															
Antimony	3	3	0.15	0.21	9	1	[2.5]	[4]	--	0.455	1	0.034	Greater	See text	Greater than reference, 1 of 3 tests
Arsenic	3	3	0.62	0.72	9	0	[3.1]	[3.4]	--	0.046	--	0.007	Greater	See text	Greater than reference, 2 of 2 tests
Barium	3	3	31	32	9	9	30	33	0.356	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Cadmium	3	3	0.019	0.037	9	0	[0.3]	[0.7]	--	0.046	--	0.007	Greater	See text	Greater than reference, 2 of 2 tests
Chromium	3	3	0.26	0.78	9	0	[1.2]	[1.6]	--	0.046	--	0.007	Greater	See text	Greater than reference, 2 of 2 tests
Iron	3	3	73	160	9	4	[32]	57	--	0.046	0.005	0.310	Equal	See text	Greater than reference, 2 of 3 tests
Lead	3	3	0.11	0.28	9	0	[1.6]	[3.1]	--	0.046	--	0.007	Greater	See text	Greater than reference, 2 of 2 tests
Manganese	3	3	5.1	19	9	9	2	4.3	0.008	0.046	0.005	--	Equal	See text	Greater than reference, 3 of 4 tests
Mercury	2	2	0.00067	0.001	9	0	[0.1]	[0.1]	--	0.018	--	0.021	Greater	See text	Greater than reference, 2 of 2 tests
Nickel	3	3	0.23	0.4	9	0	[1.3]	[2.2]	--	0.046	--	0.007	Greater	See text	Greater than reference, 2 of 2 tests
Selenium	3	3	0.16	0.21	9	0	[3.6]	[4.3]	--	0.046	--	0.007	Greater	See text	Greater than reference, 2 of 2 tests
Uranium (inorganic)	3	3	0.52	0.52	9	0	[14]	[21]	--	0.046	--	0.007	Greater	See text	Greater than reference, 2 of 2 tests
Vanadium	3	3	0.37	1.2	9	0	[0.6]	[0.9]	--	0.046	--	0.007	Greater	See text	Greater than reference, 2 of 2 tests
Zinc	3	3	1.6	5	9	9	1.1	5.8	0.288	0.455	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Radionuclides (pCi/L)															
Strontium-90	3	2	[-0.043]	66	9	0	[-0.061]	[0.19]	--	0.046	--	0.074	Equal	See text	Greater than reference, 1 of 2 tests
Technetium-99	2	0	[-0.12]	[0.077]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
No ref data = no reference site data available
No test = no statistical test performed

Table 6-49. Summary of Statistical Comparisons to Reference Aquatic Invertebrate Data Collected for the RCBRA Project. (2 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Inorganics (mg/kg)																
Aluminum	18	18	13.4	152	10	10	10.9	122	0.033	0.772	0.405	--	--	See Table 6-74	Yes	Greater than reference, 1 of 3 tests
Antimony	18	6	[0.31]	0.85	10	0	[0.31]	[0.42]	--	0.087	--	0.114	Equal	No	No	Not greater than reference, 2 of 2 tests
Arsenic	18	17	0.46	1.2	10	10	0.72	1.2	0.992	0.902	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Barium	18	18	2.1	79.4	10	10	16.5	68.6	0.676	0.772	0.405	--	--	No	No	Not greater than reference, 3 of 3 tests
Beryllium	18	1	[0.02]	[0.02]	10	0	[0.02]	[0.02]	--	--	--	0.761	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Bismuth	18	1	[0.31]	0.6	10	0	[0.31]	[0.5]	--	--	--	0.761	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Boron	18	5	[0.23]	0.46	10	0	[0.23]	[0.37]	--	0.087	--	0.186	Equal	No	No	Not greater than reference, 2 of 2 tests
Cadmium	18	17	0.03	1	10	10	0.13	0.34	0.156	0.277	0.150	--	--	No	No	Not greater than reference, 3 of 3 tests
Calcium	18	18	1,930	126,000	10	10	7,330	65,500	No test	No test	No test	No test	No test	No	No	Essential nutrient
Calculated total uranium	7	0	[0.0952]	[0.291]	4	0	[0.139]	[0.345]	No test	No test	No test	No test	No test	No	No	Not detected
Chromium	18	5	[0.21]	2.5	10	2	[0.31]	0.92	--	0.642	0.643	1	Equal	No	No	Not greater than reference, 3 of 3 tests
Cobalt	18	12	[0.09]	0.33	10	3	0.1	0.2	--	0.399	0.405	0.142	Equal	No	No	Not greater than reference, 3 of 3 tests
Copper	18	18	4.7	32.6	10	10	10.5	29.4	0.471	0.399	0.405	--	--	No	No	Not greater than reference, 3 of 3 tests
Iron	18	18	36.6	485	10	10	28.1	363	0.029	0.399	0.405	--	--	See Table 6-74	Yes	Greater than reference, 1 of 3 tests
Lead	18	9	[0.27]	1.1	10	4	[0.27]	0.56	--	0.399	0.249	0.91	Equal	No	No	Not greater than reference, 3 of 3 tests
Lithium	18	6	[0.09]	0.32	10	0	[0.04]	[0.3]	--	0.049	--	0.114	Equal	See Table 6-74	Yes	Greater than reference based on 1 of 2 tests
Magnesium	18	18	194	918	10	10	339	1,010	No test	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	18	18	6.4	103	10	10	12.6	66.1	0.102	0.399	0.405	--	--	No	No	Not greater than reference, 3 of 3 tests
Mercury	18	1	[0.01]	0.06	10	0	[0.01]	[0.02]	--	--	--	0.761	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Molybdenum	18	2	[0.12]	0.58	10	0	[0.12]	[0.28]	--	--	--	0.743	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Nickel	18	13	[0.18]	4.4	10	8	[0.23]	7.8	0.519	0.642	1	1	Equal	No	No	Not greater than reference, 4 of 4 tests
Phosphorus	18	18	798	3,860	10	10	1,740	4,820	0.604	0.772	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Potassium	18	18	468	2,120	10	10	932	2,240	No test	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	18	17	[0.36]	2.3	10	6	[0.45]	0.81	0.016	0.087	0.087	0.078	Equal	See Table 6-74	Yes	Greater than reference, 1 of 4 tests
Silicon	18	18	25.7	106	10	10	22.6	79.3	No test	No test	No test	No test	No test	No	No	Tissue property measurement
Silver	18	3	[0.07]	0.13	10	3	[0.07]	0.13	--	0.959	1	0.731	Equal	No	No	Not greater than reference, 3 of 3 tests
Sodium	18	18	535	2,280	10	10	952	2,290	No test	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	18	18	4	174	10	10	26.1	240	0.169	0.399	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Thallium	18	0	[0.55]	[0.79]	10	0	[0.55]	[0.67]	No test	No test	No test	No test	No test	No	No	Not detected
Tin	18	3	[0.33]	2.7	10	0	[0.76]	[1]	--	--	--	0.466	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Titanium	4	4	1	2.8	7	7	0.83	2.8	0.171	0.618	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Uranium (inorganic)	18	1	[0.85]	[2.5]	10	0	[0.84]	[2.4]	--	--	--	0.761	Equal	See Table 6-74	Yes	Not greater than reference, 1 test

Table 6-49. Summary of Statistical Comparisons to Reference Aquatic Invertebrate Data Collected for the RCBRA Project. (2 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Vanadium	18	16	[0.09]	0.75	10	5	[0.09]	0.63	0.030	0.772	0.405	0.069	Equal	See Table 6-74	Yes	Greater than reference, 1 of 4 tests
Zinc	18	18	16.9	52.5	10	10	16.6	29.4	0.054	0.087	0.027	--	--	See Table 6-74	Yes	Greater than reference, 1 of 3 tests
Zirconium	4	0	[1]	[1]	7	0	[1]	[1]	No test	No test	No test	No test	No test	No	No	Not detected
Radionuclides (pCi/g)																
Carbon-14	1	0	[-2.64]	[-2.64]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Strontium-90	10	1	[0.0096]	2.6	8	0	[-0.106]	[0.23]	--	--	--	0.908	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Technetium-99	1	0	[0.304]	[0.304]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Thorium-228	1	0	[0]	[0]	1	0	[0.0975]	[0.0975]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-230	1	0	[-0.152]	[-0.152]	1	0	[-0.181]	[-0.181]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-232	1	0	[0]	[0]	1	0	[-0.0417]	[-0.0417]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Uranium-233/234	7	0	[0.032]	[0.151]	4	0	[-0.047]	[0.058]	No test	No test	No test	No test	No test	No	No	Not detected
Uranium-235	7	0	[0]	[0.034]	4	0	[0]	[0.0569]	No test	No test	No test	No test	No test	No	No	Not detected
Uranium-238	7	0	[0.028]	[0.0979]	4	0	[0.0468]	[0.116]	No test	No test	No test	No test	No test	No	No	Not detected

[a] Study vs. reference.
[value] = nondetect
-- = not applicable
COPC = contaminant of potential concern
No ref data = no reference site data available
No test = no statistical test performed
RCBRA = River Corridor Baseline Risk Assessment

Table 6-50. Summary of Statistical Comparisons to Reference Aquatic Invertebrate Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison			Chi-Square P-Value	Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value				
Inorganics (mg/kg-fw)															
Aluminum	6	6	18	86	10	10	11	120	0.106	0.786	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Antimony	6	5	[0.0061]	0.031	10	0	[0.31]	[0.42]	--	0.036	--	0.003	Greater	See text	Greater than reference, 2 of 2 tests
Arsenic	6	5	[0.031]	0.48	10	10	0.72	1.2	1	1	1	--	Less	No	Not greater than reference, 3 of 3 tests
Barium	19	19	1.5	120	10	10	17	69	0.6	0.424	0.163	--	Equal	No	Not greater than reference, 3 of 3 tests
Beryllium	6	2	[0.0049]	0.0069	10	0	[0.02]	[0.02]	--	--	--	0.242	Equal	See text	Not greater than reference, 1 of 1 test
Cadmium	19	19	0.034	0.33	10	10	0.13	0.34	0.938	0.424	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Chromium	19	19	0.065	0.88	10	2	[0.31]	0.92	--	0.791	1	<0.001	Greater	See text	Greater than reference, 1 of 3 tests
Copper	6	6	8.5	12	10	10	11	29	0.999	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Lead	19	19	0.055	0.62	10	4	[0.27]	0.56	--	0.791	0.421	<0.001	Greater	See text	Greater than reference, 1 of 3 tests
Manganese	19	19	5.9	82	10	10	13	66	0.775	0.964	0.421	--	Equal	No	Not greater than reference, 3 of 3 tests
Mercury	19	15	0.013	0.11	10	0	[0.01]	[0.02]	--	0.098	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Nickel	19	19	0.043	48	10	8	[0.23]	7.8	0.096	0.424	0.655	0.212	Equal	No	Not greater than reference, 4 of 4 tests
Selenium	19	19	0.14	0.69	10	6	[0.45]	0.81	0.913	0.964	1	0.016	Greater	See text	Greater than reference, 1 of 4 tests
Silver	19	19	0.011	0.086	10	3	[0.07]	0.13	--	0.964	1	<0.001	Greater	See text	Greater than reference, 1 of 3 tests
Thallium	19	15	[0.0057]	0.17	10	0	[0.55]	[0.67]	--	0.098	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Uranium (inorganic)	19	18	[0.01]	0.058	10	0	[0.84]	[2.4]	--	0.098	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Zinc	6	6	47	64	10	10	17	29	<0.001	0.125	<0.001	--	Equal	See text	Greater than reference, 2 of 4 tests
Radionuclides (pCi/g-fw)															
Antimony-125	3	0	[-0.016]	[0.089]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Beryllium-7	3	0	[-0.15]	[2.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Half-life
Cesium-134	3	0	[-0.034]	[0.028]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Half-life
Cesium-137	3	0	[-0.007]	[0.02]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Cobalt-60	3	0	[0.014]	[0.03]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Europium-152	3	0	[-0.097]	[0.034]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Europium-154	3	0	[-0.051]	[0.051]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Europium-155	3	0	[-0.011]	[0.0087]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected
Potassium-40	3	2	[0.5]	2.5	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Background radionuclide
Ruthenium-106	3	0	[-0.1]	[0.2]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Half-life

Table 6-50. Summary of Statistical Comparisons to Reference Aquatic Invertebrate Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison			Chi-Square P-Value	Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value				
Strontium-90	5	0	[-0.0062]	[0.021]	8	0	[-0.11]	[0.23]	No test	No test	No test	No test	No test	No	Not detected
Technetium-99	4	0	[-0.014]	[0.14]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed

Table 6-51. Summary of Statistical Comparisons to Reference Clam Soft Tissue Data Collected for the RCBRA Project. (3 Pages)

Analyte	Study Sites				Reference Site				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Inorganics (mg/kg)																
Aluminum	42	40	4.6	56.7	9	9	9.5	68.2	0.806	0.815	1	--	Less	No	No	Not greater than reference, 3 of 3 tests
Antimony	42	22	[0.3]	[0.94]	9	0	[0.32]	[0.42]	--	0.147	--	0.012	Greater	See Table 6-74	Yes	Greater than reference, 1 of 2 tests
Arsenic	42	35	[0.59]	2.9	9	9	1.2	2.8	0.976	0.913	0.824	--	Less	No	No	Not greater than reference, 3 of 3 tests
Barium	42	42	0.89	71.6	9	9	1.5	4.5	0.530	0.115	0.0309	--	Equal	See Table 6-74	Yes	Greater than reference, 1 of 3 tests
Beryllium	42	0	[0.01]	[0.03]	9	0	[0.01]	[0.02]	No test	No test	No test	No test	No Test	No	No	Not detected
Bismuth	42	0	[0.3]	[1.5]	9	0	[0.31]	[0.52]	No test	No test	No test	No test	No Test	No	No	Not detected
Boron	42	10	[0.22]	[1.1]	9	1	[0.23]	[0.38]	--	0.496	0.209	0.694	Equal	No	No	Not greater than reference, 3 of 3 tests
Cadmium	42	39	[0.07]	0.57	9	9	0.3	0.56	0.999	0.999	0.824	--	Less	No	No	Not greater than reference, 3 of 3 tests
Calcium	42	42	504	40,100	9	9	912	1,900	No test	No test	No test	No test	No Test	No	No	Essential nutrient
Calculated total uranium	22	0	[0.0000039]	[0.289]	3	0	[0.0000035]	[0.443]	No test	No test	No test	No test	No Test	No	No	Not detected
Chromium	42	26	[0.41]	15.4	9	9	0.25	0.89	0.289	0.429	0.291	--	Less	No	No	Not greater than reference, 3 of 3 tests
Cobalt	42	7	0.09	[0.26]	9	1	[0.09]	[0.13]	--	--	0.622	0.929	Equal	No	No	Not greater than reference, 2 of 2 tests
Copper	42	42	4.8	27.8	9	9	7	13.8	0.072	0.115	0.0309	--	Equal	See Table 6-74	Yes	Greater than reference, 1 of 3 tests
Iron	42	42	28.1	162	9	9	64.4	143	0.997	0.991	0.551	--	Equal	No	No	Not greater than reference, 3 of 3 tests
Lead	42	28	[0.27]	[0.82]	9	1	[0.28]	0.76	--	0.429	1	0.007	Greater	See Table 6-74	Yes	Greater than reference, 1 of 3 tests
Lithium	42	10	[0.03]	0.3	9	0	[0.03]	[0.09]	--	0.115	--	0.242	Equal	No	No	Not greater than reference, 2 of 2 tests
Magnesium	42	42	75.2	612	9	9	115	186	No test	No test	No test	No test	No Test	No	No	Essential nutrient
Manganese	42	42	2	78.8	9	9	3.5	8.3	0.593	0.115	0.0309	--	Equal	See Table 6-74	Yes	Greater than reference, 1 of 3 tests
Mercury	42	2	[0.01]	0.41	9	0	[0.01]	[0.02]	--	--	--	0.781	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Molybdenum	42	9	[0.13]	[0.51]	9	0	[0.16]	[0.28]	--	--	--	0.294	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Nickel	42	15	0.2	0.72	9	7	[0.23]	0.31	--	0.496	0.225	0.052	Equal	No	No	Not greater than reference, 3 of 3 tests
Phosphorus	42	42	818	3,460	9	9	1,260	1,910	0.281	0.115	0.023	--	Equal	See Table 6-74	Yes	Greater than reference, 1 of 3 tests
Potassium	42	42	110	2,200	9	9	110	193	No test	No test	No test	No test	No Test	No	No	Essential nutrient
Selenium	42	40	[0.44]	1.6	9	9	0.7	1.3	0.027	0.312	0.233	--	Less	See Table 6-74	Yes	Greater than reference, 1 of 3 tests
Silicon	42	42	8	60.2	9	9	16.6	47.3	No test	No test	No test	No test	No Test	No	No	Tissue property measurement
Silver	42	7	[0.07]	0.3	9	0	[0.07]	[0.09]	--	--	--	0.433	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Sodium	42	42	97.2	1,760	9	9	107	222	No test	No test	No test	No test	No Test	No	No	Essential nutrient
Strontium (elemental)	42	42	0.9	141	9	9	1.7	4.1	0.168	0.115	0.0232	--	Equal	See Table 6-74	Yes	Greater than reference, 1 of 3 tests
Thallium	42	0	[0.54]	[1.7]	9	0	[0.56]	[0.67]	No test	No test	No test	No test	No Test	No	No	Not detected
Tin	42	3	[0.66]	[2.5]	9	1	[0.63]	1.1	--	--	0.510	0.779	Equal	No	No	Not greater than reference, 2 of 2 tests
Titanium	34	34	0.34	6.5	7	7	2.1	3.3	0.855	0.513	0.458	--	Equal	No	No	Not greater than reference, 3 of 3 tests
Uranium (inorganic)	42	5	[0.82]	[7.4]	9	0	[0.84]	[2.5]	--	--	--	0.637	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Vanadium	42	31	[0.08]	[0.29]	9	8	0.1	0.17	0.167	0.147	0.050	0.593	Equal	See Table 6-74	Yes	Greater than reference, 1 of 4 tests
Zinc	42	42	16.1	49.6	9	9	21.5	43.2	0.931	0.762	0.362	--	Equal	No	No	Not greater than reference, 3 of 3 tests
Zirconium	34	0	[0.99]	[1]	7	0	[1]	[1]	No test	No test	No test	No test	No Test	No	No	Not detected

Table 6-51. Summary of Statistical Comparisons to Reference Clam Soft Tissue Data Collected for the RCBRA Project. (3 Pages)

Analyte	Study Sites				Reference Site				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Organics (mg/kg)																
Acenaphthene	1	0	[0.847]	[0.847]	1	0	[1]	[1]	No test	No test	No test	No test	No Test	No	No	Not detected
Acenaphthylene	1	0	[0.847]	[0.847]	1	0	[1]	[1]	No test	No test	No test	No test	No Test	No	No	Not detected
Aldrin	19	0	[0.26]	[0.5]	7	0	[0.38]	[0.47]	No test	No test	No test	No test	No Test	No	No	Not detected
Alpha-BHC	19	0	[0.26]	[0.5]	7	0	[0.38]	[0.47]	No test	No test	No test	No test	No Test	No	No	Not detected
alpha-Chlordane	19	0	[0.26]	[0.5]	7	0	[0.38]	[0.47]	No test	No test	No test	No test	No Test	No	No	Not detected
Anthracene	1	0	[0.084]	[0.084]	1	0	[0.1]	[0.1]	No test	No test	No test	No test	No Test	No	No	Not detected
Aroclor-1016	20	0	[0.2]	[4]	7	0	[3.1]	[3.8]	No test	No test	No test	No test	No Test	No	No	Not detected
Aroclor-1221	20	0	[0.2]	[4]	7	0	[3.1]	[3.8]	No test	No test	No test	No test	No Test	No	No	Not detected
Aroclor-1232	20	0	[0.2]	[4]	7	0	[3.1]	[3.8]	No test	No test	No test	No test	No Test	No	No	Not detected
Aroclor-1242	20	0	[0.2]	[4]	7	0	[3.1]	[3.8]	No test	No test	No test	No test	No Test	No	No	Not detected
Aroclor-1248	20	0	[0.2]	[4]	7	0	[3.1]	[3.8]	No test	No test	No test	No test	No Test	No	No	Not detected
Aroclor-1254	20	0	[0.2]	[4]	7	0	[3.1]	[3.8]	No test	No test	No test	No test	No Test	No	No	Not detected
Aroclor-1260	20	0	[0.2]	[4]	7	0	[3.1]	[3.8]	No test	No test	No test	No test	No Test	No	No	Not detected
Benzo[a]anthracene	1	1	0.079	0.079	1	0	[0.1]	[0.1]	--	1	--	1	Equal	No	No	Not greater than reference, 2 of 2 tests
Benzo[a]pyrene	1	1	0.075	0.075	1	0	[0.1]	[0.1]	--	1	--	1	Equal	No	No	Not greater than reference, 2 of 2 tests
Benzo[b]fluoranthene	1	1	0.061	0.061	1	0	[0.1]	[0.1]	--	1	--	1	Equal	No	No	Not greater than reference, 2 of 2 tests
Benzo[ghi]perylene	1	0	[0.0847]	[0.0847]	1	0	[0.1]	[0.1]	No test	No test	No test	No test	No Test	No	No	Not detected
Benzo[k]fluoranthene	1	1	0.033	0.033	1	0	[0.1]	[0.1]	--	1	--	1	Equal	No	No	Not greater than reference, 2 of 2 tests
beta-1,2,3,4,5,6-Hexachlorocyclohexane	19	3	0.1	[0.5]	7	2	0.15	[0.47]	--	0.899	1	0.863	Equal	No	No	Not greater than reference, 3 of 3 tests
Chrysene	1	1	0.086	0.086	1	1	0.032	0.032	--	1	0.5	--	--	No	No	Not greater than reference, 2 of 2 tests
Delta-BHC	19	1	0.099	[0.5]	7	1	0.14	[0.47]	--	--	1	0.949	Equal	No	No	Not greater than reference, 2 of 2 tests
Dibenz[a,h]anthracene	1	0	[0.0847]	[0.0847]	1	0	[0.1]	[0.1]	No test	No test	No test	No test	No Test	No	No	Not detected
Dichlorodiphenyldichloroethane	19	0	[0.26]	[0.5]	7	0	[0.38]	[0.47]	No test	No test	No test	No test	No Test	No	No	Not detected
Dichlorodiphenyldichloroethylene	19	3	0.089	[0.5]	7	5	0.081	[0.47]	--	0.99	1	0.025	Less	See Table 6-74	Yes	Greater than reference, 1 of 3 tests
Dichlorodiphenyltrichloroethane	19	0	[0.26]	[0.5]	7	3	0.098	[0.47]	No test	No test	No test	No test	No Test	No	No	Not detected
Dieldrin	19	0	[0.26]	[0.5]	7	0	[0.38]	[0.47]	No test	No test	No test	No test	No Test	No	No	Not detected
Endosulfan I	19	16	0.092	[0.46]	7	7	0.15	0.5	0.987	0.990	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Endosulfan II	19	0	[0.26]	[0.5]	7	0	[0.38]	[0.47]	No test	No test	No test	No test	No Test	No	No	Not detected
Endosulfan sulfate	19	0	[0.26]	[0.5]	7	0	[0.38]	[0.47]	No test	No test	No test	No test	No Test	No	No	Not detected
Endrin	19	0	[0.26]	[0.5]	7	0	[0.38]	[0.47]	No test	No test	No test	No test	No Test	No	No	Not detected
Endrin aldehyde	19	0	[0.26]	[0.5]	7	0	[0.38]	[0.47]	No test	No test	No test	No test	No Test	No	No	Not detected
Endrin ketone	19	0	[0.26]	[0.5]	7	0	[0.38]	[0.47]	No test	No test	No test	No test	No Test	No	No	Not detected
Fluoranthene	1	1	0.093	0.093	1	1	0.1	0.1	--	1	1	--	--	No	No	Not greater than reference, 2 of 2 tests
Fluorene	1	0	[0.00847]	[0.00847]	1	0	[0.1]	[0.1]	No test	No test	No test	No test	No Test	No	No	Not detected
Gamma-BHC (lindane)	19	1	0.095	[0.5]	7	0	[0.38]	[0.47]	--	--	--	0.596	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
gamma-Chlordane	19	0	[0.26]	[0.5]	7	0	[0.38]	[0.47]	No test	No test	No test	No test	No Test	No	No	Not detected
Heptachlor	19	2	0.085	[0.5]	7	6	0.11	[0.45]	--	0.998	1	0.001	Less	See Table 6-74	Yes	Greater than reference, 1 of 3 tests

Table 6-51. Summary of Statistical Comparisons to Reference Clam Soft Tissue Data Collected for the RCBRA Project. (3 Pages)

Analyte	Study Sites				Reference Site				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Heptachlor epoxide	19	0	[0.26]	[0.5]	7	0	[0.38]	[0.47]	No test	No test	No test	No test	No Test	No	No	Not detected
Indeno[1,2,3-cd]pyrene	1	0	[0.084]	[0.084]	1	0	[0.1]	[0.1]	No test	No test	No test	No test	No Test	No	No	Not detected
Methoxychlor	19	6	0.056	[0.5]	7	5	0.21	[0.45]	--	0.999	1	0.169	Equal	No	No	Not greater than reference, 3 of 3 tests
Naphthalene	1	0	[0.847]	[0.847]	1	0	[1]	[1]	No test	No test	No test	No test	No Test	No	No	Not detected
Phenanthrene	1	1	0.077	0.077	1	1	0.032	0.032	--	1	0.500	--	--	No	No	Not greater than reference, 2 of 2 tests
Pyrene	1	1	0.066	0.066	1	1	0.054	0.054	--	1	0.500	--	--	No	No	Not greater than reference, 2 of 2 tests
Toxaphene	19	0	[2.6]	[5]	7	0	[3.8]	[4.7]	No test	No test	No test	No test	No Test	No	No	Not detected
Radionuclides (pCi/g)																
Americium-241	1	0	[0.63]	[0.63]	1	0	[0.19]	[0.19]	No test	No test	No test	No test	No Test	No	No	Not detected
Antimony-125	1	0	[0.8]	[0.8]	1	0	[0.58]	[0.58]	No test	No test	No test	No test	No Test	No	No	Not detected
Beryllium-7	1	0	[0.0349]	[0.0349]	1	0	[0.203]	[0.203]	No test	No test	No test	No test	No Test	No	No	Not detected
Carbon-14	9	1	[-2.85]	93.1	1	0	[-4.26]	[-4.26]	--	--	--	0.160	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Cesium-134	1	0	[0.5]	[0.5]	1	0	[0.36]	[0.36]	No test	No test	No test	No test	No Test	No	No	Short half-life
Cesium-137	1	0	[0.35]	[0.35]	1	0	[0.26]	[0.26]	No test	No test	No test	No test	No Test	No	No	Not detected
Cobalt-60	1	0	[0.38]	[0.38]	1	0	[0.29]	[0.29]	No test	No test	No test	No test	No Test	No	No	Not detected
Europium-152	1	0	[0.91]	[0.91]	1	0	[0.69]	[0.69]	No test	No test	No test	No test	No Test	No	No	Not detected
Europium-154	1	0	[1.1]	[1.1]	1	0	[0.79]	[0.79]	No test	No test	No test	No test	No Test	No	No	Not detected
Europium-155	1	0	[0.65]	[0.65]	1	0	[0.47]	[0.47]	No test	No test	No test	No test	No Test	No	No	Not detected
Potassium-40	1	0	[0]	[0]	1	0	[8.1]	[8.1]	No test	No test	No test	No test	No Test	No	No	Background radionuclide
Radium-226	1	0	[0.75]	[0.75]	1	0	[0.6]	[0.6]	No test	No test	No test	No test	No Test	No	No	Background radionuclide
Radium-228	1	0	[1.6]	[1.6]	1	0	[1.2]	[1.2]	No test	No test	No test	No test	No Test	No	No	Background radionuclide
Ruthenium-106	1	0	[3.1]	[3.1]	1	0	[2.2]	[2.2]	No test	No test	No test	No test	No Test	No	No	Short half-life
Strontium-90	21	1	[-0.0803]	0.489	1	1	3.38	3.38	--	--	1	--	--	See Table 6-74	Yes	Not greater than reference, 1 test
Technetium-99	1	0	[0.225]	[0.225]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No Ref Data	No	No	Not detected
Thorium-228	6	0	[-0.0921]	[0.181]	1	0	[0.153]	[0.153]	No test	No test	No test	No test	No Test	No	No	Background radionuclide
Thorium-230	6	0	[-0.118]	[0.0805]	1	0	[-0.0653]	[-0.0653]	No test	No test	No test	No test	No Test	No	No	Background radionuclide
Thorium-232	6	0	[-0.0336]	[0.0322]	1	0	[0]	[0]	No test	No test	No test	No test	No Test	No	No	Background radionuclide
Uranium-233/234	22	0	[0]	[0.134]	3	0	[0.022]	[0.085]	No test	No test	No test	No test	No Test	No	No	Not detected
Uranium-235	22	0	[-0.033]	[0.063]	3	0	[0]	[0]	No test	No test	No test	No test	No Test	No	No	Not detected
Uranium-238	22	0	[0]	[0.097]	3	0	[0]	[0.149]	No test	No test	No test	No test	No Test	No	No	Not detected

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
BHC = benzene hexachloride
COPC = contaminant of potential concern
No ref data = no reference site data available
No test = no statistical test performed
RCBRA = River Corridor Baseline Risk Assessment

Table 6-52. Summary of Statistical Comparisons to Reference Clam Soft Tissue Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Inorganics (mg/kg-fw)															
Aluminum	6	6	50	370	9	9	9.5	68	0.001	0.044	0.002	--	Equal	See text	Greater than reference, 3 of 3 tests
Antimony	6	3	[0.0048]	0.0099	9	0	[0.32]	[0.42]	--	0.044	--	0.087	Equal	See text	Greater than reference, 1 of 2 tests
Arsenic	6	6	1.5	2.4	9	9	1.2	2.8	0.015	0.341	1	--	Equal	See text	Greater than reference, 1 of 3 tests
Barium	25	25	1.8	6.6	9	9	1.5	4.5	0.348	0.487	0.535	--	Equal	No	Not greater than reference, 3 of 3 tests
Beryllium	6	6	0.011	0.02	9	0	[0.01]	[0.02]	--	0.044	--	<0.001	Greater	See text	Greater than reference, 2 of 2 tests
Cadmium	25	25	0.22	0.69	9	9	0.3	0.56	0.863	0.487	0.191	--	Equal	No	Not greater than reference, 3 of 3 tests
Chromium	25	25	0.65	13	9	9	0.25	0.89	<0.001	0.132	<0.001	--	Equal	See text	Greater than reference, 2 of 3 tests
Copper	6	6	7.2	12	9	9	7	14	0.188	0.341	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Lead	25	25	0.12	0.69	9	1	[0.28]	0.76	--	0.487	1	<0.001	Greater	See text	Greater than reference, 1 of 3 tests
Manganese	25	25	4.3	15	9	9	3.5	8.3	0.012	0.132	0.025	--	Equal	See text	Greater than reference, 2 of 3 tests
Mercury	25	23	0.0083	0.041	9	0	[0.01]	[0.02]	--	0.132	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Nickel	25	25	0.19	0.54	9	7	[0.23]	0.31	0.608	0.386	0.273	0.109	Equal	No	Not greater than reference, 4 of 4 tests
Selenium	25	25	0.5	0.83	9	9	0.7	1.3	1	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Silver	25	25	0.0074	0.025	9	0	[0.07]	[0.09]	--	0.132	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Thallium	25	25	0.0066	0.13	9	0	[0.56]	[0.67]	--	0.132	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Uranium (inorganic)	25	25	0.03	0.086	9	0	[0.84]	[2.5]	--	0.132	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Zinc	6	6	24	56	9	9	22	43	0.131	0.341	0.4	--	Equal	No	Not greater than reference, 3 of 3 tests
Organics (mg/kg-fw)															
Aroclor-1254	6	0	[0.0057]	[0.0075]	7	0	[3.1]	[3.8]	No test	No test	No test	No test	No test	No	Not detected
Aroclor-1260	6	0	[0.0057]	[0.0075]	7	0	[3.1]	[3.8]	No test	No test	No test	No test	No test	No	Not detected
Radionuclides (pCi/g-fw)															
Antimony-125	1	0	[-0.09]	[-0.09]	1	0	[0.58]	[0.58]	No test	No test	No test	No test	No test	No	Not detected
Beryllium-7	1	0	[0.0077]	[0.0077]	1	0	[0.2]	[0.2]	No test	No test	No test	No test	No test	No	Half-life
Cesium-134	1	0	[0.0039]	[0.0039]	1	0	[0.36]	[0.36]	No test	No test	No test	No test	No test	No	Half-life
Cesium-137	1	0	[0.0079]	[0.0079]	1	0	[0.26]	[0.26]	No test	No test	No test	No test	No test	No	Not detected
Cobalt-60	1	0	[-0.031]	[-0.031]	1	0	[0.29]	[0.29]	No test	No test	No test	No test	No test	No	Not detected
Europium-152	1	0	[0.11]	[0.11]	1	0	[0.69]	[0.69]	No test	No test	No test	No test	No test	No	Not detected
Europium-154	1	0	[0.051]	[0.051]	1	0	[0.79]	[0.79]	No test	No test	No test	No test	No test	No	Not detected

Table 6-52. Summary of Statistical Comparisons to Reference Clam Soft Tissue Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Europium-155	1	0	[-0.014]	[-0.014]	1	0	[0.47]	[0.47]	No test	No test	No test	No test	No test	No	Not detected
Potassium-40	1	0	[0.051]	[0.051]	1	0	[8.1]	[8.1]	No test	No test	No test	No test	No test	No	Background radionuclide
Ruthenium-106	1	0	[-0.13]	[-0.13]	1	0	[2.2]	[2.2]	No test	No test	No test	No test	No test	No	Half-life
Strontium-90	6	0	[-0.0035]	[0.028]	1	1	3.4	3.4	No test	No test	No test	No test	No test	No	Not detected
Technetium-99	6	1	[-0.017]	0.16	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed

Table 6-53. Summary of Statistical Comparisons to Reference Clam Soft Tissue Data Collected for the 100-NR-2 Project.

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Inorganics (mg/kg-fw)															
Aluminum	7	7	3.6	53	9	9	9.5	68	0.878	0.850	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Antimony	27	25	[0.0018]	0.0068	9	0	[0.32]	[0.42]	--	0.106	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Arsenic	27	27	0.9	2	9	9	1.2	2.8	0.994	0.976	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Barium	27	27	1.3	3.3	9	9	1.5	4.5	0.997	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Beryllium	7	0	[0.00072]	[0.00072]	9	0	[0.01]	[0.02]	No test	No test	No test	No test	No test	No	Not detected
Cadmium	27	27	0.32	0.82	9	9	0.3	0.56	0.971	0.774	0.298	--	Equal	No	Not greater than reference, 3 of 3 tests
Chromium	27	27	0.24	2.7	9	9	0.25	0.89	0.558	0.106	0.106	--	Equal	No	Not greater than reference, 3 of 3 tests
Copper	7	7	4.7	8.7	9	9	7	14	0.996	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Lead	27	27	0.051	0.16	9	1	[0.28]	0.76	--	0.426	1	<0.001	Greater	See text	Greater than reference, 1 of 3 tests
Manganese	27	27	1.9	5.4	9	9	3.5	8.3	1	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Mercury	11	11	0.0032	0.011	9	0	[0.01]	[0.02]	--	0.068	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Nickel	27	27	0.095	0.7	9	7	[0.23]	0.31	0.998	1	0.557	0.093	Equal	No	Not greater than reference, 4 of 4 tests
Selenium	27	27	0.41	0.63	9	9	0.7	1.3	1	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Silver	7	7	0.0061	0.015	9	0	[0.07]	[0.09]	--	0.063	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Thallium	7	7	0.0044	0.0085	9	0	[0.56]	[0.67]	--	0.063	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Thorium	7	7	0.0019	0.012	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data
Uranium (inorganic)	27	27	0.015	0.054	9	0	[0.84]	[2.5]	--	0.106	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Vanadium	20	20	0.038	0.14	9	8	0.1	0.17	1	0.999	1	0.677	Equal	No	Not greater than reference, 4 of 4 tests
Zinc	27	27	21	32	9	9	22	43	0.984	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed

Table 6-54. Summary of Statistical Comparisons to Reference Clam Shell Data Collected for the RCBRA Project.

Analyte	Study Sites				Reference Site				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Radionuclide (pCi/g-fw)																
Strontium-90	27	11	[0.036]	0.255	9	5	[-0.02]	0.47	--	0.950	1	0.699	Equal	No	No	Not greater than reference, 3 of 3 tests

[a] Study vs. reference.
[value] = nondetect
-- = not applicable
COPC = contaminant of potential concern
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 6-55. Summary of Statistical Comparisons to Reference Clam Shell Data Collected for the 100-B/C Pilot Project.

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Radionuclides (pCi/g-fw)															
Strontium-90	6	6	0.26	0.69	9	5	[-0.02]	0.47	0.014	0.341	0.400	0.190	Equal	See text	Greater than reference, 1 of 4 tests
Technetium-99	6	1	[0.032]	0.18	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data

[a] Study vs. reference.
[value] = nondetect
-- = not applicable
fw = fresh weight
No ref data = no reference site data available

Table 6-56. Summary of Statistical Comparisons to Reference Clam Shell Data Collected for the 100-NR-2 Project.

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Radionuclides (pCi/g-fw)															
Strontium-90	30	30	0.21	220	9	5	[-0.02]	0.47	<0.001	0.132	<0.001	0.001	Greater	See text	Greater than reference, 3 of 4 tests
Technetium-99	5	0	[0.047]	[0.22]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected

[a] Study vs. reference.
[value] = nondetect
-- = not applicable
fw = fresh weight
No ref data = no reference site data available

Table 6-57. Summary of Statistical Comparisons to Reference Mussel Soft Tissue Data Collected for the RCBRA Project. (4 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Inorganics (mg/kg-fw)																
Aluminum	6	6	9.6	12.6	3	3	11.2	23.2	0.923	1	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Antimony	6	1	[0.3]	0.32	3	1	[0.3]	0.32	--	0.917	1	0.777	Equal	No	No	Not greater than reference, 3 of 3 tests
Arsenic	6	6	0.61	1.1	3	3	0.83	1.4	0.965	1	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Barium	6	6	57.1	133	3	3	67	143	0.922	1	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Beryllium	6	3	[0.02]	0.03	3	2	[0.02]	0.03	0.556	1	1	0.813	Equal	No	No	Not greater than reference, 4 of 4 tests
Bismuth	6	0	[0.49]	[0.51]	3	0	[0.49]	[0.51]	No test	No test	No test	No test	No test	No	No	Not detected
Boron	6	1	[0.36]	[0.38]	3	2	[0.36]	0.55	--	1	1	0.453	Equal	No	No	Not greater than reference, 3 of 3 tests
Cadmium	6	6	0.15	0.61	3	3	0.22	0.91	0.923	1	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Calcium	6	6	1,550	7,210	3	3	3,060	10,200	No test	No test	No test	No test	No test	No	No	Essential nutrient
Calculated total uranium	6	0	[0]	[0.204]	3	0	[0.0000057]	[0.0576]	No test	No test	No test	No test	No test	No	No	Not detected
Chromium	6	3	[0.19]	0.72	3	2	[0.22]	0.54	0.606	0.667	0.417	0.813	Equal	No	No	Not greater than reference, 4 of 4 tests
Cobalt	6	5	0.09	0.14	3	2	[0.09]	0.17	0.854	1	1	0.777	Equal	No	No	Not greater than reference, 4 of 4 tests
Copper	6	6	0.54	2	3	3	0.62	3.1	0.922	1	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Iron	6	6	241	641	3	3	300	653	0.877	1	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Lead	6	5	[0.28]	0.44	3	3	0.32	0.47	0.651	1	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Lithium	6	3	0.04	[0.08]	3	2	0.07	[0.08]	0.890	1	1	0.813	Equal	No	No	Not greater than reference, 4 of 4 tests
Magnesium	6	6	66.2	138	3	3	79	160	No test	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	6	6	340	833	3	3	428	1,060	0.922	1	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Mercury	6	0	[0.01]	[0.02]	3	0	[0.01]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Molybdenum	6	4	0.13	0.23	3	2	[0.13]	0.18	0.654	0.667	0.667	0.453	Equal	No	No	Not greater than reference, 4 of 4 tests
Nickel	6	2	[0.18]	[0.19]	3	2	[0.19]	0.2	--	1	1	0.813	Equal	No	No	Not greater than reference, 3 of 3 tests
Phosphorus	6	6	963	3,140	3	3	1,300	4,000	0.922	1	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Potassium	6	6	53.8	276	3	3	73.4	118	No test	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	6	2	[0.35]	0.57	3	1	[0.35]	0.47	--	0.667	0.417	0.453	Equal	No	No	Not greater than reference, 3 of 3 tests
Silicon	6	6	15.3	24.9	3	3	22.2	34.9	No test	No test	No test	No test	No test	No	No	Tissue property measurement
Silver	6	0	[0.08]	[0.09]	3	0	[0.08]	[0.09]	No test	No test	No test	No test	No test	No	No	Not detected
Sodium	6	6	263	441	3	3	314	390	No test	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	6	6	8.3	25.4	3	3	11.9	35.1	0.878	1	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Thallium	6	0	[0.54]	[0.56]	3	0	[0.54]	[0.56]	No test	No test	No test	No test	No test	No	No	Not detected
Tin	6	3	0.33	0.69	3	2	[0.63]	0.75	0.940	1	1	0.813	Equal	No	No	Not greater than reference, 4 of 4 tests
Uranium (inorganic)	6	0	[2.4]	[2.5]	3	0	[2.4]	[2.5]	No test	No test	No test	No test	No test	No	No	Not detected
Vanadium	6	3	0.01	0.11	3	2	0.01	0.13	0.789	1	1	0.813	Equal	No	No	Not greater than reference, 4 of 4 tests
Zinc	6	6	11.8	35.4	3	3	15.3	60	0.922	1	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Organics (mg/kg-fw)																
1,2,4-Trichlorobenzene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
1,2-Dichlorobenzene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
1,3-Dichlorobenzene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
1,4-Dichlorobenzene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected

Table 6-57. Summary of Statistical Comparisons to Reference Mussel Soft Tissue Data Collected for the RCBRA Project. (4 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
2,4,5-Trichlorophenol	1	0	[12]	[12]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
2,4,6-Trichlorophenol	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
2,4-Dichlorophenol	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
2,4-Dimethylphenol	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
2,4-Dinitrophenol	1	0	[12]	[12]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
2,4-Dinitrotoluene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
2,6-Dinitrotoluene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
2-Chloronaphthalene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
2-Chlorophenol	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
2-Methylnaphthalene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
2-Methylphenol [cresol, o-]	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
2-Nitroaniline	1	0	[12]	[12]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
2-Nitrophenol	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
3+4 Methylphenol [cresol, m+p]	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
3,3'-Dichlorobenzidine	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
3-Nitroaniline	1	0	[12]	[12]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
4,6-Dinitro-2-methylphenol	1	0	[12]	[12]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
4-Bromophenylphenyl ether	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
4-Chloro-3-methylphenol	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
4-Chloroaniline	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
4-Chlorophenylphenyl ether	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
4-Nitroaniline	1	0	[12]	[12]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
4-Nitrophenol	1	0	[12]	[12]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Acenaphthene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Acenaphthylene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Aldrin	5	0	[0.021]	[0.025]	3	0	[0.023]	[0.025]	No test	No test	No test	No test	No test	No	No	Not detected
Alpha-BHC	5	0	[0.021]	[0.025]	3	0	[0.023]	[0.025]	No test	No test	No test	No test	No test	No	No	Not detected
Anthracene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Aroclor-1016	6	0	[0.17]	[0.2]	3	0	[0.19]	[0.2]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1221	6	0	[0.17]	[0.2]	3	0	[0.19]	[0.2]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1232	6	0	[0.17]	[0.2]	3	0	[0.19]	[0.2]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1242	6	0	[0.17]	[0.2]	3	0	[0.19]	[0.2]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1248	6	0	[0.17]	[0.2]	3	0	[0.19]	[0.2]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1254	6	0	[0.17]	[0.2]	3	0	[0.19]	[0.2]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1260	6	0	[0.17]	[0.2]	3	0	[0.19]	[0.2]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[a]anthracene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Benzo[a]pyrene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Benzo[b]fluoranthene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Benzo[ghi]perylene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Benzo[k]fluoranthene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected

Table 6-57. Summary of Statistical Comparisons to Reference Mussel Soft Tissue Data Collected for the RCBRA Project. (4 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Bis[2-Chloroethoxy]methane	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Bis[2-chloro-1-methylethyl]ether	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Bis[2-chloroethyl] ether	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Bis[2-ethylhexyl] phthalate	1	1	0.41	0.41	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See Table 6-74	Yes	No reference data
Butylbenzylphthalate	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Carbazole	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Chrysene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Delta-BHC	5	1	0.0065	[0.024]	3	0	[0.023]	[0.025]	--	0.625	--	0.783	Equal	No	No	Not greater than reference, 2 of 2 tests
Di-n-butylphthalate	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Di-n-octylphthalate	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Dibenz[a,h]anthracene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Dibenzofuran	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Dichlorodiphenyldichloroethane	5	1	0.008	[0.024]	3	2	0.009	[0.023]	--	1	1	0.572	Equal	No	No	Not greater than reference, 3 of 3 tests
Dichlorodiphenyldichloroethylene	5	2	0.0066	[0.024]	3	2	0.018	[0.023]	--	1	1	1	Equal	No	No	Not greater than reference, 3 of 3 tests
Dichlorodiphenyltrichloroethane	5	0	[0.021]	[0.025]	3	0	[0.023]	[0.025]	No test	No test	No test	No test	No test	No	No	Not detected
Dieldrin	5	0	[0.021]	[0.025]	3	0	[0.023]	[0.025]	No test	No test	No test	No test	No test	No	No	Not detected
Diethylphthalate	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Dimethyl phthalate	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Endosulfan I	5	0	[0.021]	[0.025]	3	0	[0.023]	[0.025]	No test	No test	No test	No test	No test	No	No	Not detected
Endosulfan II	5	1	0.006	[0.024]	3	0	[0.023]	[0.025]	--	0.625	--	0.783	Equal	No	No	Not greater than reference, 2 of 2 tests
Endosulfan sulfate	5	1	0.012	[0.024]	3	0	[0.023]	[0.025]	--	0.625	--	0.783	Equal	No	No	Not greater than reference, 2 of 2 tests
Endrin	5	0	[0.021]	[0.025]	3	0	[0.023]	[0.025]	No test	No test	No test	No test	No test	No	No	Not detected
Endrin aldehyde	5	0	[0.021]	[0.025]	3	0	[0.023]	[0.025]	No test	No test	No test	No test	No test	No	No	Not detected
Endrin ketone	5	0	[0.021]	[0.025]	3	0	[0.023]	[0.025]	No test	No test	No test	No test	No test	No	No	Not detected
Fluoranthene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Fluorene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Gamma-BHC (lindane)	5	0	[0.021]	[0.025]	3	0	[0.023]	[0.025]	No test	No test	No test	No test	No test	No	No	Not detected
Heptachlor	5	0	[0.021]	[0.025]	3	0	[0.023]	[0.025]	No test	No test	No test	No test	No test	No	No	Not detected
Heptachlor epoxide	5	0	[0.021]	[0.025]	3	0	[0.023]	[0.025]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorobenzene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Hexachlorobutadiene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Hexachlorocyclopentadiene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Hexachloroethane	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Indeno[1,2,3-cd]pyrene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Isophorone	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Methoxychlor	5	2	0.023	0.025	3	2	0.019	0.024	--	0.625	0.625	1	Equal	No	No	Not greater than reference, 3 of 3 tests
N-Nitroso-di-n-dipropylamine	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
N-Nitrosodiphenylamine	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Naphthalene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected

Table 6-57. Summary of Statistical Comparisons to Reference Mussel Soft Tissue Data Collected for the RCBRA Project. (4 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Nitrobenzene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Pentachlorophenol	1	1	2.3	2.3	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See Table 6-74	Yes	No reference data
Phenanthrene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Phenol	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Pyrene	1	0	[4.7]	[4.7]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Toxaphene	5	0	[0.21]	[0.25]	3	0	[0.23]	[0.25]	No test	No test	No test	No test	No test	No	No	Not detected
alpha-Chlordane	5	0	[0.021]	[0.025]	3	0	[0.023]	[0.025]	No test	No test	No test	No test	No test	No	No	Not detected
beta-1,2,3,4,5,6-Hexachlorocyclohexane	5	0	[0.021]	[0.025]	3	0	[0.023]	[0.025]	No test	No test	No test	No test	No test	No	No	Not detected
gamma-Chlordane	5	0	[0.021]	[0.025]	3	0	[0.023]	[0.025]	No test	No test	No test	No test	No test	No	No	Not detected
Radionuclides (pCi/g-fw)																
Americium-241	6	0	[0.044]	[0.24]	3	0	[0.094]	[0.14]	No test	No test	No test	No test	No test	No	No	Not detected
Antimony-125	6	0	[0.082]	[0.54]	3	0	[0.091]	[0.23]	No test	No test	No test	No test	No test	No	No	Not detected
Beryllium-7	6	0	[0]	[0.0363]	3	0	[0]	[0.25]	No test	No test	No test	No test	No test	No	No	Not detected
Cesium-134	6	0	[0.041]	[0.27]	3	0	[0.042]	[0.12]	No test	No test	No test	No test	No test	No	No	Short half-life
Cesium-137	6	0	[0.035]	[0.22]	3	0	[0.039]	[0.095]	No test	No test	No test	No test	No test	No	No	Not detected
Cobalt-60	6	0	[0.034]	[0.21]	3	0	[0.04]	[0.1]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-152	6	0	[0.084]	[0.56]	3	0	[0.093]	[0.26]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-154	6	0	[0.098]	[0.75]	3	0	[0.12]	[0.27]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-155	6	0	[0.08]	[0.3]	3	0	[0.086]	[0.15]	No test	No test	No test	No test	No test	No	No	Not detected
Potassium-40	6	0	[0]	[0.0262]	3	0	[0.0197]	[1.3]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-226	6	0	[0.083]	[0.41]	3	0	[0.11]	[0.26]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-228	6	1	0.18	[0.89]	3	0	[0.24]	[0.4]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Ruthenium-106	6	0	[0.29]	[1.9]	3	0	[0.3]	[0.86]	No test	No test	No test	No test	No test	No	No	Short half-life
Strontium-90	6	0	[-0.072]	[0.0714]	3	1	[-0.0014]	0.276	No test	No test	No test	No test	No test	No	No	Not detected
Technetium-99	1	0	[0.0345]	[0.0345]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Thorium-228	6	3	[0]	0.295	3	2	[0.0762]	0.195	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-230	6	0	[-0.11]	[-0.009]	3	0	[-0.0795]	[-0.0208]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-232	6	0	[-0.0404]	[0.0463]	3	0	[-0.0138]	[0]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Uranium-233/234	6	0	[0]	[0.0363]	3	0	[0]	[0.0367]	No test	No test	No test	No test	No test	No	No	Not detected
Uranium-235	6	0	[0]	[0.0262]	3	0	[0]	[0.0222]	No test	No test	No test	No test	No test	No	No	Not detected
Uranium-238	6	0	[0]	[0.0655]	3	0	[0]	[0.0163]	No test	No test	No test	No test	No test	No	No	Not detected

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
BHC = benzene hexachloride
COPC = contaminant of potential concern
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed
RCBRA = River Corridor Baseline Risk Assessment

Table 6-58. Summary of Statistical Comparisons to Reference Mussel Shell Data Collected for the RCBRA Project.

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Radionuclide (pCi/g-fw)																
Strontium-90	6	6	0.215	0.347	3	3	0.249	0.322	0.070	0.815	1	--	--	No	No	Not greater than reference, 3 of 3 tests

[a] Study vs. reference.
-- = not applicable
COPC = contaminant of potential concern
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment

Table 6-59. Summary of Statistical Comparisons to Reference Sculpin Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Inorganics (mg/kg-fw)																
Aluminum	28	28	6.4	58.9	10	10	6.2	53.7	0.579	0.743	0.737	--	--	No	No	Not greater than reference, 3 of 3 tests
Antimony	28	1	[0.22]	[0.43]	10	0	[0.31]	[0.43]	--	--	--	0.586	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Arsenic	28	3	[0.39]	0.8	10	1	[0.39]	1	--	--	1	0.591	Equal	No	No	Not greater than reference, 2 of 2 tests
Barium	28	28	2.7	6.2	10	10	2.3	4.1	0.152	0.064	0.042	--	--	See Table 6-74	Yes	Greater than reference, 1 of 3 tests
Beryllium	28	2	[0.01]	[0.04]	10	1	0.01	[0.02]	--	--	0.500	0.693	Equal	No	No	Not greater than reference, 2 of 2 tests
Bismuth	28	0	[0.4]	[0.55]	10	0	[0.48]	[0.59]	No test	No test	No test	No test	No test	No	No	Not detected
Boron	28	2	[0.22]	1.2	10	1	[0.23]	[0.37]	--	--	0.680	0.693	Equal	No	No	Not greater than reference, 2 of 2 tests
Cadmium	28	24	[0.03]	0.41	10	9	[0.03]	0.35	0.553	0.652	0.737	0.841	Equal	No	No	Not greater than reference, 4 of 4 tests
Calcium	28	28	7,310	20,600	10	10	6,080	14,300	No test	No test	No test	No test	No test	No	No	Essential nutrient
Calculated total uranium	26	0	[0]	[0.478]	9	2	[-0.0000032]	[0.125]	No test	No test	No test	No test	No test	No	No	Not detected
Chromium	28	26	0.15	0.96	10	3	0.32	[0.63]	--	0.094	0.025	<0.001	Greater	See Table 6-74	Yes	Greater than reference, 2 of 3 tests
Cobalt	28	0	[0.08]	[0.17]	10	0	[0.09]	[0.14]	No test	No test	No test	No test	No test	No	No	Not detected
Copper	28	26	1	10.7	10	4	[0.91]	4.3	--	0.392	0.388	0.002	Greater	See Table 6-74	Yes	Greater than reference, 1 of 3 tests
Iron	28	28	21	152	10	10	19.6	118	0.661	0.938	0.388	--	--	No	No	Not greater than reference, 3 of 3 tests
Lead	28	8	[0.27]	0.77	10	7	[0.27]	0.49	--	0.992	0.538	0.054	Equal	No	No	Not greater than reference, 3 of 3 tests
Lithium	28	18	0.04	0.2	10	1	[0.05]	[0.1]	--	0.137	0.137	0.010	Greater	See Table 6-74	Yes	Greater than reference, 1 of 3 tests
Magnesium	28	28	223	586	10	10	222	409	No test	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	28	28	2.8	11.3	10	10	1.9	8.4	0.101	0.392	0.277	--	--	No	No	Not greater than reference, 3 of 3 tests
Mercury	28	24	0.003	0.05	10	5	[0.01]	0.18	0.178	0.770	1	0.065	Equal	No	No	Not greater than reference, 4 of 4 tests
Molybdenum	28	2	[0.12]	0.33	10	1	[0.12]	[0.28]	--	--	0.577	0.693	Equal	No	No	Not greater than reference, 2 of 2 tests
Nickel	28	19	[0.18]	67.1	10	4	[0.13]	0.45	--	0.094	0.004	0.242	Equal	See Table 6-74	Yes	Greater than reference, 1 of 3 tests
Phosphorus	28	28	4,900	11,400	10	10	4,520	8,660	0.287	0.392	0.538	--	--	No	No	Not greater than reference, 3 of 3 tests
Potassium	28	28	1,570	2,910	10	10	1,980	2,270	No test	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	28	24	[0.44]	1.1	10	10	0.56	0.78	0.370	0.094	0.011	--	--	See Table 6-74	Yes	Greater than reference, 1 of 3 tests

Table 6-59. Summary of Statistical Comparisons to Reference Sculpin Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Silicon	28	26	14.3	94.5	10	5	16.7	64.2	No test	No test	No test	No test	No test	No	No	Tissue property measurement
Silver	28	0	[0.07]	[0.13]	10	1	[0.07]	[0.14]	No test	No test	No test	No test	No test	No	No	Not detected
Sodium	28	28	752	1,360	10	10	889	1,400	No test	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	25	25	13.8	30.7	10	10	12.7	21.1	0.094	0.072	0.029	--	--	See Table 6-74	Yes	Greater than reference, 1 of 3 tests
Thallium	28	0	[0.5]	[0.79]	10	0	[0.55]	[0.68]	No test	No test	No test	No test	No test	No	No	Not detected
Tin	28	6	[0.62]	[1.2]	10	0	[0.78]	[1.2]	--	--	--	0.276	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Titanium	18	18	0.26	6	8	8	0.18	3.9	0.933	0.85	0.471	--	--	No	No	Not greater than reference, 3 of 3 tests
Total inorganic arsenic	10	0	[0.014]	[0.075]	1	0	[0.015]	[0.015]	No test	No test	No test	No test	No test	No	No	Not detected
Uranium (inorganic)	28	2	[0.82]	[2.4]	10	0	[0.83]	[2.4]	--	--	--	0.965	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Vanadium	28	21	[0.08]	0.38	10	7	[0.08]	0.32	0.763	0.981	0.737	0.912	Equal	No	No	Not greater than reference, 4 of 4 tests
Zinc	28	28	21.1	46.8	10	10	19.8	53.2	0.884	0.743	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Zirconium	17	0	[0.49]	[1]	8	0	[0.52]	[1]	No test	No test	No test	No test	No test	No	No	Not detected
Organics (mg/kg-fw)																
1,2,4-Trichlorobenzene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
1,2-Dichlorobenzene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
1,3-Dichlorobenzene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
1,4-Dichlorobenzene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
2,4,5-Trichlorophenol	25	0	[9.8]	[81]	10	0	[10]	[18]	No test	No test	No test	No test	No test	No	No	Not detected
2,4,6-Trichlorophenol	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dichlorophenol	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dimethylphenol	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrophenol	25	0	[9.8]	[81]	10	0	[10]	[18]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrotoluene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
2,6-Dinitrotoluene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
2-Chloronaphthalene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
2-Chlorophenol	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
2-Methylnaphthalene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
2-Methylphenol [cresol, o-]	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
2-Nitroaniline	25	3	2.7	[81]	10	0	[10]	[18]	--	--	--	0.633	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
2-Nitrophenol	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
3+4 Methylphenol [cresol, m+p]	25	23	0.29	120	10	9	0.36	130	0.970	0.999	1	0.633	Equal	No	No	Not greater than reference, 4 of 4 tests
3,3'-Dichlorobenzidine	25	1	0.86	[42]	10	0	[4.1]	[7]	--	--	--	0.630	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
3-Nitroaniline	25	0	[9.8]	[81]	10	0	[10]	[18]	No test	No test	No test	No test	No test	No	No	Not detected
4,6-Dinitro-2-methylphenol	25	0	[9.8]	[81]	10	0	[10]	[18]	No test	No test	No test	No test	No test	No	No	Not detected

Table 6-59. Summary of Statistical Comparisons to Reference Sculpin Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
4-Bromophenylphenyl ether	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chloro-3-methylphenol	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chloroaniline	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chlorophenylphenyl ether	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
4-Nitroaniline	25	0	[9.8]	[81]	10	0	[10]	[18]	No test	No test	No test	No test	No test	No	No	Not detected
4-Nitrophenol	25	0	[9.8]	[81]	10	0	[10]	[18]	No test	No test	No test	No test	No test	No	No	Not detected
Acenaphthene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Acenaphthylene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Aldrin	25	2	0.0069	[0.21]	10	3	0.0074	[0.041]	--	--	1	0.252	Equal	No	No	Not greater than reference, 2 of 2 tests
Alpha-BHC	25	0	[0.018]	[0.21]	10	1	0.00591	[0.041]	No test	No test	No test	No test	No test	No	No	Not detected
Anthracene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1016	32	0	[0.02]	[1.7]	10	0	[0.17]	[0.33]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1221	32	0	[0.02]	[1.7]	10	0	[0.17]	[0.33]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1232	32	0	[0.02]	[1.7]	10	0	[0.17]	[0.33]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1242	32	0	[0.02]	[1.7]	10	0	[0.17]	[0.33]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1248	32	0	[0.02]	[1.7]	10	0	[0.17]	[0.33]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1254	32	3	[0.02]	[1.7]	10	0	[0.17]	[0.33]	--	--	--	0.763	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Aroclor-1260	32	1	0.015	[1.7]	10	0	[0.17]	[0.33]	--	--	--	0.534	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Benzo[a]anthracene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[a]pyrene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[b]fluoranthene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[ghi]perylene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[k]fluoranthene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-Chloroethoxy]methane	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-chloro-1-methylethyl]ether	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-chloroethyl] ether	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-ethylhexyl] phthalate	25	23	0.3	7.7	10	10	0.49	7.7	0.996	0.999	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Butylbenzylphthalate	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Carbazole	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Chrysene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Delta-BHC	25	4	0.0067	[0.21]	10	6	0.0089	[0.041]	--	0.988	1	0.029	Less	See Table 6-74	Yes	Greater than reference, 1 of 3 tests
Di-n-butylphthalate	25	15	0.21	13	10	2	0.26	[7]	--	0.335	0.574	0.078	Equal	No	No	Not greater than reference, 3 of 3 tests
Di-n-octylphthalate	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Dibenz[a,h]anthracene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected

Table 6-59. Summary of Statistical Comparisons to Reference Sculpin Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Dibenzofuran	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Dichlorodiphenyl-dichloroethane	25	13	0.0045	[0.15]	10	3	0.011	[0.041]	--	0.957	0.765	0.421	Equal	No	No	Not greater than reference, 3 of 3 tests
Dichlorodiphenyl-dichloroethylene	25	24	0.0055	0.12	10	10	0.013	0.29	0.456	0.335	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Dichlorodiphenyl-trichloroethane	25	2	0.0078	[0.21]	10	3	0.0051	[0.041]	--	--	0.400	0.252	Equal	No	No	Not greater than reference, 2 of 2 tests
Dieldrin	25	2	0.0073	[0.21]	10	0	[0.021]	[0.041]	--	--	--	0.908	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Diethylphthalate	25	1	2.2	[42]	10	0	[4.1]	[7]	--	--	--	0.630	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Dimethyl phthalate	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Endosulfan I	25	1	0.0078	[0.21]	10	0	[0.021]	[0.041]	--	--	--	0.630	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Endosulfan II	25	0	[0.018]	[0.21]	10	0	[0.021]	[0.041]	No test	No test	No test	No test	No test	No	No	Not detected
Endosulfan sulfate	25	0	[0.018]	[0.21]	10	0	[0.021]	[0.041]	No test	No test	No test	No test	No test	No	No	Not detected
Endrin	25	2	0.0085	[0.21]	10	4	0.0069	[0.041]	--	--	1	0.076	Equal	No	No	Not greater than reference, 2 of 2 tests
Endrin aldehyde	25	0	[0.018]	[0.21]	10	1	0.0078	[0.041]	No test	No test	No test	No test	No test	No	No	Not detected
Endrin ketone	25	4	0.005	[0.21]	10	5	0.0086	[0.029]	--	0.999	1	0.099	Equal	No	No	Not greater than reference, 3 of 3 tests
Fluoranthene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Fluorene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Gamma-BHC (lindane)	25	1	0.0055	[0.21]	10	0	[0.021]	[0.041]	--	--	--	0.630	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Heptachlor	25	0	[0.018]	[0.21]	10	2	0.011	[0.041]	No test	No test	No test	No test	No test	No	No	Not detected
Heptachlor epoxide	25	0	[0.018]	[0.21]	10	0	[0.021]	[0.041]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorobenzene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorobutadiene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorocyclo-pentadiene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachloroethane	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Indeno[1,2,3-cd]pyrene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Isophorone	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Methoxychlor	25	4	0.0046	[0.21]	10	2	0.0064	[0.041]	--	--	1	0.832	Equal	No	No	Not greater than reference, 2 of 2 tests
N-Nitroso-di-n-dipropylamine	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
N-Nitrosodiphenylamine	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Naphthalene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Nitrobenzene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Pentachlorophenol	25	4	2.2	25	10	2	0.46	[18]	--	--	0.067	0.832	Equal	No	No	Not greater than reference, 2 of 2 tests
Phenanthrene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Phenol	25	7	0.25	[42]	10	6	0.27	[6.3]	--	0.957	0.269	0.167	Equal	No	No	Not greater than reference, 3 of 3 tests
Pyrene	25	0	[3.9]	[42]	10	0	[4.1]	[7]	No test	No test	No test	No test	No test	No	No	Not detected
Total PCB	10	10	0.0344	0.065	1	1	0.196	0.196	--	1	1	--	--	No	No	Not greater than reference, 2 of 2 tests

Table 6-59. Summary of Statistical Comparisons to Reference Sculpin Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Toxaphene	25	0	[0.18]	[21]	10	0	[0.21]	[2.8]	No test	No test	No test	No test	No test	No	No	Not detected
alpha-Chlordane	25	0	[0.018]	[0.21]	10	0	[0.021]	[0.041]	No test	No test	No test	No test	No test	No	No	Not detected
beta-1,2,3,4,5,6-Hexachlorocyclohexane	25	5	0.0058	[0.21]	10	2	0.0068	[0.041]	--	0.690	0.714	0.640	Equal	No	No	Not greater than reference, 3 of 3 tests
gamma-Chlordane	25	5	0.0058	[0.21]	10	2	0.0056	[0.041]	--	0.690	0.714	0.640	Equal	No	No	Not greater than reference, 3 of 3 tests
Radionuclides (pCi/g-fw)																
Americium-241	27	0	[0.038]	[0.44]	9	0	[0.036]	[0.32]	No test	No test	No test	No test	No test	No	No	Not detected
Antimony-125	27	0	[0.077]	[0.47]	9	0	[0.073]	[0.38]	No test	No test	No test	No test	No test	No	No	Not detected
Beryllium-7	27	1	[0]	8.11	9	0	[0]	[1.2]	No test	No test	No test	No test	No test	No	No	Short half-life
Carbon-14	7	1	[-8.13]	8.11	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See Table 6-74	Yes	No reference data
Cesium-134	27	0	[0.04]	[0.21]	9	0	[0.039]	[0.15]	No test	No test	No test	No test	No test	No	No	Short half-life
Cesium-137	27	0	[0.035]	[0.2]	9	0	[0.056]	[0.15]	No test	No test	No test	No test	No test	No	No	Not detected
Cobalt-60	27	0	[0.036]	[0.25]	9	0	[0.035]	[0.18]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-152	27	0	[0.077]	[0.43]	9	0	[0.083]	[0.35]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-154	27	0	[0.11]	[0.61]	9	0	[0.1]	[0.5]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-155	27	0	[0.067]	[0.43]	9	0	[0.061]	[0.32]	No test	No test	No test	No test	No test	No	No	Not detected
Potassium-40	27	12	[0]	[4.7]	9	3	[0]	[9.4]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-226	27	0	[0.067]	[0.38]	9	0	[0.062]	[0.26]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-228	27	0	[0.157]	[0.88]	9	0	[0.14]	[0.62]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Ruthenium-106	27	0	[0.285]	[1.8]	9	0	[0.26]	[1.3]	No test	No test	No test	No test	No test	No	No	Short half-life
Strontium-90	26	1	[-0.09]	0.325	9	1	[-0.0706]	0.506	--	--	1	0.981	Equal	No	No	Not greater than reference, 2 of 2 tests
Technetium-99	2	0	[-0.0537]	[0.164]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Thorium-228	27	0	[-0.18]	[0.303]	9	0	[-0.275]	[0.236]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-230	25	1	[-0.201]	0.776	9	0	[-0.183]	[0.157]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-232	27	0	[-0.0378]	[0.158]	9	0	[0]	[0.124]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Uranium-233/234	26	1	[-0.019]	[0.113]	9	1	[-0.02]	[0.079]	--	--	1	0.981	Equal	No	No	Not greater than reference, 2 of 2 tests
Uranium-235	28	0	[-0.0041]	[0.13]	9	0	[-0.004]	[0.013]	No test	No test	No test	No test	No test	No	No	Not detected
Uranium-238	26	0	[0]	[0.151]	9	2	[0]	[0.042]	No test	No test	No test	No test	No test	No	No	Not detected

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
BHC = benzene hexachloride
COPC = contaminant of potential concern
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed
PCB = polychlorinated biphenyl
RCBRA = River Corridor Baseline Risk Assessment

Table 6-60. Summary of Statistical Comparisons to Reference Sculpin Tissue Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Inorganics (mg/kg-fw)															
Aluminum	6	6	2.5	46	10	10	6.2	54	0.687	0.786	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Antimony	6	2	[0.0022]	0.0036	10	0	[0.31]	[0.43]	--	--	--	0.242	Equal	See text	Not greater than reference, 1 of 1 test
Arsenic	6	5	[0.022]	0.12	10	1	[0.39]	1	--	0.304	1	0.016	Greater	See text	Greater than reference, 1 of 3 tests
Barium	8	8	1.1	5.6	10	10	2.3	4.1	0.940	0.412	0.183	--	Equal	No	Not greater than reference, 3 of 3 tests
Beryllium	6	0	[0.0044]	[0.0044]	10	1	0.01	[0.02]	No test	No test	No test	No test	No test	No	Not detected
Cadmium	8	8	0.0062	0.17	10	9	[0.03]	0.35	0.940	0.853	1	0.908	Equal	No	Not greater than reference, 4 of 4 tests
Chromium	8	8	0.22	0.41	10	3	0.32	[0.63]	--	0.853	1	0.011	Greater	See text	Greater than reference, 1 of 3 tests
Copper	6	6	0.5	0.69	10	4	[0.91]	4.3	--	1	1	0.062	Equal	No	Not greater than reference, 3 of 3 tests
Lead	8	8	0.022	0.14	10	7	[0.27]	0.49	0.994	1	1	0.289	Equal	No	Not greater than reference, 3 of 3 tests
Manganese	8	8	0.72	4.7	10	10	1.9	8.4	0.997	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Mercury	8	8	0.014	0.049	10	5	[0.01]	0.18	0.446	0.931	1	0.068	Equal	No	Not greater than reference, 4 of 4 tests
Nickel	8	8	0.19	0.69	10	4	[0.13]	0.45	--	0.412	0.444	0.029	Greater	See text	Greater than reference, 1 of 3 tests
Selenium	8	8	0.37	0.58	10	10	0.56	0.78	1	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Silver	8	0	[0.0022]	[0.0022]	10	1	[0.07]	[0.14]	No test	No test	No test	No test	No test	No	Not detected
Thallium	8	7	[0.0044]	0.031	10	0	[0.55]	[0.68]	--	0.069	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Uranium (inorganic)	8	7	[0.0022]	0.0088	10	0	[0.83]	[2.4]	--	0.069	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Zinc	6	6	14	32	10	10	20	53	0.971	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Organics (mg/kg-fw)															
Aroclor-1254	9	2	[2.9]	18	10	0	[0.17]	[0.33]	--	--	--	0.408	Equal	See text	Not greater than reference, 1 of 1 test
Aroclor-1260	9	0	[2.5]	[6.1]	10	0	[0.17]	[0.33]	No test	No test	No test	No test	No test	No	Not detected
Radionuclides (pCi/g-fw)															
Antimony-125	1	0	[-0.093]	[-0.093]	9	0	[0.073]	[0.38]	No test	No test	No test	No test	No test	No	Not detected
Beryllium-7	1	0	[0.28]	[0.28]	9	0	[0]	[1.2]	No test	No test	No test	No test	No test	No	Half-life
Cesium-134	1	0	[0.039]	[0.039]	9	0	[0.039]	[0.15]	No test	No test	No test	No test	No test	No	Half-life
Cesium-137	1	0	[-0.01]	[-0.01]	9	0	[0.056]	[0.15]	No test	No test	No test	No test	No test	No	Not detected
Cobalt-60	1	0	[0.051]	[0.051]	9	0	[0.035]	[0.18]	No test	No test	No test	No test	No test	No	Not detected
Europium-152	1	0	[0.06]	[0.06]	9	0	[0.083]	[0.35]	No test	No test	No test	No test	No test	No	Not detected
Europium-154	1	0	[0.12]	[0.12]	9	0	[0.1]	[0.5]	No test	No test	No test	No test	No test	No	Not detected
Europium-155	1	0	[-0.00099]	[-0.00099]	9	0	[0.061]	[0.32]	No test	No test	No test	No test	No test	No	Not detected
Potassium-40	1	1	2.4	2.4	9	3	[0]	[9.4]	No test	No test	No test	No test	No test	No	Background radionuclide
Ruthenium-106	1	0	[0.13]	[0.13]	9	0	[0.26]	[1.3]	No test	No test	No test	No test	No test	No	Half-life

Table 6-60. Summary of Statistical Comparisons to Reference Sculpin Tissue Data Collected for the 100-B/C Pilot Project. (2 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Strontium-90	1	1	0.081	0.081	9	1	[-0.071]	0.51	--	0.200	1	0.429	Equal	No	Not greater than reference, 3 of 3 tests
Technetium-99	1	1	0.39	0.39	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No reference data

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed

Table 6-61. Summary of Statistical Comparisons to Reference Sculpin Tissue Data Collected for the 100-NR-2 Project.

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Organics (mg/kg-fw)															
1,1',2,3',4,4',5-Pentachlorobiphenyl	5	4	[0.00035]	0.00076	1	1	0.012	0.012	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No tests
2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	5	0	[0.00025]	[0.00035]	1	1	0.000012	0.000012	No test	No test	No test	No test	No test	No	Not detected
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	5	0	[0.00025]	[0.00035]	1	1	0.00008	0.00008	No test	No test	No test	No test	No test	No	Not detected
2,2',3,3',4,4',5,6-Octachlorobiphenyl	5	0	[0.00025]	[0.00035]	1	1	0.00019	0.00019	No test	No test	No test	No test	No test	No	Not detected
2,2',3,3',4,4',5-Heptachlorobiphenyl	5	0	[0.00025]	[0.00035]	1	1	0.0013	0.0013	No test	No test	No test	No test	No test	No	Not detected
2,2',3,3',4,4'-Hexachlorobiphenyl	5	0	[0.00025]	[0.00035]	1	1	0.0024	0.0024	No test	No test	No test	No test	No test	No	Not detected
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	5	0	[0.00025]	[0.00035]	1	0	[0.00001]	[0.00001]	No test	No test	No test	No test	No test	No	Not detected
2,2',3,4',5,5',6-Heptachlorobiphenyl	5	3	[0.00025]	0.00099	1	1	0.00076	0.00076	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No tests
2,2',3,4,4',5'-Hexachlorobiphenyl	5	5	0.0011	0.0014	1	1	0.012	0.012	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No tests
2,2',3,4,4',5,5'-Heptachlorobiphenyl	5	0	[0.00025]	[0.00035]	1	1	0.0027	0.0027	No test	No test	No test	No test	No test	No	Not detected
1,1',2,2',3,5'-Tetrachlorobiphenyl	5	0	[0.00025]	[0.00035]	1	1	0.00022	0.00022	No test	No test	No test	No test	No test	No	Not detected
2,2',4,4',5,5',-Hexachlorobiphenyl	5	3	[0.00025]	0.004	1	1	0.014	0.014	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No tests
2,2',4,5,5'-Pentachlorobiphenyl	5	0	[0.00025]	[0.00035]	1	1	0.002	0.002	No test	No test	No test	No test	No test	No	Not detected
2,2',5,5'-Tetrachlorobiphenyl	5	0	[0.00025]	[0.00035]	1	1	0.00069	0.00069	No test	No test	No test	No test	No test	No	Not detected
2,2',5-Trichlorobiphenyl	5	0	[0.00025]	[0.00035]	1	1	0.000045	0.000045	No test	No test	No test	No test	No test	No	Not detected
2,3',4,4'-Tetrachlorobiphenyl	5	0	[0.00025]	[0.00035]	1	1	0.00089	0.00089	No test	No test	No test	No test	No test	No	Not detected
2,3,3',4,4'-Pentachlorobiphenyl	5	2	[0.0003]	0.00086	1	1	0.0032	0.0032	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No tests
2,4'-Dichlorobiphenyl	5	0	[0.00025]	[0.00035]	1	1	0.00001	0.00001	No test	No test	No test	No test	No test	No	Not detected
2,4,4'-Trichlorobiphenyl	5	2	[0.00027]	0.0012	1	1	0.00011	0.00011	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No tests
3,3',4,4',5-Pentachlorobiphenyl	5	0	[0.00025]	[0.00035]	1	1	0.000029	0.000029	No test	No test	No test	No test	No test	No	Not detected
3,3',4,4'-Tetrachlorobiphenyl	5	1	[0.00025]	0.00082	1	1	0.000044	0.000044	No ref data	No ref data	No ref data	No ref data	No ref data	See text	No tests
Total PCB	5	5	0.013	0.022	1	1	0.2	0.2	--	1	1	--	Equal	No	Not greater than reference, 2 of 2 tests
Radionuclides (pCi/g-fw)															
Strontium-90	4	1	[-0.011]	0.011	9	1	[-0.071]	0.51	--	0.538	1	0.848	Equal	No	Not greater than reference, 3 of 3 tests
Technetium-99	4	0	[0.021]	[0.05]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected

[a] Study vs. reference.
[value] = nondetect
-- = not applicable
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed
PCB = polychlorinated biphenyl

Table 6-62. Summary of Statistical Comparisons to Reference Sculpin Kidney Tissue Data Collected for the RCBRA Project.

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Inorganics (mg/kg-fw)																
Aluminum	27	9	[5.9]	37.8	8	7	5.9	23.2	--	0.967	0.408	0.0216	Less	No	No	Not greater than reference, 3 of 3 tests
Antimony	27	3	[0.88]	[4.9]	8	1	[0.4]	3.3	--	--	1	0.600	Equal	No	No	Not greater than reference, 2 of 2 tests
Arsenic	27	1	[1.2]	[6.8]	8	2	0.77	[4.1]	--	--	0.500	0.242	Equal	No	No	Not greater than reference, 2 of 2 tests
Barium	27	26	0.24	1.9	8	8	0.35	1.9	0.842	0.748	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Beryllium	27	0	[0.03]	[0.45]	8	2	0.02	[0.13]	No test	No test	No test	No test	No test	No	No	Not detected
Bismuth	27	0	[1]	[5.7]	8	0	[0.6]	[4.3]	No test	No test	No test	No test	No test	No	No	Not detected
Boron	27	3	[0.48]	5.4	8	0	[0.27]	[3.2]	--	--	--	0.789	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Cadmium	27	26	0.42	2.7	8	8	0.44	1.3	0.362	0.132	0.094	--	--	No	No	Not greater than reference, 3 of 3 tests
Calcium	27	27	118	1,190	8	8	229	986	No test	No test	No test	No test	No test	No	No	Essential nutrient
Chromium	27	26	0.37	3.7	8	7	0.31	2	0.123	0.484	0.590	0.941	Equal	No	No	Not greater than reference, 4 of 4 tests
Cobalt	27	0	[0.26]	[1.8]	8	0	[0.12]	[0.93]	No test	No test	No test	No test	No test	No	No	Not detected
Copper	27	20	[0.85]	59.5	8	7	1.3	48	0.729	0.820	0.771	0.753	Equal	No	No	Not greater than reference, 4 of 4 tests
Iron	27	27	32.8	149	8	8	47.5	133	0.873	0.967	0.59	--	--	No	No	Not greater than reference, 3 of 3 tests
Lead	27	3	[0.62]	[3.4]	8	0	[0.31]	[2.3]	--	--	--	0.789	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Lithium	27	13	0.08	0.67	8	4	0.07	0.38	--	0.132	0.132	0.756	Equal	No	No	Not greater than reference, 3 of 3 tests
Magnesium	27	27	136	293	8	8	150	343	No test	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	27	24	0.42	[3.6]	8	8	0.44	3.7	0.942	0.997	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Mercury	26	2	[0.02]	[0.17]	3	0	[0.08]	[0.17]	--	--	--	0.481	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Molybdenum	27	1	[0.37]	[3.2]	8	3	0.19	2.4	--	--	1	0.049	Less	No	No	Not greater than reference, 2 of 2 tests
Nickel	27	1	[0.48]	3.2	8	1	0.18	[1.6]	--	--	0.500	0.941	Equal	No	No	Not greater than reference, 2 of 2 tests
Phosphorus	27	27	1,940	5,170	8	8	2,380	4,990	0.631	0.820	0.771	--	--	No	No	Not greater than reference, 3 of 3 tests
Potassium	27	27	1,840	4,590	8	8	1,880	5,410	No test	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	27	15	[1.4]	[5.5]	8	3	1.6	3.6	--	0.484	0.296	0.621	Equal	No	No	Not greater than reference, 3 of 3 tests
Silicon	27	19	7.5	73.6	8	8	13.9	46.7	No test	No test	No test	No test	No test	No	No	Tissue property measurement
Silver	27	0	[0.14]	[0.909]	8	0	[0.14]	[0.75]	No test	No test	No test	No test	No test	No	No	Not detected
Sodium	27	27	894	2,950	8	8	1,020	2,690	No test	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	27	27	0.25	3.1	8	8	0.5	2.5	0.896	0.967	0.590	--	--	No	No	Not greater than reference, 3 of 3 tests
Thallium	27	0	[1.4]	[7.8]	8	0	[0.63]	[4.7]	No test	No test	No test	No test	No test	No	No	Not detected
Tin	27	12	1.8	[11.9]	8	5	[0.6]	9.3	--	0.58	0.758	0.621	Equal	No	No	Not greater than reference, 3 of 3 tests
Titanium	17	15	[0.12]	1.3	6	6	0.26	2.2	0.963	0.96	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Uranium (inorganic)	27	2	2.9	[22.8]	8	0	[2]	[20.9]	--	--	--	0.941	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Vanadium	27	3	[0.18]	[1.3]	8	4	0.09	[0.83]	--	0.997	0.554	0.056	Equal	No	No	Not greater than reference, 3 of 3 tests
Zinc	27	27	26.6	204	8	8	54.5	173	0.729	0.820	0.771	--	--	No	No	Not greater than reference, 3 of 3 tests
Zirconium	17	0	[2.1]	[11.8]	6	0	[0.53]	[7.1]	No test	No test	No test	No test	No test	No	No	Not detected

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
COPC = contaminant of potential concern
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed
RCBRA = River Corridor Baseline Risk Assessment

Table 6-63. Summary of Statistical Comparisons to Reference Sculpin Liver Tissue Data Collected for the RCBRA Project.

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Inorganics (mg/kg-fw)																
Aluminum	27	13	[2.2]	67.3	8	4	[1.8]	21.7	--	0.820	0.447	0.756	Equal	No	No	Not greater than reference, 3 of 3 tests
Antimony	27	7	[0.21]	4.6	8	0	[0.39]	[1.4]	--	0.132	--	0.268	Equal	No	No	Not greater than reference, 2 of 2 tests
Arsenic	27	2	[0.39]	[4.1]	8	2	[0.52]	[1.9]	--	--	0.773	0.459	Equal	No	No	Not greater than reference, 2 of 2 tests
Barium	27	25	0.09	3.6	8	8	0.09	0.59	0.709	0.484	0.335	--	--	No	No	Not greater than reference, 3 of 3 tests
Beryllium	27	0	[0.01]	[0.1]	8	2	[0.01]	[0.06]	No test	No test	No test	No test	No test	No	No	Not detected
Bismuth	27	0	[0.38]	[4]	8	0	[0.6]	[1.6]	No test	No test	No test	No test	No test	No	No	Not detected
Boron	27	8	[0.23]	6.5	8	0	[0.26]	[1.1]	--	0.132	--	0.203	Equal	No	No	Not greater than reference, 2 of 2 tests
Cadmium	27	27	0.33	4	8	8	0.44	1.6	0.539	0.182	0.182	--	--	No	No	Not greater than reference, 3 of 3 tests
Calcium	27	27	66	728	8	8	81.3	590	No test	No test	No test	No test	No test	No	No	Essential nutrient
Chromium	27	26	0.16	1.5	8	8	0.18	9.2	0.222	0.484	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Cobalt	27	2	[0.11]	[0.8]	8	1	[0.11]	[0.44]	--	--	0.577	0.789	Equal	No	No	Not greater than reference, 2 of 2 tests
Copper	27	27	1.2	19	8	8	2.4	15.6	0.681	0.820	0.590	--	--	No	No	Not greater than reference, 3 of 3 tests
Iron	27	27	19.8	237	8	8	21.8	118	0.461	0.484	0.771	--	--	No	No	Not greater than reference, 3 of 3 tests
Lead	27	4	0.3	[3.3]	8	1	[0.3]	[0.97]	--	--	1	0.681	Equal	No	No	Not greater than reference, 2 of 2 tests
Lithium	27	19	[0.05]	2.8	8	3	[0.05]	0.13	--	0.484	0.281	0.203	Equal	No	No	Not greater than reference, 3 of 3 tests
Magnesium	27	27	108	360	8	8	167	233	No test	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	27	27	0.53	3.1	8	8	0.86	3.5	0.586	0.940	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Mercury	27	24	0.02	0.19	8	5	[0.02]	0.12	0.055	0.484	0.771	0.228	Equal	No	No	Not greater than reference, 4 of 4 tests
Molybdenum	27	5	[0.15]	[1.6]	8	3	[0.16]	[0.91]	--	0.883	0.778	0.520	Equal	No	No	Not greater than reference, 3 of 3 tests
Nickel	27	0	[0.23]	[2.7]	8	1	[0.13]	4.4	No test	No test	No test	No test	No test	No	No	Not detected
Phosphorus	27	27	1,880	5,820	8	8	2,450	3,840	0.616	0.820	0.335	--	--	No	No	Not greater than reference, 3 of 3 tests
Potassium	27	27	1,480	4,180	8	8	1,780	3,260	No test	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	27	24	1.2	5.9	8	6	[1]	2.7	0.070	0.484	0.771	0.681	Equal	No	No	Not greater than reference, 4 of 4 tests
Silicon	27	25	4.6	1,670	8	8	5.2	18.8	No test	No test	No test	No test	No test	No	No	Tissue property measurement
Silver	27	3	[0.07]	[0.9]	8	0	[0.11]	[0.26]	--	--	--	0.789	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Sodium	27	27	743	1,760	8	8	787	2,210	No test	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	27	27	0.16	1.7	8	8	0.16	0.8	0.240	0.484	0.249	--	--	No	No	Not greater than reference, 3 of 3 tests
Thallium	27	0	[0.66]	[8]	8	0	[0.63]	[2.2]	No test	No test	No test	No test	No test	No	No	Not detected
Tin	27	16	0.62	10.7	8	6	0.96	3.8	0.660	0.883	0.447	0.695	Equal	No	No	Not greater than reference, 4 of 4 tests
Titanium	17	14	[0.03]	0.55	6	5	0.07	0.93	0.650	0.730	1	0.567	Equal	No	No	Not greater than reference, 4 of 4 tests
Uranium (inorganic)	27	2	[0.83]	[16.7]	8	0	[1.4]	[7.2]	--	--	--	0.941	Equal	See Table 6-74	Yes	Not greater than reference, 1 test
Vanadium	27	6	[0.08]	[0.8]	8	4	[0.09]	[0.29]	--	0.997	0.741	0.279	Equal	No	No	Not greater than reference, 3 of 3 tests
Zinc	27	27	16.9	98	8	8	21.5	37.4	0.674	0.484	0.182	--	--	No	No	Not greater than reference, 3 of 3 tests
Zirconium	15	0	[1]	[3.4]	6	1	[0.53]	[3.3]	No test	No test	No test	No test	No test	No	No	Not detected

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
COPC = contaminant of potential concern
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed
RCBRA = River Corridor Baseline Risk Assessment

Table 6-64. Summary of Statistical Comparisons to Reference Sculpin Liver Tissue Data Collected for the 100-B/C Pilot Project.

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Inorganics (mg/kg-fw)															
Aluminum	7	7	0.37	2.3	8	4	[1.8]	22	0.948	1	1	0.110	Equal	No	Not greater than reference, 4 of 4 tests
Antimony	7	7	0.0047	0.018	8	0	[0.39]	[1.4]	--	0.077	--	<0.001	Greater	See text	Greater than reference, 1 of 2 tests
Arsenic	7	3	[0.022]	0.47	8	2	[0.52]	[1.9]	--	0.877	1	0.855	Equal	No	Not greater than reference, 3 of 3 tests
Barium	12	10	0.017	0.12	8	8	0.09	0.59	1	1	1	--	Less	No	Not greater than reference, 3 of 3 tests
Beryllium	7	2	[0.0044]	0.067	8	2	[0.01]	[0.06]	--	0.877	0.583	0.668	Equal	No	Not greater than reference, 3 of 3 tests
Cadmium	12	12	0.16	3.4	8	8	0.44	1.6	0.336	0.102	0.051	--	Equal	No	Not greater than reference, 3 of 3 tests
Chromium	12	12	0.087	0.97	8	8	0.18	9.2	0.996	0.986	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Copper	7	7	1.5	6	8	8	2.4	16	0.995	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Lead	12	12	0.008	0.06	8	1	[0.3]	[0.97]	--	0.465	1	<0.001	Greater	See text	Greater than reference, 1 of 3 tests
Manganese	12	12	0.27	1.3	8	8	0.86	3.5	0.999	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Mercury	12	12	0.024	0.16	8	5	0.02	0.12	0.008	0.465	0.600	0.097	Equal	See text	Greater than reference, 1 of 4 tests
Nickel	12	9	[0.0099]	0.078	8	1	[0.13]	4.4	--	0.465	1	0.023	Greater	See text	Greater than reference, 1 of 3 tests
Selenium	12	12	1.1	1.8	8	6	[1]	2.7	0.439	0.986	1	0.287	Equal	No	Not greater than reference, 4 of 4 tests
Silver	12	10	[0.0022]	0.028	8	0	[0.11]	[0.26]	--	0.102	--	0.001	Greater	See text	Greater than reference, 1 of 2 tests
Thallium	12	7	[0.0044]	0.08	8	0	[0.63]	[2.2]	--	0.102	--	0.028	Greater	See text	Greater than reference, 1 of 2 tests
Uranium (inorganic)	12	0	[0.0022]	[0.0069]	8	0	[1.4]	[7.2]	No test	No test	No test	No test	No test	No	Not detected
Zinc	7	7	19	46	8	8	22	37	0.343	0.446	0.200	--	Equal	No	Not greater than reference, 3 of 3 tests

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed

Table 6-65. Summary of Statistical Comparisons to Reference Sculpin Liver Tissue Data Collected for the 100-NR-2 Project.

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Inorganics (mg/kg-fw)															
Antimony	4	4	0.03	0.053	8	0	[0.39]	[1.4]	--	0.091	--	0.005	Greater	See text	Greater than reference, 1 of 2 tests
Arsenic	4	1	[0.025]	0.048	8	2	[0.52]	[1.9]	--	1	1	0.480	Equal	No	Not greater than reference, 3 of 3 tests
Barium	4	4	0.12	0.28	8	8	0.09	0.59	0.778	0.576	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Cadmium	4	4	0.3	2.3	8	8	0.44	1.6	0.534	0.576	0.333	--	Equal	No	Not greater than reference, 3 of 3 tests
Chromium	4	4	0.042	0.15	8	8	0.18	9.2	0.997	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Lead	4	4	0.0099	0.032	8	1	[0.3]	[0.97]	--	0.576	1	0.023	Greater	See text	Greater than reference, 1 of 3 tests
Manganese	4	4	0.51	2.2	8	8	0.86	3.5	0.825	1	1	--	Equal	No	Not greater than reference, 3 of 3 tests
Mercury	4	4	0.019	0.089	8	5	0.02	0.12	0.219	0.576	1	0.480	Equal	No	Not greater than reference, 4 of 4 tests
Nickel	4	4	0.023	0.13	8	1	[0.13]	4.4	--	0.576	1	0.023	Greater	See text	Greater than reference, 1 of 3 tests
Selenium	4	4	0.8	2.2	8	6	[1]	2.7	0.665	0.576	1	0.784	Equal	No	Not greater than reference, 4 of 4 tests
Uranium (inorganic)	4	1	[0.0022]	0.0027	8	0	[1.4]	[7.2]	--	--	--	0.712	Equal	See text	Not greater than reference, 1 of 1 test
Vanadium	4	4	0.015	0.3	8	4	[0.09]	[0.29]	0.601	0.576	0.364	0.279	Equal	No	Not greater than reference, 4 of 4 tests
Zinc	4	4	15	35	8	8	22	37	0.601	0.576	1	--	Equal	No	Not greater than reference, 3 of 3 tests

[a] Study vs. reference.
[value] = nondetect
-- = not applicable
fw = fresh weight

Table 6-66. Summary of Statistical Comparisons to Reference Sucker Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Inorganics (mg/kg-fw)																
Aluminum	6	6	10.6	30.7	2	2	38.9	39.8	--	1	1	--	--	No	No	Not greater than reference, 2 of 2 tests
Antimony	6	1	[0.28]	0.38	2	0	[0.3]	[0.31]	--	0.750	--	0.537	Equal	No	No	Not greater than reference, 2 of 2 tests
Arsenic	6	0	[0.39]	[0.46]	2	0	[0.39]	[0.39]	No test	No test	No test	No test	No test	No	No	Not detected
Barium	6	6	3.1	4.9	2	2	3	4	--	0.750	0.357	--	--	No	No	Not greater than reference, 2 of 2 tests
Beryllium	6	0	[0.02]	[0.05]	2	0	[0.02]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Bismuth	6	0	[0.5]	[0.56]	2	0	[0.5]	[0.5]	No test	No test	No test	No test	No test	No	No	Not detected
Boron	6	0	[0.36]	[0.46]	2	0	[0.36]	[0.37]	No test	No test	No test	No test	No test	No	No	Not detected
Cadmium	6	1	[0.03]	0.05	2	0	[0.03]	[0.03]	--	0.750	--	0.537	Equal	No	No	Not greater than reference, 2 of 2 tests
Calcium	6	6	9,300	10,600	2	2	9,000	10,400	No test	No test	No test	No test	No test	No	No	Essential nutrient
Calculated total uranium	6	0	[-0.00726]	[0.185]	2	0	[0.0145]	[0.015]	No test	No test	No test	No test	No test	No	No	Not detected
Chromium	6	6	0.24	0.47	2	2	0.42	0.47	--	0.964	1	--	--	No	No	Not greater than reference, 2 of 2 tests
Cobalt	6	1	[0.09]	0.19	2	0	[0.09]	[0.09]	--	0.750	--	0.537	Equal	No	No	Not greater than reference, 2 of 2 tests
Copper	6	6	1.5	2.8	2	2	2.8	4.9	--	1	1	--	--	No	No	Not greater than reference, 2 of 2 tests
Iron	6	6	33.6	62.9	2	2	86.7	92.5	--	1	1	--	--	No	No	Not greater than reference, 2 of 2 tests
Lead	6	1	[0.27]	0.28	2	0	[0.27]	[0.27]	--	0.750	--	0.537	Equal	No	No	Not greater than reference, 2 of 2 tests
Lithium	6	1	[0.07]	[0.11]	2	0	[0.1]	[0.11]	--	0.750	--	0.537	Equal	No	No	Not greater than reference, 2 of 2 tests
Magnesium	6	6	332	464	2	2	348	369	No test	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	6	6	7.6	11.4	2	2	11.1	11.6	--	1	1	--	--	No	No	Not greater than reference, 2 of 2 tests
Mercury	6	3	0.01	[0.02]	2	0	[0.01]	[0.02]	--	0.750	--	0.673	Equal	No	No	Not greater than reference, 2 of 2 tests
Molybdenum	6	1	[0.12]	[0.28]	2	0	[0.12]	[0.12]	--	0.750	--	0.537	Equal	No	No	Not greater than reference, 2 of 2 tests
Nickel	6	1	[0.18]	0.21	2	1	[0.18]	0.19	--	0.750	0.750	1	Equal	No	No	Not greater than reference, 3 of 3 tests
Phosphorus	6	6	6,040	6,860	2	2	5,570	6,420	--	0.750	0.357	--	--	No	No	Not greater than reference, 2 of 2 tests
Potassium	6	6	1,950	2,510	2	2	2,040	2,340	No test	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	6	6	0.64	0.89	2	2	0.64	0.81	--	0.750	0.750	--	--	No	No	Not greater than reference, 2 of 2 tests
Silicon	6	6	23.5	59.3	2	2	48.5	56.3	No test	No test	No test	No test	No test	No	No	Tissue property measurement
Silver	6	0	[0.09]	[0.09]	2	0	[0.09]	[0.09]	No test	No test	No test	No test	No test	No	No	Not detected
Sodium	6	6	678	785	2	2	718	784	No test	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	6	6	15	23.1	2	2	14.3	17.2	--	0.750	0.214	--	--	No	No	Not greater than reference, 2 of 2 tests
Thallium	6	0	[0.54]	[0.56]	2	0	[0.54]	[0.55]	No test	No test	No test	No test	No test	No	No	Not detected
Tin	6	1	[0.69]	2.1	2	0	[0.83]	[1.4]	--	0.750	--	0.537	Equal	No	No	Not greater than reference, 2 of 2 tests
Total inorganic arsenic	1	0	[0.015]	[0.015]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Uranium (inorganic)	6	0	[1.9]	[2.4]	2	0	[2.4]	[2.4]	No test	No test	No test	No test	No test	No	No	Not detected
Vanadium	6	3	[0.1]	0.16	2	2	0.17	0.2	--	1	1	--	--	No	No	Not greater than reference, 2 of 2 tests
Zinc	6	6	22.5	27.4	2	2	23.9	25.8	--	0.750	0.536	--	--	No	No	Not greater than reference, 2 of 2 tests

Table 6-66. Summary of Statistical Comparisons to Reference Sucker Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Organics (mg/kg-fw)																
1,2,4-Trichlorobenzene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
1,2-Dichlorobenzene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
1,3-Dichlorobenzene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
1,4-Dichlorobenzene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
2,4,5-Trichlorophenol	5	0	[11]	[12]	2	0	[10]	[12]	No test	No test	No test	No test	No test	No	No	Not detected
2,4,6-Trichlorophenol	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dichlorophenol	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dimethylphenol	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrophenol	5	0	[11]	[12]	2	0	[10]	[12]	No test	No test	No test	No test	No test	No	No	Not detected
2,4-Dinitrotoluene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
2,6-Dinitrotoluene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
2-Chloronaphthalene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
2-Chlorophenol	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
2-Methylnaphthalene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
2-Methylphenol [cresol, o-]	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
2-Nitroaniline	5	0	[11]	[12]	2	0	[10]	[12]	No test	No test	No test	No test	No test	No	No	Not detected
2-Nitrophenol	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
3+4 Methylphenol [cresol, m+p]	5	2	0.23	[4.8]	2	0	[4.1]	[4.8]	--	0.714	--	0.895	Equal	No	No	Not greater than reference, 2 of 2 tests
3,3'-Dichlorobenzidine	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
3-Nitroaniline	5	0	[11]	[12]	2	0	[10]	[12]	No test	No test	No test	No test	No test	No	No	Not detected
4,6-Dinitro-2-methylphenol	5	0	[11]	[12]	2	0	[10]	[12]	No test	No test	No test	No test	No test	No	No	Not detected
4-Bromophenylphenyl ether	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chloro-3-methylphenol	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chloroaniline	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
4-Chlorophenylphenyl ether	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
4-Nitroaniline	5	0	[11]	[12]	2	0	[10]	[12]	No test	No test	No test	No test	No test	No	No	Not detected
4-Nitrophenol	5	0	[11]	[12]	2	0	[10]	[12]	No test	No test	No test	No test	No test	No	No	Not detected
Acenaphthene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Acenaphthylene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Aldrin	6	1	[0.0013]	[0.023]	2	0	[0.022]	[0.022]	--	0.750	--	0.537	Equal	No	No	Not greater than reference, 2 of 2 tests
Alpha-BHC	6	0	[0.0013]	[0.023]	2	0	[0.022]	[0.022]	No test	No test	No test	No test	No test	No	No	Not detected
Anthracene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1016	6	0	[0.013]	[0.19]	2	0	[0.17]	[0.18]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1221	6	0	[0.013]	[0.19]	2	0	[0.17]	[0.18]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1232	6	0	[0.013]	[0.19]	2	0	[0.17]	[0.18]	No test	No test	No test	No test	No test	No	No	Not detected

Table 6-66. Summary of Statistical Comparisons to Reference Sucker Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Aroclor-1242	6	0	[0.013]	[0.19]	2	0	[0.17]	[0.18]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1248	6	0	[0.013]	[0.19]	2	0	[0.17]	[0.18]	No test	No test	No test	No test	No test	No	No	Not detected
Aroclor-1254	6	1	0.0057	[0.19]	2	0	[0.17]	[0.18]	--	0.750	--	0.537	Equal	No	No	Not greater than reference, 2 of 2 tests
Aroclor-1260	6	0	[0.013]	[0.19]	2	0	[0.17]	[0.18]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[a]anthracene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[a]pyrene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[b]fluoranthene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[ghi]perylene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Benzo[k]fluoranthene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-Chloroethoxy]methane	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-chloro-1-methylethyl]ether	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-chloroethyl] ether	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Bis[2-ethylhexyl] phthalate	5	5	0.31	1.4	2	2	0.5	0.54	--	0.714	0.714	--	--	No	No	Not greater than reference, 2 of 2 tests
Butylbenzylphthalate	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Carbazole	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Chrysene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Delta-BHC	6	1	[0.0013]	[0.023]	2	0	[0.022]	[0.022]	--	0.750	--	0.537	Equal	No	No	Not greater than reference, 2 of 2 tests
Di-n-butylphthalate	5	2	0.33	[4.8]	2	0	[4.1]	[4.8]	--	0.714	--	0.895	Equal	No	No	Not greater than reference, 2 of 2 tests
Di-n-octylphthalate	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Dibenz[a,h]anthracene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Dibenzofuran	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Dichlorodiphenyl-dichloroethane	6	6	0.0045	0.032	2	2	0.02	0.025	--	0.750	0.357	--	--	No	No	Not greater than reference, 2 of 2 tests
Dichlorodiphenyl-dichloroethylene	6	6	0.013	0.071	2	1	[0.022]	0.051	--	0.750	0.214	--	--	No	No	Not greater than reference, 2 of 2 tests
Dichlorodiphenyl-trichloroethane	6	2	[0.0013]	[0.023]	2	1	0.0053	[0.022]	--	0.750	0.500	0.673	Equal	No	No	Not greater than reference, 3 of 3 tests
Dieldrin	6	1	[0.0013]	[0.023]	2	0	[0.022]	[0.022]	--	0.750	--	0.537	Equal	No	No	Not greater than reference, 2 of 2 tests
Diethylphthalate	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Dimethyl phthalate	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Endosulfan I	6	1	[0.0013]	[0.023]	2	1	0.0044	[0.022]	--	0.750	0.667	1	Equal	No	No	Not greater than reference, 3 of 3 tests
Endosulfan II	6	0	[0.0013]	[0.023]	2	1	0.0067	[0.022]	No test	No test	No test	No test	No test	No	No	Not detected
Endosulfan sulfate	6	0	[0.0013]	[0.023]	2	0	[0.022]	[0.022]	No test	No test	No test	No test	No test	No	No	Not detected
Endrin	6	1	[0.0013]	[0.023]	2	0	[0.022]	[0.022]	--	0.750	--	0.537	Equal	No	No	Not greater than reference, 2 of 2 tests
Endrin aldehyde	6	0	[0.0013]	[0.023]	2	0	[0.022]	[0.022]	No test	No test	No test	No test	No test	No	No	Not detected
Endrin ketone	6	3	[0.0013]	[0.023]	2	1	0.0048	[0.022]	--	0.750	0.800	0.414	Equal	No	No	Not greater than reference, 3 of 3 tests
Fluoranthene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected

Table 6-66. Summary of Statistical Comparisons to Reference Sucker Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Fluorene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Gamma-BHC (lindane)	6	0	[0.0013]	[0.023]	2	0	[0.022]	[0.022]	No test	No test	No test	No test	No test	No	No	Not detected
Heptachlor	6	0	[0.0013]	[0.023]	2	1	0.0076	[0.022]	No test	No test	No test	No test	No test	No	No	Not detected
Heptachlor epoxide	6	0	[0.0013]	[0.023]	2	0	[0.022]	[0.022]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorobenzene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorobutadiene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachlorocyclopentadiene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Hexachloroethane	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Indeno[1,2,3-cd]pyrene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Isophorone	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Methoxychlor	6	2	[0.0013]	[0.023]	2	0	[0.022]	[0.022]	--	0.750	--	1	Equal	No	No	Not greater than reference, 2 of 2 tests
N-Nitroso-di-n-dipropylamine	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
N-Nitrosodiphenylamine	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Naphthalene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Nitrobenzene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Pentachlorophenol	5	0	[11]	[12]	2	0	[10]	[12]	No test	No test	No test	No test	No test	No	No	Not detected
Phenanthrene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Phenol	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Pyrene	5	0	[4.2]	[4.8]	2	0	[4.1]	[4.8]	No test	No test	No test	No test	No test	No	No	Not detected
Total PCB	1	1	0.0332	0.0332	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	See Table 6-74	Yes	No reference data
Toxaphene	6	0	[0.013]	[0.23]	2	0	[0.22]	[0.22]	No test	No test	No test	No test	No test	No	No	Not detected
alpha-Chlordane	6	0	[0.0013]	[0.023]	2	0	[0.022]	[0.022]	No test	No test	No test	No test	No test	No	No	Not detected
beta-1,2,3,4,5,6-Hexachlorocyclohexane	6	2	[0.0013]	[0.023]	2	0	[0.022]	[0.022]	--	0.750	--	1	Equal	No	No	Not greater than reference, 2 of 2 tests
gamma-Chlordane	6	3	[0.0013]	[0.023]	2	1	0.0084	[0.022]	--	0.750	0.800	0.414	Equal	No	No	Not greater than reference, 3 of 3 tests
Radionuclides (pCi/g-fw)																
Americium-241	5	0	[0.047]	[0.31]	2	0	[0.046]	[0.3]	No test	No test	No test	No test	No test	No	No	Not detected
Antimony-125	5	0	[0.12]	[0.22]	2	0	[0.13]	[0.19]	No test	No test	No test	No test	No test	No	No	Not detected
Beryllium-7	5	1	[0]	3.52	2	0	[0]	[0.0761]	No test	No test	No test	No test	No test	No	No	Short half-life
Carbon-14	2	0	[-11.4]	[3.52]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Cesium-134	5	0	[0.068]	[0.14]	2	0	[0.076]	[0.11]	No test	No test	No test	No test	No test	No	No	Short half-life
Cesium-137	5	0	[0.058]	[0.11]	2	0	[0.065]	[0.1]	No test	No test	No test	No test	No test	No	No	Not detected
Cobalt-60	5	0	[0.061]	[0.12]	2	0	[0.062]	[0.1]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-152	5	0	[0.13]	[0.27]	2	0	[0.16]	[0.22]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-154	5	0	[0.18]	[0.38]	2	0	[0.19]	[0.31]	No test	No test	No test	No test	No test	No	No	Not detected
Europium-155	5	0	[0.079]	[0.24]	2	0	[0.11]	[0.23]	No test	No test	No test	No test	No test	No	No	Not detected
Potassium-40	5	1	[0.0026]	2.9	2	0	[0]	[0.0461]	No test	No test	No test	No test	No test	No	No	Background radionuclide

Table 6-66. Summary of Statistical Comparisons to Reference Sucker Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Radium-226	5	0	[0.11]	[0.22]	2	0	[0.13]	[0.19]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Radium-228	5	0	[0.24]	[0.51]	2	0	[0.28]	[0.44]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Ruthenium-106	5	0	[0.44]	[0.93]	2	0	[0.47]	[0.8]	No test	No test	No test	No test	No test	No	No	Short half-life
Strontium-90	6	0	[-0.109]	[0.086]	2	0	[-0.0479]	[-0.0392]	No test	No test	No test	No test	No test	No	No	Not detected
Technetium-99	2	0	[-0.114]	[0.136]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	No	Not detected
Thorium-228	6	0	[-0.0892]	[0.254]	2	0	[-0.0294]	[0]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-230	6	1	[-0.194]	0.324	2	0	[-0.117]	[-0.0379]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Thorium-232	6	0	[-0.029]	[0]	2	0	[-0.0379]	[0.0292]	No test	No test	No test	No test	No test	No	No	Background radionuclide
Uranium-233/234	6	0	[-0.003]	[0.0761]	2	0	[0.0515]	[0.0534]	No test	No test	No test	No test	No test	No	No	Not detected
Uranium-235	6	0	[0]	[0.0461]	2	0	[0.0312]	[0.0324]	No test	No test	No test	No test	No test	No	No	Not detected
Uranium-238	6	0	[-0.003]	[0.062]	2	0	[0]	[0]	No test	No test	No test	No test	No test	No	No	Not detected

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
BHC = benzene hexachloride
COPC = contaminant of potential concern
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed
PCB = polychlorinated biphenyl
RCBRA = River Corridor Baseline Risk Assessment

Table 6-67. Summary of Statistical Comparisons to Reference Sucker Tissue Data Collected for the 100-B/C Pilot Project.

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	Further Evaluation	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value			
Inorganics (mg/kg-fw)															
Aluminum	1	1	150	150	2	2	39	40	--	1	0.333	--	Equal	No	Not greater than reference, 2 of 2 tests
Antimony	1	1	0.0049	0.0049	2	0	[0.3]	[0.31]	--	1	--	0.665	Equal	No	Not greater than reference, 2 of 2 tests
Arsenic	1	1	0.11	0.11	2	0	[0.39]	[0.39]	--	1	--	0.665	Equal	No	Not greater than reference, 2 of 2 tests
Barium	6	6	0.27	5	2	2	3	4	--	0.750	0.750	--	Equal	No	Not greater than reference, 2 of 2 tests
Beryllium	1	1	0.012	0.012	2	0	[0.02]	[0.02]	--	1	--	0.665	Equal	No	Not greater than reference, 2 of 2 tests
Cadmium	6	6	0.0033	0.032	2	0	[0.03]	[0.03]	--	0.750	--	0.059	Equal	No	Not greater than reference, 2 of 2 tests
Chromium	6	6	0.03	0.95	2	2	0.42	0.47	--	0.750	0.536	--	Equal	No	Not greater than reference, 2 of 2 tests
Copper	1	1	0.73	0.73	2	2	2.8	4.9	--	1	1	--	Equal	No	Not greater than reference, 2 of 2 tests
Lead	6	6	0.01	0.22	2	0	[0.27]	[0.27]	--	0.750	--	0.059	Equal	No	Not greater than reference, 2 of 2 tests
Manganese	6	6	0.82	12	2	2	11	12	--	0.750	0.750	--	Equal	No	Not greater than reference, 2 of 3 tests
Mercury	6	3	0.01	0.026	2	0	[0.01]	[0.02]	--	0.750	--	0.673	Equal	No	Not greater than reference, 2 of 2 tests
Nickel	6	6	0.026	0.34	2	1	[0.18]	0.19	--	0.750	0.214	0.537	Equal	No	Not greater than reference, 3 of 3 tests
Selenium	6	5	[0.044]	0.55	2	2	0.64	0.81	--	1	1	--	Less	No	Not greater than reference, 2 of 2 tests
Silver	6	2	[0.0022]	[0.0099]	2	0	[0.09]	[0.09]	--	0.750	--	1	Equal	No	Not greater than reference, 2 of 2 tests
Thallium	6	5	[0.0044]	0.4	2	0	[0.54]	[0.55]	--	0.750	--	0.206	Equal	No	Not greater than reference, 2 of 2 tests
Uranium (inorganic)	6	4	[0.0022]	0.041	2	0	[2.4]	[2.4]	--	0.750	--	0.414	Equal	No	Not greater than reference, 2 of 2 tests
Zinc	1	1	20	20	2	2	24	26	--	1	1	--	Equal	No	Not greater than reference, 2 of 2 tests
Organics (mg/kg-fw)															
Aroclor-1254	3	0	[2]	[3.3]	2	0	[0.17]	[0.18]	No test	No test	No test	No test	No test	No	Not detected
Aroclor-1260	3	0	[2]	[3.3]	2	0	[0.17]	[0.18]	No test	No test	No test	No test	No test	No	Not detected
Radionuclides (pCi/g-fw)															
Strontium-90	1	0	[0.011]	[0.011]	2	0	[-0.048]	[-0.039]	No test	No test	No test	No test	No test	No	Not detected
Technetium-99	1	0	[0.15]	[0.15]	0	0	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No ref data	No	Not detected

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed

Table 6-68. Summary of Statistical Comparisons to Reference Sucker Kidney Tissue Data Collected for the RCBRA Project.

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Inorganics (mg/kg-fw)																
Aluminum	6	5	19.9	[133]	3	2	8.7	25	0.060	0.667	0.071	0.777	Equal	No	No	Not greater than reference, 4 of 4 tests
Antimony	6	0	[1.3]	[10]	3	0	[1.3]	[3.6]	No test	No test	No test	No test	No test	No	No	Not detected
Arsenic	6	2	[1.7]	[16.7]	3	0	[1.7]	[4.6]	--	0.667	--	0.777	Equal	No	No	Not greater than reference, 2 of 2 tests
Barium	6	6	4.2	10.2	3	3	0.27	11.7	0.449	1	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Beryllium	6	0	[0.04]	[1.7]	3	0	[0.04]	[0.11]	No test	No test	No test	No test	No test	No	No	Not detected
Bismuth	6	0	[2.2]	[20]	3	0	[2.2]	[5.8]	No test	No test	No test	No test	No test	No	No	Not detected
Boron	6	0	[1.6]	[16.7]	3	0	[1.6]	[4.2]	No test	No test	No test	No test	No test	No	No	Not detected
Cadmium	6	5	0.65	[1.7]	3	3	0.18	2.8	0.849	1	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Calcium	6	6	276	1170	3	3	72.8	402	No test	No test	No test	No test	No test	No	No	Essential nutrient
Chromium	6	5	0.57	[6.7]	3	3	0.36	1.6	0.602	0.667	0.625	--	--	No	No	Not greater than reference, 3 of 3 tests
Cobalt	6	0	[0.38]	[6.7]	3	0	[0.38]	[1]	No test	No test	No test	No test	No test	No	No	Not detected
Copper	6	5	1.7	[6.7]	3	3	4.2	10.4	0.986	1	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Iron	6	6	51.6	165	3	3	135	238	0.986	1	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Lead	6	0	[1.2]	[10]	3	0	[1.2]	[3.1]	No test	No test	No test	No test	No test	No	No	Not detected
Lithium	6	1	[0.17]	[1.3]	3	1	[0.17]	0.74	--	1	1	0.777	Equal	No	No	Not greater than reference, 3 of 3 tests
Magnesium	6	6	203	346	3	3	194	418	No test	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	6	6	2.5	8	3	3	4.2	8.5	0.974	1	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Mercury	4	0	[0.06]	[0.1]	1	0	[0.02]	[0.02]	No test	No test	No test	No test	No test	No	No	Not detected
Molybdenum	6	0	[0.54]	[10]	3	0	[0.54]	[1.4]	No test	No test	No test	No test	No test	No	No	Not detected
Nickel	6	0	[0.79]	[6.7]	3	0	[0.79]	[2.1]	No test	No test	No test	No test	No test	No	No	Not detected
Phosphorus	6	6	2,970	4,420	3	3	3,470	6,930	0.877	1	1	--	--	No	No	Not greater than reference, 3 of 3 tests
Potassium	6	6	2,750	4,900	3	3	2,460	5,360	No test	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	6	2	2.2	[20]	3	3	3	5.4	--	1	1	--	--	No	No	Not greater than reference, 2 of 2 tests
Silicon	6	5	15	[133]	3	1	[10.6]	57.1	No test	No test	No test	No test	No test	No	No	Tissue property measurement
Silver	6	0	[0.38]	[3.3]	3	1	0.38	[1]	No test	No test	No test	No test	No test	No	No	Not detected
Sodium	6	6	835	1,390	3	3	962	2,950	No test	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	6	6	0.74	15.5	3	3	0.27	1	0.078	0.667	0.238	--	--	No	No	Not greater than reference, 3 of 3 tests
Thallium	6	0	[2.4]	[20]	3	0	[2.4]	[6.3]	No test	No test	No test	No test	No test	No	No	Not detected
Tin	6	6	3.6	56.8	3	1	[2.8]	4.9	--	0.667	0.0476	--	--	See Table 6-74	Yes	Greater than reference, 1 of 2 tests
Uranium (inorganic)	6	0	[10.5]	[66.7]	3	0	[10.5]	[27.9]	No test	No test	No test	No test	No test	No	No	Not detected
Vanadium	6	0	[0.42]	[4.7]	3	0	[0.42]	[1.1]	No test	No test	No test	No test	No test	No	No	Not detected
Zinc	6	6	99.5	115	3	3	36.6	216	0.818	1	1	--	--	No	No	Not greater than reference, 3 of 3 tests

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
COPC = contaminant of potential concern
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed
RCBRA = River Corridor Baseline Risk Assessment

Table 6-69. Summary of Statistical Comparisons to Reference Sucker Liver Tissue Data Collected for the RCBRA Project.

Analyte	Study Sites				Reference Sites				Reference Comparison				Detect Rate Difference [a]	COPC?	Further Evaluation?	Notes
	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Number of Samples	Number of Detects	Minimum Value	Maximum Value	Gehan P-Value	Quantile P-Value	Slippage P-Value	Chi-Square P-Value				
Inorganics (mg/kg-fw)																
Aluminum	6	5	[14.8]	139	1	1	21	21	--	0.857	0.429	--	--	No	No	Not greater than reference, 2 of 2 tests
Antimony	6	0	[1.1]	[2.9]	1	0	[1.8]	[1.8]	No test	No test	No test	No test	No test	No	No	Not detected
Arsenic	6	0	[1.6]	[3.7]	1	0	[2.3]	[2.3]	No test	No test	No test	No test	No test	No	No	Not detected
Barium	6	6	0.66	3.9	1	1	0.66	0.66	--	0.857	0.286	--	--	No	No	Not greater than reference, 2 of 2 tests
Beryllium	6	0	[0.04]	[0.19]	1	0	[0.06]	[0.06]	No test	No test	No test	No test	No test	No	No	Not detected
Bismuth	6	0	[2.1]	[4.7]	1	0	[2.9]	[2.9]	No test	No test	No test	No test	No test	No	No	Not detected
Boron	6	0	[1.5]	[3.5]	1	0	[2.1]	[2.1]	No test	No test	No test	No test	No test	No	No	Not detected
Cadmium	6	3	0.14	0.36	1	1	0.33	0.33	--	0.857	0.857	--	--	No	No	Not greater than reference, 2 of 2 tests
Calcium	6	6	66.1	3,570	1	1	107	107	No test	No test	No test	No test	No test	No	No	Essential nutrient
Chromium	6	5	0.68	1.6	1	1	0.56	0.56	--	0.857	0.167	--	--	No	No	Not greater than reference, 2 of 2 tests
Cobalt	6	0	[0.36]	[0.82]	1	0	[0.5]	[0.5]	No test	No test	No test	No test	No test	No	No	Not detected
Copper	6	5	[0.74]	8.4	1	1	11.2	11.2	--	1	1	--	--	No	No	Not greater than reference, 2 of 2 tests
Iron	6	5	[16.7]	271	1	1	76.3	76.3	--	0.857	0.571	--	--	No	No	Not greater than reference, 2 of 2 tests
Lead	6	0	[1.1]	[2.5]	1	0	[1.6]	[1.6]	No test	No test	No test	No test	No test	No	No	Not detected
Lithium	6	1	[0.16]	0.39	1	0	[0.22]	[0.22]	--	0.857	--	0.270	Equal	No	No	Not greater than reference, 2 of 2 tests
Magnesium	6	6	52	350	1	1	198	198	No test	No test	No test	No test	No test	No	No	Essential nutrient
Manganese	6	6	1.1	12	1	1	6.6	6.6	--	0.857	0.714	--	--	No	No	Not greater than reference, 2 of 2 tests
Mercury	6	0	[0.01]	[0.1]	1	0	[0.03]	[0.03]	No test	No test	No test	No test	No test	No	No	Not detected
Molybdenum	6	0	[0.52]	[1.2]	1	1	1.1	1.1	No test	No test	No test	No test	No test	No	No	Not detected
Nickel	6	0	[0.74]	[1.7]	1	0	[1.1]	[1.1]	No test	No test	No test	No test	No test	No	No	Not detected
Phosphorus	6	6	653	4,250	1	1	3,410	3,410	--	0.857	0.714	--	--	No	No	Not greater than reference, 2 of 2 tests
Potassium	6	6	597	3,790	1	1	2,270	2,270	No test	No test	No test	No test	No test	No	No	Essential nutrient
Selenium	6	2	[1.5]	3.6	1	1	2.3	2.3	--	0.857	0.833	--	--	No	No	Not greater than reference, 2 of 2 tests
Silicon	6	5	12.9	188	1	1	29.8	29.8	No test	No test	No test	No test	No test	No	No	Tissue property measurement
Silver	6	0	[0.36]	[0.82]	1	0	[0.5]	[0.5]	No test	No test	No test	No test	No test	No	No	Not detected
Sodium	6	6	183	1,590	1	1	1,010	1,010	No test	No test	No test	No test	No test	No	No	Essential nutrient
Strontium (elemental)	6	6	0.27	5.3	1	1	0.44	0.44	--	0.857	0.429	--	--	No	No	Not greater than reference, 2 of 2 tests
Thallium	6	0	[2.2]	[5.2]	1	0	[3.2]	[3.2]	No test	No test	No test	No test	No test	No	No	Not detected
Tin	6	6	2.9	7.8	1	0	[2.6]	[2.6]	--	0.857	--	--	--	See Table 6-74	Yes	Not greater than reference, 1 test
Uranium (inorganic)	6	0	[7.4]	[22.8]	1	0	[13.9]	[13.9]	No test	No test	No test	No test	No test	No	No	Not detected
Vanadium	6	0	[0.4]	[0.91]	1	0	[0.56]	[0.56]	No test	No test	No test	No test	No test	No	No	Not detected
Zinc	6	6	12.3	59.7	1	1	37	37	--	0.857	0.571	--	--	No	No	Not greater than reference, 2 of 2 tests

[a] Study vs. reference.

[value] = nondetect
-- = not applicable
COPC = contaminant of potential concern
fw = fresh weight
No ref data = no reference site data available
No test = no statistical test performed
RCBRA = River Corridor Baseline Risk Assessment

Table 6-70. Overview of Statistical Comparisons for Sediment and Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Sediment Study Sites				Pore-Water Study Sites				Surface Water Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Sediment COPC Status	Count	Detect Frequency	Maximum Value	Pore Water COPC Status	Count	Detect Frequency	Maximum Value	Surface Water COPC Status		
	Inorganics (mg/kg)				Inorganics (µg/L)									
Aluminum	57	1.00	13,000	No	51	0.47	399	No	43	0.53	254	No	Yes	See Table 6-74
Antimony	57	0.00	[1.7]	No	51	0.00	[4]	No	43	0.07	5.7	No	Yes	See Table 6-74
Arsenic	57	1.00	18	No	51	0.24	[35.8]	No	43	0.16	[35.8]	TBD	No	See Table 6-74
Barium	57	1.00	209	No	51	1.00	104	No	43	1.00	39.9	No	Yes	See Table 6-74
Beryllium	57	0.96	0.9	No	51	0.00	[0.2]	No	43	0.00	[0.21]	No	No	See Table 6-74
Bismuth	57	0.02	[2.7]	TBD	51	0.04	[6.1]	TBD	43	0.05	[6.1]	TBD	No	See Table 6-74
Boron	57	0.67	5.1	No	51	1.00	31.3	No	43	1.00	22.6	No	No	See Table 6-74
Cadmium	57	0.75	2.4	No	51	0.02	0.72	No	43	0.05	[0.7]	TBD	Yes	See Table 6-74
Calcium	57	1.00	6,810	No	51	1.00	46,500	No	43	1.00	32,000	No	No	--
Calculated total uranium	47	0.98	15.4	No	50	0.66	141	No	43	0.60	3.69	No	Yes	See Table 6-74
Chromium	57	1.00	286	TBD	51	0.29	43.8	No	43	0.07	15.1	TBD	Yes	See Table 6-74
Cobalt	57	1.00	12.4	No	51	0.02	1.9	TBD	43	0.00	[1.2]	No	No	See Table 6-74
Copper	57	1.00	64	No	51	0.39	6.9	No	43	0.40	4.4	No	Yes	See Table 6-74
Hexavalent chromium	55	0.09	8.41	TBD	59	0.59	42	TBD	43	0.35	6.2	No	Yes	See Table 6-74
Iron	57	1.00	29,400	No	51	0.53	8,270	No	43	0.56	294	No	No	See Table 6-74
Lead	57	1.00	158	No	51	0.08	5.1	No	43	0.02	3.9	TBD	Yes	See Table 6-74
Lithium	57	1.00	14.8	No	51	0.92	4.3	No	43	0.93	2.6	No	No	See Table 6-74
Magnesium	57	1.00	7,320	No	51	1.00	10,400	No	43	1.00	6,880	No	No	--
Manganese	57	1.00	924	No	51	1.00	1,640	No	43	1.00	15.6	No	Yes	See Table 6-74
Mercury	57	0.26	0.2	No	51	0.00	[0.1]	No	43	0.00	[0.1]	No	Yes	See Table 6-74
Molybdenum	57	0.56	1.5	No	51	0.47	5.9	No	43	0.35	5.3	No	No	See Table 6-74
Nickel	57	1.00	32.1	No	51	0.10	2.6	TBD	43	0.09	[2.2]	TBD	Yes	See Table 6-74
Phosphorus	57	1.00	1,300	No	51	0.51	98,300	No	43	0.28	23	No	Yes	See Table 6-74
Potassium	57	1.00	1,620	No	51	0.96	3,000	No	43	1.00	2,070	No	No	--
Selenium	57	0.14	[4.6]	TBD	51	0.04	4.9	No	43	0.05	5.9	TBD	Yes	See Table 6-74
Silicon	57	1.00	3,100	No	51	1.00	11,900	No	43	1.00	5,700	No	No	--
Silver	57	0.05	0.844	TBD	51	0.02	[1.4]	TBD	43	0.07	[1.4]	TBD	No	See Table 6-74
Sodium	57	1.00	289	No	51	0.98	14,200	No	43	1.00	5,220	No	No	--
Strontium (elemental)	57	1.00	45.6	No	51	1.00	214	No	43	1.00	145	No	Yes	See Table 6-74
Thallium	57	0.02	[3.8]	No	51	0.02	[6.4]	No	43	0.05	8.3	No	No	--
Tin	57	0.46	3.7	No	51	0.08	10.1	TBD	43	0.05	6.9	TBD	Yes	See Table 6-74
Titanium	18	1.00	2,030	TBD	--	--	--	--	--	--	--	--	Yes	See Table 6-74
Uranium (inorganic)	57	0.12	[9.1]	TBD	51	0.06	137	TBD	43	0.00	[20.6]	No	Yes	See Table 6-74
Vanadium	57	1.00	66	No	51	0.35	5.3	No	43	0.16	2.4	TBD	Yes	See Table 6-74
Zinc	57	1.00	800	No	51	0.86	39.2	No	43	0.95	13.8	No	Yes	See Table 6-74

Table 6-70. Overview of Statistical Comparisons for Sediment and Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Sediment Study Sites				Pore-Water Study Sites				Surface Water Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Sediment COPC Status	Count	Detect Frequency	Maximum Value	Pore Water COPC Status	Count	Detect Frequency	Maximum Value	Surface Water COPC Status		
Zirconium	18	1.00	33.6	No	--	--	--	--	--	--	--	--	No	--
	Organics (mg/kg)				**Organics (µg/kg)**									
Total organic carbon	52	1.00	45,200	No	46	1.00	3,800	No	20	1.00	1,500	No	No	--
Total petroleum hydrocarbons	47	0.02	[323]	TBD	50	0.00	[2,000]	No	43	0.00	[2,000]	No	No	See Table 6-74
Total petroleum hydrocarbons - diesel range	47	0.79	50	No	50	0.14	[122]	No	43	0.07	200	TBD	No	See Table 6-74
Total petroleum hydrocarbons - gasoline range	47	0.19	0.21	TBD	50	0.00	[30]	No	42	0.10	390	No	No	See Table 6-74
Total petroleum hydrocarbons - motor oil (high boiling)	1	1.00	8.7	TBD	--	--	--	--	--	--	--	--	No	See Table 6-74
	Polycyclic Aromatic Hydrocarbons (mg/kg)				**Polycyclic Aromatic Hydrocarbons (µg/L)**									
2-Methylnaphthalene	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
Acenaphthene	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
Acenaphthylene	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
Anthracene	47	0.04	[1.1]	TBD	50	0.00	[12]	No	43	0.00	[11]	No	No	See Table 6-74
Benzo[a]anthracene	47	0.04	[1.1]	TBD	50	0.00	[12]	No	43	0.00	[11]	No	No	See Table 6-74
Benzo[a]pyrene	47	0.04	[1.1]	TBD	50	0.00	[12]	No	43	0.00	[11]	No	No	See Table 6-74
Benzo[b]fluoranthene	47	0.04	[1.1]	TBD	50	0.00	[12]	No	43	0.00	[11]	No	No	See Table 6-74
Benzo[ghi]perylene	47	0.04	[1.1]	TBD	50	0.00	[12]	No	43	0.00	[11]	No	No	See Table 6-74
Benzo[k]fluoranthene	47	0.04	[1.1]	TBD	50	0.00	[12]	No	43	0.00	[11]	No	No	See Table 6-74
Chrysene	47	0.04	[1.1]	TBD	50	0.00	[12]	No	43	0.00	[11]	No	No	See Table 6-74
Dibenz[a,h]anthracene	47	0.02	[1.1]	TBD	50	0.00	[12]	No	43	0.00	[11]	No	No	See Table 6-74
Fluoranthene	47	0.04	[1.1]	TBD	50	0.00	[12]	No	43	0.00	[11]	No	No	See Table 6-74
Fluorene	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
Indeno[1,2,3-cd]pyrene	47	0.04	[1.1]	TBD	50	0.00	[12]	No	43	0.00	[11]	No	No	See Table 6-74
Naphthalene	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
Phenanthrene	47	0.02	[1.1]	TBD	50	0.00	[12]	No	43	0.00	[11]	No	No	See Table 6-74
Pyrene	47	0.04	[1.1]	TBD	50	0.00	[12]	No	43	0.00	[11]	No	No	See Table 6-74
	Polychlorinated Biphenyls (mg/kg)				**Polychlorinated Biphenyls (µg/L)**									
Aroclor-1016	47	0.00	[0.044]	No	50	0.00	[0.41]	No	44	0.00	[0.41]	No	No	--
Aroclor-1221	47	0.00	[0.044]	No	50	0.00	[0.41]	No	44	0.00	[0.41]	No	No	--
Aroclor-1232	47	0.00	[0.044]	No	50	0.00	[0.41]	No	44	0.00	[0.41]	No	No	--
Aroclor-1242	47	0.00	[0.044]	No	50	0.00	[0.41]	No	44	0.00	[0.41]	No	No	--
Aroclor-1248	47	0.00	[0.044]	No	50	0.00	[0.41]	No	44	0.00	[0.41]	No	No	--
Aroclor-1254	47	0.04	[0.044]	TBD	50	0.00	[0.41]	No	44	0.00	[0.41]	No	No	See Table 6-74
Aroclor-1260	47	0.02	[0.044]	TBD	50	0.00	[0.41]	No	44	0.00	[0.41]	No	No	See Table 6-74
	Pesticides (mg/kg)				**Pesticides (µg/L)**									
Aldrin	47	0.00	[0.0033]	No	50	0.00	[0.5]	No	43	0.00	[0.062]	No	No	--
Dieldrin	47	0.00	[0.0033]	No	50	0.00	[0.5]	No	43	0.00	[0.062]	No	No	See Table 6-74

Table 6-70. Overview of Statistical Comparisons for Sediment and Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Sediment Study Sites				Pore-Water Study Sites				Surface Water Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Sediment COPC Status	Count	Detect Frequency	Maximum Value	Pore Water COPC Status	Count	Detect Frequency	Maximum Value	Surface Water COPC Status		
Methoxychlor	47	0.00	[0.0033]	No	50	0.02	1	TBD	43	0.00	[0.062]	No	No	See Table 6-74
	Pesticides - Benzene Hexachloride (mg/kg)				**Pesticides - Benzene Hexachloride (µg/L)**									
Alpha-BHC	47	0.04	[0.0033]	TBD	50	0.00	[0.5]	No	43	0.00	[0.062]	No	No	See Table 6-74
beta-1,2,3,4,5,6-Hexachlorocyclohexane	47	0.09	0.008	TBD	50	0.00	[0.5]	No	43	0.00	[0.062]	No	No	See Table 6-74
Delta-BHC	47	0.02	[0.0033]	TBD	50	0.00	[0.5]	No	43	0.00	[0.062]	No	No	See Table 6-74
Gamma-BHC (lindane)	47	0.02	0.0039	TBD	50	0.00	[0.5]	No	43	0.00	[0.062]	No	No	See Table 6-74
	Pesticides - Chlordane (mg/kg)				**Pesticides - Chlordane (µg/L)**									
alpha-Chlordane	47	0.02	[0.0033]	TBD	50	0.00	[0.5]	No	43	0.00	[0.062]	No	No	See Table 6-74
gamma-Chlordane	47	0.04	[0.0033]	TBD	50	0.00	[0.5]	No	43	0.00	[0.062]	No	No	See Table 6-74
	Pesticides - DDT (mg/kg)				**Pesticides - DDT (µg/L)**									
Dichlorodiphenyldichloroethane	47	0.04	[0.0033]	TBD	50	0.00	[0.5]	No	43	0.00	[0.062]	No	No	See Table 6-74
Dichlorodiphenyldichloroethylene	47	0.23	0.0035	No	50	0.00	[0.5]	No	43	0.00	[0.062]	No	No	--
Dichlorodiphenyltrichloroethane	47	0.09	0.11	No	50	0.00	[0.5]	No	43	0.00	[0.062]	No	No	--
	Pesticides - Endosulfan (mg/kg)				**Pesticides - Endosulfan (µg/L)**									
Endosulfan I	47	0.13	0.0054	No	50	0.00	[0.5]	No	43	0.00	[0.062]	No	No	See Table 6-74
Endosulfan II	47	0.00	[0.0033]	No	50	0.00	[0.5]	No	43	0.00	[0.062]	No	No	See Table 6-74
Endosulfan sulfate	47	0.00	[0.0033]	No	50	0.00	[0.5]	No	43	0.00	[0.062]	No	No	See Table 6-74
	Pesticides - Endrin (mg/kg)				**Pesticides - Endrin (µg/L)**									
Endrin	47	0.02	[0.0033]	TBD	50	0.00	[0.5]	No	43	0.00	[0.062]	No	No	See Table 6-74
Endrin aldehyde	47	0.02	[0.0033]	TBD	50	0.02	[0.5]	TBD	43	0.00	[0.062]	No	No	See Table 6-74
Endrin ketone	47	0.00	[0.0033]	No	50	0.00	[0.5]	No	43	0.00	[0.062]	No	No	--
	Pesticides - Heptachlor (mg/kg)				**Pesticides - Heptachlor (µg/L)**									
Heptachlor	47	0.00	[0.0033]	No	50	0.00	[0.5]	No	43	0.00	[0.062]	No	No	--
Heptachlor epoxide	47	0.00	[0.0033]	No	50	0.00	[0.5]	No	43	0.00	[0.062]	No	No	--
	Phthalates (mg/kg)				**Phthalates (µg/L)**									
Bis[2-ethylhexyl] phthalate	47	0.96	3.3	No	50	0.96	36.6	TBD	43	0.95	31.2	No	No	See Table 6-74
Butylbenzylphthalate	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
Di-n-butylphthalate	47	0.09	[1.1]	No	50	0.46	[10]	No	43	0.28	[10]	No	No	--
Di-n-octylphthalate	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
Diethylphthalate	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	See Table 6-74
Dimethyl phthalate	47	0.00	[1.1]	No	50	0.04	[12]	TBD	43	0.02	[11]	No	No	See Table 6-74
	Semivolatile Organic Compounds (mg/kg)				**Semivolatile Organic Compounds (µg/L)**									
1,2-Dichlorobenzene	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
1,2,4-Trichlorobenzene	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
1,3-Dichlorobenzene	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
1,4-Dichlorobenzene	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
2-Chloronaphthalene	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--

Table 6-70. Overview of Statistical Comparisons for Sediment and Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Sediment Study Sites				Pore-Water Study Sites				Surface Water Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Sediment COPC Status	Count	Detect Frequency	Maximum Value	Pore Water COPC Status	Count	Detect Frequency	Maximum Value	Surface Water COPC Status		
2-Chlorophenol	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
2-Methylphenol [cresol, o-]	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
2-Nitroaniline	47	0.00	[2.6]	No	50	0.00	[31]	No	43	0.00	[28]	No	No	See Table 6-74
2-Nitrophenol	47	0.00	[1.1]	No	50	0.02	[12]	TBD	43	0.00	[11]	No	No	See Table 6-74
2,4-Dichlorophenol	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
2,4-Dimethylphenol	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
2,4-Dinitrophenol	47	0.00	[2.6]	No	50	0.00	[31]	No	43	0.00	[28]	No	No	--
2,4-Dinitrotoluene	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
2,4,5-Trichlorophenol	47	0.00	[2.6]	No	50	0.00	[31]	No	43	0.00	[28]	No	No	--
2,4,6-Trichlorophenol	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
2,6-Dinitrotoluene	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
3-Nitroaniline	47	0.00	[2.6]	No	50	0.00	[31]	No	43	0.00	[28]	No	No	--
3,3'-Dichlorobenzidine	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	See Table 6-74
3+4 Methylphenol [cresol, m+p]	47	0.00	[1.1]	No	50	0.02	20	No	43	0.00	[11]	No	No	--
4-Bromophenylphenyl ether	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
4-Chloro-3-methylphenol	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
4-Chloroaniline	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
4-Chlorophenylphenyl ether	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
4-Nitroaniline	47	0.00	[2.6]	No	50	0.00	[31]	No	43	0.00	[28]	No	No	--
4-Nitrophenol	47	0.00	[2.6]	No	50	0.00	[31]	No	43	0.00	[28]	No	No	--
4,6-Dinitro-2-methylphenol	47	0.00	[2.6]	No	50	0.00	[31]	No	43	0.00	[28]	No	No	--
Bis[2-chloro-1-methylethyl]ether	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
Bis[2-Chloroethoxy]methane	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
Bis[2-chloroethyl] ether	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
Carbazole	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
Dibenzofuran	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
Hexachlorobenzene	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
Hexachlorobutadiene	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
Hexachlorocyclopentadiene	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
Hexachloroethane	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
Isophorone	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
N-Nitroso-di-n-dipropylamine	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
N-Nitrosodiphenylamine	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
Nitrobenzene	47	0.00	[1.1]	No	50	0.00	[12]	No	43	0.00	[11]	No	No	--
Pentachlorophenol	47	0.00	[2.6]	No	50	0.00	[31]	No	43	0.00	[28]	No	No	See Table 6-74
Phenol	47	0.00	[1.1]	No	50	0.04	[12]	No	43	0.00	[11]	No	No	See Table 6-74
Toxaphene	47	0.00	[0.033]	No	50	0.00	[0.62]	No	43	0.00	[0.52]	No	No	--

Table 6-70. Overview of Statistical Comparisons for Sediment and Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Sediment Study Sites				Pore-Water Study Sites				Surface Water Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Sediment COPC Status	Count	Detect Frequency	Maximum Value	Pore Water COPC Status	Count	Detect Frequency	Maximum Value	Surface Water COPC Status		
	Radionuclides (pCi/g)				Radionuclides (pCi/L)									
Americium-241	47	0.00	[0.36]	No	50	0.00	[270]	No	43	0.00	[200]	No	No	--
Antimony-125	47	0.00	[0.23]	No	50	0.00	[73]	No	43	0.00	[58]	No	No	--
Beryllium-7	47	0.15	[1.3]	No	50	0.00	[320]	No	43	0.00	[270]	No	No	--
Carbon-14	5	0.60	230	TBD	8	0.00	[75.5]	No	5	0.00	[20]	No	Yes	See Table 6-74
Cesium-134	47	0.00	[0.19]	No	50	0.00	[35]	No	43	0.00	[28]	No	No	--
Cesium-137	47	0.79	0.775	TBD	50	0.00	[29]	No	43	0.00	[25]	No	Yes	See Table 6-74
Cobalt-60	47	0.13	[0.18]	No	50	0.00	[32]	No	43	0.00	[26]	No	No	--
Europium-152	47	0.17	0.541	No	50	0.00	[86]	No	43	0.00	[64]	No	No	--
Europium-154	47	0.02	[0.52]	TBD	50	0.00	[91]	No	43	0.00	[71]	No	No	See Table 6-74
Europium-155	47	0.00	[0.24]	No	50	0.00	[100]	No	43	0.00	[87]	No	No	--
Plutonium-238	2	0.00	[0]	No	--	--	--	--	--	--	--	--	No	--
Plutonium-239/240	2	0.50	0.521	TBD	--	--	--	--	--	--	--	--	Yes	See Table 6-74
Potassium-40	47	1.00	25.3	No	50	0.00	[1,900]	No	43	0.00	[730]	No	No	--
Radium-226	47	1.00	1.15	No	50	0.02	0.908	No	43	0.02	3.6	No	No	--
Radium-228	47	1.00	2.83	No	50	0.00	[1.65]	No	43	0.00	[0.994]	No	No	--
Ruthenium-106	47	0.00	[1]	No	50	0.00	[260]	No	43	0.00	[220]	No	No	--
Strontium-90	47	0.13	1.49	No	51	0.12	6.23	TBD	43	0.00	[0.359]	No	Yes	See Table 6-74
Technetium-99	3	0.00	[0.12]	No	2	0.50	45.9	TBD	4	0.00	[1.98]	No	Yes	See Table 6-74
Thorium-228	47	0.74	2.14	No	50	0.00	[0.2]	No	43	0.00	[0.264]	No	No	--
Thorium-230	47	0.60	0.908	No	50	0.00	[0.595]	No	43	0.00	[0.179]	No	No	--
Thorium-232	47	0.81	1.92	No	50	0.02	0.283	No	43	0.00	[0.069]	No	No	--
Tritium	--	--	--	--	50	0.26	16,600	No	43	0.05	269	TBD	Yes	See Table 6-74
Uranium-233/234	47	0.98	4.31	No	50	0.78	51.4	No	43	0.81	1.29	No	Yes	See Table 6-74
Uranium-235	47	0.11	0.252	No	50	0.10	5.76	TBD	43	0.00	[0.081]	No	Yes	See Table 6-74
Uranium-238	47	0.98	5.12	No	50	0.66	46.4	No	43	0.60	1.23	No	Yes	See Table 6-74
	Anions (mg/kg)				Anions (µg/L)									
Bromide	--	--	--	--	50	0.00	[250]	--	43	0.00	[250]	No	No	--
Chloride	52	1.00	11.6	No	50	1.00	13,200	No	43	1.00	5,100	TBD	No	See Table 6-74
Chlorine	--	--	--	--	47	0.49	66,000	--	1	1.00	20	TBD	No	See Table 6-74
Fluoride	52	0.33	[2.4]	TBD	50	0.00	[250]	No	43	0.00	[250]	No	Yes	See Table 6-74
Nitrogen in ammonia	52	0.88	10.4	No	97	0.40	1,100	No	1	0.00	[200]	No	No	--
Nitrogen in nitrate	52	0.98	26.3	No	50	0.96	4,950	No	43	0.95	2,140	No	Yes	See Table 6-74
Nitrogen in nitrite	52	0.60	1.69	TBD	46	0.00	[76.1]	No	40	0.05	429	TBD	Yes	See Table 6-74
Nitrogen in nitrite and nitrate	--	--	--	--	50	1.00	5,200	No	43	1.00	3,400	No	No	--
Nitrogen, Kjeldahl total	52	1.00	3,290	No	50	0.34	1,400	No	--	--	--	--	No	--
Phosphate	--	--	--	--	46	0.00	[250]	--	40	0.00	[250]	No	No	--

Table 6-70. Overview of Statistical Comparisons for Sediment and Water Data Collected for the RCBRA Project. (6 Pages)

Analyte	Sediment Study Sites				Pore-Water Study Sites				Surface Water Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Sediment COPC Status	Count	Detect Frequency	Maximum Value	Pore Water COPC Status	Count	Detect Frequency	Maximum Value	Surface Water COPC Status		
Sulfate	52	1.00	51.9	No	50	1.00	51,700	No	43	1.00	42,300	No	No	--
	Physical Properties (%)				Physical Properties (%)									
Alkalinity (mg/L)	--	--	--	--	98	0.99	116,000	--	1	1.00	82,000	No	No	--
Cumulative percent retained on No. 100 screen	52	1.00	99.8	No	--	--	--	--	--	--	--	--	No	--
Cumulative percent retained on No. 16 screen	52	1.00	78.5	No	--	--	--	--	--	--	--	--	No	--
Cumulative percent retained on No. 200 screen	52	1.00	100	No	--	--	--	--	--	--	--	--	No	--
Cumulative percent retained on No. 30 screen	52	1.00	85.8	No	--	--	--	--	--	--	--	--	No	--
Cumulative percent retained on No. 50 screen	52	1.00	94.8	No	--	--	--	--	--	--	--	--	No	--
Cumulative percent retained on No. 8 screen	52	1.00	71	No	--	--	--	--	--	--	--	--	No	--
Fraction coarse sand	52	1.00	39.3	No	--	--	--	--	--	--	--	--	No	--
Fraction coarse silt/silt/clay (less than 0.074 mm)	52	1.00	27.2	No	--	--	--	--	--	--	--	--	No	--
Fraction fine sand	52	1.00	79.2	No	--	--	--	--	--	--	--	--	No	--
Fraction granules (greater than 2.38 mm)	52	1.00	71	No	--	--	--	--	--	--	--	--	No	--
Fraction medium sand	52	1.00	73	No	--	--	--	--	--	--	--	--	No	--
Fraction total sand	52	1.00	100	No	--	--	--	--	--	--	--	--	No	--
Fraction very coarse sand	52	1.00	39.1	No	--	--	--	--	--	--	--	--	No	--
Fraction very fine sand	52	1.00	59.5	No	--	--	--	--	--	--	--	--	No	--
Other														
Dissolved oxygen (µg/L)	1	1.00	12,300	--	151	1.00	16,600	--	86	1.00	14,800	No	No	--
Hardness (µg/L)	--	--	--	--	48	1.00	170,000	--	1	1.00	104,000	No	No	--
Percent moisture (wet sample) (%)	52	1.00	67.3	No	--	--	--	--	--	--	--	--	No	--
pH Measurement	53	1.00	8.74	No	151	1.00	9.77	No	86	1.00	9.72	No	No	--
Total suspended solids (µg/L)	--	--	--	--	50	0.18	25,700	--	--	--	--	--	No	--
Total dissolved solids (µg/L)	--	--	--	--	50	1.00	288,000	--	--	--	--	--	No	--

[value] = nondetect
-- = not applicable
BHC = benzene hexachloride
COPC = contaminant of potential concern
DDT = dichlorodiphenyltrichloroethane
RCBRA = River Corridor Baseline Risk Assessment
TBD = to be determined

Table 6-71. Overview of Statistical Comparisons for Invertebrate, Clam, and Mussel Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Invertebrate Study Sites				Clam And Clam Shell Study Sites				Mussel And Mussel Shell Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Invertebrate COPC Status	Count	Detect Frequency	Maximum Value	Clam COPC Status	Count	Detect Frequency	Maximum Value	Mussel COPC Status		
Inorganics (mg/kg-fw)														
Aluminum	18	1.00	152	TBD	42	0.95	56.7	No	6	1.00	12.6	No	Yes	See Table 6-74
Antimony	18	0.33	0.85	No	42	0.52	[0.94]	TBD	6	0.17	0.32	No	Yes	See Table 6-74
Arsenic	18	0.94	1.2	No	42	0.83	2.9	No	6	1.00	1.1	No	No	See Table 6-74
Barium	18	1.00	79.4	No	42	1.00	71.6	TBD	6	1.00	133	No	Yes	See Table 6-74
Beryllium	18	0.06	[0.02]	TBD	42	0.00	[0.03]	No	6	0.50	0.03	No	No	See Table 6-74
Bismuth	18	0.06	0.6	TBD	42	0.00	[1.5]	No	6	0.00	[0.51]	No	No	See Table 6-74
Boron	18	0.28	0.46	No	42	0.24	[1.1]	No	6	0.17	[0.38]	No	No	See Table 6-74
Cadmium	18	0.94	1	No	42	0.93	0.57	No	6	1.00	0.61	No	Yes	See Table 6-74
Calcium	18	1.00	126,000	No	42	1.00	40,100	No	6	1.00	7,210	No	No	--
Calculated total uranium	7	0.00	[0.291]	No	22	0.00	[0.289]	No	6	0.00	[0.204]	No	Yes	See Table 6-74
Chromium	18	0.28	2.5	No	42	0.62	15.4	No	6	0.50	0.72	No	Yes	See Table 6-74
Cobalt	18	0.67	0.33	No	42	0.17	[0.26]	No	6	0.83	0.14	No	No	See Table 6-74
Copper	18	1.00	32.6	No	42	1.00	27.8	TBD	6	1.00	2	No	Yes	See Table 6-74
Iron	18	1.00	485	TBD	42	1.00	162	No	6	1.00	641	No	No	See Table 6-74
Lead	18	0.50	1.1	No	42	0.67	[0.82]	TBD	6	0.83	0.44	No	Yes	See Table 6-74
Lithium	18	0.33	0.32	TBD	42	0.24	0.3	No	6	0.50	[0.08]	No	No	See Table 6-74
Magnesium	18	1.00	918	No	42	1.00	612	No	6	1.00	138	No	No	--
Manganese	18	1.00	103	No	42	1.00	78.8	TBD	6	1.00	833	No	Yes	See Table 6-74
Mercury	18	0.06	0.06	TBD	42	0.05	0.41	TBD	6	0.00	[0.02]	No	Yes	See Table 6-74
Molybdenum	18	0.11	0.58	TBD	42	0.21	[0.51]	No	6	0.67	0.23	No	No	See Table 6-74
Nickel	18	0.72	4.4	No	42	0.36	0.72	No	6	0.33	[0.19]	No	Yes	See Table 6-74
Phosphorus	18	1.00	3,860	No	42	1.00	3,460	TBD	6	1.00	3,140	No	Yes	See Table 6-74
Potassium	18	1.00	2,120	No	42	1.00	2,200	No	6	1.00	276	No	No	--
Selenium	18	0.94	2.3	TBD	42	0.95	1.6	TBD	6	0.33	0.57	No	Yes	See Table 6-74
Silicon	18	1.00	106	No	42	1.00	60.2	No	6	1.00	24.9	No	No	--
Silver	18	0.17	0.13	No	42	0.17	0.3	No	6	0.00	[0.09]	No	No	See Table 6-74
Sodium	18	1.00	2,280	No	42	1.00	1,760	No	6	1.00	441	No	No	--
Strontium (elemental)	18	1.00	174	No	42	1.00	141	TBD	6	1.00	25.4	No	Yes	See Table 6-74
Thallium	18	0.00	[0.79]	No	42	0.00	[1.7]	No	6	0.00	[0.56]	No	No	--
Tin	18	0.17	2.7	TBD	42	0.07	[2.5]	No	6	0.50	0.69	No	Yes	See Table 6-74
Titanium	4	1.00	2.8	No	34	1.00	6.5	No	--	--	--	--	Yes	See Table 6-74
Uranium (inorganic)	18	0.06	[2.5]	TBD	42	0.12	[7.4]	TBD	6	0.00	[2.5]	No	Yes	See Table 6-74
Vanadium	18	0.89	0.75	TBD	42	0.74	[0.29]	TBD	6	0.50	0.11	No	Yes	See Table 6-74
Zinc	18	1.00	52.5	TBD	42	1.00	49.6	No	6	1.00	35.4	No	Yes	See Table 6-74
Zirconium	4	0.00	[1]	No	34	0.00	[1]	No	--	--	--	--	No	--

Table 6-71. Overview of Statistical Comparisons for Invertebrate, Clam, and Mussel Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Invertebrate Study Sites				Clam And Clam Shell Study Sites				Mussel And Mussel Shell Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Invertebrate COPC Status	Count	Detect Frequency	Maximum Value	Clam COPC Status	Count	Detect Frequency	Maximum Value	Mussel COPC Status		
Polycyclic Aromatic Hydrocarbons (mg/kg-fw)														
2-Methylnaphthalene	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
Acenaphthene	--	--	--	--	1	0.00	[0.847]	No	1	0.00	[4.7]	No	No	--
Acenaphthylene	--	--	--	--	1	0.00	[0.847]	No	1	0.00	[4.7]	No	No	--
Anthracene	--	--	--	--	1	0.00	[0.084]	No	1	0.00	[4.7]	No	No	See Table 6-74
Benzo[a]anthracene	--	--	--	--	1	1.00	0.079	TBD	1	0.00	[4.7]	No	No	See Table 6-74
Benzo[a]pyrene	--	--	--	--	1	1.00	0.075	TBD	1	0.00	[4.7]	No	No	See Table 6-74
Benzo[b]fluoranthene	--	--	--	--	1	1.00	0.061	TBD	1	0.00	[4.7]	No	No	See Table 6-74
Benzo[ghi]perylene	--	--	--	--	1	0.00	[0.0847]	No	1	0.00	[4.7]	No	No	See Table 6-74
Benzo[k]fluoranthene	--	--	--	--	1	1.00	0.033	TBD	1	0.00	[4.7]	No	No	See Table 6-74
Chrysene	--	--	--	--	1	1.00	0.086	No	1	0.00	[4.7]	No	No	See Table 6-74
Dibenz[a,h]anthracene	--	--	--	--	1	0.00	[0.0847]	No	1	0.00	[4.7]	No	No	See Table 6-74
Fluoranthene	--	--	--	--	1	1.00	0.093	No	1	0.00	[4.7]	No	No	See Table 6-74
Fluorene	--	--	--	--	1	0.00	[0.00847]	No	1	0.00	[4.7]	No	No	--
Indeno[1,2,3-cd]pyrene	--	--	--	--	1	0.00	[0.084]	No	1	0.00	[4.7]	No	No	See Table 6-74
Naphthalene	--	--	--	--	1	0.00	[0.847]	No	1	0.00	[4.7]	No	No	--
Phenanthrene	--	--	--	--	1	1.00	0.077	No	1	0.00	[4.7]	No	No	See Table 6-74
Pyrene	--	--	--	--	1	1.00	0.066	No	1	0.00	[4.7]	No	No	See Table 6-74
Polychlorinated Biphenyls (mg/kg-fw)														
Aroclor-1016	--	--	--	--	20	0.00	[4]	No	6	0.00	[0.2]	No	No	--
Aroclor-1221	--	--	--	--	20	0.00	[4]	No	6	0.00	[0.2]	No	No	--
Aroclor-1232	--	--	--	--	20	0.00	[4]	No	6	0.00	[0.2]	No	No	--
Aroclor-1242	--	--	--	--	20	0.00	[4]	No	6	0.00	[0.2]	No	No	--
Aroclor-1248	--	--	--	--	20	0.00	[4]	No	6	0.00	[0.2]	No	No	--
Aroclor-1254	--	--	--	--	20	0.00	[4]	No	6	0.00	[0.2]	No	No	See Table 6-74
Aroclor-1260	--	--	--	--	20	0.00	[4]	No	6	0.00	[0.2]	No	No	See Table 6-74
Pesticides (mg/kg-fw)														
Aldrin	--	--	--	--	19	0.00	[0.5]	No	5	0.00	[0.025]	No	No	--
Dieldrin	--	--	--	--	19	0.00	[0.5]	No	5	0.00	[0.025]	No	No	See Table 6-74
Methoxychlor	--	--	--	--	19	0.32	[0.5]	No	5	0.40	0.025	No	No	See Table 6-74
Pesticides - Benzene Hexachloride (mg/kg-fw)														
Alpha-BHC	--	--	--	--	19	0.00	[0.5]	No	5	0.00	[0.025]	No	No	See Table 6-74
beta-1,2,3,4,5,6-Hexachlorocyclohexane	--	--	--	--	19	0.16	[0.5]	No	5	0.00	[0.025]	No	No	See Table 6-74
Delta-BHC	--	--	--	--	19	0.05	[0.5]	No	5	0.20	[0.024]	No	No	See Table 6-74
Gamma-BHC (lindane)	--	--	--	--	19	0.05	[0.5]	TBD	5	0.00	[0.025]	No	No	See Table 6-74

Table 6-71. Overview of Statistical Comparisons for Invertebrate, Clam, and Mussel Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Invertebrate Study Sites				Clam And Clam Shell Study Sites				Mussel And Mussel Shell Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Invertebrate COPC Status	Count	Detect Frequency	Maximum Value	Clam COPC Status	Count	Detect Frequency	Maximum Value	Mussel COPC Status		
Pesticides - Chlordane (mg/kg-fw)														
alpha-Chlordane	--	--	--	--	19	0.00	[0.5]	No	5	0.00	[0.025]	No	No	See Table 6-74
gamma-Chlordane	--	--	--	--	19	0.00	[0.5]	No	5	0.00	[0.025]	No	No	See Table 6-74
Pesticides - DDT (mg/kg-fw)														
Dichlorodiphenyldichloroethane	--	--	--	--	19	0.00	[0.5]	No	5	0.20	[0.024]	No	No	See Table 6-74
Dichlorodiphenyldichloroethylene	--	--	--	--	19	0.16	[0.5]	No	5	0.40	[0.024]	No	No	--
Dichlorodiphenyltrichloroethane	--	--	--	--	19	0.00	[0.5]	No	5	0.00	[0.025]	No	No	--
Pesticides - Endosulfan (mg/kg-fw)														
Endosulfan I	--	--	--	--	19	0.84	[0.46]	No	5	0.00	[0.025]	No	No	See Table 6-74
Endosulfan II	--	--	--	--	19	0.00	[0.5]	No	5	0.20	[0.024]	No	No	See Table 6-74
Endosulfan sulfate	--	--	--	--	19	0.00	[0.5]	No	5	0.20	[0.024]	No	No	See Table 6-74
Pesticides - Endrin (mg/kg-fw)														
Endrin	--	--	--	--	19	0.00	[0.5]	No	5	0.00	[0.025]	No	No	See Table 6-74
Endrin aldehyde	--	--	--	--	19	0.00	[0.5]	No	5	0.00	[0.025]	No	No	See Table 6-74
Endrin ketone	--	--	--	--	19	0.00	[0.5]	No	5	0.00	[0.025]	No	No	--
Pesticides - Heptachlor (mg/kg-fw)														
Heptachlor	--	--	--	--	19	0.11	[0.5]	No	5	0.00	[0.025]	No	No	--
Heptachlor epoxide	--	--	--	--	19	0.00	[0.5]	No	5	0.00	[0.025]	No	No	--
Phthalates (mg/kg-fw)														
Bis[2-ethylhexyl] phthalate	--	--	--	--	--	--	--	--	1	1.00	0.41	TBD	No	See Table 6-74
Butylbenzylphthalate	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
Di-n-butylphthalate	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
Di-n-octylphthalate	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
Diethylphthalate	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	See Table 6-74
Dimethyl phthalate	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	See Table 6-74
Semivolatile Organic Compounds (mg/kg-fw)														
1,2-Dichlorobenzene	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
1,2,4-Trichlorobenzene	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
1,3-Dichlorobenzene	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
1,4-Dichlorobenzene	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
2-Chloronaphthalene	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
2-Chlorophenol	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
2-Methylphenol [cresol, o-]	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
2-Nitroaniline	--	--	--	--	--	--	--	--	1	0.00	[12]	No	No	See Table 6-74
2-Nitrophenol	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	See Table 6-74
2,4-Dichlorophenol	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
2,4-Dimethylphenol	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--

Table 6-71. Overview of Statistical Comparisons for Invertebrate, Clam, and Mussel Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Invertebrate Study Sites				Clam And Clam Shell Study Sites				Mussel And Mussel Shell Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Invertebrate COPC Status	Count	Detect Frequency	Maximum Value	Clam COPC Status	Count	Detect Frequency	Maximum Value	Mussel COPC Status		
2,4-Dinitrophenol	--	--	--	--	--	--	--	--	1	0.00	[12]	No	No	--
2,4-Dinitrotoluene	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
2,4,5-Trichlorophenol	--	--	--	--	--	--	--	--	1	0.00	[12]	No	No	--
2,4,6-Trichlorophenol	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
2,6-Dinitrotoluene	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
3-Nitroaniline	--	--	--	--	--	--	--	--	1	0.00	[12]	No	No	--
3,3'-Dichlorobenzidine	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	See Table 6-74
3+4 Methylphenol [cresol, m+p]	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
4-Bromophenylphenyl ether	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
4-Chloro-3-methylphenol	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
4-Chloroaniline	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
4-Chlorophenylphenyl ether	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
4-Nitroaniline	--	--	--	--	--	--	--	--	1	0.00	[12]	No	No	--
4-Nitrophenol	--	--	--	--	--	--	--	--	1	0.00	[12]	No	No	--
4,6-Dinitro-2-methylphenol	--	--	--	--	--	--	--	--	1	0.00	[12]	No	No	--
Bis[2-chloro-1-methylethyl]ether	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
Bis[2-Chloroethoxy]methane	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
Bis[2-chloroethyl] ether	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
Carbazole	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
Dibenzofuran	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
Hexachlorobenzene	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
Hexachlorobutadiene	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
Hexachlorocyclopentadiene	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
Hexachloroethane	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
Isophorone	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
N-Nitroso-di-n-dipropylamine	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
N-Nitrosodiphenylamine	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
Nitrobenzene	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	--
Pentachlorophenol	--	--	--	--	--	--	--	--	1	1.00	2.3	TBD	No	See Table 6-74
Phenol	--	--	--	--	--	--	--	--	1	0.00	[4.7]	No	No	See Table 6-74
Toxaphene	--	--	--	--	19	0.00	[5]	No	5	0.00	[0.25]	No	No	--
Radionuclides (pCi/g-fw)														
Americium-241	--	--	--	--	1	0.00	[0.63]	No	6	0.00	[0.24]	No	No	--
Antimony-125	--	--	--	--	1	0.00	[0.8]	No	6	0.00	[0.54]	No	No	--
Beryllium-7	--	--	--	--	1	0.00	[0.0349]	No	6	0.00	[0.0363]	No	No	--
Carbon-14	1	0.00	[-2.64]	No	9	0.11	93.1	No	--	--	--	--	Yes	See Table 6-74
Cesium-134	--	--	--	--	1	0.00	[0.5]	No	6	0.00	[0.27]	No	No	--

Table 6-71. Overview of Statistical Comparisons for Invertebrate, Clam, and Mussel Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Invertebrate Study Sites				Clam And Clam Shell Study Sites				Mussel And Mussel Shell Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Invertebrate COPC Status	Count	Detect Frequency	Maximum Value	Clam COPC Status	Count	Detect Frequency	Maximum Value	Mussel COPC Status		
Cesium-137	--	--	--	--	1	0.00	[0.35]	No	6	0.00	[0.22]	No	Yes	See Table 6-74
Cobalt-60	--	--	--	--	1	0.00	[0.38]	No	6	0.00	[0.21]	No	No	--
Europium-152	--	--	--	--	1	0.00	[0.91]	No	6	0.00	[0.56]	No	No	--
Europium-154	--	--	--	--	1	0.00	[1.1]	No	6	0.00	[0.75]	No	No	See Table 6-74
Europium-155	--	--	--	--	1	0.00	[0.65]	No	6	0.00	[0.3]	No	No	--
Potassium-40	--	--	--	--	1	0.00	[0]	No	6	0.00	[0.0262]	No	No	--
Radium-226	--	--	--	--	1	0.00	[0.75]	No	6	0.00	[0.41]	No	No	--
Radium-228	--	--	--	--	1	0.00	[1.6]	No	6	0.17	[0.89]	No	No	--
Ruthenium-106	--	--	--	--	1	0.00	[3.1]	No	6	0.00	[1.9]	No	No	--
Strontium-90	10	0.10	2.6	TBD	21	0.05	0.489	TBD	6	0.00	[0.0714]	No	Yes	See Table 6-74
Strontium-90 shell	--	--	--	--	27	0.41	0.255	No	6	1.00	0.347	No	No	--
Technetium-99	1	0.00	[0.304]	No	1	0.00	[0.225]	No	1	0.00	[0.0345]	No	Yes	See Table 6-74
Thorium-228	1	0.00	[0]	No	6	0.00	[0.181]	No	6	0.50	0.295	No	No	--
Thorium-230	1	0.00	[-0.152]	No	6	0.00	[0.0805]	No	6	0.00	[-0.009]	No	No	--
Thorium-232	1	0.00	[0]	No	6	0.00	[0.0322]	No	6	0.00	[0.0463]	No	No	--
Uranium-233/234	7	0.00	[0.151]	No	22	0.00	[0.134]	No	6	0.00	[0.0363]	No	Yes	See Table 6-74
Uranium-235	7	0.00	[0.034]	No	22	0.00	[0.063]	No	6	0.00	[0.0262]	No	Yes	See Table 6-74
Uranium-238	7	0.00	[0.0979]	No	22	0.00	[0.097]	No	6	0.00	[0.0655]	No	Yes	See Table 6-74

[value] = nondetect
-- = not applicable
BHC = benzene hexachloride
COPC = contaminant of potential concern
DDT = dichlorodiphenyltrichloroethane
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment
TBD = to be determined

Table 6-72. Overview of Statistical Comparisons for Sculpin Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Sculpin Study Sites				Sculpin Kidney Study Sites				Sculpin Liver Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Sculpin COPC Status	Count	Detect Frequency	Maximum Value	Sculpin Kidney COPC Status	Count	Detect Frequency	Maximum Value	Sculpin Liver COPC Status		
Inorganics (mg/kg-fw)														
Aluminum	28	1.00	58.9	No	27	0.33	37.8	No	27	0.48	67.3	No	Yes	See Table 6-74
Antimony	28	0.04	[0.43]	TBD	27	0.11	[4.9]	No	27	0.26	4.6	No	Yes	See Table 6-74
Arsenic	28	0.11	0.8	No	27	0.04	[6.8]	No	27	0.07	[4.1]	No	No	See Table 6-74
Barium	28	1.00	6.2	TBD	27	0.96	1.9	No	27	0.93	3.6	No	Yes	See Table 6-74
Beryllium	28	0.07	[0.04]	No	27	0.00	[0.45]	No	27	0.00	[0.1]	No	No	See Table 6-74
Bismuth	28	0.00	[0.55]	No	27	0.00	[5.7]	No	27	0.00	[4]	No	No	See Table 6-74
Boron	28	0.07	1.2	No	27	0.11	5.4	TBD	27	0.30	6.5	No	No	See Table 6-74
Cadmium	28	0.86	0.41	No	27	0.96	2.7	No	27	1.00	4	No	Yes	See Table 6-74
Calcium	28	1.00	20,600	No	27	1.00	1,190	No	27	1.00	728	No	No	--
Calculated total uranium	26	0.00	[0.478]	No	--	--	--	--	--	--	--	--	Yes	See Table 6-74
Chromium	28	0.93	0.96	TBD	27	0.96	3.7	No	27	0.96	1.5	No	Yes	See Table 6-74
Cobalt	28	0.00	[0.17]	No	27	0.00	[1.8]	No	27	0.07	[0.8]	No	No	See Table 6-74
Copper	28	0.93	10.7	TBD	27	0.74	59.5	No	27	1.00	19	No	Yes	See Table 6-74
Iron	28	1.00	152	No	27	1.00	149	No	27	1.00	237	No	No	See Table 6-74
Lead	28	0.29	0.77	No	27	0.11	[3.4]	No	27	0.15	[3.3]	No	Yes	See Table 6-74
Lithium	28	0.64	0.2	TBD	27	0.48	0.67	No	27	0.70	2.8	No	No	See Table 6-74
Magnesium	28	1.00	586	No	27	1.00	293	No	27	1.00	360	No	No	--
Manganese	28	1.00	11.3	No	27	0.89	[3.6]	No	27	1.00	3.1	No	Yes	See Table 6-74
Mercury	28	0.86	0.05	No	26	0.08	[0.17]	TBD	27	0.89	0.19	No	Yes	See Table 6-74
Molybdenum	28	0.07	0.33	No	27	0.04	[3.2]	No	27	0.19	[1.6]	No	No	See Table 6-74
Nickel	28	0.68	67.1	TBD	27	0.04	3.2	No	27	0.00	[2.7]	No	Yes	See Table 6-74
Phosphorus	28	1.00	11,400	No	27	1.00	5,170	No	27	1.00	5,820	No	Yes	See Table 6-74
Potassium	28	1.00	2,910	No	27	1.00	4,590	No	27	1.00	4,180	No	No	--
Selenium	28	0.86	1.1	TBD	27	0.56	[5.5]	No	27	0.89	5.9	No	Yes	See Table 6-74
Silicon	28	0.93	94.5	No	27	0.70	73.6	No	27	0.93	1,670	No	No	--
Silver	28	0.00	[0.13]	No	27	0.00	[0.909]	No	27	0.11	[0.9]	TBD	No	See Table 6-74
Sodium	28	1.00	1,360	No	27	1.00	2,950	No	27	1.00	1,760	No	No	--
Strontium (elemental)	25	1.00	30.7	TBD	27	1.00	3.1	No	27	1.00	1.7	No	Yes	See Table 6-74
Thallium	28	0.00	[0.79]	No	27	0.00	[7.8]	No	27	0.00	[8]	No	No	--
Tin	28	0.21	[1.2]	TBD	27	0.44	[11.9]	No	27	0.59	10.7	No	Yes	See Table 6-74
Titanium	18	1.00	6	No	17	0.88	1.3	No	17	0.82	0.55	No	Yes	See Table 6-74
Total inorganic arsenic	10	0.00	[0.075]	No	--	--	--	--	--	--	--	--	No	--
Uranium (inorganic)	28	0.07	[2.4]	TBD	27	0.07	[22.8]	TBD	27	0.07	[16.7]	TBD	Yes	See Table 6-74
Vanadium	28	0.75	0.38	No	27	0.11	[1.3]	No	27	0.22	[0.8]	No	Yes	See Table 6-74

Table 6-72. Overview of Statistical Comparisons for Sculpin Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Sculpin Study Sites				Sculpin Kidney Study Sites				Sculpin Liver Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Sculpin COPC Status	Count	Detect Frequency	Maximum Value	Sculpin Kidney COPC Status	Count	Detect Frequency	Maximum Value	Sculpin Liver COPC Status		
Zinc	28	1.00	46.8	No	27	1.00	204	No	27	1.00	98	No	Yes	See Table 6-74
Zirconium	17	0.00	[1]	No	17	0.00	[11.8]	No	15	0.00	[3.4]	No	No	--
Polycyclic Aromatic Hydrocarbons (mg/kg-fw)														
2-Methylnaphthalene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
Acenaphthene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
Acenaphthylene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
Anthracene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Benzo[a]anthracene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Benzo[a]pyrene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Benzo[b]fluoranthene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Benzo[ghi]perylene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Benzo[k]fluoranthene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Chrysene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Dibenz[a,h]anthracene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Fluoranthene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Fluorene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
Indeno[1,2,3-cd]pyrene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Naphthalene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
Phenanthrene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Pyrene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Polychlorinated Biphenyls (mg/kg-fw)														
Aroclor-1016	32	0.00	[1.7]	No	--	--	--	--	--	--	--	--	No	--
Aroclor-1221	32	0.00	[1.7]	No	--	--	--	--	--	--	--	--	No	--
Aroclor-1232	32	0.00	[1.7]	No	--	--	--	--	--	--	--	--	No	--
Aroclor-1242	32	0.00	[1.7]	No	--	--	--	--	--	--	--	--	No	--
Aroclor-1248	32	0.00	[1.7]	No	--	--	--	--	--	--	--	--	No	--
Aroclor-1254	32	0.09	[1.7]	TBD	--	--	--	--	--	--	--	--	No	See Table 6-74
Aroclor-1260	32	0.03	[1.7]	TBD	--	--	--	--	--	--	--	--	No	See Table 6-74
Total PCB	10	1.00	0.065	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Pesticides (mg/kg-fw)														
Aldrin	25	0.08	[0.21]	No	--	--	--	--	--	--	--	--	No	--
Dieldrin	25	0.08	[0.21]	TBD	--	--	--	--	--	--	--	--	No	See Table 6-74
Methoxychlor	25	0.16	[0.21]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Pesticides - Benzene Hexachloride (mg/kg-fw)														
Alpha-BHC	25	0.00	[0.21]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
beta-1,2,3,4,5,6-Hexachlorocyclohexane	25	0.20	[0.21]	No	--	--	--	--	--	--	--	--	No	See Table 6-74

Table 6-72. Overview of Statistical Comparisons for Sculpin Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Sculpin Study Sites				Sculpin Kidney Study Sites				Sculpin Liver Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Sculpin COPC Status	Count	Detect Frequency	Maximum Value	Sculpin Kidney COPC Status	Count	Detect Frequency	Maximum Value	Sculpin Liver COPC Status		
Delta-BHC	25	0.16	[0.21]	TBD	--	--	--	--	--	--	--	--	No	See Table 6-74
Gamma-BHC (lindane)	25	0.04	[0.21]	TBD	--	--	--	--	--	--	--	--	No	See Table 6-74
Pesticides - Chlordane (mg/kg-fw)														
alpha-Chlordane	25	0.00	[0.21]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
gamma-Chlordane	25	0.20	[0.21]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Pesticides - DDT (mg/kg-fw)														
Dichlorodiphenyldichloroethane	25	0.52	[0.15]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Dichlorodiphenyldichloroethylene	25	0.96	0.12	No	--	--	--	--	--	--	--	--	No	--
Dichlorodiphenyltrichloroethane	25	0.08	[0.21]	No	--	--	--	--	--	--	--	--	No	--
Pesticides - Endosulfan (mg/kg-fw)														
Endosulfan I	25	0.04	[0.21]	TBD	--	--	--	--	--	--	--	--	No	See Table 6-74
Endosulfan II	25	0.00	[0.21]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Endosulfan sulfate	25	0.00	[0.21]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Pesticides - Endrin (mg/kg-fw)														
Endrin	25	0.08	[0.21]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Endrin aldehyde	25	0.00	[0.21]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Endrin ketone	25	0.16	[0.21]	No	--	--	--	--	--	--	--	--	No	--
Pesticides - Heptachlor (mg/kg-fw)														
Heptachlor	25	0.00	[0.21]	No	--	--	--	--	--	--	--	--	No	--
Heptachlor epoxide	25	0.00	[0.21]	No	--	--	--	--	--	--	--	--	No	--
Phthalates (mg/kg-fw)														
Bis[2-ethylhexyl] phthalate	25	0.92	7.7	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Butylbenzylphthalate	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
Di-n-butylphthalate	25	0.60	13	No	--	--	--	--	--	--	--	--	No	--
Di-n-octylphthalate	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
Diethylphthalate	25	0.04	[42]	TBD	--	--	--	--	--	--	--	--	No	See Table 6-74
Dimethyl phthalate	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Semivolatile Organic Compounds (mg/kg-fw)														
1,2-Dichlorobenzene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
1,2,4-Trichlorobenzene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
1,3-Dichlorobenzene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
1,4-Dichlorobenzene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
2-Chloronaphthalene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
2-Chlorophenol	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
2-Methylphenol [cresol, o-]	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
2-Nitroaniline	25	0.12	[81]	TBD	--	--	--	--	--	--	--	--	No	See Table 6-74
2-Nitrophenol	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	See Table 6-74

Table 6-72. Overview of Statistical Comparisons for Sculpin Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Sculpin Study Sites				Sculpin Kidney Study Sites				Sculpin Liver Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Sculpin COPC Status	Count	Detect Frequency	Maximum Value	Sculpin Kidney COPC Status	Count	Detect Frequency	Maximum Value	Sculpin Liver COPC Status		
2,4-Dichlorophenol	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
2,4-Dimethylphenol	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
2,4-Dinitrophenol	25	0.00	[81]	No	--	--	--	--	--	--	--	--	No	--
2,4-Dinitrotoluene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
2,4,5-Trichlorophenol	25	0.00	[81]	No	--	--	--	--	--	--	--	--	No	--
2,4,6-Trichlorophenol	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
2,6-Dinitrotoluene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
3-Nitroaniline	25	0.00	[81]	No	--	--	--	--	--	--	--	--	No	--
3,3'-Dichlorobenzidine	25	0.04	[42]	TBD	--	--	--	--	--	--	--	--	No	See Table 6-74
3+4 Methylphenol [cresol, m+p]	25	0.92	120	No	--	--	--	--	--	--	--	--	No	--
4-Bromophenylphenyl ether	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
4-Chloro-3-methylphenol	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
4-Chloroaniline	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
4-Chlorophenylphenyl ether	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
4-Nitroaniline	25	0.00	[81]	No	--	--	--	--	--	--	--	--	No	--
4-Nitrophenol	25	0.00	[81]	No	--	--	--	--	--	--	--	--	No	--
4,6-Dinitro-2-methylphenol	25	0.00	[81]	No	--	--	--	--	--	--	--	--	No	--
Bis[2-chloro-1-methylethyl]ether	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
Bis[2-Chloroethoxy]methane	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
Bis[2-chloroethyl] ether	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
Carbazole	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
Dibenzofuran	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
Hexachlorobenzene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
Hexachlorobutadiene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
Hexachlorocyclopentadiene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
Hexachloroethane	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
Isophorone	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
N-Nitroso-di-n-dipropylamine	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
N-Nitrosodiphenylamine	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
Nitrobenzene	25	0.00	[42]	No	--	--	--	--	--	--	--	--	No	--
Pentachlorophenol	25	0.16	25	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Phenol	25	0.28	[42]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Toxaphene	25	0.00	[21]	No	--	--	--	--	--	--	--	--	No	--
Radionuclides (pCi/g-fw)														
Americium-241	27	0.00	[0.44]	No	--	--	--	--	--	--	--	--	No	--
Antimony-125	27	0.00	[0.47]	No	--	--	--	--	--	--	--	--	No	--
Beryllium-7	27	0.04	8.11	No	--	--	--	--	--	--	--	--	No	--

Table 6-72. Overview of Statistical Comparisons for Sculpin Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Sculpin Study Sites				Sculpin Kidney Study Sites				Sculpin Liver Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Sculpin COPC Status	Count	Detect Frequency	Maximum Value	Sculpin Kidney COPC Status	Count	Detect Frequency	Maximum Value	Sculpin Liver COPC Status		
Carbon-14	7	0.14	8.11	TBD	--	--	--	--	--	--	--	--	Yes	See Table 6-74
Cesium-134	27	0.00	[0.21]	No	--	--	--	--	--	--	--	--	No	--
Cesium-137	27	0.00	[0.2]	No	--	--	--	--	--	--	--	--	Yes	See Table 6-74
Cobalt-60	27	0.00	[0.25]	No	--	--	--	--	--	--	--	--	No	--
Europium-152	27	0.00	[0.43]	No	--	--	--	--	--	--	--	--	No	--
Europium-154	27	0.00	[0.61]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Europium-155	27	0.00	[0.43]	No	--	--	--	--	--	--	--	--	No	--
Potassium-40	27	0.44	[4.7]	No	--	--	--	--	--	--	--	--	No	--
Radium-226	27	0.00	[0.38]	No	--	--	--	--	--	--	--	--	No	--
Radium-228	27	0.00	[0.88]	No	--	--	--	--	--	--	--	--	No	--
Ruthenium-106	27	0.00	[1.8]	No	--	--	--	--	--	--	--	--	No	--
Strontium-90	26	0.04	0.325	No	--	--	--	--	--	--	--	--	Yes	See Table 6-74
Technetium-99	2	0.00	[0.164]	No	--	--	--	--	--	--	--	--	Yes	See Table 6-74
Thorium-228	27	0.00	[0.303]	No	--	--	--	--	--	--	--	--	No	--
Thorium-230	25	0.04	0.776	No	--	--	--	--	--	--	--	--	No	--
Thorium-232	27	0.00	[0.158]	No	--	--	--	--	--	--	--	--	No	--
Uranium-233/234	26	0.04	[0.113]	No	--	--	--	--	--	--	--	--	Yes	See Table 6-74
Uranium-235	28	0.00	[0.13]	No	--	--	--	--	--	--	--	--	Yes	See Table 6-74
Uranium-238	26	0.00	[0.151]	No	--	--	--	--	--	--	--	--	Yes	See Table 6-74

[value] = nondetect
-- = not applicable
BHC = benzene hexachloride
COPC = contaminant of potential concern
DDT = dichlorodiphenyltrichloroethane
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment
TBD = to be determined

Table 6-73. Overview of Statistical Comparisons for Sucker Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Sucker Study Sites				Sucker Kidney Study Sites				Sucker Liver Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Sucker COPC Status	Count	Detect Frequency	Maximum Value	Sucker Kidney COPC Status	Count	Detect Frequency	Maximum Value	Sucker Liver COPC Status		
Inorganics (mg/kg-fw)														
Aluminum	6	1.00	30.7	No	6	0.83	[133]	No	6	0.83	139	No	Yes	See Table 6-74
Antimony	6	0.17	0.38	No	6	0.00	[10]	No	6	0.00	[2.9]	No	Yes	See Table 6-74
Arsenic	6	0.00	[0.46]	No	6	0.33	[16.7]	No	6	0.00	[3.7]	No	No	See Table 6-74
Barium	6	1.00	4.9	No	6	1.00	10.2	No	6	1.00	3.9	No	Yes	See Table 6-74
Beryllium	6	0.00	[0.05]	No	6	0.00	[1.7]	No	6	0.00	[0.19]	No	No	See Table 6-74
Bismuth	6	0.00	[0.56]	No	6	0.00	[20]	No	6	0.00	[4.7]	No	No	See Table 6-74
Boron	6	0.00	[0.46]	No	6	0.00	[16.7]	No	6	0.00	[3.5]	No	No	See Table 6-74
Cadmium	6	0.17	0.05	No	6	0.83	[1.7]	No	6	0.50	0.36	No	Yes	See Table 6-74
Calcium	6	1.00	10,600	No	6	1.00	1170	No	6	1.00	3,570	No	No	--
Calculated total uranium	6	0.00	[0.185]	No	--	--	--	--	--	--	--	--	Yes	See Table 6-74
Chromium	6	1.00	0.47	No	6	0.83	[6.7]	No	6	0.83	1.6	No	Yes	See Table 6-74
Cobalt	6	0.17	0.19	No	6	0.00	[6.7]	No	6	0.00	[0.82]	No	No	See Table 6-74
Copper	6	1.00	2.8	No	6	0.83	[6.7]	No	6	0.83	8.4	No	Yes	See Table 6-74
Iron	6	1.00	62.9	No	6	1.00	165	No	6	0.83	271	No	No	See Table 6-74
Lead	6	0.17	0.28	No	6	0.00	[10]	No	6	0.00	[2.5]	No	Yes	See Table 6-74
Lithium	6	0.17	[0.11]	No	6	0.17	[1.3]	No	6	0.17	0.39	No	No	See Table 6-74
Magnesium	6	1.00	464	No	6	1.00	346	No	6	1.00	350	No	No	--
Manganese	6	1.00	11.4	No	6	1.00	8	No	6	1.00	12	No	Yes	See Table 6-74
Mercury	6	0.50	[0.02]	No	4	0.00	[0.1]	No	6	0.00	[0.1]	No	Yes	See Table 6-74
Molybdenum	6	0.17	[0.28]	No	6	0.00	[10]	No	6	0.00	[1.2]	No	No	See Table 6-74
Nickel	6	0.17	0.21	No	6	0.00	[6.7]	No	6	0.00	[1.7]	No	Yes	See Table 6-74
Phosphorus	6	1.00	6,860	No	6	1.00	4,420	No	6	1.00	4,250	No	Yes	See Table 6-74
Potassium	6	1.00	2,510	No	6	1.00	4,900	No	6	1.00	3,790	No	No	--
Selenium	6	1.00	0.89	No	6	0.33	[20]	No	6	0.33	3.6	No	Yes	See Table 6-74
Silicon	6	1.00	59.3	No	6	0.83	[133]	No	6	0.83	188	No	No	--
Silver	6	0.00	[0.09]	No	6	0.00	[3.3]	No	6	0.00	[0.82]	No	No	See Table 6-74
Sodium	6	1.00	785	No	6	1.00	1,390	No	6	1.00	1,590	No	No	--
Strontium (elemental)	6	1.00	23.1	No	6	1.00	15.5	No	6	1.00	5.3	No	Yes	See Table 6-74
Thallium	6	0.00	[0.56]	No	6	0.00	[20]	No	6	0.00	[5.2]	No	No	--
Tin	6	0.17	2.1	No	6	1.00	56.8	TBD	6	1.00	7.8	TBD	Yes	See Table 6-74
Total inorganic arsenic	1	0.00	[0.015]	No	--	--	--	--	--	--	--	--	No	--
Uranium (inorganic)	6	0.00	[2.4]	No	6	0.00	[66.7]	No	6	0.00	[22.8]	No	Yes	See Table 6-74
Vanadium	6	0.50	0.16	No	6	0.00	[4.7]	No	6	0.00	[0.91]	No	Yes	See Table 6-74
Zinc	6	1.00	27.4	No	6	1.00	115	No	6	1.00	59.7	No	Yes	See Table 6-74

Table 6-73. Overview of Statistical Comparisons for Sucker Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Sucker Study Sites				Sucker Kidney Study Sites				Sucker Liver Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Sucker COPC Status	Count	Detect Frequency	Maximum Value	Sucker Kidney COPC Status	Count	Detect Frequency	Maximum Value	Sucker Liver COPC Status		
Polycyclic Aromatic Hydrocarbons (mg/kg-fw)														
2-Methylnaphthalene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
Acenaphthene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
Acenaphthylene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
Anthracene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Benzo[a]anthracene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Benzo[a]pyrene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Benzo[b]fluoranthene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Benzo[ghi]perylene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Benzo[k]fluoranthene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Chrysene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Dibenz[a,h]anthracene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Fluoranthene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Fluorene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
Indeno[1,2,3-cd]pyrene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Naphthalene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
Phenanthrene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Pyrene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Polychlorinated Biphenyls (mg/kg-fw)														
Aroclor-1016	6	0.00	[0.19]	No	--	--	--	--	--	--	--	--	No	--
Aroclor-1221	6	0.00	[0.19]	No	--	--	--	--	--	--	--	--	No	--
Aroclor-1232	6	0.00	[0.19]	No	--	--	--	--	--	--	--	--	No	--
Aroclor-1242	6	0.00	[0.19]	No	--	--	--	--	--	--	--	--	No	--
Aroclor-1248	6	0.00	[0.19]	No	--	--	--	--	--	--	--	--	No	--
Aroclor-1254	6	0.17	[0.19]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Aroclor-1260	6	0.00	[0.19]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Total PCB	1	1.00	0.0332	TBD	--	--	--	--	--	--	--	--	No	See Table 6-74
Pesticides (mg/kg-fw)														
Aldrin	6	0.17	[0.023]	No	--	--	--	--	--	--	--	--	No	--
Dieldrin	6	0.17	[0.023]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Methoxychlor	6	0.33	[0.023]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Pesticides - Benzene Hexachloride (mg/kg-fw)														
Alpha-BHC	6	0.00	[0.023]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
beta-1,2,3,4,5,6-Hexachlorocyclohexane	6	0.33	[0.023]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Delta-BHC	6	0.17	[0.023]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Gamma-BHC (lindane)	6	0.00	[0.023]	No	--	--	--	--	--	--	--	--	No	See Table 6-74

Table 6-73. Overview of Statistical Comparisons for Sucker Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Sucker Study Sites				Sucker Kidney Study Sites				Sucker Liver Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Sucker COPC Status	Count	Detect Frequency	Maximum Value	Sucker Kidney COPC Status	Count	Detect Frequency	Maximum Value	Sucker Liver COPC Status		
Pesticides - Chlordane (mg/kg-fw)														
alpha-Chlordane	6	0.00	[0.023]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
gamma-Chlordane	6	0.50	[0.023]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Pesticides - DDT (mg/kg-fw)														
Dichlorodiphenyldichloroethane	6	1.00	0.032	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Dichlorodiphenyldichloroethylene	6	1.00	0.071	No	--	--	--	--	--	--	--	--	No	--
Dichlorodiphenyltrichloroethane	6	0.33	[0.023]	No	--	--	--	--	--	--	--	--	No	--
Pesticides - Endosulfan (mg/kg-fw)														
Endosulfan I	6	0.17	[0.023]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Endosulfan II	6	0.00	[0.023]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Endosulfan sulfate	6	0.00	[0.023]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Pesticides - Endrin (mg/kg-fw)														
Endrin	6	0.17	[0.023]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Endrin aldehyde	6	0.00	[0.023]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Endrin ketone	6	0.50	[0.023]	No	--	--	--	--	--	--	--	--	No	--
Pesticides - Heptachlor (mg/kg-fw)														
Heptachlor	6	0.00	[0.023]	No	--	--	--	--	--	--	--	--	No	--
Heptachlor epoxide	6	0.00	[0.023]	No	--	--	--	--	--	--	--	--	No	--
Phthalates (mg/kg-fw)														
Bis[2-ethylhexyl] phthalate	5	1.00	1.4	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Butylbenzylphthalate	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
Di-n-butylphthalate	5	0.40	[4.8]	No	--	--	--	--	--	--	--	--	No	--
Di-n-octylphthalate	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
Diethylphthalate	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Dimethyl phthalate	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Semivolatile Organic Compounds (mg/kg-fw)														
1,2-Dichlorobenzene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
1,2,4-Trichlorobenzene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
1,3-Dichlorobenzene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
1,4-Dichlorobenzene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
2-Chloronaphthalene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
2-Chlorophenol	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
2-Methylphenol [cresol, o-]	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
2-Nitroaniline	5	0.00	[12]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
2-Nitrophenol	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
2,4-Dichlorophenol	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
2,4-Dimethylphenol	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--

Table 6-73. Overview of Statistical Comparisons for Sucker Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Sucker Study Sites				Sucker Kidney Study Sites				Sucker Liver Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Sucker COPC Status	Count	Detect Frequency	Maximum Value	Sucker Kidney COPC Status	Count	Detect Frequency	Maximum Value	Sucker Liver COPC Status		
2,4-Dinitrophenol	5	0.00	[12]	No	--	--	--	--	--	--	--	--	No	--
2,4-Dinitrotoluene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
2,4,5-Trichlorophenol	5	0.00	[12]	No	--	--	--	--	--	--	--	--	No	--
2,4,6-Trichlorophenol	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
2,6-Dinitrotoluene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
3-Nitroaniline	5	0.00	[12]	No	--	--	--	--	--	--	--	--	No	--
3,3'-Dichlorobenzidine	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
3+4 Methylphenol [cresol, m+p]	5	0.40	[4.8]	No	--	--	--	--	--	--	--	--	No	--
4-Bromophenylphenyl ether	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
4-Chloro-3-methylphenol	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
4-Chloroaniline	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
4-Chlorophenylphenyl ether	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
4-Nitroaniline	5	0.00	[12]	No	--	--	--	--	--	--	--	--	No	--
4-Nitrophenol	5	0.00	[12]	No	--	--	--	--	--	--	--	--	No	--
4,6-Dinitro-2-methylphenol	5	0.00	[12]	No	--	--	--	--	--	--	--	--	No	--
Bis[2-chloro-1-methylethyl]ether	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
Bis[2-Chloroethoxy]methane	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
Bis[2-chloroethyl] ether	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
Carbazole	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
Dibenzofuran	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
Hexachlorobenzene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
Hexachlorobutadiene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
Hexachlorocyclopentadiene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
Hexachloroethane	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
Isophorone	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
N-Nitroso-di-n-dipropylamine	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
N-Nitrosodiphenylamine	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
Nitrobenzene	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	--
Pentachlorophenol	5	0.00	[12]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Phenol	5	0.00	[4.8]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Toxaphene	6	0.00	[0.23]	No	--	--	--	--	--	--	--	--	No	--
Radionuclides (pCi/g-fw)														
Americium-241	5	0.00	[0.31]	No	--	--	--	--	--	--	--	--	No	--
Antimony-125	5	0.00	[0.22]	No	--	--	--	--	--	--	--	--	No	--
Beryllium-7	5	0.20	3.52	No	--	--	--	--	--	--	--	--	No	--
Carbon-14	2	0.00	[3.52]	No	--	--	--	--	--	--	--	--	Yes	See Table 6-74
Cesium-134	5	0.00	[0.14]	No	--	--	--	--	--	--	--	--	No	--

Table 6-73. Overview of Statistical Comparisons for Sucker Tissue Data Collected for the RCBRA Project. (5 Pages)

Analyte	Sucker Study Sites				Sucker Kidney Study Sites				Sucker Liver Study Sites				Near-Shore COPC?	Notes
	Count	Detect Frequency	Maximum Value	Sucker COPC Status	Count	Detect Frequency	Maximum Value	Sucker Kidney COPC Status	Count	Detect Frequency	Maximum Value	Sucker Liver COPC Status		
Cesium-137	5	0.00	[0.11]	No	--	--	--	--	--	--	--	--	Yes	See Table 6-74
Cobalt-60	5	0.00	[0.12]	No	--	--	--	--	--	--	--	--	No	--
Europium-152	5	0.00	[0.27]	No	--	--	--	--	--	--	--	--	No	--
Europium-154	5	0.00	[0.38]	No	--	--	--	--	--	--	--	--	No	See Table 6-74
Europium-155	5	0.00	[0.24]	No	--	--	--	--	--	--	--	--	No	--
Potassium-40	5	0.20	2.9	No	--	--	--	--	--	--	--	--	No	--
Radium-226	5	0.00	[0.22]	No	--	--	--	--	--	--	--	--	No	--
Radium-228	5	0.00	[0.51]	No	--	--	--	--	--	--	--	--	No	--
Ruthenium-106	5	0.00	[0.93]	No	--	--	--	--	--	--	--	--	No	--
Strontium-90	6	0.00	[0.086]	No	--	--	--	--	--	--	--	--	Yes	See Table 6-74
Technetium-99	2	0.00	[0.136]	No	--	--	--	--	--	--	--	--	Yes	See Table 6-74
Thorium-228	6	0.00	[0.254]	No	--	--	--	--	--	--	--	--	No	--
Thorium-230	6	0.17	0.324	No	--	--	--	--	--	--	--	--	No	--
Thorium-232	6	0.00	[0]	No	--	--	--	--	--	--	--	--	No	--
Uranium-233/234	6	0.00	[0.0761]	No	--	--	--	--	--	--	--	--	Yes	See Table 6-74
Uranium-235	6	0.00	[0.0461]	No	--	--	--	--	--	--	--	--	Yes	See Table 6-74
Uranium-238	6	0.00	[0.062]	No	--	--	--	--	--	--	--	--	Yes	See Table 6-74

[value] = nondetect
-- = not applicable
BHC = benzene hexachloride
COPC = contaminant of potential concern
DDT = dichlorodiphenyltrichloroethane
fw = fresh weight
RCBRA = River Corridor Baseline Risk Assessment
TBD = to be determined

Table 6-74. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status. (7 Pages)

Analyte Name	COPC?	Explanation
Inorganics		
Aluminum	Yes	Not different from reference for sediment, pore water, or surface water. Surface water concentration range similar to pore water. Invertebrate maximum not different from reference (slippage test). Mussel and fish are not different from reference. Retained as a COPC because 100-B/C Pilot clam tissue are greater than RCBRA reference and outside the range of reference concentrations for the 100-B/C Pilot project (see plots in Appendix F-3).
Antimony	Yes	Sediment, pore water, and surface water are not different from reference. Surface water concentration range similar to pore water. Clam, mussel, sculpin sucker-liver concentrations maxima are similar to reference. One outlier in RCBRA sculpin kidney that is much greater than the typical detection limits for samples collected for the 100-B/C Pilot and 100-NR-2 projects (see plots in Appendix F-3), thus retained as COPC.
Arsenic	No	Not a COPC in any RCBRA primary media or tissues. Outlier in reference pore water (Beverly Reference 2) based on strong groundwater signature. 100-B/C Pilot clams concentrations are greater than RCBRA reference, but are within the range of reference samples collected for the 100-B/C Pilot project so not identified as a COPC (see plots in Appendix F-3).
Barium	Yes	RCBRA sediment, pore water, and surface water are not different from reference. Surface water concentration range less than pore water. 100-B/C Pilot sediment are greater than RCBRA reference (slippage test) and are similar to 100-B/C Pilot reference (see Appendix F-2). Maximum RCBRA clam concentrations significantly greater than reference (slippage test). Fish and mussel are not different from reference.
Beryllium	No	Sediment, pore water, and surface water are not different from reference. Surface water concentration range similar to pore water. Invertebrate not different from reference. 100-B/C Pilot sediment concentrations are greater than RCBRA reference (slippage test), but are consistent with the range of reference concentrations for the 100-B/C Pilot project (see plots in Appendix F-2).
Bismuth	No	Low detection frequency (<10%) in sediment, pore water, surface water, and tissue. Detects within range of nondetects. Not different from reference.
Boron	No	Not different from reference for sediment, pore water, or surface water. Surface water concentration range similar to pore water. Sculpin-kidney not different from reference. Other tissues are not different from reference.
Cadmium	Yes	Not statistically different from reference for sediment or pore water. There is an outlier in reference sediment outlier from 300 REF-1 (see plots in Appendix F-2). The next highest sediment reference concentration is 1 mg/kg. There are 13 concentrations in sediment greater than 1 mg/kg in operational areas and thus retained as COPC. Surface water concentration range similar to pore water. Tissue not different from reference.
Calculated total uranium	Yes	No statistical differences from reference, but reviewed as a COPC based on being on the inclusion list. Sediment, pore water, and surface water concentrations are greater in the 300 Area than other ROD decision areas and thus retained as a COPC.
Chromium	Yes	On the inclusion list, sediment concentrations are greater than reference in the 100 Area. Pore-water concentrations are also greater than reference in the 100 Area and the surface water concentrations are much lower with the exception of one surface water sample in 100-F/100-IU-2/100-IU-6. RCBRA sculpin is greater than reference (slippage test) but other RCBRA tissues are not statistically different from reference. 100-B/C Pilot clam are greater than RCBRA reference (slippage test) and are greater than reference concentrations for the 100-B/C Pilot project (see plots in Appendix F-3).
Cobalt	No	Not different from reference for sediment, pore water, or surface water. Surface water concentration range similar to pore water. Tissue not different from reference.

Table 6-74. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status. (7 Pages)

Analyte Name	COPC?	Explanation
Copper	Yes	Not different from reference for sediment, pore water, or surface water. Surface water concentration range similar to pore water. Maximum clam concentrations significantly greater than reference (slippage test), thus retained as COPC. Sculpin detection rate greater but concentrations not different from reference. Other tissues are not different from reference.
Hexavalent chromium	Yes	On the inclusion list, there were no detections in reference sites so slippage test was not run. The maximum sediment concentration is 16 times greater than the maximum reference detection limit (sample collected in the 100 Area). Pore-water concentrations are also greater than reference in the 100 Area. Surface water concentrations are much lower than pore water but still greater than reference. Not measured in tissues.
Iron	No	Not a COPC in any RCBRA primary media or tissues. Outlier in reference pore water (Beverly Reference 2) based on strong groundwater signature. 100-NR-2 surface water concentrations are greater than RCBRA reference, but with a minimal shift and not different from reference concentrations for other water media. Invertebrate concentration range not different from reference (slippage test). Other tissues are not different from reference.
Lead	Yes	Four outliers in study site sediments and retained due to magnitude of 100-F/100-IU-2/100-IU-6 outlier. No statistical difference in pore water or surface water and no difference between surface and pore water. Clam and mussel are not different from reference. Invertebrates are not different from reference. Fish tissues are not different from reference.
Lithium	No	Not different from reference for sediment, pore water, or surface water. Surface water concentration range similar to pore water. Maximum sculpin concentrations not different from reference (slippage test). Other tissues are not different from reference.
Manganese	Yes	Sediment has outlier in 100-N Area but sediment, pore water, and surface water are not statistically different from reference. Outlier in reference pore water (Beverly Reference 2) based on strong groundwater signature. Clam concentrations greater than reference (slippage test) and thus identified as COPC. Other RCBRA tissues are not different from reference.
Mercury	Yes	Four outliers in sediment (100-K, 300 Area, reference [300 REF-1, reference 13]) and retained due to magnitude of 100-K outlier (4 times the second largest mercury reference concentration). Sediment, pore water, and surface water are not different from reference. Surface water concentration range similar to pore water. Outlier in RCBRA clam (20 times the reference detection limits), but other tissues are not different from reference.
Molybdenum	No	Not different from reference for sediment, pore water, or surface water. Surface water concentration range similar to pore water. Tissue not different from reference.
Nickel	Yes	Not different from reference for sediment, pore water, or surface water. Surface water concentration range similar to pore water. Sculpin concentrations greater than reference (slippage test) and identified as COPC. Other tissues are not different from reference.
Phosphorus	Yes	Pore water has extreme outlier in 100-N Area but sediment, pore water, and surface water are not statistically different from reference. Because clam concentrations are greater than reference (slippage test) and pore water has an extreme outlier identified as COPC. Other tissues are not different from reference.
Selenium	Yes	Not different from reference for sediment, pore water, or surface water. Surface water concentration range similar to pore water. Invertebrate and clam maxima not different from reference (slippage test). Sculpin concentrations greater than reference (slippage test) and identified as COPC. Other fish tissues are not different from reference.

Table 6-74. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status. (7 Pages)

Analyte Name	COPC?	Explanation
Silver	No	Sediment has outlier in 100-F/100-IU-2/100-IU-6 at less than 1 mg/kg compared to detection limits in other samples of up to 0.3 mg/kg. However, sediment is not different from reference based on statistical tests. Detection frequency in sediment and other media is low. Pore water and surface water is not different from reference and surface water concentration range similar to pore water. Tissue concentrations not different from reference.
Strontium (elemental)	Yes	Sediment has outlier in 100-N Area but sediment and water are not statistically different from reference. Pore-water concentrations are greater than surface water. Clam and sculpin concentrations greater than reference (slippage test) and thus identified as COPC. Other tissues are not different from reference.
Thallium	No	100-B/C Pilot sediment concentrations are greater than RCBRA reference, but are consistent with the range of reference concentrations for the 100-B/C Pilot project (see plots in Appendix F-2). No statistical from reference for RCBRA media (sediment, water, tissues).
Tin	Yes	Outlier in reference sediment data, but the study site concentrations greatly overlap with the rest of the reference site data (see plots in Appendix F-2). Pore water and surface water is not different from reference and surface water concentration range similar to pore water except for one pore-water sample in the 100-N Area. Sucker-kidney concentrations greater than reference (slippage test) and thus identified as COPC. Other tissues are not different from reference.
Titanium	Yes	Sediment 300 Area are greater than reference based on limited operational area and reference area data. No water data. Tissues not different from reference.
Uranium (inorganic)	Yes	On inclusion list. Uranium (based on calculated total uranium) is greater than reference in the 300 Area so uranium (inorganic) is retained as a COPC. Uranium (inorganic) not detected frequently in any media
Vanadium	Yes	Sediment, pore water, and surface water are not different from reference. Surface water concentration range similar to pore water. Clam concentrations greater than reference (slippage test), thus retained as COPC. Other tissues are not different from reference.
Zinc	Yes	Sediment has outlier in 100-IU-2/100-IU-6 that is roughly two times higher than reference maximum. However, sediments are not statistically different from reference. Water is not different from reference and surface water concentration range similar to pore water except for one pore-water sample in 100-F/100-IU-2/100-IU-6. Invertebrate concentrations greater than reference (slippage test), thus retained as COPC. Other tissues are not different from reference.
Other		
Chloride	No	Only measured in water and concentrations in pore water are greater than surface water. No statistical difference from reference for pore water. The slippage test in surface water is marginally significant. The surface water maximum at study sites is only marginally greater than the reference sites. 100-B/C Pilot seep water concentration range was not greater than RCBRA reference (slippage test). Thus, not retained as COPC.
Chlorine	No	Chlorine gas is not likely measured in water. This analyte name is more likely measuring chloride in solution. There is an extreme outlier in pore water that is not consistent with typical value for this water quality type analyte. Not retained as a COPC.
Fluoride	Yes	Sediment range is greater than reference (slippage test). Pore water and surface water not different from reference. Not measured in tissues.

Table 6-74. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status. (7 Pages)

Analyte Name	COPC?	Explanation
Nitrogen in nitrate	Yes	Although this analyte was not identified by any statistical tests, a related compound, nitrite, was identified, and nitrate is on the inclusion list and is also retained as a COPC based on five outliers in sediment (100-K, 100-D/100-H, 300 Area, reference [300 REF-1]). Pore water and surface water are not statistically different from reference. Not measured in tissues.
Nitrogen in nitrite	Yes	Sediment range is greater than reference (slippage test). Pore water and surface water are not statistically different from reference. Not measured in tissues.
Total petroleum hydrocarbons	No	TPH diesel range is on the inclusion list for 100-N Area. This TPH fraction was not frequently detected in either sediment or water.
Total petroleum hydrocarbons - diesel range	No	TPH diesel range is on the inclusion list for 100-N Area. Sediment concentrations are not different from reference (slippage test). This TPH fraction was not consistently detected in either sediment or water and there was no apparent trend from 100-N Area and thus not retained as a COPC.
Total petroleum hydrocarbons - gasoline range	No	TPH diesel range is on the inclusion list for 100-N Area. This TPH fraction was not frequently detected in either sediment or water and there was no apparent trend from 100-N Area and thus not retained as a COPC.
Total petroleum hydrocarbons - motor oil (high boiling)	No	TPH diesel range is on the inclusion list for 100-N Area. There was only a single sample result for this TPH fraction in sediment from IU2/IU6. The reported concentration for this single sample results was less than 10 mg/kg or a small fraction of the diesel range results.
Polycyclic Aromatic Hydrocarbons		
Anthracene	No	TPH is on the inclusion list in the 100-N Area and PAHs are inclusion list analytes because they are TPH constituents. PAHs were infrequently detected in sediment and the detected values are less than the nondetect values for other samples. This PAH was not detected in tissues.
Benzo[a]anthracene	No	TPH is on the inclusion list in the 100-N Area and PAHs are inclusion list analytes because they are TPH constituents. PAHs were infrequently detected in sediment and the detected values are less than the nondetect values for other samples. This PAH was detected at a concentration of 0.079 mg/kg in clams but not other tissues. There are insufficient clam samples to evaluate exposures to clams or their predators. The detected value in clam is within the range of nondetect sample results for other PAHs. In addition, no PAHs were detected in the eight whole-body sculpin samples collected at 100-D/100-H.
Benzo[a]pyrene	No	TPH is on the inclusion list in the 100-N Area and PAHs are inclusion list analytes because they are TPH constituents. PAHs were infrequently detected in sediment and the detected values are less than the nondetect values for other samples. This PAH was detected at a concentration of 0.075 mg/kg in clams but not other tissues. There are insufficient clam samples to evaluate exposures to clams or their predators. The detected value in clam is within the range of nondetect sample results for other PAHs. In addition, no PAHs were detected in the eight whole-body sculpin samples collected at 100-D/100-H.
Benzo[b]fluoranthene	No	TPH is on the inclusion list in the 100-N Area and PAHs are inclusion list analytes because they are TPH constituents. PAHs were infrequently detected in sediment and the detected values are less than the nondetect values for other samples. This PAH was detected at a concentration of 0.061 mg/kg in clams but not other tissues. There are insufficient clam samples to evaluate exposures to clams or their predators. The detected value in clam is within the range of nondetect sample results for other PAHs. In addition, no PAHs were detected in the eight whole-body sculpin samples collected at 100-D/100-H.
Benzo[ghi]perylene	No	TPH is on the inclusion list in the 100-N Area and PAHs are inclusion list analytes because they are TPH constituents. PAHs were infrequently detected in sediment and the detected values are less than the nondetect values for other samples. This PAH was not detected in tissues.

Table 6-74. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status. (7 Pages)

Analyte Name	COPC?	Explanation
Benzo[k]fluoranthene	No	TPH is on the inclusion list in the 100-N Area and PAHs are inclusion list analytes because they are TPH constituents. PAHs were infrequently detected in sediment and the detected values are less than the nondetect values for other samples. This PAH was detected at a concentration of 0.033 mg/kg in clams but not other tissues. There are insufficient clam samples to evaluate exposures to clams or their predators. The detected value in clam is within the range of nondetect sample results for other PAHs. In addition, no PAHs were detected in the eight whole-body sculpin samples collected at 100-D/100-H.
Chrysene	No	TPH is on the inclusion list in the 100-N Area and PAHs are inclusion list analytes because they are TPH constituents. PAHs were infrequently detected in sediment and the detected values are less than the nondetect values for other samples. This PAH was detected at a concentration of 0.086 mg/kg in clams but not other tissues. There are insufficient clam samples to evaluate exposures to clams or their predators. The detected value in clam is within the range of nondetect sample results for other PAHs. In addition, no PAHs were detected in the eight whole-body sculpin samples collected at 100-D/100-H.
Dibenz[a,h]anthracene	No	TPH is on the inclusion list in the 100-N Area and PAHs are inclusion list analytes because they are TPH constituents. PAHs were infrequently detected in sediment and the detected values are less than the nondetect values for other samples. This PAH was not detected in tissues.
Fluoranthene	No	TPH is on the inclusion list in the 100-N Area and PAHs are inclusion list analytes because they are TPH constituents. PAHs were infrequently detected in sediment and the detected values are less than the nondetect values for other samples. This PAH was detected at a concentration of 0.093 mg/kg in clams but not other tissues. There are insufficient clam samples to evaluate exposures to clams or their predators. The detected value in clam is within the range of nondetect sample results for other PAHs. In addition, no PAHs were detected in the eight whole-body sculpin samples collected at 100-D/100-H.
Indeno[1,2,3-cd]-pyrene	No	TPH is on the inclusion list in the 100-N Area and PAHs are inclusion list analytes because they are TPH constituents. PAHs were infrequently detected in sediment and the detected values are less than the nondetect values for other samples. This PAH was not detected in tissues.
Phenanthrene	No	TPH is on the inclusion list in the 100-N Area and PAHs are inclusion list analytes because they are TPH constituents. PAHs were infrequently detected in sediment and the detected values are less than the nondetect values for other samples. This PAH was detected at a concentration of 0.077 mg/kg in clams but not other tissues. There are insufficient clam samples to evaluate exposures to clams or their predators. The detected value in clam is within the range of nondetect sample results for other PAHs. In addition, no PAHs were detected in the eight whole-body sculpin samples collected at 100-D/100-H.
Pyrene	No	TPH is on the inclusion list in the 100-N Area and PAHs are inclusion list analytes because they are TPH constituents. PAHs were infrequently detected in sediment and the detected values are less than the nondetect values for other samples. This PAH was detected at a concentration of 0.066 mg/kg in clams but not other tissues. There are insufficient clam samples to evaluate exposures to clams or their predators. The detected value in clam is within the range of nondetect sample results for other PAHs. In addition, no PAHs were detected in the eight whole-body sculpin samples collected at 100-D/100-H.
Polychlorinated Biphenyls		
Aroclor-1254	No	Detected in sediment and fish, detected values are within the range of detection limits in other samples. 100-B/C Pilot detected Aroclor-1254 in both reference and operational area fish.
Aroclor-1260	No	Detected in sediment and fish, detected values are within the range of detection limits in other samples.

Table 6-74. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status. (7 Pages)

Analyte Name	COPC?	Explanation
Total PCB	No	Total PCBs reflect the detected PCB congener. PCB congeners were measured in fish tissue and no reference sucker were analyzed for PCB congeners. However, the total PCBs in sucker were consistent with other study site fish (sculpin) and were less than measured in the sculpin reference fish. Thus, PCBs were not retained as COPCs based on this information.
Pesticides		
Dieldrin	No	Detected in fish, detected values are within the range of detection limits in other samples.
Methoxychlor	No	Detected in one pore-water sample and infrequently in tissue, detected values in tissue are within the range of detection limits in other samples. Also detected in 100-B/C seep water.
Pesticides - Benzene Hexachloride		
Alpha-BHC	No	Detected in sediment, detected values are within the range of detection limits in other samples.
beta-1,2,3,4,5,6-Hexa-chlorocyclohexane	No	Detected in sediment and tissue, detected values are within the range of detection limits in other samples with the exception of a single sediment sample which is somewhat larger.
Delta-BHC	No	Detected in sediment and tissue, detected values are within the range of detection limits in other samples.
Gamma-BHC (lindane)	No	Detected in sediment and tissue, detected values are within the range of detection limits in other samples with the exception of a single sediment sample which is somewhat larger.
Pesticides – Chlordane		
alpha-Chlordane	No	Detected in sediment, detected values are within the range of detection limits in other samples.
gamma-Chlordane	No	Detected in sediment and tissue, detected values are within the range of detection limits in other samples.
Pesticides – Dichlorodiphenyltrichloroethane		
Dichlorodiphenyldi-chloroethane	No	Detected in sediment and tissue, detected values are within the range of detection limits in other samples.
Pesticides – Endosulfan		
Endosulfan I	No	Detected in sediment and tissue, detected values are within the range of detection limits in other samples.
Endosulfan II	No	Detected in tissue, detected values are within the range of detection limits in other samples.
Endosulfan sulfate	No	Detected in one tissue sample, detected value is within the range of detection limits in other samples.
Pesticide – Endrin		
Endrin	No	Detected in sediment, detected values are within the range of detection limits in other samples.
Endrin aldehyde	No	Detected in sediment and water, detected values are within the range of detection limits in other samples.
Phthalates		
Bis[2-ethylhexyl] phthalate	No	Detected in sediment, water and tissue, no statistical difference in concentrations from reference based on the slippage test.
Diethylphthalate	No	Detected in tissue, detected values are within the range of detection limits in other samples.
Dimethyl phthalate	No	Detected in water, detected values are less than the range of detection limits in other samples.

Table 6-74. Analyte-Specific Evaluation to Determine Contaminant of Potential Concern Status. (7 Pages)

Analyte Name	COPC?	Explanation
Radionuclides		
Carbon-14	Yes	Detected in sediment in 100-K and 100-N; also detected in sculpin. Not detected in reference data.
Cesium-137	Yes	Sediment concentration range is not different from reference (slippage test) but there is an outlier in reference data (300 REF-1) and without this outlier, there is a larger difference of ROD areas from reference and this COPC is retained on this basis. Not detected in water or tissue.
Europium-154	No	Not different from reference for sediment or water. Surface water concentration range similar to pore water. Tissues not different from reference..
Plutonium-238	Yes	Limited data set for sediment and water. Not measured in tissue. Retained due to three detections in the 100-N Area seep (evaluated as pore water).
Plutonium-239/240	Yes	Limited data set for sediment and water. Not measured in tissue. Retained due to one significant detect in the 100-B/C Area sediment.
Strontium-90	Yes	On inclusion list. Sediment greater than reference especially based on 100-NR-2 data but with notable upstream reference sediment outlier. 100-NR-2 clam shell is greater than reference.
Technetium-99	Yes	Detected in sediment based on 100-B/C Pilot. Also detected in 100-K Area pore water and 100-B/C Pilot spring/seep data. No reference data. Therefore, retained as COPC.
Tritium	Yes	Only measured in water. RCBRA data are not statistically different from reference. 100-B/C and 100-NR-2 seep or spring data are different from reference (slippage test).
Uranium-233/234	Yes	On inclusion list. No statistically significant differences from reference. Uranium as a metal has been retained as a COPC based on sediment, pore water, and surface water sample results from the 300 Area. Therefore, isotopic uranium is retained as a COPC.
Uranium-235	Yes	On inclusion list. No statistically significant differences from reference. Uranium as a metal has been retained as a COPC based on sediment, pore water, and surface water sample results from the 300 Area. Therefore, isotopic uranium is retained as a COPC.
Uranium-238	Yes	On inclusion list. No statistically significant differences from reference. Uranium as a metal has been retained as a COPC based on sediment, pore water, and surface water sample results from the 300 Area. Therefore, isotopic uranium is retained as a COPC.
Semivolatile Organic Compounds		
2-Nitroaniline	No	Detected in tissue, detected values are less than the range of detection limits in other samples.
2-Nitrophenol	No	Detected in water, detected values are less than the range of detection limits in other samples.
3,3'-Dichlorobenzidine	No	Detected in tissue, detected values are less than the range of detection limits in other samples.
Pentachlorophenol	No	Detected in tissue, detected values are less than the range of detection limits in other samples.
Phenol	No	Detected in water and tissue, detected values are less than the range of detection limits in other samples.

BHC = benzene hexachloride
COPC = contaminant of potential concern
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
RCBRA = River Corridor Baseline Risk Assessment
ROD = record of decision
TPH = total petroleum hydrocarbons

Table 6-75. Summary of Representative Concentration Types for Near-Shore Contaminants of Potential Concern in Sampled Media and Data Sources.

Data Source	Total Number of Measurements	Number of Nondetect Measurements; No CTE or RME	Representative Concentration Calculation Based on Number of Detects (n)		
			n = 1 or 2; Maximum = CTE CTE = RME	n = 3 or 4; Mean [a] = CTE Maximum = RME	n = 5 or More; Mean [b] = CTE UCL [b] = RME
Sediment					
100-B/C Pilot	17	3	14	0	0
100-NR-2 Operable Unit	14	1	1	12	0
RCBRA	1,480	362	1,094	24	0
Seep, Shallow Aquifer Tube, Pore Water					
100-B/C Pilot	25	5	1	1	18
100-NR-2 Operable Unit	20	2	1	5	12
RCBRA	698	414	282	2	0
Surface Water					
100-B/C Pilot	19	0	2	0	17
100-NR-2 Operable Unit	14	1	1	12	0
RCBRA	1,434	858	576	0	0
Aquatic Macroinvertebrate					
100-B/C Pilot	16	3	0	0	13
RCBRA	532	205	327	0	0
Clam					
100-B/C Pilot	18	2	0	1	15
100-NR-2 Operable Unit	16	1	0	0	15
RCBRA	830	275	555	0	0
Mussel					
RCBRA	217	103	114	0	0
Amphibian					
RCBRA	64	22	42	0	0
Fish					
100-B/C Pilot	46	6	7	2	31
100-NR-2 Operable Unit	14	1	1	12	0
RCBRA	1,507	595	742	110	60

[a] Using student's t statistics.
[b] Using three different methods.

CTE = central tendency exposure
n = number of detects
RCBRA = River Corridor Baseline Risk Assessment
RME = reasonable maximum exposure
UCL = upper confidence limit

Table 6-76. Comparison of Maximum Detected Sample Result to the Reasonable Maximum Exposure.

Media	Number Where the Ratio of Maximum Divided by RME is Less than 0.5	Number Where the Ratio of Maximum Divided by RME is Between 0.5 and 0.8	Number Where the Ratio of Maximum Divided by RME is Between 0.8 and 1.2	Number Where the Ratio of Maximum Divided by RME is Between 1.2 and 1.5	Number Where the Ratio of Maximum Divided by RME is Between 1.5 and 2	Number Where the Ratio of Maximum Divided by RME is Greater than 2
Amphibian	0	0	42	0	0	0
Aquatic Macroinvertebrate (not including bivalve)	0	0	336	3	1	0
Clam	0	0	561	8	9	8
Mussel	0	0	114	0	0	0
Fish	0	9	935	13	7	1
Sediment	0	0	1,145	0	0	0
Pore water, seep, shallow aquifer tube	1	4	303	4	6	4
Surface water	0	0	595	9	3	1

RME = reasonable maximum exposure

Table 6-77. Cases Where the Maximum is Very Different from the Reasonable Maximum Exposure. (2 Pages)

Site Name	COPC	Number of Sample Results	Number of Detects	RME	Maximum Detect	Maximum Divided by RME
Clam						
100-NR-2	Antimony mg/kg	27	25	0.00319	0.00680	2.13
	Uranium (inorganic) mg/kg	27	27	0.0244	0.0538	2.20
100-B/C Pilot	Lead mg/kg	25	25	0.294	0.690	2.35
100-NR-2	Chromium mg/kg	27	27	1.08	2.72	2.51
100-B/C Pilot	Mercury mg/kg	25	23	0.0147	0.0407	2.78
100-NR-2	Nickel mg/kg	27	27	0.220	0.702	3.20
100-B/C Pilot	Chromium mg/kg	25	25	3.89	12.9	3.31
Clam-Shell						
100-NR-2	Strontium-90 pCi/g	30	30	44.8	216	4.82

Table 6-77. Cases Where the Maximum is Very Different from the Reasonable Maximum Exposure. (2 Pages)

Site Name	COPC	Number of Sample Results	Number of Detects	RME	Maximum Detect	Maximum Divided by RME
Sculpin-Liver						
100-B/C Pilot	Chromium mg/kg	12	12	0.380	0.970	2.56
Seep						
100-B/C Pilot	Cadmium µg/L	19	11	0.272	0.0329	0.121
	Strontium-90 pCi/L	17	17	2.26	4.53	2.01
	Nickel µg/L	19	15	1.75	3.9	2.23
	Zinc µg/L	19	16	11.5	25.6	2.23
	Copper µg/L	19	15	3.62	14.2	3.92
Surface Water						
100-B/C Pilot	Chromium µg/L	16	16	0.457	1.23	2.69

= Higher value between RME and maximum detect.

COPC = contaminant of potential concern
RME = reasonable maximum exposure

Table 6-78. Sediment Ecological Risk Screening Values for Contaminants of Potential Concern. (4 Pages)

Analyte Name	Analyte Code	Screening Value	Effect Type	Source	Notes
Sediment Biota (mg/kg), dry weight					
Aluminum	7429-90-5	14,000	ERL	Ingersoll et al. 1996	Concentration below which effects are rarely observed or predicted among sensitive life stages and (or) species of biota.
Antimony	7440-36-0	0.4	SQS	Michelsen 2003	Concentration that will result in no adverse effects, including no acute or chronic adverse effects on biological resources.
Barium	7440-39-3	300	MPC	Crommentuijn 2000	Maximum permissible concentration.
Cadmium	7440439	0.6	SQS	Michelsen 2003	Concentration that will result in no adverse effects.
Calculated total uranium	calc_tot_U	100	PNEC	Sheppard et al. 2005	No effect on benthic population in U-impacted sediments.
Chromium	7440-47-3	26	LEL	Persaud et al. 1993	Level tolerated by majority of benthic organisms. The chemical form of chromium is unspecified.
Chromium (VI)	18540-29-9	NA	--	--	Toxicity information on chromium (VI) in sediments not available.
Copper	7440-50-8	16	LEL	Persaud et al. 1993	Level tolerated by majority of benthic organisms.

Table 6-78. Sediment Ecological Risk Screening Values for Contaminants of Potential Concern. (4 Pages)

Analyte Name	Analyte Code	Screening Value	Effect Type	Source	Notes
Lead	7439-92-1	31	LEL	Persaud et al. 1993	Level tolerated by majority of benthic organisms.
Manganese	7439-96-5	460	LEL	Persaud et al. 1993	Level tolerated by majority of benthic organisms.
Mercury	7439-97-6	0.18	TEC	MacDonald et al. 2000	Concentration below which adverse effects are not expected to occur.
Nickel	7440-02-0	16	LEL	Persaud et al. 1993	Level tolerated by majority of benthic organisms.
Phosphorus	7723-14-0	600	LEL	Persaud et al. 1993	Level tolerated by majority of benthic organisms.
Selenium	7782-49-2	0.95	SQG	MacDonald et al. 1999	Sediment Quality Guideline for Streams in State of Texas.
Strontium (elemental)	7440-24-6	NA	--	--	Toxicity information on strontium in sediments not available.
Tin	7440-31-5	NA	--	--	Toxicity information on tin in sediments not available.
Titanium	7440-32-6	NA	--	--	Toxicity information on titanium in sediments not available.
Uranium (inorganic)	7440-61-1	100	PNEC	Sheppard et al. 2005	No effect on benthic population in U-impacted sediments.
Vanadium	7440-62-2	NA	--	--	Toxicity information on vanadium in sediments not available.
Zinc	7440-66-6	98	TEL	Ingersoll et al. 1996	Concentration of a contaminant below which adverse biological effects are expected to occur rarely.
Fluoride	16984-48-8	175	NOEC	Metcalfe-Smith et al. 2003	No observed effect concentration for growth using *Hyalella azteca.*
Nitrogen in nitrate	NO3-N	NA	--	--	Toxicity information on NO_3-N in sediments not available.
Nitrogen in nitrite	NO2-N	NA	--	--	Toxicity information on NO_2-N in sediments not available.
Wildlife (mg/kg)					
Aluminum	7429-90-5	280	ESL	LA-UR-08-06673, 2008	Occult little brown myotis bat (mammalian aerial insectivore).
Antimony	7440-36-0	0.36	ESL	LA-UR-08-06673, 2008	Occult little brown myotis bat (Mammalian aerial insectivore).
Barium	7440-39-3	3,000	ESL	LA-UR-08-06673, 2008	Violet-green swallow (avian aerial insectivore).
Cadmium	7440439	0.33	ESL	LA-UR-08-06673, 2008	Occult little brown myotis bat (mammalian aerial insectivore).
Calculated total uranium	calc_tot_U	1,100	ESL	LA-UR-08-06673, 2008	Occult little brown myotis bat (mammalian aerial insectivore).

Table 6-78. Sediment Ecological Risk Screening Values for Contaminants of Potential Concern. (4 Pages)

Analyte Name	Analyte Code	Screening Value	Effect Type	Source	Notes
Chromium	7440-47-3	1,500	ESL	LA-UR-08-06673, 2008	Occult little brown myotis bat (mammalian aerial insectivore), this number applies to total chromium in sediment.
Chromium (VI)	18540-29-9	680	ESL	LA-UR-08-06673, 2008	Occult little brown myotis bat (mammalian aerial insectivore).
Copper	7440-50-8	23	ESL	LA-UR-08-06673, 2008	Violet-green swallow (avian aerial insectivore).
Lead	7439-92-1	27	ESL	LA-UR-08-06673, 2008	Violet-green swallow (avian aerial insectivore).
Manganese	7439-96-5	5,300	ESL	LA-UR-08-06673, 2008	Occult little brown myotis bat (mammalian aerial insectivore).
Mercury	7439-97-6	0.018	ESL	LA-UR-08-06673, 2008	Violet-green swallow (avian aerial insectivore).
Nickel	7440-02-0	13	ESL	LA-UR-08-06673, 2008	Occult little brown myotis bat (mammalian aerial insectivore).
Phosphorus	7723-14-0	NA	--	--	Toxicity information on phosphorous in sediments not available for wildlife.
Selenium	7782-49-2	0.9	ESL	LA-UR-08-06673, 2008	Occult little brown myotis bat (mammalian aerial insectivore).
Strontium (elemental)	7440-24-6	1,700	ESL	LA-UR-08-06673, 2008	Occult little brown myotis bat (mammalian aerial insectivore).
Tin	7440-31-5	NA	--	--	Toxicity information on tin in sediments not available for wildlife.
Titanium	7440-32-6	98	ESL	LA-UR-08-06673, 2008	Occult little brown myotis bat (mammalian aerial insectivore).
Uranium (inorganic)	7440-61-1	1,100	ESL	LA-UR-08-06673, 2008	Occult little brown myotis bat (mammalian aerial insectivore).
Vanadium	7440-62-2	30	ESL	LA-UR-08-06673, 2008	Violet-green swallow (avian aerial insectivore).
Zinc	7440-66-6	65	ESL	LA-UR-08-06673, 2008	Violet-green swallow (avian aerial insectivore).
Fluoride	16984-48-8	45	ESL	LA-UR-08-06673, 2008	Violet-green swallow (avian aerial insectivore).
Nitrogen in nitrate	NO3-N	NA	--	--	Toxicity information on NO3-N in sediments not available.
Nitrogen in nitrite	NO2-N	NA	--	--	Toxicity information on NO2-N in sediments not available.
Sediment BCG (mg/kg)					
Carbon-14	14762-75-5	59,000	BCG	RESRAD BIOTA v1.5 (DOE/EH-0676)	Riparian animal.
Cesium-137	10045-97-3	3,120	BCG		Riparian animal.
Plutonium-238	13981-16-3	5,730	BCG		Riparian animal.
Plutonium-239/240	PU-239/240	5,860	BCG		Riparian animal; Pu-239.
Strontium-90	10098-97-2	582	BCG		Riparian animal.
Technetium-99	14133-76-7	42,200	BCG		Riparian animal.

Table 6-78. Sediment Ecological Risk Screening Values for Contaminants of Potential Concern. (4 Pages)

Analyte Name	Analyte Code	Screening Value	Effect Type	Source	Notes
Tritium	10028-17-8	374,000	BCG	RESRAD BIOTA v1.5 (DOE/EH-0676)	Riparian animal.
Uranium-233/234	13966-29-5	5,270	BCG		Riparian animal; U-234.
Uranium-235	15117-96-1	3,730	BCG		Riparian animal.
Uranium-238	U-238	2,490	BCG		Riparian animal.

-- = not applicable
BCG = biota concentration guide
DOE = U.S. Department of Energy
EPA = U.S. Environmental Protection Agency
ERL = effects range low, concentration below which effects are rarely observed or predicted among sensitive life stages and (or) species of biota
ESL = ecological screening level for wildlife were calculated based on no observed adverse effect levels (NOAELs)
LEL = lowest effect level, level tolerated by majority of benthic organisms
MPC = This is the concentration at or below which the risk of adverse effects is acceptable. The primary data source is, however, not associated with MPC and therefore not available for further review. The approach starts with calculating a maximum permissible addition (MPA) on the basis of available data from laboratory toxicity tests. This MPA is considered to be the maximum concentration to be added to the background concentration (Cb). The MPC is then the sum of the Cb and the MPA: MPC=Cb+MPA
NA = not available
NOE = no observed effect concentration
PNEC = probable no effect concentration for benthic population in uranium-impacted sediments
SQS = sediment quality standard, sediment quality that will result in no adverse effects, including no acute or chronic adverse effects on biological resources
TEC = threshold effect concentration, concentration above which some effect will be produced and below which it will not
TEL = threshold effects level, concentration of a contaminant below which adverse biological effects are expected to occur rarely

Buchman M.F., 2008, NOAA Screening Quick Reference Tables, NOAA OR&R Report 08-1, Seattle WA, Office of Response and Restoration Division, National Oceanic and Atmospheric Administration, 34 pages.

Camargo, J. A., A. Alonso, A Salamanca, 2005, *Nitrate Toxicity to Aquatic Animals: A Review with New Data for Freshwater Invertebrates*, Chemosphere 58: 1255-1267.

Crommentuijn, D. et al, 2000, *Maximum Permissible and Negligible Concentration for Metals and Metalloids in the Netherlands, Taking Into Account Background Concentrations*, Journal of Environmental Management pp. 60, 121-143.

Ecology (Washington State Department of Ecology), 2006, Water Quality Standards for Surface Waters of the State of Washington, Chapter 173-201A Washington Administrative Code, Publication No. 06-01-091 (http://www.ecy.wa.gov/pubs/0610091.pdf).

Ingersoll, C. G., P. S. Haverland, E. L. Brunson, T. J. Canfield, F. J. Dwyer, C. E. Henke, and N. E. Kemble, 1996, Calculation and Evaluation of Sediment Effect Concentrations for the Amphipod *Hyalella azteca* and the Midge *Chironomus riparius*, National Biological Service Final Report for the EPA Great Lakes Nation Program Office (GLNPO) Assessment and Remediation of Contaminated Sediment (ARCS) Project, EPA/905/R96/008.

LA-UR-08-06673, 2008, ECORISK Database (Release 2.3), ER Package #186, Environmental Programs Directorate, Waste and Environmental Services Division, Los Alamos National Laboratory Los Alamos, New Mexico.

MacDonald, D. D., C. G. Ingersoll, and T. A. Berger, 2000, *Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems*, Archives of Environmental Contamination and Toxicology 39:1, pp. 20-31.

Metcalfe-Smith J. L., K. E. Holtze, G. R. Sirota, J. J. Reid, S. R. De Solla, 2003, *Toxicity of Aqueous and Sediment-Associated Fluoride to Freshwater Organisms*, Environmental Toxicology and Chemistry 22:161-166.

Michelsen, T., 2003, *Development of Freshwater Sediment Quality Values for Use in Washington State*, Phase II Report: Development and Recommendation of SQVs for Freshwater Sediments in Washington State, Publication No. 03-09-088.

Neumann, D., M. Kramer, I. Raschke, G. Graefe, 2001, *Detrimental Effects of Nitrite on the Development of Benthic Chironomus Larvae, in Relation to Their Settlement in Muddy Sediments*, Archiv. Hydrobiol., 153(1):103-128.

Persaud, D., R. Jaagumagi, and A. Hayton, 1993, *Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario*, Water Resources Branch, Ontario Ministry of the Environment, June 1992, Revised March 1993, ISBN 0-7729-9248-7.

RESRAD BIOTA Software Version 1.5. Available online at: http://www.ead.anl.gov/resrad/.

Sheppard S. C, M. I. Sheppard, M. O. Gallerand, B. Sanipelli, 2005, *Derivation of Ecotoxicity Thresholds for Uranium*, Journal Environmental Radioactivity 79:55-83.

EPA 1996, Eco Update, V3(2): Ecotox Thresholds, Office of Solid Waste and Emergency Response, EPA 540/F-95/038.

Table 6-79. Water Ecological Risk Screening Values for Contaminants of Potential Concern. (3 Pages)

Analyte Name	Analyte Code	Screening Value	Source	Notes
Aquatic Biota (µg/L)				
Aluminum	7429-90-5	87	EPA 2009	AWQC CCC, Federal chronic water quality criterion.
Antimony	7440-36-0	30	EPA 2009	AWQC CCC, Federal chronic water quality criterion.
Barium	7440-39-3	300	Michigan DEQ 2008	Criterion = e[1.0629(ln hardness)+1.1869], 70 mg/L hardness. [a]
Cadmium	7440-43-9	0.19	EPA 2009	AWQC CCC, Federal chronic water quality criterion – based on 70 mg/L hardness. [a]
Calculated total uranium	calc_tot_U	0.5	ANZECC 2000	Low reliability trigger value calculated for uranium using an assessment (safety) factor of 20 on limited chronic data.
Chromium	7440-47-3	55	EPA 2009	Chromium (III) criterion = 0.86*e[0.819(ln hardness)+0.6848], 70 mg/L hardness. [a]
Chromium (VI)	18540-29-9	10	Ecology 2006	Washington State Water Quality Standards for Surface Waters, Table 240(3) Toxic Substances Criteria.
Copper	7440-50-8	8.4	Ecology 2006	Washington State Water Quality Standards for Surface Waters, Table 240(3) Toxic Substances Criteria, 70 mg/L hardness. [a]
Lead	7439-92-1	1.7	Ecology 2006	Washington State Water Quality Standards for Surface Waters, Table 240(3) Toxic Substances Criteria, 70 mg/L hardness. [a]
Manganese	7439-96-5	50	MacDonald et al. 1999	Water quality value used in Alberta, Canada.
Mercury	7439-97-6	0.012	Ecology 2006	Washington State Water Quality Standards for Surface Waters, Table 240(3) Toxic Substances Criteria.
Nickel	7440-02-0	38	EPA 2009	AWQC CCC, Federal chronic water quality criterion – based on 70 mg/L hardness. [a]
Phosphorous	7723-14-0	17	EPA 2000	Ecoregion III, xeric west water quality value for rivers and streams, value is a nutrient criterion, not toxicity based.
Selenium	7782492	5	Ecology 2006	Washington State Water Quality Standards for Surface Waters, Table 240(3) Toxic Substances Criteria, 70 mg/L hardness. [a]
Strontium (elemental)	7440-24-6	7	MacDonald et al. 1999	Proposed guideline, provincial water quality, Ontario Ministry of Environment and Energy, Ontario, Canada.
Tin	7440-31-5	73	Suter and Tsao 1996	Secondary chronic value.
Titanium	7440-32-6	2,000	BCME 2006	Secondary chronic value.
Uranium (inorganic)	7440-61-1	0.5	ANZECC 2000	Low reliability trigger value calculated for uranium using an assessment (safety) factor of 20 on limited chronic data.
Vanadium	7440622	7	MacDonald et al. 1999	Proposed guideline, provincial water quality, Ontario Ministry of Environment and Energy, Ontario, Canada.
Zinc	7440666	77	Ecology 2006	Washington State Water Quality Standards for Surface Waters, Table 240(3) Toxic Substances Criteria, 70 mg/L hardness. [a]
Fluoride	7681-49-4	300	BCMOELP 1998	Tentative criterion; maximum where water hardness ≥ 50 mg/L, – British Columbia.
Nitrogen in nitrate	NO3-N	2,000	Camargo et al. 2005	Maximum concentration that is appropriate for protecting the most sensitive freshwater species.
Nitrogen in nitrite	NO2-N	75	Neuman et al. 2001	Based on extension (20.7 days) of *Chironomid* larval development into adults in freshwater muddy sediments. UF of 2 applied to LOEC.

Table 6-79. Water Ecological Risk Screening Values for Contaminants of Potential Concern. (3 Pages)

Analyte Name	Analyte Code	Screening Value	Source	Notes
Wildlife (µg/L)				
Aluminum	7429-90-5	8,600	LA-UR-08-06673, 2008	ESL for Montane shrew (drinking water).
Antimony	7440-36-0	960	LA-UR-08-06673, 2008	ESL for Occult little brown myotis bat (drinking water).
Barium	7440-39-3	6,100	LA-UR-08-06673, 2008	ESL for Montane shrew (drinking water).
Cadmium	7440-43-9	4,800	LA-UR-08-06673, 2008	ESL for Montane shrew (drinking water).
Calculated total uranium	calc_tot_U	27,000	LA-UR-08-06673, 2008	ESL for Occult little brown myotis bat (drinking water).
Chromium	7440-47-3	49,000	LA-UR-08-06673, 2008	ESL for violet-green swallow (drinking water), this number applies to total chromium in sediment.
Chromium (VI)	18540-29-9	7,100	LA-UR-08-06673, 2008	ESL for violet-green swallow (drinking water).
Copper	7440-50-8	12,000	LA-UR-08-06673, 2008	ESL for violet-green swallow (drinking water).
Lead	7439-92-1	4,300	LA-UR-08-06673, 2008	ESL for Montane shrew (drinking water).
Manganese	7439-96-5	190,000	LA-UR-08-06673, 2008	ESL for Montane shrew (drinking water).
Mercury	7439-97-6	78	LA-UR-08-06673, 2008	ESL for violet-green swallow (drinking water).
Nickel	7440-02-0	300	LA-UR-08-06673, 2008	ESL for Montane shrew (drinking water).
Phosphorus	7723-14-0	NA	--	Toxicity information on phosphorous in water not available for wildlife.
Selenium	7782492	890	LA-UR-08-06673, 2008	ESL for violet-green swallow (drinking water).
Strontium (elemental)	7440-24-6	110,000	LA-UR-08-06673, 2008	ESL for Montane shrew (drinking water).
Tin	7440-31-5	NA	--	Toxicity information on tin in water not available for wildlife.
Titanium	7440-32-6	70,000	LA-UR-08-06673, 2008	ESL for Montane shrew (drinking water).
Uranium (inorganic)	7440-61-1	27,000	LA-UR-08-06673, 2008	ESL for Occult little brown myotis bat (drinking water).
Vanadium	7440622	4,500	LA-UR-08-06673, 2008	ESL for violet-green swallow (drinking water).
Zinc	7440666	490,000	LA-UR-08-06673, 2008	ESL for violet-green swallow (drinking water).
Fluoride	7681-49-4	50,000	LA-UR-08-06673, 2008	ESL for violet-green swallow (drinking water).
Nitrogen in nitrate	NO3-N	NA	--	Toxicity information on NO_3-N in water not available for wildlife.
Nitrogen in nitrite	NO2-N	NA	--	Toxicity information on NO_2-N in water not available for wildlife.
Water BCG (pCi/L)				
Carbon-14	14762-75-5	609	RESRAD BIOTA v1.5 (DOE/EH-0676)	Riparian animal.
Cesium-137	10045-97-3	42.6		Riparian animal.
Plutonium-238	13981-16-3	176		Aquatic animal.
Plutonium-239/240	PU-239/240	187		Aquatic animal; Pu-239.
Strontium-90	10098-97-2	278		Riparian animal.
Technetium-99	14133-76-7	667,000		Riparian animal.
Tritium	10028-17-8	265,000,000		Riparian animal.
Uranium-233/234	13966-29-5	202		Aquatic animal; U-234.

Table 6-79. Water Ecological Risk Screening Values for Contaminants of Potential Concern. (3 Pages)

Analyte Name	Analyte Code	Screening Value	Source	Notes
Uranium-235	15117-96-1	217	RESRAD BIOTA v1.5 (DOE/EH-0676)	Aquatic animal.
Uranium-238	U-238	223		Aquatic animal.

[a] Minimum hardness value measured in pore water or surface water.

-- = not applicable
AWQC CCC = ambient water quality criteria - criterion continuous concentration
BCG = biota concentration guide
BCMOELP = British Columbia Ministry of Environment, Lands and Parks
DOE = U.S. Department of Energy
EPA = U.S. Environmental Protection Agency
ESL = ecological screening level for wildlife were calculated based on no observable adverse effect levels
LANL = Los Alamos National Laboratory
NA = not available
NOAA = National Oceanic and Atmospheric Administration
SCV = secondary chronic value
UF = uncertainty factor
WQC = water quality criteria
WQS = water quality standard

ANZECC (Australian and New Zealand ECLs and trigger values), 2000, ANZECC Water Quality Guidelines. Available online at: (http://www.mincos.gov.au/__data/assets/pdf_file/0020/316136/gfmwq-guidelines-vol2-8-3b.pdf).

British Columbia Ministry of Environment (BCME), 2001, Water Quality Criteria for Nitrogen. Available online at: http://www.env.gov.bc.ca/wat/wq/BCguidelines/nitrogen/nitrogen.html#tab1.

British Columbia Ministry of Environment (BCME), 2006, Water Quality: A Compendium of Working Water Quality Guidelines for British Columbia. Available oline at: http://www.env.gov.bc.ca/wat/wq/BCguidelines/working.html#table1.

British Columbia Ministry of the Environment, Lands and Parks (BCMOELP), 1998, British Columbia Approved Water Quality Guidelines (Criteria): 1998 Edition, ISBN 0-7726-3680-X, British Columbia Ministry of the Environment, Lands and Parks, Water Management Branch, Victoria, British Columbia.

Buchman, M. F., 2008, NOAA Screening Quick Reference Tables, NOAA OR&R Report 08-1, Office of Response and Restoration Division, National Oceanic and Atmospheric Administration, Seattle, Washington. Available online at: http://response.restoration.noaa.gov/book_shelf/122_NEW-SQuiRTs.pdf.

Camargo, J. A., A. Alonso, A Salamanca, 2005, Nitrate Toxicity to Aquatic Animals: A Review With New Data for Freshwater Invertebrates, Chemosphere 58: 1255-1267.

Ecology (Washington State Department of Ecology), 2006, Water Quality Standards for Surface Waters of the State of Washington, Chapter 173-201A Washington Administrative Code, Publication No. 06-01-091. Available online at http://www.ecy.wa.gov/pubs/0610091.pdf.

EPA, 2000, Ambient Water Quality Criteria Recommendations, Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Ecoregion III, Office of Water EPA 822-B-00-016. Available online at: http://water.epa.gov/scitech/swguidance/standards/upload/2007_09_27_criteria_nutrient_ecoregions_rivers_rivers_3.pdf.

EPA, 2009, National Recommended Water Quality Criteria, U.S. Environmental Protection Agency. Available online at: U.S. Environmental Protection Agency, http://water.epa.gov/scitech/swguidance/waterquality/standards/current/index.cfm.

LA-UR-08-06673, 2008, ECORISK Database (Release 2.3), ER Package #186, Environmental Programs Directorate, Waste and Environmental Services Division, Los Alamos National Laboratory, Los Alamos, New Mexico.

MacDonald D. D., T. Berger, K. Wood, J. Brown, T. Johnsen, M. L. Haines, K. Brydges, M. J. MacDonald, S. L. Smith, and D. P. Shaw, 1999, A Compendium of Environmental Benchmarks, Environment Canada, GBEI/EC-99-001.

Michigan Department of Environmental Quality, 2008, Rule 57 Water Quality Values, Surface Water Assessment Section. Available online at: http://www.michigan.gov/deq/0,1607,7-135-3313_3686_3728-11383--,00.html.

Neumann, D. M. Kramer, I Raschke, G. Graefe, 2001, Detrimental Effects of Nitrite on the Development of Benthic *Chironomus* Larvae, in Relation to Their Settlement in Muddy Sediments, Archiv. Hydrobiol, 153(1):103-128.

RESRAD BIOTA Software Version 1.5. Available online at: http://www.ead.anl.gov/resrad/.

Suter, G. W. and C. L. Tsao, 1996, Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ES/ER/TM-96/R2.

Suter, G. W., 1996, Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Aquatic Biota, Environmental Toxicology and Chemistry 15:1232-1241.

Table 6-80. Screening Results for Inorganic Contaminants of Potential Concern in Surface and Pore Water at Study Sites. (2 Pages)

Analyte	Number of Analyses	Number of Nonzero Results	Maximum CTE (µg/L)	Screening Value (µg/L)		COPEC?	Reason
				Aquatic Community Water	Wildlife Water		
Aluminum	59	35	399	87	8,600	Yes	CTE > aquatic SV
Antimony	61	7	5.7	30	960	No	CTE < all SV
Barium	61	61	104	300	6,100	Yes	CTE < aquatic SV
Cadmium	61	6	0.38	0.19	4,800	Yes	CTE > aquatic SV
Calculated total uranium	56	39	141	0.5	27,000	Yes	CTE > aquatic SV
Chromium	61	17	43.8	55	49,000	No	CTE < all SV
Chromium (VI)	58	28	42 (RME)	10	7,100	Yes	RME > aquatic SV
Copper	60	20	4.4	8.4	12,000	No	CTE < all SV
Fluoride	58	2	198 (RME)	300	50,000	No	RME < all SV; maximum from 100-B/C Pilot
Lead	61	7	3.9	1.7	4,300	Yes	CTE > aquatic SV
Manganese	61	61	1,640	50	190,000	Yes	CTE > aquatic SV
Mercury	61	4	0.004 (RME)	0.012	78	No	RME < all SV; maximum from 100-NR-2
Nickel	61	9	2.6	38	300	No	CTE < all SV
Nitrogen in nitrate	58	56	4,950	2,000	NA	Yes	CTE > aquatic SV
Nitrogen in nitrite	55	3	429	75	NA	Yes	CTE > aquatic SV
Phosphorus	57	22	143	17	NA	Yes	CTE > aquatic SV
Selenium	61	7	5.9	5	890	Yes	CTE > aquatic SV
Strontium (elemental)	58	58	221 (RME)	7	110,000	Yes	RME > aquatic SV; maximum from 100-B/C Pilot
Tin	57	2	6.9	73	NA	Yes	Data gap (wildlife)
Titanium	Not measured	--	--	2,000	70,000	No	Not measured
Uranium (inorganic)	61	5	137	0.5	27,000	Yes	CTE > aquatic SV
Vanadium	60	19	11.9 (RME)	7	4,500	Yes	RME > aquatic SV; maximum from 100-B/C Pilot

Table 6-80. Screening Results for Inorganic Contaminants of Potential Concern in Surface and Pore Water at Study Sites. (2 Pages)

Analyte	Number of Analyses	Number of Nonzero Results	Maximum CTE (µg/L)	Screening Value (µg/L)		COPEC?	Reason
				Aquatic Community Water	Wildlife Water		
Zinc	61	59	13.8	77	490,000	No	CTE < all SV

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
NA = not available
RME = reasonable maximum exposure
SV = screening value

Table 6-81. Screening Results for Inorganic Contaminant of Potential Concern in Sediment at Study Sites. (2 Pages)

Analyte	Number of Analyses	Number of Nonzero Results	Maximum CTE (mg/kg)	Screening Value (mg/kg)		COPEC?	Reason
				Aquatic Community Sediment	Wildlife Sediment		
Aluminum	46	46	13,000	14,000	280	Yes	CTE > wildlife SV
Antimony	48	2	0.649	0.4	0.36	Yes	CTE > all SV; maximum from 100-B/C Pilot
Barium	48	48	869	300	3,000	Yes	CTE > aquatic SV; maximum from 100-B/C Pilot
Cadmium	48	41	2.4	0.6	0.33	Yes	CTE > all SV
Calculated total uranium	46	45	15.4	100	1,100	No	CTE < all SV
Chromium	48	48	286	26	1,500	Yes	CTE > aquatic SV
Chromium (VI)	46	5	8.41	NA	680	Yes	Data gap (aquatic)
Copper	47	47	64	16	23	Yes	CTE > all SV
Fluoride	41	16	1.73	175	45	No	CTE < all SV
Lead	48	48	158	31	27	Yes	CTE > all SV
Manganese	48	48	924	460	5,300	Yes	CTE > aquatic SV
Mercury	48	16	0.2	0.18	0.018	Yes	CTE > all SV
Nickel	48	48	32.1	16	13	Yes	CTE > all SV
Nitrogen in nitrate	41	40	26.3	NA	NA	Yes	Data gap
Nitrogen in nitrite	41	27	1.69	NA	NA	Yes	Data gap
Phosphorus	46	46	1,300	600	NA	Yes	CTE > aquatic SV
Selenium	48	10	4.3	0.95	0.9	Yes	CTE > all SV
Strontium (elemental)	46	46	45.6	NA	1,700	Yes	Data gap (aquatic)
Tin	46	24	3.7	NA	NA	Yes	Data gap
Titanium	18	18	2,030	NA	98	Yes	CTE > wildlife SV
Uranium (inorganic)	48	9	6.8	100	1,100	No	CTE < all SV
Vanadium	47	47	66	NA	30	Yes	CTE > wildlife SV

Table 6-81. Screening Results for Inorganic Contaminant of Potential Concern in Sediment at Study Sites. (2 Pages)

Analyte	Number of Analyses	Number of Nonzero Results	Maximum CTE (mg/kg)	Screening Value (mg/kg)		COPEC?	Reason
				Aquatic Community Sediment	Wildlife Sediment		
Zinc	48	48	800	98	65	Yes	CTE > all SV

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
NA = not available
SV = screening value

Table 6-82. Evaluation of Sum of Fractions and Dose for Radionuclide Contaminants of Potential Concern in Surface and Pore Water at Study Sites.

Analyte	Count of RME Analyses	Count of Nonzero RME Results	Maximum CTE (pCi/L)	Maximum RME (pCi/L)	Water	Water BCG - Riparian Animal (pCi/L)	Maximum Aquatic Animal Water Ratio of RME to BCG	Maximum Riparian Animal Water Ratio of RME to BCG
					BCG - Aquatic Animal (pCi/L)			
Carbon-14	10	3	20	20	7,890	609	--	--
Cesium-137	59	1	1.74	6.94	1,050	42.6	0.0066	0.016
Plutonium-238	4	2	0.00944	0.0274	176	551	0.00016	<0.001
Plutonium-239/240	2	0	--	--	187	622	--	--
Strontium-90	61	30	34.9	65.6	53,900	278	0.001	0.24
Technetium-99	10	7	45.9	45.9	2,470,000	667,000	<0.001	<0.001
Tritium	59	38	16,600	16,600	4,990,000,000	265,000,000	<0.001	<0.001
Uranium-233/234	56	56	51.4	51.4	202	676	0.25	0.076
Uranium-235	56	24	5.76	5.76	217	736	0.027	0.0078
Uranium-238	56	55	46.4	46.4	223	756	0.21	0.061
						Sum of Fractions:	0.50	0.40
						Dose (rad/day):	0.50	0.040
						Dose Limit (rad/day)	1	0.1

-- = not applicable
BCG = biota concentration guideline
CTE = central tendency exposure
RME = reasonable maximum exposure

Table 6-83. Evaluation of Sum of Fractions and Dose for Radionuclide Contaminants of Potential Concern in Sediment at Study Sites.

Analyte	Number of RME Analyses	Number of Nonzero RME Results	Maximum CTE (pCi/g)	Maximum RME (pCi/g)	Sediment BCG - Aquatic Animal (pCi/g)	Sediment BCG - Riparian Animal (pCi/g)	Maximum Aquatic Animal Sediment Ratio of RME to BCG	Maximum Riparian Animal Sediment Ratio of RME to BCG
Carbon-14	5	4	230	230	789,000	59,000	<0.001	0.0039
Cesium-137	47	39	0.775	0.775	49,300	3,120	<0.001	<0.001
Plutonium-238	4	0	--	--	3,950,000	5,730	--	--
Plutonium-239/240	3	1	0.521	0.521	7,040,000	5,860	<0.001	<0.001
Strontium-90	48	35	18.5	31.4	35,200	582	0.0011	0.08
Technetium-99	5	4	1.14	1.14	469,000	42,200	0.000013	0.000027
Tritium	Not measured	--	--	--	7,040,000	374,000	--	--
Uranium-233/234	46	46	4.31	4.31	10,600,000	5,270	<0.001	<0.001
Uranium-235	46	33	0.252	0.252	105,000	3,730	<0.001	<0.001
Uranium-238	46	46	5.12	5.12	42,800	2,490	0.0013	0.0021
						Sum of Fractions:	0.0037	0.087
						Dose (rad/day):	0.0037	0.0087
						Dose Limit (rad/day)	1	0.1

-- = not applicable
BCG = biota concentration guideline
CTE = central tendency exposure
RME = reasonable maximum exposure

Table 6-84. Sediment Biota Benchmarks. (3 Pages)

Analyte	Analyte Code	Benchmark (mg/kg, dry weight)	Source	Effect Type	Notes	Benchmark Selected (mg/kg)
Aluminum	7429-90-5	14,000	Ingersoll et al. 1996	ERL	Sediment effects concentration - effects range low.	14,000
Antimony	7440-36-0	0.4	Michelsen 2003	SQS	Sediment quality standard, Table 3-11 in source.	--
		0.6	Michelsen 2003	CSL	Cleanup screening level, Table 3-11 in source.	0.6
		3	Buchman 2008	UET	NOAA upper effects threshold.	--
Barium	7440-39-3	300	Crommentuijn 2000	MPC	Maximum permissible concentration.	300
Cadmium	7440-43-9	0.6	Michelsen 2003	SQS	Sediment quality standard, Table 3-11 in source.	--
		1.0	Michelsen 2003	CSL	Cleanup screening level, Table 3-11 in source.	1.0
		4.98	MacDonald et al. 2000	PEC	Consensus-based probable effect concentration.	--
Calculated total uranium	calc_tot_U	100	Sheppard et al. 2005	PNEC	Aggregate values based on probable no effect concentration approach for benthic populations in U-impacted sediments.	100
Chromium [a]	7440-47-3	26	Persaud et al. 1993	LEL	Lower effect level, concentration tolerated by majority of benthic organisms.	--
		95	Michelsen 2003	SQS	Sediment quality standard, Table 3-11 in source.	--
		100	Michelsen 2003	CSL	Cleanup screening level, Table 3-11 in source.	100
		111	MacDonald et al. 2000	PEC	Consensus-based probable effect concentration.	--
Chromium (VI)	18540-29-9	NA	--	--	No toxicity information available.	--
Copper	7440-50-8	16	Persaud et al. 1993	LEL	Lower effect level, concentration tolerated by majority of benthic organisms.	--
		80	Michelsen 2003	SQS	Sediment quality standard, Table 3-11 in source.	--
		149	MacDonald et al. 2000	PEC	Consensus-based probable effect concentration.	--
		830	Michelsen 2003	CSL	Cleanup screening level, Table 3-11 in source.	830
Lead	7439-92-1	31	Persaud et al. 1993	LEL	Lower effect level.	--
		335	Michelsen 2003	SQS	Sediment quality standard, Table 3-11 in source.	--
		430	Michelsen 2003	CSL	Cleanup screening level, Table 3-11 in source.	430

Table 6-84. Sediment Biota Benchmarks. (3 Pages)

Analyte	Analyte Code	Benchmark (mg/kg, dry weight)	Source	Effect Type	Notes	Benchmark Selected (mg/kg)
Manganese	7439-96-5	460	Persaud et al. 1993	LEL	Lower effect level.	460
		1,100	Persaud et al. 1993	SEL	Severe effects level.	--
Mercury	7439-97-6	0.18	MacDonald et al. 2000	TEC	Threshold effects concentration.	--
		0.5	Michelsen 2003	SQS	Sediment quality standard, Table 3-11 in source.	--
		0.75	Michelsen 2003	CSL	Cleanup screening level, Table 3-11 in source.	0.75
		1.06	MacDonald et al. 2000	PEC	Consensus-based probable effect concentration.	--
Nickel	7440-02-0	16	Persaud et al. 1993	LEL	Lower effect level, concentration tolerated by majority of benthic organisms.	--
		60	Michelsen 2003	SQS	Sediment quality standard, Table 3-11 in source.	--
		70	Michelsen 2003	CSL	Cleanup screening level, Table 3-11 in source.	70
Nitrogen in nitrate	NO_3-N	NA	--	--	No toxicity information available for sediment.	--
Nitrogen in nitrite	NO_2-N	NA	--	--	No toxicity information available for sediment.	--
Phosphorus	7723-14-0	600	Persaud et al. 1993	LEL	Lower effect level.	600
		2,000	Persaud et al. 1993	SEL	Severe effect level.	--
Selenium	7782-49-2	4	Van Derveer and Canton 1997	OTT	Observed toxicity threshold.	4
Strontium (elemental)	7440-24-6	NA	--	--	No CSL or other sediment benchmark available.	--
Tin	7440-31-5	239	Crommentuijn et al. 2000	NC	Negligible concentration.	--
		22,000	Crommentuijn et al. 2000	MPC	Maximum permissible concentration.	22,000
Titanium	7440-32-6	NA	--	--	No CSL or other sediment benchmark available	--
Uranium (inorganic)	7440-61-1	100	Sheppard et al. 2005	PNEC	Probable no effect concentration.	100
Vanadium	7440-62-2	NA	--	--	No toxicity information available for sediment.	--

Table 6-84. Sediment Biota Benchmarks. (3 Pages)

Analyte	Analyte Code	Benchmark (mg/kg, dry weight)	Source	Effect Type	Notes	Benchmark Selected (mg/kg)
Zinc	7440-66-6	98	Ingersoll et al. 1996	TEL	Threshold effects level.	--
		140	Michelsen 2003	SQS	Sediment quality standard, Table 3-11 in source.	--
		160	Michelsen 2003	CSL	Cleanup screening level, Table 3-11 in source.	160
		459	MacDonald et al. 2000	PEC	Consensus-based probable effect concentration.	--

[a] Chemical form of chromium in sediments not specified.

-- = not applicable
CSL = cleanup screening level, concentration below which only minor adverse effects would occur, and above which more significant adverse effects are expected. Defined in the Model Toxics Control Act as a concentration of hazardous substances above which sediment must be remediated in some manner (http://www.ecy.wa.gov/programs/tcp/regs/2009MTCA/AdvGrpMeetingInfo/mtg_100726/attachmentBTerminology.pdf).
Ecology = Washington State Department of Ecology
EPA = U.S. Environmental Protection Agency
LEL = lowest effect level, level tolerated by majority of benthic organisms
LOEC = lowest observed effect concentration
MPC = maximum permissible concentration. This is the concentration at or below which the risk of adverse effects is acceptable. The primary data source is, however, not associated with MPC and therefore not available for further review. The approach starts with calculating a maximum permissible addition on the basis of available data from laboratory toxicity tests. This MPA is considered to be the maximum concentration to be added to the background concentration (Cb). The MPC is then the sum of the Cb and the MPA: MPC=Cb+MPA
NA = not available
NC = negligible concentration, concentration assumed to have no effect on all species theoretically present in the aquatic ecosystem
NOEC = no observed effect concentration
ODEQ = Oregon Department of Environmental Quality
OTT = observed toxicity threshold, for fish and wildlife toxicity (i.e., the concentration above which toxicity is likely) and represents the 10th percentile of sediment concentrations associated with observed adverse effects
PEC = probable effects concentration, concentration in sediment to which a plant or animal is directly exposed that is likely to cause an adverse effect
PNEC = probable no effect concentration for benthic population in uranium-impacted sediments
SEL = severe effect level, concentration expected to be detrimental to the majority of benthic species
SQS = sediment quality standard, sediment quality that will result in no adverse effects, including no acute or chronic adverse effects on biological resources
TEC = threshold effect concentration, concentration above which some effect (or response) will be produced and below which it will not.
TEL = threshold effects level, concentration of a contaminant below which adverse biological effects are expected to occur rarely
UET = upper effects threshold, lowest value among Apparent Effects Threshold (concentration above which effects are likely)

Buchman M. F., 2008, NOAA Screening Quick Reference Tables, NOAA OR&R Report 08-1, Seattle WA, Office of Response and Restoration Division, National Oceanic and Atmospheric Administration, 34 pages.

Crommentuijn, D. et al., 2000, Maximum Permissible and Negligible Concentration for Metals and Metalloids in the Netherlands, Taking Into Account Background Concentrations, Journal of Environmental Management, pp. 60, 121-143.

Ecology (Washington State Department of Ecology), 2006, Water Quality Standards for Surface Waters of the State of Washington, Chapter 173-201A, Washington Administrative Code, Publication No., 06-01-091. Available online at: http://www.ecy.wa.gov/pubs/0610091.pdf.

Ingersoll, C. G., P. S. Haverland, E. L. Brunson, T. J. Canfield, F. J. Dwyer, C. E. Henke, and N. E. Kemble, 1996, Calculation and Evaluation of Sediment Effect Concentrations for the Amphipod *Hyalella azteca* and the Midge *Chironomus riparius*, National Biological Service Final Report for the EPA Great Lakes Nation Program Office (GLNPO) Assessment and Remediation of Contaminated Sediment (ARCS) Project, EPA/905/R96/008.

MacDonald, D. D., R. S. Carr, F. D. Calder, E. R. Long, and C. G. Ingersoll, 1996, Development and Evaluation of Sediment Quality Guidelines for Florida Coastal Waters, Ecotoxicology, 5:4, pp. 253-278.

MacDonald, D. D., C. G. Ingersoll, and T. A. Berger, 2000, Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems, Archives of Environmental Contamination and Toxicology 39:1, pp. 20-31.

Michelsen. T., 2003, Development of Freshwater Sediment Quality Values for Use in Washington State, Phase II Report: Development and Recommendation of SQVs for Freshwater Sediments in Washington State, Publication No. 03-09-088.

Persaud, D., R. Jaagumagi, and A. Hayton, 1993, Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario, Water Resources Branch, Ontario Ministry of the Environment, June 1992, Revised March 1993, ISBN 0-7729-9248-7.

Sheppard S. C., M. I. Sheppard, M. O. Gallerand, B. Sanipelli, 2005, Derivation of Ecotoxicity Thresholds for Uuranium, Journal Environmental Radioactivity 79:55-83.

USEPA (United States Environmental Protection Agency), 1996, Eco Update, V3(2): Ecotox Thresholds, Office of Solid Waste and Emergency Response, EPA 540/F-95/038.

Van Derveer, W. D., S. P. Canton, 1997, Selenium Sediment Toxicity Thresholds and Derivation of Water Quality Criteria for Freshwater Biota of Western Streams, Environ, Toxicol. Chem. 16, 1260–1268.

Table 6-85. Aquatic Community Water Benchmarks. (8 Pages)

Receptor/ Criterion	Benchmark (µg/L)	Source	Effect Type	Notes	Selected Benchmark (µg/L)
Aluminum (7429-90-5)					
WQC	87	EPA 2009	CCC	Chronic value.	87
	750	EPA 2009	CMC	Acute value.	750
Antimony (7440-36-0)					
WQC	30	EPA 1988	CCC	Proposed chronic criterion.	30
--	--	NA	CMC	No CMC criterion or standard available.	--
Barium (7440-39-3)					
Amphibian	766	Westerman et al. 2003	NOEC	Geometric mean of LC_{10} values. See below.	--
	7,710	Westerman et al. 2003	LOEC	Geometric mean of LC_{50} values. The link between data source and data tables is ambiguous and therefore the certainty in using these values is compromised. Consequently, no water benchmark for barium and amphibians is recommended.	--
Fish	--	Birge et al. 1980	NOEC	See below.	--
	42,700	Birge et al. 1980	LOEC	Lowest LC_{50} available in Ecotox. Chronic test on a sensitive life stage (eggs). Fish toxicity data from Birge et al. based on unknown controls and uncertainty in effect (e.g., % organisms considered lethalities). Consequently, no water benchmark for barium and fish is being recommended.	--
Invertebrate	--	WHO 2001a	NOEC	See below.	--
	13,500	WHO 2001a	LOEC	World Health Organization (WHO 2001a) gives range of LC_{50} values for water flea (*Daphnia magna*) in freshwater ranging from 13,500 µg/L (21 day exposure) to >530,000 µg/L (24 hr exposure). Lowest value cited in WHO (2001a) investigated (Biesinger and Christensen 1972) and issues found with study rendered it unusable as benchmark. No alternate available at this time.	--
Plant	1,300	Wang 1986	NOEC	Based on EC50 for barium of 26,000 µg/L after 4 days exposure, which is considered an acute exposure. An NOEC was derived using the EC_{50} and applying a UF of 20.	--
	2,600	Wang 1986	LOEC	Based on EC50 for barium of 26,000 µg/L after 4 days exposure, which is considered an acute exposure. An LOEC was derived using the EC_{50} and applying a UF of 10.	2,600
Cadmium (7440-43-9)					
WQC	0.19	EPA 2009	CCC	Chronic value, calculated based on hardness of 70 mg/L.	0.19
	1.4	EPA 2009	CMC	Acute value, calculated based on hardness of 70 mg/L.	1.4
Calculated Total Uranium (calc_tot_U)					
Amphibian	--	Marques et al. 2008	NOEC	Effluent toxicity test with many elevated metals concentrations in soft water. Given the uncertainties, effect levels from this study are not recommended for use in the risk assessment.	--
	--	Marques et al. 2008	LOEC	See above.	--

Table 6-85. Aquatic Community Water Benchmarks. (8 Pages)

Receptor/ Criterion	Benchmark (µg/L)	Source	Effect Type	Notes	Selected Benchmark (µg/L)
Fish	910	Sheppard et al. 2005	NOEC	Summary paper reflecting data from many sources. Value obtained from calculated LOEL value of 1,820 µg/L (see below) using a UF of 2 for LOEC - NOEC conversion.	910
	1,820	Sheppard et al 2005	LOEC	Summary paper reflecting data from many sources. EC25 calculated at a hardness of 70 mg/L CaCO3 using study equation derived from multiple acute data points. Resulting acute EC25 value of 18,200 µg/L divided by a UF of 10 to obtain chronic LOEC.	--
Invertebrate	5	Sheppard et al. 2005	NOEC	Summary paper reflecting data from many sources. Effect levels span nearly three orders of magnitude (3 µg/L to 900 µg/L), reflecting considerable uncertainty in selection of a no-effect concentration. The value selected is a probable no-effect concentration, and is the 5th percentile of the toxicity data set.	--
	30	Sheppard et al. 2005	LOEC	As noted above, effect levels span nearly three orders of magnitude (3 µg/L to 900 µg/L), reflecting considerable uncertainty in selection of a low-effect concentration. The value selected is the 30th percentile of toxicity data.	30
Plant	5	Sheppard et al. 2005	NOEC	Summary paper reflecting data from many sources. Value is a probable no-effect concentration, and reflects a UF of 10 applied by the author to account for the lack of vascular plant data.	--
	14	Sheppard et al. 2005	LOEC	Summary paper reflecting data from many sources. Value is the low end of the EC25 range (14 to 120 µg/L).	14
Chromium (7440-47-3)					
WQC	55	EPA 2009	CCC	The hardness-based chromium (III) chronic value is 55 µg/L (at 70 mg/L hardness) calculated following EPA 2009, AWQC CCC for chromium (III).	55
	410	Ecology 2006	CMC	The hardness-based chromium (III) acute value is 410 µg/L (at 70 mg/L hardness) calculated following EPA 2009, Washington State acute water quality standard.	410
Chromium (VI) (18540-29-9)					
WQC	10	Ecology 2006	CCC	Washington State Water Quality Standards for Surface Waters, Table 240(3) Toxic Substances Acute Criteria.	10
	15	Ecology 2006	CMC	Washington State Water Quality Standards for Surface Waters, Table 240(3) Toxic Substances Chronic Criteria.	15
Copper (7440-50-8)					
WQC	8.4	Ecology 2006	CCC	Acute standard calculated based on hardness of 70 mg/L.	8.4
	12	Ecology 2006	CMC	Chronic standard calculated based on hardness of 70 mg/L.	12
	4.3	EPA 2009, Hydroqual 2007	CCC_{BLM} [a]	Modeled based on BLM.	--
	6.9	EPA 2009, Hydroqual 2007	CMC_{BLM} [a]	Modeled based on BLM.	--

Table 6-85. Aquatic Community Water Benchmarks. (8 Pages)

Receptor/ Criterion	Benchmark (µg/L)	Source	Effect Type	Notes	Selected Benchmark (µg/L)
Lead (7439-92-1)					
WQC	1.7	EPA 2009	CCC	Chronic value, calculated based on hardness of 70 mg/L.	1.7
	44	EPA 2009	CMC	Acute value, calculated based on hardness of 70 mg/L.	44
Manganese (7439-96-5)					
Amphibian	--	Birge et al. 1979	NOEC	Toxicity data from Birge et al. based on unknown controls and uncertainty in effect (e.g., what % organisms considered lethalities?). Consequently, no water benchmark for manganese and frog is being recommended.	--
	--	Birge et al. 1979	LOEC	See above.	--
Fish	655	WHO 2004	NOEC	The World Health Organization reports fish LC_{50} values (for 96 hr to 28 d) spanning three orders of magnitude (2,400 to 3,350,000 µg/L), reflecting considerable uncertainty in selection of an effect concentration. Lowest LC50 cited in WHO was from soft-water (25 mg/L CaCO3; Reimer 1999). UF of 20 applied to the lowest LC_{50} (13,100 µg/L, 96 h) from Reimer 1999 having suitable hardness (100 mg $CaCO_3$/L) based on Coho salmon yields the NOEC.	655
	1,310	WHO 2004	LOEC	As described for the NOEC, UF of 10 applied to the most appropriate LC_{50} (Reimer 1999; good study design, relevant fish species and relevant hardness) yields the LOEC.	--
Invertebrate	3,600	WHO 2004	NOEC	The World Health Organization reports invertebrate LC_{50} (for 48 hr to 21 d) values spanning four orders of magnitude (800 to 1,389,000 µg/L), reflecting considerable uncertainty in selection of an effect concentration. The low end of the range reflects tests in soft water (25 mg $CaCO_3$/L) Reimer (1999). Chronic (21 day) tests from the Reimer (1999) in more representative hardness (100 mg $CaCO_3$/L) water yielded NOEC of 3,600 µg/L, based on survival and reproduction, including time to brood, and mobility.	--
	6,900	WHO 2004	LOEC	Chronic (21 day) tests from above endpoints (Reimer 1999) in more representative hardness (100 mg $CaCO_3$/L) water yielded LOEC of 6,900 µg/L.	6,900
Plant	95	WHO 2004	NOEC	Based on lowest value reported in WHO (2004) for algae (1,900 µg/L, 12 d EC_{50} for total chlororphyll production; Fargašová et al. 1999). UF of 20 applied.	--
	190	WHO 2004	LOEC	See above. UF of 10 applied.	190
Mercury (7439-97-6)					
WQS/WQC	0.012	Ecology 2006	CCC	Washington State Water Quality Standards for Surface Waters, Table 240(3) Toxic Substances Chronic Criteria.	0.012
	1.4	EPA 2009	CMC	CMC acute value.	1.4

Table 6-85. Aquatic Community Water Benchmarks. (8 Pages)

Receptor/ Criterion	Benchmark (µg/L)	Source	Effect Type	Notes	Selected Benchmark (µg/L)
Nickel (7440-02-0)					
WQC	38	EPA 2009	CCC	Chronic value, calculated based on hardness of 70 mg/L.	38
	346	EPA 2009	CMC	Acute value, calculated based on hardness of 70 mg/L.	346
Nitrogen in Nitrate (NO3-N)					
Amphibian	1,832	Orton et al. 2006	NOEC	8,330 µg/L NO3 reported in Ecotox. Some gonadal changes, but effects on reproduction unclear.	--
	5,000	Johannsen et al. 2001	LOEC	Chronic LOEC for unacclimated species; no UF applied. In comparison, the Canadian Council of Ministers of the Environment issued a NO_3-N guideline based on exposure of Pacific treefrog tadpoles to 29,100 µg NO_3-N/L for 10d (LOEC for significant body weight decrease relative to control).	5,000
Fish	1,600	McGurk et al. 2006	NOEC	Chronic NOEC. In comparison, Camargo et al. 2005 suggest that 2,000 µg/L is protective of the most sensitive freshwater species.	1,600
	6,250	McGurk et al. 2006	LOEC	Chronic LOEC.	--
Invertebrate	2,800	Camargo et al. 2005	NOEC	Lowest LC01 reported based on toxicity to caddisfly (*Cheumatopsyche pettiti*).	--
	8,500	Camargo et al. 2005	LOEC	Lowest LOEC reported for toxicity to *Echinogammarus echinosetosus,* after 120 hr exposure.	8,500
Plant	--	DSM Agro B. V. 2009	NOEC	See below.	--
	--	DSM Agro B. V. 2009	LOEC	IC50 value given as a range: 10,000 - 100,000 µg/L. Since nitrate is a fertilizer, lower concentrations will promote plant growth. Value is highly uncertain and therefore no value is recommended for NO_3-N toxicity to plants.	--
Phosphorus (7723-14-0)					
Amphibian	10,000	Hamer et al. 2004	NOEC	Chronic test; no UF applied. Value is uncertain in that test concentrations do not appear to have been empirically verified and therefore no value is recommended for P toxicity to amphibians.	--
	15,000	Hamer et al. 2004	LOEC	Chronic test; no UF applied. Value is uncertain in that test concentrations do not appear to have been empirically verified and therefore no value is recommended for P toxicity to amphibians.	--
Fish	--	Wallen et al. 1957	NOEC	See below.	--
	--	Wallen et al. 1957	LOEC	Authors report median tolerance limit to phosphoric acid for 24, 48, and 96 hr for Mosquitofish (Gambusia) as 138,000 µg/L. However, test run in turbid water and based on nonstandard methodology, which may overestimate effects. Uncertainty in results interpretation precludes using value in risk assessment.	--
Invertebrate	--	Dowden and Bennett 1965	NOEC	Study reviewed and uncertainty in results interpretation precludes use of value in risk assessment.	--
	--	Dowden and Bennett 1965	LOEC	See above.	--

Table 6-85. Aquatic Community Water Benchmarks. (8 Pages)

Receptor/ Criterion	Benchmark (µg/L)	Source	Effect Type	Notes	Selected Benchmark (µg/L)
Plant	1,000	Blindow 1988	NOEC	No effect on growth. Using NOEC as toxicity value for reasons stated below.	1,000
	155,000	Nutra-Flow Company 2002	LOEC	Orthophosphate is a plant growth stimulant at concentrations below toxic levels. Given high uncertainty in estimating an effect level, it is not recommended that a low effect level be presented for estimating phosphate toxicity to plants.	--
Selenium 7782-49-2					
WQS/WQC	5	Ecology 2006	CCC	Washington State Water Quality Standards for Surface Waters, Table 240(3) Toxic Substances Chronic Criteria.	5
	13	EPA 2009	CMC	Acute value.	13
Strontium (Elemental) (7440-24-6)					
Amphibian	--	Birge 1978	NOEC	See below.	--
	--	Birge 1978	LOEC	LC50 reported. Toxicity data from Birge et al., based on unknown controls and uncertainty in effect. Given uncertainty with this approach, no amphibian toxicity data are recommended.	--
Fish	--	Birge 1978	NOEC	See below.	--
	--	Birge 1978	LOEC	LC50 reported. Toxicity data from Birge et al. based on unknown controls and uncertainty in effect. Given uncertainty with this approach, no fish toxicity data are recommended.	--
Invertebrate	--	WHO 2010	NOEC	See below.	--
	--	WHO 2010	LOEC	World Health Organization (2010) report effects (LC_{50} values and an EC_{50}) on freshwater invertebrates ranging from 60,000 to 910,000 µg/L. Lowest value cited in WHO (2010) (60,000 µg/L, 21 d, reproductive impairment; Biesinger and Christensen 1972) was investigated and issues found with study rendered it unusable as benchmark. No alternate available at this time.	--
Plant	--	DeJong 1965	NOEC	See below.	--
	--	DeJong 1965	LOEC	LOEC reported as >150,000 µg/L. Given uncertainty in effect level, however, a low effect level from this study is not recommended for use in risk assessment.	--
Uranium (Inorganic) (7440-61-1)					
Amphibian	--	Marques et al. 2008	NOEC	Effluent toxicity test with many elevated metals concentrations in soft water. Given the uncertainties, effect levels from this study are not recommended for use in the risk assessment.	--
	--	Marques et al. 2008	LOEC	See above.	--
Fish	910	Sheppard et al. 2005	NOEC	Summary paper reflecting data from many sources. Value obtained from calculated LOEL value of 1,820 µg/L (see below) using a UF of 2 for LOEC - NOEC conversion.	910
	1,820	Sheppard et al. 2005	LOEC	Summary paper reflecting data from many sources. EC25 calculated at a hardness of 70 mg/L CaCO3 using study equation derived from multiple acute data points. Resulting acute EC25 value of 18,200 µg/L divided by a UF of 10 to obtain chronic LOEC.	--

Table 6-85. Aquatic Community Water Benchmarks. (8 Pages)

Receptor/ Criterion	Benchmark (µg/L)	Source	Effect Type	Notes	Selected Benchmark (µg/L)
Invertebrate	5	Sheppard et al. 2005	NOEC	Summary paper reflecting data from many sources. Effect levels span nearly three orders of magnitude (3 µg/L to 900 µg/L), reflecting considerable uncertainty in selection of a no-effect concentration. The value selected is a probable no-effect concentration, and is the 5th percentile of the toxicity data set.	--
	30	Sheppard et al. 2005	LOEC	As noted above, effect levels span nearly three orders of magnitude (3 µg/L to 900 µg/L), reflecting considerable uncertainty in selection of a low-effect concentration. The value selected is the 30th percentile of toxicity data.	30
Plant	5	Sheppard et al. 2005	NOEC	Summary paper reflecting data from many sources. Value is a probable no-effect concentration, and reflects a UF of 10 applied by the author to account for the lack of vascular plant data.	--
	14	Sheppard et al. 2005	LOEC	Summary paper reflecting data from many sources. Value is the low end of the EC25 range (14 to 120 µg/L).	14
Vanadium (7440-62-2)					
Amphibian	--	Birge et al. 2000	NOEC	Composite value from at least two studies. No UF due to use of sensitive species at a sensitive life stage. Given uncertainty in effect level from Birge et al. 2000, however, an effect level from this study is not recommended for use in risk assessment.	--
	--	Birge et al. 2000	LOEC	See above.	--
Fish	100	WHO 2001b	NOEC	World Health Organization gives range of LC_{50} values for freshwater fish, from 400 µg/L (144-h exposure) to 118,000 µg/L (96-h exposure). Given the uncertainty in such a broad concentration range for the same endpoint, a NOEC was considered based on using the lowest LC_{50} (400 µg/L; Knudston 1979). This study apparently lacked controls, had nominal concentrations and measured non-native species (guppy). It is recommended that Stendahl and Sprague (1982) be used because of good study design (measured values, representative species and hardness [103 mg/L $CaCO_3$], flow-through test) based on 11-d LC50 of 2,000 µg/L. UF of 20 applied.	100
	200	WHO 2001b	LOEC	See above, UF of 10 applied.	--
Invertebrate	--	WHO 2001b	NOEC	World Health Organization gives range of LC_{50} values for freshwater invertebrates, from 2,000 µg/L (23 d exposure) to 308,000 µg/L (48 hr exposure). Given the uncertainty in such a broad concentration range for the same endpoint, a NOEC was considered using the lowest LC_{50} (Buesen and Neven 1987) but this study was found to be lacking in applicability (very hard water; 223 mg/L CaCO3). Other lower studies in Ecotox were from studies previously reviewed and considered unacceptable.	--
	--	WHO 2001b	LOEC	See above.	--

Table 6-85. Aquatic Community Water Benchmarks. (8 Pages)

Receptor/ Criterion	Benchmark (µg/L)	Source	Effect Type	Notes	Selected Benchmark (µg/L)
Plant	500	Lee et al. 1979	NOEC	See below. UF of 2 applied for LOEC-NOEC conversion.	--
	1,000	Lee et al. 1979	LOEC	Growth inhibition of a common freshwater spp. Lower values available for blue-green algae (*Anabaena flos-aquae*) but species most common in eutrophic waters, unlikely in Columbia River. Value as reported in Environment Canada/Health Canada (2010).	1,000
Zinc (7440-66-6)					
WQS	77	Ecology 2006	CCC	Washington State Water Quality Standards for Surface Waters, Table 240(3) Toxic Substances Chronic Criteria, calculated based on hardness of 70 mg/L.	77
WQS	85	Ecology 2006	CMC	Washington State Water Quality Standards for Surface Waters, Table 240(3) Toxic Substances Acute Criteria, calculated based on hardness of 70 mg/L.	85

NOTE: Minimum hardness value in RCBRA dataset, range is 70 to 170 mg/L hardness.

[a] Model Input Assumptions: Temperature set to 10°C, total organic carbon assumed equivalent to dissolved organic carbon, humic acids assumed to be 10%, sulfide assumed to be 1E-10 mg/L; these assumptions are not necessarily representative of Columbia River surface water conditions. All other model inputs taken from average RCBRA surface water data for the Hanford Reach of the Columbia River as collected through the River Corridor Baseline Risk Assessment.

-- = not applicable
BLM = Biotic Ligand Model
CCC = criteria continuous concentration
CCC_{BLM} = criteria continuous concentration calculated using the biotic ligand model
CMC = criteria maximum concentration
CMC_{BLM} = criteria maximum concentration calculated using the biotic ligand model
EPA = U.S. Department of Environmental Protection Agency
LC_{50} = lethal concentration to 50% of the test population
LOEC = lowest observed effect concentration
NA = not available
NOEC = no observed effect concentration
UF = uncertainty factor
WQC = Federal ambient water quality criterion
WQS = State of Washington Water Quality Standard for Surface Waters

Birge, W. J., A. G. Westerman, and J. A. Spromberg, 2000, *Comparative Toxicology and Risk Assessment of Amphibians*, In Sparling, et al, 2000, Ecotoxicology of Amphibians and Reptiles SETAC Press, Pensacola, FL.

Birge, W. J., J. A. Black, A. G. Westerman, and J. E. Hudson, 1980, *Aquatic Toxicity Tests on Inorganic Elements Occurring in Oil Shale*, In: C. Gale (Ed.), EPA-600/9-80-022, Oil Shale Symposium: Sampling, Analysis and Quality Assurance, March 1979, U.S. Environmental Protection Agency, Cincinnati, Ohio :519-534.

Birge, W. J., J. A. Black, and A. G. Westerman, 1979, *Evaluation of Aquatic Pollutants Using Fish and Amphibian Eggs as Bioassay Organisms*, In: S. W. Nielsen, G. Migaki, and D. G. Scarpelli (Eds.), Symp.Animals Monitors, Environmental Pollution, 1977, Storrs, CT 12:108-118.

Birge, W. J., J. A. Black, and B. A. Ramey, 1981, *The Reproductive Toxicology of Aquatic Contaminants*, In: J. Saxena and F. Fisher (Eds.), Hazard Assessment of Chemicals: Current Developments, Academic Press, New York, New York 1:59-115.

Blindow, I., 1988, Phosphorus Toxicity to Chara. Aquatic Botany pp. 32: 393-395.

Borgmann, U., Y. Couillard, P. Doyle, and D. G. Dixon, 2005, Toxicity of Sixty-Three Metals and Metalloids to Hyalella Azteca at Two Levels of Water Hardness, Environ.Toxicol.Chem. 24(3):641-652.

Camargo, J. A., A. Alonso, A. Salamanca, 2005, *Nitrate Toxicity t o Aquatic Animals: A Review With New Data for Freshwater Invertebrates*, Chemosphere 58, 1255-1267.

Davies, P. H. and S. F. Brinkman, 1994, *Acute and Chronic Toxicity of Manganese to Exposed and Unexposed Rainbow and Brown Trout*, Water Pollution Studies, Colorado Division of Wildlife, Federal Aid Project #F-243R-1.

De Jong, L. E. D, 1965, *Tolerance of Chlorella vulgaris for Metallic and Non-Metallic Ions*, Antonie Leeuwenhoek 31:301-313.

Dowden, B. F., and H. J. Bennett, 1965, Toxicity of Selected Chemicals to Certain Animals, J.Water Pollut. Control Fed. 37(9):1308-1316.

DSM Agro B. V., 2009, Safety Data Sheet for Nutramon Fertilizer; 78% Ammonium Nitrate Plus Dolomite Filler.

Ecology (Washington State Department of Ecology), 2006, Water Quality Standards for Surface Waters of the State of Washington, Chapter 173-201A Washington Administrative Code, Publication No. 06-01-091 (http://www.ecy.wa.gov/pubs/0610091.pdf).

Environment Canada/Health Canada 2010, Draft Screening Assessment for the Challenge - Vanadium Oxide, March, 2010.

EPA, 1988, Ambient Water Quality Criteria for Antimony (III), Draft, August 30th, 1988, U.S. Environmental Protection Agency, Washington, D.C.

Table 6-85. Aquatic Community Water Benchmarks. (8 Pages)

Receptor/ Criterion	Benchmark (µg/L)	Source	Effect Type	Notes	Selected Benchmark (µg/L)

EPA, 2009, National Recommended Water Quality Criteria, Office of Water; View this document online at http://www.epa.gov/ost/criteria/wqctable/.

Fargašová, A., A. Bumbalova, E. Havranek, 1999, *Ecotoxicological Effects and Uptake of Metals (Cu+, Cu 2+, Mn 2+, Mo 6+, Ni 2+, V 5+) in Freshwater Alga Scenedesmus quadricauda*, Chemosphere 38(5): 1165-1173.

Hamer, A. J., J. A. Makings, S. J. Lane, and M. J. Mahony, 2004, *Amphibian Decline and Fertilizers Used on Agricultural Land in South-Eastern Australia*, Agric.Ecosyst.Environ. 102(3):299-305.

Hydroqual, 2007 (June), Biotic Ligand Model, Windows Interface, V. 2.2.3: User's Guide and Reference Manual. Available at: http://www.hydroqual.com/wr_blm.html.

Johannsen, M., K. Rasanen, J. Merila, 2001, *Comparison of Nitrate Tolerance Between Different Populations of the Common Frog, Rana temporaria*, Aq. Tox. 54(1-2): 1-14.

Knudtson, B. K., 1979, Acute Toxicity of Vanadium to Two Species of Freshwater Fish, Bulletin of Environmental Contamination and Toxicology 23: 95-99.

Lee, K., C. Nalewajko, T. R. Jack, 1979, Effects of Vanadium on Freshwater Algae, In: Proceedings of the Fifth Annual Aquatic Toxicity Workshop, Hamilton, Ontario, 1978, Fish Mar Serv Tech Rep 862:297–310.

Marques, S. M., F. Gonçalves, and R. Pereira, 2008, Effects of a Uranium Mine Effluent in the Early-Life Stages of *Rana perezi seoane*: Science of the Total Environment, v. 402, No. 1, p. 29–35.

Orton, F., J. A. Carr, R. D. Handy 2006, Effects of Nitrate and Atrazine on Larval Development and Sexual Differentiation in the Northern Leopard Frog *Rana pipens*. Env. Tox. Chem. 25(1):65-71.

Stendahl, D. H. and J. B. Sprague, 1982, Effects of Water Hardness and pH on Vanadium Lethality to Rainbow Trout, Water. Res., 16:1479-1488.

Wang, W., 1986, Toxicity Tests of Aquatic Pollutants by Using Common Duckweed, Environmental Pollution. 11:1-14.

WHO (World Health Organization), 2001a, Concise International Chemical Assessment Document 33, Barium and Barium Compounds, ISBN 92 4 153033 2.

WHO (World Health Organization), 2001b, Concise International Chemical Assessment Document 29, Vanadium Pentoxide and Other Inorganic Vanadium Compounds, ISBN 92 4 153029 4.

WHO (World Health Organization), 2004, Concise International Chemical Assessment Document 63, Manganese and its Compounds: Environmental Aspects, ISBN 92 4 153063 4.

WHO (World Health Organization), 2004, Concise International Chemical Assessment Document 77, Strontium and Strontium Compounds: Environmental Aspects, ISBN 978 92 4 153077 4.

Table 6-86. Avian Wildlife Toxicity Reference Values. (3 Pages)

Soil Constituent	Form/ Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Avian NOAEL TRV (mg/kg/d)	Selected Avian LOAEL TRV (mg/kg/d)
Aluminum	Aluminum sulfate	Carriere et al. 1986	Ringed dove	0.155	4 months	Oral in diet	Reproduction	--	--	--	109.7	--	ES/ER/TM-86/R3	--	**109.7**	**--**
Antimony	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**
Barium	Barium hydroxide	Johnson et al. 1960	1-day old chicks	0.121	4 weeks	Oral in diet	Mortality	--	0.1	Subchronic-chronic	20.8	41.7	ES/ER/TM-86/R3	--	**20.8**	**41.7**
Cadmium	Multiple forms	Multiple studies [a]	Multiple species	--	--	--	--	--	--	--	1.47	--	OSWER Directive 9285.7-65	Geometric mean of NOAELs for reproduction and growth	**1.47**	**--**
Cadmium	Cadmium sulfate	Leach et al. 1979 [a]	Chicken	1.6	12 weeks during egg laying	Oral in diet	Reproduction	Egg production, progeny count	--	--	0.593	2.37	OSWER Directive 9285.7-65	--	**--**	**2.37**
Calculated total uranium	Depleted metallic	Haseltine and Sileo 1983	Black duck	1.25	6 weeks	Oral in diet	Growth, mortality, organ pathology	Mortality, body weight, blood chemistry, liver or kidney effects	0.1	Subchronic-chronic	16	--	ES/ER/TM-86/R3	--	**16**	**--**
Chromium (3+)	Multiple forms	Multiple studies [a]	Chicken	--	--	--	Reproduction and growth	--	--	--	2.66	--	OSWER Directive 9285.7-66	Geometric mean of NOAELs for reproduction and growth	**2.66**	**--**
Chromium (3+)	Chrome alum doceahydrate	Haseltine et al. unpublished [a]	Black duck	1.17	180 to 190 days	Oral in diet	Reproduction	Reproductive success	--	--	0.569	2.78	OSWER Directive 9285.7-66	Field study	**--**	**2.78**
Copper	Copper	Al Ankari et al. 1998 [a]	Chicken	1.52	84 days during egg laying	Oral in diet	Reproduction	Eggs per nest	--	--	4.05	12.1	OSWER Directive 9285.7-68	--	**4.05**	**12.1**
Hexavalent chromium	Dichromate, soddium or potassium	Multiple studies	Chicken	--	1 to 11 days	Oral in diet	Mutliple	Multiple	--	--	0.4	--	OSWER Directive 9285.7-66	GMM NOAEL one species	**0.4**	**--**
Hexavalent chromium	Dichromate, soddium or potassium	Asmatullah et al. 1999	Chicken	2.02	32	Oral in diet	Reproduction and growth	Multiple	--	--	--	4.02	OSWER Directive 9285.7-66	Lowest LOAEL for one species	**--**	**4.02**
Lead	Lead acetate	Edens and Garlich 1983 [a]	Chicken	1.81	4 weeks during egg laying	Oral in diet	Reproduction	Progeny count	--	--	1.63	3.26	OSWER Directive 9285.7-70	--	**1.63**	**3.26**
Manganese	Multiple forms	Multiple studies [a]	Multiple species	--	--	--	Reproduction and growth	--	--	--	179	--	OSWER Directive 9285.7-71	Geometric mean of NOAELs for reproduction and growth	**179**	**--**
Manganese	Manganese chloride tetrahydrate	Southern and Baker 1983 [a]	Chicken	0.316	14 days	Oral in diet	Growth	Body weight	--	--	261	348	OSWER Directive 9285.7-71	--	**--**	**348**

Table 6-86. Avian Wildlife Toxicity Reference Values. (3 Pages)

Soil Constituent	Form/ Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Avian NOAEL TRV (mg/kg/d)	Selected Avian LOAEL TRV (mg/kg/d)
Mercury	Methyl mercury	Heinz and Hoffman 1998; Heinz 1976	Mallard	1	2.5 months to 2 generations	Oral in diet	Reproduction	--	--	--	0.068	0.37	--	--	**0.068**	**0.37**
Nickel	Multiple forms	*Multiple studies	Multiple species	--	--	--	Reproduction and growth	--			6.71	--	OSWER Directive 9285.7-76	Geometric mean of reproduction and growth studies	**6.71**	**---**
Nickel	Nickel chloride hexahydrate	*Martinez and Diaz 1996	Chicken	1.9	42 days	Oral in diet	Growth	Body weight	--	--	5.76	11.5	OSWER Directive 9285.7-76	Lowest bounded growth or reproductive LOAEL above the geometric mean NOAEL from EPA (2007d)	**--**	**11.5**
Nitrate/nitrite	--	NA	--	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**
Phosphorous	--	NA	--	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**
Selenium	Sodium selenite	El-Begearmi and Combs 1982 [a]	Chicken	0.328	2 weeks	Oral in diet	Survival	Mortality	--	--	0.29	0.579	OSWER Directive 9285.7-72	--	**0.29**	**0.579**
Strontium (elemental)	--	NA	--	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**
Tin	Bis(Tributyl-tin) oxide	Schlatterer et al. 1993	Japanese quail	0.15	6 weeks during reproduction	Oral in diet	Reproduction	Egg weight and hatchability	--	--	6.8	16.9	ES/ER/TM-86/R3	--	**6.8**	**16.9**
Titanium	--	NA	--	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**
Uranium	Depleted metallic	Haseltine and Sileo 1983	Black duck	1.25	6 weeks	Oral in diet	Growth, mortality, organ pathology	Mortality, body weight, blood chemistry, liver or kidney effects	0.1	Subchronic-chronic	16	--	ES/ER/TM-86/R3	--	**16**	**--**
Vanadium	Sodium metavanadate	*Hill 1979	Chicken	1.042	5 weeks	Oral in diet	Growth	Body weight	--	--	0.344	0.688	OSWER Directive 9285.7-75	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**0.344**	**0.688**
Zinc	Multiple forms	Multiple studies [a]	Multiple species	--	--	--	Reproduction and growth	--	--	--	66.1	--	OSWER Directive 9285.7-73	Geometric mean of reproduction and growth studies	**66.1**	**--**

Table 6-86. Avian Wildlife Toxicity Reference Values. (3 Pages)

Soil Constituent	Form/ Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Avian NOAEL TRV (mg/kg/d)	Selected Avian LOAEL TRV (mg/kg/d)
Zinc	Zinc acetate	Gibson et al. 1986 [a]	Chicken	2	10 weeks	Oral in diet	Reproduction	Progeny count	--	--	57.3	66.5	OSWER Directive 9285.7-73	--	**--**	**66.5**

NOTE: Uncertainty factors were used to adjust all measured effect concentrations to chronic NOAELs and chronic LOAELs as follows:
LOAEL to NOAEL = 0.1.
Subchronic to chronic = 0.1 where: chronic = >12 weeks or during critical lifestage, subchronic = 4 to 12 weeks.
Bold = values selected as the avian TRVs.

[a] Study information and calculated NOAELs and LOAELs for these sources were taken directly from the cited EcoSSL report developed by the EPA. All other primary sources were obtained, reviewed, and TRVs were extracted or developed from the study.

-- = not applicable
EcoSSL = Ecological Soil Screening Level
EPA = U.S. Environmental Protection Agency
LOAEL = lowest observable adverse effect level
NA = not available
NOAEL = no observable adverse effect level
TRV = toxicity reference value

al Ankari, A., H. Najib, and A. al Hozab, 1998, "Yolk and Serum Cholesterol and Production Traits, as Affected by Incorporating a Supraoptimal Amount of Copper in the Diet of the Leghorn Hen," Br. Poult. Sci. 39(3): 393-397.
Asmatullah, Asma, A. Latif, and A. R. Shakoori, 1999, Effect of Hexavalent Chromium on Egg Laying Capacity, Hatchability of Eggs, Thickness of Egg Shell and Post-Hatching Development of Gallus Domesticus, Asian-Australasian Journal of Animal Sciences,12(6): 944-950.
Carriere, D., K. Fischer, D. Peakall, and P. Angehrn, 1986, Effects of Dietary Aluminum in Combination with Reduced Calcium and Phosphorus on the Ring Dove (Streptopelia risoria), Water, Air, and Soil Poll. 30: 757-764.
Edens, F. W. and J. D. Garlich, 1983, "Lead-Induced Egg Production Decrease in Leghorn and Japanese Quail Hens," Poult Sci 62: 1757-1763.
El-Begearmi, M. M. and G. F. Combs Jr., 1982, "Dietary Effects on Selenite Toxicity in the Chick," Poult. Sci. 61(4): 770-776.
ES/ER/TM-86/R3, 1996, Toxicological Benchmarks for Wildlife: 1996 Revision, Oak Ridge National Laboratory, Environmental Sciences Division, Oak Ridge, Tennessee.
Gibson, S. W., M. H. Stevenson, and N. Jackson, 1986, "Comparison of the Effects of Feeding Diets Supplemented with Zinc Oxide or Zinc Acetate on the Performance and Tissue Mineral Content of Mature Female Fowls," Br. Poult. Sci. (1986) 27(3): 391-402.
Haseltine, S. D. and L. Sileo, 1983, "Response of American Black Ducks to Dietary Uranium: A Proposed Substitute for Lead Shot," J. Wildl. Manage. 47: 1124-1129.
Heinz, G. H., 1976, "Methylmercury: Second-Year Feeding Effects on Mallard Reproduction and Duckling Behavior," J Wildl Manage 4: 82-90.
Heinz, G. H., and D. J. Hoffman, 1998, "Methylmercury Chloride and Selenomethionine Interactions on Health and Reproduction in Mallards," Environ Toxicol Chem 17: 139-145.
Hill, E. F, and M. B. Camardese, 1986, Lethal Dietary Toxicities of Environmental Contaminants and Pesticides to Coturnix, United States Fish And Wildlife Service: Fish and Wildlife Tech Rep 2 (NTIS PB86-176914). Laurel, MD. 154.
Jensen, L. S., R. P. Peterson, and L. Falen, 1974, "Inducement of Enlarged Hearts and Muscular Dystrophy in Turkey Poults with Dietary Silver," Poultry Sci 53(1): 57-64.
Johnson, D., Jr., A. L. Mehring, Jr., and H. W. Titus, 1960, "Tolerance of Chickens for Barium," Proc. Soc. Exp. Biol. Med. 104: 436-438.
Leach, R. M. Jr, K. W. Wang, and D. E. Baker, 1979, "Cadmium and the Food Chain: The Effect of Dietary Cadmium on Tissue Composition in Chicks and Laying Hens," J Nutr. 109(3): 437-43.
Martinez, D. A. and G. J. Diaz, Effect of Graded Levels of Dietary Nickel and Manganese on Blood Hemoglobin Content and Pulmonary Hypertension in Broiler Chickens, Avian Pathol. (1996) 25(3): 537-549
OSWER Directive 9285.7-65, 2005, Ecological Soil Screening Levels for Cadmium: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-66, 2005, Ecological Soil Screening Levels for Chromium: Interim Final, revised 2008, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-68, 2006, Ecological Soil Screening Levels for Copper: Interim Final, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-70, 2005, Ecological Soil Screening Levels for Lead: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-71, 2007, Ecological Soil Screening Levels for Manganese: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-72, 2007, Ecological Soil Screening Levels for Selenium: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-73, 2007, Ecological Soil Screening Levels for Zinc: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-75, 2005, Ecological Soil Screening Levels for Vanadium: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-76, 2007, Ecological Soil Screening Levels for Nickel: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
Schlatterer, B., T. M. M. Coenen, E. Ebert, R. Grau, V. Hilbig, and R. Munk, 1993, "Effects of Bis(tri-n-butyltin)oxide in Japanese Quail Exposed During Egg-laying Period: An Interlaboratory Comparison Study," Arch Environ Contam Toxicol, 24:440-448.
Southern, L. L. and D. H. Baker, 1983, "Eimeria Acervulina Infection in Chicks Fed Deficient or Excess Levels of Manganese," J. Nutr., 113(1): 172-7.

Table 6-87. Mammalian Wildlife Toxicity Reference Values. (3 Pages)

Soil Constituent	Form/ Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
Aluminum	Aluminum chloride	Ondreicka et al. 1966	Mouse	0.03	3 generations	Oral in water	Reproduction	Offspring growth	0.1	LOAEL-NOAEL	1.93	19.3	ES/ER/TM-86/R3	Note that soil pH must be <5.5 (USEPA 2003) for Al to be bioavailable	**1.93**	**19.3**
Antimony	Antimony trichloride	Rossi et al. 1987 [a]	Rat	0.33	31 days	Oral in water	Reproduction	Progeny body weight	--	--	0.059	0.59	OSWER Directive 9285.7-61	--	**0.059**	**0.59**
Barium	Multiple forms	Multiple studies [a]	Multiple species	--	--	--	--	--	--	--	51.8	--	OSWER Directive 9285.7- 63	Geometric mean of NOAELs for reproduction and growth	**--**	**--**
Barium	Barium chloride dihydrate	Dietz et al. 1992 [a]	Rat	0.34	92 days	Oral in water	Growth	Reduced body weight	--	--	61	121	OSWER Directive 9285.7- 63	Lowest LOAEL in growth or reproduction endpoints below the geomean NOAEL (EcoSSL)	**--**	**--**
Barium	Barium chloride	NTP 1994	Rat	0.35	105 weeks	Oral in water	Nephrotoxicity	Increased kidney weight	--	--	45	75	--	Study selected because NOAEL is similar to EcoSSL, study is of long duration, and a LOAEL was identified	**45**	**75**
Cadmium	Cadmium acetate	Yuhas et al. 1979 [a]	Rat	0.43	2 weeks	Oral in water	Growth	Body weight	--	--	0.77	7.7	OSWER Directive 9285.7-65	--	**--**	**--**
Cadmium	Cadmium chloride	Sutou et al. 1980	Rat	0.303	6 weeks during reproduction	Oral gavage	Reproduction	Reduced fetal survival	--	--	1	10	ES/ER/TM-86/R3	The ORNL TRV for cadmium was selected as it represents reproductive effects, is a longer study, and is comparable to the TRV used for EcoSSLs	**1**	**10**
Calculated total uranium	Uranyl acetate (61.32% U)	Paternain et al. 1989	Mouse	0.028	60 days prior to gestation, gestation, delivery, and lactation	Oral intubation	Reproduction	Pup survival and body weight	--	--	3.07	6.13	ES/ER/TM-86/R3	--	**3.07**	**6.13**
Chromium (3+)	Multiple forms	Multiple studies [a]	Multiple species	--	--	--	Reproduction and growth	--	--	--	2.4	--	OSWER Directive 9285.7-66	Geometric mean of NOAELs for reproduction and growth	**2.4**	**--**
Chromium (3+)	Chromium sulfate	Zahid et al. 1990 [a]	Mouse	0.0249	35 days	Oral in diet	Reproduction	Sperm cell counts	0.1	LOAEL-NOAEL	0.962	9.62	OSWER Directive 9285.7-66	--	**--**	**9.62**
Chromium (6+)	Multiple forms	Multiple studies [a]	Multiple species	--	--	--	Reproduction and growth	--	--	--	9.24	--	OSWER Directive 9285.7-66	Geometric mean of NOAELs for reproduction and growth	**9.24**	**--**
Chromium (6+)	Potassium dichromate	R.O.W. Scientists, Inc. [a]	Mouse	0.2036	3 weeks	Oral in diet	Growth	Body weight	--	--	5.66	12	OSWER Directive 9285.7-66	--	**--**	**12**
Chromium (6+)	Sodium dichromate	Chowdhury and Mitra 1995	Rat	0.3084	90 days	Oral gavage	Reproduction	Testes weight	--	--	20	40	OSWER Directive 9285.7-66	Lowest bounded reproductive LOAEL above the geometric mean NOAEL from EPA (2008).	--	**40**
Copper	Copper sulfate pentahydrate	Allcroft et al. 1961 [a]	Pig	100	4 weeks	Oral in diet	Growth	Body weight	--	--	5.6	9.34	OSWER Directive 9285.7-68	--	**5.6**	**9.34**
Lead	Lead acetate	Kimmel et al. 1980 [a]	Rat	0.3	7 weeks during gestation	Oral in water	Growth	Body weight	--	--	4.7	8.9	OSWER Directive 9285.7-70	--	**4.7**	**8.9**

Table 6-87. Mammalian Wildlife Toxicity Reference Values. (3 Pages)

Soil Constituent	Form/ Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
Manganese	Multiple forms	Multiple studies [a]	Multiple species	--	--	--	Reproduction and growth	--	--	--	51.5	--	OSWER Directive 9285.7-71	Geometric mean of NOAELs for reproduction and growth	**51.5**	**--**
Manganese	Manganese oxide	Rehnberg et al. 1980 [a]	Rat	0.0566	20 days	Gavage	Reproduction, growth	Reproductive organ histology, body weight	--	--	21	71	OSWER Directive 9285.7-71	--	**--**	**71**
Mercury	Methylmercury chloride	Verschuuren et al. 1976 [a]	Rat	0.35	3 generations	Oral in diet	Reproduction	Pup viability	--	--	0.032	0.16	ES/ER/TM-86/R3	--	**0.032**	**0.16**
Nickel	Nickelous chloride	*Pandey and Srivastava 2000	Mouse	0.025	35 days	Oral (other)	Reproduction	Sperm cell counts	--	--	1.7	3.4	OSWER Directive 9285.7-76	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**1.7**	**3.4**
Nitrate/ nitrite	Potassium nitrate	Sleight and Atallah 1968	Guinea pig	0.86	143 to 204 days	Oral in water	Reproduction	Number of live births	--	--	507	1,130	ES/ER/TM-86/R3	Converted to "as nitrogen" based on nitrate	**114**	**255**
Phosphorous	--	NA	--	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**
Selenium	Sodium selenite	Mahan and Moxon 1984 [a]	Pig	17.8	37 days	Oral in diet	Growth	Body weight	--	--	0.143	0.215	OSWER Directive 9285.7-72	--	**0.143**	**0.215**
Strontium (elemental)	Strontium chloride	Skoryna 1981	Rat	0.35	3 years	Oral in water	Growth	Body weight	--	--	263	--	ES/ER/TM-86/R3	--	**263**	**--**
Tin	Bis(tibutyltin) oxide	Davis et al. 1987	Mouse	0.03	Days 6 through 15 of gestation	Oral intubation	Reproduction	Reduced fetal weight and fetal survival	--	--	23.4	35	ES/ER/TM-86/R3	--	**23.4**	**35**
Titanium	--	NA	--	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**
Uranium	Uranyl acetate (61.32% U)	Paternain et al. 1989	Mouse	0.028	60 days prior to gestation, gestation, delivery, and lactation	Oral intubation	Reproduction	Pup survival and body weight	--	--	3.07	6.13	ES/ER/TM-86/R3	--	**3.07**	**6.13**
Vanadium	Sodium orthovanadate	*Sanchez et al. 1992	Mouse	0.047	12 days during gestation	Gavage	Reproduction	Offspring development	--	--	4.16	8.31	OSWER Directive 9285.7-75	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**4.16**	**8.31**
Zinc	Various forms	Multiple studies [a]	Multiple species	--	--	--	Reproduction and growth	--	--	--	75.4	--	OSWER Directive 9285.7-73	Geometric mean of NOAELs for reproduction and growth	**75.4**	**--**

Table 6-87. Mammalian Wildlife Toxicity Reference Values. (3 Pages)

Soil Constituent	Form/ Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
Zinc	Zinc sulfate	Miller et al. 1989 [a]	Cattle	580	14 weeks	Oral in diet	Reproduction	Progeny body weight	--	--	37.9	75.9	OSWER Directive 9285.7-73	This is lowest LOAEL above geometric mean NOAEL	--	**75.9**

NOTE: Uncertainty factors were used to adjust all measured effect concentrations to chronic NOAELs and chronic LOAELs as follows:
LOAEL to NOAEL = 0.1.
Subchronic to chronic = 0.1 where: chronic = >12 weeks or during critical lifestage, subchronic = 4 to 12 weeks.
Bold = values selected as the avian TRVs.

[a] Study information and calculated NOAELs and LOAELs for these sources were taken directly from the cited EcoSSL report developed by the EPA. All other primary sources were obtained, reviewed, and TRVs were extracted or developed from the study.

-- = not applicable
EcoSSL = Ecological Soil Screening Level
EPA = U.S. Environmental Protection Agency
LOAEL = lowest observable adverse effect level
NA = not available
NOAEL = no observable adverse effect level
TRV = toxicity reference value

Allcroft, R., K. N. Burns, and G. Lewis, 1961, "The Effects of High Levels of Copper in Rations for Pigs," Vet. Rec., 73: 714.
Davis, A., R. Barale, and G. Brun, 1987, "Evaluation of the Genetic and Embryotoxic Effects of Bis(tri-n-butyltin)oxide (TBTO), A Broad Spectrum Pesticide, in Multiple In Vivo and In Vitro Short-term Tests," Muta Res., 188:65-95.
Dietz, D., D. M. R. Elwell, W. E. Davis, Jr., and E. F. Meirhenry, 1992, "Subchronic Toxicity of Barium Chloride Dihydrate Administered to Rats and Mice in the Drinking Water," Fundam. Appl. Toxicol., 19(4):527-37.
ES/ER/TM-86/R3, 1996, Toxicological Benchmarks for Wildlife: 1996 Revision, Oak Ridge National Laboratory, Environmental Sciences Division, Oak Ridge, Tennessee.
Kimmel, C.A., L. D. Grant, C. S. Sloan, and B. C. Gladen, 1980, "Chronic Low-Level Lead Toxicity in the Rat. I. Maternal Toxicity and Perinatal Effects," Toxicol. Appl. Pharmacol., 56: 28-41.
Mahan, D. C. and A. L. Moxon, 1984, "Effect of Inorganic Selenium Supplementation on Selenosis in Postweaning Swine," Journal of Animal Science, 58(5): 1216-1221.
NTP, 1994, NTP Technical Report on the Toxicology and Carcinogenesis Studies of Barium Chloride Dihydrate (CAS no.10326-27-9) in F344/N Rats and B6C3F1 Mice (Drinking Water Studies), National Toxicity Program, Research Triangle Park, North Carolina.
Ondreicka, R., E. Ginter, and J. Kortus, 1966, Chronic Toxicity of Aluminum in Rats and Mice and Its Effects on Phosphorus Metabolism, Brit. J. Indust. Med. 23: 305-313.
OSWER Directive 9285.7-60, 2003, Ecological Soil Screening Levels for Aluminum: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-61, 2005, Ecological Soil Screening Levels for Antimony: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-63, 2005, Ecological Soil Screening Levels for Barium: Interim Final, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-65, 2005, Ecological Soil Screening Levels for Cadmium: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-66, 2005, Ecological Soil Screening Levels for Chromium: Interim Final, revised 2008, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-68, 2006, Ecological Soil Screening Levels for Copper: Interim Final, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-70, 2005, Ecological Soil Screening Levels for Lead: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-71, 2007, Ecological Soil Screening Levels for Manganese: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-72, 2007, Ecological Soil Screening Levels for Selenium: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-73, 2007, Ecological Soil Screening Levels for Zinc: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-75, 2005, Ecological Soil Screening Levels for Vanadium: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-76, 2007, Ecological Soil Screening Levels for Nickel: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
Pandey, R., R. Kumar, S. P. Singh, and S. P. Srivastava, 1999, Toxic Effects of Nickel Sulphate on Embryonic Mice, Journal of Advanced Zoology, 20 (1): 10-11.
Paternain, J. L., J. L. Domingo, A. Ortega, and J. M. Llobet, 1989, "The Effects of Uranium on Reproduction, Gestation, and Postnatal Survival in Mice," Ecotoxicol. Environ. Saf., 17: 291-296.
Rehnberg, G. L., J. F. Hein, S. D. Carter, and J. W. Laskey, 1980, "Chronic Manganese Oxide Administration to Preweanling Rats: Manganese Accumulation and Distribution," J Toxicol Environm Health, 6: 217-226.
Rossi, F., R. Acampora, C. Vacca, S. Maione, M. G. Matera, R. Servodio, and E. Marmo, 1987, "Prenatal and Postnatal Antimony Exposure in Rats: Effect on Vasomotor Reactivity Development of Pups," Teratog. Carcinog. Mutagen., 7(5): 491-496.
Skoryna, S. C., 1981, "Effects of Oral Supplementation with Stable Strontium," Can Med Assoc J, 125:703-712.
Sanchez, D. J., M. Gomez, J. L. Domingo, J. M. Llobet, and J. Corbella, 1992, Maternal and Developmental Toxicity of Metavanadate in Mice, Met. Ions Biol. Med. Proc. Int. Symp., 2nd : 319-20, Editor(s): Anastassopoulou, Jane, Publisher: Libbey, Montrouge, Fr.
Sleight, S. D. and O. A. Atallah, 1968, "Reproduction in the Guinea Pig as Affected by Chronic Administration of Potassium Nitrate and Potassium Nitrite," Toxicol Appl Pharmacol, 12:179-185.
Sutou, S., K. Yamamoto, H. Sendota, and M. Sugiyama, 1980, "Toxicity, Fertility, Teratogenicity, and Dominant Lethal Tests in Rats Administered Cadmium Subchronically, I. Fertility, Teratogenicity, and Dominant Lethal Tests," Ecotox Environ Safe 4:51-56.
ROW Scientists, Inc. 1996, Final Report on the Reproductive Toxicity of Potassium Dichromate (hexavalent) (CAS NO. 7778-50-9) Administered in Diet to SD Rats, 26 Dec 1996, PB97125355, National Toxicology Program RACB95001. 177.
Verschuuren, H. G., R. Kroes, E. M. Den Tonkelaar, J. M. Berkvens, P. W. Helleman, A. G. Rauws, P. L. Schuller, and G. J. Van Esch, 1976, "Toxicity of Methyl Mercury Chloride in Rats. II. Reproduction Study," Toxicol., 6: 97-106.
Yuhas, E. M., R. C. Schnell, and T. S. Miya, 1979, "Dose-Related Alterations in Growth and Mineral Disposition by Chronic Oral Cadmium Administration in the Male Rat," Toxicology, 12(1): 19-29.
Zahid, Z. R., Z. S. Al Hakkak, A. H. H. Kadhim, E. A. Elias, and I. S. Al Jumaily, 1990, "Comparative Effects of Trivalent and Hexavalent Chromium on Spermatogenesis of the Mouse," Toxicol. Environ. Chem., 25(2-3): 131-136.

Table 6-88. Summary of Maximum Sediment Biota Hazard Quotients for Contaminants of Potential Ecological Concern.

COPEC	Sediment Biota Benchmark (mg/kg)	Study Sites		Reference Sites	
		Maximum Concentration (mg/kg) CTE [a]	Benchmark HQ (Maximum Concentration/ Benchmark)	Maximum Concentration (mg/kg) CTE [a]	Benchmark HQ (Maximum Concentration/ Benchmark)
Aluminum	14,000	13,000	0.93	8,260	0.59
Antimony	0.6	0.649 [b]	1.1	0.47	0.78
Barium	300	869 [b]	2.9	142	0.47
Cadmium	1	2.4	2.4	2.2	2.2
Calculated total uranium	100	15.4	0.15	2.9	0.03
Chromium	100	286	2.9	21	0.21
Copper	830	64	0.08	24.7	0.03
Hexavalent chromium	NA	8.41	--	--	--
Lead	430	158	0.37	63.7	0.15
Manganese	460	924	2.0	577	1.3
Mercury	0.75	0.2	0.27	0.08	0.11
Nickel	70	32.1	0.46	23.3	0.33
Nitrogen in nitrate	NA	26.3	--	19.2	--
Nitrogen in nitrite	NA	1.69	--	0.286	--
Phosphorus	600	1,300	2.2	1,390	2.3
Selenium	4	4.3	1.1	--	--
Strontium (elemental)	NA	45.6	--	28.8	--
Tin	22,000	3.7	<0.01	17.1	<0.01
Titanium	NA	2,030	--	828	--
Uranium (inorganic)	100	6.8	0.068	--	--
Vanadium	NA	66	--	58.9	--
Zinc	160	800	5.0	358	2.2

= Concentration greater than benchmark.

[a] Concentration is CTE unless otherwise noted (RME).
[b] Maximum value from 100-B/C Pilot sample.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
HQ = hazard quotient
NA = not available
RME = reasonable maximum exposure

Table 6-89. Summary of Results by Location for Sediment Biota. (2 Pages)

Site Name	COPEC	Sediment Benchmark (mg/kg)	Sediment Concentration (mg/kg) CTE [a]
Reference Sites			
Bev Ref 1	Zinc	160	198
Ref 13	Cadmium	1	1.1
	Manganese	460	540
	Zinc	160	216
Ref 14	Cadmium	1	1.1
	Manganese	460	486
	Zinc	160	189
Ref 300-1	Cadmium	1	2.2
	Zinc	160	358
Ref 300-2	Manganese	460	577
Study Sites			
100-B/C Decision Area			
100-B/C Pilot	Antimony	0.6	0.649
	Barium	300	869
	Manganese	460	603
	Zinc	160	184
2a	Zinc	160	161
100-K Decision Area			
2c	Zinc	160	202
Cr1	Cadmium	1	1.4
	Zinc	160	286
Cr2	Cadmium	1	1.6
	Zinc	160	270
100-N Decision Area			
100-NR-2	Cadmium RME	1	1.34
	Zinc	160	176
Sr3	Cadmium	1	1.8
	Zinc	160	227
Sr4	Cadmium	1	1.1
	Zinc	160	193
Sr5	Cadmium	1	1.7
	Manganese	460	575
	Zinc	160	282

Table 6-89. Summary of Results by Location for Sediment Biota. (2 Pages)

Site Name	COPEC	Sediment Benchmark (mg/kg)	Sediment Concentration (mg/kg) CTE [a]
Sr6	Cadmium	1	2.3
	Manganese	460	924
	Zinc	160	362
Sr10	Cadmium	1	1.1
	Zinc	160	174
100-D/100-H Decision Area			
Cr5	Zinc	160	188
Cr8	Zinc	160	187
100-F/100-IU-2/100-IU-6 Decision Area			
128-F2	Cadmium	1	2.3
	Chromium	100	286
	Zinc	160	800
3b	Cadmium	1	1.8
	Zinc	160	215
300 Area Decision Area			
5d	Zinc	160	164
U2	Cadmium	1	1.2
	Manganese	460	746
	Zinc	160	193
U3	Manganese	460	494
U4	Cadmium	1	1.2
	Selenium	4	4.3
	Zinc	160	192
U8	Manganese	460	508
U9	Cadmium	1	1.7
	Manganese	460	520
	Zinc	160	278
U10	Cadmium	1	2.4
	Zinc	160	310

[a] Concentration is CTE unless otherwise noted (RME).
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
RME = reasonable maximum exposure

Table 6-90. Summary of Maximum Water Quality Standards/Criteria Hazard Quotients for Contaminants of Potential Ecological Concern.

COPECs With Water Quality Criteria/Standards	Water Quality Criteria/Standard (µg/L)		Study Sites			Reference Sites		
	Chronic Value	Acute Value	Maximum Pore-Water Concentration (µg/L) CTE [a]	Chronic HQ (Maximum Concentration/ Chronic Value)	Acute HQ (Maximum Concentration/ Acute Value)	Maximum Pore-Water Concentration (µg/L) CTE [a]	Chronic HQ (Maximum Concentration/ Chronic Value)	Acute HQ (Maximum Concentration/ Acute Value)
Aluminum	87	750	399	4.6	0.53	130	1.5	0.17
Antimony	30	NA	0.398 (RME)	0.01	--	2.6	0.09	--
Cadmium	0.19	1.4	0.272 (RME) [b]	1.4	0.19	0.85	4.5	0.61
Chromium	55	410	43.8	0.8	0.11	1.5	0.03	<0.01
Copper	8.4	12	3.62 (RME) [b]	0.43	0.30	8.9	1.1	0.74
Hexavalent chromium	10	15	42 (RME)	4.2	2.8	--	--	--
Lead	1.7	44	2.7	1.6	0.06	3.1	1.8	0.07
Mercury	0.012	1.4	0.0041 (RME)	0.34	<0.01	--	--	--
Nickel	38	346	2.6	0.07	<0.01	--	--	--
Selenium	5	13	4.1	0.82	0.32	9.8	2.0	0.75
Zinc	77	85	11.5 (RME) [b]	0.15	0.14	11.8	0.15	0.14

= Hazard quotient >1.

NOTE: Pore water also includes seep and spring data.

[a] Concentration is CTE unless otherwise noted (RME).

[b] Maximum from 100-B/C Pilot.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
HQ = hazard quotient
NA = not available
RME = reasonable maximum exposure

Table 6-91. Summary of Maximum Aquatic Biota Hazard Quotients for Contaminants of Potential Ecological Concern.

COPECs with Aquatic Biota Benchmarks	Aquatic Biota Benchmark (µg/L)				Study Sites					Reference Sites				
	Plant	Invertebrate	Amphibian	Fish	Maximum Pore-Water Concentration (µg/L) CTE [a]	Plant HQ (Maximum Concentration/ Plant Benchmark)	Invertebrate HQ (Maximum Concentration/ Invertebrate Benchmark)	Amphibian HQ (Maximum Concentration/ Amphibian Benchmark)	Fish HQ (Maximum Concentration/ Fish Benchmark)	Maximum Pore-Water Concentration (µg/L) CTE [a]	Plant HQ (Maximum Concentration/ Plant Benchmark)	Invertebrate HQ (Maximum Concentration/ Invertebrate Benchmark)	Amphibian HQ (Maximum Concentration/ Amphibian Benchmark)	Fish HQ (Maximum Concentration/ Fish Benchmark)
Barium	2,600	--	--	--	104	0.04	--	--	--	79.2	0.03	--	--	--
Calculated total uranium	14	30	--	910	141	10	4.7	--	0.15	4.3	0.31	0.14	--	<0.01
Manganese	190	6,900	--	655	1,640	8.6	0.24	--	3.1	1,210	6.4	0.17	--	1.8
Nitrogen in nitrate	5,000	8,500	5,000	1,600	4,950	0.99	0.58	0.99	3.1	12,500	2.5	1.5	2.5	7.8
Phosphorus	1,000	--	--	--	143	0.14	--	--	--	214	0.21	--	--	--
Strontium	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium (inorganic)	14	30	--	910	137	9.8	4.6	--	0.15	--	--	--	--	--
Vanadium	1,000	--	--	100	11.9 (RME) [b]	0.01	--	--	0.12	4.3	<0.01	--	--	0.04

= HQ>1.

NOTES: Pore water also includes seep and spring data.

[a] Concentration is CTE unless otherwise noted (RME).

[b] Maximum from 100-B/C Pilot.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
HQ = hazard quotient
RME = reasonable maximum exposure

Table 6-92. Summary of Results by Location for Aquatic Biota.

Site Name	COPEC	Water Quality Criteria/Standards (µg/L)		Benchmark (µg/L)				Pore-Water Concentration (µg/L) CTE [a]
		Chronic	Acute	Plant	Invertebrate	Amphibian	Fish	
Reference Sites								
Bev Ref 2	Manganese	--	--	190	6,900	--	655	1,210
Ref 300-1	Aluminum	87	750	--	--	--	--	130
Study Sites								
100-B/C Decision Area								
100-B/C Pilot	Aluminum	87	750	--	--	--	--	144
2a	Aluminum	87	750	--	--	--	--	399
	Hexavalent chromium	10	15	--	--	--	--	24
2b	Hexavalent chromium	10	15	--	--	--	--	13
100-K Decision Area								
Cr1	Aluminum	87	750	--	--	--	--	164
	Hexavalent chromium	10	15	--	--	--	--	42 (RME)
Cr2	Hexavalent chromium	10	15	--	--	--	--	25
100-D/100-H Decision Area								
Cr6	Hexavalent chromium	10	15	--	--	--	--	21 (RME)
300 Area Decision Area								
U1	Manganese	--	--	190	6,900	--	655	1,640
U4	Calculated total uranium	--	--	14	30	--	910	140.7
	Uranium (inorganic)	--	--	14	30	--	910	137

NOTES: Pore water also includes seep and spring data.

[a] Concentration is CTE unless otherwise noted (RME).

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
RME = reasonable maximum exposure

Table 6-93. Summary of Regression Analyses of Pak Choi Phytotoxicity Measures Versus Sediment Concentrations. (5 Pages)

COPEC or Confounding Factor	Statistical Difference for Sediment (Study Site vs. Reference; Table 6-74)	Number of Sites with Detects [a]	Minimum of P-Value for Pak Choi Regression	Maximum of P-Value for Pak Choi Regression	Number of Significant Regressions [b]	Maximum CTE Tested (mg/kg)	Maximum CTE Observed (mg/kg)	Notes
Contaminants of Potential Ecological Concern								
Aluminum	No	32	0.36	0.5	0	9,640	13,000	--
Antimony	No	1	--	--	--	0.47	0.649	Maximum tested at reference site. Maximum observed at 100-B/C Area.
Barium	No	32	0.039	0.069	1	209	869	Maximum tested at 300 Area (U3). Maximum observed at 100-B/C, Area.
• Pak choi shoot weight, wet = 3.1 + 0.015 barium, n = 32, r^2 = 0.13, p = 0.039								
Cadmium	Yes, outliers	28	0.094	0.094	0	1.8	2.4	--
Calculated total uranium	Yes	31	0.12	0.13	0	6.6	15.4	--
Chromium	Yes	32	0.76	0.83	0	43.7	286	Maximum observed in sediments near 128-F2 waste site.
Copper	No	32	0.5	0.64	0	27.4	64	Maximum observed in sediments near 128-F2 waste site.
Hexavalent chromium	Yes	1	--	--	--	0.92	8.41	Maximum observed in sediments near 128-F2 waste site.
Lead	Yes, outliers	32	0.45	0.6	0	38.4	158	Maximum observed in sediments near 128-F2 waste site.
Manganese	No	32	0.14	0.14	0	746	924	--
Mercury	Yes, outliers	6	0.062	0.082	0	0.06	0.2	--
Nickel	No	32	0.62	0.68	0	23.8	32.1	--
Nitrogen in nitrate	Yes, outliers	31	0.008	0.014	2	26.3	26.3	Maximum tested at 100-D Area (Cr5).
• Pak choi shoot weight, dry = 0.2 + 0.0091 nitrogen in nitrate, n = 31, r^2 = 0.19, p = 0.014 • Pak choi shoot weight, wet = 3.9 + 0.2 nitrogen in nitrate, n = 31, r^2 = 0.22, p = 0.008								
Nitrogen in nitrite	Yes	13	0.91	0.94	0	0.744	1.69	--
Phosphorus	No	32	0.002	0.005	2	1,390	1,390	Maximum tested at reference site.

Table 6-93. Summary of Regression Analyses of Pak Choi Phytotoxicity Measures Versus Sediment Concentrations. (5 Pages)

COPEC or Confounding Factor	Statistical Difference for Sediment (Study Site vs. Reference; Table 6-74)	Number of Sites with Detects [a]	Minimum of P-Value for Pak Choi Regression	Maximum of P-Value for Pak Choi Regression	Number of Significant Regressions [b]	Maximum CTE Tested (mg/kg)	Maximum CTE Observed (mg/kg)	Notes
• Pak choi shoot weight, dry = 0.073 + 0.00019 phosphorus, n = 32, r^2 = 0.24, p = 0.005 • Pak choi shoot weight, wet = 1.2 + 0.004 phosphorus, n = 32, r^2 = 0.28, p = 0.002								
Selenium	No	4 [c]	--	--	--	1.7	4.3	--
Strontium (elemental)	No	32	0.42	0.66	0	29.6	45.6	--
Tin	No	24	0.26	0.29	0	17.1	17.1	--
Titanium	No	11	0.054	0.055	0	2,030	2,030	--
Uranium (inorganic)	No	3 [c]	--	--	--	6.8	6.8	--
Vanadium	No	32	0.09	0.1	0	66	66	--
Zinc	No	32	0.39	0.52	0	227	800	Maximum observed in sediments near 128-F2 waste site.
Confounding Factors								
Cumulative percent retained on No. 8 screen	--	33	0.016	0.037	2	73.7	73.7	--
• Pak choi shoot weight, dry = 0.2 + 0.0013 cumulative percent retained on No. 8 screen, n = 33, r^2 = 0.13, p = 0.037 • Pak choi shoot weight, wet = 3.7 + 0.031 cumulative percent retained on No. 8 screen, n = 33, r^2 = 0.17, p = 0.016								
Cumulative percent retained on No. 16 screen	--	33	0.022	0.048	2	89.4	89.4	--
• Pak choi shoot weight, dry = 0.19 + 0.0011 cumulative percent retained on No. 16 screen, n = 33, r^2 = 0.12, p = 0.048 • Pak choi shoot weight, wet = 3.7 + 0.026 cumulative percent retained on No. 16 screen, n = 33, r^2 = 0.16, p = 0.022								
Cumulative percent retained on No. 200 screen	--	33	0.016	0.022	2	100	100	--
• Pak choi shoot weight, dry = -1.1 + 0.014 cumulative percent retained on No. 200 screen, n = 33, r^2 = 0.17, p = 0.016 • Pak choi shoot weight, wet = -21 + 0.26 cumulative percent retained on No. 200 screen, n = 33, r^2 = 0.16, p = 0.022								

Table 6-93. Summary of Regression Analyses of Pak Choi Phytotoxicity Measures Versus Sediment Concentrations. (5 Pages)

COPEC or Confounding Factor	Statistical Difference for Sediment (Study Site vs. Reference; Table 6-74)	Number of Sites with Detects [a]	Minimum of P-Value for Pak Choi Regression	Maximum of P-Value for Pak Choi Regression	Number of Significant Regressions [b]	Maximum CTE Tested (mg/kg)	Maximum CTE Observed (mg/kg)	Notes
Cumulative percent retained on No. 30 screen	--	33	0.018	0.039	2	94.4	94.4	--
• Pak choi shoot weight, dry = 0.19 + 0.0011 cumulative percent retained on No. 30 screen, n = 33, r^2 = 0.13, p = 0.039 • Pak choi shoot weight, wet = 3.6 + 0.025 cumulative percent retained on No. 30 screen, n = 33, r^2 = 0.17, p = 0.018								
Cumulative percent retained on No. 50 screen	--	33	0.008	0.01	2	97.3	97.3	--
• Pak choi shoot weight, dry = 0.15 + 0.0015 cumulative percent retained on No. 50 screen, n = 33, r^2 = 0.2, p = 0.01 • Pak choi shoot weight, wet = 2.8 + 0.03 cumulative percent retained on No. 50 screen, n = 33, r^2 = 0.21, p = 0.008								
Cumulative percent retained on No. 100 screen	--	33	0.004	0.005	2	99.8	99.8	--
• Pak choi shoot weight, dry = -0.11 + 0.0038 cumulative percent retained on No. 100 screen, n = 33, r^2 = 0.24, p = 0.004 • Pak choi shoot weight, wet = -2.1 + 0.074 cumulative percent retained on No. 100 screen, n = 33, r^2 = 0.23, p = 0.005								
Fraction coarse sand	--	33	0.35	0.4	0	30.5	39.3	--
Fraction coarse silt/silt/clay (less than 0.074 mm)	--	33	0.014	0.022	2	11.7	12.5	--
• Pak choi shoot weight, dry = 0.26 + -0.014 fraction coarse silt/silt/clay (less than 0.074 mm), n = 33, r^2 = 0.18, p = 0.014 • Pak choi shoot weight, wet = 5.2 + -0.26 fraction coarse silt/silt/clay (less than 0.074 mm), n = 33, r^2 = 0.16, p = 0.022								
Fraction fine sand	--	33	0.05	0.066	0	79.2	79.2	--
Fraction granules (greater than 2.38 mm)	--	33	0.016	0.037	2	73.7	73.7	--
• Pak choi shoot weight, dry = 0.2 + 0.0013 fraction granules (greater than 2.38 mm), n = 33, r^2 = 0.13, p = 0.037 • Pak choi shoot weight, wet = 3.7 + 0.031 fraction granules (greater than 2.38 mm), n = 33, r^2 = 0.17, p = 0.016								
Fraction medium sand	--	33	0.62	0.93	0	73	73	--

Table 6-93. Summary of Regression Analyses of Pak Choi Phytotoxicity Measures Versus Sediment Concentrations. (5 Pages)

COPEC or Confounding Factor	Statistical Difference for Sediment (Study Site vs. Reference; Table 6-74)	Number of Sites with Detects [a]	Minimum of P-Value for Pak Choi Regression	Maximum of P-Value for Pak Choi Regression	Number of Significant Regressions [b]	Maximum CTE Tested (mg/kg)	Maximum CTE Observed (mg/kg)	Notes
Fraction total sand	--	33	0.038	0.074	1	100	100	--
• Pak choi shoot weight, wet = 6.7 + -0.028 fraction total sand, n = 33, r^2 = 0.13, p = 0.038								
Fraction very coarse sand	--	33	0.041	0.065	1	21.9	39.1	--
• Pak choi shoot weight, wet = 3.7 + 0.13 fraction very coarse sand, n = 33, r^2 = 0.13, p = 0.041								
Fraction very fine sand	--	33	0.003	0.006	2	43.9	43.9	--
• Pak choi shoot weight, dry = 0.28 + -0.005 fraction very fine sand, n = 33, r^2 = 0.25, p = 0.003 • Pak choi shoot weight, wet = 5.5 + -0.095 fraction very fine sand, n = 33, r^2 = 0.22, p = 0.006								
Percent moisture (wet sample)	--	33	0.063	0.082	0	67.3	67.3	--
pH measurement	--	33	0.12	0.15	0	8.46	8.74	--
Specific conductance	--	1	--	--	--	159	159	--
Temperature	--	1	--	--	--	4.5	4.5	--
Total organic carbon	--	33	0.67	0.76	0	45,200	45,200	--
Dominant substrate class (1-4)	--	30	0.073	0.1	0	3	3	--
Macrophyte abundance class (1-4)	--	30	0.14	0.19	0	3	3	--
Sub dominant substrate class (1-4)	--	30	0.82	0.94	0	3	3	--
Substrate embeddedness class (1-4)	--	30	0.27	0.3	0	4	4	--
Calcium	--	32	0.083	0.17	0	5,270	6,320	--
Chloride	--	33	0.063	0.089	0	11.6	11.6	--
Fluoride	--	15	0.59	0.76	0		1.73	--
Iron	--	32	0.1	0.11	0	29,400	29,400	--

Table 6-93. Summary of Regression Analyses of Pak Choi Phytotoxicity Measures Versus Sediment Concentrations. (5 Pages)

COPEC or Confounding Factor	Statistical Difference for Sediment (Study Site vs. Reference; Table 6-74)	Number of Sites with Detects [a]	Minimum of P-Value for Pak Choi Regression	Maximum of P-Value for Pak Choi Regression	Number of Significant Regressions [b]	Maximum CTE Tested (mg/kg)	Maximum CTE Observed (mg/kg)	Notes
Magnesium	--	32	0.82	0.92	0	5,060	7,320	--
Nitrogen in ammonia	--	29	0.13	0.14	0	12.2 (RME)	12.2 (RME)	--
Nitrogen, Kjeldahl total	--	33	0.15	0.15	0	3,290	3,290	--
Potassium	--	32	0.4	0.5	0	1,400	1,620	--
Silicon	--	32	0.067	0.13	0	2,900	3,100	--
Sodium	--	32	0.23	0.37	0	250	289	--
Sulfate	--	33	0.38	0.46	0	53.1	53.1	--
Total petroleum hydrocarbons	--	1	--	--	--	287	287	--
Total petroleum hydrocarbons - diesel range	--	28	0.13	0.15	0	50	50	--
Total petroleum hydrocarbons - gasoline range	--	5	0.53	0.57	0	0.21	0.21	--

= Statistically significant regression, p-value <0.05.

[a] Number of sites with detects for both sediment and bioassay measurements out of 33 sites with paired sediment and Pak choi bioassay measurements.
[b] Number of significant regression relationships out of two bioassay endpoints measured.
[c] Regression results for fewer than five sites have insufficient for determining a biologically significant relationship.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
RME = reasonable maximum exposure

Table 6-94. Summary of Pak Choi Phytotoxicity Results and Confounding Factor Measures Using All RCBRA Sediment Sample Data. (2 Pages)

Site	Pak Choi Average		Confounding Factor (CTE)										
	Shoot Weight (dry, g)	Shoot Weight (wet, g)	No. 8 Screen (% retained)	No. 16 Screen (% retained)	No. 30 Screen (% retained)	No. 50 Screen (% retained)	No. 100 Screen (% retained)	No. 200 Screen (% retained)	Fraction Coarse Silt/Silt/Clay (less than 0.074 mm) (%)	Fraction Very Fine Sand (%)	Fraction Very Coarse Sand (%)	Fraction Total Sand (%)	Fraction Granules (greater than 2.38 mm) (%)
Study Sites													
100-B/C ROD Area													
2a	0.183	3.57	0.29	0.49	2.54	20.25	75.44	95.84	4.16	20.4	0.2	95.55	0.29
2b	0.151	3.08	0.05	0.14	0.8	42.34	98.12	99.93	0.07	1.81	0.09	99.88	0.05
100-K ROD Area													
2c	0.135	2.91	5.25	6.06	7.43	28.7	87.23	98.32	1.68	11.09	0.81	93.07	5.25
100-N ROD Area													
Sr1	0.191	3.68	7.21	17.61	32.61	82.7	98.23	99.64	0.36	1.41	10.4	92.43	7.21
Sr3	0.09	1.25	1.88	6.77	28.39	53.17	81.56	96.36	3.64	14.8	4.89	94.48	1.88
100-D/100-H ROD Area													
2f	0.13	2.64	1.47	1.77	6.89	43.13	76.73	90.77	9.23	14.04	0.3	89.3	1.47
Cr5	0.455	9.32	25.68	31.58	62.06	91.73	95.98	98.47	2.18	7.64	21.89	97.68	25.68
Cr6	0.326	6.51	2.99	4.13	10.48	46.05	97.85	99.34	0.75	4.37	1.14	99.07	2.99
Cr9	0.172	3.37	36.96	41.95	58.06	82.78	95.97	98.9	4.12	13.34	4.99	95.88	36.96
Cr10	0.219	4.55	63.93	69.97	77.79	94.75	98.39	99.24	7.97	16.68	10.62	92.03	63.93
100-F/100-IU-2/100-IU-6 ROD Area													
2j	0.413	7.18	0.05	0.09	1.14	37.96	97.85	99.93	0.07	2.08	0.04	99.88	0.05
2l	0.191	3.87	0.19	0.24	0.78	8.75	65.35	93.89	6.11	28.54	0.05	93.7	0.19
2m	0.116	2.27	0.26	0.74	1.67	6.01	63.68	94.89	5.11	31.21	0.48	94.63	0.26
3b	0.11	2.22	10.09	18.59	27.05	38.83	64.03	88.64	11.36	24.61	8.5	78.55	10.09
4a	0.109	1.91	2.1	4.11	10.16	34.76	78.3	95.01	4.99	16.71	2.01	92.91	2.1
4c	0.235	4.85	0.05	0.2	6.71	32.32	86.52	99.57	0.43	13.05	0.15	99.52	0.05
300 ROD Area													
5c	0.189	3.72	0	0.05	0.42	3.95	83.13	98.89	1.11	15.76	0.05	98.89	0
5d	0.185	4	0	0.03	0.28	6.59	77.48	97.07	2.93	19.59	0.03	97.07	0
U1	0.281	5.01	3.4	4.34	9.58	64.84	92.83	99.19	0.81	6.36	0.94	95.79	3.4
U2	0.186	3.46	39.22	56.64	67.66	78.15	92.83	98.57	1.43	5.74	17.42	59.35	39.22
U3	0.338	6.89	70.97	78.5	82.77	89.67	96.42	98.87	1.13	2.45	7.53	27.9	70.97
U5	0.339	6.73	69.82	76.27	82.72	91.4	97.2	98.98	1.02	1.78	6.45	29.16	69.82
U6	0.227	4.72	49.42	59.2	68.58	81.48	92.34	97.04	2.96	4.7	9.78	47.62	49.42
U7	0.328	5.6	0	0	1.69	74.68	99.83	100	0	0.17	0	100	0
U8	0.408	8.54	67.94	77.64	85.77	91.13	96.59	98.86	1.14	2.27	9.7	30.92	67.94
Reference Sites													
Bev Ref 1	0.158	3.15	0.47	1.98	9.64	64.05	96.17	99.23	0.77	3.06	1.51	98.76	0.47
Bev Ref 2	0.181	3.6	3.73	4.64	5.15	6.74	44.44	88.35	11.65	43.91	0.91	84.62	3.73
Ref 300-2	0.262	4.76	1.12	8.88	13.28	20.89	77.87	94.14	5.86	16.27	7.76	93.02	1.12

Table 6-94. Summary of Pak Choi Phytotoxicity Results and Confounding Factor Measures Using All RCBRA Sediment Sample Data. (2 Pages)

Site	Pak Choi Average		Confounding Factor (CTE)										
	Shoot Weight (dry, g)	Shoot Weight (wet, g)	No. 8 Screen (% retained)	No. 16 Screen (% retained)	No. 30 Screen (% retained)	No. 50 Screen (% retained)	No. 100 Screen (% retained)	No. 200 Screen (% retained)	Fraction Coarse Silt/Silt/Clay (less than 0.074 mm) (%)	Fraction Very Fine Sand (%)	Fraction Very Coarse Sand (%)	Fraction Total Sand (%)	Fraction Granules (greater than 2.38 mm) (%)
Ref 11	0.115	2.07	24.96	28.38	30.24	51.77	89.07	98.93	2.51	13.3	3.42	97.4	24.96
Ref 12	0.425	8.85	57.94	65.53	69.7	87.89	98.93	99.5	0.5	0.57	7.59	41.56	57.94
Ref 13	0.137	2.58	67.76	76.37	80.5	84.46	91.9	97.9	2.1	6	8.61	30.14	67.76
Ref 14	0.236	4.71	73.7	89.37	94.35	97.33	98.88	99.41	0.59	0.53	15.67	25.71	73.7
Ref 16	0.158	3.15	1.1	1.5	2.47	34.5	85.2	98.2	1.7	13.1	0.4	97.1	1.1

= Less 80% of the average measure in reference sites.

= Greater than 120% of average measure in reference sites.

CTE = central tendency exposure
RCBRA = River Corridor Baseline Risk Assessment
ROD = record of decision

Table 6-95. Summary of Risk Characterization for Aquatic Plants.

Receptor	Line of Evidence	Weight	Effect	Summary
Aquatic plants	Sediment bioassay (Pak Choi)	Medium	No difference in growth between study and reference sites; no correlation of growth with COPECs in sediment, thus no indication of adverse effects. Bioassay is weighted medium because Pak Choi is a vascular plant and it does not represent typical Hanford Site aquatic plants (algae, periphyton, milfoil).	Concentrations were greater than water standards or criteria. No indication of adverse effects based on the results of the bioassay.
	Benchmarks (sediment)	Low	Sediment benchmarks and reference concentrations were exceeded for seven COPECs (antimony, barium, cadmium, chromium, manganese, selenium, and zinc). Of all COPECs exceeding benchmarks and reference concentrations, chromium was elevated statistically compared to reference sites. These observations suggest the potential for adverse effects.	
	Benchmarks (pore water)	Low	Unfiltered concentrations were greater than water standards/criteria and reference concentrations for two COPECs (aluminum, hexavalent chromium). Aquatic plant water benchmarks and reference concentrations were exceeded for three COPECs (calculated total uranium, manganese, and uranium [inorganic]). Of these, calculated total uranium was statistically elevated compared to reference sites. These observations suggest the potential for adverse effects.	

COPEC = contaminant of potential ecological concern

Table 6-96. Uncertainty Analysis for Aquatic Plants. (2 Pages)

Attributes	Questions	Observations	Impact on Assessment
Growth from Pak Choi test	Is growth lower at study sites compared to reference or decrease along a COPEC gradient?	Generally, fewer uncertainties for bioassays compared to other measures. Uncertainties relate to selection of test species and its representativeness of all plants in the near-shore environment and the test duration and life stage. For example, the test is not a life cycle test. Statistical analyses evaluated single COPEC trends but did not evaluate the potential for additive or synergistic effects of COPECs and/or confounding factors. Not all study sites were evaluated in the assessment were tested with the bioassay.	Life cycle (e.g., germination, growth, reproduction) tests could identify lower effect levels and thus the growth test could underestimate risk. This is also true of most literature toxicity data. Pak Choi is not an aquatic macrophyte and thus could overestimate or underestimate effects on aquatic plants. The interactions among COPECs or confounding factors are not well documented and there are insufficient data from these studies to adequately define a statistical model that includes all potential factors. The potential for COPEC effects is therefore uncertain when accounting for such potential interactions. The maximum concentrations of chromium, lead, mercury, and zinc were not tested.

Table 6-96. Uncertainty Analysis for Aquatic Plants. (2 Pages)

Attributes	Questions	Observations	Impact on Assessment
Comparison to sediment or water effect levels	Are concentrations of COPECs greater than effect levels?	Uncertainties associated with exposure evaluation include: • Measuring media (sediment, water) concentrations Effect levels for metals are based on bioavailable forms. For example, Menzie et al. (2008) present an example study involving barium toxicity and chemical form showing that the most stable form in the environment is also the least toxic.	Some COPECs may act synergistically and therefore the potential for effects or risks could be understated. Literature toxicity data missing for some COPECs, thus risk could be underestimated. Literature toxicity information for metals could overestimate risk.

COPEC = contaminant of potential ecological concern

Table 6-97. Summary of Near-Shore Aquatic Plant Risk Results for All Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status (Table 6-74)		Sediment and Pore-Water Concentrations Compared to Benchmarks (Tables 6-88, 6-90, and 6-91)	Bioassays - Measures Related to COPECs in Sediment (Table 6-93)	Notes
	Sediment	Pore Water			
Aluminum	No	No	Sediment concentrations less than the benchmark; pore-water concentrations greater than criterion at study sites and reference sites (three times greater at study sites)	No relationship	Identified as key COPEC based on criterion comparison
Antimony	No	No	Sediment concentrations greater than the benchmark at the 100-B/C study sites only; pore-water concentrations less than criterion	Insufficient data	Identified as key COPEC based on sediment benchmark comparison
Barium	No	No	Sediment concentrations greater than the benchmark at the 100-B/C Pilot study sites only; pore-water concentrations less than benchmarks	One of two significant; however, positive relationship between COPEC concentrations and endpoints, thus no evidence for adverse effects	Identified as key COPEC based on sediment benchmark comparison
Cadmium	Yes, outliers	No	Sediment concentrations greater than the benchmark at both study sites and reference sites; pore-water concentrations greater than criterion but less than reference concentrations	No relationship	Identified as key COPEC based on sediment benchmark comparison
Calculated total uranium	Yes	Yes	Sediment concentrations less than the benchmark; pore-water concentrations greater than aquatic plant benchmark at study sites only	No relationship	Identified as key COPEC based on water benchmark comparison
Chromium	Yes	Yes	Sediment concentrations greater than the benchmark at study sites only. Pore-water concentrations less than chronic criterion and acute standard	No relationship	Identified as key COPEC based on sediment benchmark comparison
Copper	No	No	Sediment concentrations less than the benchmark; pore-water concentrations less than standard at study sites	No relationship	No significant findings
Hexavalent chromium	Yes	Yes	No sediment benchmark; pore-water concentrations greater than standard at study sites only	Insufficient data	Identified as key COPEC based on standard comparison
Lead	Yes, outliers	No	Sediment concentrations less than the benchmark; pore-water concentrations greater than criterion but less than reference concentrations	No relationship	No significant findings

Table 6-97. Summary of Near-Shore Aquatic Plant Risk Results for All Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status (Table 6-74)		Sediment and Pore-Water Concentrations Compared to Benchmarks (Tables 6-88, 6-90, and 6-91)	Bioassays - Measures Related to COPECs in Sediment (Table 6-93)	Notes
	Sediment	Pore Water			
Manganese	No	No	Sediment concentrations greater than the benchmark and reference concentrations; pore-water concentrations greater than aquatic plant benchmark and reference concentrations	No relationship	Identified as key COPEC based on sediment benchmark and water benchmark comparisons
Mercury	Yes, outliers	No	Sediment concentrations less than the benchmark; pore-water concentrations less than standard	No relationship	No significant findings
Nickel	No	No	Sediment concentrations less than the benchmark; pore-water concentrations less than criterion	No relationship	No significant findings
Nitrogen in nitrate	Yes, outliers	No	No sediment benchmark; pore water concentrations less than aquatic plant benchmark	Two of two significant; however, positive relationship between COPEC concentrations and endpoints, thus no evidence for adverse effects	No significant findings
Nitrogen in nitrite	Yes	No	No sediment benchmark; not detected in pore water	Two of two significant; however, positive relationship between COPEC concentrations and endpoints, thus no evidence for adverse effects	No significant findings
Phosphorus	No	Yes, outliers	Sediment concentrations greater than the benchmark but less than reference concentrations; pore-water concentrations less than aquatic plant benchmark	Two of two significant; however, positive relationship between COPEC concentrations and endpoints, thus no evidence for adverse effects	No significant findings. The maximum phosphorus concentration in pore water was from a sample collected under high river flow conditions. The location was Sr5 and may be associated with apatite use for 100-N treatability studies.
Selenium	No	No	Sediment concentrations greater than the benchmark and reference concentrations; pore-water concentrations less than criterion at study sites	Insufficient data	Identified as key COPEC based on sediment benchmark comparison
Strontium (elemental)	No	No	No sediment benchmark; pore-water concentrations less than aquatic plant benchmark	No relationship	No significant findings

Table 6-97. Summary of Near-Shore Aquatic Plant Risk Results for All Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status (Table 6-74)		Sediment and Pore-Water Concentrations Compared to Benchmarks (Tables 6-88, 6-90, and 6-91)	Bioassays - Measures Related to COPECs in Sediment (Table 6-93)	Notes
	Sediment	Pore Water			
Tin	No	No	Sediment concentrations less than the benchmark; not detected in water	No relationship	No significant findings
Titanium	Yes	Not measured	No sediment benchmark; not measured in water	No relationship	No significant findings
Uranium (inorganic)	No	No	Sediment concentrations less than the benchmark; pore-water concentrations greater than aquatic plant benchmark and reference concentrations	Insufficient data	Identified as key COPEC based on water benchmark comparison
Vanadium	No	No	No sediment benchmark; pore-water concentrations less than aquatic plant benchmark	No relationship	No significant findings
Zinc	No	No	Sediment concentrations greater than the benchmark and reference concentrations; pore-water concentrations less than standard	No relationship	Identified as key COPEC based on sediment benchmark comparison

= COPEC concentration is greater than effect level and reference concentrations or significant bioassay trend.

COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern

Table 6-98. Summary of Aquatic Invertebrate Tissues (Macroinvertebrate, Clam, Mussel) to Sediment and Pore-Water Regression Results. (5 Pages)

COPEC	Statistical Difference for Sediment or Pore Water and Tissue (Study Site vs. Reference); Table 6-74	Number of Sites with Detects for Sediment or Water and Tissue	Ratio of Average Tissue Concentration (fw) to Average Sediment or Water Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Sediment									
Benthic Macroinvertebrate									
Aluminum	No	24	0.0094	Benthic macroinvertebrate = 110 - 0.0091 sediment	0.22	0.022	ln(Benthic macroinvertebrate) = 13 - 1.1 ln(sediment)	0.25	0.013
Antimony	No	0	--	None, not detected in sediment and tissue at the same site	--	--	--	--	--
Barium	No	24	0.56	Benthic macroinvertebrate = 58 + -0.19 sediment	0.17	0.042	ln(Benthic macroinvertebrate) = 5.3 - 0.39 ln(sediment)	0.14	0.071
Cadmium	Yes, outliers for sediment	22	0.33	Benthic macroinvertebrate = 0.29 + -0.07 sediment	0.046	0.34	ln(Benthic macroinvertebrate) = -1.7 - 0.15 ln(sediment)	0.04	0.37
Calculated total uranium	Yes for sediment	0	--	None, no detects in tissue	--	--	--	--	--
Chromium	Yes for sediment	7	0.072	Benthic macroinvertebrate = -0.37 + 0.1 sediment	0.68	0.023	ln(Benthic macroinvertebrate) = -2.9 + 1.1 ln(sediment)	0.71	0.017
Copper	No	24	1.3	Benthic macroinvertebrate = 17 + 0.2 sediment	0.038	0.36	ln(Benthic macroinvertebrate) = 2.7 + 0.11 ln(sediment)	0.015	0.57
Hexavalent chromium	Yes for sediment	0	--	None, not measured in tissue	--	--	--	--	--
Lead	Yes, sediment outliers	12	0.025	Benthic macroinvertebrate = 0.66 + -0.0071 sediment	0.09	0.34	ln(Benthic macroinvertebrate) = -0.046 - 0.25 ln(sediment)	0.11	0.29
Manganese	No	24	0.14	Benthic macroinvertebrate = 58 + -0.051 sediment	0.2	0.029	ln(Benthic macroinvertebrate) = 5.9 - 0.4 ln(sediment)	0.27	0.01
Mercury	Yes, sediment outliers	0	--	None, not detected in sediment and tissue at the same site	--	--	--	--	--
Nickel	None	18	0.083	Benthic macroinvertebrate = 1 + 0.0052 sediment	0.00029	0.95	ln(Benthic macroinvertebrate) = -0.85 + 0.14 ln(sediment)	0.0057	0.77
Nitrogen in nitrate	Yes sediment outliers	0	--	None, not measured in tissue	--	--	--	--	--
Nitrogen in nitrite	Yes for sediment	0	--	None, not measured in tissue	--	--	--	--	--
Phosphorus	No	24	3.6	Benthic macroinvertebrate = 3500 + -1.1 sediment	0.068	0.22	ln(Benthic macroinvertebrate) = 9.5 - 0.26 ln(sediment)	0.031	0.41
Selenium	No	4	0.48	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
Strontium (elemental)	No	24	5.9	Benthic macroinvertebrate = 180 + -2.7 sediment	0.11	0.11	ln(Benthic macroinvertebrate) = 6.4 - 0.59 ln(sediment)	0.13	0.085
Tin	No	2	1.0	None, insufficient data	--	--	--	--	--
Titanium	Yes for sediment	7	0.0016	Benthic macroinvertebrate = 1.7 + 0.000095 sediment	0.011	0.82	ln(Benthic macroinvertebrate) = 0.11 + 0.066 ln(sediment)	0.015	0.79
Uranium (inorganic)	No	1	--	None, insufficient data	--	--	--	--	--
Vanadium	No	18	0.0086	Benthic macroinvertebrate = 0.45 + -0.0047 sediment	0.1	0.2	ln(Benthic macroinvertebrate) = 0.54 - 0.56 ln(sediment)	0.13	0.13
Zinc	Yes for invertebrate	24	0.18	Benthic macroinvertebrate = 25 + 0.0061 sediment	0.0039	0.77	ln(Benthic macroinvertebrate) = 3.1 + 0.019 ln(sediment)	0.0019	0.84
Clam									
Aluminum	Yes for clam (at 100-B/C Pilot)	32	0.0049	Clam = 22 + 0.0015 sediment	0.032	0.33	ln(Clam) = 0.023 + 0.38 ln(sediment)	0.035	0.3
Antimony	No	0	--	None, not detected in sediment and tissue at the same site	--	--	--	--	--
Barium	Yes for clam	33	0.25	Clam = 29 + -0.087 sediment	0.024	0.39	ln(Clam) = 2.3 - 0.039 ln(sediment)	<0.001	0.95
Cadmium	Yes, outlier for sediment	28	0.5	Clam = 0.42 + -0.0055 sediment	0.0014	0.85	ln(Clam) = -0.92 - 0.031 ln(sediment)	0.011	0.6
Calculated total uranium	Yes for sediment	0	--	None, no detects in tissue	--	--	--	--	--

Table 6-98. Summary of Aquatic Invertebrate Tissues (Macroinvertebrate, Clam, Mussel) to Sediment and Pore-Water Regression Results. (5 Pages)

COPEC	Statistical Difference for Sediment or Pore Water and Tissue (Study Site vs. Reference); Table 6-74	Number of Sites with Detects for Sediment or Water and Tissue	Ratio of Average Tissue Concentration (fw) to Average Sediment or Water Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Chromium	Yes for sediment and for clam (at 100-B/C Pilot)	30	0.069	Clam = 1.1 + 0.012 sediment	0.0023	0.8	ln(Clam) = -1.1 + 0.32 ln(sediment)	0.059	0.2
Copper	Yes for clam	33	0.83	Clam = 16 + -0.052 sediment	0.0033	0.75	ln(Clam) = 2.9 - 0.13 ln(sediment)	0.016	0.48
Hexavalent chromium	Yes for sediment	0	--	None, not measured in tissue	--	--	--	--	--
Lead	Yes, outlier for sediment	19	0.025	Clam = 0.49 + -0.0015 sediment	0.021	0.56	ln(Clam) = -0.77 - 0.011 ln(sediment)	<0.001	0.91
Manganese	Yes for clam	33	0.057	Clam = 23 + -0.013 sediment	0.0098	0.58	ln(Clam) = 1.6 + 0.14 ln(sediment)	0.004	0.73
Mercury	Yes, outlier in sediment and clam tissue	0	--	None, not detected in sediment and tissue at the same site	--	--	--	--	--
Nickel	No	20	0.025	Clam = 0.3 + 0.003 sediment	0.014	0.62	ln(Clam) = -1.3 + 0.062 ln(sediment)	0.005	0.77
Nitrogen in nitrate	Yes sediment outliers	0	--	None, not measured in tissue	--	--	--	--	--
Nitrogen in nitrite	Yes for sediment	0	--	None, not measured in tissue	--	--	--	--	--
Phosphorus	Yes for clam	33	2.4	Clam = 1,400 + 0.83 sediment	0.075	0.12	ln(Clam) = 5.3 + 0.33 ln(sediment)	0.064	0.16
Selenium	No	5	0.85	Clam = 1.3 - 0.12 sediment	0.82	0.035	ln(Clam) = 0.12 - 0.21 ln(sediment)	0.94	0.006
Strontium (elemental)	Yes for clam	33	2.1	Clam = 36 + 0.49 sediment	0.0029	0.77	ln(Clam) = 0.75 + 0.61 ln(sediment)	0.0079	0.62
Tin	No	3	1.1	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
Titanium	Yes for sediment	13	0.0022	Clam = 3 + -0.0003 sediment	0.015	0.69	ln(Clam) = 1.1 - 0.023 ln(sediment)	<0.001	0.92
Uranium (inorganic)	No	0	--	None, not detected in sediment and tissue at the same site	--	--	--	--	--
Vanadium	Yes for clam	26	0.0041	Clam = 0.14 + 0.00095 sediment	0.039	0.34	ln(Clam) = -2.5 + 0.21 ln(sediment)	0.034	0.37
Zinc	No	33	0.2	Clam = 30 + 0.0026 sediment	0.0007	0.88	ln(Clam) = 3.5 - 0.022 ln(sediment)	0.0021	0.8
Mussel									
Aluminum	No	9	0.0028	Mussel = 14 – 0.00029 sediment	0.0086	0.81	ln(Mussel) = 3 - 0.06 ln(sediment)	0.0049	0.86
Antimony	No	0	--	None, not detected in sediment and tissue at the same site	--	--	--	--	--
Barium	No	9	1.9	Mussel = 140 + -0.81 sediment	0.18	0.25	ln(Mussel) = 6.4 - 0.47 ln(sediment)	0.19	0.24
Cadmium	Yes, outlier for sediment	9	0.74	Mussel = 0.56 + -0.15 sediment	0.075	0.48	ln(Mussel) = -1 - 0.14 ln(sediment)	0.03	0.66
Calculated total uranium	Yes for sediment	0	--	None, no detects in tissue	--	--	--	--	--
Chromium	Yes for sediment	5	0.035	Mussel = 0.64 - 0.0048 sediment	0.51	0.18	ln(Mussel) = -0.16 - 0.17 ln(sediment)	0.57	0.14
Copper	No	9	0.11	Mussel = 1.7 + -0.027 sediment	0.034	0.64	ln(Mussel) = 0.21 - 0.039 ln(sediment)	<0.001	0.94
Hexavalent chromium	Yes for sediment	0	--	None, not measured in tissue	--	--	--	--	--
Lead	Yes, outlier for sediment	8	0.023	Mussel = 0.42 + -0.00064 sediment	0.019	0.74	ln(Mussel) = -0.86 - 0.018 ln(sediment)	0.01	0.81
Manganese	No	9	3.7	Mussel = 1,100 + -2.2 sediment	0.43	0.055	ln(Mussel) = 9.9 - 0.68 ln(sediment)	0.46	0.045
Mercury	Yes, outlier for sediment	0	--	None, no detects in tissue	--	--	--	--	--
Nickel	No	4	0.017	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
Nitrogen in nitrate	Yes sediment outliers	0	--	None, not measured in tissue	--	--	--	--	--
Nitrogen in nitrite	Yes for sediment	0	--	None, not measured in tissue	--	--	--	--	--
Phosphorus	No	9	3.8	Mussel = 2,500 + -0.2 sediment	0.00047	0.96	ln(Mussel) = 9.9 - 0.35 ln(sediment)	0.018	0.73

Table 6-98. Summary of Aquatic Invertebrate Tissues (Macroinvertebrate, Clam, Mussel) to Sediment and Pore-Water Regression Results. (5 Pages)

COPEC	Statistical Difference for Sediment or Pore Water and Tissue (Study Site vs. Reference); Table 6-74	Number of Sites with Detects for Sediment or Water and Tissue	Ratio of Average Tissue Concentration (fw) to Average Sediment or Water Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Selenium	No	1	--	None, insufficient data	--	--	--	--	--
Strontium (elemental)	No	9	1.2	Mussel = 36 + -0.84 sediment	0.25	0.17	ln(Mussel) = 5.4 - 0.86 ln(sediment)	0.33	0.11
Tin	No	3	0.4	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
Titanium	Yes for sediment	0	--	None, not measured in tissue	--	--	--	--	--
Uranium (inorganic)	No	0	--	None, no detects in tissue	--	--	--	--	--
Vanadium	No	5	0.0018	Mussel = 0.1 - 0.0017 sediment	0.064	0.68	ln(Mussel) = -0.84 - 0.83 ln(sediment)	0.039	0.75
Zinc	No	9	0.23	Mussel = 39 + -0.071 sediment	0.066	0.51	ln(Mussel) = 4.4 - 0.25 ln(sediment)	0.059	0.53
Pore Water									
Benthic Macroinvertebrate									
Aluminum	None	12	0.59	Benthic macroinvertebrate = 42 + 0.068 pore water	0.026	0.62	ln(Benthic macroinvertebrate) = 2.9 + 0.15 ln(pore water)	0.021	0.66
Antimony	No	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
Barium	No	18	0.95	Benthic macroinvertebrate = 42 + 0.016 pore water	0.000068	0.93	ln(Benthic macroinvertebrate) = 3.4 + 0.064 ln(pore water)	0.0037	0.81
Cadmium	No	1	--	None, insufficient data	--	--	--	--	--
Calculated total uranium	Yes for pore water and surface water	0	--	None, no detects in tissue	--	--	--	--	--
Chromium	Yes for pore water	3	0.18	None, insufficient data	--	--	--	--	--
Copper	No	6	5.8	Benthic macroinvertebrate = 15 + 0.012 pore water	<0.001	0.99	ln(Benthic macroinvertebrate) = 2.7 + 0.035 ln(pore water)	0.0072	0.87
Hexavalent chromium	Yes for pore water and surface water	0	--	None, not measured in tissue	--	--	--	--	--
Lead	No	1	--	None, insufficient data	--	--	--	--	--
Manganese	No	18	0.2	Benthic macroinvertebrate = 36 + 0.0047 pore water	0.024	0.54	ln(Benthic macroinvertebrate) = 3.4 + 0.038 ln(pore water)	0.043	0.41
Mercury	No	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
Nickel	No	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
Nitrogen in nitrate	No	0	--	None, not measured in tissue	--	--	--	--	--
Nitrogen in nitrite	No	0	--	None, not measured in tissue	--	--	--	--	--
Phosphorus	Yes for pore water	8	34	Benthic macroinvertebrate = 3,100 - 4.7 pore water	0.3	0.16	ln(Benthic macroinvertebrate) = 8.2 - 0.088 ln(pore water)	0.16	0.32
Selenium	No	2	0.086	None, insufficient data	--	--	--	--	--
Strontium (elemental)	No	18	0.92	Benthic macroinvertebrate = 150 - 0.22 pore water	0.031	0.48	ln(Benthic macroinvertebrate) = 5.3 - 0.14 ln(pore water)	0.0057	0.77
Tin	No	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
Titanium	Not measured in water	0	--	None, not measured in pore water	--	--	--	--	--
Uranium (inorganic)	No	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
Vanadium	No	9	0.13	Benthic macroinvertebrate = 0.49 - 0.097 pore water	0.29	0.14	ln(Benthic macroinvertebrate) = -1.2 - 0.55 ln(pore water)	0.28	0.14
Zinc	Yes, for invertebrate	18	5.7	Benthic macroinvertebrate = 28 - 0.43 pore water	0.038	0.44	ln(Benthic macroinvertebrate) = 3.3 - 0.078 ln(pore water)	0.042	0.42

Table 6-98. Summary of Aquatic Invertebrate Tissues (Macroinvertebrate, Clam, Mussel) to Sediment and Pore-Water Regression Results. (5 Pages)

COPEC	Statistical Difference for Sediment or Pore Water and Tissue (Study Site vs. Reference); Table 6-74	Number of Sites with Detects for Sediment or Water and Tissue	Ratio of Average Tissue Concentration (fw) to Average Sediment or Water Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Clam									
Aluminum	Yes for clam (at 100-B/C Pilot)	12	0.55	Clam = 23 + 0.15 pore water	0.2	0.14	ln(Clam) = 1.4 + 0.5 ln(pore water)	0.26	0.089
Antimony	No	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
Barium	Yes for clam	19	0.31	Clam = 19 - 0.14 pore water	0.023	0.53	ln(Clam) = 3 - 0.42 ln(pore water)	0.021	0.55
Cadmium	No	1	--	None, insufficient data	--	--	--	--	--
Calculated total uranium	Yes for pore water	0	--	None, no detects in tissue	--	--	--	--	--
Chromium	Yes for pore water and clam (at 100-B/C Pilot)	8	0.097	Clam = 0.62 + 0.027 pore water	0.43	0.078	ln(Clam) = -0.62 + 0.22 ln(pore water)	0.25	0.21
Copper	Yes for clam	5	3.4	Clam = 11 - 0.34 pore water	0.23	0.41	ln(Clam) = 2.3 - 0.14 ln(pore water)	0.29	0.35
Hexavalent chromium	Yes for pore water and surface water	0	--	None, not measured in tissue	--	--	--	--	--
Lead	No	2	0.25	None, insufficient data	--	--	--	--	--
Manganese	Yes for clam	19	0.11	Clam = 13 + -0.0045 pore water	0.0088	0.7	ln(Clam) = 2 - 0.04 ln(pore water)	0.0083	0.71
Mercury	Yes, outlier for clam	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
Nickel	No	1	--	None, insufficient data	--	--	--	--	--
Nitrogen in nitrate	No	0	--	None, not measured in tissue	--	--	--	--	--
Nitrogen in nitrite	No	0	--	None, not measured in tissue	--	--	--	--	--
Phosphorus	Yes, outlier for pore water and yes for clam	11	40	Clam = 2,300 - 7.8 pore water	0.17	0.21	ln(Clam) = 8.1 - 0.17 ln(pore water)	0.12	0.31
Selenium	No	2	0.11	None, insufficient data	--	--	--	--	--
Strontium (elemental)	Yes for clam	19	0.18	Clam = 18 + 0.046 pore water	0.0037	0.8	ln(Clam) = -0.77 + 0.52 ln(pore water)	0.0092	0.7
Tin	No	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
Titanium	Not measured in pore water	0	--	None, not measured in pore water	--	--	--	--	--
Uranium (inorganic)	No	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
Vanadium	Yes for clam	5	0.036	Clam = 0.11 + 0.0069 pore water	0.11	0.58	ln(Clam) = -2.1 + 0.075 ln(pore water)	0.021	0.82
Zinc	No	19	7.5	Clam = 29 + 0.57 pore water	0.029	0.49	ln(Clam) = 3.4 - 0.013 ln(pore water)	<0.001	0.92
Pore Water									
Mussel									
Aluminum	No	5	0.1	Mussel = 13 - 0.007 pore water	0.2	0.45	ln(Mussel) = 2.8 - 0.068 ln(pore water)	0.13	0.55
Antimony	No	1	--	None, insufficient data	--	--	--	--	--
Barium	No	6	2.2	Mussel = 83 + 0.6 pore water	0.25	0.31	ln(Mussel) = 3.8 + 0.24 ln(pore water)	0.16	0.43
Cadmium	No	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--

Table 6-98. Summary of Aquatic Invertebrate Tissues (Macroinvertebrate, Clam, Mussel) to Sediment and Pore-Water Regression Results. (5 Pages)

COPEC	Statistical Difference for Sediment or Pore Water and Tissue (Study Site vs. Reference); Table 6-74	Number of Sites with Detects for Sediment or Water and Tissue	Ratio of Average Tissue Concentration (fw) to Average Sediment or Water Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Calculated total uranium	Yes for pore water	0	--	None, no detects in tissue	--	--	--	--	--
Chromium	Yes for pore water	1	--	None, insufficient data	--	--	--	--	--
Copper	No	2	1.1	None, insufficient data	--	--	--	--	--
Hexavalent chromium	Yes for pore water and surface water	0	--	None, not measured in tissue	--	--	--	--	--
Lead	No	1	--	None, insufficient data	--	--	--	--	--
Manganese	No	6	2.8	Mussel = 680 + 0.3 pore water	0.31	0.25	ln(Mussel) = 6.5 + 0.033 ln(pore water)	0.069	0.61
Mercury	No	0	--	None, no detects in tissue	--	--	--	--	--
Nickel	No	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
Nitrogen in nitrate	No	0	--	None, not measured in tissue	--	--	--	--	--
Nitrogen in nitrite	No	0	--	None, not measured in tissue	--	--	--	--	--
Phosphorus	Yes, outlier for pore water	2	23	None, insufficient data	--	--	--	--	--
Selenium	No	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
Strontium (elemental)	No	6	0.2	Mussel = 13 + 0.092 pore water	0.087	0.57	ln(Mussel) = -0.44 + 0.74 ln(pore water)	0.16	0.43
Tin	No	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
Titanium	No	0	--	None, not measured in pore water	--	--	--	--	--
Uranium (inorganic)	No	0	--	None, no detects in tissue	--	--	--	--	--
Vanadium	None	1	--	None, insufficient data	--	--	--	--	--
Zinc	None	6	5.1	Mussel = 18 + 2.4 pore water	0.38	0.19	ln(Mussel) = 2.9 + 0.36 ln(pore water)	0.43	0.15

= Statistically significant regression with a positive relationship, p-value<0.05.

-- = not applicable
COPEC = contaminant of potential ecological concern

Table 6-99. Aquatic Invertebrate Tissue Effect Levels.

Analyte	Taxa	Species	Lifestage	Tissue Type	Tissue Concentration (mg/kg-fw)	Effect	Reference
Aquatic Macroinvertebrate Comparison Benchmarks							
Cadmium (cadmium chloride)	Insect	Caddisfly, *Hydropsyche betteni*	5-8 mm	Whole body	60	Survival - no effect	Spehar et al. 1978
Lead (lead nitrate)	Insect	Caddisfly, *Brachycentrus sp.*	5-8 mm	Whole body	260	Survival - no effect	Spehar et al. 1978
Mercury (mercuric chloride)	Insect	Midge, *Chironomus riparius*	Adult	Whole body	40	Survival - no effect	Rossaro et al. 1986
Selenium (sodium selenate)	Insect	Midge, *Chironomus decorus*	Larvae, 4th instar	Whole body	5.08	Survival - no effect	Hansen et al. 1993
Clam Comparison Benchmarks							
Cadmium (cadmium chloride)	Mollusk	Zebra mussel, *Dreissena polymorpha*	NA	Soft tissue	114	Survival - no effect	Kraak et al. 1992
Lead (lead nitrate)	Mollusk	Zebra mussel, *Dreissena polymorpha*	Adult, 1.6-2.0 cm	Soft tissue	36	Survival, growth - no effect	Kraak et al. 1994
Mercury (mercuric nitrate)	Mollusk	Mussel, *Elliptio complanata*	Adult	Soft tissue	3.0	Survival, growth - no effect	Tessier et al. 1996
Nickel	Mollusk	Mussel, *Lamellidens marginalis* (fw)	15 g	Soft tissue	277.1	Survival - no effect	Sreedevi et al. 1992

fw = fresh weight
NA = not available

Table 6-100. Summary of Regression Analyses of Clam Survival Versus Sediment and Pore Water Concentrations. (6 Pages)

COPEC or Confounding Factor	Equation	Number of Sites with Detects	R-Squared Value	P-Value	Maximum CTE Tested (mg/kg) [a]	Maximum CTE Evaluated (mg/kg) [b]
Sediment Evaluation						
Contaminant of Potential Ecological Concern						
Aluminum [c]	Clam survival = 17 + 0.004 aluminum	30	0.13	0.053	10,100	13,000
Antimony [c]	None, insufficient data	1	--	--	0.47	0.649
Barium [c]	Clam survival = 16 + 0.3 barium	30	0.37	<0.001	209	869
Cadmium [d]	Clam survival = 36 + 7.7 cadmium	26	0.047	0.29	2.4	2.4
Calculated total uranium [e]	Clam survival = 36 + 2.3 calculated total uranium	30	0.085	0.12	15.4	15.4

Table 6-100. Summary of Regression Analyses of Clam Survival Versus Sediment and Pore Water Concentrations. (6 Pages)

COPEC or Confounding Factor	Equation	Number of Sites with Detects	R-Squared Value	P-Value	Maximum CTE Tested (mg/kg) [a]	Maximum CTE Evaluated (mg/kg) [b]
Chromium [e]	Clam survival = 52 + -0.52 chromium	30	0.059	0.2	47.1	286
Copper [c]	Clam survival = 29 + 0.72 copper	30	0.056	0.21	29.7	64
Hexavalent chromium [e]	None, insufficient data to determine if there is a biologically significant relationship	4	--	--	0.98	8.41
Lead [d]	Clam survival = 40 + 0.12 lead	30	0.0059	0.69	63.7	158
Manganese [c]	Clam survival = 25 + 0.052 manganese	30	0.15	0.034	746	924
Mercury [d]	Clam survival = 53 + -100 mercury	13	0.049	0.47	0.2	0.2
Nickel [c]	Clam survival = 28 + 1 nickel	30	0.062	0.19	24.9	32.1
Nitrogen in nitrate [d]	Clam survival = 45 + -0.46 nitrogen in nitrate	31	0.017	0.48	26.3	26.3
Nitrogen in nitrite [e]	Clam survival = 38 + 7.2 nitrogen in nitrite	19	0.018	0.58	1.69	1.69
Phosphorus [c]	Clam survival = 16 + 0.03 phosphorus	30	0.12	0.065	1,390	1,390
Selenium [c]	Clam survival = 52.1 + 0.246 selenium	5	0.00044	0.97	4.3	4.3
Strontium (elemental) [c]	Clam Survival = 13 + 1.3 strontium (elemental)	30	0.12	0.058	33.7	45.6
Tin [c]	Clam survival = 45 + 0.15 tin	24	0.00047	0.92	17.1	17.1
Titanium [c]	Clam survival = 38 + 0.012 titanium	14	0.1	0.26	2,030	2,030
Uranium (inorganic) [e]	Clam survival = 57.5 + 1.68 uranium (inorganic)	5	0.12	0.57	6.8	6.8
Vanadium [c]	Clam survival = 22 + 0.5 vanadium	30	0.069	0.16	66	66
Zinc [c]	Clam survival = 40 + 0.013 zinc	30	0.0026	0.79	358	800
Confounding Factors						
Cumulative percent retained on No. 8 screen	Clam survival = 32 + 0.53 cumulative percent retained on No. 8 screen	31	0.42	<0.001	73.7	73.7
Cumulative percent retained on No. 16 screen	Clam survival = 30 + 0.47 cumulative percent retained on No. 16 screen	31	0.4	<0.001	89.4	89.4
Cumulative percent retained on No. 30 screen	Clam survival = 29 + 0.38 cumulative percent retained on No. 30 screen	31	0.3	0.002	94.4	94.4
Cumulative percent retained on No. 50 screen	Clam survival = 23 + 0.35 cumulative percent retained on No. 50 screen	31	0.18	0.018	97.3	97.3
Cumulative percent retained on No. 100 screen	Clam survival = 13 + 0.34 cumulative percent retained on No. 100 screen	31	0.028	0.37	99.8	99.8

Table 6-100. Summary of Regression Analyses of Clam Survival Versus Sediment and Pore Water Concentrations. (6 Pages)

COPEC or Confounding Factor	Equation	Number of Sites with Detects	R-Squared Value	P-Value	Maximum CTE Tested (mg/kg) [a]	Maximum CTE Evaluated (mg/kg) [b]
Cumulative percent retained on No. 200 screen	Clam survival = 32 + 0.11 cumulative percent retained on No. 200 screen	31	0.00024	0.93	100	100
Fraction coarse silt/silt/clay (less than 0.074 mm)	Clam survival = 44 + -0.39 fraction coarse silt/silt/clay (less than 0.074 mm)	31	0.0027	0.78	12.5	12.5
Fraction very fine sand	Clam survival = 52 + -0.89 fraction very fine sand	31	0.11	0.069	31.2	43.9
Fraction fine sand	Clam survival = 63 + -0.59 fraction fine sand	31	0.3	0.001	69.3	79.2
Fraction medium sand	Clam survival = 55 + -0.54 fraction medium sand	31	0.18	0.017	73	73
Fraction coarse sand	Clam survival = 47 + -0.56 fraction coarse sand	31	0.039	0.29	30.5	39.3
Fraction very coarse sand	Clam survival = 39 + 0.51 fraction very coarse sand	31	0.026	0.38	23.7	39.1
Fraction total sand	Clam survival = 88 + -0.57 fraction total sand	31	0.48	<0.001	100	100
Fraction granules (greater than 2.38 mm)	Clam survival = 32 + 0.53 fraction granules (greater than 2.38 mm)	31	0.42	<0.001	73.7	73.7
Percent moisture (wet sample)	Clam survival = 48 + -0.23 percent moisture (wet sample)	31	0.012	0.55	48.6	67.3
pH Measurement	Clam survival = 38 + 0.69 ph measurement	31	0.00017	0.95	8.74	8.74
Specific conductance	None, insufficient data	1	--	--	159	159
Temperature	None, insufficient data	1	--	--	4.5	4.5
Total organic carbon	Clam survival = 45 + -0.00037 total organic carbon	31	0.011	0.58	25,900	45,200
Dominant substrate class (1-4)	Clam survival = 46 + -1.9 dominant substrate class (1-4)	32	0.0022	0.8	4	4
Macrophyte abundance class (1-4)	Clam survival = 40 + 1.7 macrophyte abundance class (1-4)	32	0.0041	0.73	3	3
Sub dominant substrate class (1-4)	Clam survival = 33 + 4.9 sub dominant substrate class (1-4)	32	0.01	0.59	3	3
Substrate embeddedness class (1-4)	Clam survival = 63 + -8.2 substrate embeddedness class (1-4)	32	0.15	0.028	4	4
Calcium	Clam survival = 26 + 0.0043 calcium	30	0.043	0.27	6,230	6,320
Chloride	Clam survival = 42 + 0.3 chloride	31	0.00099	0.87	11.2	11.6

Table 6-100. Summary of Regression Analyses of Clam Survival Versus Sediment and Pore Water Concentrations. (6 Pages)

COPEC or Confounding Factor	Equation	Number of Sites with Detects	R-Squared Value	P-Value	Maximum CTE Tested (mg/kg) [a]	Maximum CTE Evaluated (mg/kg) [b]
Iron	Clam survival = 19 + 0.0012 iron	30	0.075	0.14	29,400	29,400
Magnesium	Clam survival = 31 + 0.0032 magnesium	30	0.015	0.53	5,860	7,320
Nitrogen in ammonia	Clam survival = 56 + -3.3 nitrogen in ammonia	29	0.062	0.19	12.2 (RME)	12.2 (RME)
Nitrogen, Kjeldahl total	Clam survival = 43 + 4.3e-05 nitrogen, Kjeldahl total	31	0.00000098	1	1,920	3,290
Potassium	Clam survival = 30 + 0.015 potassium	30	0.045	0.26	1,450	1,620
Silicon	Clam survival = 55 + -0.014 silicon	30	0.18	0.021	2,900	3,100
Sodium	Clam survival = 59 + -0.13 sodium	30	0.088	0.11	250	289
Sulfate	Clam survival = 49 + -0.71 sulfate	31	0.09	0.1	31.9	53.1
Total petroleum hydrocarbons	None, insufficient data	0	--	--	--	287
Total petroleum hydrocarbons - diesel range	Clam survival = 47 + -0.21 total petroleum hydrocarbons - diesel range	26	0.0065	0.69	38	50
Total petroleum hydrocarbons - gasoline range	None, insufficient data to determine if there is a biologically significant relationship	3	--	--	0.12	0.21
Pore Water Evaluation						
Contaminant of Potential Ecological Concern						
Aluminum [c]	Clam survival = 39 + 0.0055 aluminum	13	<0.001	0.93	399	399
Antimony [c]	None, insufficient data	1	--	--	2.6	2.6
Barium [c]	Clam survival = 44 + -0.12 barium	21	0.018	0.56	104	104
Cadmium [c]	None, insufficient data	1	--	--	0.85	0.85
Calculated total uranium [e]	Clam survival = 32 + 0.17 calculated total uranium	17	0.12	0.17	141	141
Chromium [e]	Clam survival = 38 + -0.49 chromium	11	0.18	0.2	43.8	43.8
Copper [c]	Clam survival = 43 + 1.6 copper	5	0.042	0.74	8.9	8.9
Hexavalent chromium [e]	Clam survival = 31 + -0.22 hexavalent chromium	11	0.032	0.6	40	40
Lead [c]	None, insufficient data to determine if there is a biologically significant relationship	3	--	--	3.1	3.1
Manganese [c]	Clam survival = 41 + -0.017 manganese	21	0.091	0.18	1,640	1,640
Mercury [c]	None, insufficient data	0	--	--	--	0.002
Nickel [c]	None, insufficient data	1	--	--	2.6	2.6

Table 6-100. Summary of Regression Analyses of Clam Survival Versus Sediment and Pore Water Concentrations. (6 Pages)

COPEC or Confounding Factor	Equation	Number of Sites with Detects	R-Squared Value	P-Value	Maximum CTE Tested (mg/kg) [a]	Maximum CTE Evaluated (mg/kg) [b]
Nitrogen in nitrate [c]	Clam survival = 41 + -0.001 nitrogen in nitrate	20	0.021	0.54	12,500	12,500
Nitrogen in nitrite [c]	None, insufficient data	0	--	--	--	--
Phosphorus [d]	Clam survival = 37 + -0.091 phosphorus	12	0.049	0.49	214	214
Selenium [c]	None, insufficient data	1	--	--	9.8	9.8
Strontium (elemental) [c]	Clam survival = 48 + -0.067 strontium (elemental)	21	0.034	0.43	326	326
Tin [c]	None, insufficient data	0	--	--	--	--
Titanium [c]	None, insufficient data	0	--	--	--	--
Uranium (inorganic) [c]	None, insufficient data	1	--	--	137	137
Vanadium [c]	Clam survival = 47 + -4.7 vanadium	10	0.2	0.19	5.3	9.14
Zinc [c]	Clam survival = 33 + 1.3 zinc	21	0.033	0.43	11.8	11.8
Confounding Factors						
Alkalinity	Clam survival = 62 - 0.00029 alkalinity	22	0.061	0.27	140,000	140,000
Bromide	None, insufficient data	1	--	--	1,300	1,300
Calcium	Clam survival = 50 - 0.00038 calcium	21	0.046	0.35	65,300	65,300
Chloride	Clam survival = 41 - 0.00047 chloride	20	0.012	0.64	19,000	19,000
Chlorine	Clam survival = 39 - 0.00037 chlorine	10	0.14	0.29	66,000	66,000
Hardness	Clam survival = 37 - 0.0000017 hardness	21	<0.001	0.99	170,000	170,000
Iron	Clam survival = 36 - 0.003 iron	14	0.14	0.18	10,100	10,100
Magnesium	Clam survival = 44 - 0.00079 magnesium	21	0.014	0.61	18,000	18,000
Nitrogen in nitrite and nitrate	Clam survival = 41 - 0.00091 nitrogen in nitrite and nitrate	20	0.017	0.58	12,900	12,900
Nitrogen in ammonia	Clam survival = 43 - 0.026 nitrogen in ammonia	17	0.095	0.23	1,300	1,300
Nitrogen, Kjeldahl total	Clam survival = 38 - 0.02 nitrogen, kjeldahl total	8	0.19	0.28	2,300	2,300
Potassium	Clam survival = 46 - 0.0044 potassium	20	0.04	0.4	4,120	4,182
Silicon	Clam survival = 53 - 0.0024 silicon	21	0.17	0.064	13,000	13,000
Sodium	Clam survival = 41 - 0.00043 sodium	21	0.007	0.72	16,400	16,400
Specific conductance	Clam survival = 47 - 0.039 specific conductance	21	0.037	0.4	590	590
Sulfate	Clam survival = 44 - 0.00021 sulfate	20	0.038	0.41	91,400	91,400
Temperature	Clam survival = 45 - 0.97 temperature	21	0.07	0.25	19.7	19.7

Table 6-100. Summary of Regression Analyses of Clam Survival Versus Sediment and Pore Water Concentrations. (6 Pages)

COPEC or Confounding Factor	Equation	Number of Sites with Detects	R-Squared Value	P-Value	Maximum CTE Tested (mg/kg) [a]	Maximum CTE Evaluated (mg/kg) [b]
Total dissolved solids	Clam survival = 46 - 4.5e-005 total dissolved solids	20	0.03	0.47	380,000	380,000
Total organic carbon	Clam survival = 50 - 0.0063 total organic carbon	16	0.012	0.68	7,800	7,800
Total petroleum hydrocarbons	None, insufficient data	0	--	--	--	--
Total petroleum hydrocarbons - diesel range	Clam survival = 45 - 0.43 total petroleum hydrocarbons - diesel range	5	0.32	0.32	120	120
Total petroleum hydrocarbons - gasoline range	None, insufficient data	1	--	--	0.0064	0.0064
Total suspended solids	Clam survival = 88 - 0.0027 total suspended solids	5	0.54	0.16	25,700	25,700
Water depth 1996 to 2006	Clam survival = 25 + 15 water depth 1996 to 2006	22	0.36	0.003	2.51	2.51
Water depth exceedance from 1996 to 2006	Clam survival = 83 - 0.54 water depth exceedance from 1996 to 2006	22	0.29	0.009	99.9	99.9
pH Measurement	Clam survival = 110 - 8 pH measurement	21	0.082	0.21	9.77	9.77

= Statistically significant regression, p-value<0.05; COPEC must be negative relationship; confounding factor any relationship.

[a] Study site concentrations are not statistically greater than reference.
[b] Study site concentrations are not statistically greater than reference but outliers warrant COPC status.
[c] Study site concentrations are statistically greater than reference, therefore COPC.
[d] "Tested" are samples bioassayed with clam tubes.
[e] "Evaluated" are the samples evaluated versus benchmarks in Table 6-90 and 6-91 (RCBRA and 100-B/C Pilot soil samples).

-- = not applicable
COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
RCBRA = River Corridor Baseline Risk Assessment
RME = reasonable maximum exposure

Table 6-101. Summary of Regression Data for Clam Survival Measures and Confounding Factors. (2 Pages)

Site	Average Clam Survival (%)	Confound Factors (CTE)									
		No. 8 Screen (% Retained)	No. 16 Screen (% Retained)	No. 30 Screen (% Retained)	No. 50 Screen (% Retained)	Fraction Fine Sand (%)	Fraction Medium Sand (%)	Fraction Total Sand (%)	Fraction Granules (greater than 2.38 mm) (%)	Silicon (mg/kg)	Substrate Embeddedness Class (1-4)
Study Site											
100-B/C ROD Area											
2a	36.1	0.29	0.49	2.54	20.25	55.19	17.71	95.55	0.29	616	4
2b	56	0.05	0.14	0.8	42.34	55.78	41.54	99.88	0.05	375	2
100-K ROD Area											
2c	16	5.25	6.06	7.43	28.7	58.53	21.27	93.07	5.25	1,020	3
Cr1	25.5	2.59	6.34	14.8	43.67	58.87	28.87	96.87	2.59	2,460	3
Cr2	13	4.37	12.58	24.94	53.24	56.46	28.3	98.69	4.37	866	3
Cr3	20	16.65	40.31	63.18	82.36	28.47	47.83	98.35	16.65	1,990	3
100-N ROD Area											
Cr4	45.7	15.41	35.44	60.35	82.2	50.33	22.03	99.49	15.41	1,360	2
Sr5	23.3	8.44	20.98	44.36	61.62	17.72	17.26	86.6	8.44	794	2
100-D/100-H ROD Area											
2f	29.3	1.47	1.77	6.89	43.13	33.6	36.24	89.3	1.47	590	3
2i	34	--	--	--	--	--	--	--	--	--	1
Cr5	27.6	25.68	31.58	62.06	91.73	20.17	29.67	97.68	25.68	2,900	1
Cr6	14.1	2.99	4.13	10.48	46.05	51.8	40.27	99.07	2.99	1,860	2
100-F/100-IU-2/100-IU-6 ROD Area											
2m	7.33	0.26	0.74	1.67	6.01	57.67	4.34	94.63	0.26	568	4
4a	34.7	2.1	4.11	10.16	34.76	43.54	24.6	92.91	2.1	402	3
300 ROD Area											
U1	10.9	3.4	4.34	9.58	64.84	27.99	55.26	95.79	3.4	550	4
U2	60.2	39.22	56.64	67.66	78.15	14.68	10.49	59.35	39.22	462	2
U3	76.2	70.97	78.5	82.77	89.67	6.75	6.9	27.9	70.97	497	1
U4	55.9	10.36	21.54	32.52	49.03	31.6	16.51	84.5	10.36	620	1

Table 6-101. Summary of Regression Data for Clam Survival Measures and Confounding Factors. (2 Pages)

Site	Average Clam Survival (%)	Confound Factors (CTE)									
		No. 8 Screen (% Retained)	No. 16 Screen (% Retained)	No. 30 Screen (% Retained)	No. 50 Screen (% Retained)	Fraction Fine Sand (%)	Fraction Medium Sand (%)	Fraction Total Sand (%)	Fraction Granules (greater than 2.38 mm) (%)	Silicon (mg/kg)	Substrate Embeddedness Class (1-4)
U5	47.6	69.82	76.27	82.72	91.4	5.8	8.68	29.16	69.82	368	2
U6	59.3	49.42	59.2	68.58	81.48	10.86	12.9	47.62	49.42	530	1
U7	60.4	0	0	1.69	74.68	25.15	72.99	100	0	479	1
U8	75.5	67.94	77.64	85.77	91.13	5.46	5.36	30.92	67.94	441	3
U9	55	8.48	19.42	29.48	44.49	36.55	15.01	86.76	8.48	682	3
U10	61.2	0	0.97	2.51	8.82	50.18	6.31	87.49	0	787	3
Reference Site											
Bev Ref 1	14.7	0.47	1.98	9.64	64.05	32.12	54.41	98.76	0.47	608	3
Ref 11	43.4	24.96	28.38	30.24	51.77	69.28	21.53	97.4	24.96	800	3
Ref 12	60.8	57.94	65.53	69.7	87.89	11.04	18.19	41.56	57.94	--	4
Ref 13	67.9	67.76	76.37	80.5	84.46	7.44	3.96	30.14	67.76	517	2
Ref 14	84.6	73.7	89.37	94.35	97.33	1.55	2.98	25.71	73.7	378	2
Ref 16	47.6	1.09	1.48	2.47	34.5	50.7	32	97.17	1.09	1,010	4
Ref 300-1	60.1	5.25	10.58	21.74	46.05	25.51	24.31	87.11	5.25	604	1
Ref 300-2	34.6	1.12	8.88	13.28	20.89	56.98	7.61	93.02	1.12	573	3

= Less 80% of the average measure in reference sites.
= Greater than 120% of average measure in reference sites.

-- = not applicable
CTE = central tendency exposure
ROD = record of decision

Table 6-102. Summary of Habitat Information and Diversity Measures for Aquatic Study Sites and Reference Sites and Metrics of the Aquatic Community. (2 Pages)

Site Name	Sample Date	Habitat Information					Diversity Measures							
		Dominant Substrate Class (1-4)	Sub Dominant Substrate Class (1-4)	Substrate Embeddedness Class (1-4)	Macrophyte Abundance Class (1-4)	Highest Specific Conductance (µS/cm)	EPT Taxa	Number of Ephemeroptera (Mayflies) Taxa	Number of Trichoptera (Caddisflies) Taxa	Number of Mollusk Taxa	Number of Nonnative Mollusk Taxa	Number of Tolerant Taxa (Exclusive of Oligochaeta and Chironomidae]	Hilsenhoff Biotic Index (Modified)	Shannon Diversity (log2)
Study Site														
100-B/C ROD Decision Area														
2a	8/13/2007	1	2	4	0	295	2	1	1	1	0	5	7.2	2.8
2b	8/9/2007	2	2	2	0	240	6	1	5	4	0	6	7	2.1
100-K ROD Decision Area														
2c	8/14/2007	3	2	3	1	236	5	2	3	5	1	16	7.2	2.3
Cr1	7/31/2006	2	2	3	1	395	8	2	6	8	1	16	6.3	1.8
Cr2	7/31/2006	2	2	3	2	236	4	1	3	8	2	17	6.1	1.5
Cr3	7/27/2006	2	2	3	2	186	8	3	5	6	0	16	6.5	2.1
100-N ROD Decision Area														
Sr5	8/14/2007	4	2	2	0	320	9	3	6	3	0	11	6.3	2
100-D/100-H ROD Decision Area														
2f	8/14/2007	2	2	3	0	155	9	2	7	6	0	13	6.9	2.5
2i	8/27/2007	2	2	1	1	165	12	3	9	7	1	15	7	2.6
Cr5	7/31/2006	2	2	1	1	181	10	5	5	8	0	18	6.4	2
Cr6	7/31/2006	1	2	2	1	390	9	3	6	3	0	13	6.9	2.5
Cr7	7/27/2006	2	2	1	1	162	8	3	5	6	0	10	6.3	1.7
Cr9	7/26/2006	2	2	1	1	178	9	3	6	3	0	7	6.6	2
Cr10	7/27/2006	2	2	1	1	156	8	3	5	5	1	11	6.5	2.1
100-F/100-IU-2/100-IU-6 ROD Decision Area														
2j	8/14/2007	1	1	4	2	148	3	0	3	9	1	13	7	2.8
2l	8/14/2007	2	1	4	2	145	2	0	2	5	1	11	6.7	2.7
2m	8/15/2007	2	1	4	1	209	10	3	7	6	1	16	7.4	3.3
3b	8/21/2007	2	1	3	0	221	3	1	2	8	1	17	6.6	3.4
4a	8/15/2007	2	3	3	0	246	4	2	2	6	0	15	6.7	2.4
Cr4	7/31/2006	2	3	2	1	298	8	4	4	2	0	7	6.5	1.7
300 Area ROD Decision Area														
5c	8/21/2007	2	2	3	0	199	12	5	7	8	0	13	7.1	2.9
5d	8/15/2007	1	1	4	2	218	5	2	3	7	1	13	7.8	2.8
U1	7/25/2006	1	2	4	3	273	6	1	5	10	3	18	6.8	3.1
U2	7/25/2006	2	2	2	3	341	8	1	7	12	3	22	6.8	3.3
U3	7/24/2006	2	2	1	1	309	13	5	8	8	1	18	6.8	2.9
U4	7/24/2006	2	2	1	1	347	11	6	5	1	0	10	6.6	2.5
U5	7/26/2006	2	2	2	1	383	14	5	9	6	0	20	6.5	2.7
U6	7/26/2006	2	2	1	1	333	13	5	8	9	0	23	6.4	2.5
U7	7/24/2006	2	3	1	1	411	14	7	7	4	0	15	6.7	2.8
U8	7/24/2006	2	2	3	2	428	11	3	8	7	2	18	6.5	3.1
U9	7/25/2006	2	2	3	2	504	8	2	6	9	2	18	6.6	2.8
U10	7/25/2006	2	2	3	2	497	10	3	7	9	2	19	6.9	3.4
Reference														
Ref 11	7/23/2006	2	1	3	2	593	6	3	3	7	0	17	7.1	3.6
Ref 12	7/28/2006	1	1	4	2	156	6	2	4	7	1	14	7.6	3
Ref 13	7/28/2006	2	2	2	1	137	7	3	4	4	0	9	6.2	2
Ref 14	7/28/2006	2	2	2	1	169	9	5	4	2	0	12	6.4	2.3
Ref 16	7/28/2006	1	2	4	2	154	8	4	4	8	2	19	6.9	3.5
Ref 16	8/9/2007	2	2	1	2	153	5	2	3	8	1	13	7.6	3.1
Bev Ref 1	8/22/2007	2	2	3	1	154	7	2	5	7	1	15	7.3	3.1
Bev Ref 2	8/22/2007	1	1	4	3	333	4	1	3	6	0	10	7.2	3.2
Ref 300-1	7/26/2006	2	2	1	1	145	10	4	6	8	2	18	6.7	3

Table 6-102. Summary of Habitat Information and Diversity Measures for Aquatic Study Sites and Reference Sites and Metrics of the Aquatic Community. (2 Pages)

Site Name	Sample Date	Habitat Information					Diversity Measures							
		Dominant Substrate Class (1-4)	Sub Dominant Substrate Class (1-4)	Substrate Embeddedness Class (1-4)	Macrophyte Abundance Class (1-4)	Highest Specific Conductance (µS/cm)	EPT Taxa	Number of Ephemeroptera (Mayflies) Taxa	Number of Trichoptera (Caddisflies) Taxa	Number of Mollusk Taxa	Number of Nonnative Mollusk Taxa	Number of Tolerant Taxa (Exclusive of Oligochaeta and Chironomidae]	Hilsenhoff Biotic Index (Modified)	Shannon Diversity (log2)
Ref 300-2	7/26/2006	2	2	3	2	208	12	4	8	9	1	22	6.6	3.1

EPT = Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies)
ROD = record of decision

Table 6-103. Summary of Abundance Measures for Aquatic Study Sites and Reference Sites and Metrics of the Aquatic Community. (2 Pages)

Site Name	Sample Date	Abundance Measures								
		Aquatic Macroinvertebrate Abundance	Total Number of Aquatic Macroinvertebrate Taxa	Mean Number of Individual Crayfish	Mean Number of Individual Ephemeroptera (Mayflies)	Mean Number of Individual Mollusks	Mean Number of Individual Nonnative Mollusks	Mean Number of Individual Pyrgulopsis (Spring Snail)	Mean Number of Individual Trichoptera (Caddisflies)	Mean Number of Individual Vorticifex Effusa (Common Snail)
Study Site										
100-B/C ROD Decision Area										
2a	8/13/2007	20	10	0	0.3	1	0	0	5	0
2b	8/9/2007	179	13	0	1.3	6	0	0	141.8	4
100-K ROD Decision Area										
2c	8/14/2007	134	23	0	0.6	71	0.3	0	13.6	63.3
Cr1	7/31/2006	528	28	0.4	2	8	0.8	0	33	1.3
Cr2	7/31/2006	265	24	0.7	0.3	6	0.6	0	24	0.3
Cr3	7/27/2006	698	27	0	3	16	0	0	62	3
100-N ROD Decision Area										
Sr5	8/14/2007	558	22	0	6.3	10	0	0	109	7.3
100-D/100-H ROD Decision Area										
2f	8/14/2007	391	24	0	4.3	134	0	0	66.2	118.3
2i	8/27/2007	1,122	28	0	14.7	27	2.7	0	570.6	6
Cr5	7/31/2006	272	30	0.3	6	10	0	0.3	31	4.3
Cr6	7/31/2006	1,312	23	0.3	13	130	0	0	566	126
Cr7	7/27/2006	5,407	20	0	115	108	0	4	1,923	38.7
Cr9	7/26/2006	6,770	19	0.7	75	289	0	0	2,933	186.7
Cr10	7/27/2006	7,164	20	8	121	230	0.3	0	3,080	164
100-F/100-IU-2/100-IU-6 ROD Decision Area										
2j	8/14/2007	181	23	0	0	16	0.7	0	3.6	2
2l	8/14/2007	425	18	0	0	23	4.3	0	64.3	12.7
2m	8/15/2007	411	28	0	27.4	41	3	0	38.9	19
3b	8/21/2007	218	26	0	0.7	20	0.7	0	6	2.7
4a	8/15/2007	247	23	0	5.6	101	0	0	22.6	1
Cr4	7/31/2006	2,782	17	0.3	24	8	0	0	974	0.3
300 Area ROD Decision Area										
5c	8/21/2007	79	24	0	29.2	17	0	1.3	12.9	1.3
5d	8/15/2007	263	22	0	2	14	1.3	0	4.7	0
U1	7/25/2006	364	27	0.3	18	84	6.3	3.7	29	26
U2	7/25/2006	388	34	0.3	27	109	4.6	30.7	28	56.3
U3	7/24/2006	567	34	0.3	37	104	1	6.5	216	56.2
U4	7/24/2006	939	20	0.7	168	10	0	0	368	10.3
U5	7/26/2006	476	35	0.3	74	11	0	1.7	94	6.7
U6	7/26/2006	402	38	0	67	7	0	0.7	66	0.3
U7	7/24/2006	1,242	29	0.9	212	46	0	1.8	515	35.8
U8	7/24/2006	359	30	0.3	31	186	2.3	80	39	100.3
U9	7/25/2006	364	30	1	39	22	1.6	4	40	13.7
U10	7/25/2006	255	33	0.3	20	41	1.3	2.7	41	31
Reference										
Reference										
Ref 11	7/23/2006	104	26	0	5	14	0	0	1	3.3
Ref 12	7/28/2006	671	25	1.5	2	17	1	0	211	9.8
Ref 13	7/28/2006	628	19	0.3	18	13	0	0	220	10.3
Ref 14	7/28/2006	410	12	0.7	6	13	0	0	63	0.7
Ref 16	7/28/2006	386	28	0.7	11	80	0.6	0	73	52
Ref 16	8/9/2007	82	21	0	1.6	33.8	2	0	22.3	17.3
Bev Ref 1	8/22/2007	279	25	0	0.6	31	0.7	0	30.2	1

Table 6-103. Summary of Abundance Measures for Aquatic Study Sites and Reference Sites and Metrics of the Aquatic Community. (2 Pages)

Site Name	Sample Date	Abundance Measures								
		Aquatic Macroinvertebrate Abundance	Total Number of Aquatic Macroinvertebrate Taxa	Mean Number of Individual Crayfish	Mean Number of Individual Ephemeroptera (Mayflies)	Mean Number of Individual Mollusks	Mean Number of Individual Nonnative Mollusks	Mean Number of Individual Pyrgulopsis (Spring Snail)	Mean Number of Individual Trichoptera (Caddisflies)	Mean Number of Individual Vorticifex Effusa (Common Snail)
Bev Ref 2	8/22/2007	168	21	0	0.3	13	0	0	28.6	0
Ref 300-1	7/26/2006	314	28	0	16	31	0.6	1	120	24.7
Ref 300-2	7/26/2006	335	36	0.7	34	11	0.3	1	104	5

ROD = record of decision

Table 6-104. Summary of Regression Analyses of *Hyalella* Measures Versus Sediment Concentrations. (4 Pages)

COPEC or Confounding Factor	Number of Sites with Detects [a]	Minimum of P-Value	Maximum of P-Value	Number of Significant Regressions [b]	Maximum CTE Tested (mg/kg) [a]	Maximum CTE Observed (mg/kg) [b]	Statistical Difference for Sediment (Study Site vs. Reference)
Contaminant of Potential Ecological Concern							
Aluminum	48 [c]	0.23	0.46	0	13,000	13,000	No difference
Antimony	1	--	--	--	0.47	0.47	No difference; maximum from 100-B/C Pilot
Barium	48 [c]	0.03	0.033	2	209	209	No difference; maximum from 100-B/C Pilot
• *Hyalella* growth = 0.13 + 0.00061 barium, n = 47, r^2=0.1, p = 0.03 • *Hyalella* survival = 45 + 0.25 barium, n = 48, r^2 = 0.095, p = 0.033							
Cadmium	42	0.37	0.5	0	2.4	2.4	No difference but outlier in reference sediment
Calculated total uranium	47 [c]	0.016	0.086	1	15.4	15.4	No difference but sediment concentrations in 300 Area greater than other ROD decision areas
• *Hyalella* growth = 0.15 + 0.012 calculated total uranium, n = 46, r^2 = 0.13, p = 0.016							
Chromium	48 [c]	0.49	0.77	0	47.1	286	Greater than reference in 100 Area
Copper	48 [c]	0.18	0.22	0	31.2	64	No difference
Hexavalent chromium	4 [c, d]	--	--	--	0.98	8.41	Sediment greater than reference in 100 Area
Lead	48 [c]	0.25	0.83	0	63.7	158	Three outliers in sediment
Manganese	48 [c]	0.017	0.11	1	924	924	No difference but outlier in 100-N Area sediment
• *Hyalella* survival = 44 + 0.065 manganese, n = 48, r^2 = 0.12, p = 0.017							
Mercury	16 [c]	0.034	0.23	1	0.08	0.2	Three outliers in sediment
• *Hyalella* survival = 91 + -370 mercury, n = 16, r^2 = 0.28, p = 0.034							
Nickel	48 [c]	0.063	0.18	0	32.1	32.1	No difference
Nitrogen in nitrate	47 [c]	0.085	0.21	0	26.3	26.3	Four outliers in sediment
Nitrogen in nitrite	29 [c]	0.78	0.96	0	1.69	1.69	Sediment range is greater than reference
Phosphorus	48 [c]	0.46	0.61	0	1,390	1,390	No difference
Selenium	7	0.37	0.92	0	4.3	4.3	No difference
Strontium (elemental)	48 [c]	0.094	0.46	0	45.6	45.6	No difference

Table 6-104. Summary of Regression Analyses of *Hyalella* Measures Versus Sediment Concentrations. (4 Pages)

COPEC or Confounding Factor	Number of Sites with Detects [a]	Minimum of P-Value	Maximum of P-Value	Number of Significant Regressions [b]	Maximum CTE Tested (mg/kg) [a]	Maximum CTE Observed (mg/kg) [b]	Statistical Difference for Sediment (Study Site vs. Reference)
Tin	30 [c]	0.49	0.69	0	17.1	17.1	No difference
Titanium	21	0.008	0.19	1	2,030	2,030	Sediment 300 Area greater than reference
• *Hyalella* growth = 0.14 + 0.000065 titanium, n = 21, r^2 = 0.31, p = 0.008							
Uranium (inorganic)	6	0.036	0.19	1	6.8	6.8	Sediment 300 Area greater than reference
• *Hyalella* growth = 0.23 + 0.0067 uranium (inorganic), n = 6, r^2 = 0.71, p = 0.036							
Vanadium	48 [c]	0.84	0.86	0	66	66	No difference
Zinc	48 [c]	0.13	0.44	0	362	800	No difference
Confounding Factors							
Cumulative percent retained on No. 8 screen	49 [c]	0.045	0.2	1	73.7	73.7	--
• *Hyalella* survival = 58 + 0.39 cumulative percent retained on No. 8 screen, n = 49, r^2 = 0.083, p = 0.045							
Cumulative percent retained on No. 16 screen	49 [c]	0.04	0.18	1	89.4	89.4	--
• *Hyalella* survival = 56 + 0.35 cumulative percent retained on No. 16 screen, n = 49, r^2 = 0.087, p = 0.04							
Cumulative percent retained on No. 30 screen	49 [c]	0.18	0.5	0	94.4	94.4	--
Cumulative percent retained on No. 50 screen	49 [c]	0.33	0.91	0	97.3	97.3	--
Cumulative percent retained on No. 100 screen	49 [c]	0.33	0.79	0	99.8	99.8	--
Cumulative percent retained on No. 200 screen	49 [c]	0.3	0.75	0	100	100	--
Fraction coarse silt/silt/clay (less than 0.074 mm)	49 [c]	0.048	0.51	1	12.5	12.5	--
• *Hyalella* survival = 75 + -2.8 fraction coarse silt/silt/clay (less than 0.074 mm), n = 49, r^2 = 0.081, p = 0.048							
Fraction very fine sand	49 [c]	0.1	0.46	0	43.9	43.9	--
Fraction fine sand	49 [c]	0.12	0.28	0	79.2	79.2	--
Fraction medium sand	49 [c]	0.1	0.13	0	73	73	--
Fraction coarse sand	49 [c]	0.063	0.13	0	39.3	39.3	--

Table 6-104. Summary of Regression Analyses of *Hyalella* Measures Versus Sediment Concentrations. (4 Pages)

COPEC or Confounding Factor	Number of Sites with Detects [a]	Minimum of P-Value	Maximum of P-Value	Number of Significant Regressions [b]	Maximum CTE Tested (mg/kg) [a]	Maximum CTE Observed (mg/kg) [b]	Statistical Difference for Sediment (Study Site vs. Reference)
Fraction very coarse sand	49 [c]	0.44	0.85	0	39.1	39.1	--
Fraction total sand	49 [c]	0.013	0.028	2	100	100	--
• *Hyalella* growth = 0.27 + -0.0011 fraction total sand, n = 48, r^2 = 0.1, p = 0.028 • *Hyalella* survival = 110 + -0.5 fraction total sand, n = 49, r^2 = 0.12, p = 0.013							
Fraction granules (greater than 2.38 mm)	49 [c]	0.045	0.2	1	73.7	73.7	--
• *Hyalella* survival = 58 + 0.39 fraction granules (greater than 2.38 mm), n = 49, r^2 = 0.083, p = 0.045							
Percent moisture (wet sample)	49 [c]	0.002	0.002	2	67.3	67.3	--
• *Hyalella* growth = 0.13 + 0.0024 percent moisture (wet sample), n = 48, r^2 = 0.2, p = 0.002 • *Hyalella* survival = 43 + 0.98 percent moisture (wet sample), n = 49, r^2 = 0.18, p = 0.002							
pH Measurement	49 [c]	0.001	0.008	2	8.46	8.74	--
• *Hyalella* growth = 0.88 + -0.094 ph measurement, n = 48, r^2 = 0.22, p = 0.001 • *Hyalella* survival = 280 + -29 ph measurement, n = 49, r^2 = 0.14, p = 0.008							
Specific conductance	1	--	--	--	159	159	--
Temperature	1	--	--	--	4.5	4.5	--
Total organic carbon	49 [c]	0.033	0.059	1	45,200	45,200	--
• *Hyalella* growth = 0.16 + 0.0000028 total organic carbon, n = 48, r^2 = 0.095, p = 0.033							
Dominant substrate class (1-4)	41 [c]	0.23	0.29	0	4	4	--
Macrophyte abundance class (1-4)	41 [c]	0.3	0.69	0	3	3	--
Sub dominant substrate class (1-4)	41 [c]	0.64	0.79	0	3	3	--
Substrate embeddedness class (1-4)	41 [c]	0.29	0.75	0	4	4	--
Calcium	48 [c]	0.66	0.92	0	6,320	6,320	--
Chloride	49 [c]	0.68	0.76	0	11.6	11.6	--
Fluoride	18	0.3	0.59	0	1.73	1.73	--
Iron	48 [c]	0.51	0.66	0	29,400	29,400	--
Magnesium	48 [c]	0.57	0.79	0	7,320	7,320	--
Nitrogen in ammonia	45 [c]	0.35	0.39	0	12.2 (RME)	12.2 (RME)	--

Table 6-104. Summary of Regression Analyses of *Hyalella* Measures Versus Sediment Concentrations. (4 Pages)

COPEC or Confounding Factor	Number of Sites with Detects [a]	Minimum of P-Value	Maximum of P-Value	Number of Significant Regressions [b]	Maximum CTE Tested (mg/kg) [a]	Maximum CTE Observed (mg/kg) [b]	Statistical Difference for Sediment (Study Site vs. Reference)
Nitrogen, Kjeldahl total	49 [c]	0.008	0.017	2	3,290	3,290	--
• *Hyalella* growth = 0.15 + 0.000041 nitrogen, Kjeldahl total, n = 48, r^2 = 0.14, p = 0.008 • *Hyalella* survival = 52 + 0.016 nitrogen, Kjeldahl total, n = 49, r^2 = 0.12, p = 0.017							
Potassium	48 [c]	0.46	0.58	0	1,620	1,620	--
Silicon	48 [c]	0.003	0.011	2	2,900	3,100	--
• *Hyalella* growth = 0.23 + -0.00005 silicon, n = 47, r^2 = 0.18, p = 0.003 • *Hyalella* survival = 80 + -0.018 silicon, n = 48, r^2 = 0.13, p = 0.011							
Sodium	48 [c]	0.017	0.098	1	289	289	--
• *Hyalella* growth = 0.24 + -0.00045 sodium, n = 47, r^2 = 0.12, p = 0.017							
Sulfate	49 [c]	0.008	0.012	2	53.1	53.1	--
• *Hyalella* growth = 0.21 + -0.0024 sulfate, n = 48, r^2 = 0.13, p = 0.012 • *Hyalella* survival = 76 + -1.1 sulfate, n = 49, r^2 = 0.14, p = 0.008							
Total petroleum hydrocarbons	1	--	--	--	287	287	--
Total petroleum hydrocarbons - diesel range	39	0.032	0.35	1	50	50	--
• *Hyalella* growth = 0.17 + 0.0023 total petroleum hydrocarbons - diesel range, n = 39, r^2 = 0.12, p = 0.032							
Total petroleum hydrocarbons - gasoline range	7	0.61	0.69	0	0.21	0.21	--

= Statistically significant regression, p-value <0.05.

[a] Number of sites with detects for both sediment and bioassay measurements, out of 33 sites with paired sediment and Hyalella bioassay measurements.
[b] Number of significant regression relationships out of two bioassay endpoints measured.
[c] Number of sites for Hyalella survival. The number of sites for Hyalella growth is one less.
[d] Regression results for fewer than five sites have insufficient data for determining a biologically significant relationship.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
RME = reasonable maximum exposure

Table 6-105. Summary of *Hyalella* Measures Key Contaminants of Potential Ecological Concern and Confounding Factors Using All RCBRA Sediment Data. (2 Pages)

Site	*Hyalella* Average		COPEC (CTE)	Confounding Factor (CTE)											
	Growth (mg per organism)	Survival (%)	Mercury (mg/kg)	No. 8 Screen (% retained)	No. 16 Screen (% retained)	Fraction Coarse Silt/Silt/Clay (less than 0.074 mm) (%)	Fraction Total Sand (%)	Percent Moisture (wet sample)	pH	Total Organic Carbon (mg/kg)	Nitrogen, Kjeldahl Total (mg/kg)	Silicon (mg/kg)	Sodium (mg/kg)	Sulfate (mg/kg)	Total Petroleum Hydrocarbons - Diesel Range (mg/kg)
Study Site															
100-B/C ROD Area															
2a	0.286	78	--	0.29	0.49	4.16	95.55	38.5	6.98	12,900	1,320	616	92.6	3.96	38
2b	0.12	72	--	0.05	0.14	0.07	99.88	26.8	7.79	630	76.9	375	75.3	18	2.3
100-K ROD Area															
2c	0.208	94	--	5.25	6.06	1.68	93.07	33.5	7.29	2,690	617	1,020	134	4.41	7.9
100-N ROD Area															
Cr1	0.113	66	0.02	2.59	6.34	3.53	96.87	21.7	7.76	16,600	1,000	2,460	135	28.7	--
Cr2	0.112	52	0.02	4.37	12.58	2.45	98.69	14.7	7.11	16,200	1,520	866	234	29.5	6.6
Cr3	--	0	0.2	16.7	40.3	2.18	98.35	9.66	8.74	1,260	341	1,990	180	19.5	--
Cr4	0.091	12	--	15.41	35.44	2.81	99.49	6.66	7.9	4,120	591	1,360	206	31.9	--
Sr1	0.091	16	--	7.21	17.61	0.36	92.43	4.64	7.63	849	766	266	55	0.956	15
Sr2	0.13	84	--	9.77	36.68	0.41	89.82	9.43	7.9	1,670	671	261	125	1.78	--
Sr3	0.207	88	0.06	1.88	6.77	3.64	94.48	45.4	6.9	15,400	1,710	447	139	11.5	--
Sr4	0.198	94	0.03	10.23	34.13	4.15	85.62	44.7	7.13	15,100	1,970	588	119	10.8	16
Sr5	0.251	100	0.06	8.44	20.98	4.96	86.6	48.6	7.11	18,800	1,810	794	162	11	8
Sr6	0.196	76	0.07	7.79	46.9	5.33	86.88	58.3	7.12	30,400	3,070	558	214	16.6	44
Sr9	0.25	94	--	15.45	48.2	1.54	83.01	17.1	7.46	6,220	848	409	83	3.35	7.1
Sr10	0.229	98	--	47	59.88	2.02	50.98	21.3	7.58	6,640	810	434	92.5	4.6	6.4
100-D/100-H ROD Area															
2f	0.07	2	--	1.47	1.77	9.23	89.3	11.6	8.46	1,420	125	590	95.6	1.54	12
Cr5	0.097	62	0.03	25.68	31.58	2.18	97.68	20.3	7.54	25,900	1,190	2,900	250	17.2	1.8
Cr6	0.092	48	--	2.99	4.13	0.75	99.07	23.6	7.5	4,780	345	1,860	214	8.82	2.6
Cr7	0.085	4	--	2.13	6.81	4.6	97.44	5.26	7.08	11,300	879	1,930	242	17.8	18
Cr8	0.086	9	--	6.8	22.5	10.97	89.03	5.23	8.17	8,130	828	2,770	289	7.85	--
Cr9	0.101	38	--	36.96	41.95	4.12	95.88	17.1	7.85	6,380	766	1,290	239	6.21	3.4
Cr10	0.145	66	--	63.93	69.97	7.97	92.03	6.57	7.7	3,360	378	2,270	231	12.9	2.2
100-F/100-IU-2/100-IU-6 ROD Area															
2j	0.149	28	--	0.05	0.09	0.07	99.88	26	7.52	550	112	337	70.1	3.51	--
2l	0.157	58	--	0.19	0.24	6.11	93.7	34	6.89	4,660	548	750	93.9	8.5	5.4
2m	0.199	74	--	0.26	0.74	5.11	94.63	1.41	7.45	7,270	249	568	89.1	2.18	5.3
3b	0.372	100	--	10.09	18.59	11.36	78.55	67.3	6.78	45,200	3,290	783	137	27.4	50
4a	0.36	92	--	2.1	4.11	4.99	92.91	43.5	7.07	10,800	878	402	56.8	7.46	4.8
4c	0.07	4	--	0.05	0.2	0.43	99.52	22.3	8.1	120	47.1	368	51.2	45.5	--

Table 6-105. Summary of *Hyalella* Measures Key Contaminants of Potential Ecological Concern and Confounding Factors Using All RCBRA Sediment Data. (2 Pages)

Site	*Hyalella* Average		COPEC (CTE)	Confounding Factor (CTE)											
	Growth (mg per organism)	Survival (%)	Mercury (mg/kg)	No. 8 Screen (% retained)	No. 16 Screen (% retained)	Fraction Coarse Silt/Silt/Clay (less than 0.074 mm) (%)	Fraction Total Sand (%)	Percent Moisture (wet sample)	pH	Total Organic Carbon (mg/kg)	Nitrogen, Kjeldahl Total (mg/kg)	Silicon (mg/kg)	Sodium (mg/kg)	Sulfate (mg/kg)	Total Petroleum Hydrocarbons - Diesel Range (mg/kg)
300 ROD Area															
5c	0.261	40	--	0	0.05	1.11	98.89	24.5	6.69	2,650	255	486	48.2	10.9	3.2
5d	0.135	92	--	0	0.03	2.93	97.07	29.6	7.3	1,380	316	579	105	5.87	6.1
U1	0.263	86	--	3.4	4.34	0.81	95.79	21.9	7.47	1,440	382	550	85.7	4.38	--
U2	0.271	90	0.05	39.22	56.64	1.43	59.35	18.7	7.52	7,430	896	462	108	3.48	6.7
U3	0.272	86	--	70.97	78.5	1.13	27.9	20.8	7.72	6,060	535	497	111	0.799	4.4
U4	0.249	84	0.04	10.36	21.54	5.14	84.5	15.1	7.02	11,700	1,920	620	91.3	2.82	11
U5	0.242	86	--	69.82	76.27	1.02	29.16	11	7.75	4,890	830	368	106	2.97	5.3
U6	0.202	92	0.03	49.42	59.2	2.96	47.62	24.6	7.36	5,580	880	530	85.3	5.73	8.2
U7	0.198	76	--	0	0	0	100	24.4	7.49	799	477	479	62.5	3.18	2.9
U8	0.266	96	--	67.94	77.64	1.14	30.92	22.4	7.38	9,470	551	441	116	4.95	9.6
U9	0.237	90	0.07	8.48	19.42	4.76	86.76	20.2	7.1	11,700	1,840	682	131	3.5	25
U10	0.16	2	0.05	0	0.97	12.51	87.49	10.8	6.97	5,210	914	787	132	1.27	3.2
Reference Site															
Bev Ref 1	0.289	94	--	0.47	1.98	0.77	98.76	15.2	7.5	2,650	621	608	158	4.59	20
Bev Ref 2	0.065	12	--	3.73	4.64	11.65	84.62	33.9	7.13	3,180	176	753	90.1	53.1	1.9
Ref 11	0.203	90	--	24.96	28.38	2.51	97.4	30.3	7.45	3,620	628	800	109	23.6	4.5
Ref 12	0.178	75	--	57.94	65.53	0.5	41.56	10.1	7.89	2,650	201	--	--	2.14	--
Ref 13	0.177	78	0.05	67.76	76.37	2.1	30.14	16.3	7.72	7,460	1,090	517	140	3.07	4.2
Ref 14	0.199	84	0.03	73.7	89.37	0.59	25.71	11.1	7.89	6,110	240	378	149	2.74	3.5
Ref 16	0.173	76	--	1.1	1.5	1.7	97.2	27.6	7.2	3,226.7	567.7	1,012.7	102.1	5.0	20
Ref 300-1	0.121	62	0.08	5.25	10.58	7.64	87.11	20	7.47	13,700	1,140	604	123	13.4	18
Ref 300-2	0.173	86	--	1.12	8.88	5.86	93.02	25.9	7.24	2,700	554	573	82.1	4.35	4.9

= Less 80% of the average measure in reference sites.

= Greater than 120% of average measure in reference sites.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
RCBRA = River Corridor Baseline Risk Assessment
ROD = record of decision

Table 6-106. Summary of Regression Analyses of *Ceriodaphnia* Measures Versus Pore Water Concentrations Under Low River Flow Conditions. (3 Pages)

COPEC or Confounding Factor	Number of Sites with Detects [a]	Minimum of P-Value	Maximum of P-Value	Number of Significant Regressions [b]	Maximum CTE Tested (µg/L) [a]	Maximum CTE Observed (µg/L) [b]	Statistical Difference for Pore Water (Study Site vs. Reference)
Contaminant of Potential Ecological Concern							
Aluminum	17	0.64	0.84	0	399	399	No difference
Antimony	1	--	--	--	2.6	2.6	No difference
Barium	25	0.28	0.46	0	104	104	No difference
Cadmium	1	--	--	--	0.85	0.85	No difference
Calculated total uranium	19	0.57	0.62	0	141	141	No difference but concentrations in 300 Area greater than other ROD decision areas
Chromium	11	0.54	0.76	0	43.8	43.8	Greater than reference in the 100 Area
Copper	6	0.44	0.83	0	8.9	8.9	No difference
Hexavalent chromium	12	0.17	0.99	0	42 (RME)	42 (RME)	Greater than reference in the 100 Area
Lead	3 [c]	0.32	0.51	0	3.1	3.1	No difference
Manganese	25	0.51	0.54	0	1,640	1,640	No difference
Mercury	0	--	--	--	--	0.004 (RME)	No difference; maximum from 100-NR-2
Nickel	1	--	--	--	2.6	2.6	No difference
Nitrogen in nitrate	24	0.11	0.9	0	12,500	12,500	No difference
Nitrogen in nitrite	0	--	--	--	--	--	No difference
Phosphorus	14	0.35	0.72	0	214	214	No difference but outlier in pore water
Selenium	2	--	--	--	9.8	9.8	No difference
Strontium (elemental)	25	0.04	0.76	1	326	326	No difference
• *Ceriodaphnia* survival = 91 + 0.044 strontium (elemental), n = 25, r^2 = 0.17, p = 0.042							
Tin	0	--	--	--	--	--	No difference
Titanium	0	--	--	--	--	--	No difference
Uranium (inorganic)	1	--	--	--	137	137	No difference
Vanadium	12	0.16	0.49	0	5.3	11.9 (RME)	No difference; maximum from 100-B/C Pilot
Zinc	25	0.83	0.95	0	11.8	11.8	No difference
Confounding Factors							
Alkalinity	None	0.025	0.18	1	140,000	140,000	--
Hardness	None	0.071	0.62	0	170,000	170,000	--

Table 6-106. Summary of Regression Analyses of *Ceriodaphnia* Measures Versus Pore Water Concentrations Under Low River Flow Conditions. (3 Pages)

COPEC or Confounding Factor	Number of Sites with Detects [a]	Minimum of P-Value	Maximum of P-Value	Number of Significant Regressions [b]	Maximum CTE Tested (µg/L) [a]	Maximum CTE Observed (µg/L) [b]	Statistical Difference for Pore Water (Study Site vs. Reference)
pH Measurement	None	0.27	0.32	0	9.77	9.77	--
Specific conductance	None	0.049	0.4	1	590	590	--
• *Ceriodaphnia* survival = 92 + 0.022 specific conductance, n = 24, r^2 = 0.16, p = 0.049							
Temperature	24	0.26	0.3	0	19.9 (RME)	19.9 (RME)	--
Total dissolved solids	24	0.016	0.77	1	380,000	380,000	--
• *Ceriodaphnia* survival = 92 + 0.000035 total dissolved solids, n = 24, r^2 = 0.24, p = 0.016							
Total organic carbon	20	0.013	0.58	1	7,800	7,800	--
• *Ceriodaphnia* number young per female = 29 + -0.0014 total organic carbon, n = 20, r^2 = 0.3, p = 0.013							
Total suspended solids	6	0.34	0.87	0	25,700	25,700	--
Water depth 1996 to 2006	24	0.05	0.11	0	2.51	2.51	--
Water depth exceedance from 1996 to 2006	24	0.14	0.29	0	99.9	99.9	--
Bromide	1	--	--	--	1,300	1,300	--
Calcium	25	0.025	0.96	1	65,300	65,300	--
• *Ceriodaphnia* survival = 90 + 0.00023 calcium, n = 25, r^2 = 0.2, p = 0.025							
Chloride	24	0.13	0.26	0	19,000	19,000	--
Chlorine	12	0.54	0.61	0	66,000	66,000	--
Iron	18	0.38	0.94	0	10,100	10,100	--
Magnesium	25	0.098	0.8	0	18,000	18,000	--
Nitrogen in ammonia	21	0.46	0.57	0	1,300	1,300	--
Nitrogen in nitrite and nitrate	23	0.11	0.84	0	12,900	12,900	--
Nitrogen, Kjeldahl total	12	0.31	0.75	0	2,300	2,300	--
Phosphate	0	--	--	--	--	--	--
Potassium	24	0.014	0.86	1	4,120	4,900 (RME)	--
• *Ceriodaphnia* survival = 92 + 0.0028 potassium, n = 24, r^2 = 0.24, p = 0.014							
Silicon	25	0.027	0.51	1	13,000	13,000	--
Sodium	25	0.1	0.51	0	16,400	16,400	--
Sulfate	24	0.13	0.45	0	91,400	91,400	--
Total petroleum hydrocarbons	0	--	--	--	--	--	--

Table 6-106. Summary of Regression Analyses of *Ceriodaphnia* Measures Versus Pore Water Concentrations Under Low River Flow Conditions. (3 Pages)

COPEC or Confounding Factor	Number of Sites with Detects [a]	Minimum of P-Value	Maximum of P-Value	Number of Significant Regressions [b]	Maximum CTE Tested (µg/L) [a]	Maximum CTE Observed (µg/L) [b]	Statistical Difference for Pore Water (Study Site vs. Reference)
Total petroleum hydrocarbons - diesel range	7	0.015	0.55	1	120	120	--
• *Ceriodaphnia* survival = 100 + -0.096 total petroleum hydrocarbons - diesel range, n = 7, r^2 = 0.72, p = 0.015							
Total petroleum hydrocarbons - gasoline range	2	--	--	--	0.0064	0.0064	--

= Statistically significant regression, p-value <0.05.

[a] Number of sites with detects for both sediment and bioassay measurements out of 33 sites with paired sediment and Ceriodaphnia bioassay measurements.
[b] Number of significant regression relationships out of two bioassay endpoints measured.
[c] Regression results for fewer than five sites have insufficient data for determining a biologically significant relationship.
-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
RME = reasonable maximum exposure
ROD = record of decision

Table 6-107. Summary of *Ceriodaphnia* Measures and Confounding Factors Using RCBRA Pore Water Under Low River Flow Conditions. (2 Pages)

Site	Date	*Ceriodaphnia* Average		Confounding Factors (CTE)					
		Reproduction (Young per Female)	Survival (%)	Calcium (µg/L)	Potassium (µg/L)	Specific Conductance (µS/cm)	Total Dissolved Solids (µg/L)	Total Organic Carbon (µg/L)	Total Petroleum Hydrocarbons - Diesel Range (µg/L)
Study Site									
100-B/C ROD Area									
2a	12/16/2006	27.7	100	37,200	2,910	302	201,000	1,700	44
2b	12/16/2006	23.2	100	29,200	1,410	302	156,000	1,100	--
100-K ROD Area									
2c	12/16/2006	28.1	100	31,400	1,440	259	220,000	900	--
Cr1	9/17/2006	28.1	100	31,700	2,110	227	122,000	--	31
	12/16/2006	24.2	100	46,500	2,650	337	--	--	--
Cr2	11/25/2006	26.1	100	33,200	1,940	263	201,000	1,200	64
Cr4	11/25/2006	26.1	90	18,700	1,250	168	93,000	1,400	--
100-N ROD Area									
Sr4	11/25/2006	26.5	100	24,500	957	200	78,000	1,300	72
Sr5	9/17/2006	23.7	100	23,900	1,220	171	92,000	--	27
100-D/100-H ROD Area									
2i	2/4/2007	20.4	89	20,400	785	--	70,000	1,200	--
Cr6	11/25/2006	30.1	100	29,600	1,040	235	134,000	2,000	--
300 ROD Area									
5c	1/3/2007	25	90	19,900	856	194	48,000	1,300	--
5d	1/3/2007	26.9	90	25,900	853	216	64,000	1,000	120
U1	9/5/2006	37.1	100	39,100	3,000	317	203,000	--	--
U4	9/5/2006	29.5	100	45,300	2,470	347	288,000	--	--
Reference Site									
Ref 300-1	1/16/2006	23.5	90	19,700	717	145	81,000	1,800	--
Ref 300-2	1/16/2006	27.6	100	23,100	2,880	208	113,000	830	--

Table 6-107. Summary of *Ceriodaphnia* Measures and Confounding Factors Using RCBRA Pore Water Under Low River Flow Conditions. (2 Pages)

Site	Date	*Ceriodaphnia* Average		Confounding Factors (CTE)					
		Reproduction (Young per Female)	Survival (%)	Calcium (µg/L)	Potassium (µg/L)	Specific Conductance (µS/cm)	Total Dissolved Solids (µg/L)	Total Organic Carbon (µg/L)	Total Petroleum Hydrocarbons - Diesel Range (µg/L)
Ref 11	1/25/2006	32.4	100	23,100	1,220	180	119,000	1,200	--
	12/16/2006	25.2	100	65,300	4,120	590	380,000	610	29
Ref 12	1/23/2006	28.7	100	22,700	1,150	156	108,000	880	--
Ref 13	1/23/2006	28.2	80	20,600	896	137	82,000	1,100	--
Ref 14	1/24/2006	34.4	90	21,700	1,220	169	101,000	1,100	--
Ref 16	1/24/2006	29.9	100	20,400	--	154	89,000	1,200	--
Bev Ref 1	1/4/2007	27.4	100	20,400	762	155	108,000	1,000	--
Bev Ref 2	1/4/2007	17.8	100	34,100	3,600	335	192,000	7,800	--

= Less 80% of the average measure in reference sites.

= Greater than 120% of average measure in reference sites.

-- = not applicable
CTE = central tendency exposure
RCBRA = River Corridor Baseline Risk Assessment
ROD = record of decision

Table 6-108. Summary of Risk Characterization for Aquatic Invertebrates. (2 Pages)

Receptor	Line of Evidence	Weight	Effect	Summary
Aquatic macroinvertebrates: sediment-dwelling	Sediment bioassay (*Hyalella*)	High	No differences in growth between study and reference sites but significantly lower survival in study sites compared to reference; negative correlation with one COPEC (mercury); mercury not different from reference sediment but four mercury outliers in sediment.	Lower survival for *Hyalella* thus an indication of adverse effects. Mercury correlated to reduced *Hyalella* survival. No major uncertainties.
	Benchmarks (sediment)	Low	Sediment benchmarks were exceeded for eight COPECs. Antimony, barium, chromium and selenium exceeded benchmarks at study sites only. Of these, only chromium is statistically elevated relative to reference site sediments, which suggests the potential for adverse effects. COPECs exceeding benchmarks at both study sites and reference sites include cadmium, manganese, phosphorous, and zinc. Cadmium is not elevated above reference sediments but outliers and 13 sites with benchmark exceedances observed.	
	Tissue concentration	Low	Some detections in tissues and difference of study sites compared to reference sites. One significant correlation of tissue concentrations (chromium in aquatic invertebrates) with sediment COPEC concentrations; no tissue effect levels exceeded and no potential for adverse effects.	
Aquatic macroinvertebrates: water	Water bioassay (*Ceriodaphnia)*	Medium	No difference in survival between study and reference sites, but reproduction was significantly lower at sites sampled under low river flow conditions compared to reference. Thus, difference in reproduction suggested adverse effects from groundwater discharge into the river. No negative COPEC relationships with bioassay measures. Results are qualified based on the pore-water sample results and 30 of 51 study sites were not used for gradient analyses due to sampling during high river flows that likely leads to lower contaminant concentrations.	Concentrations were greater than ambient water quality criteria. Lower reproduction for *Ceriodaphnia*, thus and indication of adverse effects. However, there are uncertainties associated with obtaining a worst-case pore-water sample and concentrations in field-deployed clams versus *in situ* clams.
	Benchmarks (water)	Low	Concentrations were greater than water standards for hexavalent chromium at study sites only; hexavalent chromium was not detected in reference site pore water. Concentrations were greater than water standards or criteria at both study sites and reference sites for three COPECs (aluminum, cadmium, and lead). Copper and selenium exceeded standards at reference sites only. Invertebrate benchmarks were exceeded for calculated total uranium and uranium (inorganic) at study sites only. Calculated total uranium was significantly elevated in pore water relative to references sites, suggesting the potential for adverse effects. The invertebrate benchmark for nitrate was exceeded at both study sites and reference sites and not significantly different in concentration between the two site types.	
	Clam histopathology	Medium	A digestive system effect observed in study site clams and a reproductive effect observed in reference site clams but no difference for the other 17 of 19 measures.	
	Mussel histopathology	Medium	Mantle condition significantly degraded in study sites but no difference for 18 of 19 measures.	
	Community metrics (rock baskets)	Medium	No difference in the EPT taxa or most other metrics between study sites and reference sites. However, total diversity was higher at reference areas and suggests adverse effects.	
	Snail diversity and abundance	Medium	No difference between study and reference sites. No adverse effects suggested at the gross scale.	

Table 6-108. Summary of Risk Characterization for Aquatic Invertebrates. (2 Pages)

Receptor	Line of Evidence	Weight	Effect	Summary
	In situ clam survival	Low	Lower survival for a subset of the clams deployed at study sites. Survival correlates with habitat and not with COPECs, suggesting no cause and effect relationship for COPEC exposure.	
	Tissue concentration benchmarks	Low	No tissue effect levels exceeded, no indication of adverse effects and no potential for adverse effects.	
	Tissue concentration	Low	Some detections in tissues and difference of study sites to reference sites; no statistically significant correlations of tissue concentrations with pore-water concentrations, but uncertainties exist for pore-water sampling and some tissue samples (clams).	
	Tissue concentration	Low	Some detections in tissues and difference of study sites to reference sites; no statistically significant correlations of tissue concentrations with pore-water concentrations, but uncertainties exist for pore-water sampling and some tissue samples (clams).	

COPEC = contaminant of potential ecological concern
EPT = Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies)

Table 6-109. Uncertainty Analysis for Aquatic Invertebrates. (2 Pages)

Attributes	Questions	Observations	Impact on Assessment
Measured tissue concentrations	Are mean study site tissue contaminant concentrations greater than at reference sites and do they increase along an increasing contamination gradient?	Tissue concentrations are subject to the following: • Analytical measurement uncertainties (e.g., detection limits typically were elevated in tissues because of matrix interferences) • Clam sleeves had lower COPEC concentrations than in situ clams (PNNL-17270, evaluation of caged clams to monitor contaminated groundwater exposure).	Worst-case pore-water concentrations may not have been sampled; risks could be underestimated.
Field measures of relative abundance and diversity	Are invertebrate relative abundance and diversity not greater at study sites compared to reference sites and do not decrease along an increasing contamination gradient?	Field measures of relative abundance/diversity are subject to the following: • Mobility of the species and ability to quickly recolonize • Understanding the sensitivity of the various taxonomic groups for Hanford Site contaminants and mixtures.	If sites are rapidly recolonizing, that difference would not be noted and risks could be underestimated.

Table 6-109. Uncertainty Analysis for Aquatic Invertebrates. (2 Pages)

Attributes	Questions	Observations	Impact on Assessment
Survival/ growth from bioassays or clam sleeves	Is survival/ growth lower at study sites compared to reference or decrease along a COPEC gradient?	Survival/growth is subject to the following: • Test duration and endpoint reflects one of many time scales for effects • Test species reflects some organism – there is uncertainty in applying these results to all invertebrates • Pore water may not represent a chronic worst case exposure concentration • Confounding factors like particle size and nutrients • Not all sites evaluated were tested with the bioassays.	Life cycle tests could identify lower effect levels and thus the single generation test could underestimate risk. This is also true of most literature toxicity data. Risks could be underestimated if worst-case pore-water concentrations were not sampled. The maximum concentrations of chromium, lead, mercury, and zinc in sediment were not tested. The maximum concentrations of mercury and vanadium in pore water were not tested.
Comparison to sediment or water benchmarks	Are concentrations of COPECs greater than benchmarks?	Uncertainties associated with exposure evaluation include: • Measuring media (sediment, water) concentrations Effect levels for metals are based on bioavailable forms. For example, Menzie et al. (2008) present an example study involving barium toxicity and chemical form showing that the most stable form in the environment is also the least toxic.	Some COPECs may act synergistically and therefore the potential for effects or risks could be understated. Literature toxicity data missing for some COPECs, thus risk could be underestimated. Literature toxicity information for metals could overestimate risk.

COPEC = contaminant of potential ecological concern

Table 6-110. Summary of Near-Shore Aquatic Invertebrate Risk Results for All Contaminants of Potential Ecological Concern. (2 Pages)

COPEC	COPC Refinement Status (Table 6-74)		Sediment and Pore-Water Concentrations Compared to Benchmarks (Tables 6-88, 6-90, and 6-91)	Biota Versus Sediment and Water Regressions (Table 6-98)	Clam Survival Versus Sediment and Pore-Water Regression (Tables 6-100)	Bioassays - Measures Related to COPECs in Sediment or Pore Water		Notes
	Sediment	Pore Water				*Hyalella* Survival and Growth Versus Sediment Regression (Table 6-104)	*Ceriodaphnia* Survival and Reproduction Versus Pore-Water Regression (Table 6-106)	
Aluminum	No	No	Sediment concentrations less than the benchmark; pore-water concentrations greater than criterion at study sites and reference sites (three times greater at study sites)	No positive statistically significant relationships	No relationship	No relationship	No relationship	Identified as key COPEC based on criterion comparison
Antimony	No	No	Sediment concentrations greater than the benchmark at study sites only; pore-water concentrations less than criterion	Insufficient data	Insufficient data	Insufficient data	Insufficient data	Identified as key COPEC based on sediment benchmark comparison
Barium	No	No	Sediment concentrations greater than the benchmark at study sites only; no invertebrate benchmark for water	No positive statistically significant relationships	No relationship for pore water. Sediment has significant, positive relationship between COPEC concentrations and endpoint, thus no evidence for adverse effects	Two of two significant; however, positive relationship between COPEC concentrations and endpoints, thus no evidence for adverse effects	No relationship	Identified as key COPEC based on sediment benchmark comparison
Cadmium	Yes, outliers	No	Sediment concentrations greater than the benchmark at both study sites and reference sites; pore-water concentrations greater than criterion at study sites but less than reference site concentrations	Insufficient data or no relationships	No relationship for sediment; insufficient data for pore water	No relationship	Insufficient data	Identified as key COPEC based on sediment benchmark comparison
Calculated total uranium	Yes	Yes	Sediment concentrations less than the benchmark; pore-water concentrations greater than aquatic invertebrate benchmark at study sites only	Isotopic uranium not detected in invertebrate tissues	No relationship	One of two significant; however, positive relationship between COPEC concentrations and endpoints, thus no evidence for adverse effects	No relationship	Identified as key COPEC based on water benchmark comparison
Chromium	Yes	Yes	Sediment concentrations greater than the benchmark at study sites only; pore-water concentrations less than standard at study sites	Significant positive relationship in aquatic macroinvertebrates	No relationship	No relationship	No relationship	Identified as key COPEC based on sediment benchmark comparison
Copper	No	No	Sediment concentrations less than the benchmark; pore-water concentrations less than standard at study sites, exceed standard at reference sites	Insufficient data or no relationships	No relationship	No relationship	No relationship	No significant findings
Hexavalent chromium	Yes	Yes	No sediment benchmark; pore-water concentrations greater than standard at study sites only	Not measured in tissue	No relationship	Insufficient data	No relationship	Identified as key COPEC based on standard comparison
Lead	Yes, outliers	No	Sediment concentrations less than the benchmark; pore-water concentrations greater than criterion at both study sites and reference sites (roughly equal magnitude of exceedance)	Insufficient data or no relationships	No relationship	No relationship	Insufficient data	No significant findings
Manganese	No	No	Sediment concentrations greater than the benchmark at both study sites and reference sites; pore-water concentrations less than aquatic invertebrate benchmark	No positive statistically significant relationships	No relationship for pore water. Sediment has significant, positive relationship between COPEC concentrations and endpoint, thus no evidence for adverse effects	One of two significant; however, positive relationship between COPEC concentrations and endpoints, thus no evidence for adverse effects	No relationship	Identified as key COPEC based on sediment benchmark comparison
Mercury	Yes, outliers	No	Sediment concentrations less than the benchmark; pore-water concentrations less than standard	Insufficient data	No relationship for sediment; insufficient data for pore water	One of two significant and suggesting evidence for adverse effects	Insufficient data	Identified as a key COPEC based on the bioassay trend
Nickel	No	No	Sediment concentrations less than the benchmark; pore-water concentrations less than criterion	Insufficient data or no relationships	No relationship for sediment; insufficient data for pore water	No relationship	Insufficient data	No significant findings

Table 6-110. Summary of Near-Shore Aquatic Invertebrate Risk Results for All Contaminants of Potential Ecological Concern. (2 Pages)

COPEC	COPC Refinement Status (Table 6-74)		Sediment and Pore-Water Concentrations Compared to Benchmarks (Tables 6-88, 6-90, and 6-91)	Biota Versus Sediment and Water Regressions (Table 6-98)	Clam Survival Versus Sediment and Pore-Water Regression (Tables 6-100)	Bioassays - Measures Related to COPECs in Sediment or Pore Water		Notes
	Sediment	Pore Water				*Hyalella* Survival and Growth Versus Sediment Regression (Table 6-104)	*Ceriodaphnia* Survival and Reproduction Versus Pore-Water Regression (Table 6-106)	
Nitrogen in nitrate	Yes, outliers	No	No sediment benchmark; pore-water concentrations greater than aquatic invertebrate benchmark at both study sites and reference sites	Not measured in tissue	No relationship	No relationship	No relationship	No significant findings
Nitrogen in nitrite	Yes	No	No sediment benchmark; not detected in pore water	Not measured in tissue	Insufficient data	No relationship	Insufficient data	No significant findings
Phosphorus	No	Yes, outliers	Sediment concentrations greater than the benchmark at both study sites and reference sites; no aquatic invertebrate benchmark	No relationships	No relationship	No relationship	No relationship	No significant findings
Selenium	No	No	Sediment concentrations greater than the benchmark at study sites only; pore-water concentrations less than criterion	Insufficient data or no relationships	Insufficient data	No relationship	Insufficient data	Identified as key COPEC based on sediment benchmark comparison
Strontium (elemental)	No	No	No sediment benchmark; no aquatic invertebrate benchmark	Insufficient data or no relationships	No relationship	No relationship	One of two significant; however, positive relationship between COPEC concentrations and endpoints, thus no evidence for adverse effects	No significant findings
Tin	No	Yes	Sediment concentrations less than the benchmark; no aquatic invertebrate benchmark but not detected in water	Insufficient data	No relationship	No relationship	Not detected in pore water	No significant findings
Titanium	Yes	Not measured	No sediment benchmark; not measured in water	Not measured in pore water	No relationship for sediment. Not measured in pore water	One of two significant; however, positive relationship between COPEC concentrations and endpoints, thus no evidence for adverse effects	Not measured in pore water	No significant findings
Uranium (inorganic)	No	No	Sediment concentrations less than the benchmark; pore-water concentrations greater than aquatic invertebrate benchmark at study sites only	Insufficient data	Insufficient data	Two of two significant; however, positive relationship between COPEC concentrations and endpoints, thus no evidence for adverse effects	Insufficient data	Identified as key COPEC based on water benchmark comparison
Vanadium	No	No	No sediment benchmark; no aquatic invertebrate benchmark	Insufficient data or no relationships	No relationship	No relationship	No relationship	No significant findings
Zinc	No	No	Sediment concentrations greater than the benchmark at both study sites and reference sites; pore-water concentrations less than standard	Insufficient data or no relationships	No relationship	No relationship	No relationship	Identified as key COPEC based on sediment benchmark comparison

= COPECs concentration is greater than effect level and reference concentrations or significant bioassay trend.

COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern
HQ = hazard quotient

Table 6-111. Summary of Regression Analyses for Frog Embryo Teratogenesis Assay – *Xenopus* Measures Versus Pore-Water Concentrations (Subset Under Low River Flow Conditions). (3 Pages)

COPEC or Confounding Factor	Number of Sites with Detects [a]	Minimum P-Value	Maximum P-Value	Number of Significant Regressions [b]	Maximum CTE Tested (µg/L)	Maximum CTE Observed (µg/L)	Statistical Difference for Pore Water (Study Site vs. Reference)
Contaminant of Potential Ecological Concern							
Aluminum	17	0.6	0.86	0	399	399	No
Antimony	1	--	--	--	2.6	2.6	No
Barium	25	0.14	0.36	0	104	104	No
Cadmium	1	--	--	--	0.85	0.85	No
Calculated total uranium	19	0.23	0.93	0	141	141	Yes
Chromium	11	0.54	0.95	0	43.8	43.8	Yes
Copper	6	0.38	0.6	0	8.9	8.9	No
Hexavalent chromium	12	0.48	0.91	0	42 (RME)	42 (RME)	Yes
Lead	3 [c]	0.15	0.76	0	3.1	3.1	No
Manganese	25	0.008	0.068	1	1,640	1,640	No
• FETAX growth (percent of CTL) = 99 + -0.0036 manganese, n = 25, r^2 = 0.27, p = 0.008							
Mercury	0	--	--	--	--	0.004 (RME)	No; maximum from 100-NR-2
Nickel	1	--	--	--	2.6	2.6	No
Nitrogen in nitrate	24	0.35	0.98	0	12,500	12,500	No
Nitrogen in nitrite	0	--	--	--	--	--	No
Phosphorus (pore water)	14	0.001	0.01	3	214	214	Yes; outlier for pore water
• FETAX deformity = 1.9 + 0.072 phosphorus, n = 14, r^2 = 0.44, p = 0.01 • FETAX survival = 100 + -0.07 phosphorus, n = 14, r^2 = 0.6, p = 0.001 • FETAX growth (percent of CTL) = 100 + -0.035 phosphorus, n = 14, r^2 = 0.48, p = 0.006							
Selenium	2	--	--	--	9.8	9.8	No
Strontium (elemental)	25	0.39	0.95	0	326	326	No
Tin	0	--	--	--	--	--	No
Titanium	0	--	--	--	--	--	No
Uranium (inorganic)	1	--	--	--	137	137	No
Vanadium	12	0.16	0.77	0	5.3	11.9 (RME)	No; maximum from 100-B/C Pilot
Zinc	25	0.4	0.88	0	11.8	11.8	No
Confounding Factors							
Alkalinity	26	0.009	0.081	1	140,000	140,000	--
• FETAX deformity = -5.1 + 0.00013 alkalinity, n = 26, r^2 = 0.25, p = 0.009							
Hardness	25	0.22	0.8	0	170,000	170,000	--
Highest specific conductance (µS/cm]	0	--	--	--	--	--	--
pH Measurement	24	0.07	0.84	0	9.77	9.77	--
Specific conductance	24	0.21	0.71	0	590	590	--

Table 6-111. Summary of Regression Analyses for Frog Embryo Teratogenesis Assay – *Xenopus* Measures Versus Pore-Water Concentrations (Subset Under Low River Flow Conditions). (3 Pages)

COPEC or Confounding Factor	Number of Sites with Detects [a]	Minimum P-Value	Maximum P-Value	Number of Significant Regressions [b]	Maximum CTE Tested (µg/L)	Maximum CTE Observed (µg/L)	Statistical Difference for Pore Water (Study Site vs. Reference)
Temperature	24	0.056	0.95	0	19.9 (RME)	19.9 (RME)	--
Total dissolved solids	24	0.42	1	0	380,000	380,000	--
Total organic carbon	20	<0.001	<0.001	3	7,800	7,800	--
• FETAX deformity = 1.7 + 0.003 total organic carbon, n = 20, r^2 = 0.64, p<0.001 • FETAX survival = 100 + -0.0025 total organic carbon, n = 20, r^2 = 0.53, p<0.001 • FETAX growth (percent of CTL) = 100 + -0.0014 total organic carbon, n = 20, r^2 = 0.5, p<0.001							
Total suspended solids	6	0.084	0.73	0	25,700	25,700	--
Water depth 1996 to 2006	24	0.083	0.89	0	2.51	2.51	--
Water depth exceedance from 1996 to 2006	24	0.056	0.86	0	99.9	99.9	--
Bromide	1	--	--	--	1,300	1,300	--
Calcium	25	0.51	0.85	0	65,300	65,300	--
Chloride	24	0.33	0.77	0	19,000	19,000	--
Chlorine	12	0.33	0.84	0	66,000	66,000	--
Iron	18	0.002	0.009	3	10,100	10,100	--
• FETAX deformity = 4.8 + 0.0011 iron, n = 18, r^2 = 0.36, p = 0.009 • FETAX survival = 98 + -0.001 iron, n = 18, r^2 = 0.41, p = 0.005 • FETAX growth (percent of CTL) = 100 + -0.00072 iron, n = 18, r^2 = 0.47, p = 0.002							
Magnesium	25	0.56	0.71	0	18,000	18,000	--
Nitrogen in ammonia	21	<0.001	0.007	3	1,300	1,300	--
• FETAX deformity = 3.7 + 0.0093 nitrogen in ammonia, n = 21, r^2 = 0.35, p = 0.005 • FETAX survival = 100 + -0.0091 nitrogen in ammonia, n = 21, r^2 = 0.47, p<0.001 • FETAX growth (percent of CTL) = 100 + -0.0052 nitrogen in ammonia, n = 21, r^2 = 0.33, p = 0.007							
Nitrogen in nitrite and nitrate	23	0.4	0.84	0	12,900	12,900	--
Nitrogen, Kjeldahl total	12	0.003	0.01	3	2,300	2,300	--
• FETAX deformity = 3.9 + 0.0069 nitrogen, Kjeldahl total, n = 12, r^2 = 0.5, p = 0.01 • FETAX survival = 99 + -0.006 nitrogen, Kjeldahl total, n = 12, r^2 = 0.56, p = 0.005 • FETAX growth (percent of CTL) = 100 + -0.0041 nitrogen, Kjeldahl total, n = 12, r^2 = 0.6, p = 0.003							
Phosphate	0	--	--	--	--	--	--
Potassium	24	0.07	0.59	0	4,120	4,900 (RME)	Maximum from 100-B/C Pilot
Silicon	25	0.12	0.48	0	13,000	13,000	--
Sodium	25	0.35	0.84	0	16,400	16,400	--
Sulfate	24	0.13	0.65	0	91,400	91,400	--
Total petroleum hydrocarbons	0	--	--	--	--	--	--

Table 6-111. Summary of Regression Analyses for Frog Embryo Teratogenesis Assay – *Xenopus* Measures Versus Pore-Water Concentrations (Subset Under Low River Flow Conditions). (3 Pages)

COPEC or Confounding Factor	Number of Sites with Detects [a]	Minimum P-Value	Maximum P-Value	Number of Significant Regressions [b]	Maximum CTE Tested (µg/L)	Maximum CTE Observed (µg/L)	Statistical Difference for Pore Water (Study Site vs. Reference)
Total petroleum hydrocarbons - diesel range	7	0.15	0.75	0	120	120	--
Total petroleum hydrocarbons - gasoline range	2	--	--	--	0.0064	0.0064	--

= Statistically significant regression, p-value <0.05.

[a] Number of sites with detects for both pore-water and bioassay measurements out of 27 site/date combinations with paired pore water and FETAX bioassay measurements.
[b] Number of significant regression relationships out of three bioassay endpoints measured.
[c] Regression results for fewer than five sites are insufficient for determining a biologically significant relationship.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
CTL = control
FETAX = Frog Embryo Teratogenesis Assay - *Xenopus*
RME = reasonable maximum exposure

Table 6-112. Summary of Regression Data for Frog Embryo Teratogenesis Assay - *Xenopus* Measures in Pore Water (Subset of Study Sites Under Low River Flow Conditions). (2 Pages)

Site	Sample Date	FETAX Survival (%)	FETAX Growth (Percent of Control)	FETAX Deformity (%)	COPEC (CTE µg/L)		Confounding Factor (CTE µg/L)				
					Manganese	Phosphorus	Alkalinity	Nitrogen in Ammonia	Nitrogen, Kjeldahl Total	Total Organic Carbon	Iron
Study Site											
100-B/C ROD Area											
2a	12/16/2006	100	100.7	5	250	96.1	108,000	230	--	1,700	805
2b	12/16/2006	96	99.2	6.3	2.1	--	86,000	--	210	1,100	58.4
100-K ROD Area											
2c	12/16/2006	95	99.8	5.3	2.4	--	76,800	150	--	900	74.9
Cr1	9/17/2006	98	98	6.1	0.9	21.2	74,900	120	--	--	--
Cr1	12/16/2006	97	100.5	5.2	2.8	30.5	116,000	90	--	--	121
Cr2	11/25/2006	100	101.8	6	1.2	29.3	90,000	60	190	1,200	30.7
Cr4	11/25/2006	100	99.7	7	223	28.3	64,000	80	160	1,400	179
100-N ROD Area											
Sr4	11/25/2006	99	98.6	7.1	5.6	33.9	66,000	50	140	1,300	85.6
Sr5	9/17/2006	96	96.4	2.1	3.9	55.6	78,000	--	110	--	36.6
Sr5	12/16/2006	100	96.5	2	--	--	78,000	160	--	--	--
100-D/100-H ROD											
2i	2/4/2007	95	99.1	3.2	2.2	--	64,000	--	150	1,200	26.8
Cr6	11/25/2006	100	96.9	5	3.1	21.7	102,000	60	170	2,000	67.6
Cr8	2/6/2006	92	95.6	2.2	--	--	--	--	--	--	--
300 ROD Area											
5c	1/3/2007	94	104.5	8.5	1.9	--	70,000	100	110	1,300	26.4
5d	1/3/2007	97	102.8	8.2	162	--	77,100	270	100	1,000	289
U1	9/5/2006	99	95.9	2	1,640	143	88,000	1,100	1,400	--	8,270
U4	9/5/2006	98	96.3	3.1	3.9	76.2	108,000	210	--	--	72.1
Reference Site											
Ref 11	1/25/2006	99	97.7	2	9	--	68,000	100	--	1,200	40.4
Ref 11	12/16/2006	100	101.3	8	1.8	32.7	116,000	240	--	610	151
Ref 12	1/23/2006	100	101.5	0	1.2	--	74,000	--	110	880	--
Ref 13	1/23/2006	100	101.6	3	2.2	--	68,000	130	--	1,100	--

Table 6-112. Summary of Regression Data for Frog Embryo Teratogenesis Assay - *Xenopus* Measures in Pore Water (Subset of Study Sites Under Low River Flow Conditions). (2 Pages)

Site	Sample Date	FETAX Survival (%)	FETAX Growth (Percent of Control)	FETAX Deformity (%)	COPEC (CTE µg/L)		Confounding Factor (CTE µg/L)				
					Manganese	Phosphorus	Alkalinity	Nitrogen in Ammonia	Nitrogen, Kjeldahl Total	Total Organic Carbon	Iron
Ref 14	1/24/2006	100	98.5	4	2.2	--	68,000	40	--	1,100	--
Ref 16	1/24/2006	99	97.8	6.1	1.7	--	68,000	60	--	1,200	--
Bev Ref 1	1/4/2007	87	98.3	12.6	2.9	--	68,000	--	--	1,000	--
Bev Ref 2	1/4/2007	80	90.7	26.3	1,210	214	140,000	1,300	2,300	7,800	10,100
Ref 300-1	1/16/2006	100	100.3	0	9.5	13.7	66,000	170	--	1,800	166
Ref 300-2	1/16/2006	100	96.3	2	0.69	11.4	78,000	10	--	830	--

= Less 80% of the average measure in reference sites.

= Greater than 120% of average measure in reference sites.

-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
FETAX = Frog Embryo Teratogenesis Assay - *Xenopus*
ROD = record of decision

Table 6-113. Summary of Risk Characterization for Amphibians

Receptor	Line of Evidence	Weight	Effect	Summary
Amphibians	FETAX bioassays with pore water	Medium	No differences for survival or growth between study and reference sites, thus no indication of adverse effects. The reference sites had greater frequency of deformities than study sites. Significant relationships between FETAX measures and COPECs and confounding factors were noted. The most significant trends were related to COPECs with higher concentrations at a reference site. However, obtaining a realistic worst-case pore-water sample for all study site locations at the Hanford Site was technically challenging and 30 of 51 study sites were not used for gradient analyses due to sampling during high river flows that likely leads to lower contaminant concentrations.	Concentrations were greater than water quality criteria and standards. There were no exceedances of benchmarks, however, few COPECs had benchmarks. There are uncertainties associated with pore-water sampling. Obtaining sufficient amphibians for tissue contaminant analysis was problematic in 2006 and 2007.
	Benchmarks (water)	Low	Concentrations were greater than water standards for hexavalent chromium at study sites only; hexavalent chromium was not detected in reference site pore water. Concentrations were greater than water standards or criteria at both study sites and reference sites for three COPECs (aluminum, cadmium, and lead). Copper and selenium exceeded standards at reference sites only. The amphibian nitrate benchmark was not exceeded.	
	Tissue concentrations	Low	Insufficient data for statistical comparisons, thus exposures and risks are uncertain.	

COPEC = contaminant of potential ecological concern
FETAX = Frog Embryo Teratogenesis Assay-Xenopus

Table 6-114. Uncertainty Analysis for Amphibians.

Attributes	Questions	Observations	Impact on Assessment
Survival, growth, and deformities from FETAX	Are survival/growth lower at study sites compared to reference or decrease along a COPEC gradient? Are deformities greater at study sites compared to reference or increase along a COPEC gradient?	Amphibian survival/growth/deformities are subject to the following: • Pore-water samples may not represent a worst case exposure condition and limits the ability to look for correlations between pore-water COPECs and toxicological effects. • Test duration and endpoint reflects one of many time scales for effects. • Test species reflects one kind of amphibian – there is uncertainty in applying these results to native species. • Xenopus is not a native species and is not particularly sensitive to contaminants. Statistical analyses evaluated single COPEC trends but did not evaluate the potential for additive or synergistic effects of COPECs and/or confounding factors. Not all sites evaluated were tested with the bioassays.	Pore-water samples may not represent worst-case and thus effects could be underestimated. The interactions among COPECs or confounding factors are not well documented and there are insufficient data from these studies to adequately define a statistical model that includes all potential factors. The potential for COPEC effects is therefore uncertain when accounting for such potential interactions. The maximum concentrations of mercury and vanadium in pore water were not tested.
Comparison to water benchmarks	Are concentrations of COPECs greater than benchmarks?	Uncertainties associated with exposure evaluation include: • Measuring media (water) concentrations Effect levels for metals are based on bioavailable forms. For example, Menzie et al. (2008) present an example study involving barium toxicity and chemical form showing that the most stable form in the environment is also the least toxic.	Some COPECs may act synergistically and therefore the potential for effects or risks could be understated. Literature toxicity data missing for some COPECs, thus risk could be underestimated. Literature toxicity information for metals could overestimate risk.

COPEC = contaminant of potential ecological concern
FETAX = Frog Embryo Teratogenesis Assay-Xenopus

Table 6-115. Summary of Near-Shore Amphibian Risk Results for All Contaminants of Potential Ecological Concern. (2 Pages)

COPEC	COPC Refinement Status in Pore Water (Table 6-74)	Study Site Pore-Water Concentrations Compared to Effect Levels (Table 6-90 and 6-91)	FETAX Versus Pore-Water Regression (Table 6-111)	Notes
Aluminum	No	Pore-water concentrations greater than criterion at study sites and reference sites (three times greater at study sites)	No relationship	Identified as key COPEC based on criterion comparison
Antimony	No	Pore-water concentrations less than criterion	Insufficient data	No significant findings
Barium	No	No amphibian benchmark	No relationship	No significant findings
Cadmium	No	Pore-water concentrations greater than criterion at study sites and reference sites (three times greater at reference sites)	Insufficient data	No significant findings
Calculated total uranium	Yes	No amphibian benchmark	No relationship	No significant findings
Chromium	Yes	Pore-water concentrations less than standard	No relationship	No significant findings
Copper	No	Pore-water concentrations less than standard	No relationship	No significant findings
Hexavalent chromium	Yes	Pore-water concentrations greater than standard	No relationship	Identified as key COPEC based on criterion comparison
Lead	No	Pore-water concentrations greater than criterion at both study sites and reference sites (roughly equal magnitude of exceedance)	Insufficient data	No significant findings
Manganese	No	No amphibian benchmark	One of three significant and suggesting evidence for adverse effects; however the second highest value for manganese is from Beverly Reference Site 2	Identified as a key COPEC based on the bioassay trend
Mercury	No	Pore-water concentrations less than standard	Insufficient data	No significant findings
Nickel	No	Pore-water concentrations less than criterion	Insufficient data	No significant findings
Nitrogen in nitrate	No	Pore-water concentrations less than amphibian benchmark	No relationship	No significant findings

Table 6-115. Summary of Near-Shore Amphibian Risk Results for All Contaminants of Potential Ecological Concern. (2 Pages)

COPEC	COPC Refinement Status in Pore Water (Table 6-74)	Study Site Pore-Water Concentrations Compared to Effect Levels (Table 6-90 and 6-91)	FETAX Versus Pore-Water Regression (Table 6-111)	Notes
Nitrogen in nitrite	No	Not detected in pore water	Insufficient data	No significant findings
Phosphorus	Yes	No amphibian benchmark	Three of three significant and suggesting evidence for adverse effects, however the highest value for phosphorus is from Beverly Reference Site 2	Not identified as a key COPEC because the maximum concentration is from a reference site
Selenium	No	Pore-water concentrations less than criterion	Insufficient data	No significant findings
Strontium (elemental)	No	No amphibian benchmark	No relationship	No significant findings
Tin	No	Not detected in water	Insufficient data	No significant findings
Titanium	Not measured	Not measured in pore water	Not measured in pore water	No significant findings
Uranium (inorganic)	No	No amphibian benchmark	Insufficient data	No significant findings
Vanadium	No	No amphibian benchmark	No relationship	No significant findings
Zinc	No	Pore-water concentrations less than standard	No relationship	No significant findings

= Shaded COPECs have pore-water concentrations greater than effect level and reference concentrations or significant bioassay trend.

COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern
FETAX = Frog Embryo Teratogenesis Assay - *Xenopus*

Table 6-116. Summary of Fish Tissue Versus Sediment and Pore-Water Concentration Regression Results. (9 Pages)

COPEC	Statistical Difference for Sediment, Pore Water, or Tissue (Study Site vs. Reference)	Tissue Type	Number of Sites with Detects for Sediment and Pore Water	Ratio of Average Tissue Concentration (fw) to Average Sediment or Water Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Sediment										
Aluminum	None	Sculpin multiple whole organism	19	0.0034	Sculpin multiple whole organism = 25 - 0.00082 sediment	0.014	0.63	ln(Sculpin multiple whole organism) = 4.4 - 0.18 ln(sediment)	0.01	0.68
		Sculpin multiple liver	13	0.0029	Sculpin multiple liver = 20 - 0.00056 sediment	0.0049	0.82	ln(Sculpin multiple liver) = 2.8 - 0.024 ln(sediment)	<0.001	0.97
		Sculpin multiple kidney	11	0.0039	Sculpin multiple kidney = 14 + 0.0012 sediment	0.076	0.41	ln(Sculpin multiple kidney) = -0.082 + 0.36 ln(sediment)	0.075	0.42
		Juvenile sucker multiple whole organism	6	0.0054	Juvenile sucker multiple whole organism = 25 - 0.00029 sediment	0.001	0.95	ln(Juvenile sucker) = 5 - 0.24 ln(sediment)	0.026	0.76
		Juvenile sucker multiple liver	6	0.014	Juvenile sucker multiple liver = 150 - 0.022 sediment	0.32	0.24	ln(Juvenile sucker multiple liver) = 16 - 1.5 ln(sediment)	0.31	0.25
		Juvenile sucker multiple kidney	5	0.0088	Juvenile sucker multiple kidney = 46 - 0.0024 sediment	0.08	0.64	ln(Juvenile sucker multiple kidney) = 6.6 - 0.37 ln(sediment)	0.12	0.56
Antimony	Sculpin liver	Sculpin multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Sculpin multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
		Sculpin multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
Barium	None	Sculpin multiple whole organism	19	0.049	Sculpin multiple whole organism = 3.8 - 0.0025 sediment	0.011	0.67	ln(Sculpin multiple whole organism) = 1.5 - 0.05 ln(sediment)	0.01	0.68
		Sculpin multiple liver	15	0.0074	Sculpin multiple liver = 0.75 - 0.003 sediment	0.011	0.71	ln(Sculpin multiple liver) = -2.9 + 0.4 ln(sediment)	0.032	0.52
		Sculpin multiple kidney	15	0.011	Sculpin multiple kidney = 0.87 - 0.0016 sediment	0.012	0.7	ln(Sculpin multiple kidney) = -0.81 + 0.091 ln(sediment)	0.004	0.82
		Juvenile sucker multiple whole organism	6	0.081	Juvenile sucker multiple whole organism = 4 - 0.0013 sediment	0.0012	0.95	ln(Juvenile sucker) = 1.5 - 0.037 ln(sediment)	0.0062	0.88
		Juvenile sucker multiple liver	6	0.034	Juvenile sucker multiple liver = 3.4 - 0.037 sediment	0.2	0.38	ln(Juvenile sucker multiple liver) = 3.4 - 0.84 ln(sediment)	0.14	0.47
		Juvenile sucker multiple kidney	6	0.18	Juvenile sucker multiple kidney = 6.1 + 0.049 sediment	0.074	0.6	ln(Juvenile sucker multiple kidney) = 1.3 + 0.21 ln(sediment)	0.032	0.73
Cadmium	Sediment	Sculpin multiple whole organism	15	0.15	Sculpin multiple whole organism = 0.14 - 0.005 sediment	0.0019	0.88	ln(Sculpin multiple whole organism) = -2.1 + 0.063 ln(sediment)	0.0083	0.75
		Sculpin multiple liver	16	1.6	Sculpin multiple liver = 1.6 - 0.27 sediment	0.039	0.46	ln(Sculpin multiple liver) = 0.063 - 0.16 ln(sediment)	0.05	0.41
		Sculpin multiple kidney	15	1.8	Sculpin multiple kidney = 1.6 - 0.28 sediment	0.068	0.35	ln(Sculpin multiple kidney) = 0.11 - 0.12 ln(sediment)	0.036	0.5
		Juvenile sucker multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple liver	4	0.32	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Juvenile sucker multiple kidney	6	1.9	Juvenile sucker multiple kidney = 1.4 - 0.3 sediment	0.052	0.67	ln(Juvenile sucker multiple kidney) = 0.057 + 0.01 ln(sediment)	<0.001	0.97
Calculated total uranium	Sediment and pore water	Sculpin multiple whole organism	2	0.043	None, insufficient data	--	--	--	--	--
		Sculpin multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Sculpin multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--

Table 6-116. Summary of Fish Tissue Versus Sediment and Pore-Water Concentration Regression Results. (9 Pages)

COPEC	Statistical Difference for Sediment, Pore Water, or Tissue (Study Site vs. Reference)	Tissue Type	Number of Sites with Detects for Sediment and Pore Water	Ratio of Average Tissue Concentration (fw) to Average Sediment or Water Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Chromium	Sediment, pore water, and sculpin	Sculpin multiple whole organism	17	0.014	Sculpin multiple whole organism = 0.43 + 0.00027 sediment	0.0094	0.71	ln(Sculpin multiple whole organism) = -1.3 + 0.15 ln(sediment)	0.098	0.22
		Sculpin multiple liver	16	0.022	Sculpin multiple liver = 0.68 - 0.0002 sediment	0.00034	0.95	ln(Sculpin multiple liver) = -0.91 + 0.097 ln(sediment)	0.019	0.61
		Sculpin multiple kidney	14	0.082	Sculpin multiple kidney = 1 + 0.0064 sediment	0.0033	0.85	ln(Sculpin multiple kidney) = -0.92 + 0.35 ln(sediment)	0.092	0.29
		Juvenile sucker multiple whole organism	6	0.021	Juvenile sucker multiple whole organism = 0.36 - 0.0014 sediment	0.045	0.69	ln(Juvenile sucker) = -0.88 - 0.09 ln(sediment)	0.066	0.62
		Juvenile sucker multiple liver	6	0.062	Juvenile sucker multiple liver = 1 - 0.003 sediment	0.013	0.83	ln(Juvenile sucker multiple liver) = 0.13 - 0.095 ln(sediment)	0.036	0.72
		Juvenile sucker multiple kidney	6	0.094	Juvenile sucker multiple kidney = 1.8 - 0.024 sediment	0.099	0.54	ln(Juvenile sucker multiple kidney) = 0.55 - 0.15 ln(sediment)	0.032	0.73
Copper	None	Sculpin multiple whole organism	18	0.18	Sculpin multiple whole organism = 4.1 - 0.044 sediment	0.069	0.29	ln(Sculpin multiple whole organism) = 1.9 - 0.3 ln(sediment)	0.11	0.17
		Sculpin multiple liver	17	0.42	Sculpin multiple liver = 8.7 - 0.058 sediment	0.038	0.46	ln(Sculpin multiple liver) = 2.1 - 0.082 ln(sediment)	0.0089	0.72
		Sculpin multiple kidney	15	0.28	Sculpin multiple kidney = 1.8 + 0.17 sediment	0.037	0.49	ln(Sculpin multiple kidney) = -0.22 + 0.46 ln(sediment)	0.067	0.35
		Juvenile sucker multiple whole organism	6	0.21	Juvenile sucker multiple whole organism = 2.3 + 0.022 sediment	0.014	0.82	ln(Juvenile sucker) = 0.28 + 0.25 ln(sediment)	0.13	0.48
		Juvenile sucker multiple liver	6	0.61	Juvenile sucker multiple liver = 8.8 - 0.15 sediment	0.15	0.44	ln(Juvenile sucker multiple liver) = 2.4 - 0.22 ln(sediment)	0.12	0.5
		Juvenile sucker multiple kidney	6	0.27	Juvenile sucker multiple kidney = 4.1 - 0.078 sediment	0.23	0.34	ln(Juvenile sucker multiple kidney) = 1.7 - 0.28 ln(sediment)	0.2	0.37
Hexavalent chromium	Sediment and pore water	Sculpin multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Sculpin multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Sculpin multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
Lead	Sediment	Sculpin multiple whole organism	9	0.017	Sculpin multiple whole organism = 0.46 - 0.0015 sediment	0.019	0.72	ln(Sculpin multiple whole organism) = -0.99 + 0.023 ln(sediment)	0.0014	0.92
		Sculpin multiple liver	3	0.026	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Sculpin multiple kidney	3	0.11	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Juvenile sucker multiple whole organism	1	--	None, insufficient data	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
Manganese	None	Sculpin multiple whole organism	19	0.018	Sculpin multiple whole organism = 5.5 - 0.0015 sediment	0.014	0.63	ln(Sculpin multiple whole organism) = 2.1 - 0.1 ln(sediment)	0.019	0.57
		Sculpin multiple liver	17	0.0054	Sculpin multiple liver = 1.3 + 0.0005 sediment	0.0097	0.71	ln(Sculpin multiple liver) = -0.8 + 0.2 ln(sediment)	0.044	0.42
		Sculpin multiple kidney	16	0.0049	Sculpin multiple kidney = 0.42 + 0.0033 sediment	0.31	0.026	ln(Sculpin multiple kidney) = -3.3 + 0.61 ln(sediment)	0.23	0.06
		Juvenile sucker multiple whole organism	6	0.06	Juvenile sucker multiple whole organism = 9.9 - 0.0031 sediment	0.016	0.81	ln(Juvenile sucker) = 2.1 + 0.018 ln(sediment)	0.0018	0.94
		Juvenile sucker multiple liver	6	0.036	Juvenile sucker multiple liver = 7.3 - 0.0067 sediment	0.019	0.79	ln(Juvenile sucker multiple liver) = 2.8 - 0.22 ln(sediment)	0.022	0.78
		Juvenile sucker multiple kidney	6	0.028	Juvenile sucker multiple kidney = 3.7 + 0.0066 sediment	0.033	0.73	ln(Juvenile sucker multiple kidney) = 0.31 + 0.23 ln(sediment)	0.037	0.72

Table 6-116. Summary of Fish Tissue Versus Sediment and Pore-Water Concentration Regression Results. (9 Pages)

COPEC	Statistical Difference for Sediment, Pore Water, or Tissue (Study Site vs. Reference)	Tissue Type	Number of Sites with Detects for Sediment and Pore Water	Ratio of Average Tissue Concentration (fw) to Average Sediment or Water Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Mercury	Sediment	Sculpin multiple whole organism	7	0.41	Sculpin multiple whole organism = 0.025 + 0.0072 sediment	<0.001	0.96	ln(Sculpin multiple whole organism) = -3.5 + 0.082 ln(sediment)	0.019	0.77
		Sculpin multiple liver	6	1.1	Sculpin multiple liver = 0.079 - 0.24 sediment	0.025	0.77	ln(Sculpin multiple liver) = -3.9 - 0.31 ln(sediment)	0.041	0.7
		Sculpin multiple kidney	1	--	None, insufficient data	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
Nickel	Sculpin	Sculpin multiple whole organism	11	0.17	Sculpin multiple whole organism = 4.3 - 0.16 sediment	0.0097	0.77	ln(Sculpin multiple whole organism) = 2.1 - 0.88 ln(sediment)	0.035	0.58
		Sculpin multiple liver	1	--	None, insufficient data	--	--	--	--	--
		Sculpin multiple kidney	2	0.13	None, insufficient data	--	--	--	--	--
		Juvenile sucker multiple whole organism	1	--	None, insufficient data	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
Nitrogen in nitrate	Sediment	Sculpin multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Sculpin multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Sculpin multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
Nitrogen in nitrite	Sediment	Sculpin multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Sculpin multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Sculpin multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
Phosphorus	Pore water	Sculpin multiple whole organism	19	7.9	Sculpin multiple whole organism = 6,700 - 0.37 sediment	0.0036	0.81	ln(Sculpin multiple whole organism) = 8.7 + 0.0017 ln(sediment)	<0.001	0.99
		Sculpin multiple liver	17	4.2	Sculpin multiple liver = 3,800 - 0.72 sediment	0.05	0.39	ln(Sculpin multiple liver) = 8.8 - 0.12 ln(sediment)	0.023	0.56
		Sculpin multiple kidney	16	4	Sculpin multiple kidney = 3,400 - 0.38 sediment	0.018	0.62	ln(Sculpin multiple kidney) = 8.4 - 0.057 ln(sediment)	0.0074	0.75
		Juvenile sucker multiple whole organism	6	10	Juvenile sucker multiple whole organism = 6,100 + 0.53 sediment	0.068	0.62	ln(Juvenile sucker) = 8.5 + 0.042 ln(sediment)	0.049	0.67
		Juvenile sucker multiple liver	6	5.7	Juvenile sucker multiple liver = 3,100 + 0.48 sediment	0.016	0.81	ln(Juvenile sucker multiple liver) = 7.2 + 0.14 ln(sediment)	0.049	0.67
		Juvenile sucker multiple kidney	6	7.3	Juvenile sucker multiple kidney = 5,200 - 1.5 sediment	0.021	0.79	ln(Juvenile sucker multiple kidney) = 8.2 + 0.016 ln(sediment)	<0.001	0.98

Table 6-116. Summary of Fish Tissue Versus Sediment and Pore-Water Concentration Regression Results. (9 Pages)

COPEC	Statistical Difference for Sediment, Pore Water, or Tissue (Study Site vs. Reference)	Tissue Type	Number of Sites with Detects for Sediment and Pore Water	Ratio of Average Tissue Concentration (fw) to Average Sediment or Water Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Selenium	Sculpin	Sculpin multiple whole organism	3	0.32	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Sculpin multiple liver	3	0.69	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Sculpin multiple kidney	2	1.1	None, insufficient data	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
Strontium (elemental)	None	Sculpin multiple whole organism	19	0.93	Sculpin multiple whole organism = 21 - 0.061 sediment	0.0084	0.71	ln(Sculpin multiple whole organism) = 3.1 - 0.055 ln(sediment)	0.0074	0.73
		Sculpin multiple liver	17	0.03	Sculpin multiple liver = 0.24 + 0.018 sediment	0.064	0.33	ln(Sculpin multiple liver) = -2.9 + 0.74 ln(sediment)	0.12	0.17
		Sculpin multiple kidney	16	0.057	Sculpin multiple kidney = 0.33 + 0.041 sediment	0.11	0.2	ln(Sculpin multiple kidney) = -3.4 + 1.1 ln(sediment)	0.27	0.04
		Juvenile sucker multiple whole organism	6	1.1	Juvenile sucker multiple whole organism = 19 - 0.015 sediment	0.0013	0.95	ln(Juvenile sucker) = 3.1 - 0.08 ln(sediment)	0.039	0.71
		Juvenile sucker multiple liver	6	0.087	Juvenile sucker multiple liver = 4.2 - 0.16 sediment	0.34	0.23	ln(Juvenile sucker multiple liver) = 5.4 - 2 ln(sediment)	0.47	0.14
		Juvenile sucker multiple kidney	6	0.2	Juvenile sucker multiple kidney = -9.4 + 0.76 sediment	0.78	0.019	ln(Juvenile sucker multiple kidney) = -5.4 + 2.1 ln(sediment)	0.48	0.13
Tin	Sucker kidney	Sculpin multiple whole organism	4	0.55	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Sculpin multiple liver	9	1.2	Sculpin multiple liver = 2.4 - 0.17 sediment	0.027	0.67	ln(Sculpin multiple liver) = 0.65 + 0.038 ln(sediment)	0.0015	0.92
		Sculpin multiple kidney	8	4.4	Sculpin multiple kidney = 6.9 - 0.1 sediment	0.0014	0.93	ln(Sculpin multiple kidney) = 1.9 + 0.058 ln(sediment)	0.0079	0.83
		Juvenile sucker multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple liver	3	2.1	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Juvenile sucker multiple kidney	3	3.1	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
Titanium	None	Sculpin multiple whole organism	3	0.00079	None, insufficient data	--	--	--	--	--
		Sculpin multiple liver	2	0.00015	None, insufficient data	--	--	--	--	--
		Sculpin multiple kidney	2	0.00098	None, insufficient data	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
Uranium (inorganic)	Sediment and pore water	Sculpin multiple liver	1	--	None, insufficient data	--	--	--	--	--
		Sculpin multiple kidney	1	--	None, insufficient data	--	--	--	--	--
		Sculpin multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--

Table 6-116. Summary of Fish Tissue Versus Sediment and Pore-Water Concentration Regression Results. (9 Pages)

COPEC	Statistical Difference for Sediment, Pore Water, or Tissue (Study Site vs. Reference)	Tissue Type	Number of Sites with Detects for Sediment and Pore Water	Ratio of Average Tissue Concentration (fw) to Average Sediment or Water Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Vanadium	None	Sculpin multiple whole organism	15	0.0049	Sculpin multiple whole organism = 0.11 + 0.0017 sediment	0.078	0.31	ln(Sculpin multiple whole organism) = -2.5 + 0.2 ln(sediment)	0.038	0.48
		Sculpin multiple liver	5	0.0047	Sculpin multiple liver = 0.26 - 0.0018 sediment	0.14	0.54	ln(Sculpin multiple liver) = -0.33 - 0.39 ln(sediment)	0.089	0.63
		Sculpin multiple kidney	3	0.0097	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Juvenile sucker multiple whole organism	4	0.0061	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
Zinc	None	Sculpin multiple whole organism	19	0.16	Sculpin multiple whole organism = 29 + 0.0018 sediment	0.0021	0.85	ln(Sculpin multiple whole organism) = 3.2 + 0.036 ln(sediment)	0.018	0.59
		Sculpin multiple liver	17	0.19	Sculpin multiple liver = 23 + 0.067 sediment	0.24	0.046	ln(Sculpin multiple liver) = 2.9 + 0.1 ln(sediment)	0.029	0.52
		Sculpin multiple kidney	16	0.61	Sculpin multiple kidney = 65 + 0.18 sediment	0.21	0.078	ln(Sculpin multiple kidney) = 3.4 + 0.22 ln(sediment)	0.19	0.09
		Juvenile sucker multiple whole organism	6	0.2	Juvenile sucker multiple whole organism = 26 - 0.0014 sediment	0.0043	0.9	ln(Juvenile sucker) = 3.3 - 0.0086 ln(sediment)	0.0073	0.87
		Juvenile sucker multiple liver	6	0.35	Juvenile sucker multiple liver = 46 - 0.019 sediment	0.014	0.82	ln(Juvenile sucker multiple liver) = 3.9 - 0.032 ln(sediment)	0.0059	0.88
		Juvenile sucker multiple kidney	6	0.99	Juvenile sucker multiple kidney = 150 - 0.21 sediment	0.12	0.5	ln(Juvenile sucker multiple kidney) = 5.3 - 0.12 ln(sediment)	0.07	0.61
Pore Water										
Aluminum	None	Sculpin multiple whole organism	8	0.36	Sculpin multiple whole organism = 21 - 0.048 pore water	0.021	0.73	ln(Sculpin multiple whole organism) = 3.6 - 0.21 ln(pore water)	0.033	0.67
		Sculpin multiple liver	6	0.26	Sculpin multiple liver = 18 - 0.065 pore water	0.27	0.29	ln(Sculpin multiple liver) = 4 - 0.34 ln(pore water)	0.27	0.29
		Sculpin multiple kidney	5	0.31	Sculpin multiple kidney = 21 - 0.023 pore water	0.022	0.81	ln(Sculpin multiple kidney) = 3.8 - 0.21 ln(pore water)	0.077	0.65
		Juvenile sucker multiple whole organism	4	0.21	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Juvenile sucker multiple liver	3	0.18	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Juvenile sucker multiple kidney	3	0.21	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
Antimony	None	Sculpin multiple whole organism	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Sculpin multiple liver	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Sculpin multiple kidney	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, no detects in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, no detects in tissue	--	--	--	--	--
Barium	None	Sculpin multiple whole organism	12	0.1	Sculpin multiple whole organism = 4.4 - 0.018 pore water	0.13	0.24	ln(Sculpin multiple whole organism) = 2.1 - 0.21 ln(pore water)	0.15	0.22
		Sculpin multiple liver	10	0.012	Sculpin multiple liver = 0.76 - 0.0088 pore water	0.095	0.39	ln(Sculpin multiple liver) = 1.7 - 0.85 ln(pore water)	0.14	0.28
		Sculpin multiple kidney	11	0.023	Sculpin multiple kidney = 0.67 + 0.0047 pore water	0.031	0.61	ln(Sculpin multiple kidney) = -0.95 + 0.19 ln(pore water)	0.019	0.68
		Juvenile sucker multiple whole organism	5	0.067	Juvenile sucker multiple whole organism = 3.2 + 0.0055 pore water	0.081	0.64	ln(Juvenile sucker) = 0.9 + 0.092 ln(pore water)	0.099	0.61
		Juvenile sucker multiple liver	4	0.025	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Juvenile sucker multiple kidney	5	0.16	Juvenile sucker multiple kidney = 7.7 - 0.01 pore water	0.0058	0.9	ln(Juvenile sucker multiple kidney) = 2 - 0.011 ln(pore water)	<0.001	0.99

Table 6-116. Summary of Fish Tissue Versus Sediment and Pore-Water Concentration Regression Results. (9 Pages)

COPEC	Statistical Difference for Sediment, Pore Water, or Tissue (Study Site vs. Reference)	Tissue Type	Number of Sites with Detects for Sediment and Pore Water	Ratio of Average Tissue Concentration (fw) to Average Sediment or Water Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Cadmium	None	Sculpin multiple whole organism	1	--	None, insufficient data	--	--	--	--	--
		Sculpin multiple liver	1	--	None, insufficient data	--	--	--	--	--
		Sculpin multiple kidney	1	--	None, insufficient data	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
Calculated total uranium	None	Sculpin multiple whole organism	1	--	None, insufficient data	--	--	--	--	--
		Sculpin multiple liver	0	--	None, no detects in tissue	--	--	--	--	--
		Sculpin multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, no detects in tissue	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
Chromium	None	Sculpin multiple whole organism	6	0.072	Sculpin multiple whole organism = 0.45 + 0.0051 pore water	0.12	0.5	ln(Sculpin multiple whole organism) = -0.9 + 0.11 ln(pore water)	0.18	0.4
		Sculpin multiple liver	5	0.053	Sculpin multiple liver = 0.37 + 0.0041 pore water	0.054	0.71	ln(Sculpin multiple liver) = -0.94 - 0.045 ln(pore water)	0.01	0.87
		Sculpin multiple kidney	5	0.2	Sculpin multiple kidney = 1.7 - 0.019 pore water	0.019	0.82	ln(Sculpin multiple kidney) = 0.27 - 0.069 ln(pore water)	0.01	0.87
		Juvenile sucker multiple whole organism	2	0.12	None, insufficient data	--	--	--	--	--
		Juvenile sucker multiple liver	3	0.38	None, insufficient data	--	--	--	--	--
		Juvenile sucker multiple kidney	3	0.48	None, insufficient data	--	--	--	--	--
Copper	None	Sculpin multiple whole organism	4	0.43	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Sculpin multiple liver	4	2.5	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Sculpin multiple kidney	4	1.8	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Juvenile sucker multiple whole organism	1	--	None, insufficient data	--	--	--	--	--
		Juvenile sucker multiple liver	1	--	None, insufficient data	--	--	--	--	--
		Juvenile sucker multiple kidney	1	--	None, insufficient data	--	--	--	--	--
Hexavalent chromium	None	Sculpin multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Sculpin multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Sculpin multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--

Table 6-116. Summary of Fish Tissue Versus Sediment and Pore-Water Concentration Regression Results. (9 Pages)

COPEC	Statistical Difference for Sediment, Pore Water, or Tissue (Study Site vs. Reference)	Tissue Type	Number of Sites with Detects for Sediment and Pore Water	Ratio of Average Tissue Concentration (fw) to Average Sediment or Water Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Lead	None	Sculpin multiple whole organism	2	0.13	None, insufficient data	--	--	--	--	--
		Sculpin multiple liver	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Sculpin multiple kidney	1	--	None, insufficient data	--	--	--	--	--
		Juvenile sucker multiple whole organism	1	--	None, insufficient data	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, no detects in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, no detects in tissue	--	--	--	--	--
Manganese	None	Sculpin multiple whole organism	12	0.16	Sculpin multiple whole organism = 5.5 - 0.0016 pore water	0.0033	0.86	ln(Sculpin multiple whole organism) = 1.7 - 0.024 ln(pore water)	0.009	0.77
		Sculpin multiple liver	11	0.079	Sculpin multiple liver = 1.5 - 0.005 pore water	0.14	0.25	ln(Sculpin multiple liver) = 0.47 - 0.18 ln(pore water)	0.25	0.12
		Sculpin multiple kidney	11	0.084	Sculpin multiple kidney = 1.6 - 0.0042 pore water	0.054	0.49	ln(Sculpin multiple kidney) = 0.28 - 0.038 ln(pore water)	0.0065	0.81
		Juvenile sucker multiple whole organism	5	0.034	Juvenile sucker multiple whole organism = 9.6 + 0.0014 pore water	0.14	0.53	ln(Juvenile sucker) = 2.3 + 0.0042 ln(pore water)	0.0048	0.91
		Juvenile sucker multiple liver	4	0.089	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Juvenile sucker multiple kidney	5	0.091	Juvenile sucker multiple kidney = 5.2 - 0.0092 pore water	0.21	0.44	ln(Juvenile sucker multiple kidney) = 1.6 - 0.079 ln(pore water)	0.17	0.49
Mercury	None	Sculpin multiple whole organism	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Sculpin multiple liver	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Sculpin multiple kidney	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, no detects in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, no detects in tissue	--	--	--	--	--
Nickel	None	Sculpin multiple whole organism	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Sculpin multiple liver	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Sculpin multiple kidney	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, no detects in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, no detects in tissue	--	--	--	--	--
Nitrogen in nitrate	None	Sculpin multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Sculpin multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Sculpin multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--

Table 6-116. Summary of Fish Tissue Versus Sediment and Pore-Water Concentration Regression Results. (9 Pages)

COPEC	Statistical Difference for Sediment, Pore Water, or Tissue (Study Site vs. Reference)	Tissue Type	Number of Sites with Detects for Sediment and Pore Water	Ratio of Average Tissue Concentration (fw) to Average Sediment or Water Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Nitrogen in nitrite	None	Sculpin multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Sculpin multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Sculpin multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, not measured in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, not measured in tissue	--	--	--	--	--
Phosphorus	None	Sculpin multiple whole organism	5	150	Sculpin multiple whole organism = 6,400 - 11 pore water	0.076	0.65	ln(Sculpin multiple whole organism) = 8.8 - 0.031 ln(pore water)	0.017	0.83
		Sculpin multiple liver	4	74	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Sculpin multiple kidney	4	77	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Juvenile sucker multiple whole organism	2	41	None, insufficient data	--	--	--	--	--
		Juvenile sucker multiple liver	2	59	None, insufficient data	--	--	--	--	--
		Juvenile sucker multiple kidney	2	88	None, insufficient data	--	--	--	--	--
Selenium	None	Sculpin multiple whole organism	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Sculpin multiple liver	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Sculpin multiple kidney	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Juvenile sucker multiple liver	1	--	None, insufficient data	--	--	--	--	--
		Juvenile sucker multiple kidney	1	--	None, insufficient data	--	--	--	--	--
Strontium (elemental)	None	Sculpin multiple whole organism	12	0.16	Sculpin multiple whole organism = 19 + 0.0035 pore water	<0.001	0.93	ln(Sculpin multiple whole organism) = 2.8 + 0.032 ln(pore water)	0.0018	0.9
		Sculpin multiple liver	11	0.0053	Sculpin multiple liver = 0.69 - 0.00039 pore water	0.001	0.93	ln(Sculpin multiple liver) = -1.4 + 0.16 ln(pore water)	0.0035	0.86
		Sculpin multiple kidney	11	0.012	Sculpin multiple kidney = 1.3 + 0.0012 pore water	0.0035	0.86	ln(Sculpin multiple kidney) = -0.74 + 0.2 ln(pore water)	0.0095	0.78
		Juvenile sucker multiple whole organism	5	0.13	Juvenile sucker multiple whole organism = 17 - 0.0061 pore water	0.013	0.86	ln(Juvenile sucker) = 3.1 - 0.056 ln(pore water)	0.016	0.84
		Juvenile sucker multiple liver	4	0.0052	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Juvenile sucker multiple kidney	5	0.0053	Juvenile sucker multiple kidney = 0.37 + 0.0028 pore water	0.41	0.25	ln(Juvenile sucker multiple kidney) = -3.1 + 0.58 ln(pore water)	0.36	0.28
Tin	None	Sculpin multiple whole organism	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Sculpin multiple liver	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Sculpin multiple kidney	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--

Table 6-116. Summary of Fish Tissue Versus Sediment and Pore-Water Concentration Regression Results. (9 Pages)

COPEC	Statistical Difference for Sediment, Pore Water, or Tissue (Study Site vs. Reference)	Tissue Type	Number of Sites with Detects for Sediment and Pore Water	Ratio of Average Tissue Concentration (fw) to Average Sediment or Water Concentration	Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)	Log-Linear Regression Equation	Explained Variance of the Regression (R-Squared)	Statistical Significance (P-Value)
Titanium	None	Sculpin multiple whole organism	0	--	None, not measured in pore water	--	--	--	--	--
		Sculpin multiple liver	0	--	None, not measured in pore water	--	--	--	--	--
		Sculpin multiple kidney	0	--	None, not measured in pore water	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, not measured in pore water	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, not measured in pore water	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, not measured in pore water	--	--	--	--	--
Uranium (inorganic)	None	Sculpin multiple liver	1	--	None, insufficient data	--	--	--	--	--
		Sculpin multiple kidney	1	--	None, insufficient data	--	--	--	--	--
		Sculpin multiple whole organism	0	--	None, not detected in pore water and tissue at the same site	--	--	--	--	--
		Juvenile sucker multiple whole organism	0	--	None, no detects in tissue	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, no detects in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, no detects in tissue	--	--	--	--	--
Vanadium	None	Sculpin multiple whole organism	4	0.08	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Sculpin multiple liver	2	0.062	None, insufficient data	--	--	--	--	--
		Sculpin multiple kidney	1	--	None, insufficient data	--	--	--	--	--
		Juvenile sucker multiple whole organism	3	0.11	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Juvenile sucker multiple liver	0	--	None, no detects in tissue	--	--	--	--	--
		Juvenile sucker multiple kidney	0	--	None, no detects in tissue	--	--	--	--	--
Zinc	None	Sculpin multiple whole organism	12	6.6	Sculpin multiple whole organism = 26 + 0.49 pore water	0.097	0.32	ln(Sculpin multiple whole organism) = 3.1 + 0.14 ln(pore water)	0.25	0.1
		Sculpin multiple liver	11	5.9	Sculpin multiple liver = 26 + 0.0086 pore water	0.000037	0.99	ln(Sculpin multiple liver) = 3.2 + 0.052 ln(pore water)	0.035	0.58
		Sculpin multiple kidney	11	23	Sculpin multiple kidney = 89 + 2 pore water	0.035	0.58	ln(Sculpin multiple kidney) = 4.3 + 0.15 ln(pore water)	0.072	0.42
		Juvenile sucker multiple whole organism	5	5.2	Juvenile sucker multiple whole organism = 24 + 0.19 pore water	0.21	0.43	ln(Juvenile sucker) = 3.2 + 0.021 ln(pore water)	0.077	0.65
		Juvenile sucker multiple liver	4	8.3	None, insufficient data to determine if there is a biologically significant relationship	--	--	--	--	--
		Juvenile sucker multiple kidney	5	28	Juvenile sucker multiple kidney = 110 + 3.5 pore water	0.073	0.66	ln(Juvenile sucker multiple kidney) = 4.6 + 0.18 ln(pore water)	0.22	0.42

= Statistically significant positive regression, p-value<0.05.

-- = not applicable
COPEC = contaminant of potential ecological concern
fw = fresh weight

Table 6-117. Fish Tissue Effect Levels.

COPEC	Species	Lifestage	Tissue Type	Tissue Concentration (mg/kg-fw)	Effect	Reference
Fish Liver Comparison Benchmarks						
Cadmium (cadmium sulfate)	Rainbow trout, *Oncorhynchus mykiss*	Adult	Liver	1.1	Reproduction - no effect	Brown et al. 1994
Chromium (potassium dichromate)	Rainbow trout, *Oncorhynchus mykiss*	150 to 200 g	Liver	1.98	Survival - no effect	Calamari et al. 1982
Lead (lead nitrate)	Brook trout, *Salvelinus fontinalis*	Embryo to adult	Liver	9.8	Survival, growth, reproduction - no effect	Holcombe et al. 1976
Mercury, (mercuric nitrate)	Fish, *Anabas scandens*	10 to 12 cm	Liver	3.0	Survival - no effect	Panigrahi and Misra 1978
Nickel (nickel chloride)	Rainbow trout, *Oncorhynchus mykiss*	150 to 200 g	Liver	2.92	Survival - no effect	Calamari et al. 1982
Selenium (sodium selenite)	Rainbow trout, *Oncorhynchus mykiss*	Fingerling to juvenile	Liver	0.22	Growth - no effect	Hilton et al. 1982
Selenium (sodium selenite)	Rainbow trout, *Oncorhynchus mykiss*	Fingerling to juvenile	Liver	8.84	Survival - no effect and reduced growth	Hilton et al. 1982
Fish Whole Organism Comparison Benchmarks						
Cadmium	Rainbow trout, *Oncorhynchus mykiss*	3.1 g	Whole body	0.54	Growth - no effect	Kumada et al. 1973
Lead (lead nitrate)	Rainbow trout, *Oncorhynchus mykiss*	Underyearling, 6.5 g	Whole body	4.0	Survival - no effect and reduced growth	Hodson et al. 1978
Mercury (mercuric chloride)	Fathead minnow, *Pimephales promelas*	Larvae to adult	Whole body	0.80	Survival - no effect	Snarski and Olson 1982
Selenium (sodium selenite)	Rainbow trout, *Oncorhynchus mykiss*	Egg to juvenile	Carcass without organs	0.28	Survival, growth - no effect	Hodson et al. 1980
Selenium (sodium selenite)	Rainbow trout, *Oncorhynchus mykiss*	3 to 6 g	Whole body	1.9	Survival - reduced 30%	Gissel Nielsen and Gissel-Nielsen 1978

COPEC = contaminant of potential ecological concern
fw = fresh weight

Table 6-118. Summary of Risk Characterization for Fish.

Receptor	Line of Evidence	Weight	Effect	Summary
Fish	Histopathology	High	Fish are longer and heavier in reference sites compared to study but otherwise no consistent effect: 2 of 23 measures higher at study sites (liver parasites and muscle granulomas), 2 higher in reference sites (kidney and gill parasites). Thus, inconsistent evidence for differences, no consistent evidence for adverse effects.	There is evidence of risk to fish with uncertainties.
	Tissue concentrations to tissue benchmarks (liver and whole fish)	Low	Exceedances at both study sites and reference sites, therefore no indication of adverse effects from Hanford Site operations. This line of evidence was originally weighted medium. However, an evaluation of the use of tissue effect levels published after the RCBRA was planned has identified that between-species and between lifestage evaluation has limited validity or is not valid (Adams et al. 2011). Therefore, tissue effect levels are considered but have uncertainty in estimating ecological risks from COPECs.	
	T&E surveys	Medium	Steelhead habitat is present, suggesting exposure to T&E species.	
	Benchmarks (water)	Low	Concentrations were greater than water standards for hexavalent chromium in pore water at study sites only; hexavalent chromium was not detected in reference site pore water. Concentrations were greater than water standards or criteria at both study sites and reference sites for three COPECs (aluminum, cadmium, and lead). Copper and selenium exceeded standards at reference sites only. Fish benchmarks were exceeded for manganese and nitrate at both study sites and reference sites. Concentrations of both COPECs were not significantly elevated at study sites but nitrate has five outliers in sediment.	

COPEC = contaminant of potential ecological concern
RCBRA = River Corridor Baseline Risk Assessment
T&E = threatened and endangered

Table 6-119. Uncertainty Analysis for Fish.

Attributes	Questions	Observations	Impact on Assessment
Measured tissue concentrations	Are mean study site tissue contaminant concentrations greater than at reference sites and do not increase along an increasing contamination gradient?	Tissue concentrations in fish are subject to the following: • Analytical measurement uncertainties (e.g., detection limits typically are elevated in tissues because of matrix interferences) • Gradient analyses with sediment and pore water were limited due to the relatively large sampling areas of fish.	Detection limits can lead to underestimating risks.
Field surveys of T&E habitat	Is there T&E fish habitat at study sites?	Field surveys of T&E species are subject to the following: • Not all aspects of species preferences are likely captured by the habitat and substrate model.	The model does not account for water flow during nest building, thus potential for exposure and risk could be overestimated.
Comparison to water benchmarks	Are concentrations of COPECs greater than benchmarks?	Uncertainties associated with exposure evaluation include: • Measuring media (water) concentrations. Effect levels for metals are based on bioavailable forms. For example, Menzie et al. (2008) present an example study involving barium toxicity and chemical form showing that the most stable form in the environment is also the least toxic.	Some COPECs may act synergistically and therefore the potential for effects or risks could be understated. Literature toxicity data missing for some COPECs, thus risk could be underestimated. Literature toxicity information for metals could overestimate risk.

COPEC = contaminant of potential ecological concern
T&E = threatened and endangered

Table 6-120. Summary of Near-Shore Fish Risk Results for All Contaminants of Potential Ecological Concern. (2 Pages)

COPEC	COPC Refinement Status (Table 6-74)		Pore-Water Concentrations Compared to Benchmarks (Table 6-90 and 6-91)	Comparison to Tissue Benchmarks	Biota Versus Sediment And Pore-Water Regressions (Table 6-116)	Notes
	Sediment	Pore Water				
Aluminum	No	No	Pore-water concentrations greater than criterion at study sites and reference sites (three times greater at study sites)	No tissue effect levels	No relationship	Identified as key COPEC based on criterion comparison
Antimony	No	No	Pore-water concentrations less than criterion	No tissue effect levels	Insufficient data	No significant findings
Barium	No	No	No fish benchmark	No tissue effect levels	No relationship	No significant findings
Cadmium	Yes, outliers	No	Pore-water concentrations greater than criterion at study sites but less than reference site concentrations	Greater than liver effect level in both study site and reference site samples, greater magnitude of exceedance at study sites. Whole fish concentrations are less than effect levels	No relationship	No significant findings
Calculated total uranium	Yes	Yes	Pore-water concentrations less than fish benchmark	No tissue effect levels	Insufficient data	No significant findings
Chromium	Yes	Yes	Pore-water concentrations less than standard	Greater than liver effect level in both study site and reference site samples but approximately same in magnitude, limited to three outliers	No relationship	No significant findings
Copper	No	No	Pore-water concentrations less than standard at study sites, exceed standard at reference sites	No tissue effect levels	No relationship	No significant findings
Hexavalent chromium	Yes	Yes	Pore-water concentrations greater than standard at study sites only	No tissue effect levels	Not measured in tissue	Identified as key COPEC based on criterion comparison
Lead	Yes, outliers	No	Pore-water concentrations greater than criterion at both study sites and reference sites (roughly equal magnitude of exceedance)	Effect levels were not exceeded	No relationship	No significant findings
Manganese	No	No	Pore-water concentrations greater than fish benchmark at both study sites and reference sites	No tissue effect levels	Sculpin kidney correlated to sediment. No other relationships	Identified as a key COPEC based on the water benchmark comparison

Table 6-120. Summary of Near-Shore Fish Risk Results for All Contaminants of Potential Ecological Concern. (2 Pages)

COPEC	COPC Refinement Status (Table 6-74)		Pore-Water Concentrations Compared to Benchmarks (Table 6-90 and 6-91)	Comparison to Tissue Benchmarks	Biota Versus Sediment And Pore-Water Regressions (Table 6-116)	Notes
	Sediment	Pore Water				
Mercury	Yes, outliers	No	Pore-water concentrations less than standard	Effect levels were not exceeded	No relationship	No significant findings
Nickel	No	No	Pore-water concentrations less than criterion	Greater than liver effect level in both study site and reference site samples, magnitude of exceedance greater at reference sites	No relationship	No significant findings
Nitrogen in nitrate	Yes, outliers	No	Pore-water concentrations greater than fish benchmark at both study sites and reference sites	No tissue effect levels	Not measured in tissue	No significant findings
Nitrogen in nitrite	Yes	No	Not detected in pore water	No tissue effect levels	Not measured in tissue	No significant findings
Phosphorus	No	Yes, outliers	Pore-water concentrations less than fish benchmark	No tissue effect levels	No relationship	No significant findings
Selenium	No	No	Pore-water concentrations less than criterion at study sites, exceed criterion at reference sites	Concentrations in liver or whole fish are bounded between no effect and lowest effect levels for both study sites and reference sites	Insufficient data	No significant findings
Strontium (elemental)	No	No	No fish benchmark	No tissue effect levels	Juvenile sucker kidney and sculpin kidney correlated to sediment. No other relationships	No significant findings
Tin	No	Yes	Not detected in water	No tissue effect levels	No relationship	No significant findings
Titanium	Yes	Not measured	Not measured in pore water	No tissue effect levels	Insufficient data	No significant findings
Uranium (inorganic)	No	No	Pore-water concentrations less than fish benchmark	No tissue effect levels	Insufficient data	No significant findings
Vanadium	No	No	Pore-water concentrations less than fish benchmark	No tissue effect levels	No relationship	No significant findings
Zinc	No	No	Pore-water concentrations less than standard	No tissue effect levels	Sculpin liver correlated to sediment. No other relationships	No significant findings

= Shaded contaminants of potential ecological concern have pore-water concentrations greater than the effect level and reference concentrations.

COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern

Table 6-121. Exposure Parameters for Near-Shore Middle Trophic Level Receptors. (2 Pages)

Parameter	Value	Units	Reference	Notes
Birds (Insectivore and Omnivore)				
Kingbird				
Body weight	0.0399	kg	Median weight from four papers, see notes on gender and counts	Female western kingbird (avg., 0.0373, n = 9) male western kingbird (avg., 0.0385, n = 9) female western kingbird (avg., 0.0458, n = 5) male western kingbird (avg., 0.0412, n = 2) from Birds of North America online (http://bna.birds.cornell.edu/bna/)
Diet composition sediment	0	%	--	Assume strict aerial insectivore, no sediment ingestion in near shore environment
Ingestion sediment	0	kg/kg/d	--	Sediment ingestion is equal to the percent sediment in diet multiplied by the food ingestion rate as follows: sediment ingestion = (percent sediment/100 * intake food dry weight)
Ingestion water	0.17	L/kg/d	EPA/600/ R-93/187	Allometric equation for all birds, Eqn. 3-15; WI = 0.059Wt^0.67 (kg)
Intake food dry weight	0.182	kg/kg/d	Nagy 2001	Allometric estimation for "insectivorous birds" normalized to kg/kg-bw/d dry weight
Conversion factor (fresh from dry intake)	3.2	--	EPA/600/ R-93/187	Fresh from dry intake conversion factor based on 69% moisture in diet (grasshoppers and crickets), calculated as 1 divided dry fraction
Intake food fresh weight	0.582	kg/kg/d	--	Intake food dry weight * conversion factor
Diet composition aquatic invertebrate	1	Proportion	Assumed	--
Bufflehead				
Body weight	0.407	kg	Median weight from five papers, see notes on gender and counts	Male bufflehead (avg., 0.465, n = 108) immature male bufflehead (avg., 0.449, n = 65) female bufflehead (avg., 0.337, n = 111) male bufflehead (avg., 0.407, n = 62) female bufflehead (avg., 0.295, n = 10) from Birds of North America online (http://bna.birds.cornell.edu/bna/)
Diet composition sediment	9.6	%	Beyer et al. 2008	9.6% of dietary intake
Ingestion sediment	0.0088	kg/kg/d	Calculated	Sediment ingestion is equal to the percent sediment in diet multiplied by the food ingestion rate as follows: sediment ingestion = (percent sediment/100 * intake food dry weight)
Ingestion water	0.079	L/kg/d	EPA/600/ R-93/187	Allometric equation for all birds, Eqn. 3-15; WI = 0.059Wt^0.67 (kg)
Intake food dry weight	0.092	kg/kg/d	Nagy 2001	Allometric estimation for "insectivorous birds" normalized to kg/kg-bw/d dry weight
Conversion factor (fresh from dry intake)	4.55	--	EPA/600/ R-93/187	Fresh from dry intake conversion factor based on 78% moisture shrimp (surrogate for crayfish), calculated as 1 divided dry fraction

Table 6-121. Exposure Parameters for Near-Shore Middle Trophic Level Receptors. (2 Pages)

Parameter	Value	Units	Reference	Notes
Intake food fresh weight	0.42	kg/kg/d		Intake food dry weight * conversion factor
Diet composition aquatic invertebrate	0.5	Proportion	Assumed	--
Diet composition clam	0.5	Proportion	Assumed	--
Mammal (Piscivore)				
Mink				
Body weight	1.02	kg	Median weight from five mink, see notes on gender and counts	Sample and Suter 1999, 1 kg female Halbrook et al. 1997 – 1.245 female (Dec diet B), 1.016 female (Jun diet B), 1.23 female (Dec diet E), 0.935 female (Jun diet E)
Diet composition sediment	9.4	%	EPA/600/ R-93/187	Raccoon, Table 4-4, p. 4-20, sediment is 9.4% diet
Ingestion soil	0	kg/kg/d	--	Assume incidental soil ingestion at near shore sites
Ingestion sediment	0.0046	kg/kg/d	Calculated	Sediment ingestion is equal to the percent sediment in diet multiplied by the food ingestion rate as follows: sediment ingestion = (percent sediment/100 * intake food dry weight)
Ingestion water	0.1	L/kg/d	EPA/600/ R-93/187	Allometric eqn. for water intake for mammals p. 3-10, EQN 3-17; WI (L/day) = 0.099Wt^0.9 (kg)
Intake food dry weight	0.0485	kg/kg/d	Nagy 2001	Allometric estimation for "carnivorous mammals" normalized to kg/kg-bw/d
Conversion factor (fresh from dry intake)	4	--	EPA/600/ R-93/187	Fresh from dry intake conversion factor based on bony fish 75% moisture, calculated as 1 divided dry fraction
Intake food fresh weight	0.194	kg/kg/d	--	Intake food dry weight * conversion factor
Diet composition fish	1	Proportion	Assumed	--

-- = not applicable

Beyer, W. N, M. C. Perry, P. C. Osenton, 2008, Sediment Ingestion Rates in Waterfowl (Anatidae) and their Use in Environmental Risk Assessment, Integrated Environmental Assessment and Management 4(2):246-251.

EPA/600/R-93/187, 1993, Wildlife Exposure Factors Handbook, Vol. 1, Office of Health and Environmental Assessment and Office of Research and Development, U.S. Environmental Protection Agency, Washington, D.C.

Halbrook, R. S., L. A. Lewis, R. I. Aulrich, and S. J. Bursian, 1997, *Mercury Accumulation in Mink Fed Fish Collected from the Streams on the Oak Ridge Reservation*, Arch. Environ. Contam. Toxicol. 33, 312-316.

Nagy KA, 2001, food requirements of wild animals: predictive equations for free-living mammals, reptiles and birds. Nutrition Abstracts and Reviews, Series B 71, 21R-31R.

Sample and Suter, 1999, *Ecological Risk Assessment in a Large River Reservoir: 4. Piscivorous Wildlife*, Environmental Toxicology and Chemistry, Vol. 18, No. 4, pp. 610–62

Table 6-122. Near-Shore Receptors and Exposure Pathways for Hazard Quotient Calculations.

Receptor	HQ Pathway Parameters	Representative Concentrations
Kingbird (insectivore)	Benthic macroinvertebrates Water	One composite sample One grab sample
Bufflehead (omnivore)	Sediment Benthic macroinvertebrates Clams Water	One grab sample One composite sample One composite sample One grab sample
Mink (piscivore)	Sediment Fish Water	One grab sample One composite sample of whole fish per species One grab sample

HQ = hazard quotient

Table 6-123. Summary of Near-Shore Middle Trophic-Level Wildlife Risk Results for all Contaminants of Potential Ecological Concern.

COPEC	Study Sites				Reference Sites			
	NOAEL		LOAEL		NOAEL		LOAEL	
	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ
Aluminum	<0.01	25	0.09	2.5	0.06	22	0.39	2.2
Antimony	<0.01	1.2	<0.01	0.12	<0.01	0.04	<0.01	<0.01
Barium	<0.01	2.2	<0.01	1.1	<0.01	1.9	<0.01	0.96
Cadmium	<0.01	0.40	<0.01	0.25	<0.01	0.13	<0.01	0.08
Calculated total uranium	<0.01	0.02	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
Chromium	<0.01	1.3	<0.01	1.2	0.02	0.20	<0.01	0.19
Copper	<0.01	4.6	<0.01	1.6	<0.01	4.2	<0.01	1.4
Hexavalent chromium	<0.01	0.19	<0.01	0.02	NA	NA	NA	NA
Lead	<0.01	0.85	<0.01	0.43	<0.01	0.34	<0.01	0.17
Manganese	<0.01	0.34	<0.01	0.17	0.02	0.22	0.01	0.11
Mercury	<0.01	1.3	<0.01	0.23	<0.01	1.1	<0.01	0.22
Nickel	<0.01	14	<0.01	7.1	0.02	0.68	0.01	0.40
Nitrogen in nitrate	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrogen in nitrite	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phosphorous	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	0.01	4.6	<0.01	2.3	0.41	1.6	0.21	0.81
Strontium (elemental)	0.01	0.02	NA	NA	<0.01	0.02	NA	NA
Tin	<0.01	0.23	<0.01	0.09	<0.01	0.04	<0.01	0.01
Titanium	NA	NA	NA	NA	NA	NA	NA	NA
Uranium (inorganic)	<0.01	0.07	<0.01	0.03	NA	NA	NA	NA
Vanadium	<0.01	1.9	<0.01	0.95	<0.01	1.6	<0.01	0.79
Zinc [a]	<0.01	0.52	<0.01	0.52	<0.01	0.26	<0.01	0.26

= Hazard quotient >1.0.

[a] Maximum value from 100-B/C sample.

COPEC = contaminant of potential ecological concern
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
NA = not available
NOAEL = no observable adverse effect level

Table 6-124. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for Bufflehead (Omnivore). (3 Pages)

Site Name	COPEC	Concentration [a]				NOAEL HQ					LOAEL HQ				
		Surface Water (µg/L)	Sediment (mg/kg)	Aquatic Invertebrate (mg/kg-fw)	Clam (mg/kg-fw)	Surface Water	Sediment	Aquatic Invertebrate	Clam	Sum [b]	Surface Water	Sediment	Aquatic Invertebrate	Clam	Sum [b]
Reference Site															
Beverly Reference 1	Copper	ND	23.4	21.2	8.4	--	0.05	1.1	0.44	1.6	--	0.02	0.37	0.15	0.53
	Selenium	ND	ND	0.81	1.3	--	--	0.59	0.95	1.5	--	--	0.30	0.48	0.77
	Vanadium	ND	39.3	ND	--	--	1.0	--	--	1.0	--	0.50	--	--	0.50
Ref 11	Copper	ND	9.87	14.9	9.9	--	0.02	0.78	0.52	1.3	--	<0.01	0.26	0.17	0.44
Ref 12	Copper	ND	ND	25.7	7.1	--	--	1.3	0.37	1.7	--	--	0.45	0.12	0.57
	Selenium	ND	ND	0.46	0.97	--	--	0.33	0.71	1.0	--	--	0.17	0.35	0.52
Ref 13	Copper	ND	24.7	29.4	7.4	--	0.05	1.5	0.39	2	--	0.02	0.51	0.13	0.66
	Vanadium	ND	52.9	ND	0.11	--	1.4	--	0.07	1.4	--	0.68	--	0.03	0.71
Ref 14	Copper	ND	23.6	20.6	8.8	--	0.05	1.1	0.46	1.6	--	0.02	0.36	0.15	0.53
	Selenium	ND	ND	0.62	0.88	--	--	0.45	0.64	1.1	--	--	0.23	0.32	0.55
	Vanadium	ND	58.9	ND	0.11	--	1.5	--	0.07	1.6	--	0.75	--	0.03	0.8
Ref 16	Copper	1.5 (RME)	12.8 (RME)	24.4 (RME)	13.8 (RME)	<0.01	0.03	1.3	0.72	2.0	<0.01	<0.01	0.43	0.24	0.68
	Selenium	ND	ND	0.72	1	--	--	0.52	0.73	1.3	--	--	0.26	0.36	0.63
Ref 300-1	Copper	2.3	24.5	15.1	7.7	<0.01	0.05	0.79	0.4	1.2	<0.01	0.02	0.26	0.13	0.42
	Vanadium	ND	38.5	ND	0.14	--	0.98	--	0.09	1.1	--	0.5	--	0.04	0.54
Ref 300-2	Copper	1.4	18.6	12.6	7.8	<0.01	0.04	0.66	0.41	1.1	<0.01	0.01	0.22	0.14	0.37
Study Site															
100-B/C Decision Area															
100-B/C Pilot	Copper	0.741 (RME)	17.4 (RME)	10.8 (RME)	10.9 (RME)	<0.01	0.04	0.56	0.57	1.2	<0.01	0.01	0.19	0.19	0.39
	Nickel	1.18 (RME)	21.1(RME)	49.3 (RME)	0.305 (RME)	<0.01	0.03	1.5	<0.01	1.6	<0.01	0.02	0.90	<0.01	0.93
2a	Copper	ND	10.2	23.5	13.6	--	0.02	1.2	0.71	2.0	--	<0.01	0.41	0.24	0.65
	Selenium	ND	ND	0.69	0.89	--	--	0.50	0.65	1.1	--	--	0.25	0.32	0.58
2b	Copper	ND	7.9	24.3	11.1	--	0.02	1.3	0.58	1.9	--	<0.01	0.42	0.19	0.62
	Selenium	ND	ND	0.56	1.1	--	--	0.41	0.8	1.2	--	--	0.20	0.40	0.60
	Vanadium	ND	28.4	0.68	--	--	0.73	0.42	--	1.1	--	0.36	0.21	--	0.57
100-K Decision Area															
2c	Copper	ND	15.9	30.7	13.5	--	0.04	1.6	0.7	2.3	--	0.01	0.54	0.24	0.78
	Selenium	ND	ND	0.72	1.4	--	--	0.52	1.0	1.5	--	--	0.26	0.51	0.77
Cr1	Copper	ND	19.9	ND	26.5	--	0.04	--	1.4	1.4	--	0.02	--	0.46	0.48
Cr2	Copper	1.4	20.7	ND	19.3	<0.01	0.05	--	1.0	1.1	<0.01	0.02	--	0.34	0.35
Cr3	Copper	ND	27.5	ND	21.1	--	0.06	--	1.1	1.2	--	0.02	--	0.37	0.39
	Selenium	ND	ND	ND	1.4	--	--	--	1.0	1.0	--	--	--	0.51	0.51
	Vanadium	ND	38	ND	0.14	--	0.97	--	0.09	1.1	--	0.5	--	0.04	0.53
100-N Decision Area															
100-NR-2	Vanadium	0.657	51.2	ND	0.0694	<0.01	1.3	--	0.04	1.4	<0.01	0.65	--	0.02	0.68
	Vanadium	1.2 (RME)	54.3 (RME)	ND	0.079 (RME)	<0.01	1.4	--	0.05	1.4	<0.01	0.69	--	0.02	0.72
Cr4	Copper	ND	14.2	ND	27	--	0.03	--	1.4	1.4	--	0.01	--	0.47	0.48
	Vanadium	ND	45.1	ND	0.16	--	1.2	--	0.10	1.3	--	0.58	--	0.05	0.63
Sr2	Vanadium	ND	45	ND	--	--	1.2	--	--	1.2	--	0.58	--	--	0.58
Sr5	Copper	1.4	27	32.6	8.7	<0.01	0.06	1.7	0.45	2.2	<0.01	0.02	0.57	0.15	0.74
	Selenium	ND	0.97	0.68	1.1	--	0.03	0.49	0.80	1.3	--	0.02	0.25	0.40	0.66
	Vanadium	ND	39.8	0.13	--	--	1.02	0.08	--	1.1	--	0.51	0.04	--	0.55

Table 6-124. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for Bufflehead (Omnivore). (3 Pages)

Site Name	COPEC	Concentration [a]				NOAEL HQ					LOAEL HQ				
		Surface Water (µg/L)	Sediment (mg/kg)	Aquatic Invertebrate (mg/kg-fw)	Clam (mg/kg-fw)	Surface Water	Sediment	Aquatic Invertebrate	Clam	Sum [b]	Surface Water	Sediment	Aquatic Invertebrate	Clam	Sum [b]
Sr6	Aluminum	45	13,000	ND	--	<0.01	1.0	--	--	1.0	--	--	--	--	--
	Vanadium	ND	47.1	ND	--	--	1.2	--	--	1.2	--	0.60	--	--	0.60
100-D/100-H Decision Area															
2f	Copper	2.8	10	27.8	13.6	<0.01	0.02	1.4	0.71	2.2	<0.01	<0.01	0.48	0.24	0.73
	Selenium	ND	ND	0.51	1.2	--	--	0.37	0.87	1.2	--	--	0.19	0.44	0.62
	Vanadium	1.1	46.5	0.22	--	<0.01	1.2	0.13	--	1.3	<0.01	0.59	0.07	--	0.66
2i	Copper	ND	ND	9.5	13.7	--	--	0.49	0.71	1.2	--	--	0.17	0.24	0.40
	Selenium	ND	ND	0.54	1.3	--	--	0.39	0.95	1.3	--	--	0.20	0.47	0.67
Cr5	Copper	ND	21.7	ND	19.2	--	0.05	--	1.0	1.0	--	0.02	--	0.33	0.35
	Vanadium	ND	45.4	ND	0.22	--	1.2	--	0.14	1.3	--	0.58	--	0.07	0.65
Cr6	Copper	ND	12.3	ND	23	--	0.03	--	1.2	1.2	--	<0.01	--	0.40	0.41
	Selenium	5.9	ND	ND	1.4	<0.01	--	--	1.0	1.0	<0.01	--	--	0.51	0.51
	Vanadium	ND	46.2	ND	0.24	--	1.2	--	0.15	1.4	--	0.60	--	0.07	0.67
Cr7	Vanadium	ND	53.8	ND	0.2	--	1.4	--	0.12	1.5	--	0.69	--	0.06	0.76
Cr8	Vanadium	ND	41.3	ND	--	--	1.1	--	--	1.1	--	0.53	--	--	0.53
Cr9	Mercury	ND	ND	ND	0.41	--	--	--	1.3	1.3	--	--	--	0.23	0.23
	Selenium	ND	ND	ND	1.6	--	--	--	1.2	1.2	--	--	--	0.58	0.58
	Vanadium	ND	43.6	ND	0.25	--	1.1	--	0.15	1.3	--	0.56	--	0.08	0.63
Cr10	Selenium	ND	ND	ND	1.4	--	--	--	1.0	1.0	--	--	--	0.51	0.51
	Vanadium	ND	50.8	ND	0.14	--	1.3	--	0.09	1.4	--	0.65	--	0.04	0.69
100-F/100-IU-2/100-IU-6 Decision Area															
2j	Copper	ND	6.4	26.6	--	--	0.01	1.4	--	1.4	--	<0.01	0.46	--	0.47
	Selenium	ND	ND	2.3	--	--	--	1.7	--	1.7	--	--	0.84	--	0.84
	Vanadium	ND	34.6	0.25	--	--	0.89	0.15	--	1.0	--	0.44	0.08	--	0.52
2m	Chromium	ND	19.5	ND	15.4	--	0.07	--	1.2	1.3	--	0.06	--	1.2	1.2
	Vanadium	ND	47.4	0.53	--	--	1.2	0.32	--	1.5	--	0.61	0.16	--	0.77
3b	Copper	ND	22.6	27.8	--	--	0.05	1.4	--	1.5	--	0.02	0.48	--	0.50
	Vanadium	0.76	32.4	0.25	--	<0.01	0.83	0.15	--	0.98	<0.01	0.41	0.08	--	0.49
4a	Copper	1.4	6.1	24.9	17.6	<0.01	0.01	1.3	0.92	2.2	<0.01	<0.01	0.43	0.31	0.75
	Selenium	ND	ND	0.66	1	--	--	0.48	0.73	1.2	--	--	0.24	0.36	0.60
	Vanadium	ND	32.4	0.24	0.15	--	0.83	0.15	0.09	1.1	--	0.41	0.07	0.05	0.53
300 Area Decision Area															
5d	Vanadium	ND	22.2	0.75	--	--	0.57	0.46	--	1.0	--	0.28	0.23	--	0.51
5i	Vanadium	ND	40.4	ND	--	--	1.0	--	--	1.0	--	0.52	--	--	0.52
U1	Copper	2.6	9.6	18.8	20.1	<0.01	0.02	0.98	1.1	2.1	<0.01	<0.01	0.33	0.35	0.69
	Selenium	ND	ND	0.68	0.86	--	--	0.49	0.63	1.1	--	--	0.25	0.31	0.56
	Vanadium	ND	53.8	ND	0.28	--	1.4	--	0.17	1.6	--	0.69	--	0.09	0.79
U2	Copper	1.5	27.4	22.5	9.2	<0.01	0.06	1.2	0.48	1.7	<0.01	0.02	0.39	0.16	0.57
	Selenium	ND	ND	1.6	1.2	--	--	1.2	0.87	2.0	--	--	0.58	0.44	1.0
	Vanadium	ND	66	0.15	0.2	--	1.7	0.09	0.12	1.9	--	0.84	0.05	0.06	0.95
U3	Copper	ND	21.9	10.8	7.7	--	0.05	0.56	0.4	1.0	--	0.02	0.19	0.13	0.34
	Selenium	ND	0.66	0.96	1.2	--	0.02	0.70	0.87	1.6	--	0.01	0.35	0.44	0.8
	Vanadium	ND	60.6	0.12	0.2	--	1.6	0.07	0.12	1.7	--	0.78	0.04	0.06	0.87

Table 6-124. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for Bufflehead (Omnivore). (3 Pages)

Site Name	COPEC	Concentration [a]				NOAEL HQ					LOAEL HQ				
		Surface Water (µg/L)	Sediment (mg/kg)	Aquatic Invertebrate (mg/kg-fw)	Clam (mg/kg-fw)	Surface Water	Sediment	Aquatic Invertebrate	Clam	Sum [b]	Surface Water	Sediment	Aquatic Invertebrate	Clam	Sum [b]
U4	Copper	1.5	14.6	23.9	6.6	<0.01	0.03	1.2	0.34	1.6	<0.01	0.01	0.42	0.12	0.54
	Selenium	ND	4.3	1.4	0.84	--	0.13	1.0	0.61	1.8	--	0.07	0.51	0.31	0.88
	Vanadium	ND	37.4	0.13	0.14	--	0.96	0.08	0.09	1.1	--	0.48	0.04	0.04	0.56
U5	Selenium	4	0.51	ND	1.4	<0.01	0.02	--	1.0	1.0	<0.01	<0.01	--	0.51	0.52
	Vanadium	ND	46.3	ND	0.21	--	1.2	--	0.13	1.3	--	0.59	--	0.06	0.66
U7	Selenium	ND	ND	ND	1.5	--	--	--	1.1	1.1	--	--	--	0.55	0.55
	Vanadium	ND	36.9	ND	0.24	--	0.94	--	0.15	1.1	--	0.47	--	0.07	0.55
U8	Copper	ND	24	ND	19.9	--	0.05	--	1.0	1.1	--	0.02	--	0.35	0.36
	Vanadium	1.8	40.3	ND	0.17	<0.01	1.0	--	0.1	1.1	<0.01	0.52	--	0.05	0.57
U9	Vanadium	ND	39.2	ND	0.28	--	1.0	--	0.17	1.2	--	0.5	--	0.09	0.6
U10	Copper	ND	27.4	ND	27.8	--	0.06	--	1.5	1.5	--	0.02	--	0.48	0.5
	Vanadium	1.1	38.8	ND	0.13	<0.01	0.99	--	0.08	1.1	<0.01	0.5	--	0.04	0.54

= Hazard quotient greater than 1.0.

[a] Concentrations and hazard quotients are in terms of central tendency exposures unless otherwise noted.
[b] Water HQ + sediment HQ + aquatic invertebrate HQ + clam HQ.

= = not applicable
COPEC = contaminant of potential ecological concern
fw = fresh weight
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
ND = nondetect
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 6-125. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for Kingbird (Insectivore). (2 Pages)

Site Name	COPEC	Concentration [a]		NOAEL HQ			LOAEL HQ		
		Surface Water (µg/L)	Aquatic Invertebrate (mg/kg-fw)	Surface Water	Aquatic Invertebrate	Sum [b]	Surface Water	Aquatic Invertebrate	Sum [b]
Reference Site									
Beverly Reference 1	Barium	32.9	66	<0.01	1.8	1.8	<0.01	0.92	0.92
	Copper	ND	21.2	--	3.0	3.0	--	1.0	1.0
	Selenium	ND	0.81	--	1.6	1.6	--	0.81	0.81
Beverly Reference 2	Copper	ND	10.5	--	1.5	1.5	--	0.51	0.51
	Selenium	ND	0.57	--	1.1	1.1	--	0.57	0.57
	Vanadium	ND	0.63	--	1.1	1.1	--	0.53	0.53
Ref 11	Barium	29.9	36.6	<0.01	1.0	1.0	<0.01	0.51	0.51
	Copper	ND	14.9	--	2.1	2.1	--	0.72	0.72
	Selenium	ND	0.52	--	1.0	1.0	--	0.52	0.52
Ref 12	Barium	30.4	44.2	<0.01	1.2	1.2	<0.01	0.61	0.61
	Copper	ND	25.7	--	3.7	3.7	--	1.2	1.2
Ref 13	Copper	ND	29.4	--	4.2	4.2	--	1.4	1.4
Ref 14	Copper	ND	20.6	--	3.0	3.0	--	0.99	0.99
	Selenium	ND	0.62	--	1.2	1.2	--	0.62	0.62
Ref 16	Barium	32.6	53.3	<0.01	1.5	1.5	<0.01	0.74	0.74
	Copper	1.5	24.4	<0.01	3.5	3.5	<0.01	1.2	1.2
	Selenium	ND	0.72	--	1.4	1.4	--	0.72	0.72
Ref 300-1	Barium	30.6	68.6	<0.01	1.9	1.9	<0.01	0.96	0.96
	Copper	2.3	15.1	<0.01	2.2	2.2	<0.01	0.73	0.73
Ref 300-2	Copper	1.4	12.6	<0.01	1.8	1.8	<0.01	0.61	0.61
Study Site									
100-B/C Decision Area									
100-B/C Pilot	Copper	0.741 (RME)	10.8 (RME)	<0.01 (RME)	1.6	1.6	<0.01	0.52	0.52
	Nickel	1.18 (RME)	49.3 (RME)	<0.01 (RME)	4.3	4.3	<0.01	2.5	2.5
	Selenium	0.256 (RME)	0.59 (RME)	<0.01 (RME)	1.2	1.2	<0.01	0.59	0.59
2a	Barium	29.9	65.2	<0.01	1.8	1.8	<0.01	0.91	0.91
	Copper	ND	23.5	--	3.4	3.4	--	1.1	1.1
	Selenium	ND	0.69	--	1.4	1.4	--	0.69	0.69
2b	Barium	34.5	53.9	<0.01	1.5	1.5	<0.01	0.75	0.75
	Copper	ND	24.3	--	3.5	3.5	--	1.2	1.2
	Selenium	ND	0.56	--	1.1	1.1	--	0.56	0.56
	Vanadium	ND	0.68	--	1.2	1.2	--	0.58	0.58
100-K Decision Area									
2c	Barium	32.1	79.4	<0.01	2.2	2.2	<0.01	1.1	1.1
	Copper	ND	30.7	--	4.4	4.4	--	1.5	1.5
	Selenium	ND	0.72	--	1.4	1.4	--	0.72	0.72
100-N Decision Area									
Sr5	Barium	34.2	38.1	<0.01	1.1	1.1	<0.01	0.53	0.53
	Copper	1.4	32.6	<0.01	4.7	4.7	<0.01	1.6	1.6
	Selenium	ND	0.68	--	1.4	1.4	--	0.68	0.68

Table 6-125. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for Kingbird (Insectivore). (2 Pages)

Site Name	COPEC	Concentration [a]		NOAEL HQ			LOAEL HQ		
		Surface Water (µg/L)	Aquatic Invertebrate (mg/kg-fw)	Surface Water	Aquatic Invertebrate	Sum [b]	Surface Water	Aquatic Invertebrate	Sum [b]
100-D/100-H Decision Area									
2f	Barium	34.6	39.8	<0.01	1.1	1.1	<0.01	0.55	0.55
	Copper	2.8	27.8	<0.01	4.0	4.0	<0.01	1.3	1.3
	Selenium	ND	0.51	--	1.0	1.0	--	0.51	0.51
2i	Copper	ND	9.5	--	1.4	1.4	--	0.45	0.45
	Selenium	ND	0.54	--	1.1	1.1	--	0.54	0.54
100-F/100-IU-2/100-IU-6 Decision Area									
2j	Barium	29.7	73.3	<0.01	2.1	2.1	<0.01	1.0	1.0
	Copper	ND	26.6	--	3.8	3.8	--	1.3	1.3
	Selenium	ND	2.3	--	4.6	4.6	--	2.3	2.3
2l	Copper	ND	12.5	--	1.8	1.8	--	0.60	0.60
	Selenium	ND	0.61	--	1.2	1.2	--	0.61	0.61
3b	Barium	36.5	64	<0.01	1.8	1.8	<0.01	0.89	0.89
	Copper	ND	27.8	--	4.0	4.0	--	1.3	1.3
	Selenium	ND	0.75	--	1.5	1.5	--	0.75	0.75
4a	Barium	33.6	60.3	<0.01	1.7	1.7	<0.01	0.84	0.84
	Copper	1.4	24.9	<0.01	3.6	3.6	<0.01	1.2	1.2
	Selenium	ND	0.66	--	1.3	1.3	--	0.66	0.66
300 Area Decision Area									
5c	Barium	34.5	40.4	<0.01	1.1	1.1	<0.01	0.56	0.56
	Copper	0.88	14.2	<0.01	2.0	2.0	<0.01	0.68	0.68
5d	Copper	ND	13.9	--	2.0	2.0	--	0.66	0.66
	Selenium	ND	0.62	--	1.2	1.2	--	0.62	0.62
	Vanadium	ND	0.75	--	1.3	1.3	--	0.63	0.63
U1	Copper	2.6	18.8	<0.01	2.7	2.7	<0.01	0.90	0.90
	Selenium	ND	0.68	--	1.4	1.4	--	0.68	0.68
U2	Copper	1.5	22.5	<0.01	3.2	3.2	<0.01	1.1	1.1
	Selenium	ND	1.6	--	3.2	3.2	--	1.6	1.6
U3	Copper	ND	10.8	--	1.6	1.6	--	0.52	0.52
	Selenium	ND	0.96	--	1.9	1.9	--	0.97	0.97
U4	Barium	33.2	48.5	<0.01	1.4	1.4	<0.01	0.68	0.68
	Copper	1.5	23.9	<0.01	3.4	3.4	<0.01	1.2	1.2
	Selenium	ND	1.4	--	2.8	2.8	--	1.4	1.4

= Hazard quotient greater than 1.

[a] Concentrations and hazard quotients are in terms of central tendency exposures unless otherwise noted.
[b] Water HQ + sediment HQ + aquatic invertebrate HQ + clam HQ.

-- = not applicable
COPEC = contaminant of potential ecological concern
fw = fresh weight
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
ND = not detected
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 6-126. Contaminants of Potential Ecological Concern with Hazard Quotient >1 for Mink (Piscivore).

Site Name	COPEC	Concentration [a]			NOAEL HQ				LOAEL HQ			
		Surface Water (µg/L)	Sediment (mg/kg)	Fish (mg/kg)	Surface Water	Sediment	Fish	Sum [b]	Surface Water	Sediment	Fish	Sum [b]
Reference Site												
Beverly Reference 1	Aluminum	108	6,680	6.2	<0.01	16	0.62	17	<0.01	1.6	0.06	1.7
Beverly Reference 2	Aluminum	109	5,590	39.8	<0.01	13	4.0	17	<0.01	1.3	0.40	1.7
	Selenium	ND	ND	0.81	--	--	1.1	1.1	--	--	0.73	0.73
Ref 11	Aluminum	72.4	6,310 (RME)	ND	<0.01	15	--	15	<0.01	1.5	--	1.5
Ref 14	Aluminum	31.9	7,150	36	<0.01	17	3.7	21	<0.01	1.7	0.37	2.1
Ref 16	Aluminum	34.4	4,370	22.9	<0.01	10	2.3	13	<0.01	1.04	0.23	1.3
Ref 300-1	Aluminum	28.6	7,480	15.7 (RME)	<0.01	18	1.6	19	<0.01	1.8	0.16	1.9
	Selenium	ND	ND	0.72 (RME)	--	--	1.0	1.0	--	--	0.69	0.69
Study Site												
100-B/C Decision Area												
2a	Aluminum	ND	4,690	15.1	--	11	1.5	13	--	1.1	0.15	1.3
2b	Aluminum	35.6	3,870	16.7	<0.01	9.2	1.7	11	<0.01	0.92	0.17	1.1
100-K Decision Area												
100-K Low	Aluminum	ND	5,510	25.8	--	13	2.6	16	--	1.3	0.26	1.6
100-K Elevated	Nickel	1.3	12.6	125 (RME)	<0.01	0.03	14	14	<0.01	0.02	7.1	7.1
2c	Aluminum	ND	4,180	18	--	10	1.8	12	--	1.0	0.18	1.2
100-N Decision Area												
Sr5	Aluminum	33.1	10,100	13.9	<0.01	24	1.4	25	<0.01	2.4	0.14	2.5
100-D/100-H Decision Area												
2f	Aluminum	40.3	5,220	17.8	<0.01	12	1.8	14	<0.01	1.2	0.18	1.4
100-F/100-IU-2/100-IU-6 Decision Area												
2j	Aluminum	ND	2,600	27.8	--	6.2	2.8	9.0	--	0.62	0.28	0.90
	Antimony	ND	ND	0.38	--	--	1.2	1.2	--	--	0.12	0.12
2l	Aluminum	59.9	5,010	35.2	<0.01	12	3.5	15	<0.01	1.2	0.35	1.5
2m	Aluminum	ND	5,330	58.9	--	13	5.9	19	--	1.3	0.59	1.9
	Antimony	ND	ND	0.31	--	--	1.0	1.0	--	--	0.10	0.10
3b	Aluminum	203	6,070	10.6	0.01	14	1.1	16	<0.01	1.4	0.11	1.6
4a	Aluminum	47.4	3,370	11	<0.01	8.0	1.1	9.1	<0.01	0.80	0.11	0.91
4c	Aluminum	45	2,920	11.1	<0.01	7.0	1.1	8.1	<0.01	0.70	0.11	0.81
300 Area Decision Area												
300 Low	Selenium	ND	ND	0.83	--	--	1.1	1.1	--	--	0.75	0.75
5c	Aluminum	37	2,910	16	<0.01	6.9	1.6	8.5	<0.01	0.69	0.16	0.85
5d	Aluminum	23.1	4,450	9.6	<0.01	11	0.97	12	<0.01	1.1	0.10	1.2

= Hazard quotient greater than 1.0.

[a] Concentrations and hazard quotients are in terms of central tendency exposures unless otherwise noted.
[b] Water HQ + sediment HQ + aquatic invertebrate HQ + clam HQ.

-- = not applicable
COPEC = contaminant of potential ecological concern
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
ND = not detected
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 6-127. Summary of Risk Characterization for Middle Trophic-Level Birds and Mammals.

Receptor	Line of Evidence	Weight	Effect	Summary
Birds	Exposure evaluation of bufflehead (clams and aquatic invertebrates)	Medium	NOAEL- and LOAEL-based HQs were greater than 1, thus a potential for adverse effects.	There is potential for adverse effects based on the exposure evaluation.
	Exposure evaluation of kingbird (invertebrates)	Medium	NOAEL- and LOAEL-based HQs were greater than 1, thus a potential for adverse effects.	
	Measured concentration in bird crops	Low	Inorganic chemicals were measured in bird crops; concentrations were more consistent with aquatic than terrestrial invertebrates. Thus, exposure to birds is predominantly from aquatic macroinvertebrates.	
Mammals	Exposure evaluation of mink (fish)	Medium	NOAEL- and LOAEL-based HQs were greater than 1, thus a potential for adverse effects.	There is potential for adverse effects based on the exposure evaluation.

HQ = hazard quotient
LOAEL = lowest observable adverse effect level
NOAEL = no observable adverse effect level

Table 6-128. Uncertainty Analysis for Middle Trophic-Level Vertebrates.

Attributes	Question	Observations	Impact on Assessment
Literature toxicity information	Is dietary exposure from study sites greater than toxicity reference values?	Uncertainties associated with modeled exposure include: • Measuring media (tissue, sediment, water) concentrations • Extent to which modeled intake for representative receptors reflects actual intake for organisms onsite • Difference in contaminant uptake for in situ clams versus clams deployed in sleeves • Toxicity information is lacking for some COPECs • Effect levels for metals are based on bioavailable forms. For example, Menzie et al. (2008) present an example study involving barium toxicity and chemical form showing that the most stable form in the environment is also the least toxic.	Some COPECs may act synergistically and therefore the potential for effects or risks could be understated. Literature toxicity data missing for some COPECs, thus risk could be underestimated. The measured tissue concentrations may not match the diets of these species. For example mink likely do not commonly eat sculpins. Risks are likely overestimated. In the case of the kingbirds, the crop content concentrations matched the aquatic invertebrate levels and suggested the diet was realistic. Risks could be underestimated for certain COPECs. Bioavailability could be greatly overestimated as would the potential for adverse effects in the near-shore environment.

COPEC = contaminant of potential ecological concern

Table 6-129. Summary of Near-Shore Middle Trophic-Level Risk Results for All Contaminants of Potential Ecological Concern.

COPEC	COPC Refinement Status (Table 6-74)						Exposure Evaluation Based on Sediment, Surface Water, and Food	Notes
	Sediment	Pore Water	Invertebrate Tissue	Clam Tissue	Fish Organ	Fish Tissue		
Aluminum	No	No	No	Yes	No	No	NOAEL- and LOAEL-based HQs are greater than 1 at both study sites and reference sites	Identified as key COPEC based on LOAEL comparison
Antimony	No	No	No	No	Yes	No	NOAEL-based HQ >1 at study sites only, LOAEL-based HQ<1	Identified as key COPEC based on NOAEL comparison
Barium	No	No	No	Yes	No	No	NOAEL- based HQs are greater than 1 at study sites and reference sites, LOAEL-based HQ >1 at study sites only	Identified as key COPEC based on LOAEL comparison
Cadmium	Yes, outliers	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	No significant findings
Calculated total uranium	Yes	Yes	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	No significant findings
Chromium	Yes	Yes	No	Yes	No	Yes	NOAEL- and LOAEL-based HQs are greater than 1 at study sites only	Identified as key COPEC based on LOAEL comparison
Copper	No	No	No	Yes	No	No	NOAEL- and LOAEL-based HQs are greater than 1 at study sites and reference sites	Identified as key COPEC based on LOAEL comparison
Hexavalent chromium	Yes	Yes	Not measured	Not measured	Not measured	Not measured	NOAEL- and LOAEL-based HQs are less than 1	No significant findings
Lead	Yes, outliers	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	No significant findings
Manganese	No	No	No	Yes	No	No	NOAEL- and LOAEL-based HQs are less than 1	No significant findings
Mercury	Yes, outliers	No	No	Yes	No	No	NOAEL-based HQ >1 at study sites and reference sites, LOAEL-based HQ<1	Identified as key COPEC based on NOAEL comparison
Nickel	No	No	No	No	No	Yes	NOAEL- and LOAEL-based HQs are greater than 1 at study sites only	Identified as key COPEC based on LOAEL comparison
Nitrogen in nitrate	Yes, outliers	No	Not measured	Not measured	Not measured	Not measured	NOAEL- and LOAEL-based HQs are less than 1	No significant findings
Nitrogen in nitrite	Yes	No	Not measured	Not measured	Not measured	Not measured	NOAEL- and LOAEL-based HQs are less than 1	No significant findings
Phosphorus	No	Yes, outliers	No	Yes	No	No	No NOAEL or LOAEL	No significant findings
Selenium	No	No	No	No	No	Yes	NOAEL- and LOAEL-based HQs are greater than 1 at study sites and reference sites	Identified as key COPEC based on LOAEL comparison
Strontium (elemental)	No	No	No	Yes	No	Yes	NOAEL- and LOAEL-based HQs are less than 1	No significant findings
Tin	No	No	No	No	Yes	No	NOAEL- and LOAEL-based HQs are less than 1	No significant findings
Titanium	Yes	Not measured	No	No	No	No	No NOAEL or LOAEL	No significant findings
Uranium (inorganic)	No	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	No significant findings
Vanadium	No	No	No	Yes	No	No	NOAEL- based HQ are greater than 1 at study sites	Identified as key COPEC based on NOAEL comparison
Zinc	No	No	Yes	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	No significant findings

= COPECs have dose greater than the NOAEL or LOAEL and HQ at study sites is greater than reference sites.

COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
NOAEL = no observable adverse effect level

Table 6-130. Summary of Near-Shore Risk Results for Key Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status			Aquatic Plant Risk Results	Aquatic Invertebrate Risk Results	Amphibian Risk Results	Fish Risk Results	Wildlife Risk Results	Conclusions
	Sediment	Pore Water	Tissue						
Aluminum	No	No	Yes	Sediment concentrations less than the benchmark; pore-water concentrations greater than criterion at study sites and reference sites (three times greater at study sites). No trends with bioassays.	Sediment concentrations less than the benchmark; pore-water concentrations greater than criterion at study sites and reference sites (three times greater at study sites). No trends with bioassays.	Pore-water concentrations greater than criterion at study sites and reference sites (three times greater at study sites), no trends with bioassay.	Pore-water concentrations greater than criterion at study sites and reference sites (three times greater at study sites), no tissue effect levels.	NOAEL- and LOAEL-based HQs are greater than 1 at both study sites and reference sites.	Based on pore-water concentrations greater than criterion and wildlife LOAEL-based HQs greater than 1, evaluate this COPEC further in Section 8.0.
Antimony	No	No	Yes	Sediment concentrations greater than the benchmark at study sites only; pore-water concentrations less than criterion. Insufficient data to evaluate bioassay trends.	Sediment concentrations greater than the benchmark at study sites only; pore-water concentrations less than criterion. No trends with bioassays.	Pore-water concentrations less than criterion, insufficient data to evaluate bioassay trends.	Pore-water concentrations less than criterion, no tissue effect levels.	NOAEL-based HQ >1 at study sites only, LOAEL-based HQ<1.	Based on sediment concentrations greater than the benchmark evaluate this COPEC further in Section 8.0.
Barium	No	No	Yes	Sediment concentrations greater than the benchmark at study sites only; pore-water concentrations less than benchmarks. No negative trends with bioassays.	Sediment concentrations greater than the benchmark at study sites only; no invertebrate benchmark for water. No negative trends with bioassays.	No amphibian benchmark, no trends with bioassay.	No fish benchmark, no tissue effect levels.	NOAEL- based HQs are greater than 1 at study sites and reference sites, LOAEL-based HQ >1 at study sites only.	Based on sediment concentrations greater than the benchmark and wildlife LOAEL-based HQs greater than 1, evaluate this COPEC further in Section 8.0.
Cadmium	Yes, outliers	No	No	Sediment concentrations greater than the benchmark at both study sites and reference sites; pore-water concentrations greater than criterion at study sites but greater than reference site concentrations. No trends with bioassays.	Sediment concentrations greater than the benchmark at both study sites and reference sites; pore-water concentrations greater than criterion at study sites but greater than reference site concentrations. No trends with bioassays.	Pore-water concentrations greater than criterion at study sites but greater than reference site concentrations, insufficient data to evaluate bioassay trends.	Pore-water concentrations greater than criterion at study sites but greater than reference site concentrations. Concentrations are greater than tissue effect levels at both reference sites and study sites.	NOAEL- and LOAEL-based HQs are less than 1.	Based on sediment concentrations greater than the benchmark evaluate this COPEC further in Section 8.0.
Calculated total uranium	Yes	Yes	No	Sediment concentrations less than the benchmark; pore-water concentrations greater than aquatic plant benchmark at study sites only. No trends with bioassays.	Sediment concentrations less than the benchmark; pore-water concentrations greater than aquatic invertebrate benchmark at study sites only. No negative trends with bioassays.	No amphibian benchmark, no trends with bioassay.	Pore-water concentrations less than fish benchmark, no tissue effect levels.	NOAEL- and LOAEL-based HQs are less than 1.	Based on pore-water concentrations greater than the benchmark evaluate this COPEC further in Section 8.0.
Chromium	Yes	Yes	Yes	Sediment concentrations greater than the benchmark at study sites only. Pore-water concentrations less than chronic criterion and acute standard at study sites. No trends with bioassays.	Sediment concentrations greater than the benchmark at study sites only; pore-water concentrations less than chronic criterion and acute standard at study sites. No trends with bioassays. Significant positive relationship in aquatic macroinvertebrates tissues.	Pore-water concentrations less than chronic criterion and acute standard at study sites, no trends with bioassay.	Pore-water concentrations less than chronic criterion and acute standard at study sites, greater than liver effect level in a reference site sample, no indication of adverse effects at study sites.	NOAEL- and LOAEL-based HQs are greater than 1 at study sites only.	Based on sediment concentrations greater than the benchmark and wildlife LOAEL-based HQs greater than 1, evaluate this COPEC further in Section 8.0.
Copper	No	No	Yes	Sediment concentrations less than the benchmark; pore-water concentrations less than standard at study sites. No trends with bioassays.	Sediment concentrations less than the benchmark; pore-water concentrations less than standard at study sites, exceed standard at reference sites. No trends with bioassays.	Pore-water concentrations less than standard at study sites, exceed standard at reference sites, no trends with bioassay.	Pore-water concentrations less than standard at study sites, exceed standard at reference sites, no tissue effect levels.	NOAEL- and LOAEL-based HQs are greater than 1 at study sites and reference sites.	Based on wildlife LOAEL-based HQs greater than 1, evaluate this COPEC further in Section 8.0.
Hexavalent chromium	Yes	Yes	Not measured	No sediment benchmark; pore-water concentrations greater than standard at study sites only. Insufficient data to evaluate bioassay trends.	No sediment benchmark; pore-water concentrations greater than standard at study sites only. No negative trends with bioassays.	Pore-water concentrations greater than standard at study sites only, no trends with bioassay.	Pore-water concentrations greater than standard at study sites only, no tissue effect levels.	NOAEL- and LOAEL-based HQs are less than 1.	Based on pore-water concentrations greater than the standard evaluate this COPEC further in Section 8.0.

Table 6-130. Summary of Near-Shore Risk Results for Key Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status			Aquatic Plant Risk Results	Aquatic Invertebrate Risk Results	Amphibian Risk Results	Fish Risk Results	Wildlife Risk Results	Conclusions
	Sediment	Pore Water	Tissue						
Lead	Yes, outliers	No	No	Sediment concentrations less than the benchmark; pore-water concentrations greater than criterion at study sites but less than reference site concentrations. No trends with bioassays.	Sediment concentrations less than the benchmark; pore-water concentrations greater than criterion at study sites but less than reference site concentrations. No trends with bioassays.	Pore-water concentrations greater than criterion at study sites but less than reference site concentrations, insufficient data to evaluate bioassay trends.	Pore-water concentrations greater than criterion at study sites but less than reference site concentrations, effect levels were not exceeded.	NOAEL- and LOAEL-based HQs are less than 1.	Further evaluation is not indicated by the near-shore risk results.
Manganese	No	No	Yes	Sediment concentrations greater than the benchmark at both study sites and reference sites; pore-water concentrations greater than aquatic plant benchmark at both study sites and reference sites (approximately same magnitude of exceedance). No trends with bioassays.	Sediment concentrations greater than the benchmark at both study sites and reference sites; pore-water concentrations less than aquatic invertebrate benchmark. No negative trends with bioassays.	No amphibian benchmark, one significant negative relationship with FETAX, but second highest value is from reference site.	Pore-water concentrations greater than fish benchmark at both study sites and reference sites, no tissue effect levels.	NOAEL- and LOAEL-based HQs are less than 1.	Based on sediment and pore-water concentrations greater than the benchmark and biassay trend evaluate this COPEC further in Section 8.0.
Mercury	Yes, outliers	No	Yes	Sediment concentrations less than the benchmark; pore-water concentrations less than standard. No trends with bioassays.	Sediment concentrations less than the benchmark; pore-water concentrations less than standard; negative trends with *Hyalella* survival but no other trends with bioassays.	Pore-water concentrations less than standard, insufficient data to evaluate bioassay trends.	Pore-water concentrations less than standard, tissue effect levels were not exceeded.	NOAEL-based HQ >1, LOAEL-based HQ<1.	Based on biassay trend evaluate this COPEC further in Section 8.0.
Nickel	No	No	Yes	Sediment concentrations less than the benchmark; pore-water concentrations less than criterion. No trends with bioassays.	Sediment concentrations less than the benchmark; pore-water concentrations less than criterion. No trends with bioassays.	Pore-water concentrations less than criterion, insufficient data to evaluate bioassay trends.	Pore-water concentrations less than criterion. Concentrations are greater than tissue effect levels at both reference sites and study sites.	NOAEL- and LOAEL-based HQs are greater than 1 at study sites only.	Based on wildlife LOAEL-based HQs greater than 1, evaluate this COPEC further in Section 8.0.
Nitrogen in nitrate	Yes, outliers	No	Not measured	No sediment benchmark; pore-water concentrations less than aquatic plant benchmark. No negative trends with bioassays.	No sediment benchmark; pore-water concentrations greater than aquatic invertebrate benchmark at study sites but less than reference site concentrations. No negative trends with bioassays.	Pore-water concentrations less than amphibian benchmark, no trends with bioassay.	Pore-water concentrations greater than fish benchmark at study sites but less than reference site concentrations, no tissue effect levels.	NOAEL- and LOAEL-based HQs are less than 1.	Further evaluation is not indicated by the near-shore risk results.
Nitrogen in nitrite	Yes	No	Not measured	No sediment benchmark; not detected in pore water. No negative trends with bioassays.	No sediment benchmark; not detected in pore water. No negative trends with bioassays.	Not detected in pore water.	Not detected in pore water, no tissue effect levels.	NOAEL- and LOAEL-based HQs are less than 1.	Further evaluation is not indicated by the near-shore risk results.
Phosphorus	No	Yes	Yes	Sediment concentrations greater than the benchmark at study sites but less than reference site concentrations; pore-water concentrations less than aquatic plant benchmark. No negative trends with bioassays.	Sediment concentrations greater than the benchmark at study sites but less than reference site concentrations; no aquatic invertebrate benchmark. No trends with bioassays.	No amphibian benchmark, negative relationships with FETAX, but highest value is from reference site (Beverly Reference Site 2).	Pore-water concentrations less than fish benchmark, no tissue effect levels.	No NOAEL or LOAEL.	Further evaluation is not indicated by the near-shore risk results.
Selenium	No	No	Yes	Sediment concentrations greater than the benchmark at study sites; pore-water concentrations less than criterion at study sites, exceed criterion at reference sites. Insufficient data to evaluate bioassay trends.	Sediment concentrations greater than the benchmark at study sites; pore-water concentrations less than criterion at study sites exceed criterion at reference sites. No trends with bioassays.	Pore-water concentrations less than criterion at study sites, exceed criterion at reference sites; insufficient data to evaluate bioassay trends.	Pore-water concentrations less than criterion at study sites, exceed criterion at reference sites, between tissue effect NOEC and LOEC for liver and whole fish.	NOAEL- and LOAEL-based HQ > 1 HQs are greater than 1 at study sites.	Based on sediment concentrations greater than the benchmark and LOAEL-based HQs greater than 1, evaluate this COPEC further in Section 8.0.
Strontium (elemental)	No	No	Yes	No sediment benchmark; pore-water concentrations less than aquatic plant benchmark. No trends with bioassays.	No sediment or water benchmark. No negative trends with bioassays.	No amphibian benchmark, no trends with bioassay.	No fish benchmark, significant correlation between sediment and juvenile sucker kidney, no tissue effect levels.	NOAEL- and LOAEL-based HQs are less than 1.	Further evaluation is not indicated by the near-shore risk results.

Table 6-130. Summary of Near-Shore Risk Results for Key Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status			Aquatic Plant Risk Results	Aquatic Invertebrate Risk Results	Amphibian Risk Results	Fish Risk Results	Wildlife Risk Results	Conclusions
	Sediment	Pore Water	Tissue						
Tin	No	No	Yes	Sediment concentrations less than the benchmark; not detected in water. No trends with bioassays.	Sediment concentrations less than the benchmark; no aquatic invertebrate benchmark but not detected in water. Sediment concentrations less than the benchmark; no aquatic invertebrate benchmark but not detected in water.	Not detected in water, insufficient data to evaluate bioassay trends.	Not detected in water, no tissue effect levels.	NOAEL- and LOAEL-based HQs are less than 1.	Further evaluation is not indicated by the near-shore risk results.
Titanium	Yes	Not measured	No	No sediment benchmark; not measured in water. No trends with bioassays.	No sediment benchmark; not measured in water. No trends with bioassays.	Not measured in pore water.	Not measured in pore water, no tissue effect levels.	No NOAEL or LOAEL.	Further evaluation is not indicated by the near-shore risk results.
Uranium (inorganic)	No	No	No	Sediment concentrations less than the benchmark; pore-water concentrations greater than aquatic plant benchmark at study sites. Insufficient data to evaluate bioassay trends.	Sediment concentrations less than the benchmark; pore-water concentrations greater than aquatic invertebrate benchmark at study sites only. No negative trends with bioassays.	No amphibian benchmark, insufficient data to evaluate bioassay trends.	Pore-water concentrations less than fish benchmark, no tissue effect levels.	NOAEL- and LOAEL-based HQs are less than 1.	Based on pore-water concentrations greater than the benchmark evaluate this COPEC further in Section 8.0.
Vanadium	No	No	Yes	No sediment benchmark; pore-water concentrations less than aquatic plant benchmark. No trends with bioassays.	No sediment or water benchmark. No trends with bioassays.	No amphibian benchmark, no trends with bioassay.	Pore-water concentrations less than fish benchmark, no tissue effect levels.	NOAEL- based HQ >1 at study sites.and reference sites.	Further evaluation is not indicated by the near-shore risk results.
Zinc	No	No	Yes	Sediment concentrations greater than the benchmark at both study sites and reference sites; pore-water concentrations less than standard. No trends with bioassays.	Sediment concentrations greater than the benchmark at both study sites and reference sites; pore-water concentrations less than standard. No trends with bioassays.	Pore-water concentrations less than standard, no trends with bioassay.	Pore-water concentrations less than standard, no tissue effect levels.	NOAEL- and LOAEL-based HQs are less than 1.	Based on sediment concentrations greater than the benchmark evaluate this COPEC further in Section 8.0.

COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern
FETAX = Frog Embryo Teratogenesis Assay - *Xenopus*
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
NOAEL = no observable adverse effect level

Table 6-131. Summary of Near-Shore Risk Results for Assessment Endpoints. (2 Pages)

Comparison Type	Results	Key Uncertainties
Aquatic Plants		
Evidence for adverse effects based on comparison of study sites to reference sites	• No difference in Pak Choi growth at study sites compared to reference sites. • Lack of difference for bioassay measures between study sites and reference sites suggest no evidence for adverse effects.	Many pore-water samples were collected during high river flows when there would be expected to be more mixing of groundwater and surface water. The worst case mixing conditions were not consistently characterized.
Trends with COPEC concentrations	• No COPECs had relationships with bioassay measures but many confounding factors also were correlated with bioassay measures. • Cause-effect relationships based on COPECs are not evident.	
Potential for adverse effects based on comparisons of sediment or water concentrations to benchmarks or ambient water quality criteria	• Unfiltered concentrations were greater than water standards/criteria and reference concentrations for two COPECs (aluminum [study site and reference], hexavalent chromium [study site only]). Water benchmarks and reference concentrations were exceeded for three COPECs (calculated total uranium [study site only], manganese [study site and reference], and uranium [inorganic] [study site only]). Of these, calculated total uranium was elevated compared to reference sites. These observations suggest the potential for adverse effects. Sediment benchmarks and reference concentrations were exceeded for seven COPECs (antimony, barium, cadmium, chromium, manganese, selenium, and zinc) at study sites. Cadmium, manganese, phosphorous, and zinc were also exceeded at reference sites. Of all COPECs exceeding benchmarks, chromium was elevated compared to reference sites. Cadmium had an outlier at a reference site and 13 samples that exceeded the benchmark.	
Aquatic Invertebrates		
Evidence for adverse effects based on comparison of study sites to reference sites	• Decreased clam survival at study sites compared to reference sites. • No difference in *Hyalella* growth but lower survival at study sites. • No difference in *Ceriodaphnia* survival but lower reproduction for subset of study sites. • Lower survival and reproduction for bioassay measures at study sites provide evidence for adverse effects.	• Many pore-water samples were collected during high river flows when there would be expected to be more mixing of groundwater and surface water. The worst case mixing conditions were not consistently characterized. • There is uncertainty in clam or other invertebrate exposure levels based on studies that show rapid uptake and depuration of uranium.
Trends with COPEC concentrations	• One relationship (chromium) of sediment or pore water to tissue concentrations. • One COPEC (mercury in sediment) had relationship with one bioassay measure but many confounding factors also were correlated with bioassay measures. • Cause-effect relationships based on COPECs are not evident.	
Potential for adverse effects based on comparisons of sediment or water concentrations to benchmarks or ambient water quality criteria	• Unfiltered concentrations were greater than water standards/criteria and reference concentrations for two COPECs (aluminum [study site and reference], hexavalent chromium [study site only]). Invertebrate benchmarks and reference concentrations were exceeded for calculated total uranium and uranium (inorganic). Calculated total uranium was significantly elevated in pore water relative to references sites, suggesting the potential for adverse effects. Sediment benchmarks and reference concentrations were exceeded for seven COPECs. Antimony, barium, chromium and selenium exceeded benchmarks at study sites only. Of these, only chromium is statistically elevated relative to reference site sediments, which suggests the potential for adverse effects. COPECs exceeding benchmarks at both study sites and reference sites include cadmium, manganese, and zinc. Cadmium is not elevated above reference sediments but outliers and 13 sites with benchmark exceedances observed.	
Amphibians		
Evidence for adverse effects based on comparison of study sites to reference sites	• No difference in growth or survival from FETAX and greater deformity index at reference sites. • No indication of adverse effects at study sites.	Many pore-water samples were collected during high river flows when there would be expected to be more mixing of groundwater and surface water. The worst case mixing conditions were not consistently characterized.
Trends with COPEC concentrations	• Two COPECs (manganese, phosphorus) had relationships with FETAX measures. • Cause-effect relationships based on COPECs at study sites are not evident.	
Potential for adverse effects based on comparisons of water concentrations to benchmarks or ambient water quality criteria	• Concentrations were greater than water standards for hexavalent chromium at study sites only; hexavalent chromium was not detected in reference site pore-water. Concentrations were greater than water standards/criteria and reference concentrations for two COPECs (aluminum and hexavalent chromium). Amphibian benchmarks were not exceeded.	
Fish		
Evidence for adverse effects based on comparison of study sites to reference sites	• No relevant measures were planned in the RCBRA SAP.	None
Trends with COPEC concentrations	• Relationships of fish tissue concentrations to sediment concentrations for three COPECs (manganese, strontium [elemental], zinc). • No relationships of fish tissue with pore water.	
Potential for adverse effects based on comparisons of sediment or pore-water concentrations to benchmarks or ambient water quality criteria	• Concentrations were greater than water standards for hexavalent chromium at study sites only; hexavalent chromium was not detected in reference site pore water. Concentrations were greater than water standards/criteria and reference concentrations for two COPECs (aluminum and hexavalent chromium). • Fish benchmarks and reference concentrations were exceeded for manganese. Concentrations of manganese were not significantly elevated at study sites.	

Table 6-131. Summary of Near-Shore Risk Results for Assessment Endpoints. (2 Pages)

Comparison Type	Results	Key Uncertainties
Middle Trophic-Level Wildlife		
Evidence for adverse effects based on comparison of study sites to reference sites	• No relevant measures were planned in the RCBRA SAP.	None
Trends with COPEC concentrations	• No relevant measures were planned in the RCBRA SAP.	
Potential for adverse effects based on comparisons of exposure levels to NOAELs/LOAELs	• Exposures based on measured diet concentrations are greater than NOAELs for nine COPECs, thus there is a low potential for adverse effects from these analytes. • LOAELs are exceeded for six COPECs (aluminum, barium, chromium, copper, nickel and selenium), suggesting a potential for adverse effects.	

COPEC = contaminant of potential ecological concern
FETAX = Frog Embryo Teratogenesis Assay – *Xenopus*
LOAEL = lowest observable adverse effect level
NOAEL = no observable adverse effect level
RCBRA = River Corridor Baseline Risk Assessment
SAP = sampling and analysis plan

Table 7-1. Summary of Contaminants of Potential Ecological Concern for the Broad-Scale Assessment. (3 Pages)

Contaminant of Potential Ecological Concern	COPC Refinement Status [a]							COPEC Status by Environment		
	Abiotic Media				Biotic Media (Tissue)					
	Upland	Riparian	Near Shore		Upland	Riparian	Near Shore	Upland	Riparian	Near Shore
	Soil	Soil	Sediment	Pore Water						
Inorganics										
Aluminum	No	No	No	No	Invertebrate, mouse organ	Mouse organ	Clam	No	No	Yes
Antimony	Yes	No	No	No	No	No	Sucker kidney	Yes	No	Yes
Arsenic	Yes	Yes	No	No	Invertebrate	No	No	Yes	Yes	No
Barium	Yes	Yes	No	No	No	Plant, invertebrate	Clam	Yes	Yes	Yes
Boron	Yes	No	No	No	Plant	No	No	Yes	No	No
Cadmium	Yes	Yes	Yes	No	No	Invertebrate	No	Yes	Yes	Yes
Calculated total uranium	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
Chromium	Yes	Yes	Yes	Yes	No	No	Clam, sculpin	Yes	Yes	Yes
Copper	Yes	No	No	No	Invertebrate	Plant, invertebrate	Clam	Yes	Yes	Yes
Hexavalent chromium	Yes	Yes	Yes	Yes	--	--	--	Yes	Yes	Yes
Lead	Yes	Yes	Yes	No	Mouse	Mouse, mouse organ	No	Yes	Yes	Yes
Manganese	No	No	No	No	Invertebrate, mouse organ	No	Clam	Yes	No	Yes
Mercury	Yes	Yes	Yes	No	No	Invertebrate	Clam	Yes	Yes	Yes
Nickel	No	No	No	No	No	No	Sculpin	No	No	Yes
Selenium	No	No	No	No	Mouse organ	Invertebrate	Sculpin	Yes	Yes	Yes
Silver	Yes	No	No	No	No	Invertebrate	No	Yes	Yes	No
Strontium (elemental)	Yes	No	No	No	No	No	Clam, sculpin	Yes	No	Yes
Thallium	No	No	No	No	No	Plant	No	No	Yes	No
Tin	Yes	No	No	No	No	No	Sucker kidney	Yes	No	Yes
Titanium	--	--	Yes	No	No	No	No	No	No	Yes
Uranium (inorganic)	Yes	No	No	No	No	No	No	Yes	Yes	Yes
Vanadium	No	No	No	No	No	Invertebrate	Clam	No	Yes	Yes

Table 7-1. Summary of Contaminants of Potential Ecological Concern for the Broad-Scale Assessment. (3 Pages)

Contaminant of Potential Ecological Concern	COPC Refinement Status [a]							COPEC Status by Environment		
	Abiotic Media				Biotic Media (Tissue)					
	Upland	Riparian	Near Shore		Upland	Riparian	Near Shore	Upland	Riparian	Near Shore
	Soil	Soil	Sediment	Pore Water						
Zinc	No	Yes	No	No	Invertebrate	Plant, invertebrate	Invertebrate	Yes	Yes	Yes
Herbicide										
Dichloroprop	Yes	--	--	--	--	--	--	Yes	No	No
PAH and TPH										
Benzo[a]anthracene	Yes	No	No	No	No	No	No	Yes	No	No
Benzo[a]pyrene	Yes	No	No	No	No	No	No	Yes	No	No
Benzo[b]fluoranthene	Yes	No	No	No	No	No	No	Yes	No	No
Benzo[ghi]perylene	Yes	No	No	No	No	No	No	Yes	No	No
Benzo[k]fluoranthene	Yes	No	No	No	No	No	No	Yes	No	No
Chrysene	Yes	No	No	No	No	No	No	Yes	No	No
Dibenz[a,h]anthracene	Yes	No	No	No	No	No	No	Yes	No	No
Indeno[1,2,3-cd]pyrene	Yes	No	No	No	No	No	No	Yes	No	No
Pyrene	Yes	Yes	No	No	No	No	No	Yes	No	No
Total petroleum hydrocarbons-diesel range	--	Yes	No	No	--	--	--	No	Yes	No
PCBs										
Aroclor-1254	Yes	No	No	No	No	No	No	Yes	No	No
Aroclor-1260	Yes	Yes	No	No	No	Mouse	No	Yes	Yes	No
Aroclor-1262	Yes	--	--	--	--	--	--	Yes	No	No
Congeners: total PCB and TEC for bird and mammal	--	Yes	No	No	No	Mouse organ	No	No	Yes	No
Pesticides										
Aldrin	No	Yes	No	No	No	No	No	No	Yes	No
beta-1,2,3,4,5,6-Hexachlorocyclohexane	Yes	No	No	No	No	No	No	Yes	No	No
Dichlorodiphenyldichloro-ethylene	Yes	No	No	No	No	No	No	Yes	No	No
Dichlorodiphenyltrichloro-ethane	Yes	No	No	No	No	No	No	Yes	No	No
Dieldrin	Yes	Yes	No	No	Plant	No	No	Yes	No	No
Endosulfan I	Yes	No	No	No	No	No	No	Yes	No	No

Table 7-1. Summary of Contaminants of Potential Ecological Concern for the Broad-Scale Assessment. (3 Pages)

Contaminant of Potential Ecological Concern	COPC Refinement Status [a]							COPEC Status by Environment		
	Abiotic Media				Biotic Media (Tissue)					
	Upland	Riparian	Near Shore		Upland	Riparian	Near Shore	Upland	Riparian	Near Shore
	Soil	Soil	Sediment	Pore Water						
Endosulfan II	Yes	No	No	No	No	No	No	Yes	No	No
Endosulfan sulfate	Yes	Yes	No	No	Invertebrate	No	No	Yes	Rare plant only	No
Endrin aldehyde	No	Yes	No	No	No	No	No	No	Rare plant only	No
Methoxychlor	Yes	No	No	No	No	No	No	Yes	No	No
Phthalate										
Bis[2-ethylhexyl] phthalate	No	Yes	No	No	No	No	No	No	Yes	No
Anions										
Nitrogen in nitrate	No	No	Yes	No	--	--	--	No	No	Yes
Nitrogen in nitrite	No	No	Yes	No	--	--	--	No	No	Yes
Phosphorus	No	No	No	Yes	No	No	Clam	No	No	Yes

[a] Cells are coded based on statistical tests and narrative analysis comparing study site concentrations to reference or background concentrations. "Yes" indicates a study site concentration is greater than reference or background concentrations for that receptor group, and the COPC was determined to be a COPEC.

-- = not applicable, not analyzed
COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern
PAH = polyaromatic hydrocarbons
PCB = polychlorinated biphenyl
TEC = TCDD (2,3,7,8-Tetrachlorodibenzo-p-Dioxin) equivalent concentration
TPH = total petroleum hydrocarbons

Table 7-2. Avian Wildlife Toxicity Reference Values. (4 Pages)

COPEC	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Avian NOAEL TRV (mg/kg/d)	Selected Avian LOAEL TRV (mg/kg/d)
Aluminum	Aluminum sulfate	Carriere et al. 1986	Ringed dove	0.155	4 months	Oral in diet	Reproduction	--	--	--	109.7	--	ES/ER/TM-86/R3	--	**109.7**	--
Antimony	--	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	Arsenic oxide	*Holcman and Stibilj 1997	Chicken	1.6	19 days during reproduction	Oral in diet	Reproduction	Progeny count	NA	NA	2.24	--	OSWER Directive 9285.7-62	--	--	--
Arsenic	Sodium arsenate	Stanley et al. 1994	Mallard	1	>10 weeks	Oral in diet	Reproduction	--	--	--	9.3	40.3	--	--	**9.3**	**40.3**
Barium	Barium hydroxide	Johnson et al. 1960	1-day old chicks	0.121	4 weeks	Oral in diet	Mortality		0.1	Subchronic-chronic	20.8	41.7	ES/ER/TM-86/R3	--	**20.8**	**41.7**
Boron	--	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	Multiple forms	*Multiple studies	Multiple species	--	--	--	--	--	--	--	1.47	--	OSWER Directive 9285.7-65	Geometric mean of NOAELs for reproduction and growth	**1.47**	--
Cadmium	Cadmium sulfate	*Leach et al. 1979	Chicken	1.6	12 weeks during egg laying	Oral in diet	Reproduction	Egg production, progeny count	--	--		2.37	OSWER Directive 9285.7-65	--	--	**2.37**
Calculated total uranium	Depleted metallic	Haseltine and Sileo 1983	Black duck	1.25	6 weeks	Oral in diet	Growth, mortality, organ pathology	Mortality, body weight, blood chemistry, liver or kidney effects	0.1	Subchronic-chronic	16	--	ES/ER/TM-86/R3	--	**16**	--
Chromium (3+)	Multiple forms	*Multiple studies	Chicken	--	--	--	Reproduction and growth	--	--	--	2.66	--	OSWER Directive 9285.7-66	Geometric mean of NOAELs for reproduction and growth	**2.66**	--
Chromium (3+)	Chrome alum doceahydrate	*Haseltine et al. unpublished	Black duck	1.17	180 to 190 days	Oral in diet	Reproduction	Reproductive success	--	--	0.569	2.78	OSWER Directive 9285.7-66	Field study	--	**2.78**
Hexavalent chromium	Dichromate, sodium or potassium	Multiple studies	Chicken	NA	1 to 11 days	Food	Multiple	Multiple	--	--	0.4	--	OSWER Directive 9285.7-66	Geometric mean of NOAEL for one species	**0.4**	--
Hexavalent chromium	Dichromate, sodium or potassium	Asmatullah et al. 1999	Chicken	2.02	1 to 11 days	Food	Multiple	Multiple	--	--	--	4.02	OSWER Directive 9285.7-66	Lowest LOAEL for one species	--	**4.02**
Copper	Copper	*al Ankari et al. 1998	Chicken	1.52	84 days during egg laying	Oral in diet	Reproduction	Eggs per nest	--	--	4.05	12.1	OSWER Directive 9285.7-68	--	**4.05**	**12.1**
Lead	Lead acetate	*Edens and Garlich 1983	Chicken	1.81	4 weeks during egg laying	Oral in diet	Reproduction	Progeny count	--	--	1.63	3.26	OSWER Directive 9285.7-70	--	**1.63**	**3.26**
Manganese	Multiple forms	*Multiple studies	Multiple species	--	--	--	Reproduction and growth	--	--	--	179	--	OSWER Directive 9285.7	Geometric mean of NOAELs for reproduction and growth	**179**	--
Manganese	Manganese chloride tetrahydrate	*Southern and Baker 1983	Chicken	0.316	14 days	Oral in diet	Growth	Body weight	--	--	261	348	OSWER Directive 9285.7	--	--	**348**
Mercury	Methyl mercury	Heinz and Hoffman 1998; Heinz 1976	Mallard	1	2.5 months to 2 generations	Oral in diet	Reproduction	--	--	--	0.068	0.37	--	--	**0.068**	**0.37**
Nickel	Multiple forms	*Multiple studies	Multiple species	--	--	--	Reproduction and growth	--	--	--	6.71	--	OSWER Directive 9285.7-76	Geometric mean of reproduction and growth studies	**6.71**	--
Nickel	Nickel chloride hexahydrate	*Martinez and Diaz 1996	Chicken	1.89	42 days	Oral in diet	Growth	Body weight	--	--	--	11.5	--	Lowest bounded growth or reproductive LOAEL above the geometric mean NOAEL from EPA (2007d)	--	**11.5**
Selenium	Sodium selenite	*El-Begearmi and Combs 1982	Chicken	0.328	2 weeks	Oral in diet	Survival	Mortality	--	--	0.29	0.579	OSWER Directive 9285.7-72	--	**0.29**	**0.579**
Silver	Silver acetate	*Jensen et al. 1974	Turkey	0.662	5 weeks	Oral in diet	Growth	--	0.1	LOAEL-NOAEL	2.02	20.2	OSWER Directive 9285.7-77	--	**2.02**	**20.2**
Strontium	--	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 7-2. Avian Wildlife Toxicity Reference Values. (4 Pages)

COPEC	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Avian NOAEL TRV (mg/kg/d)	Selected Avian LOAEL TRV (mg/kg/d)
Thallium	--	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	bis(Tributyltin) oxide	Schlatterer et al. 1993	Japanese quail	0.15	6 weeks during reproduction	Oral in diet	Reproduction	Egg weight and hatchability	NA	NA	6.8	16.9	ES/ER/TM-86/R3	--	**6.8**	**16.9**
Titanium	--	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium	Depleted metallic	Haseltine and Sileo 1983	Black duck	1.25	6 weeks	Oral in diet	Growth, mortality, organ pathology	Mortality, body weight, blood chemistry, liver or kidney effects	0.1	Subchronic-chronic	16	--	ES/ER/TM-86/R3	--	**16**	--
Vanadium	Sodium metavanadate	*Hill 1979	Chicken	1.042	5 weeks	Oral in diet	Growth	Body weight	--	--	0.344	0.688	OSWER Directive 9285.7-75	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**0.344**	**0.688**
Zinc	Multiple forms	*Multiple studies	Multiple species	--	--	--	Reproduction and growth	--	--	--	66.1	--	OSWER Directive 9285.7-73	Geometric mean of reproduction and growth studies	**66.1**	--
Zinc	Zinc acetate	*Gibson et al. 1986	Chicken	2	10 weeks	Oral in diet	Reproduction	Progeny count	--	--	57.3	66.5	OSWER Directive 9285.7-73	--	--	**66.5**
Nitrate/nitrite	--	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorous	--	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	Benzo(a)anthra-cene	Beall 2007	Bobwhite quail	--	60 days	Oral in diet	Growth	--	--	--	0.65	--	--	NOAEL based on mean exposure over 60-day duration of the study	**0.65**	--
Benzo(a)anthra-cene	NA	Beall 2007	Bobwhite quail	--	60 days	Oral in diet	Growth	--	--	--	0.65	--	--	NOAEL based on mean exposure over 60-day duration of the study	**0.65**	--
Benzo(b)fluor-anthene	Benzo(a)anthra-cene	Beall 2007	Bobwhite quail	--	60 days	Oral in diet	Growth	--	--	--	0.65	--	--	NOAEL based on mean exposure over 60-day duration of the study	**0.65**	--
Benzo(ghi)-perilene	Benzo(a)anthra-cene	Beall 2007	Bobwhite quail	--	60 days	Oral in diet	Growth	--	--	--	0.65	--	--	NOAEL based on mean exposure over 60-day duration of the study	**0.65**	--
Benzo(k)fluor-anthene	Benzo(a)anthra-cene	Beall 2007	Bobwhite quail	--	60 days	Oral in diet	Growth	--	--	--	0.65	--	--	NOAEL based on mean exposure over 60-day duration of the study	**0.65**	--
Chrysene	Benzo(a)anthra-cene	Beall 2007	Bobwhite quail	--	60 days	Oral in diet	Growth	--	--	--	0.65	--	--	NOAEL based on mean exposure over 60-day duration of the study	**0.65**	--
Dibenz(ah)anthra-cene	Benzo(a)anthra-cene	Beall 2007	Bobwhite quail	--	60 days	Oral in diet	Growth	--	--	--	0.65	--	--	NOAEL based on mean exposure over 60-day duration of the study	**0.65**	--
Indeno[1,2,3-cd]-pyrene	Benzo(a)anthra-cene	Beall 2007	Bobwhite quail	--	60 days	Oral in diet	Growth	--	--	--	0.65	--	--	NOAEL based on mean exposure over 60-day duration of the study	**0.65**	--
Pyrene	Benzo(a)anthra-cene	Beall 2007	Bobwhite quail	--	60 days	Oral in diet	Growth	--	--	--	0.65	--	--	NOAEL based on mean exposure over 60-day duration of the study	**0.65**	--
Aroclor 1254	Aroclor 1254	Dahlgren et al. 1972	Ring-necked pheasant	1	17 weeks during egg laying	Oral via gelatin capsule	Reproduction	Reduced egg hatchability	0.1	LOAEL-NOAEL	0.18	1.8	ES/ER/TM-86/R3	--	**0.18**	**1.8**
Aroclor 1260	Aroclor 1254	Dahlgren et al. 1972	Ring-necked pheasant	1	17 weeks during egg laying	Oral via gelatin capsule	Reproduction	Reduced egg hatchability	0.1	LOAEL-NOAEL	0.18	1.8	ES/ER/TM-86/R3	--	**0.18**	**1.8**
Aroclor 1262	Aroclor 1254	Dahlgren et al. 1972	Ring-necked pheasant	1	17 weeks during egg laying	Oral via gelatin capsule	Reproduction	Reduced egg hatchability	0.1	LOAEL-NOAEL	0.18	1.8	ES/ER/TM-86/R3	--	**0.18**	**1.8**
TEC birds	Dioxin	NA	--	--	--	--	--	--	--	--	--	--	WAC 173-340-900, Table 749-5	--	--	**0.000014**
Total PCBs	Aroclor 1254	Dahlgren et al. 1972	Ring-necked pheasant	1	17 weeks during egg laying	Oral via gelatin capsule	Reproduction	Reduced egg hatchability	0.1	LOAEL-NOAEL	0.18	1.8	ES/ER/TM	--	**0.18**	**1.8**
Bis[2-ethylhexyl] phthalate	NA	Peakall 1974	Ringed dove	0.155	4 weeks (during reproduction)	Oral in diet	Reproduction	--	NA	--	1.1	--	ES/ER/TM	--	**1.1**	--

Table 7-2. Avian Wildlife Toxicity Reference Values. (4 Pages)

COPEC	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Avian NOAEL TRV (mg/kg/d)	Selected Avian LOAEL TRV (mg/kg/d)
Aldrin	NA	Hall et al. 1971	Ring-necked pheasant	--	6 weeks	Oral via gelatin capsule	Growth	--	0.1(for NOAEL) 0.25 (for LOAEL)	--	0.007	0.035	CHPPM 2005	Study and value selected based on an extensive review of available literature - documented in CHPPM 2005	**0.007**	**0.035**
beta-1,2,3,4,5,6-Hexachlorocyclo-hexane	Gamma hexachloro-benzene (lindane)	Chakravarty and Lahiri 1986; Chakravarty et al. 1986	Mallard	1	8 weeks	Oral intubation	Reproduction	Eggshell thickness, egg number, etc.	0.1	For interspecies uncertainty	0.571	0.857	CHPPM 2009	Study and value selected based on an extensive review of available literature - documented in CHPPM 2009	**0.571**	**0.857**
DDE	DDT	Cecil et al. 1978	Chicken	--	30 days	Oral in diet	Growth	Body weight	--	--	0.227	2.27	OSWER Directive 9285.7	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**0.227**	--
DDE	DDT	Heath et al. 1969	Mallard	--	1 year	Oral in diet	Reproduction	Reproductive success	--	--	0.563	1.892	OSWER Directive 9285.7	Value is lowest reproductive LOAEL above the NOAEL used for the EcoSSL; NOAEL is from same study	--	**1.892**
DDT	NA	Cecil et al. 1978	Chicken	--	30 days	Oral in diet	Growth	Body weight	--	--	0.227	2.27	OSWER Directive 9285.7	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**0.227**	--
DDT	NA	Heath et al. 1969	Mallard	--	1 year	Oral in diet	Reproduction	Reproductive success	--	--	0.563	1.892	OSWER Directive 9285.7	Value is lowest reproductive LOAEL above the NOAEL used for the EcoSSL; NOAEL is from same study	--	**1.892**
Dieldrin	NA	Nebeker et al. 1992	Mallard	--	24 days	Oral in diet	Growth	Body weight	--	--	0.0709	3.78	OSWER Directive 9285.7	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**0.0709**	--
Dieldrin	NA	Weise et al. 1968	Crowned guinea fowl	--	21 months	Oral in diet	Reproduction	Number of progeny	--	--	0.0671	0.223	OSWER Directive 9285.7	Value is lowest reproductive LOAEL above the NOAEL used for the EcoSSL; NOAEL is from same study	--	**0.223**
Endosulfan I	Endosulfan	Abiola 1992	Gray partridge	0.4	4 weeks (during reproduction)	Oral in diet	Reproduction	--	--	--	10	--	ES/ER/TM	--	**10**	--
Endosulfan II	Endosulfan	Abiola 1992	Gray partridge	0.4	4 weeks (during reproduction)	Oral in diet	Reproduction	--	--	--	10	--	ES/ER/TM	--	**10**	--
Endosulfan sulfate	Endosulfan	Abiola 1992	Gray partridge	0.4	4 weeks (during reproduction)	Oral in diet	Reproduction	--	--	--	10	--	ES/ER/TM		**10**	--
Endrin aldehyde	Endrin	Spann et al. 1986	Mallard	1.15	>200 days	Oral in diet	Reproduction	--	--	--	0.3	--	ES/ER/TM		**0.3**	--
Methoxychlor	Methoxychlor	Hill and Camardese 1986	Japanese quail	0.0225	5 days	Oral in diet	Survival	Survival	0.01	Acute to chronic	25.8	--	LA-UR-08-6673	Tier 3 critical study TRV	**25.8**	--
TPH - Diesel	No. 2 fuel	Szaro et al. 1981	Mallard	1	18 weeks	Oral in diet	Mortality and growth	Reduced growth	--	--	500	5,000	--	--	**500**	**5,000**

*Study information and calculated NOAELs and LOAELs for these sources were taken directly from the cited EcoSSL report developed by the EPA. All other primary sources were obtained, reviewed, and TRVs were extracted or developed from the study.
Uncertainty factors were used to adjust all measured effect concentrations to chronic NOAELS and chronic LOAELs as follows:
LOAEL to NOAEL = 0.1
Subchronic to chronic = 0.1 where: chronic = >12 weeks or during critical lifestage, subchronic = 4 to 12 weeks.
These uncertainty factors are consistent with methods used in development of the EcoSSLs (EPA 2007a) and are more conservative than uncertainty factors recommended in the Region 10 Supplemental Ecological Risk Assessment Guidance for Superfund (EPA 1997b).

-- = not applicable
COPEC = contaminant of potential ecological concern
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
EcoSSL = ecological soil screening level
EPA = U.S. Environmental Protection Agency
LANL = Los Alamos National Laboratory
LOAEL = lowest observable adverse effect level
NA = not available
NOAEL = no observable adverse effect level
TPH = total petroleum hydrocarbons
TRV = toxicity reference value

Abiola, F. A., 1992, "Ecotoxicity of Organochloride Insecticides: Effects of Endosulfan on Birds Reproduction and Evaluation of Its Induction Effects in Partridge, *Perdix perdix* L." *Rev. Vet. Med.*, 143:443-450.
al Ankari, A., H. Najib, and A. al Hozab, 1998, "Yolk and Serum Cholesterol and Production Traits, As Affected by Incorporating a Supraoptimal Amount of Copper in the Diet of the Leghorn Hen," *Br. Poult. Sci.* 39(3): 393-397.
Asmatullah, L. A. A. and A. R. Shakoori, 1999, Effect of Hexavalent Chromium on Egg Laying Capacity, Hatchability of Eggs, Thickness of Egg Shell, and Post Hatching Development of *Gallus domesticus, Asian–Australas. J. Anim. Sci.,*1999, vol. 12, pp. 944–950.
Beall, B. N., 2007, *Effects of Polycyclic Aromatic Hydrocarbons in Northern Bobwhite Quail* (Colinus virginianus), A Thesis In Environmental Toxicology Submitted to the Graduate Faculty of Texas Tech University in Partial Fulfillment of the Requirements for the Degree of Master of Sciences.
Carriere, D., K. L. Fischer, D. B. Peakall, and P. Anghern, 1986, "Effects of Dietary Aluminum in Combination with Reduced Calcium and Phosphorus on the Ring Dove (*Streptopelia risoria*)," *Water Air Soil Poll*, 30:757-764.
Cecil, H. C., S. J. Harris, and J. Bitman, 1978, "Liver Mixed Function Oxidases in Chickens: Induction by Polychlorinated Biphenyls and Lack of Induction by DDT," Arch. Environm. Contam. Toxicol., 7: 283-290.
Chakravarty, S. and P. Lahiri, 1986, "Effects of Lindane on Eggshell Characteristics and Calcium Level in the Domestic Duck," *Toxicology*, 42:245-258.
Chakravarty, S., A. Mandal, and P. Lahiri, 1986, Effect of Lindane on Clutch Size and Level of Egg Yolk Protein in Domestic Duck," *Toxicology*, 39: 93-103.
CHPPM, 2005, *Wildlife Toxicity Assessment for Aldrin*, USACHPPM Document No: 39-EJ1138-01J, U.S. Army Center for Health Promotion and Preventive Medicine.
CHPPM, 2009, *Wildlife Toxicity Assessment for hexachlorocyclohexane, USA CHPPM Document No., 87-MA02T6-05C*, U.S. Army Center for Health Promotion and Preventive Medicine..Dahlgren, R. B., R. L. Linder, and C. W. Carlson, 1972, "Polychlorinated biphenyls: Their Effects on Penned Pheasants," *Environ. Health Perspect.* 1: 89-101.
Edens, F. W. and J. D. Garlich, 1983, "Lead-Induced Egg Production Decrease in Leghorn and Japanese Quail Hens," *Poult Sci* 62: 1757-1763.
El-Begearmi, M. M. and G. F. Combs Jr., 1982, "Dietary Effects on Selenite Toxicity in the Chick," *Poult. Sci.* 61(4): 770-776.
ES/ER/TM-86/R3, 1996, Toxicological Benchmarks for Wildlife: 1996 Revision, Oak Ridge National Laboratory, Environmental Sciences Division, Oak Ridge, Tennessee.
Gibson, S. W., M. H. Stevenson, and N. Jackson, 1986, "Comparison of the Effects of Feeding Diets Supplemented with Zinc Oxide or Zinc Acetate on the Performance and Tissue Mineral Content of Mature Female Fowls," *Br. Poult. Sci.* (1986) 27(3): 391-402.
Hall, J. E., Y. A. Greichus, and K. E. Severson, 1971, "Effects of Aldrin on Young Pen-Reared Pheasants," *J. Wildlife Manage.*, 35: 429-434.
Haseltine, S. D., Sileo, L., Hoffman, D. J., and Mulhern, B. M., 1986, "Effects of chromium on reproduction and growth of black ducks. Unpublished (Cited in Eisler, 1986 & Custer Et Al., 1986).
Haseltine, S. D. and L. Sileo, 1983, "Response of American Black Ducks to Dietary Uranium: A Proposed Substitute for Lead Shot," *J. Wildl. Manage.* 47: 1124-1129.
Heath, R. G., J. W. Spann, and J. F. Kreitzer, 1969, "Marked DDE Impairment of Mallard Reproduction in Controlled Studies," *Nature.*, 224(214): 47-48.
Heinz, G. H., 1976, "Methylmercury: Second-Year Feeding Effects on Mallard Reproduction and Duckling Behavior," *J Wildl Manage* 4: 82-90.
Heinz, G. H., and D. J. Hoffman, 1998, "Methylmercury Chloride and Selenomethionine Interactions on Health and Reproduction in Mallards," *Environ Toxicol Chem* 17: 139-145.
Hill, C.H. 1979, "The Effect of Dietary Protein Levels on Mineral Toxicity in Chicks," *J Nutr.* 109 (3): 501-7.
Holeman, A. and V. Stibilj, 1997, "Arsenic Residues in Eggs from Laying Hens Fed with a Diet Containing Arsenic (iii) Oxide," *Arch. Environ. Contam. Toxicol.* (1997) 32(4): 407-410. Ref ID: 5305.
Hill, E. F. and M. B. Camardese, 1986, Lethal Dietary Toxicities of Environmental Contaminants and Pesticides to Coturnix. United States Fish and Wildlife Service: Fish and Wildlife Tech Rep 2 (NTIS PB86-176914). Laurel, MD. 154Jensen, L. S., R. P. Peterson, and L. Falen, 1974, "Inducement of Enlarged Hearts and Muscular Dystrophy in Turkey Poults with Dietary Silver," *Poultry Science.* 53(1): 57-64.
Johnson, D., Jr., A. L. Mehring, Jr., and H. W. Titus, 1960, "Tolerance of Chickens for Barium," *Proc. Soc. Exp. Biol. Med.* 104: 436-438.
LA-UR-08-6673, 2008, Ecorisk Database (Release 2.3), Los Alamos National Laboratory, Los Alamos, New Mexico.
Leach, R. M. Jr, K. W. Wang, and D. E. Baker, 1979, "Cadmium and the Food Chain: The Effect of Dietary Cadmium on Tissue Composition in Chicks and Laying Hens," *J Nutr.* 109(3): 437-43. Ref ID: 398.
Nebeker, A. V., W. L. Griffis, T. W. Stutzman, G. S. Schuytema, L. A. Carey, and S. M. Scherer, 1992, "Effects of Aqueous and Dietary Exposure of Dieldrin on Survival, Growth and Bioconcentration in Mallard Ducklings," *Environ Toxicol Chem.*, 11(5): 687-699.
OSWER Directive 9285.7-56, 2006, *Ecological Soil Screening Levels for Dieldren: Interim Final*, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-57, 2007, *Ecological Soil Screening Levels for DDT and Metabolites: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-62, 2005, *Ecological Soil Screening Levels for Arsenic: Interim Final*, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-63, 2005, *Ecological Soil Screening Levels for Barium: Interim Final*, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-65, 2005, *Ecological Soil Screening Levels for Cadmium: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-66, 2005, *Ecological Soil Screening Levels for Chromium: Interim Final*, revised 2008, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-68, 2006, *Ecological Soil Screening Levels for Copper: Interim Final*, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-70, 2005, *Ecological Soil Screening Levels for Lead: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-71, 2007, *Ecological Soil Screening Levels for Manganese: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-72, 2007, *Ecological Soil Screening Levels for Selenium: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-73, 2007, *Ecological Soil Screening Levels for Zinc: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-75, 2005, *Ecological Soil Screening Levels for Vanadium: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-76, 2007, *Ecological Soil Screening Levels for Nickel: Interim Final*, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
OSWER Directive 9285.7-77, 2006, *Ecological Soil Screening Levels for Silver: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
Peakall, D. B. 1974, "Effects of Di-N-Buylphthalate and Di-2-Ethylhexylphthalate on the Eggs of Ring Doves," *Bull. Environ. Contam. Toxicol*, 12: 698-702.
Schlatterer, B., T. M. M. Coenen, E. Ebert, R. Grau, V. Hilbig, and R. Munk, 1993, "Effects of Bis(tri-n-butyltin)oxide in Japanese Quail Exposed During Egg-laying Period: An Interlaboratory Comparison Study," *Arch Environ Contam Toxicol*, 24:440-448.
Stanley, T. R. Jr., J. W. Spann, G. J. Smith, and R. Rosscoe, 1994, "Main and Interactive Effects of Arsenic and Selenium on Mallard Reproduction and Duckling Growth and Survival," *Arch Environ Contam Toxicol* 26: 444-451.
Southern, L. L. and D. H. Baker, 1983, "Eimeria Acervulina Infection in Chicks Fed Deficient or Excess Levels of Manganese," *J. Nutr.*, 113(1): 172-7.
Spann, J. W., G. H. Heinz, and C. S. Hulse, 1986, "Reproduction and Health in Mallards Fed Endrin," *Environ Toxicol Chem*, 5:755-759.
Szaro, R. C., G. Hensler, and G. H. Heinz, 1981, "Effects of Chronic Ingestion of No. 2 Fuel Oil on Mallard Ducklings," *J. Toxicol. and Env. Hlth*, 7:789-799.
WAC 173-340-900, "Tables," *Washington Administrative Code*, as amended.
Wiese, I. H., N. C. J. Basson, J. H. Van Der Vyver, and J. H. Van Der Merwe, 1969, "Toxicology and Dynamics of Dieldrin in the Crowned Guinea-fowl, Numida Meleagris (L)," Phytophylactica., 1(3-4): 161-175.

Table 7-3. Mammalian Wildlife Toxicity Reference Values. (5 Pages)

COPEC	Form/ Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
Aluminum	Aluminum chloride	Ondreicka et al. 1966	Mouse	0.03	3 generations	Oral in water	Reproduction	Offspring growth	0.1	LOAEL-NOAEL	1.93	19.3	ES/ER/TM-86/R3	Note that soil pH must be <5.5 (OSWER Directive 9285.7-60) for Al to be bioavailable	**1.93**	**19.3**
Antimony	Antimony trichloride	*Rossi et al. 1987	Rat	0.33	31 days	Oral in water	Reproduction	Progeny body weight	--	--	0.059	0.59	OSWER Directive 9285.7-61	--	**0.059**	**0.59**
Arsenic	Sodium arsenite	*Neiger and Osweiler 1989	Dog	10.1	8 weeks	Oral in diet	Growth	Reduced body weight	--	--	1.04	1.66	OSWER Directive 9285.7-62	--		**1.66**
Barium	Multiple forms	*Multiple studies	Multiple species	--	--	--	--	--	--	--	51.8	--	OSWER Directive 9285.7- 63	Geometric mean of NOAELs for reproduction and growth	--	--
Barium	Barium chloride dihydrate	*Dietz et al. 1992	Rat	0.34	92 days	Oral in water	Growth	Reduced body weight	--	--	61	121	OSWER Directive 9285.7- 63	Lowest LOAEL in growth or reproduction endpoints below the geomean NOAEL (EcoSSL)	--	--
Barium	Barium chloride	NTP 1994	Rat	0.35	105 weeks	Oral in water	Nephrotoxicity	Increased kidney weight	--	--	45	75	--	Study selected because NOAEL is similar to EcoSSL; study is of long duration, and a LOAEL was identified	45	75
Boron	Boric acid or borax	Weir and Fischer 1972	Rat	0.35	3 generations	Oral in diet	Reproduction	Sterility	--	--	28	93.6	ES/ER/TM-86/R3	--	**28**	**93.6**
Cadmium	Cadmium acetate	*Yuhas et al. 1979	Rat	0.43	2 weeks	Oral in water	Growth	Body weight	--	--	0.77	7.7	OSWER Directive 9285.7-65	--	--	--
Cadmium	Cadmium chloride	Sutou et al. 1980	Rat	0.303	6 weeks during reproduction	Oral gavage	Reproduction	Reduced fetal survival	--	--	1	10	ES/ER/TM-86/R3	The ORNL TRV for cadmium was selected as it represents reproductive effects, is a longer study, and is comparable to the TRV used for EcoSSLs	1	10
Calculated total uranium	Uranyl acetate (61.32% U)	Paternain et al. 1989	Mouse	0.028	60 days prior to gestation, gestation, delivery, and lactation	Oral intubation	Reproduction	Pup survival and body weight	--	--	3.07	6.13	ES/ER/TM-86/R3	--	**3.07**	**6.13**
Chromium (3+)	Multiple forms	*Multiple studies	Multiple species	--	--	--	Reproduction and growth	--	--	--	2.4	--	OSWER Directive 9285.7-66	Geometric mean of NOAELs for reproduction and growth	**2.4**	--
Chromium (3+)	Chromium sulfate	*Zahid et al. 1990	Mouse	0.0249	35 days	Oral in diet	Reproduction	Sperm cell counts	0.1	LOAEL-NOAEL	0.962	9.62	OSWER Directive 9285.7-66	--	--	**9.62**
Hexavalent chromium	Multiple forms	*Multiple studies	Multiple species	--	--	--	Reproduction and growth	--	--	--	9.24	--	OSWER Directive 9285.7-66	Geometric mean of NOAELs for reproduction and growth	**9.24**	--
Hexavalent chromium	Potassium dichromate	*R.O.W. Scientists, Inc.	Mouse	0.2036	3 weeks	Oral in diet	Growth	Body weight	--	--	5.66	12	OSWER Directive 9285.7-66	--	--	--
Hexavalent chromium	Sodium dichromate	Chowdhury and Mitra 1995	Rat	0.3084	90 days	Oral gavage	Reproduction	Testes weight	--	--	20	40	OSWER Directive 9285.7-66	Lowest bounded reproductive LOAEL above the geometric mean NOAEL from EPA (2008)	--	**40**
Copper	Copper sulfate penta-hydrate	*Allcroft et al. 1961	Pig	100	4 weeks	Oral in diet	Growth	Body weight	--	--	5.6	9.34	OSWER Directive 9285.7-68	--	**5.6**	**9.34**
Lead	Lead acetate	*Kimmel et al. 1980	Rat	0.3	7 weeks during gestation	Oral in water	Growth	Body weight	--	--	4.7	8.9	OSWER Directive 9285.7-70	--	**4.7**	**8.9**
Manganese	Multiple forms	*Multiple studies	Multiple species	--	--	--	Reproduction and growth	--	--	--	51.5	--	OSWER Directive 9285.7-71	Geometric mean of NOAELs for reproduction and growth	**51.5**	--
Manganese	Manganese oxide	*Rehnberg et al. 1980	Rat	0.0566	20 days	Gavage	Reproduction, growth	Reproductive organ histology, body weight	--	--	21	71	OSWER Directive 9285.7-71	--	--	**71**
Mercury	Methyl-mercury chloride	Verschuuren et al. 1976a	Rat	0.35	3 generations	Oral in diet	Reproduction	Pup viability	--	--	0.032	0.16	ES/ER/TM-86/	--	**0.032**	**0.16**

Table 7-3. Mammalian Wildlife Toxicity Reference Values. (5 Pages)

COPEC	Form/ Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
Nickel	Nickelous chloride	*Pandey and Srivastava 2000	Mouse	0.025	35 days	Oral (other)	Reproduction	Sperm cell counts	--	--	1.7	3.4	OSWER Directive 9285.7-76	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**1.7**	**3.4**
Selenium	Sodium selenite	*Mahan and Moxon 1984	Pig	17.8	37 days	Oral in diet	Growth	Body weight	--	--	0.143	0.215	OSWER Directive 9285.7-72	--	**0.143**	**0.215**
Silver	Silver acetate	*Van Vleet 1976	Pig	8.86	40 days	Oral in diet	Growth	Body weight	0.1	LOAEL-NOAEL	6.02	60.2	OSWER Directive 9285.7-77	--	**6.02**	**60.2**
Strontium	Strontium chloride	Skoryna 1981	Rat	0.35	3 yrs	Oral in water	Growth	Body weight	--	--	263	--	ES/ER/TM-86/	--	**263**	--
Thallium	Thallium sulfate	Formigli et al. 1986	Rat	0.365	60 days	Drinking water	Reproduction	Sperm motility	0.05 and 0.25	Subchronic LOAEL-chronic NOAEL; subchronic LOAEL-chronic LOAEL	0.015	0.075	ES/ER/TM-86/; CHPPM 2007	Study and value selected based on an extensive review of available literature - documented in CHPPM 2007	**0.015**	**0.075**
Tin	bis(tibutyl-tin) oxide	Davis et al. 1987	Mouse	0.03	Days 6 to 15 of gestation	Oral intubation	Reproduction	Reduced fetal weight and fetal survival	--	--	23.4	35	ES/ER/TM-86/	--	**23.4**	**35**
Titanium	--	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium	Uranyl acetate (61.32% U)	Paternain et al. 1989	Mouse	0.028	60 days prior to gestation, gestation, delivery, and lactation	Oral intubation	Reproduction	Pup survival and body weight	--	--	3.07	6.13	ES/ER/TM-86/	--	**3.07**	**6.13**
Vanadium	Sodium orthovana-date	*Sanchez et al. 1991	Mouse	0.047	12 days during gestation	Gavage	Reproduction	Offspring development	--	--	4.16	8.31	OSWER Directive 9285.7-75	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**4.16**	**8.31**
Zinc	Various forms	*Multiple studies	Multiple species	--	--	--	Reproduction and growth	--	--	--	75.4	--	OSWER Directive 9285.7-73	Geometric mean of NOAELs for reproduction and growth	**75.4**	--
Zinc	Zinc sulfate	*Miller et al. 1989	Cattle	580	14 weeks	Oral in diet	Reproduction	Progeny body weight	--	--	37.9	75.9	OSWER Directive 9285.7-73	This is lowest LOAEL above geometric mean NOAEL	--	**75.9**
Nitrate/nitrite	Potassium nitrate	Sleight and Atallah 1968	Guinea pig	0.86	143 to 204 days	Oral in water	Reproduction	Number of live births	--	--	507	1130	ES/ER/TM-86/	Converted to "as nitrogen" based on nitrate	**114**	**255**
Phosphorus	--	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	--	Mackenzie and Angevine 1981	Mouse	0.03	Gestation days 7 to 16	Oral intubation	Reproduction	Reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/; CHPPM 2005	Study and value selected based on an extensive review of available literature - documented in CHPPM 2005	**1**	**10**
Benzo(a)anthracene	Benzo(a)-pyrene	Mackenzie and Angevine 1981	Mouse	0.03	Gestation days 7 to 16	Oral intubation	Reproduction	Reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/; CHPPM 2005	Study and value selected based on an extensive review of available literature - documented in CHPPM 2005	**1**	**10**
Benzo(b)fluor-anthene	Benzo(a)-pyrene	Mackenzie and Angevine 1981	Mouse	0.03	Gestation days 7 to 16	Oral intubation	Reproduction	Reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/; CHPPM 2005	Study and value selected based on an extensive review of available literature - documented in CHPPM 2005	**1**	**10**
Benzo(ghi)perylene	Benzo(a)-pyrene	Mackenzie and Angevine 1981	Mouse	0.03	Gestation days 7 to 16	Oral intubation	Reproduction	Reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/; CHPPM 2005	Study and value selected based on an extensive review of available literature - documented in CHPPM 2005	**1**	**10**
Benzo(k)fluor-anthene	Benzo(a)-pyrene	Mackenzie and Angevine 1981	Mouse	0.03	Gestation days 7 to 16	Oral intubation	Reproduction	Reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/; CHPPM 2005	Study and value selected based on an extensive review of available literature - documented in CHPPM 2005	**1**	**10**
Chrysene	Benzo(a)-pyrene	Mackenzie and Angevine 1981	Mouse	0.03	Gestation days 7 to 16	Oral intubation	Reproduction	Reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/; CHPPM 2005	Study and value selected based on an extensive review of available literature - documented in CHPPM 2005	**1**	**10**

Table 7-3. Mammalian Wildlife Toxicity Reference Values. (5 Pages)

COPEC	Form/ Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
Dibenz(ah)anthra-cene	Benzo(a)-pyrene	Mackenzie and Angevine 1981	Mouse	0.03	Gestation days 7 to 16	Oral intubation	Reproduction	Reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/; CHPPM 2005	Study and value selected based on an extensive review of available literature - documented in CHPPM 2005	**1**	**10**
Indeno[1,2,3-cd]pyrene	Benzo(a)-pyrene	Mackenzie and Angevine 1981	Mouse	0.03	Gestation days 7 to 16	Oral intubation	Reproduction	Reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/; CHPPM 2005	Study and value selected based on an extensive review of available literature - documented in CHPPM 2005	**1**	**10**
Pyrene	--	EPA 1989d	Mouse	0.03	13 weeks	Oral gavage	Nephropathy	--	--	--	75	125	IRIS	Verified on IRIS (http://www.epa.gov/ncea/iris/subst/-0445.htm) December 9, 2009	**75**	**125**
Aroclor 1254	Aroclor 1254	McCoy et al. 1995	Oldfield mouse	0.014	12 months	Oral in diet	Reproduction	Reduced number of litters, pup body weight, and pup survival	0.1	LOAEL-NOAEL	0.068	0.68	ES/ER/TM-86/	--	**0.068**	**0.68**
Aroclor 1260	Aroclor 1254	McCoy et al. 1995	Oldfield mouse	0.014	12 months	Oral in diet	Reproduction	Reduced number of litters, pup body weight, and pup survival	0.1	LOAEL-NOAEL	0.068	0.68	ES/ER/TM-86/	--	**0.068**	**0.68**
Aroclor 1262	Aroclor 1254	McCoy et al. 1995	Oldfield mouse	0.014	12 months	Oral in diet	Reproduction	Reduced number of litters, pup body weight, and pup survival	0.1	LOAEL-NOAEL	0.068	0.68	ES/ER/TM-86/	--	**0.068**	**0.68**
Total PCBs	Aroclor 1254	McCoy et al. 1995	Oldfield mouse	0.014	12 months	Oral in diet	Reproduction	Reduced number of litters, pup body weight, and pup survival	0.1	LOAEL-NOAEL	0.068	0.68	ES/ER/TM-86/	--	**0.068**	**0.68**
TEC mammal	Dioxin	Murray et al. 1979	Rat, Sprague-Dawley	NA	21 days	Oral in diet	Reproduction	Gestation survival index (percentage of pups alive at birth)	--	--	0.000000562	--	LA-UR-08-6673	--	**0.000000562**	--
TEC mammal	Dioxin	NA	--	--	--	--	--	--	--	--	--	--	WAC Table 749-5	--	--	**0.0000225**
Bis[2-ethylhexyl] phthalate	--	Lamb et al. 1987	Mouse	0.03	105 days (during reproduction)	Oral in diet	Reproduction	--	NA	--	18.3	183	ES/ER/TM-86/	--	**18.3**	**183**
Dichloroprop	--	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aldrin	--	Treon and Cleveland 1955	Rat	0.35	3 generations	Oral in diet	Reproduction	Number of litters and offspring mortality	NA	--	0.2	1	ES/ER/TM-86/	--	**0.2**	**1**
beta-1,2,3,4,5,6-Hexachlorocyclo-hexane	--	Van Velsen et al. 1986	Rat	0.35	13 weeks	Oral in diet	Growth, blood chemistry, organ histology	Gonadal atrophy in male and female rats	0.1	Chronic-subchronic	0.4	2	ES/ER/TM-86/	--	**0.4**	**2**
DDE	DDT	Wrenn et al. 1970	Rat	--	15 days (during gestation)	Oral gavage	Reproduction	--	--	--	0.147	0.735	OSWER Directive 9285.7-57	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**0.147**	**0.735**

Table 7-3. Mammalian Wildlife Toxicity Reference Values. (5 Pages)

COPEC	Form/ Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
DDT	--	Wrenn et al. 1970	Rat	--	15 days (during gestation)	Oral gavage	Reproduction	--	--	--	0.147	0.735	OSWER Directive 9285.7-57	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**0.147**	**0.735**
Dieldrin	--	Harr et al. 1970	Rat	--	750 days	Oral in diet	Reproduction	--	NA	--	0.015	0.03	OSWER Directive 9285.7-56	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**0.015**	**0.03**
Endosulfan I	Endosulfan	Dikshith et al. 1984	Rat	0.35	30 days (not during reproduction)	Oral intubation	Reproduction and blood chemistry	--	0.1	Chronic-subchronic	0.15	--	ES/ER/TM-86/	No effects observed at highest dose	**0.15**	--
Endosulfan II	Endosulfan	Dikshith et al. 1984	Rat	0.35	30 days (not during reproduction)	Oral intubation	Reproduction and blood chemistry	--	0.1	Chronic-subchronic	0.15	--	ES/ER/TM-86/	No effects observed at highest dose	**0.15**	--
Endosulfan sulfate	Endosulfan	Dikshith et al. 1984	Rat	0.35	30 days (not during reproduction)	Oral intubation	Reproduction and blood chemistry		0.1	Chronic-subchronic	0.15	--	ES/ER/TM-86/	No effects observed at highest dose	**0.15**	--
Endrin aldehyde	Endrin	Good and Ware 1969	Mouse	0.03	120 days (during reproduction)	Oral in diet	Reproduction	Reduced parental survival, litter size, and number of young per day	0.1	LOAEL-NOAEL	0.092	0.92	ES/ER/TM-86/	--	**0.092**	**0.92**
Methoxychlor	--	Gray et al. 1988	Rat	0.35	11 months (during reproduction)	Oral in diet	Reproduction	Fertility and litter size reduced	NA	--	4	8	ES/ER/TM-86/	--	**4**	**8**
TPH - diesel	JP-8 jet fuel	Cooper and Mattie 1996	Rat	0.35	Gestation days 6 to 15	Oral gavage	Reproduction	Adult and fetal weight; fetal mortality	--	--	1,000	1,500	--	--	**1,000**	**1,500**

*Study information and calculated NOAELs and LOAELs for these sources were taken directly from the cited EcoSSL report developed by the EPA. All other primary sources were obtained, reviewed, and TRVs were extracted or developed from the study.
Uncertainty factors were used to adjust all measured effect concentrations to chronic NOAELS and chronic LOAELs as follows:
LOAEL to NOAEL = 0.1.
Subchronic to chronic = 0.1 where: chronic = >12 weeks or during critical lifestage, subchronic = 4 to 12 weeks.
These uncertainty factors are consistent with methods used in development of the EcoSSLs (EPA 2007a) and are more conservative than uncertainty factors recommended in the Region 10 Supplemental Ecological Risk Assessment Guidance for Superfund (EPA 1997b).

-- = not applicable
COPEC = contaminant of potential ecological concern
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
EcoSSL = ecological soil screening level
EPA = U.S. Environmental Protection Agency
IRIS = Integrated Risk Information System
LOAEL = lowest observable adverse effect level
NA = not available
NOAEL = no observable adverse effect level
ORNL = Oak Ridge National Laboratory
PCB = polychlorinated biphenyl
TEC = TCDD (2,3,7,8-Tetrachlorodibenzo-p-Dioxin) equivalent concentration
TPH = total petroleum hydrocarbons
TRV = toxicity reference value
WAC = *Washington Administrative Code*

Allcroft, R., K. N. Burns, and G. Lewis, 1961, "The Effects of High Levels of Copper in Rations for Pigs," *Vet. Rec.*, 73: 714.

CHPPM, 2005, *Wildlife Toxicity Assessment for Benzo(a)pyrene*, USACHPPM Document No: 39-EJ-1138-01P, U.S. Army Center for Health Promotion and Preventive Medicine.

CHPPM, 2007, *Wildlife Toxicity Assessment for Thallium*, USACHPPM Document No: 37-EJ1138-01O, U.S. Army Center for Health Promotion and Preventive Medicine.

Cooper, J. R. and D. R. Mattie, 1996, "Developmental Toxicity of JP-8 Jet Fuel in the Rat," *J. App. Tox.*, 16: 197–200.

Davis, A., R. Barale, and G. Brun, 1987, "Evaluation of the Genetic and Embryotoxic Effects of Bis(tri-n-butyltin)oxide (TBTO), A Broad Spectrum Pesticide, in Multiple In Vivo and In Vitro Short-term Tests," *Muta Res.*, 188:65-95.

Dietz, D., D. M. R. Elwell, W. E. Davis, Jr., and E. F. Meirhenry, 1992, "Subchronic Toxicity of Barium Chloride Dihydrate Administered to Rats and Mice in the Drinking Water," Fundam. Appl. Toxicol., 19(4):527-37.

Dikshith, T. S. S., R. B. Raizada, M. K. Srivastava, and B. S. Kaphalia, 1984, "Response of Rats to Repeated Oral Administration of Endosulfan," *Industrial Health*, 22:295-304.

EPA, 1989, *Mouse Oral Subchronic Toxicity of Pyrene*, study conducted by Toxicity Research Laboratories, Muskegon, Michigan for the U.S. Environmental Protection Agency, Office of Solid Waste, Washington, DC.

ES/ER/TM-86/R3, 1996, Toxicological Benchmarks for Wildlife: 1996 Revision, Oak Ridge National Laboratory, Environmental Sciences Division, Oak Ridge, Tennessee.

Formigli, L., R. Scelsi, P. Poggi, C. Gregotti, A. DiNucci, E. Sabbioni, L. Gottardi, and L. Manzo, 1986, "Thallium-Induced Testicular Toxicity in the Rat," *Environ. Res.*, 40: 531-539.

Good, E. E. and G. W. Ware, 1969, "Effects of Insecticides on Reproduction in the Laboratory Mouse, IV. Endrin and Dieldrin," *Toxicol Appl Pharmacol*, 14:201-203.

Gray, L. E., J. Ostby, R. Sigmon, J. Ferrel, R. Rehnberg, R. Linder, J. Cooper, J. Goldman, and J. Laskey, 1988, "The Development of A Protocol to Assess Reproduction Effects of Toxicants in the Rat," *Reprod Toxicol.*, 2:281-287.

Harr, J. R., Claeys, R. R., Bone, J. F., and T. W. McCorcle, 1970, "Dieldrin Toxidosis: Rat Reproduction," *Am J Vet Res.*, 31(1): 181-9.

Kimmel, C.A., L. D. Grant, C. S. Sloan, and B. C. Gladen, 1980, "Chronic Low-Level Lead Toxicity in the Rat. I. Maternal Toxicity and Perinatal Effects," *Toxicol. Appl. Pharmacol.*, 56: 28–41.

LA-UR-08-6673, 2008, Ecorisk Database (Release 2.3), Los Alamos National Laboratory, Los Alamos, New Mexico.

Lamb, J. C., IV, R. E. Chapin, J. Teague, A. D. Lawton, and J. R. Reel, 1987, "Reproductive Effects of Four Phthalic Acid Esters in the Mouse, *Toxicol. Appl. Pharmacol.*, 88: 255-269.

Mackenzie, K. M. and D. M. Angevine, 1981, "Infertility in Mice Exposed In Utero to Benzo[a]pyrene," *Bio Reprod*, 24:183-191.

Mahan, D. C. and A. L. Moxon, 1984, "Effect of Inorganic Selenium Supplementation on Selenosis in Postweaning Swine," *Journal of Animal Science*, 58(5): 1216-1221.

McCoy, G, M., F. Finlay, A. Rhone, K. James, and G. P. Cobb, 1995, "Chronic Polychlorinated Biphenyls Exposure on Three Generations of Oldfield Mice (*Permyscus polionotus*): Effects on Reproduction, Growth, and Body Residues," *Arch. Environ. Contam. Toxicol.*, 28: 431-435.

Murray, F. J., F. A. Smith, K. D. Nitschke, C. G. Humiston, R. J. Kociba, and B. A. Schwetz, 1979, Three-Generation Reproduction Study of Rats Given 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) in the Diet. Toxicol Appl Pharmacol, 50:241-252, Neiger, R. D. and G. D. Osweiler, 1989, "Effect of Subacute Low Level Dietary Sodium Arsenite on Dogs," *Fund. Appl. Toxicol.*, 13: 439-451. Ref ID: 14583.

NTP, 1994, NTP Technical Report on the Toxicology and Carcinogenesis Studies of Barium Chloride Dihydrate (CAS no.10326-27-9) in F344/N Rats and B6C3F1 Mice (Drinking Water Studies), National Toxicity Program, Research Triangle Park, North Carolina.

Ondreicka, R., E. Ginter, and J. Kortus. 1966. Chronic toxicity of aluminum in rats and mice and its effects on phosphorus metabolism. Brit. J. Indust. Med. 23: 305-313. OSWER Directive 9285.7-60, 2003, *Ecological Soil Screening Levels for Aluminum: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-56, 2006, *Ecological Soil Screening Levels for Dieldren: Interim Final*, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-57, 2007, *Ecological Soil Screening Levels for DDT and Metabolites: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-61, 2005, *Ecological Soil Screening Levels for Antimony: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-62, 2005, *Ecological Soil Screening Levels for Arsenic: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-63, 2005, *Ecological Soil Screening Levels for Barium: Interim Final*, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-65, 2005, *Ecological Soil Screening Levels for Cadmium: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-66, 2005, *Ecological Soil Screening Levels for Chromium: Interim Final*, revised 2008, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-68, 2006, *Ecological Soil Screening Levels for Copper: Interim Final*, revised 2007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-70, 2005, *Ecological Soil Screening Levels for Lead: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-71, 2007, *Ecological Soil Screening Levels for Manganese: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-72, 2007, *Ecological Soil Screening Levels for Selenium: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-73, 2007, *Ecological Soil Screening Levels for Zinc: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-75, 2005, *Ecological Soil Screening Levels for Vanadium: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-76, 2007, *Ecological Soil Screening Levels for Nickel: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

OSWER Directive 9285.7-77, 2006, *Ecological Soil Screening Levels for Silver: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

Pandey, R., R. Kumar, S. P. Singh, and S. P. Srivastava, 1999, *Toxic Effects of Nickel Sulphate on Embryonic Mice,* Journal of Advanced Zoology. 20 (1): 10-11.

Paternain, J. L., J. L. Domingo, A. Ortega, and J. M. Llobet, 1989, "The Effects of Uranium on Reproduction, Gestation, and Postnatal Survival in Mice," *Ecotoxicol. Environ. Saf.*, 17: 291-296.

Rehnberg, G. L., J. F. Hein, S. D. Carter, and J. W. Laskey, 1980, "Chronic Manganese Oxide Administration to Preweanling Rats: Manganese Accumulation and Distribution," *J Toxicol Environm Health*, 6: 217-226.

Rossi, F., R. Acampora, C. Vacca, S. Maione, M. G. Matera, R. Servodio, and E. Marmo, 1987, "Prenatal and Postnatal Antimony Exposure in Rats: Effect on Vasomotor Reactivity Development of Pups," *Teratog. Carcinog. Mutagen.*, 7(5): 491-496.

ROW Scientists, Inc. 1996. Final report on the reproductive toxicity of potassium dichromate (hexavalent) (CAS NO. 7778-50-9) administered in diet to SD rats. 26 Dec 1996. PB97125355. National Toxicology Program RACB95001. 177 p. Ref ID: 25925 Sanchez, D. J., Gomez, M., Domingo, J. L., Llobet, J. M., and Corbella, J. 1992. maternal and developmental toxicity of metavanadate in mice. Met. Ions Biol. Med. Proc. Int. Symp., 2nd : 319-20. Editor(s): Anastassopoulou, Jane. Publisher: Libbey, Montrouge, Fr.

Skoryna, S. C., 1981, "Effects of Oral Supplementation with Stable Strontium," *Can Med Assoc J*, 125:703-712.

Sleight, S. D. and O. A. Atallah, 1968, "Reproduction in the Guinea Pig as Affected by Chronic Administration of Potassium Nitrate and Potassium Nitrite," *Toxicol Appl Pharmacol*, 12:179-185.

Sutou, S., K. Yamamoto, H. Sendota, and M. Sugiyama, 1980, "Toxicity, Fertility, Teratogenicity, and Dominant Lethal Tests in Rats Administered Cadmium Subchronically, I. Fertility, Teratogenicity, and Dominant Lethal Tests," Ecotox Environ Safe 4:51-56.

Treon, J. F. and F. P. Cleveland, 1955, "Toxicity of Certain Chlorinated Hydrocarbon Insecticides for Laboratory Animals, With Special Reference to Aldrin and Dieldrin," *Ag. Food Chem.*, 3: 402-408.

Van Velsen, F. L., L. H. J. C. Danse, F. X. R. Van Leeuwen, J. A. M. A. Dormans, and M. J. Van Logten, 1986,*The Subchronic Oral Toxicity of the Beta-Isomer of Hexachlorocyclohexane in Rats*, Fund. Appl. Toxicol. 6: 697-712. Verschuuren, H. G., R. Kroes, E. M. Den Tonkelaar, J. M. Berkvens, P. W. Helleman, A. G. Rauws, P. L. Schuller, and G. J. Van Esch, 1976, "Toxicity of Methyl Mercury Chloride in Rats. II. Reproduction Study," *Toxicol.*, 6: 97-106.

WAC 173-340-900, "Tables," *Washington Administrative Code*, as amended.

Weir, R. J. and R. S. Fisher, 1972, "Toxicological Studies on Borax and Boric Acid," *Toxicol Appl Pharmacol*, 23:351-364.

Wrenn, T. R., J. R. Weyant, G. F. Fries, and J. Bitman, 1971, "Effect of Several Dietary Levels of o,p'-DDT on Reproduction and Lactation in the Rat," *Bull. Environ. Contam. Toxicol.*, 6(5): 471-80.

Yuhas, E. M., Schnell, R. C., and Miya, T. S., 1979, "Dose-Related Alterations in Growth and Mineral Disposition by Chronic Oral Cadmium Administration in the Male Rat," *Toxicology*, 12(1): 19-29. Ref ID: 776.

Zahid, Z. R., Z. S. Al Hakkak, A. H. H. Kadhim, E. A. Elias, and I. S. Al Jumaily, 1990, "Comparative Effects of Trivalent and Hexavalent Chromium on Spermatogenesis of the Mouse," *Toxicol. Environ. Chem.*, 25(2-3): 131-136.

Table 7-4. Summary of Soil, Sediment, and Surface Water Data Sources and the Associated Exposure Groups Evaluated in the Broad-Scale Assessment.

Data Source	Exposure Group
Upland Soil	
Reference Site Exposure Groups	
RCBRA	Backfill Reference
	Native-Soil Reference
Study Site Exposure Groups	
100-B/C Pilot	Combined [a] Backfilled Waste Site
RCBRA	
RCBRA	Native Soil Waste Site
Riparian Soil	
Reference Site Exposure Group	
RCBRA	Reference
Study Site Exposure Group	
100-B/C Pilot	Combined: [a] 100-B/C Pilot, RCBRA Study Sites
100-NR-2	
RCBRA	
Sediment	
Reference Site Exposure Group	
RCBRA	Reference
Study Site Exposure Group	
100-B/C Pilot	Combined: [a] 100-B/C Pilot, RCBRA Study Sites
100-NR-2	
RCBRA	
Surface Water	
Reference Site Exposure Group	
RCBRA	Reference
Study Site Exposure Group	
100-B/C Pilot	Combined: [a] 100-B/C Pilot, RCBRA Study Sites
100-NR-2	
RCBRA	

[a] Combined refers to sample results collected as part of the 100-B/C Pilot or 100-NR-2 can be combined with other samples results; for example, the upland 100-B/C Pilot samples were collected from study sites associated with remediated backfill waste sites and can be combined with other remediated backfill waste sites for evaluating broad-scale ecological exposures.

RCBRA = River Corridor Baseline Risk Assessment

Table 7-5. Summary of Aquatic Invertebrate Data Sources, Taxa, Tissue Type, and the Associated Exposure Groups Evaluated in the Broad-Scale Assessment.

Biota Media Tissue	Data Source	Exposure Group	Evaluated for Broad-Scale Exposures?
Caddisfly			
Whole organism	100-B/C Pilot	Study Site	Yes
Crayfish			
Carcass	100-B/C Pilot	Not Evaluated	No
Hepatopancreas			No
Offal			No
Aquatic Invertebrate [a]			
Multiple whole organism	RCBRA	Study Site	Yes
Multiple whole organism	RCBRA	Reference	Yes

[a] Aquatic invertebrate tissue data may also include crayfish
RCBRA = River Corridor Baseline Risk Assessment

Table 7-6. Summary of Fish Data Sources, Taxa, Tissue Type, and the Associated Exposure Groups Evaluated in the Broad-Scale Assessment. (2 Pages)

Biota Media Tissue	Data Source	Exposure Group	Evaluated for Broad-Scale Exposures?
Sculpin			
Carcass	100-B/C Pilot	Study Site	Yes
Composite			Yes
Liver			Yes
Offal			Yes
Whole organism			Yes
Liver	100-NR-2		Yes
Whole organism			Yes
Kidney	RCBRA		Yes
Liver			Yes
Multiple kidney			Yes
Multiple liver			Yes
Multiple whole organism			Yes
Whole organism			Yes
Sculpin			
Kidney	RCBRA	Reference Site	Yes
Liver			Yes
Multiple kidney			Yes
Multiple whole organism			Yes
Whole organism			Yes

Table 7-6. Summary of Fish Data Sources, Taxa, Tissue Type, and the Associated Exposure Groups Evaluated in the Broad-Scale Assessment. (2 Pages)

Biota Media Tissue	Data Source	Exposure Group	Evaluated for Broad-Scale Exposures?
Sculpin-Sucker			
Composite	100-B/C Pilot	Study Site	Yes
Sucker			
Composite	100-B/C Pilot	Study Site	Yes
Whole organism			Yes
Juvenile Sucker			
Whole organism	100-B/C Pilot	Study Site	Yes
Multiple kidney	RCBRA		Yes
Multiple liver			Yes
Multiple whole organism			Yes
Multiple kidney	RCBRA	Reference Site	Yes
Multiple liver			Yes
Multiple whole organism			Yes

RCBRA = River Corridor Baseline Risk Assessment

Table 7-7. Summary of Mouse Data Sources, Taxa, Tissue Type, and the Associated Exposure Groups Evaluated in the Broad-Scale Assessment. (2 Pages)

Biota Media Tissue	Data Source	Exposure Group	Evaluated for Broad-Scale Exposures?
Upland			
Deer Mouse			
Brain	100-B/C Pilot	Backfill Study Site	Yes
Offal			Yes
Great Basin Pocket Mouse			
Liver	100-B/C Pilot	Backfill Study Site	Yes
Mouse			
Whole organism	100-B/C Pilot	Backfill Study Site	Yes
Multiple carcasses	RCBRA		Yes
Multiple kidney/liver			Yes
Multiple carcasses	RCBRA	Native Soil Study Site	Yes
Multiple kidney/liver			Yes
Multiple carcasses	RCBRA	Backfill Reference	Yes
Multiple kidney/liver			Yes
Multiple carcasses	RCBRA	Native Soil Reference	Yes
Multiple kidney/liver			Yes

Table 7-7. Summary of Mouse Data Sources, Taxa, Tissue Type, and the Associated Exposure Groups Evaluated in the Broad-Scale Assessment. (2 Pages)

Biota Media Tissue	Data Source	Exposure Group	Evaluated for Broad-Scale Exposures?
Riparian			
Deer Mouse			
Brain	100-B/C Pilot	Study Site	Yes
Carcass			Yes
Liver			Yes
Offal			Yes
Brain	100-NR-2		Yes
Carcass			Yes
Liver			Yes
Mouse			
Composite	100-B/C Pilot	Study Site	Yes
Multiple carcasses	RCBRA		Yes
Multiple kidney/liver			Yes
Multiple carcasses	RCBRA	Reference	Yes
Multiple kidney/liver			Yes

RCBRA = River Corridor Baseline Risk Assessment

Table 7-8. Summary of Bird Data Sources, Taxa, Tissue Type, and the Associated Exposure Groups Evaluated in the Broad-Scale Assessment. (2 Pages)

Biota Media Tissue	Data Source	Exposure Group	Evaluated for Broad-Scale Exposures?
Cliff Swallow Juvenile			
Crop content	RCBRA	Study Site	Yes
Offal			Yes
Crop content		Reference	Yes
Offal			Yes
Eastern and Western Juvenile Kingbird			
Offal	RCBRA	Study Site	Yes
Offal		Reference	Yes
Eastern Kingbird Juvenile			
Crop content	RCBRA	Study Site	Yes
Offal			Yes
Crop content		Reference	Yes
Offal			Yes

Table 7-8. Summary of Bird Data Sources, Taxa, Tissue Type, and the Associated Exposure Groups Evaluated in the Broad-Scale Assessment. (2 Pages)

Biota Media Tissue	Data Source	Exposure Group	Evaluated for Broad-Scale Exposures?
Western Kingbird Juvenile			
Crop content	RCBRA	Study Site	Yes
Offal			Yes
Crop content		Reference	Yes
Offal			Yes
Offal			Yes

RCBRA = River Corridor Baseline Risk Assessment

Table 7-9. Summary of Representative Concentration Types for Broad-Scale Contaminants of Potential Ecological Concern in Sampled Media.

Media	Total COPEC and Site Combinations	Count of COPECs Not Detected for All Sites	Representative Concentration Calculation Based on Number of Detects (n)		
			n = 1 or 2; Maximum = CTE CTE = RME	n = 3 or 4; Mean [a] = CTE Maximum = RME	n = 5 or more; Mean [b] = CTE UCL [b] = RME
Soil	291	61	42	38	150
Sediment	101	26	22	6	47
Surface water	96	56	5	4	31
Aquatic invertebrate	46	8	1	5	32
Fish	96	28	16	7	45
Bird	90	36	18	2	34
Mouse	272	161	34	23	54

[a] Using student's t statistics.
[b] Using three different methods.

COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
n = number of detects
RME = reasonable maximum exposure
UCL = upper confidence limit

Table 7-10. Comparison of the Maximum Detected Sample Result to the Reasonable Maximum Exposure.

Media	Number Where the Ratio of Maximum Divided by RME is Less Than 0.5	Number Where the Ratio of Maximum Divided by RME is Between 0.5 and 0.8	Number Where the Ratio of Maximum Divided by RME is Between 0.8 and 1.2	Number Where the Ratio of Maximum Divided by RME is Between 1.2 and 1.5	Number Where the Ratio of Maximum Divided by RME is Between 1.5 and 2	Number Where the Ratio of Maximum Divided by RME is Between 2 and 5	Number Where the Ratio of Maximum Divided by RME is Greater Than 5
Soil	0	1	145	32	29	23	0
Sediment	0	0	36	7	6	16	10
Surface water	0	0	14	6	5	11	4
Aquatic invertebrate	1	0	9	11	7	9	1
Fish	1	2	29	8	12	16	0
Bird	0	2	21	8	10	13	0
Mouse	0	0	78	25	4	4	0
Total	2	5	332	97	73	92	15

RME = reasonable maximum exposure

Table 7-11. Cases where the Reasonable Maximum Exposure is Very Different from the Maximum in the Near Shore Environment.

COPEC	Number of Locations	Number of Locations With One or More Detects	CTE	RME	Maximum Detect	Maximum Divided by RME
Sediment (mg/kg)						
Nitrogen in nitrate	42	41	3.60	5.23	26.3	5.03
Calculated total uranium	47	46	2.12	2.72	15.4	5.64
Selenium	50	11	0.518	0.748	4.3	5.75
Mercury	50	17	0.023	0.033	0.2	6.01
Barium	50	50	105	141	869	6.15
Lead	50	50	20.0	25.4	158	6.22
Silver	49	5	0.059	0.135	0.844	6.25
Chromium	50	50	24.6	34.3	286	8.33
Bis[2-ethylhexyl] phthalate	47	45	0.210	0.344	3.3	9.60
Hexavalent chromium	47	5	0.366	0.737	8.41	11.4
Surface Water (µg/L)						
Nitrogen in nitrate	43	41	292	417	2,140	5.13
Lead	50	9	0.273	0.686	3.9	5.69
Bis[2-ethylhexyl] phthalate	42	40	2.40	3.79	31.2	8.22
Chromium	50	11	0.855	1.65	15.1	9.17
Aquatic Invertebrate (mg/kg)						
Thallium	23	6	0.125	0.152	0.0379	0.25
Nickel	23	19	2.54	7.57	47.6	6.29
Fish (mg/kg)						
Thallium	27	6	0.498	0.646	0.159	0.25

= High value between RME and maximum detect.

COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
RME = reasonable maximum exposure

Table 7-12. Exposure Parameters for Broad-Scale Wildlife. (3 Pages)

Parameter	Value	Units	Reference	Notes
Carnivore				
Badger				
Body weight	7.6	kg	Median of nine values reported from two sources	Messick and Hornocker 1981: 7.6 (M n = 10), 8.8 (M n = 61), 9.8 (M n = 64), 10.9 (M n = 1), 6.9 (F n = 20), 6.7 (F n = 60), 7.2 (F n = 47), 7.8 (F n = 9) Silva and Downing 1995: 7.19 (mean of males and females).
Diet composition soil	5.2	%	Beyer et al. 1994	Data regarding soil ingestion of badgers are unavailable. Because the badger is a burrowing mammal, soil ingestion may be similar to that of the prairie dog. It was assumed that the median soil ingestion of the two prairie dog species with available data (2.7 and 7.7 %) would be representative of the badger.
Ingestion soil	0.0018	kg/kg/d	Calculated	Soil ingestion is equal to the percent soil in diet multiplied by the food ingestion rate as follows: soil ingestion = (diet composition soil/100 * Intake food dry weight).
Ingestion water	0.081	L/kg/d	EPA/600/R-93/187	Allometric equation for water intake for mammals, EPA/600/R-93/187, p. 3-10, EQN 3-17; WI (L/day) = 0.099Wt^0.9 (kg).
Intake food dry weight	0.035	kg/kg/d	Nagy 2001	Allometric estimation for "omnivorous mammals" normalized to kg/kg-bw/d.
Conversion factor (fresh from dry intake)	3.13	--	EPA/600/R-93/187	Fresh from dry intake conversion factor based on 68% moisture in diet (mammals), calculated as 1 divided by dry fraction.
Intake food fresh weight	0.110	kg/kg/d	Calculated	Intake food dry weight * conversion factor.
Diet composition mammal	1	Proportion	Assumed	--
Red-Tailed Hawk (100% Small Mammal Diet)				
Body weight	1.179	kg	Median of six values reported from three sources	Craighead & Craighead, 1956: 1.224 (F n = 100), 1.028 (M n = 108) Steenhof, 1983: 1.154 (F), 0.957 (M) Springer & Osborne, 1983: 1.235 (F), 1.204 (M).
Diet composition soil	2.4	%	OSWER Directive 9285.7-55	Median soil ingestion rate estimated for red-tailed hawk in Attachment 4-1, Table 3. The median was selected as the best measure of central tendency that is unbiased by outliners.
Ingestion soil	0.00084	kg/kg/d	Calculated	Soil ingestion is equal to the percent soil in diet multiplied by the food ingestion rate as follows: soil ingestion = (diet composition soil/100 * Intake food dry weight).
Ingestion water	0.0559	L/kg/d	EPA/600/R-93/187	Allometric equation for all birds, EPA/600/R-93/187, Eqn. 3-15; WI = 0.059Wt^0.67 (kg).
Intake food dry weight	0.0353	kg/kg/d	OSWER Directive 9285.7-55	Attachment 4-1, Table 1, red-tailed hawk, high end point est., g dw/g bw/d.
Conversion factor (fresh from dry intake)	3.13	--	EPA/600/R-93/187	Fresh from dry intake conversion factor based on 68% moisture in diet (mammals), calculated as 1 divided by dry fraction.
Intake food fresh weight	0.110	kg/kg/d	Calculated	Intake food dry weight * conversion factor.
Diet composition bird	0	Proportion	Assumed	--
Diet composition mammal	1	Proportion	Assumed	--
Red-Tailed Hawk (100% Bird Diet)				
Body weight	1.179	kg	Median of six values reported from three sources	Craighead & Craighead, 1956: 1.224 (F n = 100), 1.028 (M n = 108) Steenhof, 1983: 1.154 (F), 0.957 (M) Springer & Osborne, 1983: 1.235 (F), 1.204 (M).
Diet composition soil	2.4	%	OSWER Directive 9285.7-55	Median soil ingestion rate estimated for red-tailed hawk in Attachment 4-1, Table 3. The median was selected as the best measure of central tendency that is unbiased by outliners.
Ingestion soil	0.00084	kg/kg/d	OSWER Directive 9285.7-55	Soil ingestion is equal to the percent soil in diet multiplied by the food ingestion rate as follows: soil ingestion = (diet composition soil/100 * Intake food dry weight).
Ingestion water	0.0559	L/kg/d	EPA/600/R-93/187	Allometric equation for all birds EPA/600/R-93/187, Eqn. 3-15; WI = 0.059Wt^0.67 (kg).
Intake food dry weight	0.0353	kg/kg/d	OSWER Directive 9285.7-55	Attachment 4-1, Table 1, red-tailed hawk, high end point estimate, g dw/g bw/d.
Conversion factor (fresh from dry intake)	3.13	--	EPA/600/R-93/187	Fresh from dry intake conversion factor based on 68% moisture in diet (mammals), calculated as 1 divided by dry fraction.
Intake food fresh weight	0.110	kg/kg/d	Calculated	Intake food dry weight * conversion factor.
Diet composition bird	1	Proportion	Assumed	--
Diet composition mammal	0	Proportion	Assumed	--

Table 7-12. Exposure Parameters for Broad-Scale Wildlife. (3 Pages)

Parameter	Value	Units	Reference	Notes
Insectivore				
Occult Myotis Bat				
Body weight	0.00875	kg	Whitaker, J. O., Jr. 1989	--
Ingestion soil	0	kg/kg/d	Assumed	Aerial insectivore, soil ingestion negligible.
Ingestion sediment	0	kg/kg/d	Assumed	Aerial insectivore, sediment ingestion negligible.
Ingestion water	0.159	L/kg/d	EPA/600/R-93/187	Allometric equation for water intake for mammals EPA/600/R-93/187, p. 3-10, EQN 3-17; WI (L/day) = 0.099Wt^0.9 (kg).
Intake food dry weight	0.179	kg/kg/d	Nagy 2001	Allometric estimation for "Chiroptera" normalized to kg/kg-bw/d.
Conversion Factor (fresh from dry intake)	3.23	--	EPA/600/R-93/187	Fresh from dry intake conversion factor based on 69% moisture (grasshoppers and crickets), calculated as 1 divided by dry fraction.
Intake food fresh weight	0.577	kg/kg/d	Calculated	Intake food dry weight * conversion factor.
Diet composition aquatic invertebrate	1	Proportion	Assumed	--
Bank Swallow				
Body weight	0.0137	kg	Median of 12 values reported from one source	Birds of North America On-line: http://bna.birds.cornell.edu/bna/species/414/articles/species/414/galleries/data/tab1. 0.013 (M, n = 61), 0.0137 (M, n = 39), 0.0136 (M, n = 184), 0.0127 (M, n = 165), 0.0135 (M, n = 942), 0.013 (M, n = 698), 0.0147 (F, n = 61), 0.0148 (F, n = 82), 0.015 (F, n = 154), 0.0134 (F, n = 175), 0.0144 (F, n = 1046), 0.0139 (F, n = 1013).
Ingestion soil	0	kg/kg/d	Assumed	Aerial insectivore, soil ingestion negligible.
Ingestion sediment	0	kg/kg/d	Assumed	Aerial insectivore, sediment ingestion negligible.
Ingestion water	0.243	L/kg/d	EPA/600/R-93/187	Allometric equation for all birds EPA/600/R-93/187, Eqn. 3-15; WI = 0.059Wt^0.67 (kg).
Intake food dry weight	0.25	kg/kg/d	Nagy 2001	Allometric estimation for "insectivorous birds"normalized to kg/kg-bw/d.
Conversion Factor (fresh from dry intake)	4.76	--	EPA/600/R-93/187	Fresh from dry intake conversion factor based on 79% moisture (aquatic invertebrates), calculated as 1 divided by dry fraction.
Intake food wet	1.19	kg/kg/d	Calculated	Intake food dry weight * conversion factor.
Diet composition aquatic invertebrate	1	Proportion	Assumed	--
Piscivore				
Mink				
Body weight	1.02	kg	Median of five values from two sources	Sample and Suter 1999: 1 Halbrook et al. 1997: 1.245 (F), 1.016 (F), 1.23 (F), 0.935 (F).
Diet composition sediment	9.4	%	EPA/600/R-93/187	Raccoon, EPA/600/R-93/187, Table 4-4, p.4-20, sediment is 9.4% diet.
Ingestion soil	0	kg/kg/d	Assumed	Strict piscivorous diet, soil ingestion negligible.
Ingestion sediment	0.0046	kg/kg/d	Calculated	Sediment ingestion is equal to the percent soil in diet multiplied by the food ingestion rate as follows: sediment ingestion = (diet composition sediment/100 * Intake food dry weight).
Ingestion water	0.1	L/kg/d	EPA/600/R-93/187	Allometric equation for water intake for mammals p. 3-10, EQN 3-17; WI (L/day) = 0.099Wt^0.9 (kg).
Intake food dry weight	0.0485	kg/kg/d	Nagy 2001	Allometric estimation for "carnivorous mammals" normalized to kg/kg-bw/d.
Conversion Factor (fresh from dry intake)	4	--	EPA/600/R-93/187	Fresh from dry intake conversion factor based on 75% moisture (bony fish), calculated as 1 divided by dry fraction.
Intake food fresh weight	0.194	kg/kg/d	Calculated	Intake food dry weight * conversion factor.
Diet composition fish	1	%	Assumed	--
Great Blue Heron				
Body weight	2.39	kg	Median of three values from two sources	Sample and Suter 1999: 2.39 http://bna.birds.cornell.edu/bna/species/414/articles/species/414/galleries/data/tab1: 2.48 (M, n=24), 2.11 (F, n=29).
Diet composition sediment	13	%	Beyer et al., 2008	Ruddy duck invertebrate diet, 13% sediment ingestion.
Ingestion soil	0	kg/kg/d	Assumed	Strict piscivorous diet, soil ingestion negligible.
Ingestion sediment	0.00585	kg/kg/d	Calculated	Sediment ingestion is equal to the percent soil in diet multiplied by the food ingestion rate as follows: sediment ingestion = (diet composition sediment/100 * Intake food dry weight).
Ingestion water	0.045	L/kg/d	EPA/600/R-93/187	Rate cited by Calder and Braun (1983) estimated using allometric equation cited in Great Blue Heron parameter table, p. 2-8.

Table 7-12. Exposure Parameters for Broad-Scale Wildlife. (3 Pages)

Parameter	Value	Units	Reference	Notes
Intake food dry weight	0.045	kg/kg/d	EPA/600/R-93/187	Intake food fresh weight/conversion factor.
Conversion factor (fresh from dry intake)	4	--	EPA/600/R-93/187	Fresh from dry intake conversion factor based on 75% moisture (bony fish), calculated as 1 divided by dry fraction.
Intake food fresh weight	0.18	kg/kg/d	EPA/600/R-93/187	Empirical food ingestion wet weight. Total food ingestion rate of 0.18 g/g/d cited by Kushlan (1978) in EPA/600/R-93/187, Great Blue Heron exposure Table, p. 2-8.
Diet composition fish	1	Proportion	Assumed	--
Diet composition aquatic invertebrate	0	Proportion	Assumed	--

-- = not applicable

Beyer, W. N., E. E. Connor, and S. Gerould, 1994, "Estimates of Soil Ingestion by Wildlife," *J. Wildlife Manage* 58:375-382.
Beyer, W. N., M. C. Perry, and P. C. Osenton, 2008, "Sediment Ingestion Rates in Waterfowl (*Anatidae*) and Their Use in Environmental Risk Assessment," *Integrated Environmental Assessment and Management,* 4(2):246-251.
Calder, W. A. and E. J. Braun, 1983, "Scaling of Osmotic Regulation in Mammals and Birds," *Am. J. Physiol.*, 244: R601-R606.
Craighead, J. J. and F. C. Craighead, 1956, *Hawks, Owls and Wildlife*, Stackpole Co., Harrisburg, Pennsylvania.
EPA/822/R-93/006, U.S. Environmental Protection Agency, 1993, Wildlife criteria portions of the proposed water quality guidance for the Great Lakes system. EPA/822/R-93/006. Washington, D.C.
OSWER Directive 9285.7-55, Guidance for Developing Ecological Soil Screening Levels (Eco-SSLs).
Halbrook, R. S., L. A. Lewis, R. I. Aulrich, and S. J. Bursian, 1997, "Mercury Accumulation in Mink Fed Fish Collected from the Streams on the Oak Ridge Reservation," *Arch. Environ. Contam. Toxicol.*, 33, 312-316.
Messick, J. P. and M. G. Hornocker, 1981, "Ecology of the Badger in Southwestern Idaho," *Wildlife Monographs* 76:1-53.
Nagy, K. A., 2001, "Food Requirements for Wild Animals: Predictive Equations for Free-Living Mammals, Reptiles and Birds," *Nutrition Abstracts and Reviews*, Series B 71, 21R-31R.
Sample, B. E., and G. W. Suter, 1999, "Ecological Risk Assessment in a Large River–Reservoir: 4. Piscivorous Wildlife". *Environmental Toxicology and Chemistry*, 18: 610–620.
Silva, M. and J. A. Downing, 1995, *CRC Handbook of Mammalian Body Masses*, CRC Press, Boca Raton, Florida.
Springer, M. A. and D. R. Osborne, 1983, "Analysis of Growth of the Red-tailed Hawk (*Buteo jamaicensis*)," *Ohio J. Sci*, 83: 13-19.
Steenhof, K., 1983, "Prey Weights for Computing Percent Biomass in Raptor Diets," *Raptor Res.*, 17: 15-27.
Whitaker, J. O. Jr., 1989, *The Audubon Society Field Guide to North American Mammals*, Alfred A Knopf, New York, New York.

Table 7-13. Broad-Scale Receptors and Exposure Pathways for Hazard Quotient Calculations.

Receptor	Hazard Quotient Pathway Parameters	Representative Concentrations
Badger (carnivore)	Soil and small mammal (mouse) tissue	Mean and upper confidence limit of the mean concentrations for each medium for study sites and reference sites for the following data sources: RCBRA, 100-B/C Pilot, 100-NR-2
Badger (drinking water)	Surface water	
Red-tailed hawk (carnivore-mammal)	Soil and small mammal (mouse) tissue	
Red-tailed hawk (carnivore-bird)	Soil and bird tissue	
Red-tailed hawk (drinking water)	Surface water	
Occult *Myotis* bat (aerial insectivore)	Water and aquatic invertebrate tissue	
Bank swallow (aerial insectivore)	Water and aquatic invertebrate tissue	
Mink (piscivore)	Sediment, water, and fish tissue	
Great blue heron (piscivore)	Sediment, water, and fish tissue	

RCBRA= River Corridor Baseline Risk Assessment

Table 7-14. Summary of Broad-Scale Wildlife Risk Results for all Contaminants of Potential Ecological Concern. (2 Pages)

COPEC	Study Sites								Reference Sites							
	All Receptors and Pathways				Badger and Hawk Surface Water Pathway				All Receptors and Pathways				Badger and Hawk Surface Water Pathway			
	NOAEL		LOAEL		NOAEL		LOAEL		NOAEL		LOAEL		NOAEL		LOAEL	
	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ
Aldrin	<0.01	0.74	<0.01	0.15	--	--	--	--	<0.01	0.44	<0.01	0.09	--	--	--	--
Aluminum	<0.01	22	<0.01	2.2	<0.01	<0.01	<0.01	<0.01	<0.01	21	<0.01	2.1	<0.01	<0.01	<0.01	<0.01
Antimony	<0.01	4.0	<0.01	0.40	<0.01	<0.01	<0.01	<0.01	<0.01	11	<0.01	1.1	<0.01	<0.01	<0.01	<0.01
Aroclor-1254	<0.01	16	<0.01	1.6	--	--	--	--	<0.01	<0.01	<0.01	0.01	--	--	--	--
Aroclor-1260	<0.01	0.04	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1262	<0.01	<0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	<0.01	0.42	<0.01	0.26	<0.01	<0.01	<0.01	<0.01	<0.01	0.56	<0.01	0.35	<0.01	<0.01	<0.01	<0.01
Barium	<0.01	2.7	<0.01	1.3	<0.01	<0.01	<0.01	<0.01	<0.01	3	<0.01	1.5	<0.01	<0.01	<0.01	<0.01
Benzo[a]anthracene	<0.01	0.01	<0.01	<0.01	--	--	--	--	<0.01	<0.01	<0.01	<0.01	--	--	--	--
Benzo[a]pyrene	<0.01	0.01	<0.01	<0.01	--	--	--	--	<0.01	<0.01	<0.01	<0.01	--	--	--	--
Benzo[b]fluoranthene	<0.01	<0.01	<0.01	<0.01	--	--	--	--	<0.01	<0.01	<0.01	<0.01	--	--	--	--
Benzo[ghi]perylene	<0.01	<0.01	<0.01	<0.01	--	--	--	--	<0.01	0.04	<0.01	<0.01	--	--	--	--
Benzo[k]fluoranthene	<0.01	0.01	<0.01	<0.01	--	--	--	--	<0.01	<0.01	<0.01	<0.01	--	--	--	--
beta-1,2,3,4,5,6-Hexachlorocyclohexane	<0.01	0.01	<0.01	<0.01	--	--	--	--	<0.01	0.02	<0.01	<0.01	--	--	--	--
Bis[2-ethylhexyl] phthalate	<0.01	0.52	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.47	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	<0.01	0.30	<0.01	0.19	<0.01	<0.01	<0.01	<0.01	<0.01	0.83	<0.01	0.32	<0.01	<0.01	<0.01	<0.01
Calculated total uranium	<0.01	0.06	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	<0.01	0.25	<0.01	0.23	<0.01	<0.01	<0.01	<0.01	<0.01	0.41	<0.01	0.39	<0.01	<0.01	<0.01	<0.01
Chrysene	<0.01	<0.01	<0.01	<0.01	--	--	--		<0.01	<0.01	<0.01	<0.01	--	--	--	--
Copper	<0.01	6.3	<0.01	2.1	<0.01	<0.01	<0.01	<0.01	<0.01	6.9	<0.01	2.3	<0.01	<0.01	<0.01	<0.01
Dibenz[a,h]anthracene	<0.01	<0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--
Dichlorodiphenyldichloroethylene	<0.01	0.07	<0.01	0.01	--	--	--	--	<0.01	0.68	<0.01	0.14	--	--	--	--
Dichlorodiphenyltrichloroethane	<0.01	0.02	<0.01	<0.01	--	--	--	--	<0.01	0.01	<0.01	<0.01	--	--	--	--
Dichloroprop	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dieldrin	<0.01	0.10	<0.01	0.05	--	--	--	--	--	--	--	--	--	--	--	--
Endosulfan I	<0.01	0.01	--	--	--	--	--	--	<0.01	<0.01	--	--	--	--	--	--
Endosulfan II	<0.01	<0.01	--	--	--	--	--	--	<0.01	<0.01	--	--	--	--	--	--
Endosulfan sulfate	<0.01	<0.01	--	--	--	--	--	--	<0.01	<0.01	--	--	--	--	--	--
Endrin aldehyde	<0.01	0.02	<0.01	<0.01	--	--	--	--	<0.01	0.02	<0.01	<0.01	--	--	--	--
Hexavalent chromium	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno[1,2,3-cd]pyrene	<0.01	<0.01	<0.01	<0.01	--	--	--	--	<0.01	<0.01	<0.01	<0.01	--	--	--	--
Lead	<0.01	0.45	<0.01	0.22	<0.01	<0.01	<0.01	<0.01	<0.01	0.40	<0.01	0.20	<0.01	<0.01	<0.01	<0.01
Manganese	<0.01	0.53	<0.01	0.39	<0.01	<0.01	<0.01	<0.01	<0.01	0.54	<0.01	0.39	<0.01	<0.01	<0.01	<0.01
Mercury	<0.01	0.52	<0.01	0.10	<0.01	<0.01	<0.01	<0.01	<0.01	0.65	<0.01	0.13	<0.01	<0.01	<0.01	<0.01
Methoxychlor	<0.01	<0.01	<0.01	<0.01	--	--	--	--	<0.01	<0.01	<0.01	<0.01	--	--	--	--
Nickel	<0.01	2.6	<0.01	1.3	<0.01	<0.01	<0.01	<0.01	<0.01	2.4	<0.01	1.2	<0.01	<0.01	<0.01	<0.01
Nitrogen in nitrate	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrogen in nitrite	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phosphorous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	<0.01	<0.01	<0.01	<0.01	--	--	--	--	<0.01	<0.01	<0.01	<0.01	--	--	--	--
Selenium	<0.01	3.7	<0.01	2.4	<0.01	<0.01	<0.01	<0.01	<0.01	4.7	0.14	3.1	<0.01	<0.01	<0.01	<0.01
Silver	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.08	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Strontium (elemental)	<0.01	0.31	--	--	<0.01	<0.01	--	--	<0.01	0.36	--	--	<0.01	<0.01	--	--
TEC bird	--	--	<0.01	0.78	--	--	--	--	--	--	0.08	0.08	--	--	--	--
TEC mammal	0.04	0.40	<0.01	0.01	--	--	--	--	1.3	1.3	0.03	0.03	--	--	--	--

Table 7-14. Summary of Broad-Scale Wildlife Risk Results for all Contaminants of Potential Ecological Concern. (2 Pages)

COPEC	Study Sites								Reference Sites							
	All Receptors and Pathways				Badger and Hawk Surface Water Pathway				All Receptors and Pathways				Badger and Hawk Surface Water Pathway			
	NOAEL		LOAEL		NOAEL		LOAEL		NOAEL		LOAEL		NOAEL		LOAEL	
	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ	Minimum HQ	Maximum HQ
Thallium	<0.01	11	<0.01	2.2	<0.01	0.04	<0.01	<0.01	<0.01	0.47	<0.01	0.09	<0.01	0.04	<0.01	<0.01
Tin	<0.01	0.47	<0.01	0.19	<0.01	<0.01	<0.01	<0.01	<0.01	0.14	<0.01	0.06	<0.01	<0.01	<0.01	<0.01
Titanium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total PCB	<0.01	0.15	<0.01	0.02	--	--	--	--	0.19	0.56	0.02	0.06	--	--	--	--
Total petroleum hydrocarbons - diesel range	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium (inorganic)	<0.01	0.19	<0.01	0.09	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	<0.01	1.6	<0.01	0.82	<0.01	<0.01	<0.01	<0.01	<0.01	2.2	0.01	1.1	<0.01	<0.01	<0.01	<0.01
Zinc	<0.01	0.73	<0.01	0.72	<0.01	<0.01	<0.01	<0.01	<0.01	0.47	<0.01	0.47	<0.01	<0.01	<0.01	<0.01

= Hazard quotient >1.0.

-- = not applicable
COPEC = contaminant of potential ecological concern
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
NOAEL = no observable adverse effect level
PCB = polychlorinated biphenyl
TEC = TCDD (2,3,7,8-Tetrachlorodibenzo-*p*-Dioxin) equivalent concentration

Table 7-15. Contaminants of Potential Ecological Concern With Hazard Quotient >1 for Badger (Carnivore).

COPEC	Exposure Group	Concentration				NOAEL HQ						LOAEL HQ					
		Soil (mg/kg)		Mammal (mg/kg-fw)		CTE			RME			CTE			RME		
		CTE	RME	CTE	RME	Soil	Mammal	Sum [a]	Soil	Mammal	Sum [a]	Soil	Mammal	Sum [a]	Soil	Mammal	Sum [a]
Study Sites																	
Aluminum	Backfilled waste sites	5,970	6,870	24.2	53.6	5.6	1.4	7.0	6.4	3.0	9.4	0.56	0.14	0.70	0.64	0.30	0.94
	Native soil waste sites	6,110	6,640	45.3	63	5.7	2.6	8.3	6.2	3.6	9.8	0.57	0.26	0.83	0.62	0.36	0.98
	Riparian	7,820	8,500	30.7	37.2	7.3	1.7	9.1	7.9	2.1	10	0.73	0.17	0.91	0.79	0.21	1.0
Reference Sites																	
Aluminum	Backfill	5,830	6,930	48.9	48.9	5.4	2.8	8.2	6.5	2.8	9.2	0.54	0.28	0.82	0.65	0.28	0.92
	Native soil	9,430	11,600	44.8	56.4	8.8	2.5	11	11	3.2	14	0.88	0.25	1.1	1.1	0.32	1.4
	Riparian	8,910	9,850	104	104	8.3	5.9	14	9.2	5.9	15	0.83	0.59	1.4	0.92	0.59	1.5

= Hazard quotient >1.0.

[a] Soil HQ + mammal HQ.

COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
fw = fresh weight
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 7-16. Contaminants of Potential Ecological Concern With Hazard Quotient >1 for Myotis Bat (Insectivore).

COPEC	Concentration				NOAEL HQ						LOAEL HQ					
	Water (µg/L)		Aquatic Invertebrate (mg/kg-fw)		CTE			RME			CTE			RME		
	CTE	RME	CTE	RME	Water	Aquatic Invertebrate	Sum [a]	Water	Aquatic Invertebrate	Sum [a]	Water	Aquatic Invertebrate	Sum [a]	Water	Aquatic Invertebrate	Sum [a]
Study Site																
Aluminum	42.5	57	56.5	72.1	<0.01	17	17	<0.01	22	22	<0.01	1.7	1.7	<0.01	2.2	2.2
Nickel	0.967	1.06	2.54	7.57	<0.01	0.87	0.87	<0.01	2.6	2.6	<0.01	0.43	0.43	<0.01	1.3	1.3
Thallium	8.3	8.3	0.125	0.152	0.09	4.8	4.9	0.09	5.8	5.9	0.02	0.96	0.98	0.02	1.2	1.2
Reference																
Aluminum	63.2	88.3	39.5	70.8	<0.01	12	12	<0.01	21	21	<0.01	1.2	1.2	<0.01	2.1	2.1
Nickel	ND	ND	1.19	6.98	--	0.40	0.40	--	2.4	2.4	--	0.20	0.20	--	1.2	1.2

= Hazard quotient >1.0.
[a] Water HQ + aquatic invertebrate HQ.
-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
fw = fresh weight
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
ND = nondetect
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 7-17. Contaminants of Potential Ecological Concern With Hazard Quotient >1 for Bank Swallow (Insectivore).

COPEC	Concentration				NOAEL HQ						LOAEL HQ					
	Water (µg/L)		Aquatic Invertebrate (mg/kg-fw)		CTE			RME			CTE			RME		
	CTE	RME	CTE	RME	Water	Aquatic Invertebrate	Sum [a]	Water	Aquatic Invertebrate	Sum [a]	Water	Aquatic Invertebrate	Sum [a]	Water	Aquatic Invertebrate	Sum [a]
Study Site																
Nickel	0.967	1.06	2.54	7.57	<0.01	0.45	0.45	<0.01	1.3	1.3	<0.01	0.26	0.26	<0.01	0.78	0.78
Reference																
Nickel	ND	ND	1.19	6.98	--	0.21	0.21	--	1.2	1.2	--	0.12	0.12	--	0.72	0.72

= Hazard quotient >1.0.
[a] Water HQ + aquatic invertebrate HQ.
-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
fw = fresh weight
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
ND = nondetect
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 7-18. Contaminants of Potential Ecological concern With Hazard Quotient >1 for Mink (Piscivore).

COPEC	Concentration						NOAEL HQ								LOAEL HQ							
	Water (µg/L)		Sediment (mg/kg)		Fish (mg/kg-fw)		CTE				RME				CTE				RME			
	CTE	RME	CTE	RME	CTE	RME	Water	Sediment	Fish	Sum [a]	Water	Sediment	Fish	Sum [a]	Water	Sediment	Fish	Sum [a]	Water	Sediment	Fish	Sum [a]
Study Site																						
Aroclor-1254	ND	ND	0.024	0.024	1.19	5.63	--	<0.01	3.4	3.4	--	<0.01	16	16	--	<0.01	0.34	0.34	--	<0.01	1.6	1.6
Thallium	8.3	8.3	5.89	7.91	0.498	0.646	0.05	1.8	6.4	8.3	0.05	2.4	8.4	11	0.01	0.36	1.3	1.7	0.01	0.49	1.7	2.2

= Hazard quotient >1.0.
[a] Water HQ + sediment HQ + fish HQ.
-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
fw = fresh weight
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
ND = nondetect
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 7-19. Contaminants of Potential Ecological Concern With Hazard Quotient >1 for Great Blue Heron (Piscivore).

COPEC	Concentration						NOAEL HQ								LOAEL HQ							
	Water (µg/L)		Sediment (mg/kg)		Fish (mg/kg-fw)		CTE				RME				CTE				RME			
	CTE	RME	CTE	RME	CTE	RME	Water	Sediment	Fish	Sum [a]	Water	Sediment	Fish	Sum [a]	Water	Sediment	Fish	Sum [a]	Water	Sediment	Fish	Sum [a]
Study Site																						
Aroclor-1254	ND	ND	0.024	0.024	1.19	5.63	--	<0.01	1.2	1.2	--	<0.01	5.6	5.6	--	<0.01	0.12	0.12	--	<0.01	0.56	0.56

= Hazard quotient >1.0.
[a] Water HQ + sediment HQ + fish HQ.
-- = not applicable
COPEC = contaminant of potential ecological concern
CTE = central tendency exposure
fw = fresh weight
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
ND = nondetect
NOAEL = no observable adverse effect level
RME = reasonable maximum exposure

Table 7-20. Uncertainty Analysis for Aerial Insectivores and Upper Trophic-Level Vertebrates.

Attributes	Risk Question	Observations	Impact on Assessment
Literature values for survival, growth, or reproduction compared to exposure.	Is dietary exposure at broad scales greater than toxicity reference values?	Toxicity information is lacking for some COPECs. Use of literature toxicity reference values involves uncertainty in the extrapolation from test organisms to species occurring onsite based on the following: • Test conditions (e.g., method of contaminant delivery such as oral intubation or via gavage compared to ingestion of contaminated media onsite) • Bioavailability of contaminant (laboratory studies typically represent maximum bioavailability) relative to site-specific bioavailability • Laboratory toxicity studies typically focus on a single contaminant whereas conditions in the field typically involve contaminant mixtures • Relatively short-term laboratory exposure compared to chronic exposure to contaminants in the field • Similarity in toxic response. Uncertainties associated with exposure include: • Measuring media (tissue, soil) concentrations • Extent to which intake for representative receptors reflects actual intake for organisms onsite. • Concentrations of some COPECs vary widely among sample locations. For example, the near-shore media and COPECs listed in Table 7-11 have maximum concentrations that are five or more times the RME. Adverse effects are inferred by a single line of evidence.	Risks could be underestimated for certain COPECs. Literature toxicity information could overestimate risk to certain COPECs, in particular inorganic chemicals when the literature bioassays are based on the bioavailable and more toxic forms. For example, Menzie et al. (2008) present an example study involving barium toxicity and chemical form showing that the most stable form in the environment is also the least toxic. Most of the COPECs are inorganic chemicals. Some COPECs may act synergistically; therefore the potential for effects or risks could be understated. The mean concentration is based on small number of detected sample results in some cases. Thus, risks could be over- or underestimated. Of the COPECs listed in Table 7-11, concentrations of three COPECs in sediment (barium, chromium, lead) and nickel in aquatic invertebrates vary among study sites, and the HQ for these pathways represents a sufficient potential for risk (HQ>0.1). Thus, exposure within areas smaller than the River Corridor could represent greater risk for these COPECs. Among these COPECs two exceed effect levels (barium and nickel), and two do not (chromium and lead). Thus, chromium and lead should be viewed to represent uncertain risk to broad-ranging species. High detection limits in food can lead to underestimating risks. The measured tissue concentrations used to represent food do not match the diets of these species. For example, fish samples are sculpin or sucker. This could over- or underestimate exposure and effects.

COPEC = contaminant of potential ecological concern
HQ = hazard quotient
RME = reasonable maximum exposure

Menzie, C. A., B. Southworth, G. Stephenson, and N. Feisthauer, 2008, *The Importance of Understanding the Chemical Form of a Metal in the Environment: The Case of Barium Sulfate (Barite)*, Human and Ecological Risk Assessment 14-974-991.

Table 7-21. Summary of Broad-Scale Wildlife Risk Results for All Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status [a]							Exposure Evaluation at Study Sites Based on Soil, Sediment, Surface Water, and Food	Conclusions
	Abiotic Media				Biotic Media (Tissue)				
	Upland	Riparian	Near Shore		Upland	Riparian	Near Shore		
	Soil	Soil	Sediment	Pore Water					
Aluminum	No	No	No	No	Invertebrate	Mouse organ	Clam	NOAEL- and LOAEL-based HQs are greater than 1 at study sites; exposure is greater than reference	Although broad-scale, LOAEL-based HQs greater than 1 and exposure greater than reference, adverse effects at circumneutral soil pH are not indicated (OSWER Directive 9285.7-60). Therefore, further evaluation is not indicated by broad-scale risk results.
Antimony	Yes	No	No	No	No	No	Sucker kidney	NOAEL-based HQ greater than 1 at study sites and reference, LOAEL-based HQ less than 1 at study sites; exposure less than reference	Further evaluation is not indicated by broad-scale risk results.
Arsenic	Yes	Yes	No	No	Invertebrate	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Barium	Yes	Yes	No	No	No	Plant, Invertebrate	Clam	NOAEL- and LOAEL-based HQs are greater than 1 at study sites, exposure less than reference	Further evaluation is not indicated by broad-scale risk results.
Boron	Yes	No	No	No	Plant	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Cadmium	Yes	Yes	Yes	No	No	Invertebrate	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Calculated total uranium	Yes	Yes	Yes	Yes	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Chromium	Yes	Yes	Yes	Yes	No	No	Clam, sculpin	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Copper	Yes	No	No	No	Invertebrate	Plant, Invertebrate	Clam	NOAEL- and LOAEL-based HQs are greater than 1 at study sites; exposure less than reference.	Further evaluation is not indicated by broad-scale risk results.
Hexavalent chromium	Yes	Yes	Yes	Yes	--	--	--	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Lead	Yes	Yes	Yes	No	Mouse	Mouse, mouse organ	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Manganese	No	No	No	No	Invertebrate, mouse	No	Clam	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Mercury	Yes	Yes	Yes	No	No	Invertebrate	Clam	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Nickel	No	No	No	No	No	No	Sculpin	NOAEL- and LOAEL-based HQs are greater than 1 at study sites; exposure is greater than reference	Nickel concentrations in aquatic invertebrates vary widely among locations (maximum is more than 5 times the RME), and the aquatic invertebrates pathway represents a significant exposure pathway (pathway HQ greater than 0.1). Given LOAEL-based HQs greater than 1, evaluate this COPEC further in Section 8.0.
Selenium	No	No	No	No	Mouse organ	Invertebrate	Sculpin	NOAEL- and LOAEL-based HQs are greater than 1 at study sites; exposure is less than reference	Further evaluation is not indicated by broad-scale risk results.
Silver	Yes	No	No	No	No	Invertebrate	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Strontium (elemental)	Yes	No	No	No	No	No	Clam, sculpin	NOAEL-based HQs are less than 1; no LOAEL	Further evaluation is not indicated by broad-scale risk results.
Thallium	No	No	No	No	No	Plant	No	NOAEL- and LOAEL-based HQs are greater than 1 at study sites; exposure > than reference	Given LOAEL-based HQs greater than 1, evaluate this COPEC further in Section 8.0.
Tin	Yes	No	No	No	No	No	Sucker kidney	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.

Table 7-21. Summary of Broad-Scale Wildlife Risk Results for All Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status [a]							Exposure Evaluation at Study Sites Based on Soil, Sediment, Surface Water, and Food	Conclusions
	Abiotic Media				Biotic Media (Tissue)				
	Upland	Riparian	Near Shore		Upland	Riparian	Near Shore		
	Soil	Soil	Sediment	Pore Water					
Titanium	--	--	Yes	No	No	No	No	No NOAEL or LOAEL	No effect levels.
Uranium (inorganic)	Yes	No	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Vanadium	No	No	No	No	No	Invertebrate	Clam	NOAEL-based HQ greater than 1 at study sites, LOAEL-based HQ less than 1 at study sites; exposure is less than reference	Further evaluation is not indicated by broad-scale risk results.
Zinc	No	Yes	No	No	Invertebrate	Plant, invertebrate	Invertebrate	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Nitrogen in nitrate	No	No	Yes	No	--	--	--	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Nitrogen in nitrite	No	No	Yes	No	--	--	--	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Phosphorus	No	No	No	Yes	No	No	Clam	No NOAEL or LOAEL	No effect levels.
Benzo[a]anthracene	Yes	No	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Benzo[a]pyrene	Yes	No	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Benzo[b]fluoranthene	Yes	No	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Benzo[ghi]perylene	Yes	No	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Benzo[k]fluoranthene	Yes	No	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Chrysene	Yes	No	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Dibenz[a,h]anthracene	Yes	No	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Indeno[1,2,3-cd]pyrene	Yes	No	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Pyrene	Yes	Yes	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Aroclor-1254	Yes	No	No	No	No	No	No	NOAEL- and LOAEL-based HQs are greater than 1 at study sites; exposure is greater than reference.	Given LOAEL-based HQs greater than 1, evaluate this COPEC further in Section 8.0.
Aroclor-1260	Yes	Yes	No	No	No	Mouse	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Aroclor-1262	Yes	--	--	--	--	--	--	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
TEC bird	--	Yes	No	No	No	Mouse organ	No	LOAEL-based HQs are less than 1 at study sites. No NOAEL.	Further evaluation is not indicated by broad-scale risk results.
TEC mammal	--	Yes	No	No	No	Mouse organ	No	NOAEL- and LOAEL-based HQs are less than 1 at study sites	Further evaluation is not indicated by broad-scale risk results.
Total PCB	--	Yes	No	No	No	Mouse organ	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Aldrin	No	Yes	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
beta-1,2,3,4,5,6-Hexachlorocyclohexane	Yes	No	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
DDE	Yes	No	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.

Table 7-21. Summary of Broad-Scale Wildlife Risk Results for All Contaminants of Potential Ecological Concern. (3 Pages)

COPEC	COPC Refinement Status [a]							Exposure Evaluation at Study Sites Based on Soil, Sediment, Surface Water, and Food	Conclusions
	Abiotic Media				Biotic Media (Tissue)				
	Upland	Riparian	Near Shore		Upland	Riparian	Near Shore		
	Soil	Soil	Sediment	Pore Water					
DDT	Yes	No	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Dieldrin	Yes	Yes	No	No	Plant	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Dichloroprop	Yes	--	--	--	--	--	--	No NOAEL or LOAEL	No effect levels.
Endosulfan I	Yes	No	No	No	No	No	No	NOAEL-based HQs are less than 1; no LOAEL	Further evaluation is not indicated by broad-scale risk results.
Endosulfan II	Yes	No	No	No	No	No	No	NOAEL-based HQs are less than 1; no LOAEL	Further evaluation is not indicated by broad-scale risk results.
Endosulfan sulfate	Yes	Yes	No	No	Invertebrate	No	No	NOAEL-based HQs are less than 1; no LOAEL	Further evaluation is not indicated by broad-scale risk results.
Endrin aldehyde	No	Yes	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Methoxychlor	Yes	No	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Bis[2-ethylhexyl] phthalate	No	Yes	No	No	No	No	No	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.
Total petroleum hydrocarbons-diesel range	--	Yes	No	No	--	--	--	NOAEL- and LOAEL-based HQs are less than 1	Further evaluation is not indicated by broad-scale risk results.

= COPECs have HQ >1 for LOAEL and exposure is greater than reference. Except for aluminum (for reasons stated above), these COPECs are to be further evaluated in Section 8.0.

[a] "Yes" indicates a study site concentration is greater than reference or background concentrations for that receptor group and the COPC was determined to be a COPEC.

-- = not applicable
COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
NOAEL = no observable adverse effect level
PCB = polychlorinated biphenyl
TEC = TCDD (2,3,7,8-Tetrachlorodibenzo-p-Dioxin) equivalent concentration

OSWER Directive 9285.7-60, 2003, *Ecological Soil Screening Levels for Aluminum: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

Table 8-1. Comparison of Sampling and Analysis Plan Indicator Contaminants, Inclusion List Contaminants, and Contaminant Status for the Upland and Riparian Environments. (4 Pages)

Analyte	Terrestrial Indicator Contaminant (SAP)	Waste Site Inclusion Contaminant	Contaminant With Ecological Screening Value Less Than IAROD Cleanup Value	Upland Environment		Riparian Environment	
				COPC	COPEC	COPC	COPEC
Inorganics							
Aluminum	--	--	X	X	--	--	--
Antimony	X	--	X	X	X	--	--
Arsenic	X	--	X	X	X	X	X
Barium	--	--	X	X	X	X	X
Beryllium	--	--	--	X	--	--	--
Boron	--	--	X	X	X	--	--
Cadmium	X	--	X	X	X	X	X
Chromium	X	X	--	X	X	X	X
Cobalt	--	--	X	--	--	--	--
Copper	X	--	--	X	X	X	X
Hexavalent chromium	X	X	--	X	X	X	X
Lead	X	X	--	X	X	X	X
Lithium	X	--	--	--	--	--	--
Manganese	--	--	X	X	X	--	--
Mercury	X	X	X	X	X	X	X
Molybdenum	--	--	X	--	--	--	--
Selenium	--	--	X	X	X	X	X
Silver	X	--	--	X	X	X	X
Strontium (elemental)	--	--	--	X	X	--	--
Thallium	--	--	--	--	--	X	X
Tin	--	--	X	X	X	--	--
Calculated total uranium	X	X	--	X	X	X	X
Uranium (inorganic)	X	X	--	X	X	--	X
Vanadium	--	--	X	--	--	X	X
Zinc	X	--	X	X	X	X	X

Table 8-1. Comparison of Sampling and Analysis Plan Indicator Contaminants, Inclusion List Contaminants, and Contaminant Status for the Upland and Riparian Environments. (4 Pages)

Analyte	Terrestrial Indicator Contaminant (SAP)	Waste Site Inclusion Contaminant	Contaminant With Ecological Screening Value Less Than IAROD Cleanup Value	Upland Environment		Riparian Environment	
				COPC	COPEC	COPC	COPEC
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	X	--	X	X	--	--	--
Acenaphthylene	X	--	X	X	--	--	--
Anthracene	X	--	X	X	--	--	--
Benzo[a]anthracene	--	--	--	X	X	--	--
Benzo[a]pyrene	X	--	--	X	X	--	--
Benzo[ghi]perylene	X	--	X	X	X	--	--
Benzo[b]fluoranthene	--	--	--	X	X	--	--
Benzo[k]fluoranthene	X	--	--	X	X	--	--
Chrysene	X	--	--	X	X	--	--
Dibenz[a,h]anthracene	X	--	--	X	X	--	--
Fluoranthene	X	--	--	X	--	X	
Fluorene	X	--	X	X	--	--	--
Indeno[1,2,3-cd]pyrene	X	--	--	X	X	--	--
Naphthalene	X	--	--	X	--	--	--
Phenanthrene	X	--	X	X	--	--	--
Pyrene	X	--	X	X	X	X	--
Pesticides/Herbicides							
Aldrin	--	--	--	--	--	X	X
beta-1,2,3,4,5,6-Hexachlorocyclohexane	--	--	--	X	X	--	--
Dichlorodiphenyldi-chloroethylene	--	--	--	X	X	--	--
Dichlorodiphenyltri-chloroethane	--	--	--	X	X	--	--
Dichloroprop	--	--	--	X	X	--	--
Dieldrin	--	--	--	X	X	X	--
Endosulfan I	--	--	--	X	X	--	--

Table 8-1. Comparison of Sampling and Analysis Plan Indicator Contaminants, Inclusion List Contaminants, and Contaminant Status for the Upland and Riparian Environments. (4 Pages)

Analyte	Terrestrial Indicator Contaminant (SAP)	Waste Site Inclusion Contaminant	Contaminant With Ecological Screening Value Less Than IAROD Cleanup Value	Upland Environment		Riparian Environment	
				COPC	COPEC	COPC	COPEC
Endosulfan II	--	--	--	X	X	--	--
Endosulfan sulfate	--	--	--	X	X	X	X
Endrin aldehyde	--	--	--	--	--	X	X
Methoxychlor	--	--	--	X	X	--	--
Polychlorinated Biphenyls							
Aroclor-1232	X	--	--	--	--	--	--
Aroclor-1242	X	--	--	--	--	--	--
Aroclor-1254	X	--	--	X	X	--	--
Aroclor-1260	X	--	--	X	X	X	X
Aroclor-1262	--	--	--	X	X	--	--
Total PCBs (congeners)	--	--	--	--	--	X	X
Semivolatile Organic Compounds							
1,2-dichlorobenzene	X	--	--	--	--	--	--
1,2,4-trichlorobenzene	X	--	--	--	--	--	--
2,4,5-trichlorophenol	X	--	X	--	--	--	--
2,4,6-trichlorophenol	X	--	--	--	--	--	--
Dibenzofuran	X	--	--	--	--	--	--
Pentachlorophenol	X	--	--	--	--	--	--
Bis[2-ethylhexyl] phthalate	--	--	--	--	--	X	X
Diethylphthalate	--	--	X	--	--	--	--
Dimethylphthalate	--	--	X	--	--	--	--
4-Nitrophenol	--	--	X	--	--	--	--
Phenol	--	--	X	--	--	X	--

Table 8-1. Comparison of Sampling and Analysis Plan Indicator Contaminants, Inclusion List Contaminants, and Contaminant Status for the Upland and Riparian Environments. (4 Pages)

Analyte	Terrestrial Indicator Contaminant (SAP)	Waste Site Inclusion Contaminant	Contaminant With Ecological Screening Value Less Than IAROD Cleanup Value	Upland Environment		Riparian Environment	
				COPC	COPEC	COPC	COPEC
Total Petroleum Hydrocarbons							
TPH - diesel range	--	--	--	--	--	X	X
Radionuclides							
Carbon-14	--	--	--	--	--	X	--
Cesium-137	X	X	--	X	--	X	--
Cobalt-60	X	X	--	--	--	--	--
Curium-244	--	--	--	X	--	--	--
Europium-152	X	X	--	X	--	X	--
Europium-154	X	X	--	X	--	--	--
Plutonium-238	X	--	--	--	--	--	--
Plutonium-239/240	--	X	--	X	--	--	--
Radium-226	X	--	--	--	--	--	--
Radium-228	X	--	--	--	--	--	--
Strontium-90	X	X	--	X	--	X	--
Tecnetium-99	--	--	--	--	--	X	--
Thorium-228	X	--	--	--	--	--	--
Thorium-232	X	--	--	--	--	--	--
Uranium-233/234	X	X	--	X	--	X	--
Uranium-235	X	X	--	--	--	--	--
Uranium-238	X	X	--	X	--	X	--

-- = not applicable
COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern
IAROD = interim action record of decision
PCB = polychlorinated biphenyl
SAP = sampling and analysis plan
TPH = total petroleum hydrocarbons

Table 8-2. Summary of Upland Conclusions.

COEC	Step 6 Site Characterization and Data Analysis												Step 7 Risk Characterization					
	Maximum Soil RC (mg/kg) [a]		Background 90th Percentile (mg/kg)		COPC Refinement [b]					Soil Screening Values (mg/kg) [c]			Plant (mg/kg) [d]		Invertebrate (mg/kg) [d]		Maximum Wildlife LOAEL HQ [e]	
	Study Site	Reference Site	Hanford Site	Yakima Basin	Soil	Plant	Invertebrate	Mammal Organ	Mammal Carcass	Plant	Invertebrate	Wildlife	Benchmark	Site-Specific NOEC [f]	Benchmark	Site-Specific NOEC [f]	Study Site	Reference Site
Antimony	6.1	0.3	NA	NA	**Yes**	No	No	No	No	0.05	78	0.26	5	ND	78	6.1	0.30	0.30
Arsenic	14	4.3	6.47	5	**Yes**	No	**Yes**	No	No	10	6.8	7	10	16	60	10.9	0.90	0.57
Barium	410	133	132	NA	**Yes**	No	No	No	No	110	330	102	500	314	330	358	0.20	0.30
Boron	36	2.6	NA	NA	**Yes**	**Yes**	No	No	No	0.5	NA	2.0	0.5	29.6	NV	28.6	0.70	0.33
Copper	58	22	22	26.5	**Yes**	No	**Yes**	No	No	70	50	15	70	38.5	50	45.6	1.1	0.84
Lead	510	9.0	10.2	11	**Yes**	No	No	No	**Yes**	50	500	11	50	-- [g]	1,700	116	2.2	0.09
Mercury	0.14	0.022	0.33	0.05	**Yes**	No	No	No	No	0.3	0.05	0.013	0.3	ND	0.1	0.14	0.05	0.72
Dieldrin	0.007	ND	NA	NA	**Yes**	**Yes**	No	Not measured	No	10	NA	0.0045	NV	Not measured	NV	Insufficient data	6.6	ND

[a] Soil RCs include *MULTI INCREMENT®* sampling samples and discrete samples.
[b] Cells are coded based on statistical tests and narrative analysis comparing study site concentrations to reference or background concentrations. "Yes" indicates a study site concentration exceeded reference or background concentrations for that receptor group.
[c] Cells are shaded gray if the maximum study site soil concentration is greater than plant, invertebrate, or wildlife soil screening values.
[d] Cells are shaded based on risk characterization results: green if maximum study site concentrations are less than or equal to the benchmark, yellow if the maximum study site concentration is greater than the benchmark.
[e] Cells are shaded based on risk characterization results: green if LOAEL HQ is less than or equal to 1, yellow if LOAEL HQ is greater than 1.
[f] Site-specific NOEC is the maximum concentration from the bioassay unless there were insufficient data or a gradient suggesting adverse effects from the COEC. The site-specific NOEC is shaded as described in footnote "d" if the value is greater than the benchmark.
[g] There was a statistical relationship for two bioassay measures among nine, suggesting the potential for adverse effects. In addition, the maximum concentration tested with the bioassay (102 mg/kg) was less than the maximum concentration evaluated (510 mg/kg).

-- = not applicable
COEC = contaminant of ecological concern
COPC = contaminant of potential concern
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
NA = not available
ND = not detected
NOEC = no observed effect concentration
NV = no value
RC = representative concentration

Table 8-3. Summary of Riparian Conclusions.

COEC	Step 6 Site Characterization and Data Analysis												Step 7 Risk Characterization					
	Maximum Soil RC (mg/kg) [a]		Background 90th Percentile (mg/kg)		COPC Refinement [b]					Soil Screening Values (mg/kg) [c]			Plant (mg/kg) [d]		Invertebrate (mg/kg) [d]		Maximum Wildlife LOAEL HQ [e]	
	Study Site	Reference Site	Hanford Site	Yakima Basin	Soil	Plant	Invertebrate	Mammal Organ	Mammal Carcass	Plant	Invertebrate	Wildlife	Benchmark	Site-Specific NOEC [f]	Benchmark	Site-Specific NOEC [f]	Study Site	Reference Site
Arsenic	13.1	9.9	6.47	5	**Yes**	No	No	No	No	10	6.8	7	10	19.3	60	12.2	0.34	0.36
Chromium	171	28.6	18.5	38.3	**Yes**	No	No	No	No	2.4	2.3	26	42	-- [g]	42	149	0.88	0.28
Lead	125	67.9	10.2	11	**Yes**	No	**Yes**	**Yes**	**Yes**	50	500	11	50	125	1,700	83.5	0.36	0.30
Mercury	0.16	0.11	0.33	0.05	**Yes**	No	**Yes**	No	No	0.3	0.05	0.013	0.3	0.13	0.1	0.13	0.20	0.06
Zinc	621	326	67.8	78.7	**Yes**	**Yes**	No	No	No	86	120	46	50	621	100	393	1.1	0.45
TPH- D	570	Not measured	NA	NA	**Yes**	Not measured				NV	200	6,000	NV	Not measured	200	Not measured	<0.01	ND

[a] Soil RCs include *MULTI INCREMENT*® sampling and discrete samples.
[b] Cells are coded based on statistical tests and narrative analysis comparing study site concentrations to reference or background concentrations. "Yes" indicates a study site concentration exceeded reference or background concentrations for that receptor group.
[c] Cells are shaded gray if the maximum study site soil concentration is greater than plant, invertebrate, or wildlife soil screening values.
[d] Cells are shaded based on risk characterization results: green if maximum study site concentrations are less than or equal to the benchmark, yellow if the maximum study site concentration is greater than the benchmark.
[e] Cells are shaded based on risk characterization results: green if LOAEL HQ is less than or equal to 1, yellow if the LOAEL HQ is greater than 1.
[f] Site-specific NOEC is the maximum concentration from the bioassay unless there were insufficient data or a gradient suggesting adverse effects from the COEC. The site-specific NOEC is shaded as described in footnote "d" if the value is greater than the benchmark.
[g] There was a statistical relationship for one bioassay measure among nine, suggesting the potential for adverse effects. In addition, the maximum concentration tested with the bioassay (39.3 mg/kg) was less than the maximum concentration evaluated (141 mg/kg).

-- = not applicable
COEC = contaminant of ecological concern
COPC = contaminant of potential concern
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
NA = not available
ND = not detected
NOEC = no observed effect concentration
NV = no value
RC = representative concentration
TPH – D = total petroleum hydrocarbons – diesel range

Table 8-4. Comparison of Sampling and Analysis Plan Indicator Contaminants, Inclusion List Contaminants, and Contaminants of Potential Ecological Concern for the Near-Shore Environment. (2 Pages)

Analyte	Near-Shore Indicator Contaminant (SAP)	Groundwater Inclusion List Contaminant	Near-Shore Environment	
			COPC	COPEC
Inorganics				
Aluminum	X	--	X	X
Antimony	X	--	X	X
Arsenic	X	--	--	--
Barium	X	--	X	X
Beryllium	X	--	--	--
Cadmium	X	--	X	X
Chromium	X	X	X	X
Copper	X	--	X	X
Fluoride	--	--	X	--
Hexavalent chromium	X	X	X	X
Iron	X	--	--	--
Lead	X	--	X	X
Manganese	X	--	X	X
Mercury	X	--	X	X
Nickel	X	--	X	X
Nitrogen in nitrate	X	X	X	X
Nitrogen in nitrite	--	--	X	X
Phosphorus	--	--	X	X
Selenium	--	--	X	X
Silver	X	--	--	--
Strontium (elemental)	--	--	X	X
Sulfate	--	X	--	--
Tin	X	--	X	X
Titanium	--	--	X	X
Tributyl phosphate	--	X	--	--
Calculated total uranium	X	X	X	X
Uranium (inorganic)	X	X	--	X
Vanadium	X	--	X	X
Zinc	X	--	X	X
Polychlorinated Biphenyl				
Aroclor-1254	X	--	--	--
Pesticide				
Methoxychlor	X	--	--	--

Table 8-4. Comparison of Sampling and Analysis Plan Indicator Contaminants, Inclusion List Contaminants, and Contaminants of Potential Ecological Concern for the Near-Shore Environment. (2 Pages)

Analyte	Near-Shore Indicator Contaminant (SAP)	Groundwater Inclusion List Contaminant	Near-Shore Environment	
			COPC	COPEC
Total Petroleum Hydrocarbons				
TPH	X	X	--	--
TPH - diesel range	X	X	--	--
TPH - gasoline range	X	X	--	--
Volatile Organic Compounds				
cis-1,2-dichloroethene	--	X	--	--
Tetrachloroethene	--	X	--	--
Trichloroethene	--	X	--	--
Radionuclides				
Carbon-14	X	X	X	--
Cesium-137	X	--	X	--
Cobalt-60	X	--	--	--
Plutonium-238	--	--	X	--
Plutonium-239/240	--	--	X	--
Radium-226	X	--	--	--
Radium-228	X	--	--	--
Strontium-90	X	X	X	--
Technetium-99	--	X	X	--
Thorium-232	X	--	--	--
Tritium	X	X	X	--
Uranium-233/234	X	X	X	--
Uranium-235	X	X	X	--
Uranium-238	X	X	X	--

-- = not applicable
COPC = contaminant of potential concern
COPEC = contaminant of potential ecological concern
SAP = sampling and analysis plan
TPH = total petroleum hydrocarbons

Table 8-5. Summary of Near-Shore Conclusions (Step 6).

COEC	Step 6 Site Characterization and Data Analysis													
	Maximum Sediment RC (mg/kg)		Maximum Pore Water RC (µg/L)		COPC Refinement [a]						Ecological Screening Values [b]			
					Sediment	Pore Water	Tissue				Sediment (mg/kg)		Pore Water (µg/L)	
	Study Site	Reference Site	Study Site	Reference Site			Aquatic Invertebrate	Clam	Fish Organ	Fish Tissue	Sediment Biota	Wildlife	Aquatic Biota	Wildlife
Cadmium	2.4	2.2	0.27	0.85	**Yes**	No	No	No	No	No	0.6	0.33	0.19	4,800
Chromium	286	21	43.8	1.5	**Yes**	**Yes**	No	No	No	**Yes**	26	1,500	55	49,000
Hexavalent chromium	8.41	ND	42	ND	**Yes**	**Yes**	Not measured				NV	680	10	7,100
Manganese	924	577	1,640	1,210	**Yes**	No	No	**Yes**	No	No	460	5,300	50	190,000
Uranium [c]	15.4	2.93	141	ND	**Yes**	**Yes**	No	No	No	No	100	1,100	0.5	27,000

[a] Cells are coded based on statistical tests and narrative analysis comparing the study site concentrations to reference concentrations. "Yes" indicates a study site concentration exceeded reference concentrations for that receptor group.
[b] Cells are shaded gray if the maximum study site concentration is greater than sediment or pore-water screening values.
[c] Refers to both calculated total uranium and uranium (inorganic).

COEC = contaminant of ecological concern
COPC = contaminant of potential concern
ND = not detected
NV = no value
RC = representative concentration

Table 8-6. Summary of Near-Shore Conclusions (Step 7).

COEC	Step 7 Risk Characterization															
	Maximum Sediment RC (mg/kg)		Sediment (mg/kg) [a]		Maximum Pore Water RC (µg/L)		Water Standards or Criteria (µg/L) [a]		Plants (µg/L) [a]	Aquatic Invertebrates (µg/L) [a]		Amphibians (µg/L) [a]		Fish (µg/L) [a]	Maximum Wildlife LOAEL HQ [b]	
	Study Site	Reference Site	Benchmark	Site-Specific NOEC [c]	Study Site	Reference Site	Chronic	Acute	Benchmark	Benchmark	Site-Specific NOEC [c]	Benchmark	Site-Specific NOEC [c]	Benchmark	Study Site	Reference Site
Cadmium	2.4	2.2	1.0	2.4	0.27	0.85	0.19	1.4	--	--	Insufficient data	--	Insufficient data	--	0.25	0.08
Chromium	286	21	100	47.1	43.8	1.5	55	410	--	--	43.8	--	43.8	--	1.2	0.19
Hexavalent chromium	8.4	ND	NV	0.98	42	ND	10	15	--	--	40	--	40	--	0.02	ND
Manganese	924	577	460	924	1,640	1,210	NV	NV	190	6,500	1,640	NV	-- [d]	655	0.17	0.11
Uranium [e]	15.4	2.9	100	15.4	141	4.3	NV	NV	14	30	141	NV	141	910	0.03	<0.01

[a] Cells are shaded based on risk characterization results: green if maximum study site concentrations are less than or equal to the benchmark, yellow if the maximum study site concentration is greater than the benchmark.
[b] Cells are shaded based on risk characterization results: green if LOAEL HQ is less than or equal to 1, yellow if LOAEL HQ is greater than 1.
[c] Site-specific NOEC is the maximum concentration from the bioassay unless there were insufficient data or a gradient suggesting adverse effects from the COEC. The site-specific NOEC is shaded as described in footnote "a" if the value is greater than the benchmark.
[d] There was a statistical relationship for one bioassay measure among three, suggesting the potential for adverse effects.
[e] Refers to both calculated total uranium and uranium (inorganic).

-- = not applicable
COEC = contaminant of ecological concern
HQ = hazard quotient
LOAEL = lowest observable adverse effect level
ND = not detected
NOEC = no observed effect concentration
NV = no value
RC = representative concentration

Table 8-7. Basis for Soil Ecological Preliminary Remediation Goals for Plants. (2 Pages)

Analyte	Hanford Site Background Values	Maximum Upland Reference RC	Screening Values					Site-Specific Bioassay Results				Potential PRG	Notes
			WAC Table 749-3	ORNL Value	Confidence	Eco-SSL	Confidence	Number of Sites Tested	Significant Endpoints/ Total Endpoints	Site-Specific NOEC	Confidence		
Inorganics (mg/kg)													
Aluminum	11,800	12,000	50	50	Low	pH <5.5 only	Moderate-high	27	0/9	12,000	Moderate	None	Toxicity if soil pH<5.5 [a]
Antimony	NA	0.3	5	5	Low	NV	--	3	0/0	0.685	Low	5	Screening value with low confidence
Arsenic	6.47	4.29	10	10	Moderate	18	Moderate-high	27	0/9	19.3	Moderate-high	19.3	Site-specific NOEC moderate-high confidence
Barium	132	133	500	500	Low	NV	--	27	0/9	314	Moderate	500	Screening value with low confidence
Boron	NA	3.1	0.5	0.5	Low	NV	--	24	0/9	29.6	Moderate-high	29.6	Site-specific NOEC moderate-high confidence
Cadmium	NA	0.22	4	4	High	32	Moderate-high	21	0/9	2.7	Moderate-high	4	Screening value with high confidence
Chromium	18.5	15.6	42	1	Low	NV	--	27	1/9	39.3	Low	42	Screening value from WAC Table 749-3
Hexavalent chromium	NA	0.49	NV	NV	--	NV	--	11	0/9	0.3	Moderate	None	No screening values available
Cobalt	15.7	12.4	20	20	Low	13	Moderate-high	27	0/9	11.2	Low	13	Screening value with moderate-high confidence, which is less than Hanford Site background
Copper	22	21.9	100	100	Low	70	Moderate-high	27	0/9	53.6	Moderate-high	70	Screening value with moderate-high confidence
Lead	10.2	8.97	50	50	Moderate	120	Moderate-high	27	0/9	125	Moderate-high	125	Site-specific NOEC moderate-high confidence
Lithium	33.5	11.2	35	2	Low	NV	--	27	0/9	13.3	Low	35	Screening value from WAC Table 749-3
Manganese	512	562	1,100	500	Low	220	Moderate-high	27	0/9	558	Moderate	558	Site-specific NOEC moderate confidence
Mercury	0.33	0.022	0.3	0.3	Low	NV	--	16	0/9	0.126	Moderate	0.3	Screening value with low confidence
Molybdenum	NA	0.94	2	2	Low	NV	--	17	0/9	1.2	Moderate	2	Screening value with low confidence
Nickel	19.1	16.8	30	30	Low	38	Moderate-high	27	0/9	24.8	Moderate	38	Screening value with moderate-high confidence
Selenium	NA	1.2	1	1	Low	0.52	Moderate-high	3	0/0	1.2	Low	1.2	Site-specific NOEC low confidence
Silver	0.73	ND	2	2	Low	560	Moderate-high	3	0/0	0.12	Low	560	Screening value with moderate-high confidence
Tin	NA	1.4	50	50	Low	NV	--	17	0/9	14.2	Moderate-high	50	Screening value with low confidence
Uranium	3.21	1.18	5	5	Low	NV	--	17	0/9	8.10	Moderate	250	Screening value from Sheppard et al. 2005
Vanadium	85.1	71	2	2	Low	NV	--	27	1/9	84.7	Low	84.7	Site-specific NOEC low confidence
Zinc	67.8	58.1	86	50	Moderate	160	Moderate-high	27	0/9	621	Moderate-high	621	Site-specific NOEC moderate-high confidence
Organics (mg/kg)													
Acenapthene	NA	ND	20	20	Low	NV	--	3	0/0	0.51	Low	20	Screening value with low confidence
Acenapthylene	NA	ND	NV	NV	--	NV	--	1	0/0	0.003	Low	None	No screening values available
Anthracene	NA	0.009	NV	NV	--	NV	--	5	0/0	0.014	Low	None	No screening values available
Benzo(g,h,i)perylene	NA	0.004	NV	NV	--	NV	--	6	0/0	0.18	Low	None	No screening values available
Fluorene	NA	0.009	NV	NV	--	NV	--	5	0/0	0.036	Low	None	No screening values available
Phenanthrene	NA	0.018	NV	NV	--	NV	--	8	0/9	0.076	Low	None	No screening values available
Pyrene	NA	0.008	NV	NV	--	NV	--	7	0/0	0.053	Low	None	No screening values available
TPH (gasoline range)	NA	Not measured	NV	NV	--	NV	--	0	--	Not measured	--	None	No screening values available
Diethylphthalate	NA	ND	100	100	Low	NV	--	7	0/0	0.054	Low	100	Screening value with low confidence
Dinitrophenol; 2,4-	NA	ND	20	20	Moderate	NV	--	0	--	ND	--	20	Screening value with moderate confidence
Dimethylphthalate	NA	ND	NV	NV	--	NV	--	0	--	ND	--	None	No screening values available
Nitrophenol; 4-	NA	ND	NV	NV	--	NV	--	0	--	ND	--	None	No screening values available
Phenol	NA	0.018	70	70	Low	NV	--	11	0/9	0.127	Moderate	70	Screening value with low confidence
Trichlorophenol; 2,4,5-	NA	ND	4	4	Low	NV	--	0	--	ND	--	4	Screening value with low confidence
Aroclor-1254	NA	ND	40	40	Low	NV	--	1	0/0	0.018	Low	40	Screening value with low confidence
Dichloroprop	NA	0.26	NV	NV	--	NV	--	0	--	Not measured	--	None	No screening values available

Table 8-7. Basis for Soil Ecological Preliminary Remediation Goals for Plants. (2 Pages)

Analyte	Hanford Site Background Values	Maximum Upland Reference RC	Screening Values					Site-Specific Bioassay Results				Potential PRG	Notes
			WAC Table 749-3	ORNL Value	Confidence	Eco-SSL	Confidence	Number of Sites Tested	Significant Endpoints/ Total Endpoints	Site-Specific NOEC	Confidence		
DDE	NA	0.0067	NV	NV	--	NV	--	10	0/9	0.011	Low	None	No screening values available
DDT	NA	ND	NV	NV	--	NV	--	4	0/0	0.0025	Low	None	No screening values available
Dieldrin	NA	ND	NV	NV	--	NV	--	3	0/0	0.022	Low	None	No screening values available

= Lowest value for group of parameters.

[a] The Eco-SSL indicates aluminum toxicity based on pH, specifically pH <5.5, therefore aluminum is nontoxic in soils evaluated in the RCBRA which are in the circumneutral pH range (OSWER Directive 9285.7-60, 2003, *Ecological Soil Screening Level for Aluminum: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.).

-- = not applicable
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
Eco-SSL = ecological soil screening level
NA = not available
ND = nondetect
NOEC = no observed effect concentration
NV = no value
ORNL = Oak Ridge National Laboratory
pH = the reciprocal of the hydrogen-ion concentration used as a measure of acidity or basicity
PRG = preliminary remediation goal
RC = representative concentration
RCBRA = River Corridor Baseline Risk Assessment
TPH = total petroleum hydrocarbons
WAC = *Washington Administrative Code*

Table 8-8. Basis for Soil Ecological Preliminary Remediation Goals for Invertebrates. (2 Pages)

Analyte	Hanford Site Background Values	Maximum Upland Reference RC	Screening Values					Site-Specific Bioassay Results				Potential PRG	Notes
			WAC Table 749-3	ORNL Value	Confidence	Eco-SSL	Confidence	Number of Sites Tested	Significant Endpoints/ Total Endpoints	Site-Specific NOEC	Confidence		
Inorganics (mg/kg)													
Aluminum	11,800	12,000	NV	NV	--	pH <5.5 only	Moderate-high	55	0/1	11,680	Moderate	None	Toxicity if soil pH<5.5 [a]
Antimony	NA	0.3	NV	NV	--	78	Moderate-high	13	0/1	6.1	Moderate-high	78	Screening value with moderate-high confidence
Arsenic	6.47	4.29	60	60	Low	NV	--	55	0/1	12.2	Moderate-high	60	Screening value with low confidence
Barium	132	133	NV	NV	--	330	Moderate-high	55	0/1	358	Moderate-high	358	Site-specific NOEC moderate-high confidence
Boron	NA	3.1	NV	NV	--	NV	--	54	0/1	28.6	Moderate-high	None	No screening values available
Cadmium	NA	0.22	20	20	Moderate	140	Moderate-high	43	0/1	2.54	Moderate-high	20	Screening value with moderate confidence
Chromium	18.5	15.6	42	0.4	Low	NV	--	55	0/1	149	Moderate-high	149	Site-specific NOEC moderate-high confidence
Hexavalent chromium	NA	0.49	NV	NV	--	NV	--	40	0/1	0.596	Moderate	None	No screening values available
Cobalt	15.7	12.4	NV	NV	--	NV	--	54	0/1	12.2	Moderate	None	No screening values available
Copper	22	21.9	50	60	Moderate	80	Moderate-high	55	0/1	45.6	Moderate-high	50	Screening value from WAC Table 749-3
Lead	10.2	8.97	500	500	Low	1,700	Moderate-high	55	0/1	116	Moderate-high	1,700	Screening value with moderate-high confidence
Lithium	33.5	11.2	NV	NV	--	NV	--	54	0/1	13.6	Moderate	None	No screening values available
Manganese	512	562	NV	NV	--	450	Moderate-high	55	0/1	570	Moderate	570	Site-specific NOEC moderate confidence
Mercury	0.33	0.022	0.1	0.1	Low	NV	--	35	0/1	0.136	Moderate	0.136	Site-specific NOEC moderate confidence
Molybdenum	NA	0.94	NV	NV	--	NV	--	40	0/1	1.09	Moderate	None	No screening values available
Nickel	19.1	16.8	200	200	Low	280	Moderate-high	55	0/1	24.8	Moderate	280	Screening value with moderate-high confidence
Selenium	NA	1.2	70	70	Low	4.1	Moderate-high	8	0/1	0.973	Low	4.1	Screening value with moderate-high confidence
Silver	0.73	ND	NV	NV	--	NV	--	8	0/1	0.344	Low	None	No screening values available
Tin	NA	1.4	NV	NV	--	NV	--	31	0/1	19.0	Moderate	None	No screening values available
Uranium	3.21	1.18	NV	NV	--	NV	--	53	0/1	4.53	Moderate	None	No screening values available
Vanadium	85.1	71	NV	NV	--	NV	--	55	0/1	84.7	Moderate	None	No screening values available
Zinc	67.8	58.1	200	100	Moderate	120	Moderate-high	55	0/1	393	Moderate-high	393	Site-specific NOEC moderate-high confidence
Organics (mg/kg)													
Acenapthene	NA	ND	NV	NV	--	29	Moderate-high	10	0/1	0.2	Moderate	29	Screening value with moderate-high confidence
Acenapthylene	NA	ND	NV	NV	--	29	Moderate-high	5	0/0	0.74	Low	29	Screening value with moderate-high confidence
Anthracene	NA	0.009	NV	NV	--	29	Moderate-high	19	0/1	0.11	Moderate	29	Screening value with moderate-high confidence
Benzo(g,h,i)perylene	NA	0.004	NV	NV	--	18	Moderate-high	24	0/1	0.14	Moderate	18	Screening value with moderate-high confidence
Fluorene	NA	0.009	30	30	Low	29	Moderate-high	15	0/1	0.029	Moderate	29	Screening value with moderate-high confidence
Phenanthrene	NA	0.018	NV	NV	--	29	Moderate-high	31	0/1	0.205	Moderate	29	Screening value with moderate-high confidence
Pyrene	NA	0.008	NV	NV	--	18	Moderate-high	30	0/1	0.372	Moderate	18	Screening value with moderate-high confidence
TPH (gasoline range)	NA	Not measured	100	NV	--	NV	--	0	--	Not measured	--	100	Screening value from WAC Table 749-3
Diethylphthalate	NA	ND	NV	NV	--	NV	--	9	0/1	0.054	Low	None	No screening values available
Dinitrophenol; 2,4-	NA	ND	NV	NV	--	NV	--	0	--	ND	--	None	No screening values available
Dimethylphthalate	NA	ND	200	200	Low	NV	--	0	--	ND	--	200	Screening value with low confidence
Nitrophenol; 4-	NA	ND	7	7	Low	NV	--	0	--	ND	--	7	Screening value with low confidence
Phenol	NA	0.018	30	30	Low	NV	--	21	0/1	0.127	Moderate	30	Screening value with low confidence
Trichlorophenol; 2,4,5-	NA	ND	9	9	Low	NV	--	0	--	ND	--	9	Screening value with low confidence
Aroclor-1254	NA	ND	NV	NV	--	NV	--	8	1/1	2.05	Low	None	No screening values available
Dichloroprop	NA	0.26	NV	NV	--	NV	--	23	0/1	0.684	Moderate	None	No screening values available
DDE	NA	0.0067	NV	NV	--	NV	--	28	0/1	0.113	Moderate	None	No screening values available

Table 8-8. Basis for Soil Ecological Preliminary Remediation Goals for Invertebrates. (2 Pages)

Analyte	Hanford Site Background Values	Maximum Upland Reference RC	Screening Values					Site-Specific Bioassay Results				Potential PRG	Notes
			WAC Table 749-3	ORNL Value	Confidence	Eco-SSL	Confidence	Number of Sites Tested	Significant Endpoints/ Total Endpoints	Site-Specific NOEC	Confidence		
DDT	NA	ND	NV	NV	--	NV	--	15	0/1	0.372	Moderate	None	No screening values available
Dieldrin	NA	ND	NV	NV	--	NV	--	4	0/0	0.0041	Low	None	No screening values available

= Lowest value for group of parameters.

[a] The Eco-SSL indicates aluminum toxicity based on pH, specifically pH <5.5, therefore aluminum is nontoxic in soils evaluated in the RCBRA which are in the circumneutral pH range (OSWER Directive 9285.7-60, 2003, *Ecological Soil Screening Level for Aluminum: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.)

-- = not applicable
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
Eco-SSL = ecological soil screening level
NA = not available
ND = nondetect
NOEC = no observed effect concentration
NV = no value
ORNL = Oak Ridge National Laboratory
pH = the reciprocal of the hydrogen-ion concentration used as a measure of acidity or basicity
PRG = preliminary remediation goal
RC = representative concentration
RCBRA = River Corridor Baseline Risk Assessment
TPH = total petroleum hydrocarbons
WAC = *Washington Administrative Code*

Table 8-9. Summary of Lowest Observable Adverse Effect Level-Based Tier 1 Refined Ecological Preliminary Remediation Goals for Wildlife. (2 Pages)

Analyte	Hanford Site Background Values	Maximum Upland Reference RC	Screening Value			Tier 1 PRG for Wildlife								Tier 1 Wildlife PRG [a]	
						Bird Receptors				Mammal Receptors					
			WAC Table 749-3 Wildlife	Eco-SSL Bird	Eco-SSL Mammal	California Quail	Meadowlark	Killdeer	Red-Tailed Hawk	Great Basin Pocket Mouse	Deer Mouse	Grasshopper Mouse	Badger	Bird	Mammal
Inorganics (mg/kg)															
Aluminum	11,800	12,000	NV	-- [b]	-- [b]	-- [b]	-- [b]	-- [b]	-- [b]	-- [b]	-- [b]	-- [b]	-- [b]	-- [b]	-- [b]
Antimony	NA	0.3	NV	NV	0.27	NV	NV	NV	NV	97	7	6	167	NV	6
Arsenic	6.47	4.29	7	43	NV	8,104	10,559	2,132	45,439	459	190	318	881	2,132	190
Barium	132	133	102	NV	2,000	2,464	2,548	1,323	28,954	3,470	3,148	7,676	31,405	1,323	3,148
Boron	NA	3.1	NV	NV	NV	222	300	485	2,766	133	167	949	2,563	222	133
Cadmium	NA	0.22	14	0.77	0.36	278	5	2	2,335	2,065	28	24	5,228	2	24
Chromium	18.5	15.6	67	26	34	349	101	38	1,355	1,284	299	313	3,536	38	299
Hexavalent chromium	NA	0.49	NV	NV	130	NV	NV	NV	NV	5,340	1,245	1,300	16,583	NV	1,245
Cobalt	15.7	12.4	NV	120	230	1,461	313	111	1,633	3,233	388	372	1,869	111	372
Copper	22	21.9	217	28	49	1,914	272	107	13,021	1,894	176	182	4,672	107	176
Lead	10.2	8.97	118	11	56	537	115	36	2,433	2,544	332	336	4,108	36	332
Lithium	33.5	11.2	NV	NV	NV	NV	NV	NV	NV	6,379	2,517	3,498	515	NV	515
Manganese	512	562	1,500	4,300	4,000	31,823	48,820	19,636	221,536	5,828	5,798	27,720	28,213	19,636	5,798
Mercury	0.33	0.022	5.5	NV	NV	36	21	4	134	8	2	3	43	4	2
Molybdenum	NA	0.94	7	NV	NV	345	270	179	977	17	14	28	71	179	14
Nickel	19.1	16.8	980	210	130	1,912	136	53	11,076	676	36	33	1,438	53	33
Selenium	NA	1.2	0.3	1.2	0.63	10	8	4	417	3	2	3	60	4	2
Silver	0.73	ND	NV	4.2	14	3,453	128	50	20,437	14,418	346	300	30,959	50	300
Tin	NA	1.4	NV	NV	NV	204	318	575	4,603	279	377	4,025	7,639	204	279
Uranium	3.21	1.18	NV	NV	NV	NV	NV	NV	NV	1,217	786	1,494	3,383	NV	786
Vanadium	85.1	71	NV	7.8	280	134	116	31	537	2,723	1,153	1,668	3,723	31	1,153
Zinc	67.8	58.1	360	46	79	5,015	726	68	71,294	4,661	644	810	38,866	68	644
Organics (mg/kg)															
Acenapthene	NA	ND	NV	NV	100 [c]	68,306	2,849	1,096	383,617	142,500	2,793	2,422	193,905	1,096	2,422
Acenapthylene	NA	ND	NV	NV	100 [c]	43,766	186	74	383,617	54,132	183	156	193,905	74	156
Anthracene	NA	0.009	NV	NV	100 [c]	43,400	1,720	678	383,617	NV	NV	NV	NV	678	NV
Aroclor-1254	NA	ND	0.65 [d]	NV	NV	115	3.6	1.8	273	35	1.6	1.5	91	1.8	1.5
Benzo(g,h,i)perylene	NA	0.004	NV	NV	1.1 [e]	NV	NV	NV	NV	89	32	35	5,540	NV	32
DDE	NA	0.0067	0.75	0.093 [f]	0.021 [f]	300	2.3	0.8	1.7	136	0.7	0.6	0.4	0.8	0.4
DDT	NA	ND	0.75	0.093 [f]	0.021 [f]	300	3.5	1.2	46.3	136	1.0	0.9	12.7	1.2	0.9
Dichloroprop	NA	0.26	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV
Dieldrin	NA	ND	0.07	0.022	0.0049	6.1	0.20	0.08	5.2	0.57	0.02	0.02	0.69	0.08	0.02
Diethylphthalate	NA	ND	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV
Dinitrophenol; 2,4-	NA	ND	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV
Dimethylphthalate	NA	ND	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV
Fluorene	NA	0.009	NV	NV	100 [c]	68,306	446	175	383,617	101,796	313	267	138,503	175	267
Nitrophenol; 4-	NA	ND	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV
Phenanthrene	NA	0.018	NV	NV	100 [c]	56,061	2,406	943	383,617	NV	NV	NV	NV	943	NV
Phenol	NA	0.018	NV	NV	NV	NV	NV	NV	NV	14,657	1,578	1,511	17,756	NV	1,511
Pyrene	NA	0.008	NV	NV	1.1 [e]	NV	NV	NV	NV	1,375	600	727	69,252	NV	600

Table 8-9. Summary of Lowest Observable Adverse Effect Level-Based Tier 1 Refined Ecological Preliminary Remediation Goals for Wildlife. (2 Pages)

Analyte	Hanford Site Background Values	Maximum Upland Reference RC	Screening Value			Tier 1 PRG for Wildlife								Tier 1 Wildlife PRG [a]	
						Bird Receptors				Mammal Receptors					
			WAC Table 749-3 Wildlife	Eco-SSL Bird	Eco-SSL Mammal	California Quail	Meadowlark	Killdeer	Red-Tailed Hawk	Great Basin Pocket Mouse	Deer Mouse	Grasshopper Mouse	Badger	Bird	Mammal
Trichlorophenol; 2,4,5-	NA	ND	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV
TPH (gasoline range)	NA	Not measured	500	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV

= Lowest Tier 1 refined preliminary remediation goal for bird receptors.
= Lowest Tier 1 refined preliminary remediation goal for mammal receptors.

[a] Tier 2 wildlife PRGs are preferable to Tier 1, provided that Tier 2 have at least moderate confidence.
[b] The Eco-SSL indicates aluminum toxicity based on pH, specifically pH <5.5, and therefore aluminum nontoxic in RCBRA soil circumneutral pH range (OSWER Directive 9285.7-60, 2003, Ecological Soil Screening Level for Aluminum: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.).
[c] Total value for low-molecular-weight PAHs.
[d] Total PCBs.
[e] Total value for high-molecular-weight PAHs.
[f] Total value for DDT and metabolites.

-- = not applicable
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
Eco-SSL = ecological soil screening level
NA = not available
ND = nondetect
NV = no value
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RC = representative concentration
RCBRA = River Corridor Baseline Risk Assessment
TPH = total petroleum hydrocarbons
WAC = *Washington Administrative Code*

Table 8-10. Summary of Tier 2 Ecological Preliminary Remediation Goals for Wildlife. (2 Pages)

Analyte	Hanford Site Background Values	Maximum Upland Reference RC	Screening Value			Tier 2 PRG for Wildlife								Confidence	Tier 2 Wildlife PRG	
						Bird Receptors				Mammal Receptors						
			WAC Table 749-3 Wildlife	Eco-SSL Bird	Eco-SSL Mammal	California Quail	Meadowlark	Killdeer	Red-Tailed Hawk	Great Basin Pocket Mouse	Deer Mouse	Grasshopper Mouse	Badger		Bird	Mammal
Inorganics (mg/kg)																
Aluminum	11,800	12,000	NV	-- [a]	-- [a]	-- [a]	-- [a]	-- [a]	-- [a]	-- [a]	-- [a]	-- [a]	-- [a]	--	-- [a]	-- [a]
Antimony	NA	0.3	NV	NV	0.27	NTD	NTD	NTD	NTD	231	146	366	NBD	Moderate	NV	146
Arsenic	6.47	4.29	7	43	NV	4,776	7,403	2,284	40,102	201	127	302	847	High	2,284	127
Barium	132	133	102	NV	2,000	1,721	2,335	1,687	8,101	2,265	2,617	11,873	12,430	Moderate	1,687	2,265
Boron	NA	3.1	NV	NV	NV	248	144	91	2,714	122	91	170	2,516	Moderate	91	91
Cadmium	NA	0.22	14	0.77	0.36	294	103	29	1,711	2,203	624	858	4,704	High	29	624
Chromium	18.5	15.6	67	26	34	193	221	109	2,595	544	517	1,424	4,918	Moderate	109	517
Hexavalent chromium	NA	Not measured	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	--	NV	NV [b]
Cobalt	15.7	12.4	NV	120	230	1,397	2,050	484	4,798	2,901	2,136	5,610	4,234	Moderate	484	2,136
Copper	22	21.9	217	28	49	2,020	1,532	213	12,881	2,176	579	1,217	4,631	High	213	579
Lead	10.2	8.97	118	11	56	559	664	156	2,300	2,672	1,578	3,807	3,966	High	156	1,578
Lithium	33.5	11.2	NV	NV	NV	NV	NV	NV	NV	1,664	1,797	8,347	6,522	Moderate	NV	1,664
Manganese	512	562	1,500	4,300	4,000	20,746	26,026	14,407	150,899	3,322	3,467	11,780	21,916	Moderate	14,407	3,322
Mercury	0.33	0.022	5.5	NV	NV	36	4.7	2.0	92	7.9	1.6	1.8	33	Moderate	2.0	1.6
Molybdenum	NA	0.94	7	NV	NV	125	117	95	515	5.9	5.7	14	38	Moderate	95	5.7
Nickel	19.1	16.8	980	210	130	2,051	1,127	361	11,625	711	247	342	1,520	Moderate	361	247
Selenium	NA	1.2	0.3	1.2	0.63	10	4.9	2.4	24	2.7	1.4	1.9	8.8	Moderate	2.4	1.4
Silver	0.73	ND	NV	4.2	14	4,238	3,973	983	20,186	24,465	9,806	14,362	30,778	Moderate	983	9,806
Tin	NA	1.4	NV	NV	NV	97	98	84	335	130	133	365	693	Low	NV [b]	NV [b]
Uranium	3.21	1.18	NV	NV	NV	2,002	339	139	82	812	123	119	40	High	82	40
Vanadium	85.1	71	NV	7.8	280	81	107	43	505	260	297	4,531	3,596	Moderate	43	260
Zinc	67.8	58.1	360	46	79	6,289	4,662	856	906	6,711	3,331	12,666	1,037	High	856	1,037
Organics (mg/kg)																
Acenapthene	NA	ND	NV	NV	100 [c]	NV	NV	NV	NV	NV	NV	NV	NV	--	NV [b]	NV [b]
Acenapthylene	NA	ND	NV	NV	100 [c]	NV	NV	NV	NV	NV	NV	NV	NV	--	NV [b]	NV [b]
Anthracene	NA	0.009	NV	NV	100 [c]	NV	NV	NV	NV	NV	NV	NV	NV	--	NV [b]	NV
Aroclor-1254	NA	ND	0.65 [d]	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	--	NV [b]	NV [b]
Benzo(g,h,i)perylene	NA	0.004	NV	NV	1.1 [e]	NV	NV	NV	NV	NV	NV	NV	NV	--	NV	NV [b]
DDE	NA	0.0067	0.75	0.093 [f]	0.021 [f]	0.24	0.33	0.57	NBD	0.06	0.08	0.44	NBD	Low	NV [b]	NV [b]
DDT	NA	ND	0.75	0.093 [f]	0.021 [f]	0.22	0.24	0.25	NBD	0.05	0.06	0.19	NBD	Low	NV [b]	NV [b]
Dichloroprop	NA	0.26	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	--	NV	NV
Dieldrin	NA	ND	0.07	0.022	0.0049	0.002	NBD	NBD	NBD	0.00014	NBD	NBD	NBD	Low	NV [b]	NV [b]
Diethylphthalate	NA	ND	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	--	NV	NV
Dinitrophenol; 2,4-	NA	ND	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	--	NV	NV
Dimethylphthalate	NA	ND	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	--	NV	NV
Fluorene	NA	0.009	NV	NV	100 [c]	NBD	NBD	8.0	NBD	NBD	NBD	12	NBD	Low	NV [b]	NV [b]
Nitrophenol; 4-	NA	ND	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	--	NV	NV
Phenanthrene	NA	0.018	NV	NV	100 [c]	NBD	NBD	48	NBD	NBD	NBD	292	NBD	Low	NV [b]	NV
Phenol	NA	0.018	NV	NV	NV	NTD	NTD	NTD	NTD	0.5	NBD	NBD	23	Low	NV	NV [b]
Pyrene	NA	0.008	NV	NV	1.1 [e]	NV	NV	NV	NV	NV	NV	NV	NV	--	NV	NV [b]

Table 8-10. Summary of Tier 2 Ecological Preliminary Remediation Goals for Wildlife. (2 Pages)

Analyte	Hanford Site Background Values	Maximum Upland Reference RC	Screening Value			Tier 2 PRG for Wildlife								Confidence	Tier 2 Wildlife PRG	
						Bird Receptors				Mammal Receptors						
			WAC Table 749-3 Wildlife	Eco-SSL Bird	Eco-SSL Mammal	California Quail	Meadowlark	Killdeer	Red-Tailed Hawk	Great Basin Pocket Mouse	Deer Mouse	Grasshopper Mouse	Badger		Bird	Mammal
Trichlorophenol; 2,4,5-	NA	ND	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	--	NV	NV
TPH (gasoline range)	NA	Not measured	500	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	--	NV	NV

= Lowest Tier 2 preliminary remediation goal for bird receptors.
= Lowest Tier 2 preliminary remediation goal for mammal receptors.

[a] The Eco-SSL indicates aluminum toxicity based on pH, specifically pH <5.5, and therefore aluminum nontoxic in RCBRA soil circumneutral pH range (OSWER Directive 9285.7-60, 2003, Ecological Soil Screening Level for Aluminum: Interim Final, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.).
[b] Tier 2 values are identified as low confidence and therefore a Tier 2 PRG is not proposed; a Tier 1 wildlife PRG is available for these analytes and receptors.
[c] Total value for low-molecular-weight PAHs.
[d] Total PCBs.
[e] Total value for high-molecular-weight PAHs.
[f] Total value for DDT and metabolites.

-- = not applicable
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
Eco-SSL = ecological soil screening level
NA = not available
NBD = no bioaccumulation data
ND = nondetect
NTD = no toxicity data
NV = no value
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RC = representative concentration
RCBRA = River Corridor Baseline Risk Assessment
TPH = total petroleum hydrocarbons
WAC = *Washington Administrative Code*

Table 8-11. Summary of Biota Concentration Guide and Tier 1 Refined Ecological Preliminary Remediation Goal Values for Radionuclides.

Radionuclides	Hanford Site Background Values (pCi/g)	Maximum Upland Reference RC (pCi/g)	BCG (pCi/g)		Tier 1 PRG (pCi/g)								Potential PRG (pCi/g)		
					Bird Receptors				Mammal Receptors						
			Plant	Terrestrial Animal	California Quail	Meadowlark	Killdeer	Red-Tailed Hawk	Great Basin Pocket Mouse	Deer Mouse	Grasshopper Mouse	Badger	Plant	Bird	Mammal
Cesium-137	1.05	0.18	2,210	20.8	2,390	2,700	2,800	1,430	2,510	2,630	3,280	924	2,210	1,430	924
Cobalt-60	0.00842	ND	6,130	692	805	805	805	863	805	805	806	1,000	6,130	805	805
Europium-152	NA	ND	14,700	1,520	1,740	1,740	1,740	1,880	1,740	1,740	1,740	2,220	14,700	1,740	1,740
Europium-154	0.0334	ND	12,500	1,290	1,610	1,610	1,610	1,740	1,610	1,610	1,610	2,060	12,500	1,610	1,610
Plutonium-238	0.00378	ND	17,500	5,270	36,300	56,200	20,900	26,800	291,000	161,000	161,000	5,980	17,500	20,900	5,980
Plutonium-239/240	0.0248	0.15	12,700	6,110	38,800	60,300	22,300	28,400	324,000	175,000	176,000	6,270	12,700	22,300	6,270
Strontium-90	0.178	0.32	3,580	22.5	521	302	151	112	706	519	413	91.1	3,580	112	91.1
Uranium-233/234	1.1	0.42	51,600	5,130	12,700	21,800	6,370	40,900	30,300	24,800	51,600	14,200	51,600	6,370	14,200
Uranium-235	0.109	ND	27,400	2,770	6,340	7,810	4,360	10,200	8,600	8,130	9,630	8,060	27,400	4,360	8,060
Uranium-238	1.06	0.4	15,700	1,580	8,020	10,400	5,150	22,100	11,900	11,000	13,900	13,400	15,700	5,150	11,000

= Lowest biota concentration guide for plant receptors.
= Lowest Tier 1 preliminary remediation goal for bird receptors.
= Lowest Tier 1 preliminary remediation goal for mammal receptors.

BCG = biota concentration guide
NA = not available
ND = nondetect
PRG = preliminary remediation goal
RC = representative concentration

Table 8-12. Summary of Upland Proposed Soil Ecological Preliminary Remediation Goals. (2 Pages)

Analyte	Status as Contaminant in the Upland Environment	Study Site Soil RC			Remediated Waste Site Soil RC			WAC Table 749-3 Screening Values			Eco-SSL Values				Maximum Upland Reference RC	90th Percentile Background Hanford Site	Proposed PRG by Receptor			
		Maximum	Number of RCs	Number of Detects	Maximum	Number of RCs	Number of Detects	Plant	Soil Biota	Wildlife	Plant	Soil Invertebrate	Bird	Mammal			Plant	Invertebrate	Bird [a]	Mammal [a]
Inorganics (mg/kg)																				
Aluminum	COPEC	10,500	34	34	11,400	20	20	50	NV	NV	NV [b]	NV [b]	NV [b]	NV [b]	12,000	11,800	-- [b]	-- [b]	-- [b]	-- [b]
Antimony	COEC	6.1	34	7	3	24	8	5	NV	NV	NV	78	NV	0.27	0.3	NA	5	78	No SSV	146 [c]
Arsenic	COEC	15.9	34	32	17.3	77	73	10	60	7	18	NV	43	NV	4.29	6.47	19.3 [d]	60	2,284 [c]	127 [c]
Barium	COEC	406	34	34	508	67	67	500	NV	102	NV	330	NV	2,000	133	132	500	358 [d]	1,687 [c]	2,265 [c]
Boron	COEC	36.4	34	29	23.5	19	18	0.5	NV	NV	NV	NV	NV	NV	3.1	NA	29.6 [d]	No SSV	91.3 [c]	91 [c]
Cadmium	COEC	1.15	34	20	1.33	63	45	4	20	14	32	140	0.77	0.36	0.22	NA	4	20	29 [c]	624 [c]
Chromium	COEC	21.8	34	34	111	104	104	42	42	67	NV	NV	26	34	15.6	18.5	42	149 [d]	109 [c]	517 [c]
Cobalt	Analyte	9.07	34	33	9.7	25	25	20	NV	NV	13	NV	120	230	12.4	15.7	13 [e]	No SSV	484 [c]	2,136 [c]
Copper	COEC	58	34	34	1,422	25	24	100	50	217	70	80	28	49	21.9	22	70	50	213 [c]	579 [c]
Hexavalent chromium	COEC	0.71	26	24	2.1	107	44	NV	NV	NV	NV	NV	NV	130	0.49	NA	NV	No SSV	NV	1,245
Lead	COEC	511	34	34	214	102	101	50	500	118	120	1,700	11	56	8.97	10.2	125 [d]	1,700	156 [c]	1,578 [c]
Lithium	Analyte	9.5	34	33	12.5	2	2	35	NV	NV	NV	NV	NV	NV	11.2	33.5	35	No SSV	NV	1,664 [c]
Manganese	COEC	420	34	34	446	26	26	1,100	NV	1,500	220	450	4,300	4,000	562	512	558 [d]	570 [d]	14,407 [c]	3,322 [c]
Mercury	COEC	0.14	34	9	17.5	90	48	0.3	0.1	5.5	NV	NV	NV	NV	0.022	0.33	0.3 [e]	0.136 [e, d]	2.0 [c]	1.6 [c]
Molybdenum	Analyte	1.26	34	12	1.9	19	18	2	NV	7	NV	NV	NV	NV	0.94	NA	2	No SSV	95 [c]	5.7 [c]
Nickel	COPEC	16.1	34	34	97.6	25	25	30	200	980	38	280	210	130	16.8	19.1	38	280	361 [c]	247 [c]
Selenium	COPEC	0.73	34	3	3	52	9	1	70	0.3	0.52	4.1	1.2	0.63	1.2	NA	1.2 [d]	4.1	2.4 [c]	1.4 [c]
Silver	COPEC	1.2	34	3	13.1	54	10	2	NV	NV	560	NV	4.2	14	ND	0.73	560	No SSV	983 [c]	9,806 [c]
Tin	COPEC	93.7	34	10	Not measured			50	NV	NV	NV	NV	NV	NV	1.4	NA	50	No SSV	204	279
Uranium	COEC	2.6	26	24	242	77	77	5	NV	NV	NV	NV	NV	NV	1.18	3.21	250	No SSV	82 [c]	40 [c]
Vanadium	COPEC	63.4	34	34	71.6	25	25	2	NV	NV	NV	NV	7.8	280	71.0	85.1	84.7 [d, e]	No SSV	43 [c, e]	260 [c]
Zinc	COEC	145	34	34	250	26	26	86	200	360	160	120	46	79	58.1	67.8	621 [d]	393 [d]	856 [c]	1,037 [c]
Organics (mg/kg)																				
Acenapthene	COPC	0.51	33	14	1.2	35	1	20	NV	NV	NV	29 [f]	NV	100 [f]	ND	NA	20	29 [f]	1,096	2,422
Acenapthylene	COPC	0.74	3	6	0.038	35	1	NV	NV	NV	NV	29 [f]	NV	100 [f]	ND	NA	No SSV	29 [f]	74	156
Anthracene	COPC	0.11	33	17	0.047	35	2	NV	NV	NV	NV	29 [f]	NV	100 [f]	0.009	NA	No SSV	29 [f]	678	NV
Aroclor-1254	COPEC	13.5	26	7	1.3	59	19	40	NV	0.65 [g]	NV	NV	NV	NV	ND	NA	40	No SSV	1.8	1.5
Benzo(g,h,i)perylene	COPEC	0.4	33	23	1.7	35	7	NV	NV	NV	NV	18 [h]	NV	1.1 [h]	0.004	NA	No SSV	18 [h]	NV	32
DDE	COPEC	0.98	26	9	0.016	21	1	NV	NV	0.75	NV	NV	0.093 [i]	0.021 [i]	0.0067	NA	No SSV	No SSV	0.8	0.4
DDT	COPEC	1.1	26	6	0.027	21	3	NV	NV	0.75	NV	NV	0.093 [i]	0.021 [i]	ND	NA	No SSV	No SSV	1.2	0.9
Dichloroprop	COPEC	1.46	22	16	ND	8	0	NV	NV	NV	NV	NV	NV	NV	0.26	NA	No SSV	No SSV	NV	NV
Dieldrin	COEC	0.0066	26	4	0.0046	21	1	NV	NV	0.07	NV	NV	0.022	0.0049	ND	NA	No SSV	No SSV	0.08	0.02
Diethylphthalate	Analyte	ND	26	0	0.024	34	1	100	NV	NV	NV	NV	NV	NV	ND	NA	100	No SSV	NV	NV
Dimethylphthalate	Analyte	ND	26	0	ND	34	0	NV	200	NV	NV	NV	NV	NV	ND	NA	No SSV	200	NV	NV
Dinitrophenol; 2,4-	Analyte	ND	26	0	ND	34	0	20	NV	NV	NV	NV	NV	NV	ND	NA	20	NTV	NV	NV
Fluorene	COPC	0.038	33	15	0.62	35	1	NV	30	NV	NV	29 [f]	NV	100 [f]	0.009	NA	No SSV	29 [f]	175	267
Nitrophenol; 4-	Analyte	ND	26	0	ND	34	0	NV	7	NV	NV	NV	NV	NV	ND	NA	No SSV	7	NV	NV
Phenanthrene	COPC	1.31	33	31	0.34	35	8	NV	NV	NV	NV	29 [f]	NV	100 [f]	0.018	NA	No SSV	29 [f]	943	NV
Phenol	Analyte	0.02	26	2	0.084	34	3	70	30	NV	NV	NV	NV	NV	0.018	NA	70	30	NV	1,511
Pyrene	COPEC	2.3	33	28	1.9	35	12	NV	NV	NV	NV	18 [h]	NV	1.1 [h]	0.008	NA	No SSV	18 [h]	NV	600
TPH (gasoline range)	Not analyzed	Not measured			Not measured			NV	100	500	NV	NV	NV	NV	Not measured	NA	No SSV	100	500 [j]	500 [j]
Trichlorophenol; 2,4,5-	Analyte	ND	26	0	ND	34	0	4	9	NV	NV	NV	NV	NV	ND	NA	4	9	NV	NV
Radionuclides (pCi/g)																				
Cesium-137	COPC	1.92	27	15	9.34	123	93	NV	NV	NV	NV	NV	NV	NV	0.182	1.05	2,210 [d]	NV	1,430	924
Cobalt-60	Indicator	0.092	27	1	1.68	122	43	NV	NV	NV	NV	NV	NV	NV	ND	0.008	6,130 [d]	NV	805	805
Europium-152	COPC	4.04	27	2	4.86	122	61	NV	NV	NV	NV	NV	NV	NV	ND	NA	14,700 [d]	NV	1,740	1,740

Table 8-12. Summary of Upland Proposed Soil Ecological Preliminary Remediation Goals. (2 Pages)

Analyte	Status as Contaminant in the Upland Environment	Study Site Soil RC			Remediated Waste Site Soil RC			WAC Table 749-3 Screening Values			Eco-SSL Values				Maximum Upland Reference RC	90th Percentile Background Hanford Site	Proposed PRG by Receptor			
		Maximum	Number of RCs	Number of Detects	Maximum	Number of RCs	Number of Detects	Plant	Soil Biota	Wildlife	Plant	Soil Invertebrate	Bird	Mammal			Plant	Invertebrate	Bird [a]	Mammal [a]
Europium-154	COPC	0.3	27	1	0.52	122	31	NV	NV	NV	NV	NV	NV	NV	ND	0.033	12,500 [d]	NV	1,610	1,610
Plutonium-238	Indicator	ND	27	0	0.37	68	61	NV	NV	NV	NV	NV	NV	NV	ND	0.005	17,500 [d]	NV	20,900	5,980
Plutonium-239/240	COPC	0.53	27	3	0.53	68	67	NV	NV	NV	NV	NV	NV	NV	0.15	0.025	12,700 [d]	NV	22,300	6,270
Strontium-90	COPC	1.03	27	3	5.28	78	74	NV	NV	NV	NV	NV	NV	NV	0.32	0.178	3,580 [d]	NV	112	91.1
Uranium-233/234	COPC	0.93	26	23	114	77	77	NV	NV	NV	NV	NV	NV	NV	0.42	1.1	51,600 [d]	NV	6,370	14,200
Uranium-235	Indicator	ND	26	0	12.1	123	75	NV	NV	NV	NV	NV	NV	NV	ND	0.109	27,400 [d]	NV	4,360	8,060
Uranium-238	COPC	0.86	26	24	79.5	77	77	NV	NV	NV	NV	NV	NV	NV	0.40	1.06	15,700 [d]	NV	5,150	11,000

= Measured maximum concentration is greater than background and the proposed PRG; these analytes are further discussed in the text.
= Background value is greater than lowest PRG; no PRG is proposed for these analytes.
= Lowest proposed PRG for any of the receptors.

[a] PRG is based on lowest observable adverse effect level.
[b] The Eco-SSL indicates aluminum toxicity based on pH, specifically pH <5.5, therefore aluminum nontoxic in soils evaluated in the RCBRA which are in the circumneutral pH range (OSWER Directive 9285.7-60, 2003, *Ecological Soil Screening Level for Aluminum: Interim Final*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.).
[c] Tier 2 PRG based on lowest observable adverse effect level.
[d] PRG is the site-specific NOEC based on soil bioassays and reflects the information available at this time.
[e] Toxicity-based PRG is less than the Hanford Site 90th percentile background.
[f] Total value for low-molecular-weight PAHs.
[g] Total PCBs.
[h] Total value for high-molecular-weight PAHs.
[i] Total value for DDT and metabolites.
[j] PRG is the WAC Table 749-3 wildlife screening value.

-- = not applicable
Analyte = included in the soil and biota analyses but not identified as contaminants of potential concern
Indicator = indictor contaminant from the RCBRA SAP (DOE/RL-2005-42)
COEC = contaminant of ecological concern; identified in Section 8.0 based on key findings for the contaminant (e.g., soil concentration greater than benchmark or exposure greater than low effect level)
COPC = contaminant of potential concern; identified in Section 4.0 based on study site concentrations being greater than background or reference
COPEC = contaminant of potential ecological concern; identified in Section 4.0 based on study site concentrations being greater screening values or lacking a screening value for a receptor group
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
Eco-SSL = ecological soil screening level
NA = not available
ND = nondetect
NTV = no literature toxicity values from WAC Table 749-3, Oak Ridge National Laboratory, U.S. Environmental Protection Agency Eco-SSL, or RESidual RADioactivity-Biota
NV = no value
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
pH = the reciprocal of the hydrogen-ion concentration used as a measure of acidity or basicity
PRG = preliminary remediation goal
RC = representative concentration
RCBRA = River Corridor Baseline Risk Assessment
SSV = soil screening value
TPH = total petroleum hydrocarbons
WAC = *Washington Administrative Code*

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