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SECTION

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Table S–54b. Map 12B: Radionuclide Inventories (curies)

WIDS ID/ Building Number	Common Site Name	Source Type	Decay Date[a]	Cs-137	Gd-152	Th-232	U-238 (U-233, U-234, U-235, U-238)	Np-237	Pu-239 (Pu-239, Pu-240)	Am-241
UPR-200-E-86	UPR-200-E-86	Liquid	2001	1.98×10^{4}	–	6.75×10^{-7}	1.71×10^{-3}	2.02×10^{-2}	4.20×10^{-1}	4.58×10^{-1}
216-A-40	216-A-40 Trench	Liquid	2001	1.13×10^{-4}	–	1.07×10^{-13}	2.70×10^{-10}	3.32×10^{-9}	4.45×10^{-8}	5.08×10^{-8}
216-A-41	216-A-41 Crib	Liquid	2001	7.01×10^{-5}	–	1.78×10^{-14}	2.34×10^{-7}	2.51×10^{-6}	6.88×10^{-5}	7.40×10^{-5}
216-A-9	216-A-9 Crib	Liquid	2001	7.84	–	3.74×10^{-7}	1.42×10^{1}	1.30×10^{-3}	2.48×10^{2}	1.02×10^{-1}
216-A-3	216-A-3 Crib	Liquid	2001	2.45×10^{-2}	–	1.17×10^{-9}	1.78	1.52×10^{-8}	1.32×10^{-4}	2.69×10^{-5}
216-A-39	216-A-39 Crib	Liquid	2001	1.45×10^{1}	–	4.08×10^{-15}	4.27×10^{-7}	9.14×10^{-6}	1.25×10^{-4}	1.35×10^{-4}
216-A-18	216-A-18 Trench	Liquid	2001	–	–	–	4.59×10^{-1}	–	–	–
216-A-1	216-A-1 Crib	Liquid	2001	–	–	–	9.28×10^{-2}	–	–	–
216-A-7	216-A-7 Crib	Liquid	2001	2.99×10^{3}	–	6.66×10^{-11}	3.32×10^{-1}	3.14×10^{-3}	7.59×10^{-1}	1.85×10^{-1}
UPR-200-E-145	UPR-200-E-145	Liquid	2001	–	–	–	3.66×10^{-3}	–	–	–
216-A-16	216-A-16 French Drain	Liquid	2001	8.43×10^{-4}	–	2.65×10^{-13}	6.46×10^{-10}	8.23×10^{-10}	3.45×10^{-8}	2.39×10^{-8}
216-A-17	216-A-17 French Drain	Liquid	2001	4.15×10^{-4}	–	1.31×10^{-13}	3.18×10^{-10}	4.04×10^{-10}	1.70×10^{-8}	1.18×10^{-8}
242-A	242-A Evaporator	Liquid	1998	1.49×10^{5}	–	–	–	–	1.58×10^{1}	9.90×10^{1}
216-A-22	216-A-22 Crib (French Drain)	Liquid	2001	–	–	2.63×10^{-17}	3.11×10^{-3}	2.42×10^{-9}	3.67×10^{-7}	4.68×10^{-12}
216-A-28	216-A-28 French Drain	Liquid	2001	–	–	–	4.42×10^{-1}	–	–	–
216-A-32	216-A-32 Crib	Liquid	2001	2.77×10^{-5}	–	8.71×10^{-15}	2.12×10^{-11}	2.70×10^{-11}	1.13×10^{-9}	7.86×10^{-10}
200-E-78	200-E-78 Reverse Well	Liquid	2001	–	–	3.67×10^{-15}	6.85×10^{-6}	8.34×10^{-8}	2.46×10^{-5}	3.68×10^{-10}

[a] Date of determination of the inventories reflected in this table. For purposes of groundwater modeling (see Appendix N), these concentrations were adjusted (i.e., increased) to account for decay from the date of radionuclide release.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: Am=americium; Cs=cesium; Gd=gadolinium; ID=identifier; Np=neptunium; Pu=plutonium; Th=thorium; U=uranium; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–55a. Map 12C: Radionuclide Inventories (curies)

WIDS ID/ Building Number	Common Site Name	Source Type	Decay Date[a]	H-3	C-14	K-40	Sr-90	Zr-93	Tc-99	I-129
UPR-200-E-51	UPR-200-E-51	Liquid		Site consolidated with Site WIDS ID 216-A-29						
216-A-24	216-A-24 Crib	Liquid	2001	8.80×10^{3}	3.03	–	1.75	4.75×10^{-2}	8.57×10^{-3}	5.64×10^{-6}
216-A-6	216-A-6 Crib	Liquid	2001	1.16×10^{3}	1.32×10^{-2}	–	2.09	3.99×10^{-3}	2.10×10^{-2}	7.30×10^{-2}
216-A-19	216-A-19 Trench	Liquid	2001	–	–	–	–	–	–	–
216-A-20	216-A-20 Trench	Liquid	2001	2.33	3.37×10^{-3}	–	4.15×10^{-4}	–	–	–
216-A-8	216-A-8 Crib	Liquid	2001	2.46×10^{4}	3.53	–	8.65	2.85×10^{-1}	5.15×10^{-2}	3.74×10^{-5}
216-A-29[b]	216-A-29 Ditch	Liquid	Unknown	–	–	–	–	–	–	–
216-A-30	216-A-30 Crib	Liquid	2001	1.81×10^{-2}	2.89×10^{-2}	–	1.10	1.21×10^{-4}	7.39×10^{-4}	8.91×10^{-3}
216-A-37-1	216-A-37-1 Crib	Liquid	2001	5.92×10^{2}	1.50	–	1.85×10^{-1}	–	–	–
216-A-37-2	216-A-37-2 Crib	Liquid	2001	9.51	4.53×10^{-1}	–	5.56×10^{-2}	–	–	5.44×10^{-5}

a Date of determination of the inventories reflected in this table. For purposes of groundwater modeling (see Appendix N), these concentrations were adjusted (i.e., increased) to account for decay from the date of radionuclide release.

b This site was consolidated with another site for purposes of modeling.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: C=carbon; H=hydrogen; I=iodine; ID=identifier; K=potassium; Sr=strontium; Tc=technetium; WIDS=Waste Information Data System; Zr=zirconium.

Source: SAIC 2006.

Table S–55b. Map 12C: Radionuclide Inventories (curies)

WIDS ID/ Building Number	Common Site Name	Source Type	Decay Date[a]	Cs-137	Gd-152	Th-232	U-238 (U-233, U-234, U-235, U-238)	Np-237	Pu-239 (Pu-239, Pu-240)	Am-241
UPR-200-E-51	UPR-200-E-51	Liquid		Site consolidated with Site WIDS ID 216-A-29						
216-A-24	216-A-24 Crib	Liquid	2001	4.01×10^{2}	–	2.03×10^{-11}	5.14×10^{-2}	2.27×10^{-3}	4.40×10^{-1}	2.98×10^{-1}
216-A-6	216-A-6 Crib	Liquid	2001	1.10	–	9.53×10^{-10}	1.45×10^{-1}	9.19×10^{-2}	3.61	2.94
216-A-19	216-A-19 Trench	Liquid	2001	–	–	–	2.93×10^{1}	–	–	–
216-A-20	216-A-20 Trench	Liquid	2001	–	–	5.44×10^{-17}	4.18×10^{-1}	2.13×10^{-6}	3.23×10^{-4}	2.70×10^{-4}
216-A-8	216-A-8 Crib	Liquid	2001	2.41×10^{3}	–	1.22×10^{-10}	3.10×10^{-1}	3.77×10^{-3}	1.13	5.18×10^{-1}
216-A-29[b]	216-A-29 Ditch	Liquid	Unknown	–	–	–	–	–	–	–
216-A-30	216-A-30 Crib	Liquid	2001	2.80	–	6.18×10^{-8}	2.58	3.31×10^{-3}	4.14×10^{1}	1.47×10^{-3}
216-A-37-1	216-A-37-1 Crib	Liquid	2001	–	–	1.23×10^{-13}	1.59×10^{-4}	4.31×10^{-4}	1.57×10^{-1}	1.20×10^{-1}
216-A-37-2	216-A-37-2 Crib	Liquid	2001	–	–	3.73×10^{-11}	3.97×10^{-2}	5.76×10^{-4}	1.78×10^{-1}	3.60×10^{-2}

a Date of determination of the inventories reflected in this table. For purposes of groundwater modeling (see Appendix N), these concentrations were adjusted (i.e., increased) to account for decay from the date of radionuclide release.

b This site was consolidated with another site for purposes of modeling.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: Am=americium; Cs=cesium; Gd=gadolinium; ID=identifier; Np=neptunium; Pu=plutonium; Th=thorium; U=uranium; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–56a. Map 12D: Radionuclide Inventories (curies)

WIDS ID/ Building Number	Common Site Name	Source Type	Decay Date[a]	H-3	C-14	K-40	Sr-90	Zr-93	Tc-99	I-129
216-A-13	216-A-13 French Drain	Liquid	2001	2.72×10^{-8}	6.23×10^{-10}	–	5.54×10^{-7}	3.14×10^{-9}	1.67×10^{-8}	3.20×10^{-11}
200-E-61	200-E-61 Reverse Well	Liquid	2001	4.90×10^{-6}	1.12×10^{-7}	–	9.96×10^{-5}	5.65×10^{-7}	3.00×10^{-6}	5.75×10^{-9}
200-E-136	200-E-136 PUREX Plant (202-A and Others)	Solid	2003	–	–	–	8.92×10^{3}	–	–	6.21×10^{-3}
UPR-200-E-39	UPR-200-E-39 (@ 216-A-36B)	Liquid	2001	1.43×10^{-1}	–	–	1.12	1.55×10^{-4}	6.90×10^{-4}	–
UPR-200-E-40	UPR-200-E-40	Liquid	2001	1.10×10^{-2}	–	–	8.64×10^{-2}	1.20×10^{-5}	5.33×10^{-5}	–
200-E-85	200-E-85 Reverse Well	Liquid	2001	3.87×10^{-6}	8.88×10^{-8}	–	7.88×10^{-5}	4.48×10^{-7}	2.37×10^{-6}	4.56×10^{-9}
216-A-35	216-A-35 French Drain	Liquid	2001	2.72×10^{-8}	6.22×10^{-10}	–	5.53×10^{-7}	3.14×10^{-9}	1.67×10^{-8}	3.20×10^{-11}
200-E-54	200-E-54 Unplanned Release	Liquid	2001	5.45×10^{-7}	1.25×10^{-8}	–	1.11×10^{-5}	6.29×10^{-8}	3.34×10^{-7}	6.42×10^{-10}
200-E-103	200-E-103 PUREX Stabilized Area	Liquid	2001	1.09×10^{-8}	2.49×10^{-10}	–	2.21×10^{-7}	1.26×10^{-9}	6.66×10^{-9}	1.28×10^{-11}
UPR-200-E-117[b]	UPR-200-E-117	Liquid	2001	3.54×10^{-3}	6.36×10^{-4}	–	8.21×10^{-1}	4.51×10^{-3}	2.39×10^{-2}	1.27×10^{-5}
216-A-2	216-A-2 Crib	Liquid	2001	1.40×10^{-3}	2.21×10^{-3}	–	8.92×10^{-1}	1.49×10^{-1}	2.70×10^{-2}	1.76×10^{-5}
216-A-26	216-A-26 French Drain	Liquid	2001	1.05×10^{-8}	2.40×10^{-10}	–	2.14×10^{-7}	1.21×10^{-9}	6.43×10^{-9}	1.23×10^{-11}
216-A-26A	216-A-26A French Drain	Liquid	2001	2.72×10^{-9}	6.23×10^{-11}	–	5.54×10^{-8}	3.14×10^{-10}	1.67×10^{-9}	3.20×10^{-12}
216-A-15	216-A-15 French Drain	Liquid	2001	–	3.90×10^{-5}	–	2.40×10^{-6}	–	–	5.51×10^{-7}
200-E-107	200-E-107 Unplanned Release	Liquid	2001	7.28×10^{-9}	1.67×10^{-10}	–	1.49×10^{-7}	8.41×10^{-10}	4.47×10^{-9}	2.34×10^{-6}
218-E-14	218-E-14 PUREX Tunnel 1	Solid	1990	–	–	–	8.45×10^{2}	–	–	–
218-E-15	218-E-15 PUREX Tunnel 2	Solid	1990	–	–	–	–	–	–	–
216-A-4	216-A-4 Crib	Liquid	2001	6.45×10^{1}	8.02×10^{-5}	–	4.14	1.99×10^{-4}	5.72×10^{-1}	–
216-A-5	216-A-5 Crib	Liquid	2001	1.71×10^{4}	9.98×10^{-3}	–	3.03×10^{1}	5.82×10^{-2}	3.07×10^{-1}	9.63×10^{-1}
216-A-10	216-A-10 Crib	Liquid	2001	5.78×10^{4}	1.11×10^{-2}	–	1.84×10^{1}	9.36×10^{-2}	4.89×10^{-1}	1.73
216-A-21	216-A-21 Crib	Liquid	2001	4.95×10^{1}	–	–	6.06	1.69×10^{-3}	7.53×10^{-3}	–
216-A-27	216-A-27 Crib	Liquid	2001	5.01×10^{-2}	4.82×10^{-4}	–	2.48×10^{1}	1.21×10^{-3}	8.61×10^{-3}	7.40×10^{-8}
216-A-31	216-A-31 Crib	Liquid	2001	5.52×10^{-4}	3.51×10^{-4}	–	1.27	4.40×10^{-2}	7.93×10^{-3}	5.20×10^{-6}
216-A-36-A	216-A-36A Crib	Liquid	2001	1.00×10^{2}	–	–	7.89×10^{2}	1.10×10^{-1}	4.89×10^{-1}	–
216-A-36-B	216-A-36B Crib	Liquid	2001	2.00×10^{2}	–	–	2.75×10^{2}	1.43×10^{-2}	6.33×10^{-2}	8.64×10^{-3}
216-A-45	216-A-45 Crib	Liquid	2001	3.22×10^{3}	3.96×10^{-5}	–	6.99×10^{-2}	1.20×10^{-3}	5.84×10^{-3}	3.26×10^{-2}

a Date of determination of the inventories reflected in this table. For purposes of groundwater modeling (see Appendix N), these concentrations were adjusted (i.e., increased) to account for decay from the date of radionuclide release.

b This site was not modeled because not all the information needed to prepare model input files was available and assumptions could not be made.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: C=carbon; H=hydrogen; I=iodine; ID=identifier; K=potassium; PUREX=Plutonium-Uranium Extraction; Sr=strontium; Tc=technetium; WIDS=Waste Information Data System; Zr=zirconium.

Source: SAIC 2006.

Table S–56b. Map 12D: Radionuclide Inventories (curies)

WIDS ID/ Building Number	Common Site Name	Source Type	Decay Date[a]	Cs-137	Gd-152	Th-232	U-238 (U-233, U-234, U-235, U-238)	Np-237	Pu-239 (Pu-239, Pu-240)	Am-241
216-A-13	216-A-13 French Drain	Liquid	2001	6.92×10^{-5}	–	2.18×10^{-14}	5.30×10^{-11}	6.75×10^{-11}	2.83×10^{-9}	1.96×10^{-9}
200-E-61	200-E-61 Reverse Well	Liquid	2001	1.24×10^{-2}	–	3.92×10^{-12}	9.53×10^{-9}	1.21×10^{-8}	5.09×10^{-7}	3.53×10^{-7}
200-E-136	200-E-136 PUREX Plant (202-A and Others)	Solid	2003	1.10×10^{4}	–	–	–	–	4.78×10^{2}	4.91×10^{2}
UPR-200-E-39	UPR-200-E-39 (@ 216-A-36B)	Liquid	2001	9.73×10^{-1}	–	6.45×10^{-14}	1.63×10^{-4}	8.47×10^{-6}	4.75×10^{-3}	3.43×10^{-3}
UPR-200-E-40	UPR-200-E-40	Liquid	2001	7.54×10^{-2}	–	4.99×10^{-15}	1.26×10^{-5}	6.56×10^{-7}	3.71×10^{-4}	2.60×10^{-4}
200-E-85	200-E-85 Reverse Well	Liquid	2001	9.85×10^{-3}	–	3.10×10^{-12}	7.55×10^{-9}	9.61×10^{-9}	4.03×10^{-7}	2.80×10^{-7}
216-A-35	216-A-35 French Drain	Liquid	2001	6.91×10^{-5}	–	2.18×10^{-14}	5.29×10^{-11}	6.74×10^{-11}	2.83×10^{-9}	1.96×10^{-9}
200-E-54	200-E-54 Unplanned Release	Liquid	2001	1.39×10^{-3}	–	4.36×10^{-13}	1.06×10^{-9}	1.35×10^{-9}	5.67×10^{-8}	3.93×10^{-8}
200-E-103	200-E-103 PUREX Stabilized Area	Liquid	2001	2.76×10^{-5}	–	8.70×10^{-15}	2.12×10^{-11}	2.70×10^{-11}	1.13×10^{-9}	7.85×10^{-10}
UPR-200-E-117[b]	UPR-200-E-117	Liquid	2001	9.64×10^{1}	–	3.23×10^{-9}	8.35×10^{-6}	9.85×10^{-5}	2.03×10^{-3}	2.24×10^{-3}
216-A-2	216-A-2 Crib	Liquid	2001	1.86	–	2.86×10^{-11}	1.54×10^{-1}	6.23×10^{-2}	9.47	1.76×10^{-1}
216-A-26	216-A-26 French Drain	Liquid	2001	2.67×10^{-5}	–	8.40×10^{-15}	2.04×10^{-11}	2.60×10^{-11}	1.09×10^{-9}	7.57×10^{-10}
216-A-26A	216-A-26A French Drain	Liquid	2001	6.92×10^{-6}	–	2.18×10^{-15}	5.30×10^{-12}	6.75×10^{-12}	2.83×10^{-10}	1.96×10^{-10}
216-A-15	216-A-15 French Drain	Liquid	2001	–	–	8.73×10^{-14}	3.43×10^{-4}	5.84×10^{-6}	1.31×10^{-3}	2.00×10^{-8}
200-E-107	200-E-107 Unplanned Release	Liquid	2001	1.85×10^{-5}	–	5.85×10^{-15}	1.42×10^{-11}	1.81×10^{-11}	7.60×10^{-10}	5.26×10^{-10}
218-E-14	218-E-14 PUREX Tunnel 1	Solid	1990	9.45×10^{2}	–	–	–	–	–	–
218-E-15	218-E-15 PUREX Tunnel 2	Solid	1990	–	–	–	–	–	4.74×10^{1}	–
216-A-4	216-A-4 Crib	Liquid	2001	4.86	–	2.32×10^{-7}	3.71	3.02×10^{-6}	1.47	5.35×10^{-3}
216-A-5	216-A-5 Crib	Liquid	2001	1.16×10^{1}	–	3.84×10^{-10}	1.33×10^{-1}	1.31	3.91×10^{1}	4.30×10^{1}
216-A-10	216-A-10 Crib	Liquid	2001	2.84×10^{1}	–	6.37×10^{-9}	2.50×10^{-1}	2.50	6.99×10^{1}	7.53×10^{1}
216-A-21	216-A-21 Crib	Liquid	2001	6.37×10^{1}	–	2.69×10^{-11}	1.34×10^{-1}	2.37×10^{-2}	5.74	4.61
216-A-27	216-A-27 Crib	Liquid	2001	2.94×10^{1}	–	1.39×10^{-6}	4.99×10^{-1}	1.83×10^{-5}	8.76	3.21×10^{-2}
216-A-31	216-A-31 Crib	Liquid	2001	3.71×10^{2}	–	8.27×10^{-12}	4.12×10^{-2}	3.89×10^{-4}	9.43×10^{-2}	2.29×10^{-2}
216-A-36-A	216-A-36A Crib	Liquid	2001	6.87×10^{2}	–	4.55×10^{-11}	1.15×10^{-1}	5.96×10^{-3}	3.39	2.40
216-A-36-B	216-A-36B Crib	Liquid	2001	2.92×10^{2}	–	9.58×10^{-11}	1.02×10^{-1}	2.43×10^{-4}	7.49×10^{-2}	2.26×10^{-1}
216-A-45	216-A-45 Crib	Liquid	2001	1.59	–	7.82×10^{-10}	6.52×10^{-3}	4.35×10^{-2}	1.18	1.25

a Date of determination of the inventories reflected in this table. For purposes of groundwater modeling (see Appendix N), these concentrations were adjusted (i.e., increased) to account for decay from the date of radionuclide release.

b This site was not modeled because not all the information needed to prepare model input files was available and assumptions could not be made.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: Am=americium; Cs=cesium; Gd=gadolinium; ID=identifier; Np=neptunium; Pu=plutonium; PUREX=Plutonium-Uranium Extraction; Th=thorium; U=uranium; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–57a. Map 13: Radionuclide Inventories (curies)

WIDS ID/ Building Number	Common Site Name	Source Type	Decay Date[a]	H-3	C-14	K-40	Sr-90	Zr-93	Tc-99	I-129
2101-M Pond	2101-M Pond	Liquid	2001	1.50×10^{-1}	3.25×10^{-3}	–	1.69×10^{-4}	–	–	1.43×10^{-5}
216-B-54	216-B-54 Trench	Liquid	2001	1.04×10^{-2}	2.62×10^{-2}	–	5.19	2.50×10^{-4}	1.79×10^{-3}	–
216-B-14	216-B-14 Crib	Liquid	2001	5.41×10^{1}	2.10	–	5.95×10^{2}	2.54×10^{-2}	3.29×10^{1}	4.23×10^{-2}
216-B-15	216-B-15 Crib	Liquid	2001	3.94×10^{1}	1.53	–	1.68×10^{2}	1.85×10^{-2}	2.40×10^{1}	3.08×10^{-2}
216-B-16	216-B-16 Crib	Liquid	2001	3.50×10^{1}	1.31	–	1.45×10^{2}	5.02×10^{-1}	1.97×10^{1}	2.98×10^{-2}
216-B-17	216-B-17 Crib	Liquid	2001	2.13×10^{1}	7.41×10^{-1}	–	8.29×10^{1}	9.90×10^{-1}	9.84	2.17×10^{-2}
216-B-18	216-B-18 Crib	Liquid	2001	5.31×10^{1}	2.06	–	2.27×10^{2}	2.50×10^{-2}	3.24×10^{1}	4.15×10^{-2}
216-B-19	216-B-19 Crib	Liquid	2001	3.97×10^{1}	1.43	–	1.59×10^{2}	1.29	2.01×10^{1}	3.75×10^{-2}
216-B-20	216-B-20 Trench	Liquid	2001	2.92×10^{1}	1.06	–	3.07×10^{2}	8.33×10^{-1}	1.52×10^{1}	2.70×10^{-2}
216-B-21	216-B-21 Trench	Liquid	2001	2.91×10^{1}	1.11	–	1.23×10^{2}	2.06×10^{-1}	1.71×10^{1}	2.38×10^{-2}
216-B-22	216-B-22 Trench	Liquid	2001	2.96×10^{1}	1.10	–	1.22×10^{2}	5.43×10^{-1}	1.63×10^{1}	2.58×10^{-2}
216-B-23	216-B-23 Trench	Liquid	2001	2.82×10^{1}	1.05	–	1.16×10^{2}	5.31×10^{-1}	1.55×10^{1}	2.47×10^{-2}
216-B-24	216-B-24 Trench	Liquid	2001	3.04×10^{1}	1.18	–	1.30×10^{2}	1.43×10^{-2}	1.85×10^{1}	2.37×10^{-2}
216-B-25	216-B-25 Trench	Liquid	2001	3.06×10^{1}	1.19	–	1.31×10^{2}	1.44×10^{-2}	1.87×10^{1}	2.39×10^{-2}
216-B-26	216-B-26 Trench	Liquid	2001	2.96×10^{1}	1.15	–	4.88×10^{2}	1.39×10^{-2}	1.80×10^{1}	2.31×10^{-2}
216-B-27	216-B-27 Trench	Liquid	2001	2.76×10^{1}	1.07	–	1.18×10^{2}	1.30×10^{-2}	1.68×10^{1}	2.15×10^{-2}
216-B-28	216-B-28 Trench	Liquid	2001	3.15×10^{1}	1.18	–	1.30×10^{2}	5.12×10^{-1}	1.76×10^{1}	2.72×10^{-2}
216-B-29	216-B-29 Trench	Liquid	2001	3.01×10^{1}	1.17	–	2.49×10^{2}	1.42×10^{-2}	1.84×10^{1}	2.35×10^{-2}
216-B-30	216-B-30 Trench	Liquid	2001	2.99×10^{1}	1.07	–	1.19×10^{2}	1.02	1.50×10^{1}	2.85×10^{-2}
216-B-31	216-B-31 Trench	Liquid	2001	3.03×10^{1}	1.09	–	1.21×10^{2}	1.02	1.52×10^{1}	2.88×10^{-2}
216-B-32	216-B-32 Trench	Liquid	2001	2.97×10^{1}	1.06	–	1.51×10^{2}	1.06	1.47×10^{1}	2.85×10^{-2}
216-B-33	216-B-33 Trench	Liquid	2001	2.97×10^{1}	1.04	–	1.70×10^{2}	1.24	1.42×10^{1}	2.94×10^{-2}
216-B-34	216-B-34 Trench	Liquid	2001	3.05×10^{1}	1.07	–	1.65×10^{2}	1.29	1.45×10^{1}	3.04×10^{-2}
216-B-52	216-B-52 Trench	Liquid	2001	5.33×10^{1}	1.89	–	3.87×10^{2}	2.00	2.61×10^{1}	5.18×10^{-2}
216-B-53A	216-B-53A Trench	Liquid	2001	1.79×10^{-2}	1.44×10^{-2}	–	8.88	4.29×10^{-4}	3.07×10^{-3}	–
216-B-53B	216-B-53B Trench	Liquid	2001	1.05×10^{-2}	4.97×10^{-4}	–	5.19	2.50×10^{-4}	1.79×10^{-3}	–
216-B-58	216-B-58 Trench	Liquid	2001	8.36×10^{-3}	1.09×10^{-2}	–	4.15	2.00×10^{-4}	1.43×10^{-3}	–

[a] Date of determination of the inventories reflected in this table. For purposes of groundwater modeling (see Appendix N), these concentrations were adjusted (i.e., increased) to account for decay from the date of radionuclide release.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: C=carbon; H=hydrogen; I=iodine; ID=identifier; K=potassium; Sr=strontium; Tc=technetium; WIDS=Waste Information Data System; Zr=zirconium.

Source: SAIC 2006.

Table S–57b. Map 13: Radionuclide Inventories (curies)

WIDS ID/ Building Number	Common Site Name	Source Type	Decay Date[a]	Cs-137	Gd-152	Th-232	U-238 (U-233, U-234, U-235, U-238)	Np-237	Pu-239 (Pu-239, Pu-240)	Am-241
2101-M Pond	2101-M Pond	Liquid	2001	1.15×10^{-3}	–	1.78×10^{-12}	8.75×10^{-3}	2.14×10^{-4}	3.27×10^{-2}	6.76×10^{-4}
216-B-54	216-B-54 Trench	Liquid	2001	6.12	–	2.91×10^{-7}	6.62×10^{-2}	7.93×10^{-4}	1.30	5.52×10^{-1}
216-B-14	216-B-14 Crib	Liquid	2001	3.04×10^{2}	–	8.53×10^{-10}	1.82×10^{-1}	2.61×10^{-1}	7.64	1.44×10^{1}
216-B-15	216-B-15 Crib	Liquid	2001	2.22×10^{2}	–	6.22×10^{-10}	1.32×10^{-1}	1.91×10^{-1}	5.57	1.05×10^{1}
216-B-16	216-B-16 Crib	Liquid	2001	1.97×10^{2}	–	6.51×10^{-10}	1.17×10^{-1}	1.58×10^{-1}	4.94	8.83
216-B-17	216-B-17 Crib	Liquid	2001	1.20×10^{2}	–	5.38×10^{-10}	7.00×10^{-2}	8.04×10^{-2}	3.02	4.65
216-B-18	216-B-18 Crib	Liquid	2001	2.99×10^{2}	–	8.39×10^{-10}	1.79×10^{-1}	2.57×10^{-1}	7.51	1.42×10^{1}
216-B-19	216-B-19 Crib	Liquid	2001	2.23×10^{2}	–	8.86×10^{-10}	1.31×10^{-1}	1.62×10^{-1}	5.61	9.25
216-B-20	216-B-20 Trench	Liquid	2001	5.49×10^{2}	–	6.30×10^{-10}	9.99×10^{-2}	1.22×10^{-1}	4.25	6.94
216-B-21	216-B-21 Trench	Liquid	2001	1.64×10^{2}	–	4.99×10^{-10}	9.76×10^{-2}	1.36×10^{-1}	4.12	7.58
216-B-22	216-B-22 Trench	Liquid	2001	1.66×10^{2}	–	5.76×10^{-10}	9.86×10^{-2}	1.31×10^{-1}	4.18	7.34
216-B-23	216-B-23 Trench	Liquid	2001	1.59×10^{2}	–	5.52×10^{-10}	9.40×10^{-2}	1.24×10^{-1}	3.99	6.99
216-B-24	216-B-24 Trench	Liquid	2001	1.71×10^{2}	–	4.79×10^{-10}	1.02×10^{-1}	1.47×10^{-1}	4.29	8.11
216-B-25	216-B-25 Trench	Liquid	2001	1.72×10^{2}	–	4.83×10^{-10}	1.03×10^{-1}	1.48×10^{-1}	4.33	8.18
216-B-26	216-B-26 Trench	Liquid	2001	5.85×10^{2}	–	4.67×10^{-10}	1.07×10^{-1}	1.43×10^{-1}	4.27	7.91
216-B-27	216-B-27 Trench	Liquid	2001	1.55×10^{2}	–	4.35×10^{-10}	9.27×10^{-2}	1.33×10^{-1}	3.90	7.36
216-B-28	216-B-28 Trench	Liquid	2001	1.77×10^{2}	–	6.00×10^{-10}	1.05×10^{-1}	1.41×10^{-1}	4.46	7.89
216-B-29	216-B-29 Trench	Liquid	2001	1.70×10^{2}	–	4.75×10^{-10}	1.01×10^{-1}	1.46×10^{-1}	4.26	8.05
216-B-30	216-B-30 Trench	Liquid	2001	1.68×10^{2}	–	6.77×10^{-10}	9.87×10^{-2}	1.21×10^{-1}	4.23	6.92
216-B-31	216-B-31 Trench	Liquid	2001	1.70×10^{2}	–	6.84×10^{-10}	1.00×10^{-1}	1.23×10^{-1}	4.29	7.03
216-B-32	216-B-32 Trench	Liquid	2001	1.67×10^{2}	–	6.83×10^{-10}	9.81×10^{-2}	1.19×10^{-1}	4.20	6.83
216-B-33	216-B-33 Trench	Liquid	2001	1.67×10^{2}	–	7.19×10^{-10}	9.78×10^{-2}	1.15×10^{-1}	4.20	6.63
216-B-34	216-B-34 Trench	Liquid	2001	1.71×10^{2}	–	7.44×10^{-10}	1.00×10^{-1}	1.18×10^{-1}	4.31	6.79
216-B-52	216-B-52 Trench	Liquid	2001	3.00×10^{2}	–	1.25×10^{-9}	1.76×10^{-1}	2.12×10^{-1}	7.54	1.21×10^{1}
216-B-53A	216-B-53A Trench	Liquid	2001	1.05×10^{1}	–	4.99×10^{-7}	2.15×10^{-1}	4.35×10^{-4}	3.86	3.08×10^{-1}
216-B-53B	216-B-53B Trench	Liquid	2001	6.10	–	2.91×10^{-7}	6.25×10^{-2}	1.90×10^{-5}	1.11	1.50×10^{-2}
216-B-58	216-B-58 Trench	Liquid	2001	4.89	–	2.33×10^{-7}	5.17×10^{-2}	3.30×10^{-4}	9.67×10^{-1}	2.32×10^{-1}

[a] Date of determination of the inventories reflected in this table. For purposes of groundwater modeling (see Appendix N), these concentrations were adjusted (i.e., increased) to account for decay from the date of radionuclide release.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: Am=americium; Cs=cesium; Gd=gadolinium; ID=identifier; Np=neptunium; Pu=plutonium; Th=thorium; U=uranium; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–58a. Map 14: Radionuclide Inventories (curies)

WIDS ID/ Building Number	Common Site Name	Source Type	Decay Date[a]	H-3	C-14	K-40	Sr-90	Zr-93	Tc-99	I-129
600 NRDWL	600 Nonrad Dangerous Waste Landfill	Solid	N/A	–	–	–	–	–	–	–

[a] Date of determination of the inventories reflected in this table. For purposes of groundwater modeling (see Appendix N), these concentrations were adjusted (i.e., increased) to account for decay from the date of radionuclide release.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: C=carbon; H=hydrogen; I=iodine; ID=identifier; K=potassium; N/A=not applicable; Sr=strontium; Tc=technetium; WIDS=Waste Information Data System; Zr=zirconium.

Source: SAIC 2006.

Table S–58b. Map 14: Radionuclide Inventories (curies)

WIDS ID/ Building Number	Common Site Name	Source Type	Decay Date[a]	Cs-137	Gd-152	Th-232	U-238 (U-233, U-234, U-235, U-238)	Np-237	Pu-239 (Pu-239, Pu-240)	Am-241
600 NRDWL	600 Nonrad Dangerous Waste Landfill	Solid	N/A	–	–	–	–	–	–	–

[a] Date of determination of the inventories reflected in this table. For purposes of groundwater modeling (see Appendix N), these concentrations were adjusted (i.e., increased) to account for decay from the date of radionuclide release.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: Am=americium; Cs=cesium; Gd=gadolinium; ID=identifier; N/A=not applicable; Np=neptunium; Pu=plutonium; Th=thorium; U=uranium; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–59a. Map 15: Radionuclide Inventories (curies)

WIDS ID/ Building Number	Common Site Name	Source Type	Decay Date[a]	H-3	C-14	K-40	Sr-90	Zr-93	Tc-99	I-129
618-11	300 Wye Burial Ground	Solid	1986	–	–	–	1.00×10^{3}	–	–	–
400 RFD[b]	400 Area Retired French Drains	Liquid	N/A	–	–	–	–	–	–	–
316-4	300 North Cribs, 321 Cribs	Liquid	2001	–	–	–	–	–	–	–

[a] Date of determination of the inventories reflected in this table. For purposes of groundwater modeling (see Appendix N), these concentrations were adjusted (i.e., increased) to account for decay from the date of radionuclide release.

[b] This site had inventories that were in the initial list of constituents but was screened out during the final screening described in Section S.3.6.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: C=carbon; H=hydrogen; I=iodine; ID=identifier; K=potassium; N/A=not applicable; Sr=strontium; Tc=technetium; WIDS=Waste Information Data System; Zr=zirconium.

Source: SAIC 2006.

Table S–59b. Map 15: Radionuclide Inventories (curies)

WIDS ID/ Building Number	Common Site Name	Source Type	Decay Date[a]	Cs-137	Gd-152	Th-232	U-238 (U-233, U-234, U-235, U-238)	Np-237	Pu-239 (Pu-239, Pu-240)	Am-241
618-11	300 Wye Burial Ground	Solid	1986	1.00×10^{3}	–	–	–	–	6.23×10^{2}	–
400 RFD[b]	400 Area Retired French Drains	Liquid	N/A	–	–	–	–	–	–	–
316-4	300 North Cribs, 321 Cribs	Liquid	2001	–	–	–	1.30×10^{-4}	–	–	–

[a] Date of determination of the inventories reflected in this table. For purposes of groundwater modeling (see Appendix N), these concentrations were adjusted (i.e., increased) to account for decay from the date of radionuclide release.

[b] This site had inventories that were in the initial list of constituents but was screened out during the final screening described in Section S.3.6.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: Am=americium; Cs=cesium; Gd=gadolinium; ID=identifier; N/A=not applicable; Np=neptunium; Pu=plutonium; Th=thorium; U=uranium; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–60a. Map 16: Radionuclide Inventories (curies)

WIDS ID/ Building Number	Common Site Name	Source Type	Decay Date[a]	H-3	C-14	K-40	Sr-90	Zr-93	Tc-99	I-129
618-9	300 West Burial Ground	Solid	N/A	–	–	–	–	–	–	–
316-1	300 Area South Process Ponds	Liquid	2001	1.05	1.23×10^{-1}	–	1.17×10^{2}	4.78×10^{-2}	4.35×10^{-1}	1.79×10^{-2}
316-2	300 Area North Process Ponds	Liquid	2001	4.69×10^{-1}	1.11×10^{-1}	–	5.20×10^{1}	2.13×10^{-2}	1.93×10^{-1}	1.76×10^{-2}
316-5	300 Area Process Trenches	Liquid	2001	–	1.41×10^{-1}	–	8.72×10^{-3}	–	–	2.00×10^{-3}
UPR-300-1	307-340 Waste Line Leak	Liquid	1969	–	–	–	1.00×10^{1}	–	–	–
300-19[b]	324 Sodium Removal Pilot Plant	Liquid	Unknown	–	–	–	–	–	–	–
UPR-300-13[b]	Acid Neutralization Tank Leak East of 333 Building	Liquid	N/A	–	–	–	–	–	–	–
300-264	327 Building, Postirradiation Testing Laboratory	Liquid	Unknown	–	–	–	2.25×10^{2}	–	–	–
309-WS-1	309 Plutonium Recycle Test Reactor Ion Exchange Vault	Liquid	1994	–	–	–	1.00	–	–	–
316-3	307 Disposal Trenches	Liquid	N/A	–	–	–	–	–	–	–

[a] Date of determination of the inventories reflected in this table. For purposes of groundwater modeling (see Appendix N), these concentrations were adjusted (i.e., increased) to account for decay from the date of radionuclide release.

[b] This site was not modeled because not all the information needed to prepare model input files was available and assumptions could not be made.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: C=carbon; H=hydrogen; I=iodine; ID=identifier; K=potassium; N/A=not applicable; Sr=strontium; Tc=technetium; WIDS=Waste Information Data System; Zr=zirconium.

Source: SAIC 2006.

Table S–60b. Map 16: Radionuclide Inventories (curies)

WIDS ID/ Building Number	Common Site Name	Source Type	Decay Date[a]	Cs-137	Gd-152	Th-232	U-238 (U-233, U-234, U-235, U-238)	Np-237	Pu-239 (Pu-239, Pu-240)	Am-241
618-9	300 West Burial Ground	Solid	N/A	–	–	–	–	–	–	–
316-1	300 Area South Process Ponds	Liquid	2001	9.61×10^{2}	–	3.28×10^{-10}	8.45×10^{1}	1.59×10^{-2}	4.03	1.52×10^{-1}
316-2	300 Area North Process Ponds	Liquid	2001	4.27×10^{2}	–	3.14×10^{-10}	6.16×10^{1}	1.44×10^{-2}	3.73	6.78×10^{-2}
316-5	300 Area Process Trenches	Liquid	2001	–	–	7.83×10^{-10}	1.41	1.09×10^{-2}	5.03	7.26×10^{-5}
UPR-300-1	307-340 Waste Line Leak	Liquid	1969	1.00×10^{1}	–	–	–	–	–	–
300-19[b]	324 Sodium Removal Pilot Plant	Liquid	Unknown	4.20×10^{4}	–	–	–	–	7.77	5.67×10^{1}
UPR-300-13[b]	Acid Neutralization Tank Leak East of 333 Building	Liquid	N/A	–	–	–	–	–	–	–
300-264	327 Building, Postirradiation Testing Laboratory	Liquid	Unknown	1.60×10^{2}	–	–	–	–	–	–
309-WS-1	309 Plutonium Recycle Test Reactor Ion Exchange Vault	Liquid	1994	1.00	–	–	–	–	–	–
316-3	307 Disposal Trenches	Liquid	N/A	–	–	–	–	–	–	–

[a] Date of determination of the inventories reflected in this table. For purposes of groundwater modeling (see Appendix N), these concentrations were adjusted (i.e., increased) to account for decay from the date of radionuclide release.

[b] This site was not modeled because not all the information needed to prepare model input files was available and assumptions could not be made.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: Am=americium; Cs=cesium; Gd=gadolinium; ID=identifier; N/A=not applicable; Np=neptunium; Pu=plutonium; Th=thorium; U=uranium; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–61a. Map 1: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
116-B-1	107-B Liquid Waste Disposal Trench	L	–	–	–	–	–	–	–	–	–	–	2.40×10^{1}	–	–
116-B-4	105-B Dummy Decontamination French Drain	L	–	–	–	–	–	–	–	–	–	–	4.00×10^{2}	–	–
116-B-5	108-B Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-B-6A	116-B-6-1 Crib	L	–	–	–	–	–	–	–	–	–	–	2.00×10^{1}	–	–
116-B-6B	116-B-6-2 Crib	L	–	–	–	–	–	–	–	–	–	–	2.00×10^{1}	–	–
116-B-11	107-B Retention Basins	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-C-5	107-C Retention Basins	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-C-1	107-C Liquid Waste Disposal Trench	L	–	–	–	–	–	–	–	–	–	–	4.00×10^{1}	–	–
116-C-2A	105-C Pluto Crib	L	–	–	–	–	–	–	–	–	–	–	2.00×10^{2}	–	–
116-C-2C	105-C Pluto Crib Sand Filter	L	–	–	–	–	–	–	–	–	–	–	–	–	–

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; TBP=tributyl phosphate; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–61b. Map 1: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
116-B-1	107-B Liquid Waste Disposal Trench	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-B-4	105-B Dummy Decontamination French Drain	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-B-5	108-B Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-B-6A	116-B-6-1 Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-B-6B	116-B-6-2 Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-B-11	107-B Retention Basins	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-C-5	107-C Retention Basins	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-C-1	107-C Liquid Waste Disposal Trench	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-C-2A	105-C Pluto Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-C-2C	105-C Pluto Crib Sand Filter	L	–	–	–	–	–	–	–	–	–	–	–	–	–

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–62a. Map 2: Chemical Inventories (kilograms)

WIDS ID/ Building Number.	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
116-K-1	100-K Crib	L	–	–	–	–	–	–	–	–	–	–	$1.60{\times}10^{1}$	–	–
116-K-2	100-K Mile Long Trench	L	–	–	–	–	–	–	–	–	–	–	$1.20{\times}10^{5}$	–	–
116-KE-4	107-KE Retention Basins	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-KW-3	107-KW Retention Basin	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-KE-1	115-KE Condensate Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-KE-2	1706-KER Waste Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-KW-1	115-KW Condensate Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-100-K-1[a]	100-KE Fuel Storage Basin Leak	L	–	–	–	–	–	–	–	–	–	–	–	–	–
120-KE-1	183-KE Filter Waste Facility Drywell	L/S	–	–	–	–	–	–	–	–	–	–	–	–	–

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; S=solid; TBP=tributyl phosphate; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–62b. Map 2: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
116-K-1	100-K Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-K-2	100-K Mile Long Trench	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-KE-4	107-KE Retention Basins	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-KW-3	107-KW Retention Basin	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-KE-1	115-KE Condensate Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-KE-2	1706-KER Waste Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-KW-1	115-KW Condensate Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-100-K-1[a]	100-KE Fuel Storage Basin Leak	L	–	–	–	–	–	–	–	–	–	–	–	–	–
120-KE-1	183-KE Filter Waste Facility Drywell	L/S	–	–	–	2.20×10^{2}	–	–	–	–	–	–	–	–	–

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; S=solid; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–63a. Map 3: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
116-N-1	1301-N Liquid Waste Disposal Facility	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-N-3	1325-N Liquid Waste Disposal Facility	L	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-100-N-3	Spacer Disposal System Transport Line Leak	L	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-100-N-7	Rad Line Leak	L	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-100-N-35[a]	100-N Fuel Storage Basin Drainage System Leak	L	–	–	–	–	–	–		–	–	–	–	–	–

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.
Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; TBP=tributyl phosphate; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–63b. Map 3: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
116-N-1	1301-N Liquid Waste Disposal Facility	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-N-3	1325-N Liquid Waste Disposal Facility	L	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-100-N-3	Spacer Disposal System Transport Line Leak	L	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-100-N-7	Rad Line Leak	L	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-100-N-35[a]	100-N Fuel Storage Basin Drainage System Leak	L	–	–	–	–	–	–	–	–	–	–	–	–	–

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.
Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–64a. Map 4: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
116-D-1A	105-D Storage Basin Trenches 1	L	–	–	–	–	–	–	–	–	–	–	4.00×10^{2}	–	–
116-D-1B	105-D Storage Basin Trenches 2	L	–	–	–	–	–	–	–	–	–	–	2.80×10^{2}	–	–
116-D-7	107-D Retention Basin	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-DR-9	107-DR Retention Basin	L	–	–	–	–	–	–	–	–	–	–	–	–	–
100-D-25[a]	107-DR Basin Leaks	L	–	–	–	–	–	–		–	–	–	–	–	
UPR-100-D-4[a]	107-D Basin Leaks	L	–	–	–	–	–	–		–	–	–	–	–	
116-DR-1&2	107-DR Liquid Waste Disposal Trenches	L	–	–	–	–	–	–	–	–	–	–	3.20×10^{1}	–	–
116-DR-6	1608-DR Liquid Disposal Trench	L	–	–	–	–	–	–	–	–	–	–	8.00×10^{-1}	–	–
116-DR-7	105-DR Inkwell Crib	L	–	–	–	–	–	–	–	3.30×10^{2}	–	–	–	–	–

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; TBP=tributyl phosphate; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–64b. Map 4: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
116-D-1A	105-D Storage Basin Trenches 1	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-D-1B	105-D Storage Basin Trenches 2	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-D-7	107-D Retention Basin	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-DR-9	107-DR Retention Basin	L	–	–	–	–	–	–	–	–	–	–	–	–	–
100-D-25[a]	107-DR Basin Leaks	L	–	–		–	–	–	–	–	–		–		–
UPR-100-D-4[a]	107-D Basin Leaks	L	–	–		–	–	–	–	–	–		–		–
116-DR-1&2	107-DR Liquid Waste Disposal Trenches	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-DR-6	1608-DR Liquid Disposal Trench	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-DR-7	105-DR Inkwell Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–65a. Map 5: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
100-H-33	183-H Solar Evaporation Basins Radionuclide Components	L	–	–	–	–	–	–	–	–	–	–	7.35×10^{2}	–	8.74×10^{4}
116-H-6	183-H Solar Evaporation Basins	L	Site consolidated with Site WIDS ID 100-H-33												
116-H-1	107-H Liquid Disposal Trench	L	–	–	–	–	–	–	–	–	–	–	3.60×10^{1}	–	–
116-H-2	1608-H Liquid Waste Disposal Trench	L	–	–	–	–	–	–	–	–	–	–	2.40×10^{2}	–	–
116-H-4	105-H Pluto Crib	L	–	–	–	–	–	–	–	–	–	–	4.00×10^{2}	–	–
116-H-7	107-H Retention Basin	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-H-3	105-H Dummy Decontamination French Drain	L	–	–	–	–	–	–	–	–	–	–	8.00×10^{2}	–	–

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; TBP=tributyl phosphate; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–65b. Map 5: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
100-H-33	183-H Solar Evaporation Basins Radionuclide Components	L	–	–	1.39×10^{3}	–	–	–	1.36×10^{6}	–	–	–	–	1.96×10^{3}	–
116-H-6	183-H Solar Evaporation Basins	L	Site consolidated with Site WIDS ID 100-H-33												
116-H-1	107-H Liquid Disposal Trench	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-H-2	1608-H Liquid Waste Disposal Trench	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-H-4	105-H Pluto Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-H-7	107-H Retention Basin	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-H-3	105-H Dummy Decontamination French Drain	L	–	–	–	–	–	–	–	–	–	–	–	–	–

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–66a. Map 6: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
116-F-1[a]	Lewis Canal	L	–	–	–	–	–	–	–	–	–	–	4.00×10^{1}	–	–
116-F-2	107-F Liquid Waste Disposal Trench	L	–	–	–	–	–	–	–	–	–	–	2.40×10^{1}	–	–
116-F-9	Animal Waste Leaching Trench	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-F-3	105-F Storage Basin Trench	L	–	–	–	–	–	–	–	–	–	–	1.60	–	–
116-F-6	105-F Cooling Water Trench	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-F-4	105-F Pluto Crib	L	–	–	–	–	–	–	–	–	–	–	1.60×10^{-3}	–	–
116-F-10	105-F Dummy Decon French Drain	L	–	–	–	–	–	–	–	–	–	–	8.00×10^{2}	–	–
116-F-14	107-F Retention Basin	L	–	–	–	–	–	–	–	–	–	–	–	–	–

[a] This site was not modeled because it emptied directly into the Columbia River.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; TBP=tributyl phosphate; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–66b. Map 6: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
116-F-1[a]	Lewis Canal	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-F-2	107-F Liquid Waste Disposal Trench	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-F-9	Animal Waste Leaching Trench	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-F-3	105-F Storage Basin Trench	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-F-6	105-F Cooling Water Trench	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-F-4	105-F Pluto Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-F-10	105-F Dummy Decon French Drain	L	–	–	–	–	–	–	–	–	–	–	–	–	–
116-F-14	107-F Retention Basin	L	–	–	–	–	–	–	–	–	–	–	–	–	–

[a] This site was not modeled because it emptied directly into the Columbia River.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–67a. Map 7: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
216-N-1	216-N-1 Pond	L	–	–	–	–	–	–	–	–	–	–	–	–	1.22×10^{2}
216-N-2	216-N-2 Trench	L	–	–	–	–	–	–	–	–	–	–	2.00×10^{-2}	–	1.14
216-N-3	216-N-3 Trench	L	–	–	–	–	–	–	–	–	–	–	2.00×10^{-2}	–	1.14
216-N-4	216-N-4 Pond	L	–	–	–	–	–	–	–	–	–	–	2.01×10^{-2}	–	1.23×10^{2}
216-N-5	216-N-5 Trench	L	–	–	–	–	–	–	–	–	–	–	2.00×10^{-2}	–	1.14
216-N-6	216-N-6 Pond	L	–	–	–	–	–	–	–	–	–	–	2.01×10^{-2}	–	1.23×10^{2}
216-N-7	216-N-7 Trench	L	–	–	–	–	–	–	–	–	–	–	2.00×10^{-2}	–	1.14

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; TBP=tributyl phosphate; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–67b. Map 7: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
216-N-1	216-N-1 Pond	L	–	8.61	2.94×10^{1}	–	–	–	–	–	–	–	–	5.77×10^{-1}	–
216-N-2	216-N-2 Trench	L	–	6.55×10^{-2}	2.24×10^{-1}	6.04×10^{-6}	–	6.46×10^{-3}	4.53	–	–	–	–	2.23×10^{-2}	–
216-N-3	216-N-3 Trench	L	–	6.55×10^{-2}	2.24×10^{-1}	6.04×10^{-6}	–	6.46×10^{-3}	4.53	–	–	–	–	2.23×10^{-2}	–
216-N-4	216-N-4 Pond	L	–	8.61	2.94×10^{1}	6.05×10^{-6}	–	6.47×10^{-3}	4.54	–	–	–	–	5.95×10^{-1}	–
216-N-5	216-N-5 Trench	L	–	6.55×10^{-2}	2.24×10^{-1}	6.04×10^{-6}	–	6.45×10^{-3}	4.53	–	–	–	–	2.23×10^{-2}	–
216-N-6	216-N-6 Pond	L	–	8.61	2.94×10^{1}	6.05×10^{-6}	–	6.46×10^{-3}	4.54	–	–	–	–	5.95×10^{-1}	–
216-N-7	216-N-7 Trench	L	–	6.55×10^{-2}	2.24×10^{-1}	6.04×10^{-6}	–	6.46×10^{-3}	4.53	–	–	–	–	2.23×10^{-2}	–

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–68a. Map 8: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
216-A-25	216-A-25 Gable Mountain Pond	L	–	–	1.05×10^{4}	–	–	–	–	–	–	2.20×10^{3}	4.58	–	4.88×10^{4}
UPR-200-E-34	UPR-200-E-34	L	Site consolidated with Site WIDS ID 216-A-25												
600-118	600-118 Ditch	L	Site consolidated with Site WIDS ID 216-A-25												

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; TBP=tributyl phosphate; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–68b. Map 8: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
216-A-25	216-A-25 Gable Mountain Pond	L	–	9.37×10^{1}	1.74×10^{3}	8.80×10^{-1}	–	1.35	1.64×10^{5}	–	–	–	–	1.22×10^{4}	–
UPR-200-E-34	UPR-200-E-34	L	Site consolidated with Site WIDS ID 216-A-25												
600-118	600-118 Ditch	L	Site consolidated with Site WIDS ID 216-A-25												

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–69a. Map 9: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
216-S-5	216-S-5 Crib	L	–	–	1.04×10^{-3}	–	–	–	–	–	–	–	3.58	–	5.15
216-S-6	216-S-6 Crib	L	–	–	7.97×10^{-4}	–	–	–	–	–	–	–	1.84×10^{-1}	–	3.94
216-S-10D[a]	216-S-10D Ditch	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-S-10P	216-S-10P Pond	L	–	–	–	–	–	–	–	–	–	–	2.98×10^{3}	–	7.43×10^{2}
216-S-11P	216-S-11 Pond	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-S-16D[a]	216-S-16D Ditch	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-S-16P	216-S-16P Pond	L	–	–	6.10×10^{-4}	–	–	–	–	–	–	–	1.54	–	3.01
216-S-17	216-S-17 Pond	L	–	–	2.22×10^{-4}	–	–	–	–	–	–	–	3.32	–	4.88×10^{2}
UPR-200-W-47	UPR-200-W-47	L	Site consolidated with Site WIDS ID 216-S-16P												
UPR-200-W-59	UPR-200-W-59	L	Site consolidated with Site WIDS ID 216-S-16P												
UPR-200-W-34	UPR-200-W-34	L	Site consolidated with Site WIDS ID 216-S-10D												
218-W-1	218-W-1 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
218-W-2	218-W-2 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
218-W-4B	218-W-4B Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
218-W-4C	218-W-4C Burial Ground	S	–	–	–	–	–	8.08	1.42×10^{-1}	4.90	1.81×10^{2}	8.16×10^{2}	3.75×10^{2}	6.14	5.84×10^{1}
218-W-5	218-W-5 Burial Ground	S	–	–	–	3.20×10^{3}	–	1.83×10^{1}	2.14	1.01×10^{1}	1.21×10^{2}	7.62×10^{-1}	5.08×10^{1}	1.16×10^{2}	7.62×10^{-1}
218-W-3AE	218-W-3AE Burial Ground	S	–	–	–	–	–	9.90×10^{-3}	–	–	3.82×10^{-1}	1.87	3.18×10^{2}	–	1.63×10^{-1}
218-W-3A	218-W-3A Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
Z Plant BP	Z Plant Burning Pit	S	Site consolidated with Site WIDS ID 218-W-4C												

[a] This site was consolidated with another site for purposes of modeling.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; S=solid; TBP=tributyl phosphate; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–69b. Map 9: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
216-S-5	216-S-5 Crib	L	–	1.16×10^{-3}	1.68×10^{-1}	3.99	–	1.53×10^{-1}	5.07×10^{5}	–	–	–	–	1.10×10^{3}	–
216-S-6	216-S-6 Crib	L	–	1.26×10^{-3}	2.66×10^{-3}	4.33	–	1.57×10^{-2}	5.52×10^{5}	–	–	–	–	8.53×10^{2}	–
216-S-10D[a]	216-S-10D Ditch	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-S-10P	216-S-10P Pond	L	–	2.97×10^{3}	4.29×10^{1}	1.20×10^{2}	–	1.97×10^{-1}	9.55×10^{4}	–	–	–	–	5.12×10^{2}	–
216-S-11P	216-S-11 Pond	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-S-16D[a]	216-S-16D Ditch	L	–	–	–	–	–	–	1.00×10^{1}	–	–	–	–	–	–
216-S-16P	216-S-16P Pond	L	–	1.16×10^{-2}	1.23×10^{-2}	3.97×10^{1}	–	7.01×10^{-2}	5.03×10^{6}	–	–	–	–	6.57×10^{2}	–
216-S-17	216-S-17 Pond	L	–	3.08×10^{-2}	7.06×10^{-2}	5.34	–	1.37×10^{-1}	6.76×10^{5}	–	–	–	–	3.54	–
UPR-200-W-47	UPR-200-W-47	L	Site consolidated with Site WIDS ID 216-S-16P												
UPR-200-W-59	UPR-200-W-59	L	Site consolidated with Site WIDS ID 216-S-16P												
UPR-200-W-34	UPR-200-W-34	L	Site consolidated with Site WIDS ID 216-S-10D												
218-W-1	218-W-1 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
218-W-2	218-W-2 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
218-W-4B	218-W-4B Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
218-W-4C	218-W-4C Burial Ground	S	–	3.77×10^{5}	7.96×10^{1}	8.42×10^{1}	3.23×10^{1}	1.19×10^{2}	2.86×10^{2}	6.67×10^{-2}	2.98×10^{2}	2.46	1.35×10^{-1}	8.35×10^{1}	9.50×10^{-1}
218-W-5	218-W-5 Burial Ground	S	6.04	4.19×10^{5}	8.28×10^{-1}	1.21×10^{1}	4.98×10^{-3}	3.67×10^{1}	8.63×10^{2}	9.68	7.11×10^{1}	3.40×10^{-4}	1.49×10^{1}	5.54×10^{-2}	1.10
218-W-3AE	218-W-3AE Burial Ground	S	–	7.03×10^{3}	9.00	1.53×10^{2}	4.00×10^{-4}	1.17×10^{-1}	3.21×10^{1}	2.50×10^{-3}	1.64	–	–	–	–
218-W-3A	218-W-3A Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
Z Plant BP	Z Plant Burning Pit	S	Site consolidated with Site WIDS ID 218-W-4C												

[a] This site was consolidated with another site for purposes of modeling.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; S=solid; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–70a. Map 9A: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
218-W-3	218-W-3 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
218-W-4A	218-W-4A Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
218-W-2A	218-W-2A Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-200-W-84	UPR-200-W-84	L	Site consolidated with Site WIDS ID 218-W-3A												
UPR-200-W-134	UPR-200-W-134	S	Site consolidated with Site WIDS ID 218-W-3A												
UPR-200-W-53	UPR-200-W-53	L	Site consolidated with Site WIDS ID 218-W-2A												
UPR-200-W-72	UPR-200-W-72	S	Site consolidated with Site WIDS ID 218-W-4A												
UPR-200-W-16	UPR-200-W-16	S	Site consolidated with Site WIDS ID 218-W-1												
216-T-4A	216-T-4A Pond	L	–	–	3.51×10^{-3}	–	–	–	–	–	–	3.62×10^{2}	1.14×10^{4}	–	4.90×10^{3}
216-T-4B	216-T-4B Pond	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-T-36	216-T-36 Crib	L	–	–	–	–	–	–	–	–	–	–	2.12×10^{2}	–	–
216-T-4-2	216-T-4-2 Ditch	L	Site consolidated with Site WIDS ID 216-T-4A												
UPR-200-W-97	UPR-200-W-97 Unplanned Release	L	–	–	–	–	–	–	–	–	–	–	7.66×10^{-1}	–	8.33
UPR-200-W-29	UPR-200-W-29 Unplanned Release	L	–	–	–	–	–	–	–	–	–	–	1.36	–	1.42×10^{1}
216-T-13	216-T-13 Trench	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-T-27	216-T-27 Crib	L	–	–	–	–	–	–	–	–	–	–	1.25×10^{3}	–	5.52×10^{-1}
216-TY-201	216-TY-201 Settling Tank	L	–	–	–	–	–	–	–	–	–	–	–	–	–

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; S=solid; TBP=tributyl phosphate; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–70b. Map 9A: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
218-W-3	218-W-3 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
218-W-4A	218-W-4A Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
218-W-2A	218-W-2A Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-200-W-84	UPR-200-W-84	L	Site consolidated with Site WIDS ID 218-W-3A												
UPR-200-W-134	UPR-200-W-134	S	Site consolidated with Site WIDS ID 218-W-3A												
UPR-200-W-53	UPR-200-W-53	L	Site consolidated with Site WIDS ID 218-W-2A												
UPR-200-W-72	UPR-200-W-72	S	Site consolidated with Site WIDS ID 218-W-4A												
UPR-200-W-16	UPR-200-W-16	S	Site consolidated with Site WIDS ID 218-W-1												
216-T-4A	216-T-4A Pond	L	–	1.35	1.26×10^{1}	1.12	–	2.96×10^{3}	4.11×10^{5}	–	–	–	–	6.07×10^{2}	–
216-T-4B	216-T-4B Pond	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-T-36	216-T-36 Crib	L	–	–	–	–	–	9.44×10^{1}	5.71×10^{3}	–	–	–	–	1.72×10^{2}	–
216-T-4-2	216-T-4-2 Ditch	L	Site consolidated with Site WIDS ID 216-T-4A												
UPR-200-W-97	UPR-200-W-97 Unplanned Release	L	–	–	–	–	–	1.87×10^{-1}	1.53×10^{2}	–	–	–	–	1.53×10^{-2}	–
UPR-200-W-29	UPR-200-W-29 Unplanned Release	L	–	–	–	1.23×10^{-3}	–	3.77×10^{-1}	4.18×10^{2}	–	–	–	–	1.17×10^{-1}	–
216-T-13	216-T-13 Trench	L	–	–	–	–	–	–	–	–	–	–	–	5.00×10^{-2}	–
216-T-27	216-T-27 Crib	L	–	2.19	2.30×10^{-2}	9.21×10^{-2}	–	3.20×10^{2}	3.42×10^{4}	–	–	–	–	3.07×10^{1}	–
216-TY-201	216-TY-201 Settling Tank	L	–	1.06×10^{1}	–	–	–	–	–	–	–	8.38	–	8.30	–

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; S=solid; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–71a. Map 9B: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
216-T-12	216-T-12 Trench	L	–	–	2.52×10^{-2}	–	–	–	–	–	–	–	2.34	–	1.43×10^{2}
218-W-1A	218-W-1A Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-200-W-26	UPR-200-W-26	S	Site consolidated with Site WIDS ID 218-W-1A												
216-T-29	216-T-29 Crib	L	–	–	–	–	–	–	–	–	–	–	3.48×10^{-2}	–	2.24×10^{-2}
216-T-33	216-T-33 Crib	L	–	–	2.51×10^{-4}	–	–	–	–	–	–	–	2.16×10^{1}	–	1.24
216-T-34	216-T-34 Crib	L	–	–	–	–	–	–	–	–	–	–	5.83×10^{3}	–	4.37×10^{-1}
216-T-35	216-T-35 Crib	L	–	–	–	–	–	–	–	–	–	–	3.00	–	7.56×10^{-1}
216-T-1	216-T-1 Ditch (221-T Ditch)	L	–	–	–	–	–	–	–	–	–	–	8.24×10^{2}	–	2.44×10^{1}
216-T-2	216-T-2 Reverse Well	L	–	–	–	–	–	–	–	–	–	–	2.50×10^{3}	–	–
216-T-3	216-T-3 Reverse Well	L	–	–	–	–	–	–	–	–	–	–	2.65×10^{3}	–	3.86×10^{4}
216-T-6	216-T-6 Cribs	L	–	–	–	–	–	–	–	–	–	–	6.83×10^{2}	–	1.26×10^{4}
216-T-8	216-T-8 Crib	L	–	–	–	–	–	–	–	–	–	–	2.10×10^{1}	–	–
200-W-45	200-W-45 Sand Filter	S	–	–	–	–	–	–		–	–	–	–	–	–
200-W-20	2706-T Equipment Decontamination Building	S	–	–	–	–	–	–		–	–	–	–	–	–
200-W-20	T Plant Complex (including 221-T Canyon)	S	–	–	–	–	–	–	–	–	–	–	–	–	–
224-T	224-T Canyon	L/S	–	–	–	–	–	–		–	–	–	–	–	–
200-W-9	200-W-9 Unplanned Release	L	–	–	–	–	–	–	–	–	–	–	5.66×10^{1}	–	–
UPR-200-W-2[a]	UPR-200-W-2 Unplanned Release	L	–	–	–	–	–	–	–	–	–	–	2.24	–	–
UPR-200-W-21	UPR-200-W-21	L	–	–	–	–	–	–	–	–	–	–	2.06	–	–
UPR-200-W-38	UPR-200-W-38 Unplanned Release	L	–	–	–	–	–	–	–	–	–	–	1.43	–	–
UPR-200-W-98[a]	UPR-200-W-98 Unplanned Release	L	–	–	–	–	–	–	–	–	–	–	6.02×10^{-2}	–	–
UPR-200-W-102	UPR-200-W-102 Unplanned Release	L	–	–	–	–	–	–	–	–	–	–	9.38	–	1.36×10^{2}

Table S-71a. Map 9B: Chemical Inventories (kilograms) *(continued)*

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
TRUSAF	TRUSAF (in 224-T Canyon)	L/S	–	–	–	–	–	–	–	–	–	–	–	–	–
241-T-361	241-T-361 Settling Tank	L/S	–	–	–	–	–	–	–	–	–	–	–	–	–

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.
Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; S=solid; TBP=tributyl phosphate; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–71b. Map 9B: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
216-T-12	216-T-12 Trench	L	–	–	4.54×10^{-2}	1.65×10^{-2}	–	7.75×10^{-1}	7.71×10^{4}	–	–	–	–	2.17×10^{2}	–
218-W-1A	218-W-1A Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-200-W-26	UPR-200-W-26	S	Site consolidated with Site WIDS ID 218-W-1A												
216-T-29	216-T-29 Crib	L	–	–	5.51×10^{-5}	6.46×10^{-7}	–	9.07×10^{-3}	1.36	–	–	–	–	1.91×10^{-3}	–
216-T-33	216-T-33 Crib	L	–	–	4.52×10^{-4}	1.85×10^{-4}	–	9.45	1.34×10^{3}	–	–	–	–	6.02×10^{1}	–
216-T-34	216-T-34 Crib	L	–	1.73	1.82×10^{-2}	7.28×10^{-2}	–	1.51×10^{3}	1.57×10^{5}	–	–	–	–	6.37×10^{1}	–
216-T-35	216-T-35 Crib	L	–	3.00	3.15×10^{-2}	1.26×10^{-1}	–	–	3.00	–	–	–	–	3.01×10^{1}	–
216-T-1	216-T-1 Ditch (221-T Ditch)	L	–	2.37	3.39	8.36×10^{-1}	–	2.13×10^{2}	2.24×10^{4}	–	–	–	–	2.13×10^{-1}	–
216-T-2	216-T-2 Reverse Well	L	–	–	–	–	–	6.44×10^{2}	6.75×10^{4}	–	–	–	–	2.99×10^{-1}	–
216-T-3	216-T-3 Reverse Well	L	–	–	1.05×10^{3}	–	–	6.97×10^{2}	6.47×10^{5}	–	–	–	–	2.01	–
216-T-6	216-T-6 Cribs	L	–	–	8.22×10^{1}	–	–	2.78×10^{2}	2.30×10^{5}	–	–	–	–	2.08×10^{1}	–
216-T-8	216-T-8 Crib	L	–	–	–	–	–	9.31	5.66×10^{2}	–	–	–	–	4.75×10^{1}	–
200-W-45	200-W-45 Sand Filter	S	–	–	–	–	–	–	–	–	–	–	–	–	–

Table S-71b. Map 9B: Chemical Inventories (kilograms) *(continued)*

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
200-W-20	2706-T Equipment Decontamination Building	S	–	–	–	–	–	–	8.93×10^{2}	–	–	–	–	–	–
200-W-20	T Plant complex (including 221-T Canyon)	S	–	–	–	–	–	–	3.13×10^{3}	–	–	–	–	–	–
224-T	224-T Canyon	L/S	–	–	–	–	–	–	–	–	–	–	–	–	–
200-W-9	200-W-9 Unplanned Release	L	–	–	–	–	–	1.46×10^{1}	1.53×10^{3}	–	–	–	–	6.75×10^{-3}	–
UPR-200-W-2[a]	UPR-200-W-2 Unplanned Release	L	–	–	–	–	–	1.27	1.54×10^{2}	–	–	–	–	1.17×10^{1}	–
UPR-200-W-21	UPR-200-W-21	L	–	–	–	3.60×10^{-3}	–	1.16	1.42×10^{2}	–	–	–	–	1.06×10^{1}	–
UPR-200-W-38	UPR-200-W-38 Unplanned Release	L	–	–	–	2.50×10^{-3}	–	8.06×10^{-1}	9.83×10^{1}	–	–	–	–	7.34	–
UPR-200-W-98[a]	UPR-200-W-98 Unplanned Release	L	–	–	–	–	–	3.40×10^{-2}	4.15	–	–	–	–	3.15×10^{-1}	–
UPR-200-W-102	UPR-200-W-102 Unplanned Release	L	–	–	1.24×10^{2}	–	–	2.44	2.27×10^{3}	–	–	–	–	5.37×10^{-4}	–
TRUSAF	TRUSAF (in 224-T Canyon)	L/S	–	–	–	–	–	–	–	–	–	–	–	–	–
241-T-361	241-T-361 Settling Tank	L/S	–	–	–	–	–	–	–	–	–	–	–	–	–

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; S=solid; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–72a. Map 9C: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
216-Z-16	216-Z-16 Crib	L	–	–	–	–	–	–	–	–	–	–	1.27×10^{1}	–	5.81×10^{6}
231-Z	231-Z Plutonium Isolation Facility	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-Z-4	216-Z-4 Trench	L	–	–	3.16	–	–	–	–	–	–	5.42×10^{-1}	1.14×10^{-4}	–	9.36×10^{-1}
216-Z-5	216-Z-5 Crib	L	–	–	5.02×10^{1}	–	–	–	–	–	–	8.60	3.22×10^{-1}	–	1.49×10^{1}
216-Z-6	216-Z-6 Crib	L	–	–	6.73	–	–	–	–	–	–	1.15	1.02×10^{-3}	–	1.99
216-Z-7	216-Z-7 Crib	L	–	–	2.12×10^{3}	–	–	–	–	–	–	3.63×10^{2}	2.63×10^{3}	–	6.26×10^{2}
216-Z-8	216-Z-8 Trench	L	–	–	3.14×10^{1}	–	–	–	–	–	–	3.62×10^{2}	2.42×10^{-3}	–	1.21×10^{-3}
216-Z-9	216-Z-9 Trench	L	–	–	1.79×10^{4}	–	–	–	–	–	–	2.08×10^{5}	–	–	2.11×10^{4}
216-Z-10	216-Z-10 Reverse Well	L	–	–	6.61×10^{1}	–	–	–	–	–	–	1.13×10^{1}	1.04×10^{-2}	–	1.96×10^{1}
UPR-200-W-130[a]	UPR-200-W-130	L	–	–	–	–	–	–	–	–	–	–	4.12×10^{-5}	–	1.88×10^{1}
216-Z-17	216-Z-17 Trench	L	–	–	–	–	–	–	–	–	–	–	4.59	–	2.10×10^{6}
216-Z-15	216-Z-15 French Drain	L	–	–	–	–	–	–	–	–	–	–	2.43×10^{1}	–	6.56
234-5Z	234-5Z Plutonium Finishing Plant	S	–	–	–	–	–	–	–	–	–	–	–	–	–
2736-Z	2736-Z Plutonium Finishing Plant	S/L	–	–	–	–	–	–	–	–	–	–	–	–	–
242-Z	242-Z Americium Recovery Facility	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-Z-1D[b]	216-Z-1(D) Ditch	L	–	–	–	–	–	–	–	–	–	–	–	–	–
236-Z	236-Z Plutonium Reclamation Facility	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-Z-14	216-Z-14 French Drain	L	–	–	–	–	–	–	–	–	–	2.18×10^{2}	1.31×10^{1}	–	6.53
291-Z	291-Z Exhaust Fan and Compressor House	S	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-200-W-103	UPR-200-W-103	L	–	–	1.12×10^{1}	–	–	–	–	–	–	1.29×10^{2}	–	–	–
241-Z[b]	241-Z Treatment Tank	L	–	–	–	–	–	–	–	–	–	–	–	–	–
241-Z-361	241-Z-361 Settling Tank	L	–	–	–	–	–	–	–	–	–	–	–	–	–

Table S-72a. Map 9C: Chemical Inventories (kilograms) *(continued)*

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
216-Z-13	216-Z-13 French Drain	L	–	–	–	–	–	–	–	–	–	2.18×10^{2}	1.26×10^{1}	–	6.28
216-Z-1&2	216-Z-1 & 2 Cribs	L	–	–	1.09×10^{3}	–	–	–	–	–	–	3.80×10^{4}	1.61×10^{1}	–	1.20×10^{3}
216-Z-3	216-Z-3 Crib	L	–	–	–	–	–	–	–	–	–	2.25×10^{4}	1.56×10^{1}	–	3.79
216-Z-12	216-Z-12 Crib	L	–	–	5.03×10^{3}	–	–	–	–	–	–	1.35×10^{5}	5.18×10^{1}	–	9.81×10^{4}
216-Z-1A	216-Z-1A Tile Field	L	–	–	2.63×10^{4}	–	–	–	–	–	–	3.07×10^{5}	9.32×10^{1}	–	2.59×10^{4}
216-Z-18	216-Z-18 Crib	L	–	–	1.65×10^{4}	–	–	–	–	–	–	1.92×10^{5}	7.11	–	1.96×10^{4}
216-Z-20	216-Z-20 Crib	L	–	–	2.51×10^{4}	–	–	–	–	–	–	2.90×10^{2}	2.89×10^{2}	–	1.67×10^{2}
216-Z-21	216-Z-21 Seepage Basin	L	–	–	–	–	–	–	–	–	–	7.92×10^{3}	3.96×10^{2}	–	1.98×10^{2}
216-Z-11	216-Z-11 Ditch	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-U-13	216-U-13 Trench	L	–	–	–	–	–	–	–	–	–	–	4.73	–	–
216-U-14[c]	216-U-14 Ditch	L	–	–	3.46×10^{-3}	–	–	–	–	–	–	–	8.82	–	1.22×10^{3}
207-U	207-U Retention Basin	L	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-200-W-135	UPR-200-W-135 Unplanned Release	L	–	–	–	–	–	–	–	–	–	–	7.02×10^{-1}	–	–
UPR-200-W-28	UPR-200-W-28	L	–	–	1.58×10^{-3}	–	–	–	–	–	–	–	3.84×10^{-1}	–	–
UPR-200-W-131[a]	UPR-200-W-131	L	–	–	1.03×10^{-5}	–	–	–	–	–	–	–	2.51×10^{-3}	–	–
200-W PP	200-W PP Powerhouse Pond	L	–	–	–	–	–	–	–	–	–	–	3.44×10^{-2}	–	1.72×10^{3}
216-T-20	216-T-20 Trench	L	–	–	2.02×10^{-5}	–	–	–	–	–	–	–	1.57×10^{-2}	–	1.20×10^{-1}
232-Z	232-Z Waste Incinerator	S	–	–	–	–	–	–	–	–	–	–	–	–	–

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.
[b] This site had inventories that were in the initial list of constituents, but was screened out during final screening described in Section S.3.6.
[c] This site was consolidated with another site for purposes of modeling.
Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; S=solid; TBP=tributyl phosphate; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–72b. Map 9C: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
216-Z-16	216-Z-16 Crib	L	–	–	–	–	–	1.30×10^{1}	–	–	–	–	–	4.16×10^{-1}	–
231-Z	231-Z Plutonium Isolation Facility	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-Z-4	216-Z-4 Trench	L	–	–	2.26×10^{-4}	–	–	1.27×10^{-4}	3.04×10^{1}	–	–	–	–	1.41×10^{-2}	–
216-Z-5	216-Z-5 Crib	L	–	–	6.82×10^{-1}	–	–	3.60×10^{-1}	3.93×10^{4}	–	–	–	–	2.25×10^{-1}	–
216-Z-6	216-Z-6 Crib	L	–	–	2.12×10^{-3}	–	–	1.14×10^{-3}	1.59×10^{2}	–	–	–	–	2.99×10^{-2}	–
216-Z-7	216-Z-7 Crib	L	–	–	1.61	–	–	7.27×10^{2}	1.75×10^{5}	–	–	–	–	2.20×10^{2}	–
216-Z-8	216-Z-8 Trench	L	–	9.57×10^{-5}	3.39×10^{-5}	1.38×10^{-4}	–	4.92×10^{-5}	–	–	–	–	–	4.75×10^{-6}	–
216-Z-9	216-Z-9 Trench	L	–	–	–	9.21×10^{4}	–	–	8.86×10^{5}	–	–	–	–	2.52×10^{-2}	–
216-Z-10	216-Z-10 Reverse Well	L	–	–	2.17×10^{-2}	–	–	1.16×10^{-2}	1.60×10^{3}	–	–	–	–	2.94×10^{-1}	–
UPR-200-W-130[a]	UPR-200-W-130	L	–	–	–	–	–	4.21×10^{-5}	–	–	–	–	–	1.33×10^{-6}	–
216-Z-17	216-Z-17 Trench	L	–	–	–	–	–	4.70	–	–	–	–	–	1.50×10^{-1}	–
216-Z-15	216-Z-15 French Drain	L	–	2.43×10^{1}	9.71×10^{-1}	1.34×10^{-2}	–	2.72×10^{-1}	–	–	–	–	–	2.11×10^{-2}	–
234-5Z	234-5Z Plutonium Finishing Plant	S	–	–	–	–	–	–	–	–	–	–	–	–	–
2736-Z	2736-Z Plutonium Finishing Plant	S/L	–	–	–	–	–	–	–	–	–	–	–	–	–
242-Z	242-Z Americium Recovery Facility	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-Z-1D[b]	216-Z-1(D) Ditch	L	–	–	–	–	–	–	–	–	–	–	–	–	–
236-Z	236-Z Plutonium Reclamation Facility	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-Z-14	216-Z-14 French Drain	L	–	5.16×10^{-1}	1.83×10^{-1}	7.42×10^{-1}	–	2.62×10^{-1}	–	–	–	–	–	2.04×10^{-2}	–
291-Z	291-Z Exhaust Fan and Compressor House	S	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-200-W-103	UPR-200-W-103	L	–	–	–	–	–	–	–	–	–	–	–	3.29×10^{-7}	–
241-Z[b]	241-Z Treatment Tank	L	–	–	–	–	–	–	–	–	–	–	–	–	–
241-Z-361	241-Z-361 Settling Tank	L	–	–	–	–	–	–	–	–	–	–	–	–	–

Table S-72b. Map 9C: Chemical Inventories (kilograms) *(continued)*

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
216-Z-13	216-Z-13 French Drain	L	–	4.97×10^{-1}	1.76×10^{-1}	7.14×10^{-1}	–	2.52×10^{-1}	–	–	–	–	–	1.96×10^{-2}	–
216-Z-1&2	216-Z-1 & 2 Cribs	L	–	1.61×10^{1}	2.06×10^{-1}	5.30×10^{3}	–	1.50×10^{-1}	5.51×10^{4}	–	–	–	–	1.04×10^{-2}	–
216-Z-3	216-Z-3 Crib	L	–	1.40×10^{1}	3.34	7.73×10^{-3}	–	1.76	1.91×10^{5}	–	–	–	–	1.64×10^{-2}	–
216-Z-12	216-Z-12 Crib	L	–	4.99×10^{1}	8.73	4.31×10^{5}	–	6.11	4.37×10^{6}	–	–	–	–	1.94×10^{-1}	–
216-Z-1A	216-Z-1A Tile Field	L	–	9.28×10^{1}	4.93×10^{1}	1.41×10^{5}	–	4.16×10^{1}	1.32×10^{6}	–	–	–	–	9.34×10^{-2}	–
216-Z-18	216-Z-18 Crib	L	–	7.08	3.76	8.78×10^{4}	–	3.17	8.41×10^{5}	–	–	–	–	2.40×10^{-2}	–
216-Z-20	216-Z-20 Crib	L	–	2.89×10^{2}	2.60×10^{1}	1.59×10^{-1}	–	3.24	1.04×10^{5}	–	–	–	–	2.52×10^{-1}	–
216-Z-21	216-Z-21 Seepage Basin	L	–	1.56×10^{1}	5.54	2.25×10^{1}	–	8.05	–	–	–	–	–	6.27×10^{-1}	–
216-Z-11	216-Z-11 Ditch	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-U-13	216-U-13 Trench	L	–	–	–	–	–	1.26	1.27×10^{2}	–	–	–	–	5.42×10^{-1}	–
216-U-14[c]	216-U-14 Ditch	L	–	1.93×10^{1}	2.64×10^{1}	1.15	–	1.37×10^{1}	1.83×10^{5}	–	–	–	–	8.28×10^{1}	–
207-U	207-U Retention Basin	L	–	–	–	–	–	–	–	–	–	–	–	4.54×10^{1}	–
UPR-200-W-135	UPR-200-W-135 Unplanned Release	L	–	–	–	1.23×10^{-3}	–	3.96×10^{-1}	4.83×10^{1}	–	–	–	–	3.60	–
UPR-200-W-28	UPR-200-W-28	L	–	–	–	7.33×10^{-4}	–	2.17×10^{-1}	4.44×10^{2}	–	–	–	–	7.18×10^{-2}	–
UPR-200-W-131[a]	UPR-200-W-131	L	–	–	–	4.81×10^{-6}	–	1.42×10^{-3}	2.90	–	–	–	–	4.67×10^{-4}	–
200-W PP	200-W PP Powerhouse Pond	L	–	1.03×10^{-1}	5.85×10^{-2}	3.44×10^{-4}	–	3.44×10^{-2}	1.72×10^{3}	–	–	–	–	–	–
216-T-20	216-T-20 Trench	L	–	–	–	1.08×10^{-5}	–	3.58×10^{-3}	2.00×10^{1}	–	–	–	–	1.07×10^{-3}	–
232-Z	232-Z Waste Incinerator	S	–	–	–	–	–	–	1.33×10^{2}	–	–	–	–	–	–

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.
[b] This site had inventories that were in the initial list of constituents, but was screened out during final screening described in Section S.3.6.
[c] This site was consolidated with another site for purposes of modeling.
Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; S=solid; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–73a. Map 9D: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
216-U-10	216-U-10 Pond	L	–	–	1.12×10^{5}	–	–	–	–	–	–	3.91×10^{4}	9.01×10^{3}	–	3.45×10^{4}
216-U-3	216-U-3 French Drain	L	–	–	1.00×10^{-4}	–	–	–	–	–	–	–	3.91×10^{-1}	–	6.90×10^{-1}
UPR-200-W-104	UPR-200-W-104	L	Site consolidated with Site WIDS ID 216-U-10.												
UPR-200-W-105	UPR-200-W-105	L	Site consolidated with Site WIDS ID 216-U-10.												
UPR-200-W-106	UPR-200-W-106	L	Site consolidated with Site WIDS ID 216-U-10.												
216-S-4	216-S-4 French Drain	L	–	–	–	–	–	–	–	–	–	–	5.04×10^{-1}	–	2.52×10^{-1}
216-S-3	216-S-3 Crib	L	–	–	9.09×10^{-3}	–	–	–	–	–	–	–	2.50	–	1.12
216-S-21	216-S-21 Crib	L	–	–	1.04	–	–	–	–	–	–	–	5.08×10^{1}	–	2.19×10^{1}
UPR-200-W-107	UPR-200-W-107	L	Site consolidated with Site WIDS ID 216-U-10.												
216-S-25	216-S-25 Crib	L	–	–	7.34×10^{-2}	–	–	–	–	–	–	–	1.40×10^{2}	–	4.27×10^{2}
216-S-1&2	216-S-1 & 216-S-2 Cribs	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-S-8	216-S-8 Trench	L	–	–	–	–	–	–	–	–	–	–	2.88×10^{4}	–	–
UPR-200-W-95	UPR-200-W-95	L	–	–	–	–	–	–	–	–	–	–	1.41×10^{-1}	–	–

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; TBP=tributyl phosphate; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–73b. Map 9D: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
216-U-10	216-U-10 Pond	L	–	9.29×10^{3}	1.10×10^{3}	3.46×10^{1}	–	4.54×10^{2}	5.20×10^{6}	–	–	–	–	2.16×10^{3}	–
216-U-3	216-U-3 French Drain	L	–	4.10×10^{-3}	1.81×10^{-4}	1.56×10^{-2}	–	1.10×10^{-3}	3.06×10^{2}	–	–	–	–	1.73×10^{1}	–
UPR-200-W-104	UPR-200-W-104	L	Site consolidated with Site WIDS ID 216-U-10.												
UPR-200-W-105	UPR-200-W-105	L	Site consolidated with Site WIDS ID 216-U-10.												
UPR-200-W-106	UPR-200-W-106	L	Site consolidated with Site WIDS ID 216-U-10.												
216-S-4	216-S-4 French Drain	L	–	5.31×10^{-3}	–	2.02×10^{-2}	–	–	5.19×10^{-1}	–	–	–	–	3.02×10^{-4}	–
216-S-3	216-S-3 Crib	L	–	2.55×10^{-2}	4.09×10^{-3}	8.49×10^{-2}	–	1.44×10^{-2}	8.65×10^{1}	–	–	–	–	2.08	–
216-S-21	216-S-21 Crib	L	–	5.10×10^{-1}	7.48×10^{2}	1.75	–	2.78×10^{-1}	7.71×10^{2}	–	–	–	–	1.06×10^{-1}	–
UPR-200-W-107	UPR-200-W-107	L	Site consolidated with Site WIDS ID 216-U-10.												
216-S-25	216-S-25 Crib	L	–	9.95	2.57×10^{-1}	5.57	–	8.08×10^{-1}	2.23×10^{5}	–	–	–	–	6.89×10^{-1}	–
216-S-1&2	216-S-1 & 216-S-2 Cribs	L	–	–	–	–	–	–	2.11×10^{5}	–	–	–	–	2.22×10^{3}	–
216-S-8	216-S-8 Trench	L	–	–	3.05×10^{2}	3.24	–	1.07×10^{3}	1.87×10^{6}	–	–	–	–	3.10×10^{2}	–
UPR-200-W-95	UPR-200-W-95	L	–	–	1.21×10^{-3}	1.29×10^{-5}	–	4.24×10^{-3}	7.43	–	–	–	–	1.23×10^{-3}	–

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–74a. Map 9E: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
216-U-5	216-U-5 Trench	L	–	–	–	–	–	–	–	–	–	–	9.41×10^{2}	–	–
216-U-6	216-U-6 Trench	L	–	–	–	–	–	–	–	–	–	–	9.41×10^{2}	–	–
221-U	221-U Process Canyon	L/S	–	–	–	–	–	–	–	–	–	–	–	–	–
241-WR-Vault	241-WR Vault	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-U-15	216-U-15 Trench	L	–	–	4.62	–	–	–	–	–	–	–	1.78×10^{1}	–	–
UPR-200-W-138	UPR-200-W-138	L	–	–	7.46×10^{-5}	–	–	–	–	–	–	–	1.61×10^{-3}	–	3.68×10^{-1}
200-W-44	200-W-44 Sand Filter	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-U-7	216-U-7 French Drain	L	–	–	7.67×10^{-8}	–	–	–	–	–	–	–	1.82×10^{-4}	–	3.91×10^{-3}
UPR-200-W-101	UPR-200-W-101 Unplanned Release	L	–	–	2.26×10^{-5}	–	–	–	–	–	–	–	4.88×10^{-4}	–	1.12×10^{-1}
216-U-4	216-U-4 Reverse Well	L	–	–	–	–	–	–	–	–	–	–	1.25×10^{2}	–	1.55
216-U-4A	216-U-4A French Drain	L	–	–	–	–	–	–	–	–	–	–	4.85×10^{-1}	–	7.20×10^{-2}
216-U-1&2	216-U-1 & 2 Cribs	L	–	–	9.27×10^{2}	–	–	–	–	–	–	–	2.15×10^{2}	–	2.56×10^{2}
241-U-361	241-U-361 Settling Tank	L	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-200-W-39	UPR-200-W-39 Unplanned Release	L	–	–	1.93×10^{-6}	–	–	–	–	–	–	–	4.17×10^{-5}	–	9.55×10^{-3}
200-W-42[a]	200-W-42 Process Sewer	L	–	–	5.61×10^{-5}	–	–	–	–	–	–	–	1.21×10^{-3}	–	2.75×10^{-1}
UPR-200-W-163	UPR-200-W-163 Unplanned Release	L	–	–	1.48×10^{-4}	–	–	–	–	–	–	–	3.20×10^{-3}	–	7.31×10^{-1}
216-U-16	216-U-16 Crib	L	–	–	8.68×10^{3}	–	–	–	–	–	–	–	–	–	1.55×10^{2}
216-S-9	216-S-9 Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-S-23	216-S-23 Crib	L	–	–	–	–	–	–	–	–	–	–	1.28×10^{-3}	–	–
216-U-8	216-U-8 Crib	L	–	–	1.49	–	–	–	–	–	–	–	3.21×10^{1}	–	7.30×10^{3}
216-U-12	216-U-12 Crib	L	–	–	2.25	–	–	–	–	–	–	–	1.91×10^{1}	–	3.71×10^{3}

a This site was consolidated with another site for purposes of modeling.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; S=solid; TBP=tributyl phosphate; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–74b. Map 9E: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
216-U-5	216-U-5 Trench	L	–	5.23×10^{1}	–	1.09	–	2.50×10^{2}	6.31×10^{4}	–	–	–	–	6.35×10^{2}	–
216-U-6	216-U-6 Trench	L	–	5.23×10^{1}	–	1.09	–	2.50×10^{2}	6.31×10^{4}	–	–	–	–	6.34×10^{2}	–
221-U	221-U Process Canyon	L/S	–	–	–	–	–	–	–	–	–	–	–	–	–
241-WR-Vault	241-WR Vault	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-U-15	216-U-15 Trench	L	–	–	–	–	–	4.73	5.27×10^{2}	–	–	–	–	9.93	–
UPR-200-W-138	UPR-200-W-138	L	–	–	1.34×10^{-4}	5.50×10^{-5}	–	8.21×10^{-4}	2.27×10^{2}	–	–	–	–	1.29×10^{1}	–
200-W-44	200-W-44 Sand Filter	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-U-7	216-U-7 French Drain	L	–	1.82×10^{-8}	2.65×10^{-9}	3.49×10^{-11}	–	1.52×10^{-4}	2.11	–	–	–	–	9.80×10^{-9}	–
UPR-200-W-101	UPR-200-W-101 Unplanned Release	L	–	–	4.07×10^{-5}	1.66×10^{-5}	–	2.49×10^{-4}	6.87×10^{1}	–	–	–	–	3.89	–
216-U-4	216-U-4 Reverse Well	L	–	–	9.07×10^{-3}	–	–	3.21×10^{1}	3.39×10^{3}	–	–	–	–	1.49×10^{-2}	–
216-U-4A	216-U-4A French Drain	L	–	2.86×10^{-1}	3.00×10^{-3}	1.20×10^{-2}	–	5.13×10^{-2}	5.66	–	–	–	–	2.87	–
216-U-1&2	216-U-1 & 2 Cribs	L	–	–	9.37×10^{-2}	3.18×10^{-2}	–	8.54×10^{1}	1.73×10^{5}	–	–	–	–	3.96×10^{3}	–
241-U-361	241-U-361 Settling Tank	L	–	–	–	–	–	–	–	–	–	–	–	6.90×10^{4}	–
UPR-200-W-39	UPR-200-W-39 Unplanned Release	L	–	–	3.47×10^{-6}	1.42×10^{-6}	–	2.12×10^{-5}	5.87	–	–	–	–	3.32×10^{-1}	–
200-W-42[a]	200-W-42 Process Sewer	L	–	–	1.01×10^{-4}	3.23×10^{-5}	–	6.17×10^{-4}	1.70×10^{2}	–	–	–	–	4.59×10^{-4}	–
UPR-200-W-163	UPR-200-W-163 Unplanned Release	L	–	–	2.67×10^{-4}	1.06×10^{-4}	–	1.63×10^{-3}	4.53×10^{2}	–	–	–	–	2.22×10^{1}	–
216-U-16	216-U-16 Crib	L	–	1.53	4.32	1.60×10^{-1}	–	2.46	1.66×10^{4}	–	–	–	–	1.26×10^{-1}	–
216-S-9	216-S-9 Crib	L	–	–	–	–	–	–	4.18×10^{4}	–	–	–	–	2.76×10^{2}	–
216-S-23	216-S-23 Crib	L	–	9.68×10^{-6}	9.38×10^{-6}	3.32×10^{-2}	–	5.30×10^{-5}	4.20×10^{3}	–	–	–	–	1.57×10^{-5}	–
216-U-8	216-U-8 Crib	L	–	–	2.67	8.79×10^{-1}	–	1.63×10^{1}	4.56×10^{6}	–	–	–	–	2.55×10^{4}	–
216-U-12	216-U-12 Crib	L	–	1.81×10^{-7}	1.35	4.39×10^{-1}	–	9.17	2.28×10^{6}	–	–	–	–	6.46×10^{3}	–

[a] This site was consolidated with another site for purposes of modeling.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; S=solid; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–75a. Map 9F: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
216-S-19	216-S-19 Pond	L	–	–	–	–	–	–	–	–	–	–	6.56×10^{2}	–	1.64×10^{2}
216-S-14	216-S-14 Trench	L	–	–	–	–	–	–	–	–	–	–	2.94×10^{-1}	–	–
216-S-7	216-S-7 Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-200-W-32[a]	UPR-200-W-32	L	–	–	1.66×10^{-6}	–	–	–	–	–	–	–	3.58×10^{-5}	–	8.18×10^{-3}
216-S-13	216-S-13 Crib	L	–	–	9.75×10^{-3}	–	–	–	–	–	–	–	1.21×10^{1}	–	4.79×10^{1}
216-S-12	216-S-12 Trench	L	–	–	–	–	–	–	–	–	–	–	6.40×10^{-3}	–	–
200-W-22	200-W-22 Unplanned Release	L	–	–	1.61×10^{-7}	–	–	–	–	–	–	–	3.47×10^{-6}	–	7.93×10^{-4}
233-S	233-S Plutonium Concentration Facility	S	–	–	–	–	–	–		–	–	–	–	–	
200-W-69	200-W-69 Lab Complex (includes 222-S Lab, 222-S DMWSA, 219-S, 222-SA, 296-S-21, 296-S-16, 296-S-23, 296-S-13)	L/S	–	–	–	–	–	–		–	–	–	–	–	1.12×10^{1}
UPR-200-W-61	UPR-200-W-61	L	–	–	–	–	–	–	–	–	–	–	2.39	–	–
202-S	202-S (REDOX)	S	–	–	–	–	–	–	–	–	–	–	–	–	–
291-S	291-S Sand Filter	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-S-20	216-S-20 Crib	L	–	–	–	–	–	–	–	–	–	–	5.88×10^{3}	–	1.60×10^{1}
216-S-22	216-S-22 Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-S-26	216-S-26 Crib	L	–	–	–	–	–	–	–	–	–	–	1.11×10^{2}	–	2.76×10^{1}
218-W-7	218-W-7 Burial Ground (222-S Vault)	S	–	–	–	–	–	–	–	–	–	–	–	–	–

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; REDOX=Reduction-Oxidation (Facility); S=solid; TBP=tributyl phosphate; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–75b. Map 9F: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
216-S-19	216-S-19 Pond	L	–	6.56×10^{2}	9.51	2.62×10^{1}	–	–	7.54×10^{2}	–	–	–	–	6.87×10^{-1}	–
216-S-14	216-S-14 Trench	L	–	–	–	–	–	1.14×10^{-2}	1.78×10^{2}	–	–	–	–	7.36×10^{-2}	–
216-S-7	216-S-7 Crib	L	–	–	–	–	–	–	4.32×10^{5}	–	–	–	–	3.41×10^{3}	–
UPR-200-W-32[a]	UPR-200-W-32	L	–	–	2.98×10^{-6}	1.22×10^{-6}	–	1.82×10^{-5}	5.03	–	–	–	–	2.83×10^{-1}	–
216-S-13	216-S-13 Crib	L	–	–	1.76×10^{-2}	5.62×10^{-3}	–	5.69×10^{-1}	3.67×10^{4}	–	–	–	–	3.05	–
216-S-12	216-S-12 Trench	L	–	4.92×10^{-5}	2.14×10^{-6}	2.97×10^{-7}	–	1.26×10^{-4}	3.06×10^{2}	–	–	–	–	3.21	–
200-W-22	200-W-22 Unplanned Release	L	–	–	2.89×10^{-7}	1.18×10^{-7}	–	1.77×10^{-6}	4.88×10^{-1}	–	–	–	–	2.77×10^{-2}	–
233-S	233-S Plutonium Concentration Facility	S	–	–	–	–	–	–	–	–	–	–	–	–	–
200-W-69	200-W-69 Lab Complex (includes 222-S Lab, 222-S DMWSA, 219-S, 222-SA, 296-S-21, 296-S-16, 296-S-23, 296-S-13)	L/S	–	–	–	–	–	–	1.55×10^{2}	–	–	–	–	–	–
UPR-200-W-61	UPR-200-W-61	L	–	2.63×10^{-11}	2.54×10^{-2}	2.70×10^{-4}	–	8.90×10^{-2}	1.56×10^{2}	–	–	–	–	2.58×10^{-2}	–
202-S	202-S (REDOX)	S	–	–	–	–	–	–	–	–	–	–	–	–	–
291-S	291-S Sand Filter	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-S-20	216-S-20 Crib	L	–	6.34×10^{1}	7.04×10^{-1}	2.64	–	1.50×10^{3}	1.69×10^{5}	–	–	–	–	5.64×10^{2}	–
216-S-22	216-S-22 Crib	L	–	–	–	–	–	–	6.44×10^{1}	–	–	–	–	4.52×10^{-8}	–
216-S-26	216-S-26 Crib	L	–	1.11×10^{2}	1.60	4.42	–	7.12×10^{-5}	1.27×10^{2}	–	–	–	–	1.16×10^{-1}	–
218-W-7	218-W-7 Burial Ground (222-S Vault)	S	–	–	–	–	–	–	–	–	–	–	–	–	–

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; REDOX=Reduction-Oxidation (Facility); S=solid; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–76a. Map 10: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
600-148	Environmental Restoration Disposal Facility	S	–	–	–	–	–	–		–	–	–	–	–	–
N/A	US Ecology	S	–	–	–	–	–	–		–	–	–	–	–	–
216-W-LWC	216-W-LWC Crib	L	–	–	–	–	–	–	–	–	–	–	3.23×10^{1}	–	7.21×10^{2}
216-U-17	216-U-17 Crib	L	–	–	3.00×10^{-2}	–	–	–	–	–	–	–	6.47×10^{-1}	–	1.47×10^{2}

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HF=hydrogen fluoride; ID=identifier; L=liquid; N/A=not applicable; $Na_2Cr_2O_7$=sodium dichromate; S=solid; TBP=tributyl phosphate; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–76b. Map 10: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
600-148	Environmental Restoration Disposal Facility	S	–	–	–	–	–	–	–	–	–	–	–	–	–
N/A	US Ecology	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-W-LWC	216-W-LWC Crib	L	–	1.09×10^{2}	6.71×10^{1}	3.13×10^{-1}	–	4.89×10^{1}	1.38×10^{3}	–	–	–	–	2.87	–
216-U-17	216-U-17 Crib	L	–	–	5.39×10^{-2}	1.72×10^{-2}	–	3.30×10^{-1}	9.08×10^{4}	–	–	–	–	2.46×10^{-1}	–

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HNO_3=nitric acid; ID=identifier; L=liquid; N/A=not applicable; NO_2=nitrogen dioxide; S=solid; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–77a. Map 11: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
218-E-10	218-E-10 Trench	S	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-200-E-23	UPR-200-E-23	S	Site consolidated with Site WIDS ID 218-E-10												
UPR-200-E-24	UPR-200-E-24	S	Site consolidated with Site WIDS ID 218-E-10												
216-B-50	216-B-50 Crib	L	–	–	5.64×10^{-1}	–	–	–	–	–	–	–	1.48×10^{1}	–	7.59
216-B-57	216-B-57 Crib	L	–	–	1.69	–	–	–	–	–	–	–	2.42×10^{1}	–	1.27×10^{1}
UPR-200-E-9	UPR-200-E-9	L	–	–	2.83×10^{-2}	–	–	–	–	–	–	–	6.91	–	–
216-B-11A & B	216-B-11A & B	L	–	–	6.08×10^{-4}	–	–	–	–	–	–	–	4.72×10^{-1}	–	3.60
216-B-51	216-B-51 French Drain	L	–	–	–	–	–	–	–	–	–	–	1.72×10^{-1}	–	4.05
218-E-5	218-E-5 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
218-E-5A	218-E-5A Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
218-E-2	218-E-2 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-200-E-79	UPR-200-E-79 Unplanned Release	L	–	–	2.34×10^{-3}	–	–	–	–	–	–	–	1.82	–	1.38×10^{1}
UPR-200-E-78	UPR-200-E-78 Unplanned Release	L	–	–	–	–	–	–	–	–	–	–	6.13×10^{-2}	–	–
218-E-4	218-E-4 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-B-5	216-B-5 Reverse Well	L	–	–	–	–	–	–	–	–	–	–	3.79×10^{3}	–	5.63×10^{4}
216-B-9	216-B-9 Crib	L	–	–	–	–	–	–	–	–	–	–	6.40×10^{2}	–	9.53×10^{3}
216-B-59	216-B-59 Trench	L	–	–	6.99×10^{-12}	–	–	–	–	–	–	–	5.88×10^{-6}	–	6.36×10^{-2}
241-B-361	241-B-361 Settling Tank	L	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-200-E-7	UPR-200-E-7 Unplanned Release	L	–	–	–	–	–	–	–	–	–	–	4.15×10^{-1}	–	5.22
221-B	221-B B Plant/Canyon	S	–	–	–	–	–	–	–	–	4.20×10^{-1}	–	1.86×10^{1}	–	–
200-E-28	200-E-28 UPR	L	–	–	–	–	–	–	–	–	–	–	–	–	–

Table S-77a. Map 11: Chemical Inventories (kilograms) *(continued)*

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
200-E-97	200-E-97 French Drain	L	–	–	–	–	–	–	–	–	–	–	1.95×10^{-3}	–	2.04×10^{-2}
200-E-98[a]	200-E-98 French Drain	L	–	–	–	–	–	–	–	–	–	–	1.63×10^{-3}	–	1.70×10^{-2}
WESF	WESF (Building 225-B)	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-B-62	216-B-62 Crib	L	–	–	4.10×10^{-9}	–	–	–	–	–	–	–	2.96×10^{1}	–	3.77×10^{1}
216-B-12	216-B-12 Crib	L	–	–	9.58×10^{-1}	–	–	–	–	–	–	–	5.61×10^{2}	–	4.74×10^{3}
216-B-55	216-B-55 Crib	L	–	–	1.75×10^{-8}	–	–	–	–	–	–	–	1.47×10^{-2}	–	1.60×10^{2}
212-B	212-B Cask Loading Station	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-B-60	216-B-60 Crib	L	–	–	–	–	–	–	–	–	–	–	7.87	–	–
UPR-200-E-84	UPR-200-E-84 Unplanned Release	L	–	–	–	–	–	–	–	–	–	–	–	–	–
224-B	224-B Plutonium Concentration Facility	S	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-200-E-87	UPR-200-E-87 Unplanned Release	L	–	–	–	–	–	–	–	–	–	–	9.41	–	1.37×10^{2}
UPR-200-E-1[a]	UPR-200-E-1 Unplanned Release	L	–	–	–	–	–	–	–	–	–	–	7.30	–	7.64×10^{1}
UPR-200-E-3[a]	UPR-200-E-3 Unplanned Release	L	–	–	–	–	–	–	–	–	–	–	1.18×10^{-1}	–	1.24
UPR-200-E-85	UPR-200-E-85 Unplanned Release	L	–	–	–	–	–	–	–	–	–	–	4.08	–	9.07×10^{-2}
216-B-4	216-B-4 Reverse Well	L	–	–	–	–	–	–	–	–	–	–	5.57×10^{-4}	–	5.83×10^{-3}
216-B-6	216-B-6 Reverse Well	L	–	–	–	–	–	–	–	–	–	–	2.50×10^{3}	–	–
200-E-30	200-E-30 Sand Filter (291-B Sand Filter)	S	–	–	–	–	–	–	–	–	–	–	–	–	–
200-E-55	200-E-55 French Drain	L	–	–	–	–	–	–	–	–	–	–	1.91×10^{-3}	–	2.00×10^{-2}
200-E-95	200-E-95 French Drain	L	–	–	–	–	–	–	–	–	–	–	1.95×10^{-3}	–	2.04×10^{-2}
216-B-10A	216-B-10A Crib	L	–	–	2.51×10^{-5}	–	–	–	–	–	–	–	4.22×10^{1}	–	5.88

Table S-77a. Map 11: Chemical Inventories (kilograms) *(continued)*

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
216-B-10B	216-B-10B Crib	L	–	–	–	–	–	–	–	–	–	–	1.17×10^{1}	–	–
UPR-200-E-77	UPR-200-E-77 Unplanned Release	L	–	–	–	–	–	–	–	–	–	–	6.33×10^{-3}	–	–

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; S=solid; TBP=tributyl phosphate; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–77b. Map 11: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
218-E-10	218-E-10 Trench	S	–	4.53×10^{2}	–	–	–	–	–	–	–	–	–	–	–
UPR-200-E-23	UPR-200-E-23	S	Site consolidated with Site WIDS ID 218-E-10												
UPR-200-E-24	UPR-200-E-24	S	Site consolidated with Site WIDS ID 218-E-10												
216-B-50	216-B-50 Crib	L	–	5.94×10^{-1}	2.01×10^{-1}	7.85×10^{-1}	–	3.55×10^{-2}	1.64×10^{2}	–	–	–	–	2.88×10^{-2}	–
216-B-57	216-B-57 Crib	L	–	9.86×10^{-1}	3.21×10^{-1}	1.21	–	1.07×10^{-1}	4.34×10^{2}	–	–	–	–	5.94×10^{-2}	–
UPR-200-E-9	UPR-200-E-9	L	–	–	–	1.33×10^{-2}	–	3.90	7.99×10^{3}	–	–	–	–	1.29	–
216-B-11A & B	216-B-11A & B	L	–	4.34×10^{-1}	2.09×10^{-1}	2.52×10^{-1}	–	1.07×10^{-1}	2.56×10^{2}	–	–	–	–	4.21×10^{-2}	–
216-B-51	216-B-51 French Drain	L	–	–	–	3.19×10^{-4}	–	1.05×10^{-1}	1.99×10^{2}	–	–	–	–	3.10×10^{-2}	–
218-E-5	218-E-5 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
218-E-5A	218-E-5A Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–

Table S-77b. Map 11: Chemical Inventories (kilograms) *(continued)*

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
218-E-2	218-E-2 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-200-E-79	UPR-200-E-79 Unplanned Release	L	–	–	–	1.25×10^{-3}	–	4.14×10^{-1}	8.83×10^{2}	–	–	–	–	1.20×10^{-1}	–
UPR-200-E-78	UPR-200-E-78 Unplanned Release	L	–	7.00×10^{-2}	–	5.00×10^{-5}	–	3.62×10^{-2}	1.04×10^{1}	–	–	–	–	4.74×10^{-3}	–
218-E-4	218-E-4 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-B-5	216-B-5 Reverse Well	L	–	–	1.93×10^{3}	–	–	1.04×10^{3}	9.50×10^{5}	–	–	–	–	1.05×10^{1}	–
216-B-9	216-B-9 Crib	L	–	–	1.69×10^{1}	–	–	2.02×10^{2}	1.71×10^{5}	–	–	–	–	1.23×10^{1}	–
216-B-59	216-B-59 Trench	L	–	2.65×10^{-3}	2.41×10^{-3}	1.17×10^{-9}	–	3.95×10^{-7}	2.41×10^{-1}	–	–	–	–	1.12×10^{-7}	–
241-B-361	241-B-361 Settling Tank	L	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-200-E-7	UPR-200-E-7 Unplanned Release	L	–	–	1.68×10^{-2}	–	–	1.06×10^{-1}	9.13×10^{1}	–	–	–	–	4.40×10^{-3}	–
221-B	221-B B Plant/Canyon	S	–	9.71×10^{4}	–	–	–	–	–	–	–	–	–	–	–
200-E-28	200-E-28 UPR	L	–	8.58×10^{-3}	4.14×10^{-3}	4.97×10^{-3}	–	–	5.33×10^{-1}	–	–	–	–	2.18×10^{-4}	–
200-E-97	200-E-97 French Drain	L	–	2.89×10^{-3}	1.44×10^{-3}	1.67×10^{-3}	–	6.29×10^{-4}	6.20×10^{-1}	–	–	–	–	1.82×10^{-3}	–
200-E-98[a]	200-E-98 French Drain	L	–	2.38×10^{-3}	1.19×10^{-3}	1.38×10^{-3}	–	5.24×10^{-4}	5.16×10^{-1}	–	–	–	–	1.51×10^{-3}	–
WESF	WESF (Building 225-B)	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-B-62	216-B-62 Crib	L	–	3.11	1.74	1.08×10^{-2}	–	3.56	1.75×10^{3}	–	–	–	–	–	–
216-B-12	216-B-12 Crib	L	–	3.54	3.75	2.14	–	1.59×10^{2}	2.86×10^{6}	–	–	–	–	1.51×10^{4}	–
216-B-55	216-B-55 Crib	L	–	6.65	6.04	2.94×10^{-6}	–	9.90×10^{-4}	6.05×10^{2}	–	–	–	–	2.80×10^{-4}	–
212-B	212-B Cask Loading Station	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-B-60	216-B-60 Crib	L	–	–	–	–	–	2.17	2.12×10^{2}	–	–	–	–	6.33×10^{-1}	–
UPR-200-E-84	UPR-200-E-84 Unplanned Release	L	–	–	–	–	–	–	4.22	–	–	–	–	7.81×10^{-4}	–
224-B	224-B Plutonium Concentration Facility	S	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-200-E-87	UPR-200-E-87 Unplanned Release	L	–	–	1.40×10^{2}	–	–	2.48	2.28×10^{3}	–	–	–	–	5.39×10^{-4}	–

Table S-77b. Map 11: Chemical Inventories (kilograms) ***(continued)***

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
UPR-200-E-1[a]	UPR-200-E-1 Unplanned Release	L	–		–	–	–	2.03	2.28×10^{3}	–	–	–	–	6.33×10^{-1}	
UPR-200-E-3[a]	UPR-200-E-3 Unplanned Release	L	–		–	1.07×10^{-4}	–	3.29×10^{-2}	3.64×10^{1}	–	–	–	–	1.02×10^{-2}	
UPR-200-E-85	UPR-200-E-85 Unplanned Release	L	–	2.51×10^{-1}	4.40×10^{-2}	8.06×10^{-4}		2.65×10^{-1}	3.27×10^{2}	–	–	–	–	7.76×10^{-2}	–
216-B-4	216-B-4 Reverse Well	L	–	–	1.43×10^{-5}	1.68×10^{-7}	–	1.80×10^{-4}	1.26×10^{-1}	–	–	–	–	4.98×10^{-4}	–
216-B-6	216-B-6 Reverse Well	L	–		–	–	–	6.42×10^{2}	6.73×10^{4}	–		–	–	2.98×10^{-1}	
200-E-30	200-E-30 Sand Filter (291-B Sand Filter)	S	–		–	–	–			–		–		–	
200-E-55	200-E-55 French Drain	L	–	2.88×10^{-3}	1.44×10^{-3}	1.67×10^{-3}	–	6.16×10^{-4}	6.11×10^{-1}	–		–		1.78×10^{-3}	
200-E-95	200-E-95 French Drain	L	–	2.69×10^{-3}	1.35×10^{-3}	1.56×10^{-3}	–	6.29×10^{-4}	6.09×10^{-1}	–		–		1.81×10^{-3}	
216-B-10A	216-B-10A Crib	L	–	–	1.42×10^{-2}	1.85×10^{-4}	–	1.09×10^{1}	1.32×10^{3}	–		–		4.83	
216-B-10B	216-B-10B Crib	L	–		–	–	–	3.00	3.14×10^{2}	–	–	–		2.63×10^{-8}	
UPR-200-E-77	UPR-200-E-77 Unplanned Release	L	–	–	–	–	–	3.57×10^{-3}	4.36×10^{-1}	–	–	–	–	3.30×10^{-2}	

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.

Note: Dash ( ) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; S=solid; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–78a. Map 12: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
218-E-12B	218-E-12B Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
218-E-12A	218-E-12A Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-B-63	216-B-63 Ditch	L	–	–	1.00×10^{-3}	–	–	–	–	–	–	–	1.38×10^{1}	–	1.12×10^{3}
216-B-2-2	216-B-2-2 Ditch	L	Site consolidated with Site WIDS ID 216-B-3												
216-B-2-1	216-B-2-1 Ditch	L	Site consolidated with Site WIDS ID 216-B-3												
UPR-200-E-138	UPR-200-E-138 Unplanned Release	L	Site consolidated with Site WIDS ID 216-B-3												
218-E-8	218-E-8 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
218-E-1	218-E-1 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-B-3	216-B-3 Pond	L	–	–	4.26×10^{4}	–	–	–	–	–	–	4.68×10^{3}	1.41×10^{3}	–	4.61×10^{4}
216-B-3A Pond / 216-B-3A RAD	216-B-3A Pond / 216-B-3A RAD	L	Site consolidated with Site WIDS ID 216-B-3												
216-B-3B Pond / 216-B-3B-RAD	216-B-3B Pond / 216-B-3B-RAD	L	Site consolidated with Site WIDS ID 216-B-3												
216-B-3C Pond / 216-B-3C RAD	216-B-3C Pond / 216-B-3C RAD	L	Site consolidated with Site WIDS ID 216-B-3												
UPR-200-E-14	Unplanned Release-UPR-200-E-14	L	Site consolidated with Site WIDS ID 216-B-3												
UPR-200-E-34	UPR-200-E-34	L	Site consolidated with Site WIDS ID 216-A-25 and 216-B-3												

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; S=solid; TBP=tributyl phosphate; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–78b. Map 12: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
218-E-12B	218-E-12B Burial Ground	S	–	1.06×10^{7}	–	–	–	–	–	1.82×10^{3}	–	–	–	–	–
218-E-12A	218-E-12A Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-B-63	216-B-63 Ditch	L	–	1.06	4.62×10^{1}	7.81×10^{-1}	–	1.11×10^{-2}	3.14×10^{3}	–	–	–	–	1.78×10^{2}	–
216-B-2-2	216-B-2-2 Ditch	L	Site consolidated with Site WIDS ID 216-B-3												
216-B-2-1	216-B-2-1 Ditch	L	Site consolidated with Site WIDS ID 216-B-3												
UPR-200-E-138	UPR-200-E-138 Unplanned Release	L	Site consolidated with Site WIDS ID 216-B-3												
218-E-8	218-E-8 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
218-E-1	218-E-1 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
216-B-3	216-B-3 Pond	L	–	5.88×10^{3}	2.27×10^{3}	2.79×10^{2}	–	2.50×10^{2}	2.94×10^{5}	–	–	–	–	2.79×10^{3}	–
216-B-3A Pond / 216-B-3A RAD	216-B-3A Pond / 216-B-3A RAD	L	Site consolidated with Site WIDS ID 216-B-3												
216-B-3B Pond / 216-B-3B-RAD	216-B-3B Pond / 216-B-3B-RAD	L	Site consolidated with Site WIDS ID 216-B-3												
216-B-3C Pond / 216-B-3C RAD	216-B-3C Pond / 216-B-3C RAD	L	Site consolidated with Site WIDS ID 216-B-3												
UPR-200-E-14	Unplanned Release-UPR-200-E-14	L	Site consolidated with Site WIDS ID 216-B-3												
UPR-200-E-34	UPR-200-E-34	L	Site consolidated with Site WIDS ID 216-A-25 and 216-B-3												

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; S=solid; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–79a. Map 12A: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
216-C-9	216-C-9 Swamp	L	–	–	1.37×10^{-8}	–	–	–	–	–	–	–	1.15×10^{-2}	–	1.32×10^{2}
218-C-9	218-C-9 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-200-E-141[a]	UPR-200-E-141	L	–	–	1.04×10^{-6}	–	–	–	–	–	–	–	2.26×10^{-5}	–	5.16×10^{-3}
200-E-56[a]	200-E-56 Unplanned Release	L	–	–	–	–	–	–	–	–	–	–	3.01×10^{1}	–	–
201-C	201-C Process Building	L/S	–	–	–	–	–	–		–	–	–	–	–	–
216-C-1	216-C-1 Hot Semi Work Crib	L	–	–	–	–	–	–	–	–	–	–	5.77×10^{4}	–	–
216-C-3	216-C-3 Hot Semi Work Crib	L	–	–	2.52×10^{-2}	–	–	–	–	–	–	–	5.85×10^{-1}	–	1.24×10^{2}
216-C-4	216-C-4 Hot Semi Work Crib	L	–	–	–	–	–	–	–	–	–	–	1.04×10^{-6}	–	–
216-C-5	216-C-5 Hot Semi Work Crib	L	–	–	–	–	–	–	–	–	–	–	1.63×10^{1}	–	–
216-C-6	216-C-6 Hot Semi Work Crib	L	–	–	–	–	–	–	–	–	–	–	2.82×10^{-6}	–	–
216-C-10	216-C-10 Hot Semi Work Crib	L	–	–	–	–	–	–	–	–	–	–	7.96×10^{-2}	–	–
216-C-2	216-C-2 Semi Works Reverse Well	L	–	–	–	–	–	–	–	–	–	–	–	–	–
200-E-57[a]	200-E-57 Unplanned Release	L	–	–	–	–	–	–	–	–	–	–	4.51×10^{1}	–	–
241-CX-72	241-CX-72 Storage Tank and Vault	L/S	–	–	–	–	–	–	–	–	–	–	–	–	–
291-C-1	291-C-1 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; S=solid; TBP=tributyl phosphate; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–79b. Map 12A: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
216-C-9	216-C-9 Swamp	L	–	5.98	5.47	4.39×10^{-1}	–	7.74×10^{-4}	5.20×10^{2}	–	–	–	–	4.52×10^{-2}	–
218-C-9	218-C-9 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-200-E-141[a]	UPR-200-E-141	L	–	–	1.88×10^{-6}	7.69×10^{-7}	–	1.15×10^{-5}	3.18	–	–	–	–	1.80×10^{-1}	–
200-E-56[a]	200-E-56 Unplanned Release	L	–	3.43×10^{1}	–	2.45×10^{-2}	–	1.77×10^{1}	5.10×10^{3}	–	–	–	–	2.35	–
201-C	201-C Process Building	L/S	–	2.27×10^{3}	–	–	–	–	–	–	–	–	–	–	–
216-C-1	216-C-1 Hot Semi Work Crib	L	–	9.15×10^{1}	5.94×10^{2}	7.70	–	2.51×10^{3}	3.76×10^{6}	–	–	–	–	9.08×10^{2}	–
216-C-3	216-C-3 Hot Semi Work Crib	L	–	4.54×10^{-2}	4.54×10^{-2}	1.46×10^{-2}	–	3.01×10^{-1}	7.65×10^{4}	–	–	–	–	4.54	–
216-C-4	216-C-4 Hot Semi Work Crib	L	–	2.49×10^{-3}	1.20×10^{-3}	1.47×10^{-3}	–	5.89×10^{-2}	5.67	–	–	–	–	3.17×10^{-3}	–
216-C-5	216-C-5 Hot Semi Work Crib	L	–	9.03×10^{-1}	–	2.50×10^{-2}	–	4.49	1.09×10^{3}	–	–	–	–	2.07×10^{1}	–
216-C-6	216-C-6 Hot Semi Work Crib	L	–	–	–	8.75×10^{-5}	–	1.59×10^{-1}	2.83×10^{2}	–	–	–	–	1.78	–
216-C-10	216-C-10 Hot Semi Work Crib	L	–	1.04×10^{-1}	6.34×10^{-3}	7.67×10^{-3}	–	4.70×10^{-2}	1.43×10^{1}	–	–	–	–	6.52×10^{-3}	–
216-C-2	216-C-2 Semi Works Reverse Well	L	–	4.62×10^{-2}	2.23×10^{-2}	2.68×10^{-2}	–	–	2.86	–	–	–	–	1.18×10^{-3}	–
200-E-57[a]	200-E-57 Unplanned Release	L	–	5.15×10^{1}	–	$3.67\times10^{-}$	–	2.66×10^{1}	7.65×10^{3}	–	–	–	–	3.51	–
241-CX-72	241-CX-72 Storage Tank and Vault	L/S	–	–	–	–	–	–	–	–	–	–	–	–	–
291-C-1	291-C-1 Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; S=solid; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–80a. Map 12B: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
UPR-200-E-86	UPR-200-E-86	L	–	–	–	–	–	–	–	–	–	–	6.04×10^{1}	–	8.43×10^{-1}
216-A-40	216-A-40 Trench	L	–	–	1.39×10^{-11}	–	–	–	–	–	–	–	1.17×10^{-5}	–	1.26×10^{-1}
216-A-41	216-A-41 Crib	L	–	–	7.83×10^{-8}	–	–	–	–	–	–	–	1.86×10^{-4}	–	3.99×10^{-3}
216-A-9	216-A-9 Crib	L	–	–	3.60×10^{2}	–	–	–	–	–	–	–	8.36×10^{2}	–	1.32×10^{2}
216-A-3	216-A-3 Crib	L	–	–	1.53×10^{-2}	–	–	–	–	–	–	–	3.39×10^{-1}	–	7.56×10^{1}
216-A-39	216-A-39 Crib	L	–	–	–	–	–	–	–	–	–	–	8.47×10^{-3}	–	–
216-A-18	216-A-18 Trench	L	–	–	–	–	–	–	–	–	–	–	2.04×10^{2}	–	–
216-A-1	216-A-1 Crib	L	–	–	–	–	–	–	–	–	–	–	4.11×10^{1}	–	–
216-A-7	216-A-7 Crib	L	–	–	1.32×10^{5}	–	–	–	–	–	–	–	4.84×10^{-3}	–	1.05×10^{-2}
UPR-200-E-145	UPR-200-E-145	L	–	–	3.13×10^{-5}	–	–	–	–	–	–	–	6.77×10^{-4}	–	1.55×10^{-1}
216-A-16	216-A-16 French Drain	L	–	–	1.34×10^{-6}	–	–	–	–	–	–	–	3.17×10^{-3}	–	6.81×10^{-2}
216-A-17	216-A-17 French Drain	L	–	–	6.57×10^{-7}	–	–	–	–	–	–	–	1.56×10^{-3}	–	3.35×10^{-2}
242-A	242-A Evaporator	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-A-22	216-A-22 Crib (French Drain)	L	–	–	3.70×10^{-1}	–	–	–	–	–	–	–	–	–	4.93×10^{-3}
216-A-28	216-A-28 French Drain	L	–	–	1.43×10^{-4}	–	–	–	–	–	–	–	3.09×10^{-3}	–	7.07×10^{-1}
216-A-32	216-A-32 Crib	L	–	–	4.39×10^{-8}	–	–	–	–	–	–	–	1.04×10^{-4}	–	2.24×10^{-3}
200-E-78	200-E-78 Reverse Well	L	–	–	–	–	–	–	–	–	–	–	–	–	2.51×10^{-2}

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; TBP=tributyl phosphate; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–80b. Map 12B: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
UPR-200-E-86	UPR-200-E-86	L	–	3.17	6.64×10^{-1}	2.20×10^{-2}	–	7.26	3.28×10^{3}	–	–	–	–	2.11	–
216-A-40	216-A-40 Trench	L	–	5.25×10^{-3}	4.78×10^{-3}	2.32×10^{-9}	–	7.83×10^{-7}	4.78×10^{-1}	–	–	–	–	2.22×10^{-7}	–
216-A-41	216-A-41 Crib	L	–	1.86×10^{-8}	2.71×10^{-9}	3.56×10^{-11}	–	1.55×10^{-4}	4.03	–	–	–	–	3.40×10^{-4}	–
216-A-9	216-A-9 Crib	L	–	1.54	8.60	3.20×10^{-2}	–	6.42×10^{2}	2.18×10^{4}	–	–	–	–	1.89×10^{3}	–
216-A-3	216-A-3 Crib	L	–	–	2.75×10^{-2}	1.13×10^{-2}	–	1.70×10^{-1}	4.65×10^{4}	–	–	–	–	2.64×10^{3}	–
216-A-39	216-A-39 Crib	L	–	2.98×10^{-3}	–	6.49×10^{-6}	–	2.14×10^{-3}	9.13×10^{-1}	–	–	–	–	6.21×10^{-4}	–
216-A-18	216-A-18 Trench	L	–	1.13×10^{1}	–	5.82×10^{-1}	–	6.33×10^{1}	1.37×10^{4}	–	–	–	–	6.82×10^{2}	–
216-A-1	216-A-1 Crib	L	–	2.29	–	1.17×10^{-1}	–	1.28×10^{1}	2.76×10^{3}	–	–	–	–	1.38×10^{2}	–
216-A-7	216-A-7 Crib	L	–	4.08×10^{-4}	1.16×10^{-3}	8.49×10^{-6}	–	7.33×10^{-4}	1.49×10^{3}	–	–	–	–	4.81×10^{2}	–
UPR-200-E-145	UPR-200-E-145	L	–	–	5.64×10^{-5}	2.31×10^{-5}	–	3.45×10^{-4}	9.53×10^{1}	–	–	–	–	5.41	–
216-A-16	216-A-16 French Drain	L	–	3.18×10^{-7}	4.62×10^{-8}	6.08×10^{-10}	–	2.65×10^{-3}	3.67×10^{1}	–	–	–	–	1.71×10^{-7}	–
216-A-17	216-A-17 French Drain	L	–	1.56×10^{-7}	2.27×10^{-8}	2.99×10^{-10}	–	1.30×10^{-3}	1.81×10^{1}	–	–	–	–	8.40×10^{-8}	–
242-A	242-A Evaporator	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-A-22	216-A-22 Crib (French Drain)	L	–	–	8.38×10^{-5}	2.64×10^{-5}	–	4.23×10^{-4}	6.01×10^{-1}	–	–	–	–	4.61	–
216-A-28	216-A-28 French Drain	L	–	–	2.57×10^{-4}	1.05×10^{-4}	–	1.57×10^{-3}	4.35×10^{2}	–	–	–	–	6.54×10^{2}	–
216-A-32	216-A-32 Crib	L	–	1.04×10^{-8}	1.52×10^{-9}	2.00×10^{-11}	–	8.70×10^{-5}	1.21	–	–	–	–	5.61×10^{-9}	–
200-E-78	200-E-78 Reverse Well	L	–	–	1.15×10^{-3}	–	–	–	1.04×10^{-1}	–	–	–	–	8.87×10^{-3}	–

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–81a. Map 12C: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
UPR-200-E-51	UPR-200-E-51	L	Site consolidated with Site WIDS ID 216-A-29												
216-A-24	216-A-24 Crib	L	–	–	1.88×10^{4}	–	–	–	–	–	–	–	6.49×10^{-4}	–	1.08×10^{2}
216-A-6	216-A-6 Crib	L	–	–	3.72×10^{-4}	–	–	–	–	–	–	–	5.00×10^{3}	–	4.56×10^{2}
216-A-19	216-A-19 Trench	L	–	–	–	–	–	–	–	–	–	–	4.59×10^{2}	–	–
216-A-20	216-A-20 Trench	L	–	–	1.04	–	–	–	–	–	–	–	5.65×10^{1}	–	1.07×10^{-1}
216-A-8	216-A-8 Crib	L	–	–	1.08×10^{5}	–	–	–	–	–	–	–	3.90×10^{-3}	–	1.52×10^{2}
216-A-29[a]	216-A-29 Ditch	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-A-30	216-A-30 Crib	L	–	–	2.29×10^{-3}	–	–	–	–	–	–	–	6.04×10^{3}	–	1.13×10^{3}
216-A-37-1	216-A-37-1 Crib	L	–	–	4.65×10^{2}	–	–	–	–	–	–	6.68×10^{1}	–	–	4.79×10^{1}
216-A-37-2	216-A-37-2 Crib	L	–	–	1.39×10^{2}	–	–	–	–	–	–	–	–	–	1.49×10^{2}

a This site was consolidated with another site for purposes of modeling.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; TBP=tributyl phosphate; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–81b. Map 12C: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
UPR-200-E-51	UPR-200-E-51	L	Site consolidated with Site WIDS ID 216-A-29												
216-A-24	216-A-24 Crib	L	–	4.31×10^{1}	1.49×10^{1}	1.65	–	9.86×10^{-5}	6.53×10^{2}	–	–	–	–	6.51×10^{1}	–
216-A-6	216-A-6 Crib	L	–	1.36×10^{-1}	2.02×10^{1}	2.71×10^{-3}	–	1.29×10^{3}	2.20×10^{5}	–	–	–	–	1.70×10^{2}	–
216-A-19	216-A-19 Trench	L	–	2.55×10^{1}	–	2.79×10^{1}	–	8.41×10^{2}	3.08×10^{4}	–	–	–	–	4.34×10^{4}	–
216-A-20	216-A-20 Trench	L	–	3.14	1.19×10^{-2}	4.34×10^{-1}	–	2.47×10^{1}	3.79×10^{3}	–	–	–	–	6.21×10^{2}	–
216-A-8	216-A-8 Crib	L	–	1.16×10^{2}	2.49×10^{1}	4.54	–	5.91×10^{-4}	1.83×10^{3}	–	–	–	–	3.91×10^{2}	–
216-A-29[a]	216-A-29 Ditch	L	–	–	–	–	–	–	3.24×10^{2}	–	–	–	–		–
216-A-30	216-A-30 Crib	L	–	3.68×10^{-1}	4.68×10^{1}	7.35×10^{-3}	–	1.63×10^{3}	2.30×10^{5}	–	–	–	–	6.56×10^{2}	–
216-A-37-1	216-A-37-1 Crib	L	–	1.86	5.30	3.87×10^{-2}	–	–	2.05×10^{2}	–	–	–	–	1.93×10^{-1}	–
216-A-37-2	216-A-37-2 Crib	L	–	5.55×10^{-1}	7.73	1.16×10^{-2}	–	–	6.18×10^{2}	–	–	–	–	4.76×10^{1}	–

[a] This site was consolidated with another site for purposes of modeling.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–82a. Map 12D: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
216-A-13	216-A-13 French Drain	L	–	–	1.10×10^{-7}	–	–	–	–	–	–	–	2.60×10^{-4}	–	5.59×10^{-3}
200-E-61	200-E-61 Reverse Well	L	–	–	1.97×10^{-5}	–	–	–	–	–	–	–	4.67×10^{-2}	–	1.01
200-E-136	200-E-136 PUREX Plant (202-A and Others)	S	–	–	–	–	–	–	–	–	1.29×10^{2}	–	–	–	–
UPR-200-E-39	UPR-200-E-39 (@ 216-A-36B)	L	–	–	–	–	–	–	–	–	–	–	–	–	–
UPR-200-E-40	UPR-200-E-40	L	–	–	–	–	–	–	–	–	–	–	–	–	–
200-E-85	200-E-85 Reverse Well	L	–	–	1.56×10^{-5}	–	–	–	–	–	–	–	3.70×10^{-2}	–	7.96×10^{-1}
216-A-35	216-A-35 French Drain	L	–	–	1.10×10^{-7}	–	–	–	–	–	–	–	2.60×10^{-4}	–	5.59×10^{-3}
200-E-54	200-E-54 Unplanned Release	L	–	–	2.20×10^{-6}	–	–	–	–	–	–	–	5.21×10^{-3}	–	1.12×10^{-1}
200-E-103	200-E-103 PUREX Stabilized Area	L	–	–	4.38×10^{-8}	–	–	–	–	–	–	–	1.04×10^{-4}	–	2.23×10^{-3}
UPR-200-E-117[a]	UPR-200-E-117	L	–	–	–	–	–	–	–	–	–	–	2.94×10^{-1}	–	4.09×10^{-3}
216-A-2	216-A-2 Crib	L	–	–	1.24×10^{5}	–	–	–	–	–	–	–	4.56×10^{-3}	–	–
216-A-26	216-A-26 French Drain	L	–		4.23×10^{-8}	–	–	–	–		–	–	1.00×10^{-4}	–	2.16×10^{-3}
216-A-26A	216-A-26A French Drain	L	–		1.10×10^{-8}	–	–	–	–		–	–	2.60×10^{-5}	–	5.59×10^{-4}
216-A-15	216-A-15 French Drain	L	–		–	–	–	–	–		–	–	–	–	1.36
200-E-107	200-E-107 Unplanned Release	L	–		–	–	–	–	–		–	–	1.67	–	–
218-E-14	218-E-14 PUREX Tunnel 1	S	–	–	–	–	–	–	–	–	–	–	–	–	–
218-E-15	218-E-15 PUREX Tunnel 2	S	–	–	–	–	–	–	–	–	6.85×10^{1}	–	9.00	–	–
216-A-4	216-A-4 Crib	L	–	–	3.11×10^{-2}	–	–	–	–	–	–	–	2.34	–	1.54×10^{2}
216-A-5	216-A-5 Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–

Table S-82a. Map 12D: Chemical Inventories (kilograms) *(continued)*

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
216-A-10	216-A-10 Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	3.19×10^{1}
216-A-21	216-A-21 Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-A-27	216-A-27 Crib	L	–	–	2.54×10^{-4}	–	–	–	–	–	–	–	1.06×10^{1}	–	1.29×10^{1}
216-A-31	216-A-31 Crib	L	–	–	1.64×10^{4}	–	–	–	–	–	–	–	6.00×10^{-4}	–	–
216-A-36-A	216-A-36A Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-A-36-B	216-A-36B Crib	L	–	–	–	–	–	–	–	–	–	–	–	–	–
216-A-45	216-A-45 Crib	L	–	–	2.53×10^{-1}	–	–	–	–	–	–	–	5.45	–	1.24×10^{3}

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HF=hydrogen fluoride; ID=identifier;; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; PUREX=Plutonium-Uranium Extraction; S=solid; TBP=tributyl phosphate; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–82b. Map 12D: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
216-A-13	216-A-13 French Drain	L	–	2.61×10^{-8}	3.79×10^{-9}	4.99×10^{-11}	–	2.17×10^{-4}	3.01	–	–	–	–	1.40×10^{-8}	–
200-E-61	200-E-61 Reverse Well	L	–	4.69×10^{-6}	6.82×10^{-7}	8.97×10^{-9}	–	3.91×10^{-2}	5.42×10^{2}	–	–	–	–	2.52×10^{-6}	–
200-E-136	200-E-136 PUREX Plant (202-A and Others)	S	–	1.81×10^{4}	–	1.14×10^{2}	–	–	–	–	–	–	–	–	–
UPR-200-E-39	UPR-200-E-39 (@ 216-A-36B)	L	–	–	–	–	–	–	6.24	–	–	–	–	2.08×10^{-1}	–
UPR-200-E-40	UPR-200-E-40	L	–	–	–	–	–	–	4.80×10^{-1}	–	–	–	–	1.59×10^{-2}	–
200-E-85	200-E-85 Reverse Well	L	–	3.71×10^{-6}	5.40×10^{-7}	7.11×10^{-9}	–	3.10×10^{-2}	4.29×10^{2}	–	–	–	–	2.00×10^{-6}	–

Table S-82b. Map 12D: Chemical Inventories (kilograms) *(continued)*

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
216-A-35	216-A-35 French Drain	L	–	2.60×10^{-8}	3.79×10^{-9}	4.98×10^{-11}	–	2.17×10^{-4}	3.01	–	–	–	–	1.40×10^{-8}	–
200-E-54	200-E-54 Unplanned Release	L	–	5.22×10^{-7}	7.61×10^{-8}	1.00×10^{-9}	–	4.36×10^{-3}	6.04×10^{1}	–	–	–	–	2.81×10^{-7}	–
200-E-103	200-E-103 PUREX Stabilized Area	L	–	1.04×10^{-8}	1.52×10^{-9}	1.99×10^{-11}	–	8.68×10^{-5}	1.20	–	–	–	–	5.61×10^{-9}	–
UPR-200-E-117[a]	UPR-200-E-117	L	–	1.54×10^{-2}	3.23×10^{-3}	1.07×10^{-4}	–	3.53×10^{-2}	1.60×10^{1}	–	–	–	–	1.01×10^{-2}	–
216-A-2	216-A-2 Crib	L	–	–	–	–	–	7.00×10^{-4}	2.37×10^{3}	–	–	–	–	2.28×10^{2}	–
216-A-26	216-A-26 French Drain	L	–	1.00×10^{-8}	1.46×10^{-9}	1.92×10^{-11}	–	8.38×10^{-5}	1.16	–	–	–	–	5.40×10^{-9}	–
216-A-26A	216-A-26A French Drain	L	–	2.61×10^{-9}	3.79×10^{-10}	4.99×10^{-12}	–	2.17×10^{-5}	3.01×10^{-1}	–	–	–	–	1.40×10^{-9}	–
216-A-15	216-A-15 French Drain	L	–	–	6.23×10^{-2}	–	–	–	5.64	–	–	–	–	4.82×10^{-1}	–
200-E-107	200-E-107 Unplanned Release	L	–	–	–	–	–	4.28×10^{-1}	4.49×10^{1}	–	–	–	–	3.75×10^{-9}	–
218-E-14	218-E-14 PUREX Tunnel 1	S	–	2.30×10^{2}	–	–	–		–	–	–	–	–	–	–
218-E-15	218-E-15 PUREX Tunnel 2	S	–	9.73×10^{3}	–	1.30×10^{2}	–		–	–	7.40×10^{2}	–	–	–	–
216-A-4	216-A-4 Crib	L	–	–	5.61×10^{-2}	2.29×10^{-2}	–	1.16	9.54×10^{4}	–	–	–	–	5.39×10^{3}	–
216-A-5	216-A-5 Crib	L	–	–	–	–	–	–	1.07×10^{6}	–	–	–	–	1.98×10^{2}	–
216-A-10	216-A-10 Crib	L	–	–	–	–	–	–	1.92×10^{6}	–	–	–	–	3.58×10^{2}	–
216-A-21	216-A-21 Crib	L	–	–	–	–	–	–	3.20×10^{5}	–	–	–	–	1.95×10^{2}	–
216-A-27	216-A-27 Crib	L	–	6.03×10^{-5}	8.77×10^{-6}	1.15×10^{-7}	–	5.40	1.13×10^{4}	–	–	–	–	6.51×10^{1}	–
216-A-31	216-A-31 Crib	L	–	–	–	–	–	9.10×10^{-5}	1.85×10^{2}	–	–	–	–	5.98×10^{1}	–
216-A-36-A	216-A-36A Crib	L	–	–	–	–	–	–	4.39×10^{3}	–	–	–	–	1.45×10^{2}	–
216-A-36-B	216-A-36B Crib	L	–	–	–	–	–	–	1.30×10^{6}	–	–	–	–	1.22×10^{2}	–
216-A-45	216-A-45 Crib	L	–	4.82×10^{-3}	4.59×10^{-1}	1.45×10^{-1}	–	2.78	8.00×10^{5}	–	–	–	–	7.82	–

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; PUREX=Plutonium-Uranium Extraction; S=solid; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–83a. Map 13: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
2101-M Pond	2101-M Pond	L	–	–	–	–	–	–	–	–	–	–	4.30×10^{2}	–	1.43×10^{2}
216-B-54	216-B-54 Trench	L	–	–	–	–	–	–	–	–	–	–	2.61	–	1.32×10^{-1}
216-B-14	216-B-14 Crib	L	–	–	–	–	–	–	–	–	–	–	1.49×10^{3}	–	3.51×10^{4}
216-B-15	216-B-15 Crib	L	–	–	–	–	–	–	–	–	–	–	1.09×10^{3}	–	2.56×10^{4}
216-B-16	216-B-16 Crib	L	–	–	1.89	–	–	–	–	–	–	–	1.08×10^{3}	–	1.89×10^{4}
216-B-17	216-B-17 Crib	L	–	–	3.82	–	–	–	–	–	–	–	8.19×10^{2}	–	6.11×10^{3}
216-B-18	216-B-18 Crib	L	–	–	–	–	–	–	–	–	–	–	1.46×10^{3}	–	3.45×10^{4}
216-B-19	216-B-19 Crib	L	–	–	4.94	–	–	–	–	–	–	–	1.39×10^{3}	–	1.58×10^{4}
216-B-20	216-B-20 Trench	L	–	–	3.19	–	–	–	–	–	–	–	9.98×10^{2}	–	1.25×10^{4}
216-B-21	216-B-21 Trench	L	–	–	7.50×10^{-1}	–	–	–	–	–	–	–	8.49×10^{2}	–	1.74×10^{4}
216-B-22	216-B-22 Trench	L	–	–	2.06	–	–	–	–	–	–	–	9.41×10^{2}	–	1.50×10^{4}
216-B-23	216-B-23 Trench	L	–	–	2.02	–	–	–	–	–	–	–	9.00×10^{2}	–	1.42×10^{4}
216-B-24	216-B-24 Trench	L	–	–	–	–	–	–	–	–	–	–	8.38×10^{2}	–	1.97×10^{4}
216-B-25	216-B-25 Trench	L	–	–	–	–	–	–	–	–	–	–	8.44×10^{2}	–	1.99×10^{4}
216-B-26	216-B-26 Trench	L	–	–	–	–	–	–	–	–	–	–	8.17×10^{2}	–	1.92×10^{4}
216-B-27	216-B-27 Trench	L	–	–	–	–	–	–	–	–	–	–	7.60×10^{2}	–	1.79×10^{4}
216-B-28	216-B-28 Trench	L	–	–	1.94	–	–	–	–	–	–	–	9.86×10^{2}	–	1.65×10^{4}
216-B-29	216-B-29 Trench	L	–	–	–	–	–	–	–	–	–	–	8.31×10^{2}	–	1.96×10^{4}
216-B-30	216-B-30 Trench	L	–	–	3.91	–	–	–	–	–	–	–	1.06×10^{3}	–	1.15×10^{4}
216-B-31	216-B-31 Trench	L	–	–	3.91	–	–	–	–	–	–	–	1.07×10^{3}	–	1.18×10^{4}
216-B-32	216-B-32 Trench	L	–	–	4.06	–	–	–	–	–	–	–	1.06×10^{3}	–	1.11×10^{4}
216-B-33	216-B-33 Trench	L	–	–	4.76	–	–	–	–	–	–	–	1.11×10^{3}	–	9.63×10^{3}
216-B-34	216-B-34 Trench	L	–	–	4.98	–	–	–	–	–	–	–	1.14×10^{3}	–	9.70×10^{3}
216-B-52	216-B-52 Trench	L	–	–	7.71	–	–	–	–	–	–	–	1.94×10^{3}	–	1.90×10^{4}
216-B-53A	216-B-53A Trench	L	–	–	–	–	–	–	–	–	–	–	3.86	–	7.15×10^{-2}
216-B-53B	216-B-53B Trench	L	–	–	–	–	–	–	–	–	–	–	2.10	–	2.00×10^{-3}
216-B-58	216-B-58 Trench	L	–	–	–	–	–	–	–	–	–	–	1.89	–	5.46×10^{-2}

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; TBP=tributyl phosphate; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–83b. Map 13: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
2101-M Pond	2101-M Pond	L	–	4.29×10^{2}	7.84	1.72×10^{1}	–	–	6.40×10^{2}	–	–	–	–	1.29×10^{1}	–
216-B-54	216-B-54 Trench	L	–	5.22×10^{-1}	5.48×10^{-3}	2.19×10^{-2}	–	8.26×10^{-1}	8.99×10^{2}	–	–	–	–	1.34×10^{1}	–
216-B-14	216-B-14 Crib	L	–	–	–	2.76	–	9.11×10^{2}	1.73×10^{6}	–	–	–	–	2.69×10^{2}	–
216-B-15	216-B-15 Crib	L	–	–	–	2.01	–	6.64×10^{2}	1.26×10^{6}	–	–	–	–	1.96×10^{2}	–
216-B-16	216-B-16 Crib	L	–	2.28	–	1.68	–	5.89×10^{2}	1.07×10^{6}	–	–	–	–	1.73×10^{2}	–
216-B-17	216-B-17 Crib	L	–	4.60	–	8.72×10^{-1}	–	3.58×10^{2}	5.87×10^{5}	–	–	–	–	1.04×10^{2}	–
216-B-18	216-B-18 Crib	L	–	–	–	2.71	–	8.95×10^{2}	1.70×10^{6}	–	–	–	–	2.64×10^{2}	–
216-B-19	216-B-19 Crib	L	–	5.94	–	1.75	–	6.67×10^{2}	1.15×10^{6}	–	–	–	–	1.94×10^{2}	–
216-B-20	216-B-20 Trench	L	–	3.84	–	1.36	–	5.18×10^{2}	8.54×10^{5}	–	–	–	–	1.48×10^{2}	–
216-B-21	216-B-21 Trench	L	–	9.03×10^{-1}	–	1.45	–	4.91×10^{2}	9.13×10^{5}	–	–	–	–	1.44×10^{2}	–
216-B-22	216-B-22 Trench	L	–	2.48	–	1.40	–	4.98×10^{2}	8.94×10^{5}	–	–	–	–	1.46×10^{2}	–
216-B-23	216-B-23 Trench	L	–	2.43	–	1.33	–	4.75×10^{2}	8.52×10^{5}	–	–	–	–	1.39×10^{2}	–
216-B-24	216-B-24 Trench	L	–	–	–	1.55	–	5.12×10^{2}	9.71×10^{5}	–	–	–	–	1.51×10^{2}	–
216-B-25	216-B-25 Trench	L	–	–	–	1.56	–	5.16×10^{2}	9.79×10^{5}	–	–	–	–	1.52×10^{2}	–
216-B-26	216-B-26 Trench	L	–	–	–	1.63	–	5.11×10^{2}	9.46×10^{5}	–	–	–	–	1.59×10^{2}	–
216-B-27	216-B-27 Trench	L	–	–	–	1.41	–	4.65×10^{2}	8.81×10^{5}	–	–	–	–	1.37×10^{2}	–
216-B-28	216-B-28 Trench	L	–	2.33	–	1.50	–	5.31×10^{2}	9.59×10^{5}	–	–	–	–	1.56×10^{2}	–
216-B-29	216-B-29 Trench	L	–	–	–	1.54	–	5.07×10^{2}	9.62×10^{5}	–	–	–	–	1.50×10^{2}	–
216-B-30	216-B-30 Trench	L	–	4.71	–	1.30	–	5.02×10^{2}	8.57×10^{5}	–	–	–	–	1.46×10^{2}	–
216-B-31	216-B-31 Trench	L	–	4.70	–	1.33	–	5.10×10^{2}	8.71×10^{5}	–	–	–	–	1.48×10^{2}	–
216-B-32	216-B-32 Trench	L	–	4.89	–	1.29	–	5.00×10^{2}	8.48×10^{5}	–	–	–	–	1.45×10^{2}	–
216-B-33	216-B-33 Trench	L	–	5.73	–	1.25	–	4.99×10^{2}	8.30×10^{5}	–	–	–	–	1.45×10^{2}	–
216-B-34	216-B-34 Trench	L	–	5.99	–	1.28	–	5.13×10^{2}	8.51×10^{5}	–	–	–	–	1.48×10^{2}	–
216-B-52	216-B-52 Trench	L	–	9.29	–	2.29	–	8.96×10^{2}	1.51×10^{6}	–	–	–	–	2.60×10^{2}	–
216-B-53A	216-B-53A Trench	L	–	2.84×10^{-1}	2.98×10^{-3}	1.19×10^{-2}	–	1.92	1.54×10^{3}	–	–	–	–	3.07×10^{1}	–
216-B-53B	216-B-53B Trench	L	–	7.92×10^{-3}	8.32×10^{-5}	3.33×10^{-4}	–	8.26×10^{-1}	8.98×10^{2}	–	–	–	–	8.26	–
216-B-58	216-B-58 Trench	L	–	2.17×10^{-1}	2.27×10^{-3}	9.10×10^{-3}	–	6.60×10^{-1}	7.19×10^{2}	–	–	–	–	8.76	–

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–84a. Map 14: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
600 NRDWL	600 Nonrad Dangerous Waste Landfill	S	3.00	7.95×10^{1}	1.35×10^{1}	–	4.50	2.72×10^{-1}	3.56×10^{2}	6.51×10^{2}	4.48×10^{2}	9.40×10^{1}	2.64×10^{1}	2.10×10^{1}	7.62×10^{1}

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HF=hydrogen fluoride; ID=identifier; $Na_2Cr_2O_7$=sodium dichromate; S=solid; TBP=tributyl phosphate; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–84b. Map 14: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
600 NRDWL	600 Nonrad Dangerous Waste Landfill	S	3.15×10^{2}	1.04×10^{1}	6.09	1.36×10^{2}	1.90	2.24×10^{3}	1.06×10^{4}	–	1.27×10^{-1}	4.10×10^{-2}	6.31×10^{2}	–	–

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HNO_3=nitric acid; ID=identifier; NO_2=nitrogen dioxide; S=solid; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–85a. Map 15: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
618-11	300 Wye Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
400 RFD[a]	400 Area Retired French Drains	L	–	–	–	–	–	–	–	–	–	–	–	–	–
316-4	300 North Cribs, 321 Cribs	L	–	–	–	–	–	–	–	–	–	–	7.73×10^{-1}	–	–

[a] This site had inventories that were on the initial list of constituents, but was screened out during final screening described in Section S.3.6.
Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; S=solid; TBP=tributyl phosphate; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–85b. Map 15: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
618-11	300 Wye Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
400 RFD[a]	400 Area Retired French Drains	L	–	–	–	–	–	–	–	–	–	–	–	–	–
316-4	300 North Cribs, 321 Cribs	L	–	–	–	–	–	3.01×10^{-2}	4.68×10^{2}	–	–	–	–	1.94×10^{-1}	–

[a] This site had inventories that were on the initial list of constituents, but was screened out during final screening described in Section S.3.6.
Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.
Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; S=solid; WIDS=Waste Information Data System.
Source: SAIC 2006.

Table S–86a. Map 16: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	1,2-Dichloroethane	1,4-Dioxane	1-Butanol (includes Butanol and 1-Butanol from TBP)	2,4,6-Trichlorophenol	Acetonitrile	Arsenic (Inorganic)	Benzene	Boron and Compound	Cadmium	Carbon tetrachloride	Chromium (includes Hexavalent Chromium and Chromium from $Na_2Cr_2O_7$)	Dichloromethane	Fluoride (soluble fluoride) (includes Fluorine and Fluorine from HF)
618-9	300 West Burial Ground	S	–	–	4.98×10^{3}	–	–	–		–	–	–	–	–	–
316-1	300 Area South Process Ponds	L	–	–	–	–	–	–	–	–	–	–	2.78×10^{4}	–	4.07×10^{3}
316-2	300 Area North Process Ponds	L	–	–	–	–	–	–	–	–	–	–	2.03×10^{4}	–	3.80×10^{3}
316-5	300 Area Process Trenches	L	–	–	–	–	–	–	–	–	–	–	–	–	4.94×10^{3}
UPR-300-1	307-340 Waste Line Leak	L	–	–	–	–	–	–	–	–	–	–	–	–	–
300-19[a]	324 Sodium Removal Pilot Plant	L	–	–	–	–	–	–		–	–	–	–	–	–
UPR-300-13[a]	Acid Neutralization Tank Leak East of 333 Building	L	–	–	–	–	–	–	–	–	–	–	–	–	–
300-264	327 Building, Postirradiation Testing Laboratory	L	–	–	–	–	–	–	–	–	–	–	–	–	–
309-WS-1	309 Plutonium Recycle Test Reactor Ion Exchange Vault	L	–	–	–	–	–	–	–	–	–	–	–	–	–
316-3	307 Disposal Trenches	L	–	–	–	–	–	–	–	–	2.00×10^{1}	–	1.00×10^{3}	–	2.00×10^{3}

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HF=hydrogen fluoride; ID=identifier; L=liquid; $Na_2Cr_2O_7$=sodium dichromate; S=solid; TBP=tributyl phosphate; WIDS=Waste Information Data System.

Source: SAIC 2006.

Table S–86b. Map 16: Chemical Inventories (kilograms)

WIDS ID/ Building Number	Common Site Name	Source Type	Hydrazine/Hydrazine Sulfate	Lead	Manganese	Mercury	Molybdenum	Nickel (soluble salt)	Nitrate (includes nitrate, nitrate from HNO_3, and nitrate from NO_2)	Polychlorinated Biphenyls	Silver	Strontium (stable)	Trichloroethylene	Total Uranium (soluble salt)	Vinyl Chloride
618-9	300 West Burial Ground	S	–	–	–	–	–	–	–	–	–	–	–	–	–
316-1	300 Area South Process Ponds	L	–	3.48×10^{4}	1.65×10^{2}	1.45×10^{-2}	–	8.89×10^{3}	3.86×10^{6}	–	–	–	–	2.62×10^{4}	–
316-2	300 Area North Process Ponds	L	–	2.54×10^{4}	1.64×10^{2}	6.49×10^{-3}	–	6.48×10^{3}	2.82×10^{6}	–	–	–	–	1.94×10^{4}	–
316-5	300 Area Process Trenches	L	–	–	2.26×10^{2}	–	–	–	2.05×10^{4}	–	–	–	–	1.75×10^{3}	–
UPR-300-1	307-340 Waste Line Leak	L	–	–	–	–	–	–	–	–	–	–	–	–	–
300-19[a]	324 Sodium Removal Pilot Plant	L	–	–		–	–	–	–	–	–	–	–	–	–
UPR-300-13[a]	Acid Neutralization Tank Leak East of 333 Building	L	–	–	–	–	–	–	1.99×10^{3}	–	–	–	–	1.35	–
300-264	327 Building, Postirradiation Testing Laboratory	L	–	–	–	–	–	–	–	–	–	–	–	–	–
309-WS-1	309 Plutonium Recycle Test Reactor Ion Exchange Vault	L	–	–	–	–	–	–	–	–	–	–	–	–	–
316-3	307 Disposal Trenches	L	–	6.00×10^{2}	–	1.00×10^{1}	–	3.00×10^{3}	–	–	–	–	–	1.00×10^{4}	–

[a] This site was not modeled because not all information needed to prepare model input files was available and assumptions could not be made.

Note: Dash (–) means no data found or inventory is estimated to be 0 or below detectable levels.

Key: HNO_3=nitric acid; ID=identifier; L=liquid; NO_2=nitrogen dioxide; S=solid; WIDS=Waste Information Data System.

Source: SAIC 2006.

S.4 REFERENCES

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APPENDIX T
SUPPORTING INFORMATION FOR THE SHORT-TERM CUMULATIVE IMPACT ANALYSES

This appendix contains the detailed tables that support the short-term cumulative impacts presented in Chapter 6 of this *Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington*. The cumulative impact methodologies are described in Appendix R.

This section presents detailed tables for short-term cumulative impacts for the following resource areas: land resources, ecological resources, cultural and paleontological resources, socioeconomics, and transportation (see Tables T–1 through T–4). Other resource areas do not need detailed tables to support their short-term cumulative impact analyses.

The tables in this appendix describe the past, present, and reasonably foreseeable future actions in the regions of influence that were considered in the cumulative impact assessment for these resource areas. Past and present actions that may contribute to cumulative impacts include those conducted by government agencies, businesses, or individuals within the regions of influence considered. As described in Appendix R, Table R–4, 52 projects or sets of projects were evaluated for their contributions to cumulative impacts.

Cumulative Impacts

Effects on the environment that result from the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions (40 CFR 1508.7).

The methodology used in this *Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington* to estimate cumulative impacts was divided into four phases: (1) selection of resource areas and appropriate regions of influence, (2) selection of reasonably foreseeable future actions, (3) estimation of cumulative impacts, and (4) identification of monitoring and mitigation. A flow chart showing the four phases of cumulative impacts analysis is presented in Appendix R, Figure R–2. The tables presented in this Appendix T form a portion of Phases 2 and 3 and contain detailed information to support the short-term cumulative impacts analysis presented in Chapter 6.

Table T–1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources

Project/Action	Total Land Area/ Terrestrial Habitat Affected[a] (hectares)	Area of Shrub-Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
***TC & WM EIS* Activities**						
Alternative Combination 1[b]	2/2	0	See Chapter 4, Section 4.4.6.3, for a discussion of species potentially impacted by Alternative Combination 1.	Not applicable	Chapter 4, Sections 4.4.1 and 4.4.6, provide information on *TC & WM EIS* Alternative Combination 1.	Chapter 4, Table 4–153, Table 4–157.
Alternative Combination 2[b]	307/207	65.5	See Chapter 4, Section 4.4.6.3, for a discussion of species potentially impacted by Alternative Combination 2.	Not applicable	Chapter 4, Sections 4.4.1 and 4.4.6, provide information on *TC & WM EIS* Alternative Combination 2.	Chapter 4, Table 4–153, Table 4–157.
Alternative Combination 3[b]	793/749	346	See Chapter 4, Section 4.4.6.3, for a discussion of species potentially impacted by Alternative Combination 3.	Not applicable	Chapter 4, Sections 4.4.1 and 4.4.6, provide information on *TC & WM EIS* Alternative Combination 3.	Chapter 4, Table 4–153 Table 4–157.
Other DOE Activities at the Hanford Site						
Central Plateau closure[b]	112.1	56.3	Not addressed.	On site	The area would be required as a source for geologic material to be used for covers and to fill voids. Although specific mining plans and precise areas and schedules for material excavation have not been identified, Borrow Area C and/or gravel pit No. 30 are the designated source areas for all geologic materials. It was further assumed that 50 percent of the disturbed area would be shrub-steppe habitat.	Fluor Hanford 2004:2-13, 2-15.

Table T–1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources *(continued)*

Project/Action	Total Land Area/ Terrestrial Habitat Affected[a] (hectares)	Area of Shrub-Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other DOE Activities at the Hanford Site *(continued)*						
Decommissioning of eight surplus production reactors and their support facilities in the 100 Areas[b, c]	6.1	6.1	Impacts are not expected because reactor sites are highly disturbed.	On site	The land requirement is related to the disposal of radioactive waste in the 200 Areas. It was conservatively assumed that all of this land is shrub-steppe habitat. Five of the eight reactors have been decommissioned. Habitat loss could be offset by a gain of 5 hectares that would become available for reuse within the 100 Areas once the reactors are removed.	DOE 1992:1-27.
Decommissioning of the N Reactor and its support facilities[b]	0	0	Impacts are not expected because the project area is highly developed.	On site	Undergoing interim safe storage (2006–2009).	DOE 2005:10, 12.
Actions to empty the K Basins in the 100-K Area and implement dry storage of the fuel rods in the Canister Storage Building in the 200-East Area[b]	3.6	0	Impacts are not expected because the new facility was built within a disturbed area.	On site	The facility was built in the vicinity of the Canister Storage Building.	DOE 1995:5.12, 5.38, 5.39.
Excavation and use of geologic materials from existing borrow pits[b]	31.2	8.1	Potential impacts are expected on gray cryptantha, dwarf evening primrose, Piper's daisy, and loggerhead shrike. Ecological reviews would be necessary prior to excavation.	On site	Land use would be consistent with current designations. Some shrub-steppe habitat could be impacted. Land use was assumed to be 25 percent (8.1 hectares) of total newly disturbed area.	DOE 2001a:3-1, 5-2, Appendix A.

Table T–1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources *(continued)*

Project/Action	Total Land Area/ Terrestrial Habitat Affected[a] (hectares)	Area of Shrub-Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other DOE Activities at the Hanford Site *(continued)*						
Reactivation and use of three former borrow sites in the 100-F, 100-H, and 100-N Areas[b]	38.9	0	Not present.	On site	Extraction would be authorized as an existing nonconforming use within the "Preservation" land use category. There would be minimal visual impact because existing sites would not be visible to the public from the Hanford Reach National Monument or the Columbia River, and they would be revegetated where possible during and after site usage.	DOE 2003a:5-1–5-3, B-1, B-2.
Construction and operation of the Environmental Restoration Disposal Facility near the 200-West Area[b]	414.4	414.4	Stalked-pod milkvetch and loggerhead shrike were observed on site.	On site	Total land use would be 414 hectares. Phase III (which is complete) occupies 34.4 hectares. The area is low-lying, so there would be minimal visual impact. The facility would detract from the view from Rattlesnake Mountain. Because the disposal area would be capped and revegetated where possible during and after facility usage, long-term impacts would be minimal.	DOE 1999a:9-24; 2001b:6; Sackschewsky 2003:8.
Transport of Navy reactor compartments from the Columbia River and their disposal[b]	4	0	Not present.	On site	Four hectares would be used. (in trench 218-E-12B). The area to be used is classified as a disturbed area.	Navy 1996:2-2, 3-14.

Table T–1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources *(continued)*

Project/Action	Total Land Area/ Terrestrial Habitat Affected[a] (hectares)	Area of Shrub-Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other DOE Activities at the Hanford Site *(continued)*						
Construction and operation of a Pacific Northwest National Laboratory Physical Sciences Facility[b]	40.1	25.9	Burrowing owls were observed on site. Potential impacts are expected on sage sparrow and loggerhead shrike.	On site		DOE 2007:26, 38.
Total for Other DOE Activities at the Hanford Site	**650.3**	**510.7**	**Not applicable**	**Not applicable**	**Not applicable**	**Not applicable**
Non-DOE Activities at the Hanford Site						
Management of the Hanford Reach National Monument and Saddle Mountain National Wildlife Refuge[b]	404.7	101.2	Impacts on threatened and endangered species would be generally minor; however, a number of species are present. Those potentially affected by the *TC & WM EIS* alternatives include the loggerhead shrike, sage sparrow, long-billed curlew, and black-tailed jackrabbit.	On site	Many areas that would be affected have been previously disturbed. It was assumed that 25 percent of the area to be disturbed is shrub-steppe habitat. A total of approximately 32,398 hectares of shrub-steppe habitat are found in the monument. 1,214 hectares of shrub-steppe habitat would be restored each year. 405 hectares of land could be disturbed by recreation facilities and visitor services. Goal 8 of the *Hanford Reach National Monument Comprehensive Conservation Plan and Environment Impact Statement* is to "Protect the natural visual character and promote the opportunity to experience solitude on the Monument."	USFWS 2008:2-52, 2-131, 2-132, 4-63, 4-72 to 4-82, 4-109, 4-110.

Table T–1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources *(continued)*

Project/Action	Total Land Area/ Terrestrial Habitat Affected[a] (hectares)	Area of Shrub-Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Non-DOE Activities at the Hanford Site *(continued)*						
Operation of the US Ecology commercial low-level radioactive waste disposal site near the 200-East Area[b]	40.5	40.5	Listed species were not identified on site.	On site	The cover construction would have minimal impact on ecology; revegetation would encourage shrub-steppe habitat development. An undisturbed 6.1-hectare area of shrub-steppe habitat in the northwest corner may need to be developed for spoils.	Ecology and WSDOH 2004:26–28, 128, 130.
Total for Non-DOE Activities at the Hanford Site	**445.2**	**141.6**	**Not applicable**	**Not applicable**	**Not applicable**	**Not applicable**
Total for Hanford Site	**1,095.5**	**652.4**	**Not applicable**	**Not applicable**	**Not applicable**	**Not applicable**
Other Projects/Activities in the Region of Influence						
Southridge development project, Kennewick, Washington	1,023.9	607	Burrowing owls were observed on site.	50 southeast	Habitat at the site includes 607 hectares of shrub-steppe, 253 hectares of apple orchards, and 152 hectares that are developed. An additional 101 hectares are at the planning/permitting stage.	Kennewick 2005:i, 3-17, 3-28, 3-29; Romine 2007.
Hansen Park development project, Kennewick, Washington	152.6	0	Not addressed.	48 southeast	Primarily agricultural land (based on Google Earth aerial photography).	Kennewick 2006:149.
Clearwater development project, Kennewick, Washington	164.3	40.5	Not addressed.	48 southeast	The site is 164.3 hectares. It is estimated that 40.5 hectares of the site is sagebrush habitat. Other land is agricultural, fallow agricultural, and industrial (based on Google Earth aerial photography).	Kennewick 1999:2.

Table T–1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources *(continued)*

Project/Action	Total Land Area/ Terrestrial Habitat Affected[a] (hectares)	Area of Shrub-Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other Projects/Activities in the Region of Influence *(continued)*						
Pasco, Washington (three subdivisions)	115.3	0	Not addressed.	48 south southeast	The subdivisions would be located northwest and southwest of the airport. The land appears to be mostly agricultural (based on Google Earth aerial photography).	Adams 2007.
Red Mountain Center (mixed use development),[b] West Richland, Washington	129.5	129.5	Not addressed.	34 south southeast	The land does not appear to be agricultural and was assumed to be shrub-steppe habitat (based on Google Earth aerial photography).	Gouk 2007.
Red Mountain American Viticulture Area,[b] Benton County, Washington	566.6	509.9	Not addressed.	34 south	The total area is 1,781 hectares. The developed area is currently 283 hectares, but the number of vineyards could double from 10 to 20 in the next 5 years, increasing the developed area to 567 hectares. The area is primarily native habitat with some agricultural land (based on Google Earth aerial photography). It was assumed that 90 percent of past and future development (510 hectares) is shrub-steppe habitat.	Benton County 2006:B-14.
Yakima City, Washington (new subdivisions)	647.5	0	Not addressed.	80 west	Potential for 1,000 new homes to be built. The area is mixed agricultural and rural residential land. The site is to be annexed by the city.	Benson 2007.

Table T–1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources *(continued)*

Project/Action	Total Land Area/ Terrestrial Habitat Affected[a] (hectares)	Area of Shrub-Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other Projects/Activities in the Region of Influence *(continued)*						
Gravel mine, Yakima County, Washington	40.5	20.2	Not addressed.	68 west	The site is located east of the city. The project has been permitted; however, work has not yet begun. The current land use is unknown because the location of the site has not been specified. It was assumed that 50 percent of the area is shrub-steppe habitat.	Patterson 2007.
Residential/golf community, Walla Walla County, Washington	202.3	202.3	Not addressed.	90 southeast	The parcel totals 4,856 hectares, with 202 hectares remaining to be developed. The location of the site was not specified. It was conservatively assumed that all 202 hectares to be developed are shrub-steppe habitat.	Prentice 2007.
Boardman Speedway, Morrow County, Oregon	566.6	0	Not addressed.	80 south southeast	The parcel total is 850 hectares, with 567 hectares currently dedicated for use as a race track. The area is agricultural land (based on Google Earth aerial photography).	McClane 2007.
Boardman Resort, Morrow County, Oregon	647.5	0	Not addressed.	80 south southeast	The resort area is 911 hectares in size. A total of 648 hectares is developable. The site does not appear to be shrub-steppe habitat (based on Google Earth aerial photography).	McClane 2007.

Table T–1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources *(continued)*

Project/Action	Total Land Area/ Terrestrial Habitat Affected[a] (hectares)	Area of Shrub-Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other Projects/Activities in the Region of Influence *(continued)*						
Boardman Industrial Park, Morrow County, Oregon	161.9	0	Not addressed.	76 south	The area is agricultural land (based on Google Earth aerial photography).	McClane 2007.
Sunnyside Water Conservation Program, Washington	35.2	0	No impacts are expected on bald eagle or Ute ladies' tresses.	24 to 48 west and southwest	The area includes three reservoirs on agricultural and pasture land.	BOR 2004:17, 43, 46.
Big Horn Wind Project, Bickleton, Washington	41.2	21.8	No rare plants or federally threatened or endangered species are present.	80 southwest	The project would temporarily disturb 90.2 hectares and permanently disturb 34 hectares. The switching station and the road contain scrub oak and scattered ponderosa pine. The area includes some shrub-steppe habitat, but it is unknown how much would be affected. It was assumed that 50 percent of disturbed land would be shrub-steppe habitat. The wind turbines would be readily visible from houses and roads. Turbines would be painted a neutral color to minimize visual impacts.	BPA 2005:8-14.

Table T–1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources *(continued)*

Project/Action	Total Land Area/ Terrestrial Habitat Affected[a] (hectares)	Area of Shrub-Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other Projects/Activities in the Region of Influence *(continued)*						
Wild Horse Wind Project, Kittitas County, Washington	66.8	60.3	Potential impacts are expected on 10 percent of the individual hedgehog cactus plants.	90 northwest	The 3,480-hectare site is currently zoned as Forest and Range and Commercial Agriculture. 66.8 hectares would be permanently affected. Approximately 90 percent of impacts would occur in shrub-steppe habitat.	Energy Facility Site Evaluation Council 2005:1-6, 1-11, 1-48, 1-49.
Desert Claim Wind Project, Kittitas County, Washington	31.2	12.1	Potential impacts are expected on bald eagle, golden eagle, northern goshawk, sage thrasher, and loggerhead shrike.	97 northwest	12.1 hectares of shrub-steppe habitat would be permanently disturbed. The project would result in visual impacts ranging from low to high, which would represent a significant unavoidable change in the visual environment.	Kittitas County 2004:1-22, 1-36, 1-39, 1-68; Young, Erickson, and Poulton 2006:3, 12.
Black Rock Reservoir,[b] Yakima County, Washington	3,496.5	1,558.1	Habitat for shrub-steppe species is limited within the site area. Loggerhead shrike, sage thrasher, and sage sparrow are most likely to be present. Moderate impacts are expected on sage sparrow.	23 west southwest	The site is 2,590 hectares. The valley floor is composed of fallow fields, cultivated land, and sparse patches of sagebrush. The largest contiguous patch of sagebrush is 24.3 hectares.	Benton County Sustainable Development 2002:1, 8, 12; BOR and Ecology 2008:2-117.

Table T–1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources *(continued)*

Project/Action	Total Land Area/ Terrestrial Habitat Affected[a] (hectares)	Area of Shrub-Steppe Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other Projects/Activities in the Region of Influence *(continued)*						
Transportation Project, Roadway from Interstate 82 to Finley, Washington	32.4	25.1	Not addressed.	53 southeast	The roadway is 17.7 kilometers long and 11 meters wide. Assuming 3.7 meters are needed on each side of the road, the total width is 18.3 meters. The road passes through open land, which appears to be primarily shrub-steppe habitat with some agricultural land (based on Google Earth aerial photography). It was assumed that 13.7 kilometers are shrub-steppe habitat.	WSDOT 2007.
Finley Columbia Ethanol Plant, Benton County, Washington	22.3	0	No impact.	62 southeast	16.2 to 22.3 hectares of agricultural land would be disturbed. Plant is adjacent to industrial facility. Area is zoned industrial. Aesthetic impacts would be negligible	Columbia Ethanol Plant Holdings 2006:22, 23, 27, 29.
Operation of the Perma-Fix Northwest (formerly Pacific EcoSolutions) Waste Treatment Facility in Richland, Washington	18.2	0	No impact.	3.2 southeast	The project would impact 18.2 hectares of disturbed grassland. No sensitive habitats would be affected.	DOE 1998:8, 20, 21, 50.

Table T–1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources *(continued)*

Project/Action	Total Land Area/ Terrestrial Habitat Affected[a] (hectares)	Area of Shrub-Steppe Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Total for Other Projects/Activities in the Region of Influence	**8,162.1**	**3,186.9**	Not applicable	Not applicable	Not applicable	Not applicable
Grand Totals						
Combination 1	**9,260/9,260**	**3,839**	**Not applicable**	**Not applicable**	**Not applicable**	**Not applicable**
Combination 2	**9,564/9,465**	**3,905**	**Not applicable**	**Not applicable**	**Not applicable**	**Not applicable**
Combination 3	**10,050/10,006**	**4,185**	**Not applicable**	**Not applicable**	**Not applicable**	**Not applicable**

a For all non–*TC & WM EIS* projects and activities, it was assumed that the total land area affected and the area of undeveloped land affected would be the same; thus, only one value was provided. It is assumed that undeveloped land equates with terrestrial habitat. For those projects and activities where the land cover was not reported, the entire project area was conservatively assumed to be terrestrial habitat. Terrestrial habitat could include shrub-steppe habitat, other native and non-native habitat, grazing land, and cropland.

b All listed projects and activities are within the region of influence for land use and ecological resources. Those within the region of influence for visual resources are indicated with the superscript "b."

c B Reactor was recently designated a National Historic Landmark (DOE and DOI 2008). Therefore, B Reactor will not be decommissioned and moved to the Hanford Central Plateau for disposal as analyzed in the *Environmental Impact Statement, Decommissioning of Eight Surplus Production Reactors at the Hanford Site, Richland, Washington* (DOE 1989, 1992) and assumed in this *TC & WM EIS.*

Note: To convert hectares to acres, multiply by 2.471; kilometers to miles, by 0.6214; meters to feet, by 3.281.

Key: DOE=U.S. Department of Energy; *TC & WM EIS =Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington.*

Table T–2. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Cultural Resources

Action	Total Area Disturbed (hectares)	Cultural Resources and Visual Impacts	Source
***TC & WM EIS* Activities**			
Alternative Combination 1	2	On site. Specific elements of the *TC & WM EIS* Alternative Combination 1 are addressed in Chapter 4, Section 4.4.7.	Chapter 4, Section 4.4.7.
Alternative Combination 2	307	On site. Specific elements of the *TC & WM EIS* Alternative Combination 2 are addressed in Chapter 4, Section 4.4.7.	Chapter 4, Section 4.4.7.
Alternative Combination 3	793	On site. Specific elements of the *TC & WM EIS* Alternative Combination 3 are addressed in Chapter 4, Section 4.4.7.	Chapter 4, Section 4.4.7.
Other DOE Activities at the Hanford Site			
Central Plateau closure	112.1	On site. Although specific mining plans and precise areas and schedules for material excavation have not been identified, Borrow Area C and/or gravel pit No. 30 are the designated source areas for all geologic materials. Changes to the viewshed would occur. Future uses of the Central Plateau would likely include structures and activities consistent with Industrial-Exclusive use.	Fluor Hanford 2004.
Decommissioning of the eight surplus production reactors and their support facilities in the 100 Areas along the Columbia River[a]	6.1	On site. The location is in a highly developed area. There would be a possible impact on archaeological or cultural properties that could be found within the 100 Areas and/or the 100-B Reactor.	DOE 1989:4.39; 1992.
Decommissioning of the N Reactor and its support facilities	0	On site. 105-N and 109-N Buildings. Impacts are not expected because the project is in a highly developed area.	DOE 2005.

Table T–2. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Cultural Resources *(continued)*

Action	Total Area Disturbed (hectares)	Cultural Resources and Visual Impacts	Source
Other DOE Activities at the Hanford Site *(continued)*			
Actions to empty the K Basins in the 100-K Area and implement dry storage of the fuel rods in the Canister Storage Building in the 200-East Area	3.6	On site. No known archaeological or historic sites were located during intensive inventories of the reference site. There would be no impact on visual resources. The new facility was built within a disturbed area.	DOE 1995:5.11.
Excavation and use of geologic materials from existing borrow pits[b]	31.2	On site. The area can be seen from the viewshed of American Indian areas of interest. It is expected that excavation activities would be primarily in a previously disturbed area. No cultural resources are known to exist within the currently active borrow areas. Specific cultural resource reviews would be conducted before any expansion activities.	DOE 2001a:5-2, 5-3.
Reactivation and use of three former borrow sites in the 100-F, 100-H, and 100-N Areas	38.9	On site. No cultural resources, historic properties, or American Indian areas of interest are located in the project location area. There would be no visual impacts within the viewshed of American Indian areas of interest, and the sites would be revegetated where possible during and after site usage.	DOE 2003a:5.1.6, 5.1.7, 5.2.
Construction and operation of the Environmental Restoration Disposal Facility near the 200-West Area	414.4	On site. The facility is within the viewshed of American Indian areas of interest. The rail line that traverses the area could adversely affect a portion of the historic White Bluffs Road. No archaeological or historic sites are considered eligible for the National Register of Historic Places. The area would be revegetated where possible during and after facility operation.	DOE 1994:ES-22–27, 12; 2001b.

Table T–2. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Cultural Resources *(continued)*

Action	Total Area Disturbed (hectares)	Cultural Resources and Visual Impacts	Source
Other DOE Activities at the Hanford Site *(continued)*			
Transport and disposal of Navy reactor compartments from the Columbia River	4	On site. The area to be used is classified as disturbed. There would be no impact on cultural resources or visual impact on American Indian areas of interest.	Navy 1996.
Construction and operation of a Pacific Northwest National Laboratory Physical Sciences Facility	40.1	On site. The fenced area in the eastern portion will protect a site of cultural significance to regional tribes. Two prehistoric sites are located in the eastern buffer area near the Columbia River and are monitored to confirm they remain undisturbed.	DOE 2007:26, 37.
Non-DOE Activities at the Hanford Site			
Management of the Hanford Reach National Monument and Saddle Mountain National Wildlife Refuge	404.7	On site. Many of the areas to be affected have been previously disturbed. Goal 5 of the *Hanford Reach National Monument Comprehensive Conservation Plan and Environmental Impact Statement* is to "Protect and acknowledge the Native American, settler, atomic and Cold War histories of the Monument to ensure present and future generations recognize the significance of the area's past, incorporating a balance of views."	USFWS 2008.
Operation of the US Ecology commercial LLW disposal site near the 200-East Area	40.5	On site. There is a high probability that the proposed actions will not impact any historic buildings, archaeological sites, or specific American Indian areas of interest.	Ecology and WSDOH 2004:134.
Other Activities in the Region of Influence			
Red Mountain American Viticulture Area, Benton County, Washington	566.6	The area is within the viewshed of nearby higher elevations, which are of interest to the American Indians. The developed area could increase from 10 to 20 vineyards in the next 5 years.	Benton County 2006.

Table T–2. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Cultural Resources *(continued)*

Action	Total Area Disturbed (hectares)	Cultural Resources and Visual Impacts	Source
Other Activities in the Region of Influence *(continued)*			
Black Rock Reservoir, Yakima County, Washington	3,496.5	The area is within the viewshed of nearby higher elevations, which are of interest to the American Indians. The proposed location area has a high potential for both historic and prehistoric resources.	BOR and Ecology 2008:4-255.

[a] B Reactor was recently designated a National Historic Landmark (DOE and DOI 2008). Therefore, B Reactor will not be decommissioned and moved to the Hanford Central Plateau for disposal as analyzed in the *Environmental Impact Statement, Decommissioning of Eight Surplus Production Reactors at the Hanford Site, Richland, Washington* (DOE 1989, 1992) and assumed in this *TC & WM EIS*.

[b] As a result of tribal and public comments on the *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement* (DOE 1999b), DOE designated the McGee Ranch as Preservation as a "tradeoff" for keeping Borrow Area C available as the primary source of geologic materials for site remediation. There are discussions of this decision in the following sections of the *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement*: the Summary, the main text, Appendices D and E, and the Comment Response Document.

Note: To convert hectares to acres, multiply by 2.471.

Key: DOE=U.S. Department of Energy; *TC & WM EIS=Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington*.

Table T–3. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Socioeconomics

Project/Action	Peak Annual Employment (FTEs)	Peak Daily Traffic		Notes	Source
		Commuter[a]	Offsite Truck		
Existing Site Activities					
Baseline	9,760	7,810	Not Applicable	Construction FTEs were not separated from operations FTEs. No data on truck traffic.	Chapter 3, Section 3.2.9.
***TC & WM EIS* Activities**					
Alternative Combination 1[b]	1,840	1,470	4		Chapter 4, Section 4.4.8, provides information on *TC & WM EIS* Alternative Combination 1.
Alternative Combination 2[b]	8,190	6,550	79		Chapter 4, Section 4.4.8, provides information on *TC & WM EIS* Alternative Combination 2.
Alternative Combination 3[b]	12,500	10,000	102		Chapter 4, Section 4.4.8, provides information on *TC & WM EIS* Alternative Combination 3.
Other DOE Activities at the Hanford Site					
Changes in land use at the Hanford Site	1,100	880	Not Applicable	This ongoing activity includes industrial development, research and development initiatives, limited mining, and increased recreational use at the Hanford Site during the next 50 years.	DOE 1999b:5-48.
Actions to empty the K Basins in the 100-K Area and implement dry storage of the fuel rods in the Canister Storage Building in the 200-East Area	140	326	Not Applicable	This is an ongoing activity. Future milestones could require additional FTEs. Employment would be reduced (negative) after spent nuclear fuel is placed in long-term storage. Most truck trips would be on site.	DOE 1995:3.24, 5.1, 5.10, 5.47; 2008a.

Table T–3. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Socioeconomics *(continued)*

Project/Action	Peak Annual Employment (FTEs)	Peak Daily Traffic		Notes	Source
		Commuter[a]	Offsite Truck		
Other DOE Activities at the Hanford Site *(continued)*					
Final disposition of the canyons, PUREX Plant, PUREX tunnels, and other facilities in the 200 Areas and cleanup to Industrial-Exclusive land use standards	172	138	64	The activity was assumed to have four times the values of the U Plant regional closure. It could possibly use the same workers or could potentially be done consecutively.	Fluor Hanford 2004:ES-7.
Deactivation of the Fast Flux Test Facility in the 400 Area	20	16	Not Applicable	This ongoing activity could require additional FTEs. Most truck trips would be on site.	DOE 2006a:2-8, 4-2, 4-3, 4-4, 4-8, 4-9.
Construction and operation of a Pacific Northwest National Laboratory Physical Sciences Facility	450	450	3	This activity involves construction impacts only. Annual workers were merely relocated, therefore they were already included in the baseline. The commuter numbers are supplied in the source document.	DOE 2007:39–41.
Non-DOE Activities at the Hanford Site					
Operation of the US Ecology commercial LLW disposal site near the 200-East Area	Included in baseline	Included in baseline	4	The facility is currently operating. Workers were already included in the ROI. Offsite truck trips represent potential future construction.	Ecology and WSDOH 2004:25, 35, 94, 141.
Management of the Hanford Reach National Monument and Saddle Mountain National Wildlife Refuge	41	76	Not Applicable	The commuter traffic represents the peak weekend number of national monument visitors.	USFWS 2008:4-202, 4-217.

Table T–3. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Socioeconomics *(continued)*

Project/Action	Peak Annual Employment (FTEs)	Peak Daily Traffic		Notes	Source
		Commuter[a]	Offsite Truck		
Other Projects/Activities in the Region of Influence					
Operation of the Perma-Fix Northwest (formerly Pacific EcoSolutions) Waste Treatment Facility in Richland, Washington	150	129	4	This includes DOE waste generators and other organizations' waste generators.	Richland 1998:14, 24, 25, 39, 40. DOE 1999c:1 of 9, 29 of 33, 32 of 33.
Construction and operation of biofuels facilities	162	96	35		Columbia Ethanol Plant Holdings 2006:13, 21, 43.
Additional Activities Subtotal	**2,235[c]**	**2,111[c]**	**110[c]**		
Grand Totals					
Alternative Combination 1	**4,080[c]**	**3,580[c]**	**115[c]**	Additional activities subtotal added to Alternative Combination 1.	
Alternative Combination 2	**10,400[c]**	**8,660[c]**	**189[c]**	Additional activities subtotal added to Alternative Combination 2.	
Alternative Combination 3	**14,700[c]**	**12,100[c]**	**212[c]**	Additional activities subtotal added to Alternative Combination 3.	

a Unless otherwise noted, commuter traffic figures were calculated based on employee numbers.

b For each combination, the peaks for each component could potentially occur during different timespans. In order to determine the potential impact from each combination of alternatives, the peak amount for each component was totaled together. The resulting conservative total estimates represent the upper limit of workforce requirements.

c Total may not equal the sum of the contributions due to rounding.

Key: DOE=U.S. Department of Energy; FTE=full-time equivalent; LLW=low-level radioactive waste; PUREX=Plutonium-Uranium Extraction; ROI=region of influence; *TC & WM EIS=Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington.*

Table T–4. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Transportation

Activity	Worker		General Population		Traffic Fatalities
	Collective Dose (person-rem)	LCFs	Collective Dose (person-rem)	LCFs	
Historical Shipments to the Hanford Site (1943–1993)					
SNF shipments[a]	52	0.03	27	0.02	N/L
Radioactive waste[a]	240	0.14	290	0.17	N/L
Subtotal	**292**	**0.18**	**317**	**0.19**	**N/L**
General Radioactive Material Transport (includes DOE and non-DOE actions)					
1943–1982[a, b]	220,000	132	170,000	102	N/L
1983–2073[a, c]	154,000	92	168,000	101	116
Subtotal	**374,000**	**224**	**338,000**	**203**	**116**
Reasonably Foreseeable Actions					
Surplus Plutonium Disposition EIS[a]	60	0.04	67	0.04	0.05
Naval Reactor Disposal EIS (Navy 1996)	5.8	0.00	5.80	0.0	0.01
K Basin Fuel Storage EIS (DOE 1995)	0.06	0.00	N/A	N/A	0.00
Treatment of MLLW EA (DOE 1998)	18	0.01	1.34	0.0	1.25
Treatment of MLLW EA FONSI (DOE 1999c)	0.48	0.0	0.19	0.0	N/L
WM PEIS[a, d]	15,550	9.3	18,430	11.1	36
WIPP SEIS-II[a]	790	0.47	5,900	3.54	5
Idaho HLW and Facilities Disposition EIS[a]	520	0.31	2,900	1.74	1.0
SNL Site-Wide EIS[a]	94	0.06	590	0.35	1.30
Tritium Production in Commercial Light Water Reactor EIS[a]	16	0.01	80	0.05	0.06
LANL Site-Wide EIS (DOE 2008b)	910	0.55	287	0.17	2.96
Plutonium Residue at Rocky Flats EIS[a]	2.10	0.00	1.30	0.00	0.01
Surplus disposition of HEU[a]	400	0.24	520	0.31	1.10
Molybdenum-99 Production EIS[a]	240	0.14	520	0.31	0.10
Import of Russian Plutonium-238 EA[a]	1.80	0.00	4.40	0.00	0.00
Pantex Site-Wide EIS[a]	250	0.15	490	0.29	0.01
NTS Site-Wide EIS[a]	0.0	0.00	155[e]	0.09	8
Storage and disposition of fissile material[a]	0.0	0.00	2,400[e]	1.44	5.5
Stockpile stewardship[a]	0.0	0.0	38[e]	0.02	0.06
Container system for Naval SNF[a]	11	0.010	15	0.01	0.05
DUF_6 Conversion at Paducah EIS (DOE 2004a)	770	0.46	31	0.02	0.42
S3G and D1G Prototype Reactor Plant Disposal EIS[a]	2.9	0.00	2.2	0.00	0.01
S1G Prototype Reactor Plant Disposal EIS[a]	6.7	0.00	1.9	0.00	0.00
DUF_6 Conversion at Portsmouth EIS (DOE 2004b)	520	0.31	29	0.02	0.45
ETTP DUF_6 Transport to Portsmouth EIS (DOE 2004b)	99	0.06	3.20	0.00	0.33
Spent Nuclear Fuel PEIS[a]	360	0.22	810	0.49	0.77
FRR SNF EIS (DOE 1996)	90	0.05	222	0.13	0.07
Private Fuel Storage Facility Final EIS (NRC, BIA, BLM, and STB 2001)	30	0.02	190	0.11	1
West Valley Demonstration Project Waste Management EIS (DOE 2003b)	520	0.31	410	0.25	0.15

Table T–4. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Transportation *(continued)*

Activity	Worker		General Population		Traffic Fatalities
	Collective Dose (person-rem)	LCFs	Collective Dose (person-rem)	LCFs	
Reasonably Foreseeable Actions *(continued)*					
MOX Fuel Fabrication at SRS EIS (NRC 2005a)	530	0.32	560	0.34	0.20
Enrichment Facility in Lea County EIS (NRC 2005b)[f]	1,500	0.90	5,000	3.00	18
Complex Transformation Programmatic EIS (DOE 2008d)	5,500	3	190	0.10	0.02
EA for the Decontamination, Demolition, and Removal of Certain Facilities at the West Valley Demonstration Project (DOE 2006b)	14	0.00	11	0.00	0.01
West Valley Decommissioning and/or Long-Term Stewardship Draft EIS (DOE and NYSERDA 2008)	403	0.24	71	0.043	4
Subtotal	**29,214**	**18**	**39,936**	**24**	**88**
Total Transportation Impacts Not Related to This *TC & WM EIS*					
Total Impacts (Through 2073)	**403,500[g]**	**242**	**378,300[g]**	**227**	**204**

[a] Values are from the *Final Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada (Yucca Mountain SEIS)* (DOE 2008c).

[b] These estimates are very conservative because not that many shipments were made in the 1950s and 1960s. Also, the nonexclusive shipment dose estimates are based on a very conservative method.

[c] The annual dose estimates are similar to those generated for the period 1975–1983. The methodology used to estimate traffic fatalities is detailed in Chapter 6, Section 6.3.11.2.

[d] The values are for the low-level and mixed low-level radioactive waste transportation impacts based on the amended Record of Decision, 65 FR 10061, February 25, 2000.

[e] Includes worker and general population doses.

[f] Maximum values from truck transportation were used. For consistency with other data in this table, occupational traffic fatalities were not considered.

[g] The values are rounded to the nearest hundred.

Key: DOE=U.S. Department of Energy; DUF_6=depleted uranium hexafluoride; EA=environmental assessment; EIS=environmental impact statement; ETTP=East Tennessee Technology Park; *FRR SNF EIS=Final Environmental Impact Statement on a Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel*; HEU=highly enriched uranium; HLW=high-level radioactive waste; *K Basin Fuel Storage EIS=Draft Environmental Impact Statement, Management of Spent Nuclear Fuel from the K Basins at the Hanford Site, Richland, Washington;* LANL *Site-Wide EIS=Final Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico*; LCF=latent cancer fatality; MLLW=mixed low-level radioactive waste; *MOX Fuel Fabrication at SRS EIS=Environmental Impact Statement on the Construction and Operation of a Proposed Mixed Oxide Fuel Fabrication Facility at the Savannah River Site, South Carolina*; N/A=not applicable; *Naval Reactor Disposal EIS=Final Environmental Impact Statement on the Disposal of Decommissioned, Defueled Cruiser, OHIO Class, and LOS ANGELES Class Naval Reactor Plants*; N/L=not listed; *NTS Site-Wide EIS=Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada;* PEIS=programmatic EIS; *Plutonium Residue at Rocky Flats EIS=Final Environmental Impact Statement on Management of Certain Plutonium Residues and Scrub Alloy Stored at the Rocky Flats Environmental Technology Site; Private Fuel Storage Facility Final EIS=Final Environmental Impact Statement for the Construction and Operation of an Independent Spent Fuel Storage Installation on the Reservation of the Skull Valley Band of Goshute Indians and the Related Transportation Facility in Tooele County, Utah;* SEIS=supplemental EIS; SNF=spent nuclear fuel; SNL=Sandia National Laboratories; *TC & WM EIS=Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington*; *Treatment of MLLW EA=Environmental Assessment, Non-thermal Treatment of Hanford Site Low-Level Mixed Waste; Treatment of MLLW EA FONSI="Environmental Assessment, Offsite Thermal Treatment of Low-Level Mixed Waste," Finding of No Significant Impact; Yucca Mountain SEIS=Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada; WIPP SEIS-II=Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement; WM PEIS=Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste.*

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APPENDIX U
SUPPORTING INFORMATION FOR THE LONG-TERM CUMULATIVE IMPACT ANALYSES

This appendix contains detailed information supporting the long-term cumulative impact analyses presented in Chapter 6. Long-term cumulative impacts would occur following the active project phase under each alternative. For this *Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington*, long-term cumulative impacts were assessed out to approximately 10,000 years in the future.

> **Cumulative Impacts**
>
> Effects on the environment that result from the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions (40 CFR 1508.7).

This section presents detailed information regarding long-term cumulative impacts on groundwater quality and human health. The methodology used to estimate cumulative impacts for this *Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington (TC & WM EIS)* was divided into four phases: (1) selection of resource areas and appropriate regions of influence (ROIs), (2) selection of reasonably foreseeable future actions, (3) estimation of cumulative impacts, and (4) identification of monitoring and mitigation requirements. The general cumulative impacts methodology is described in Appendix R. A flowchart showing the four phases of cumulative impacts analysis is presented in Appendix R, Figure R–2. The information presented in this appendix reflects portions of Phases 2 and 3 and contains detailed information to support the long-term cumulative impacts analysis presented in Chapter 6.

The cumulative impact analyses of these resource areas were based largely on the results of the modeling performed for the cumulative groundwater quality analysis. Inventory development for the past, present, and reasonably foreseeable future action (non–*TC & WM EIS*) sources is described in Appendix S. Appendix S also describes the non–*TC & WM EIS* actions in the ROIs that were considered in the cumulative impact analyses of groundwater quality and human health.

U.1 GROUNDWATER QUALITY

This section discusses the methodology and results for the long-term groundwater impacts of non–*TC & WM EIS* actions. The methodology is described in Section U.1.1, and the results are discussed in Sections U.1.2 through U.1.4. The presentation of the results follows the format developed for the *TC & WM EIS* alternatives (see Appendix O and Chapter 5). This section does not present cumulative groundwater quality impacts (i.e., non–*TC & WM EIS* impacts added to the impacts of the *TC & WM EIS* alternative combinations). Cumulative groundwater quality impacts are presented in Chapter 6.

U.1.1 Methodology

The purpose of the long-term groundwater impacts analysis for non–*TC & WM EIS* sources is to provide a context for the comparison of the *TC & WM EIS* alternatives. Therefore, the methodology was designed to be fully consistent with the long-term groundwater alternatives analysis and the *Technical Guidance Document for Tank Closure Environmental Impact Statement, Vadose Zone and Groundwater Revised Analyses* (DOE 2005). This design consistency includes the models chosen to conduct the analysis, the parameter selection that affects the analysis, and the presentation and interpretation of the results.

The development of the inventory for the non–*TC & WM EIS* sources is described in Appendix S. The constituents of potential concern (COPCs) considered in this analysis include all the COPCs in the *TC & WM EIS* alternatives analysis, as well as several COPCs that originate from only non–*TC & WM EIS* sources. The inventory development relied on a search of available literature that provided estimates of the inventories for each source, estimates of uncertainties in the inventories, and a characterization of each source type and likely end state.

The approach to analyzing releases to the vadose zone for the non–*TC & WM EIS* sources was the same as that described in Appendix M for the *TC & WM EIS* alternatives. This analysis used site-specific parameters to estimate release rates from each of the sources to the vadose zone. The waste-form performance parameters, release models, and infiltration profiles in the release to vadose zone analysis are fully consistent with their counterparts in the *TC & WM EIS* alternatives analysis. The output from the analysis of the releases to the vadose zone was input into the vadose zone transport analysis.

The vadose zone transport analysis methodology for the non–*TC & WM EIS* sources was the same as that described in Appendix N for the *TC & WM EIS* alternatives. The vadose zone transport analysis used the STOMP [Subsurface Transport Over Multiple Phases] model to solve the nonlinear equations describing water and contaminant mass transport through the vadose zone. A fully three-dimensional model of the subsurface geology for each of the non–*TC & WM EIS* sources was developed using the same techniques that were used in the *TC & WM EIS* alternatives analysis. The material properties, infiltration profiles, and transport properties used in the vadose zone analysis are fully consistent with the *TC & WM EIS* alternatives analysis. The output from the vadose zone transport analysis was input into the groundwater transport analysis.

The methodology used for groundwater transport impacts analysis for non–*TC & WM EIS* sources was the same as that described in Appendices L and O for the *TC & WM EIS* alternatives. Appendix L discusses the development of the Base Case groundwater flow field, which describes the direction and rate of water movement in the aquifer. This Base Case flow field was used for both the *TC & WM EIS* alternatives analysis and the non–*TC & WM EIS* sources analysis. Appendix O discusses the use of the particle-tracking method to calculate a fully three-dimensional, regional-scale transient analysis of contaminant distribution in the aquifer. The flow field, transport properties, and concentration measurement parameters in the groundwater transport analysis are fully consistent with the *TC & WM EIS* alternatives analysis. The outputs from the groundwater transport analysis were analyzed in terms of overall mass balance, concentration versus time at selected locations, and concentration distributions at selected times, which is the same process used for the alternatives impact analysis. The level of protection provided for the drinking water pathway is evaluated by comparison against the maximum contaminant levels of the "National Primary Drinking Water Regulations" (40 CFR 141) and other benchmarks presented in Appendix O.

U.1.2 Release and Mass Balance

This section presents the results of the impacts analysis for non–*TC & WM EIS* sources in terms of total amount of COPCs released to the vadose zone, groundwater, and Columbia River. Releases of radionuclides are totaled in curies, and releases of chemicals are totaled in kilograms. Both are totaled over the 10,000-year period of analysis. Table U–1 lists the releases to the vadose zone, groundwater, and Columbia River for the COPCs that contribute the bulk of the risk.

Table U–1. Release to the Vadose Zone, Groundwater, and the Columbia River of the COPC Drivers from Non–*TC & WM EIS* Sources

	Radionuclide (curies)				Chemical (kilograms)		
Release to:	**H-3**	**I-129**	**Tc-99**	**U-238**	**Cr**	**NO_3**	**Utot**
Vadose zone	3.43×10^{6}	2.49×10^{1}	7.33×10^{2}	3.13×10^{3}	3.35×10^{5}	7.38×10^{7}	2.53×10^{5}
Groundwater	2.06×10^{6}	2.48×10^{1}	7.12×10^{2}	1.48×10^{2}	3.40×10^{5}	7.42×10^{7}	1.05×10^{5}
Columbia River	1.11×10^{5}	2.46×10^{1}	7.26×10^{2}	1.40×10^{2}	3.51×10^{5}	7.47×10^{7}	9.28×10^{4}

Note: Total amount released over the 10,000-year period of analysis.

Key: COPC = constituent of potential concern; Cr=chromium; H-3=hydrogen-3 (tritium); I=iodine; NO_3=nitrate; Tc=technetium; *TC & WM EIS = Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington*; U=uranium; Utot=total uranium.

U.1.3 Concentration Versus Time

This section presents the results of the impacts analysis for non–*TC & WM EIS* sources in terms of groundwater COPC concentrations versus time at the Core Zone Boundary and Columbia River. Table U–2 lists the maximum COPC concentrations at the Core Zone Boundary and the Columbia River nearshore for the peak year of the 10,000-year period of analysis. Figures U–1 through U–9 include concentration versus time plots for hydrogen-3 (tritium), iodine-129, strontium-90, technetium-99, uranium-238, carbon tetrachloride, chromium, nitrate, and total uranium, respectively. Because of the discrete nature of the concentrations carried across a barrier or the river, a line denoting the 95th percentile upper confidence limit of the concentrations is included on several of these figures. This confidence interval was calculated to aid in interpreting data with a significant amount of random fluctuation (noise). The confidence interval was calculated when (1) the concentration had a considerable amount of noise, (2) the concentration trend was level, and (3) the concentration was near the benchmark. The benchmark concentration for each radionuclide and chemical is also shown. Note that the concentrations are plotted on a logarithmic scale to facilitate visual comparison of concentrations that vary over five orders of magnitude.

Table U–2. Maximum Peak Year Concentrations of the COPCs from Non–*TC & WM EIS* Sources at the Core Zone Boundary and the Columbia River Nearshore

Contaminant	Core Zone Boundary (peak year)	Columbia River Nearshore (peak year)	Benchmark Concentration[a]
Radionuclide (picocuries per liter)			
Hydrogen-3 (tritium)	104,000,000 (1996)	4,190,000 (1986)	20,000
Carbon-14	46,700 (1998)	196 (2013)	2,000
Strontium-90	181,000 (1998)	4,160,000 (1991)	8
Technetium-99	1,230 (3301)	2,830 (1999)	900
Iodine-129	50.9 (4043)	9.1 (4540)	1
Cesium-137	0[b] (1997)	1,310,000 (1985)	200
Uranium isotopes (includes U-233, -234, -235, -238)	2,200 (1991)	22,400 (1973)	15
Neptunium-237	114 (2066)	16 (2004)	15
Plutonium isotopes (includes Pu-239, -240)	2,660 (11,848)	4,250 (2983)	15

Table U–2. Maximum Peak Year Concentrations of the COPCs from Non–*TC & WM EIS* Sources at the Core Zone Boundary and the Columbia River Nearshore *(continued)*

Contaminant	Core Zone Boundary (peak year)	Columbia River Nearshore (peak year)	Benchmark Concentration[a]
Chemical (micrograms per liter)			
1-Butanol	17,200 (1998)	49 (11,243)	3,600
Carbon tetrachloride	3,350 (2270)	60.7 (2527)	5
Chromium[c]	2,540 (2216)	16,100 (1978)	100
Dichloromethane	0.7 (3286)	0.1 (4711)	5
Fluoride	90,200 (2003)	14,500 (1982)	4,000
Hydrazine/hydrazine sulfate	0.030 (3343)	0.088 (3627)	0.022
Lead	0[b] (2021)	9,080 (2374)	15
Manganese	392 (8610)	242 (2286)	1,600
Mercury	183 (2015)	25.5 (1997)	2
Nickel (soluble salts)	0[b] (11,871)	8,310 (3877)	700
Nitrate	1,020,000 (2269)	502,000 (1973)	45,000
Total uranium	3,290 (1991)	15,400 (1964)	30
Trichloroethylene (TCE)	0.1 (3404)	0.2 (3764)	5

[a] The sources of the benchmark concentrations are provided in Appendix O, Section O.3.
[b] Values that are less than 0.001 are reported as zero.
[c] It was assumed, for the purposes of analysis, that all chromium was hexavalent.
Note: Peak concentrations for some non–*TC & WM EIS* source constituents occur in the past. The relationship of past to future non–*TC & WM EIS* source constituent concentrations is presented in the concentration versus time plots in Figures U–1 through U–9.
Key: COPC=constituent of potential concern; *TC & WM EIS*=*Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington.*

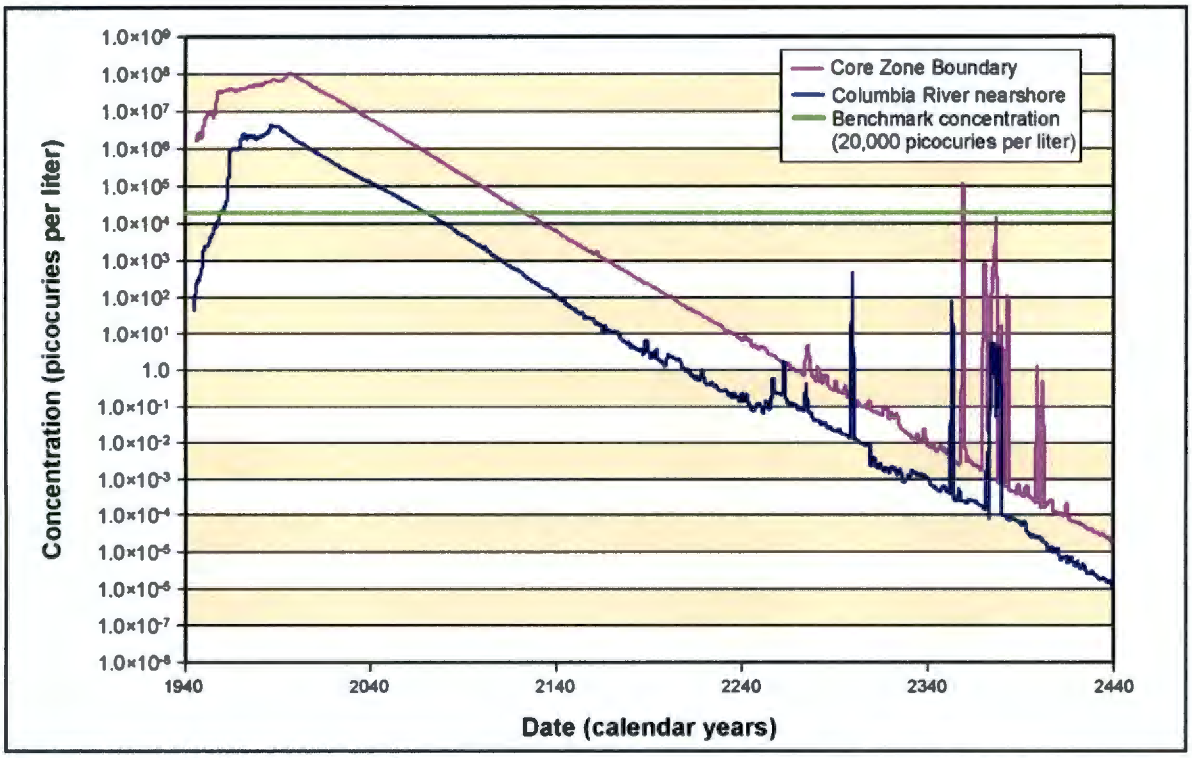


Figure U–1. Hydrogen-3 (Tritium) Concentration Versus Time (Non–*TC & WM EIS* Sources)

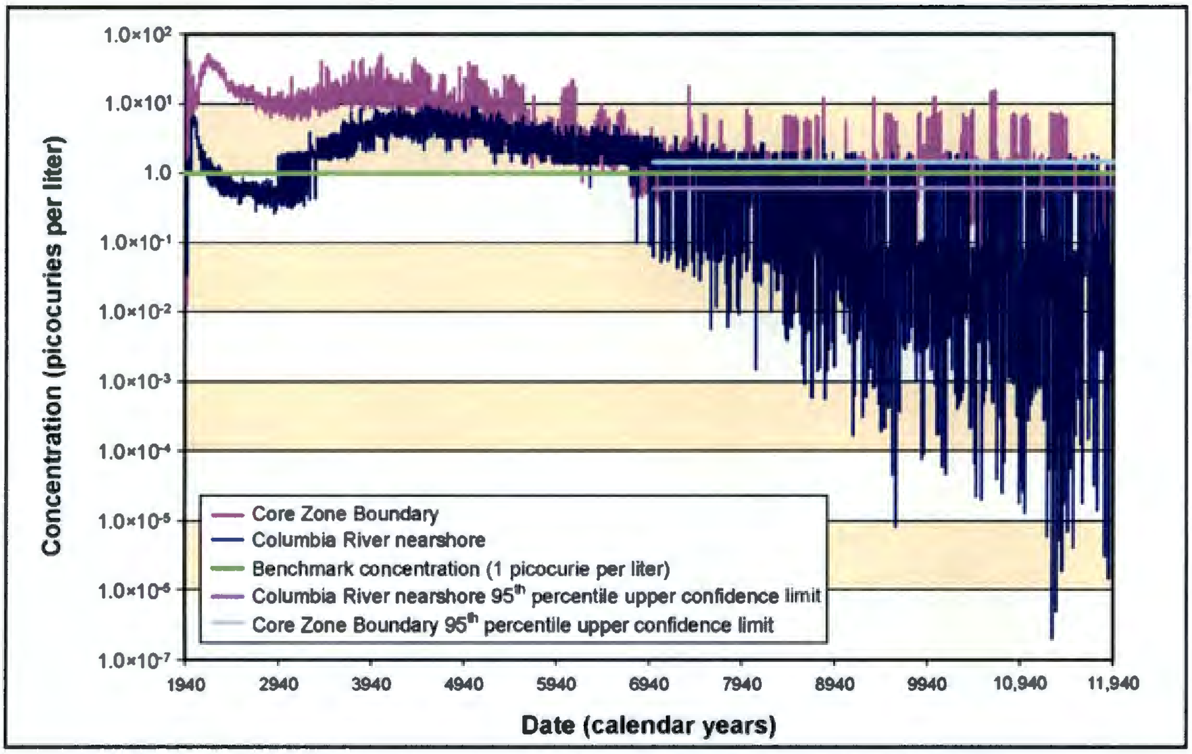


Figure U–2. Iodine-129 Concentration Versus Time (Non–*TC & WM EIS* Sources)

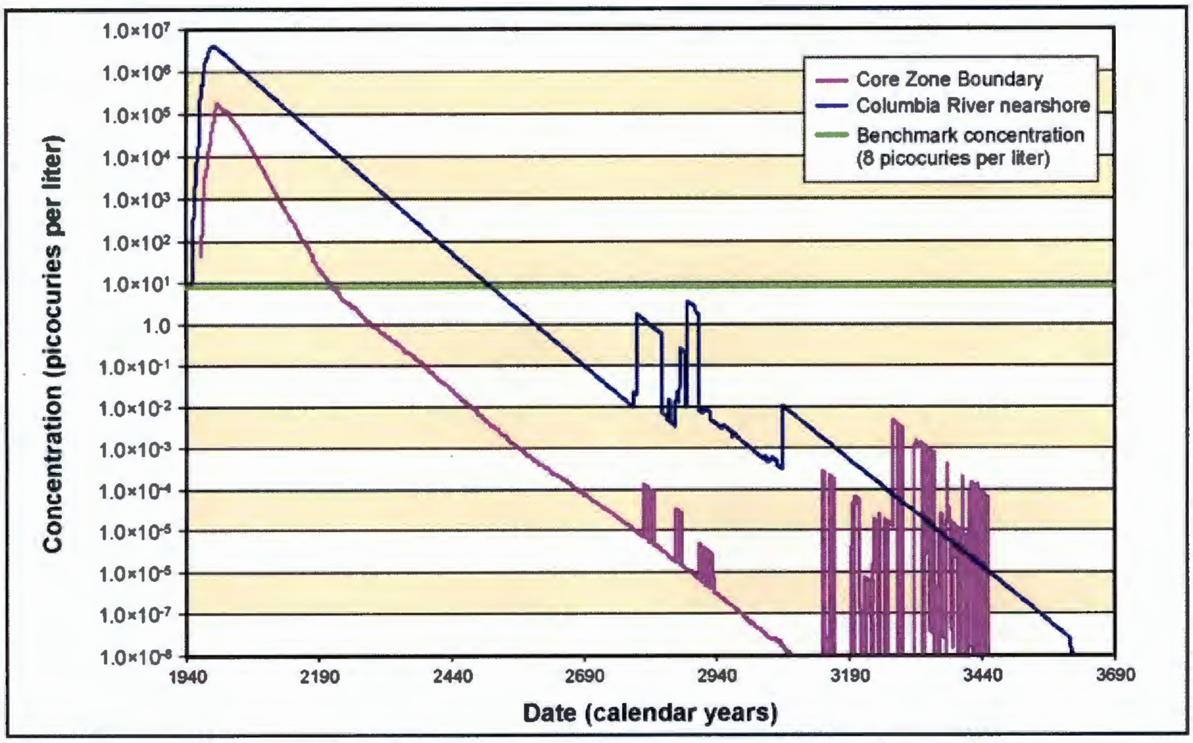


Figure U–3. Strontium-90 Concentration Versus Time (Non–*TC & WM EIS* Sources)

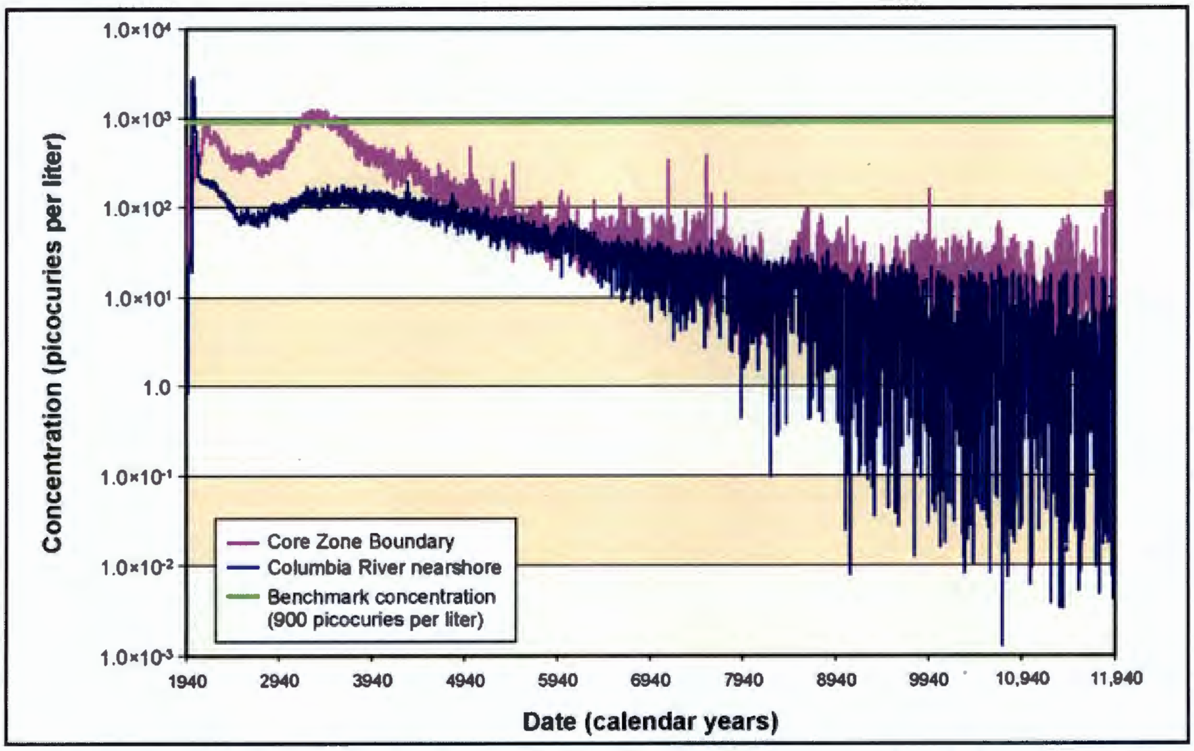


Figure U–4. Technetium-99 Concentration Versus Time (Non–*TC & WM EIS* Sources)

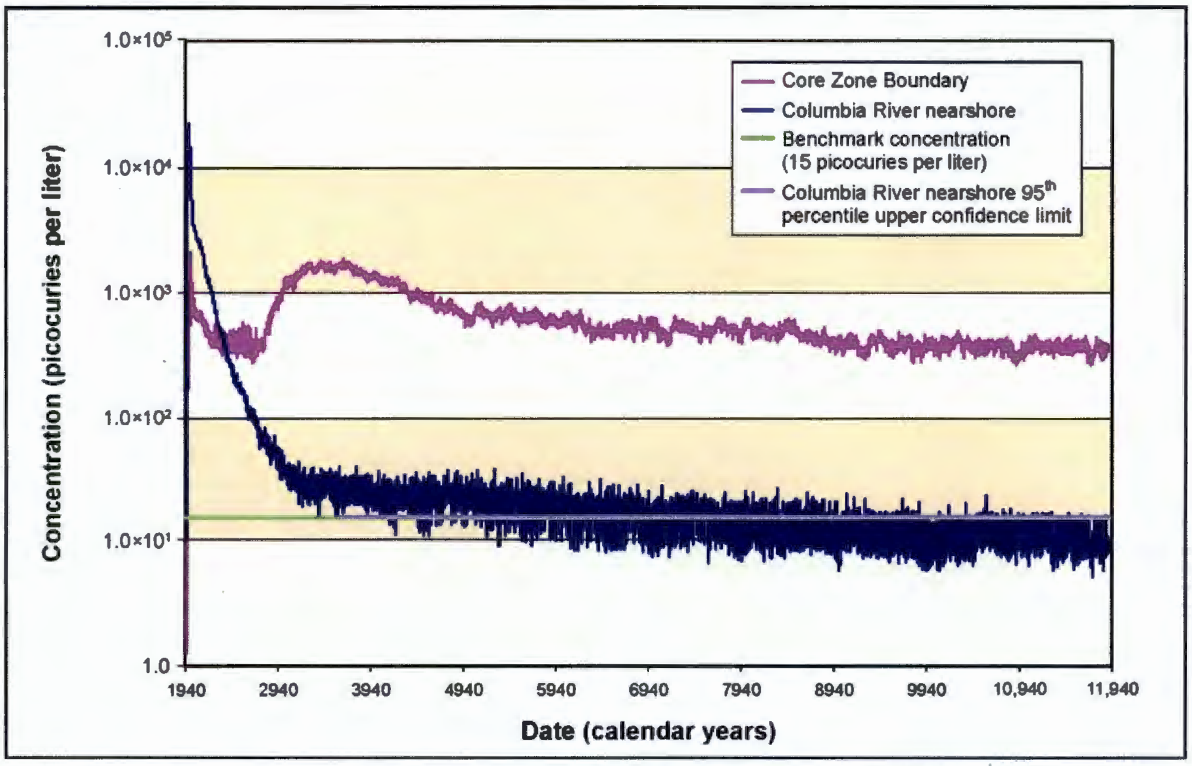


Figure U–5. Uranium-238 Concentration Versus Time (Non–*TC & WM EIS* Sources)

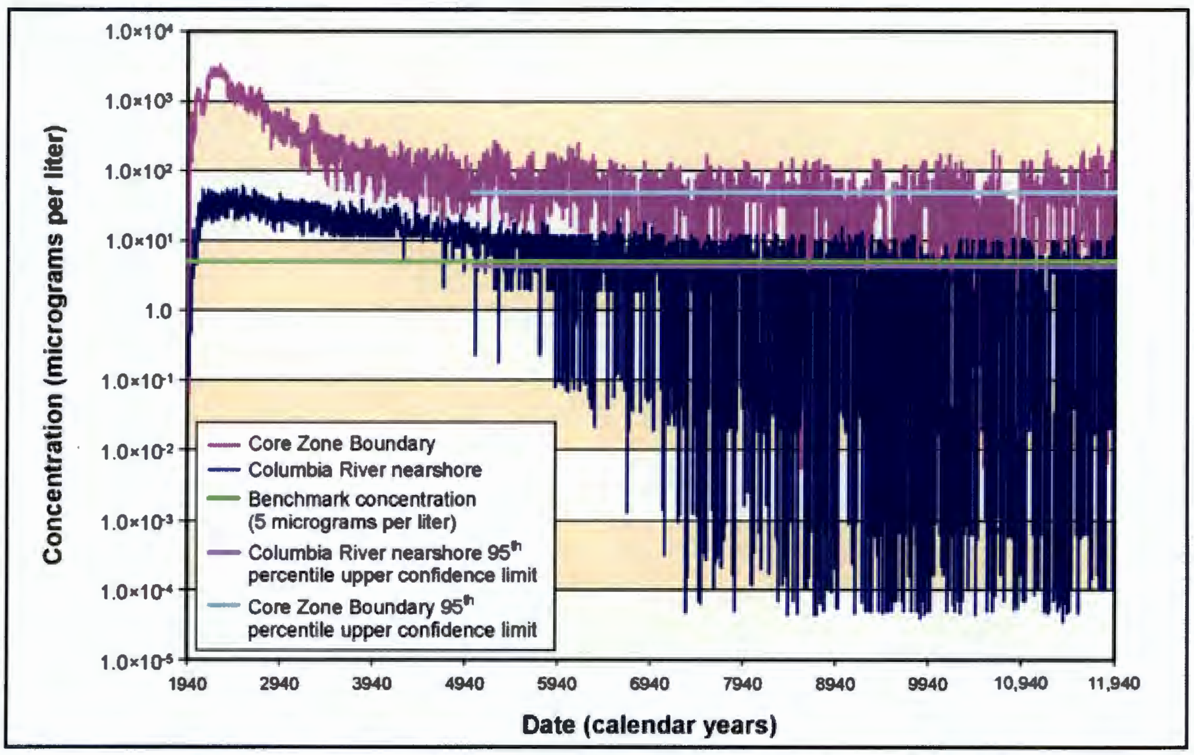


Figure U–6. Carbon Tetrachloride Concentration Versus Time (Non–*TC & WM EIS* Sources)

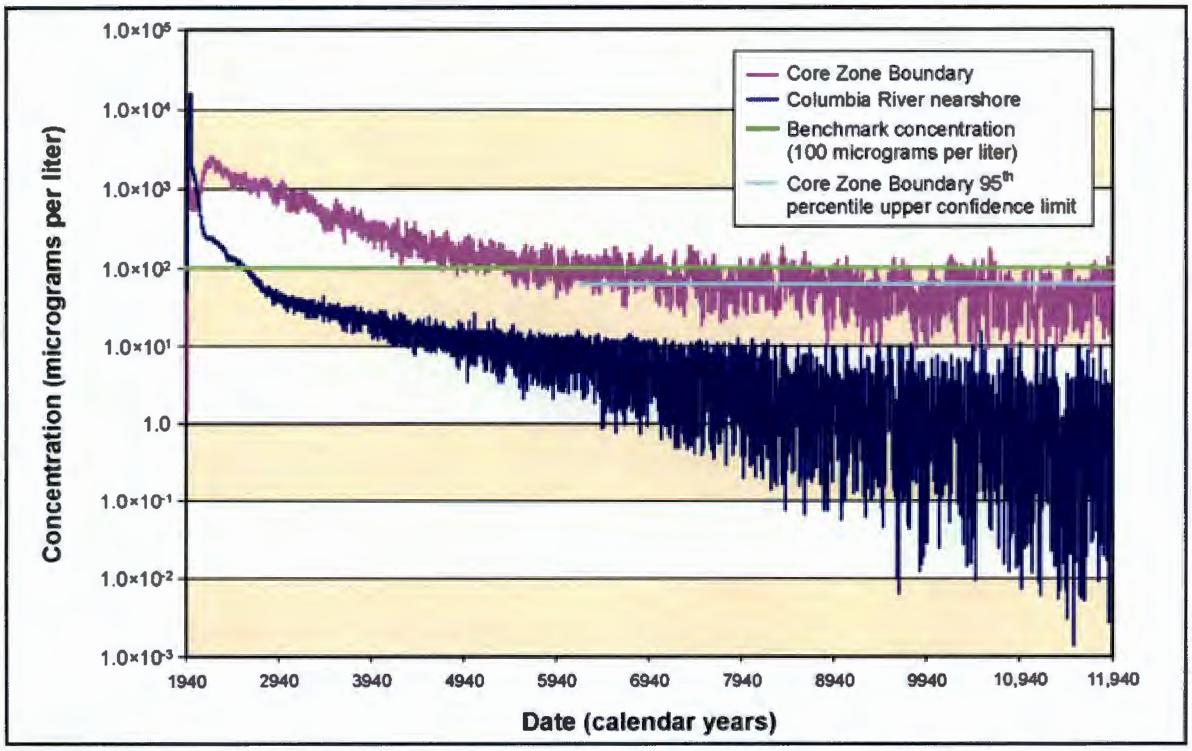


Figure U–7. Chromium Concentration Versus Time (Non–*TC & WM EIS* Sources)

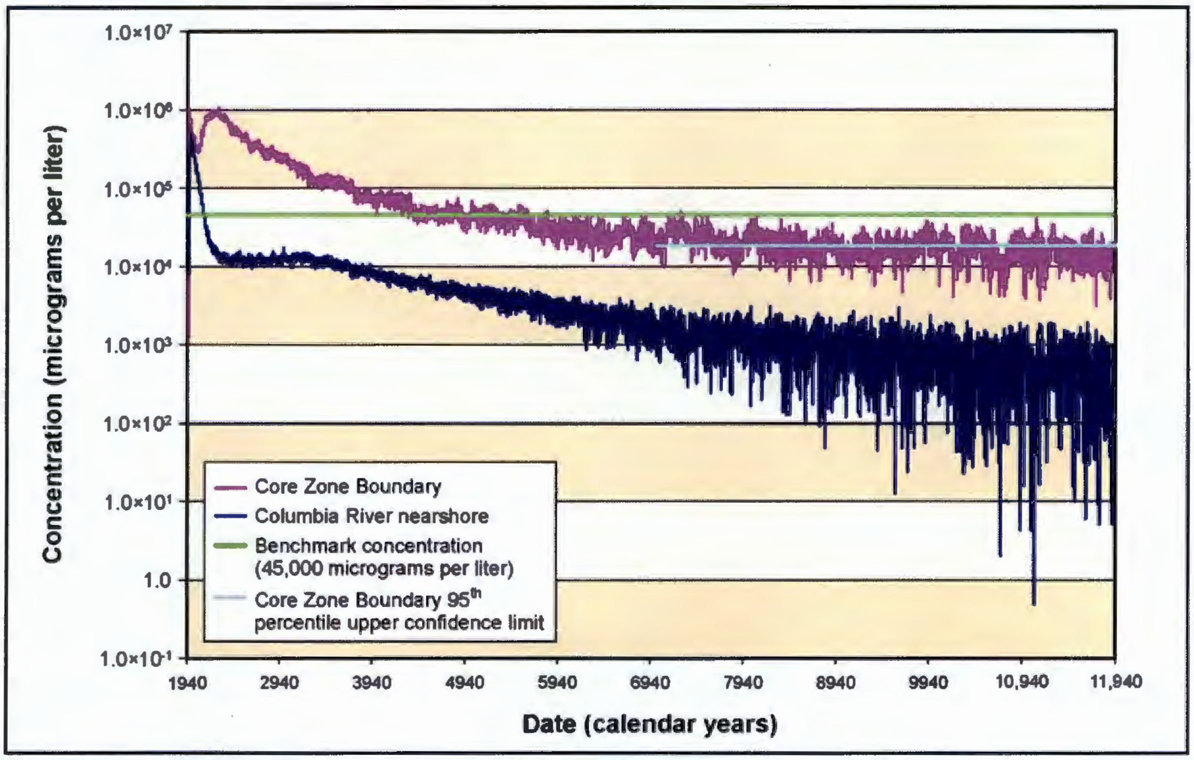


Figure U–8. Nitrate Concentration Versus Time (Non–*TC & WM EIS* Sources)

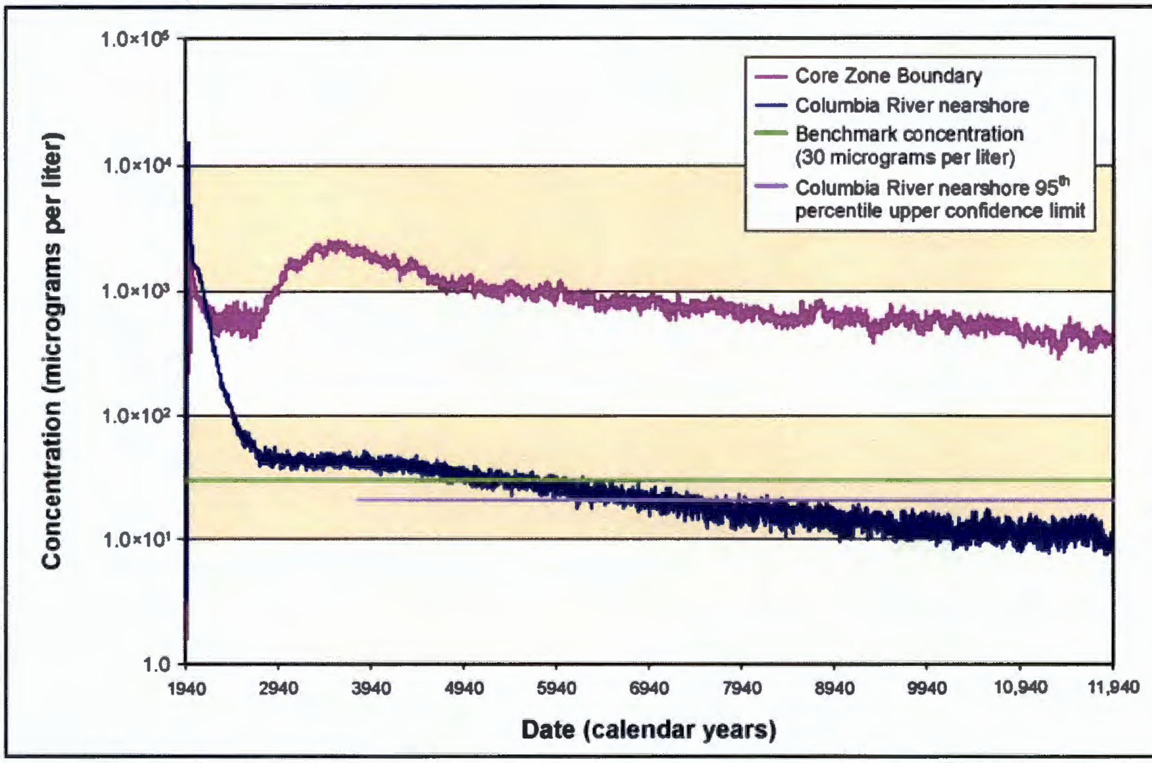


Figure U–9. Total Uranium Concentration Versus Time (Non–*TC & WM EIS* Sources)

U.1.4 Spatial Distribution of Concentration

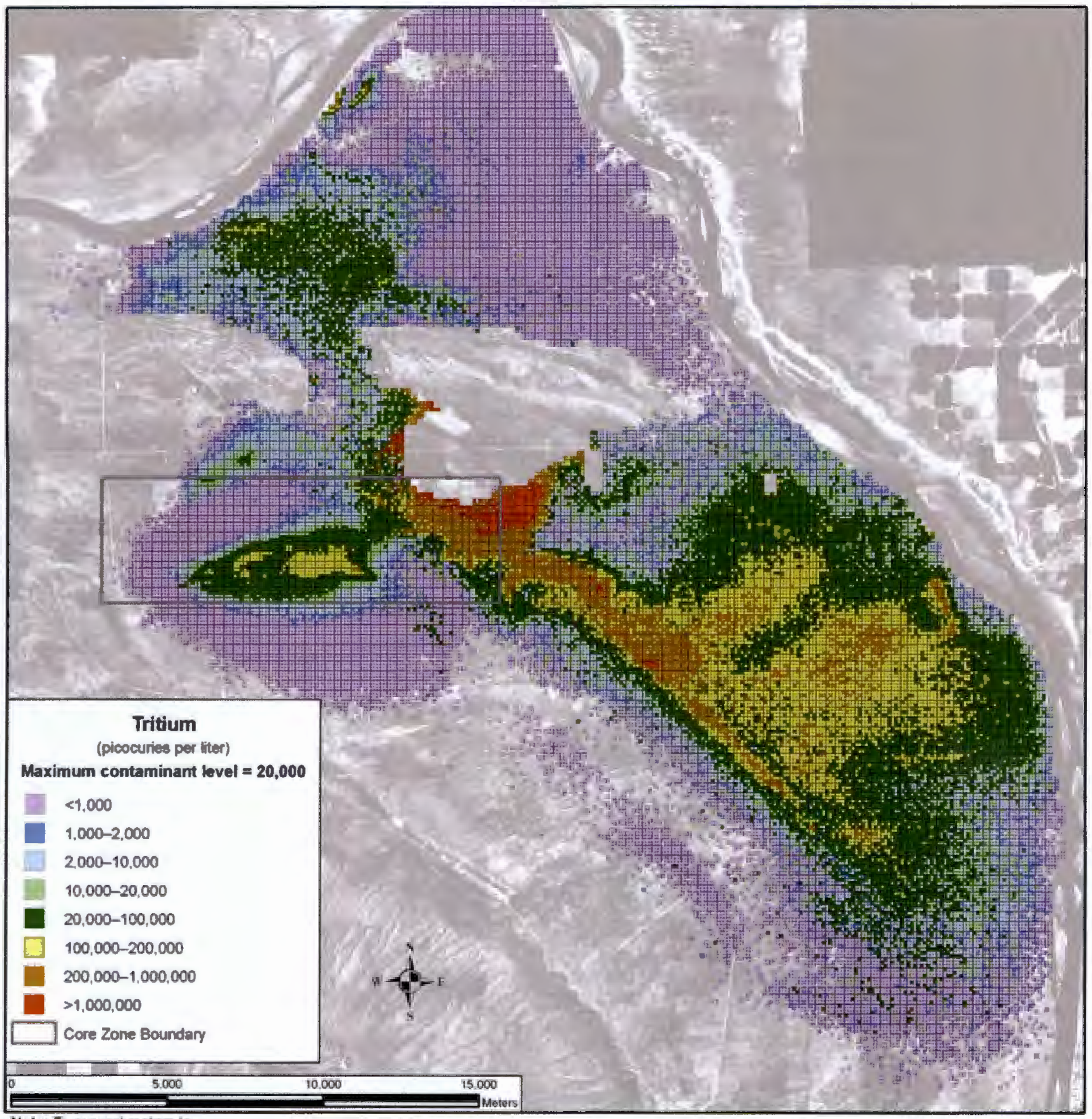
This section presents the results of the impacts analysis for non–*TC & WM EIS* sources in terms of the spatial distribution of COPC concentrations in the groundwater at selected times. Concentrations for each radionuclide and chemical are indicated by a color scale indicating the benchmark concentration. Concentrations greater than the benchmark concentration are indicated by the fully saturated colors green, yellow, orange, and red in order of increasing concentration. Concentrations less than the benchmark concentration are indicated by the faded colors green, blue, indigo, and violet in order of decreasing concentration. Note that the concentration ranges are on a logarithmic scale to facilitate visual comparison of concentrations that vary over three orders of magnitude. Figures U–10 through U–48 include maps of the projected concentrations of contaminants in the groundwater for the following:

- Tritium in 2005 and 2135 (see Figures U–10 and U–11)
- Iodine-129 in 2005, 2135, 3890, 7140, and 11,885 (see Figures U–12 through U–16)
- Strontium-90 in 2005 and 2135 (see Figures U–17 and U–18)
- Technetium-99 in 2005, 2135, 3890, 7140, and 11,885 (see Figures U–19 through U–23)
- Uranium-238 in 2005, 2135, 3890, 7140, and 11,885 (see Figures U–24 through U–28)
- Carbon tetrachloride in 2005, 2135, 3890, 7140, and 11,885 (see Figures U–29 through U–33)
- Chromium in 2005, 2135, 3890, 7140, and 11,885 (see Figures U–34 through U–38)
- Nitrate in 2005, 2135, 3890, 7140, and 11,885 (see Figures U–39 through U–43)
- Total uranium in 2005, 2135, 3890, 7140, and 11,885 (see Figures U–44 through U–48)

In general, the simulations of groundwater transport in this *TC & WM EIS* replicate the values measured in the field to a close order of magnitude, particularly for discharges to cribs and trenches (ditches), where the historic measurements are most complete and show the strongest signature of past-practice operations. As shown in Appendices N and O, the agreement is good for both *TC & WM EIS* alternative sources and non–*TC & WM EIS* sources. There are two contaminant plumes for which the simulated plumes are in greater disagreement with observation. Both are non–*TC & WM EIS* sources: the carbon tetrachloride plume in the 200-West Area (see Figure U–29), and the uranium-238 plume (see Figure U–24) and total uranium plume (see Figure U–44) in the 200-East Area.

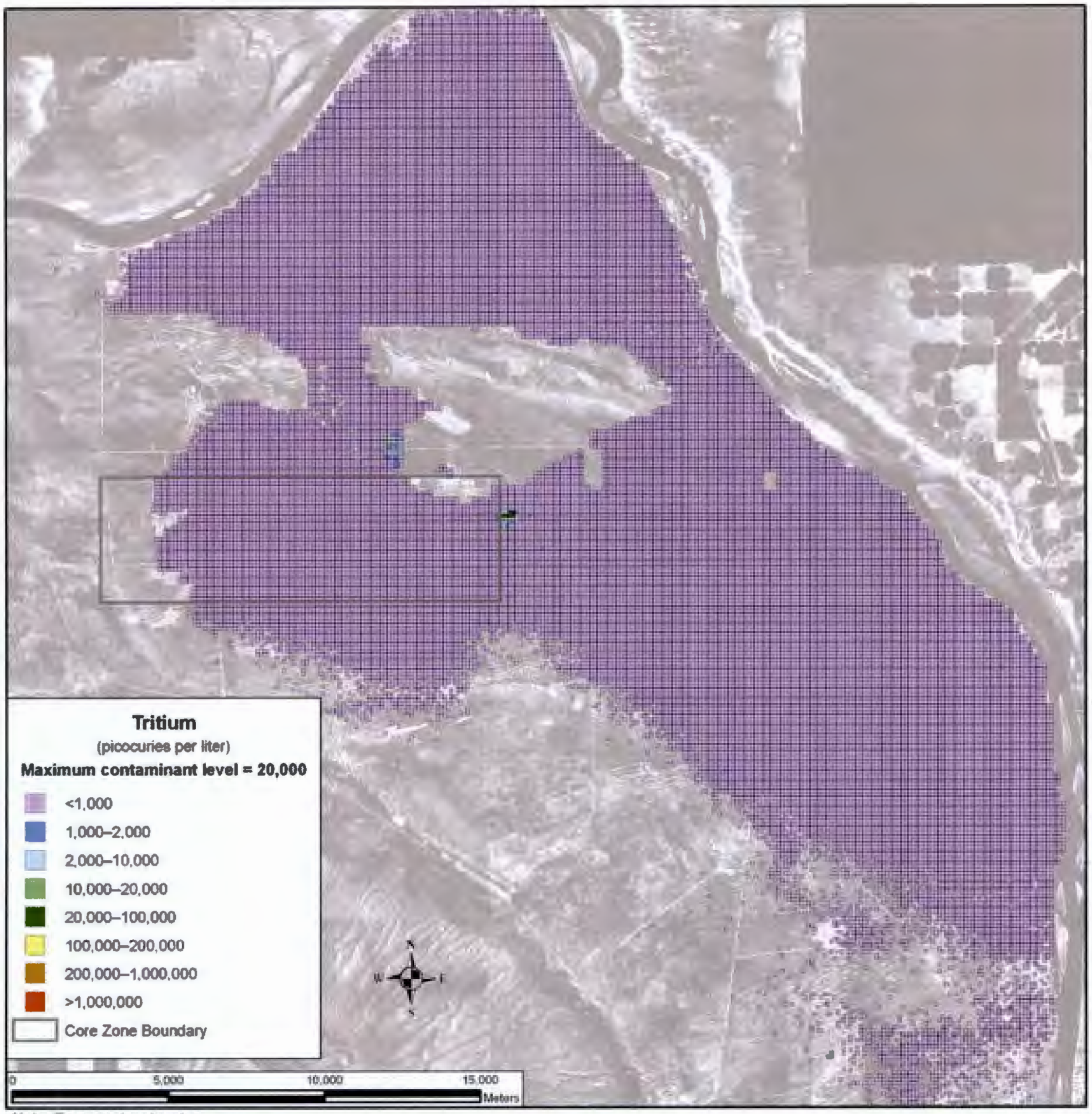
Carbon tetrachloride, when discharged in sufficient quantity, behaves as a dense, non-aqueous-phase liquid (DNAPL) rather than a dissolved solute. Simulation results for DNAPL flow and transport in the vadose zone exhibit sensitivities of more than several orders of magnitude to uncertainties in input parameters, which suggests that DNAPL contaminant behavior is not well understood or constrained. For the purposes of the *TC & WM EIS* long-term groundwater cumulative impacts analysis, these vadose zone uncertainties were recognized to result in variations in predicted groundwater impacts that are qualitatively greater than those for other COPCs in the analysis. Therefore, the *TC & WM EIS* analysis of the carbon tetrachloride plume started with a more-constrained initial condition, the 65,000 kilograms (143,000 pounds) of carbon tetrachloride estimated in the vadose zone in 2005 (Hartman and Webber 2008). This total inventory was assumed to be present in the unconfined aquifer starting in 2005, and the concentrations were modeled forward from this initial condition. In addition, because of the uncertainties in the design and implementation of the groundwater remediation system for Operable Unit 200-ZP-1, no credit was taken in the *TC &WM EIS* modeling for removal or containment of carbon tetrachloride. In light of these approximations, the predicted concentrations of carbon tetrachloride should be considered qualitatively more uncertain than other contaminants in the cumulative impacts analysis.

Uranium-238 and total uranium simulation results show higher impacts resulting from large discharge facilities in the 200-East Area (e.g., B Pond) than actually observed. The disagreement of these plumes with field measurements suggests that two possible areas of uncertainty may dominate the simulation of these impacts. The first is the uncertainty in the inventory of uranium-238 and total uranium in the large discharge ponds (see Appendix S), which is approximately 50 percent. The second, and probably more-important source of uncertainty, is the interaction of uranium-238 and total uranium with subsurface materials beneath these facilities. The *TC & WM EIS* analysis is based on a distribution coefficient for uranium of about 0.6 milliliters per gram (DOE 2005). This value, although appropriate for far-field conditions in the unconfined aquifer, is probably not representative of the conditions beneath the large discharge sources (e.g., B Ponds). Therefore, the prediction of the uranium-238 and total uranium contaminant plumes for large non–*TC & WM EIS* sources should be considered an overestimate of the actual impacts by about an order of magnitude.



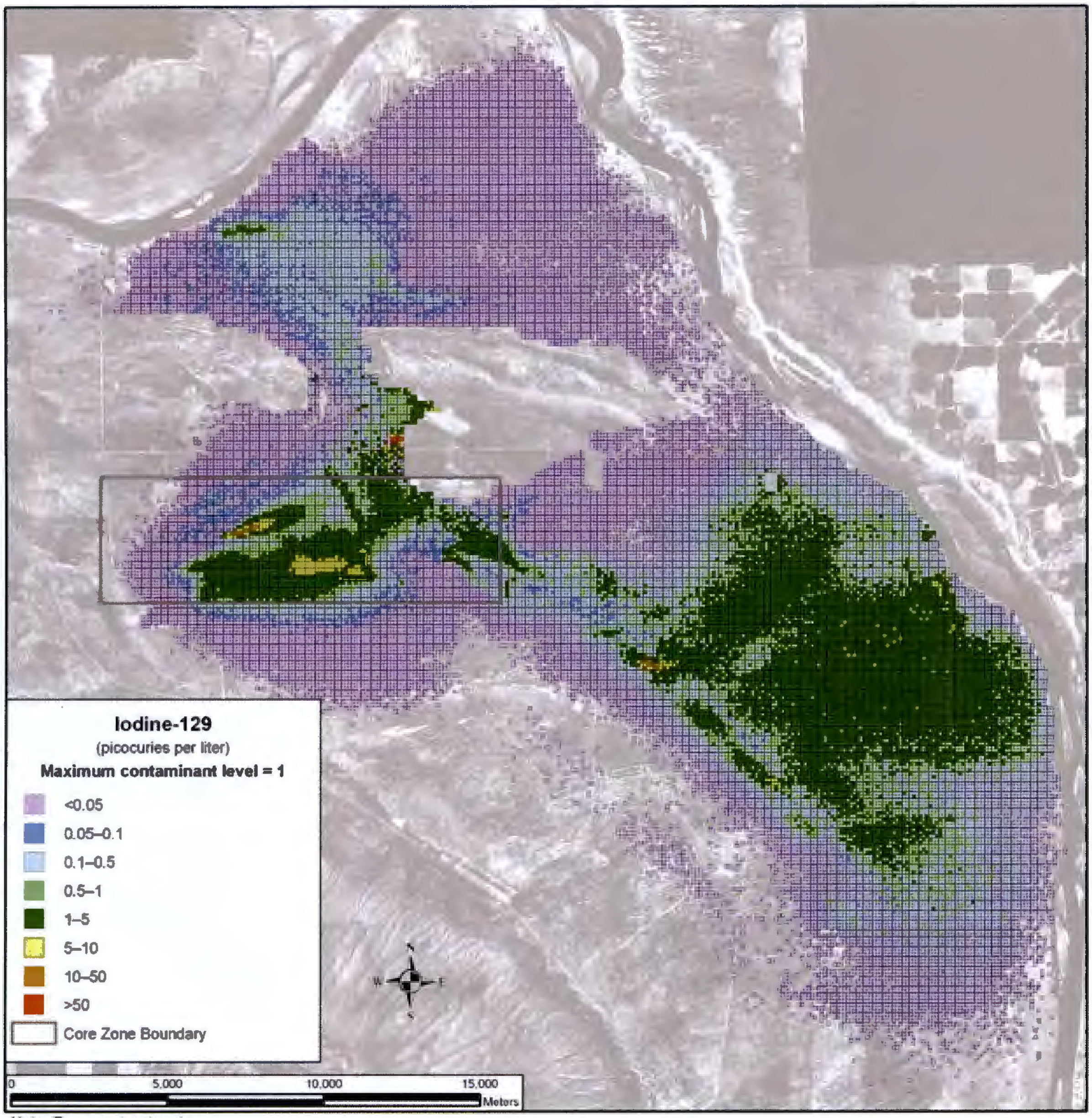
Note: To convert meters to feet, multiply by 3.281

Figure U–10. Spatial Distribution of Groundwater Hydrogen-3 (Tritium) Concentration (Non–*TC & WM EIS* Sources), Calendar Year 2005



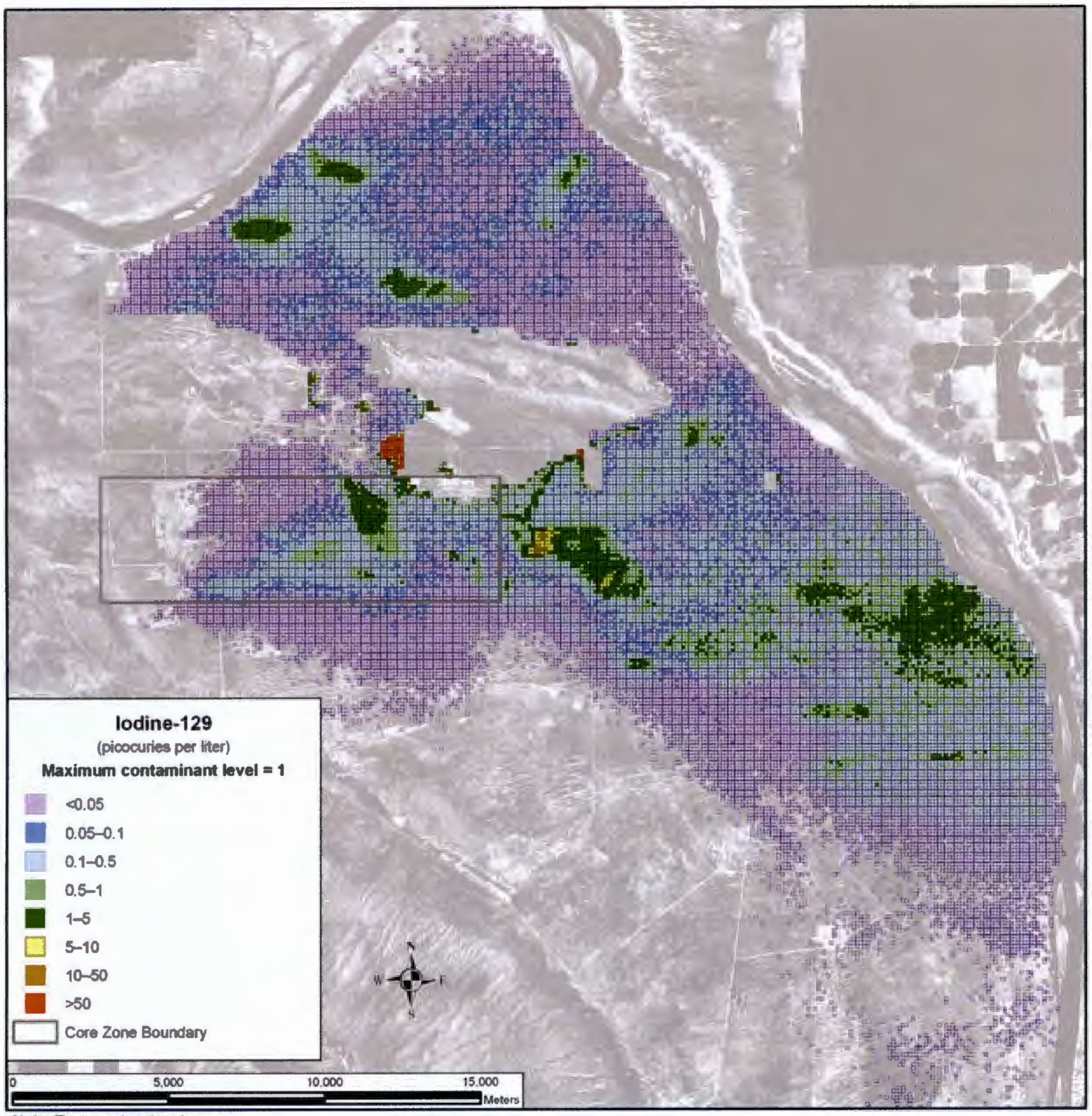
Note: To convert meters to feet, multiply by 3.281

Figure U–11. Spatial Distribution of Groundwater Hydrogen-3 (Tritium) Concentration (Non–*TC & WM EIS* Sources), Calendar Year 2135



Note: To convert meters to feet, multiply by 3.281

Figure U–12. Spatial Distribution of Groundwater Iodine-129 Concentration (Non–*TC & WM EIS* Sources), Calendar Year 2005



Note: To convert meters to feet, multiply by 3.281

Figure U–13. Spatial Distribution of Groundwater Iodine-129 Concentration (Non–*TC & WM EIS* Sources), Calendar Year 2135

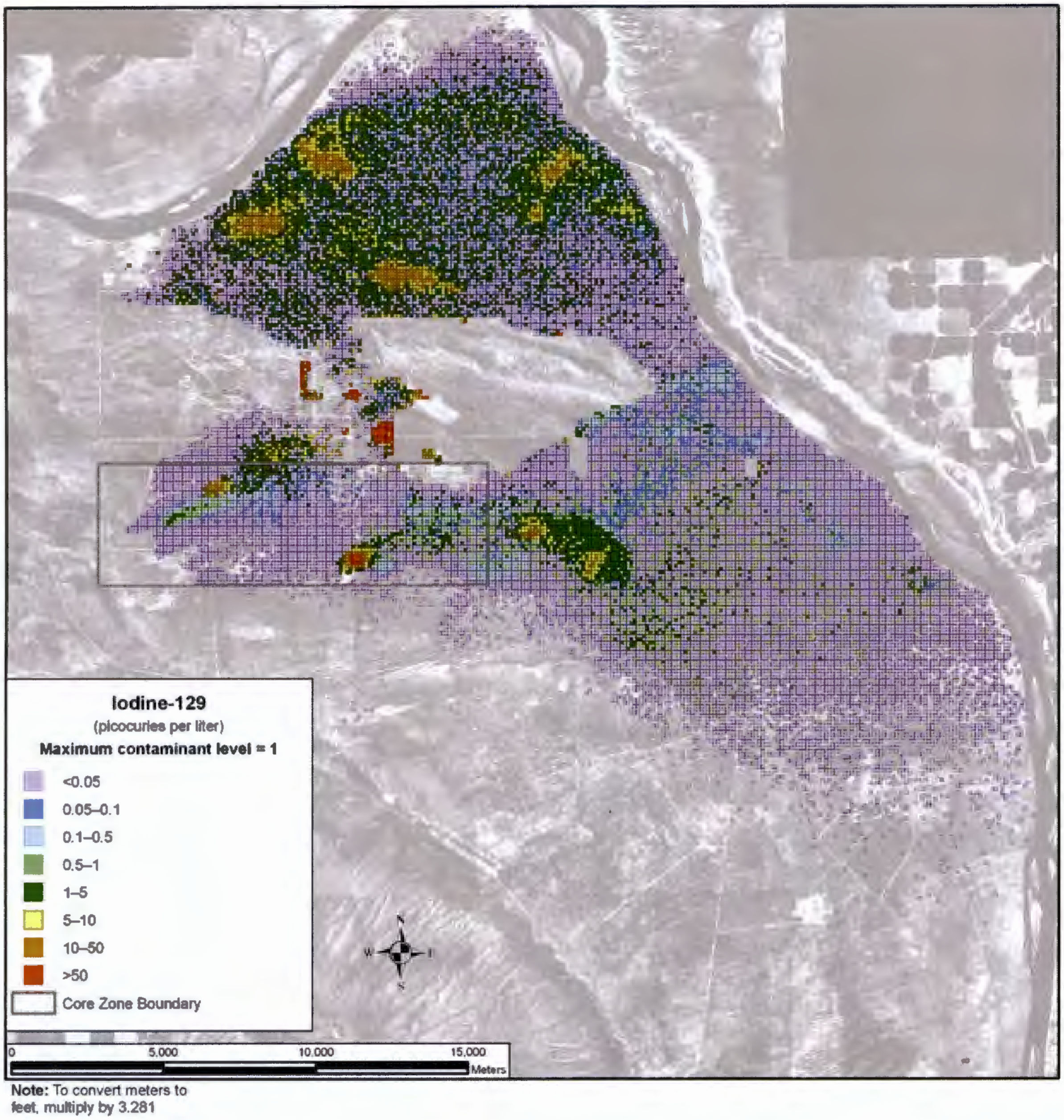
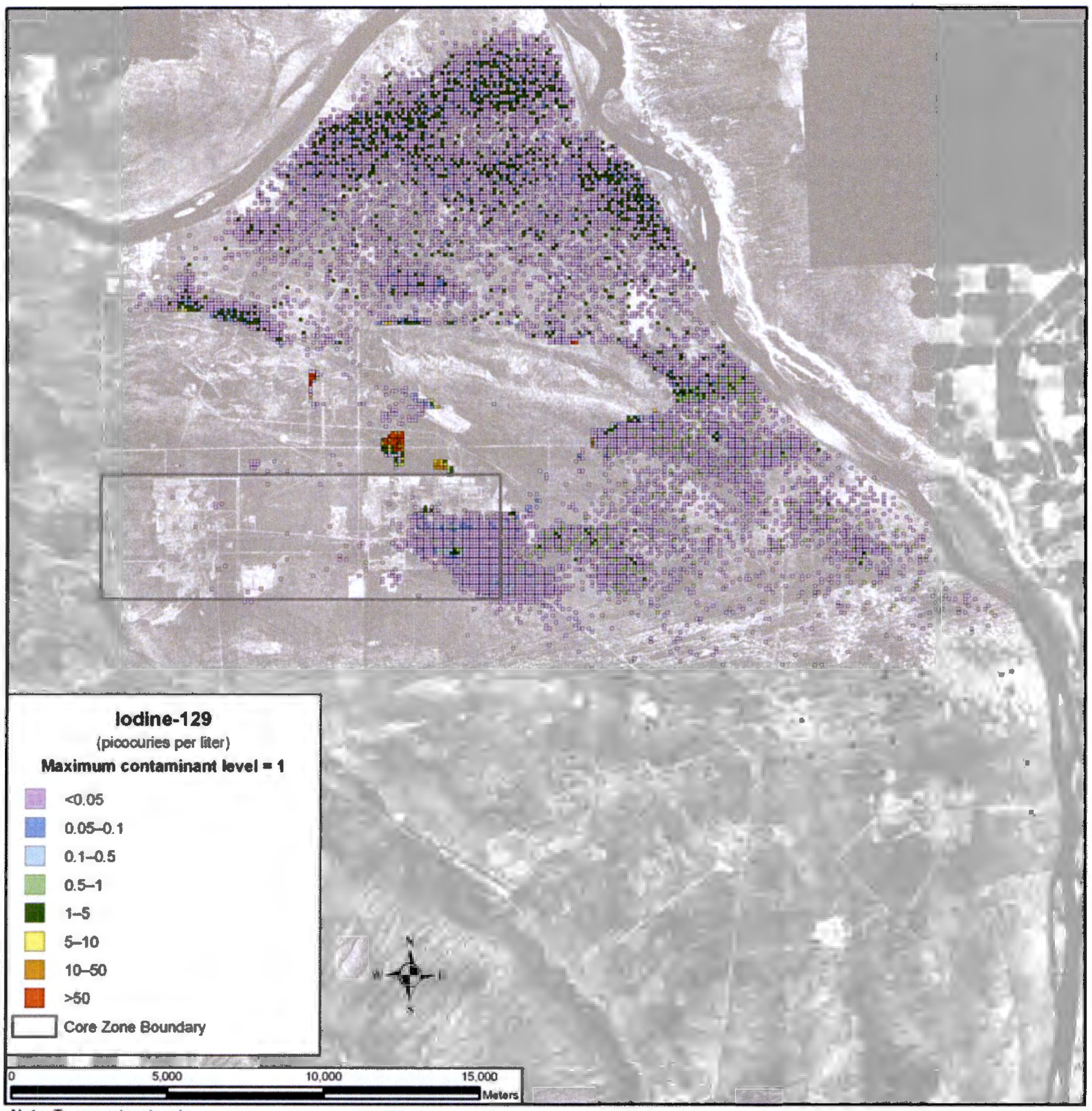
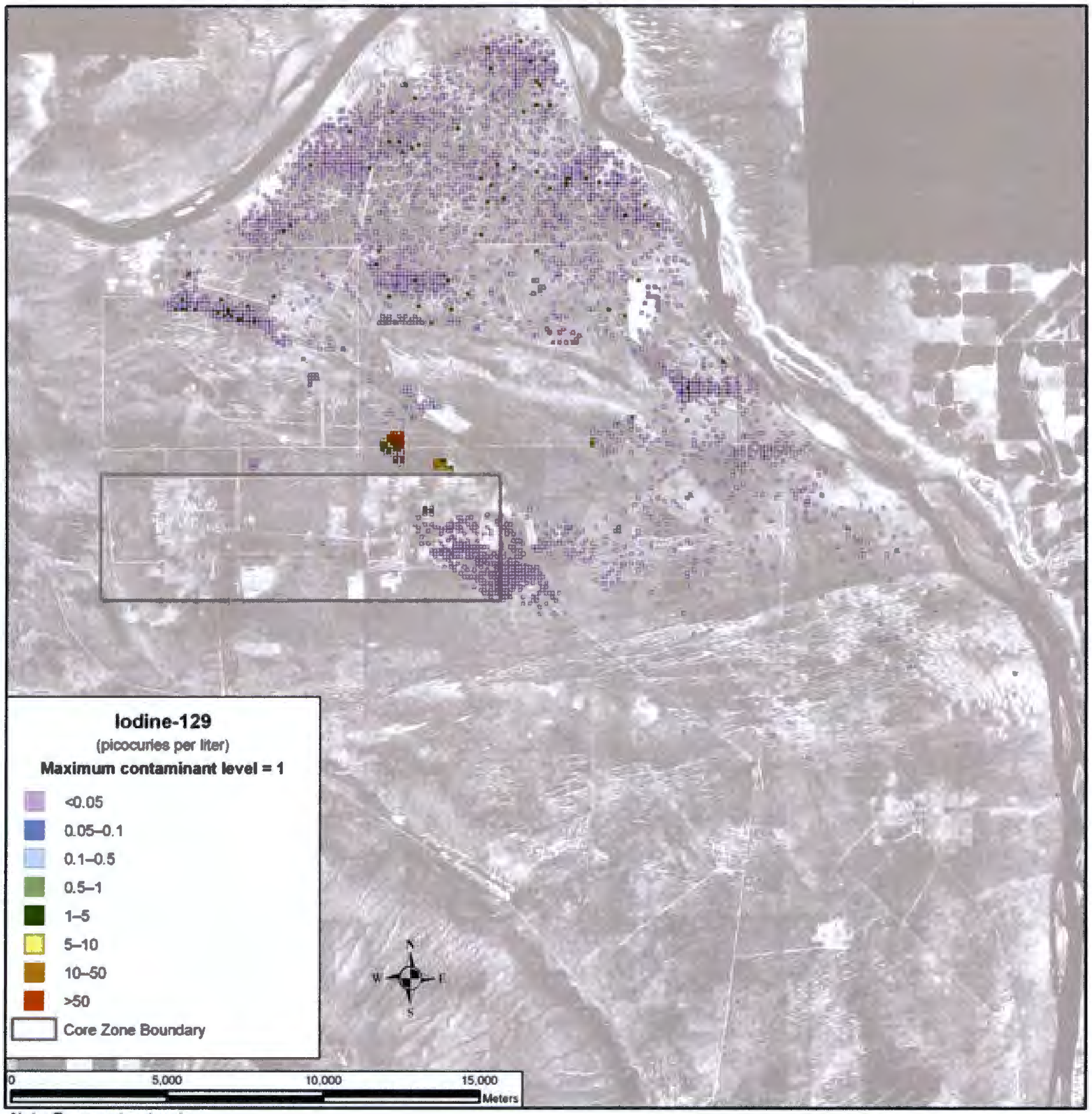


Figure U–14. Spatial Distribution of Groundwater Iodine-129 Concentration (Non–*TC & WM EIS* Sources), Calendar Year 3890



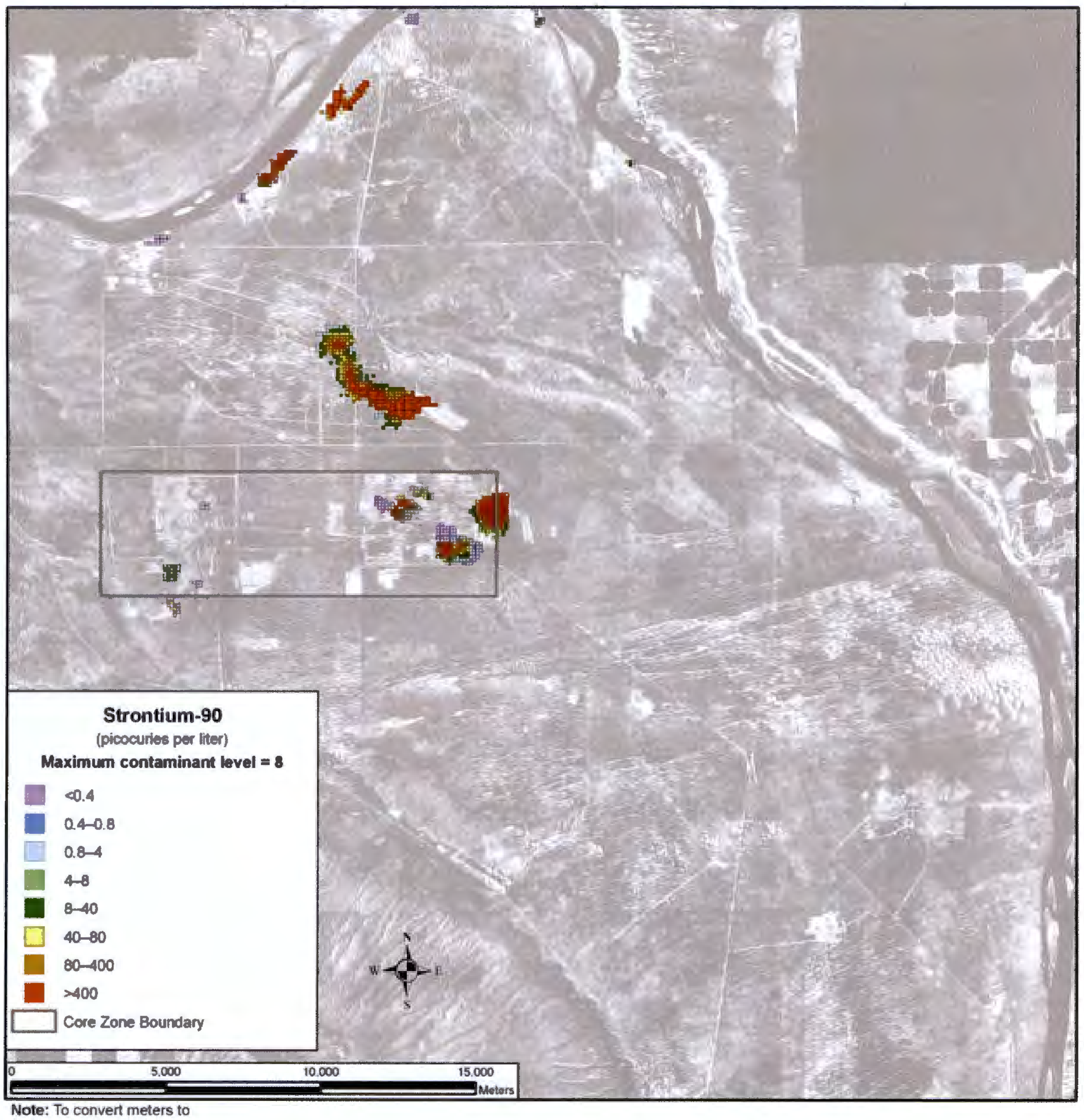
Note: To convert meters to feet, multiply by 3.281

Figure U–15. Spatial Distribution of Groundwater Iodine-129 Concentration (Non–*TC & WM EIS* Sources), Calendar Year 7140



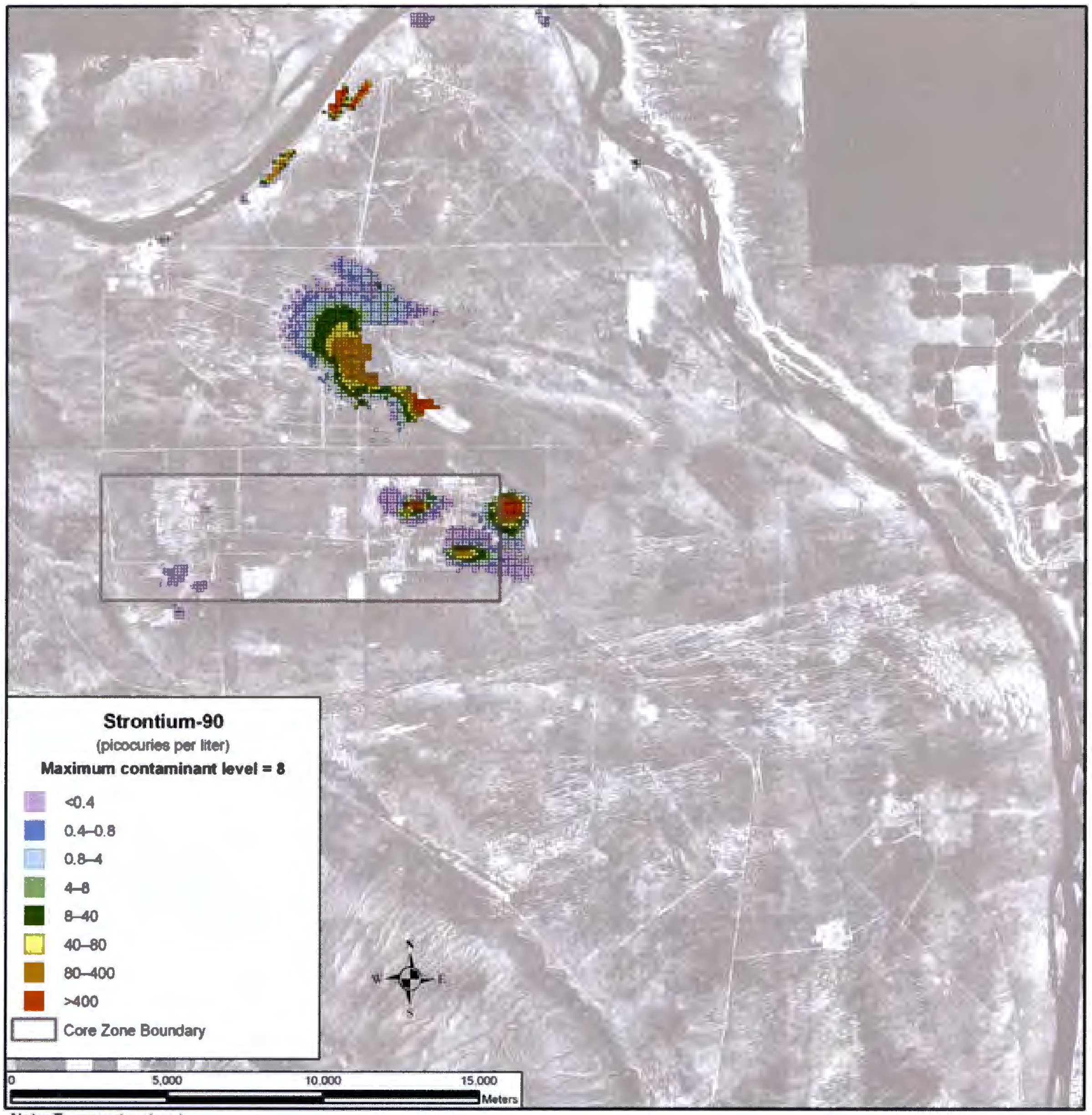
Note: To convert meters to feet, multiply by 3.281

Figure U–16. Spatial Distribution of Groundwater Iodine-129 Concentration (Non–*TC & WM EIS* Sources), Calendar Year 11,885



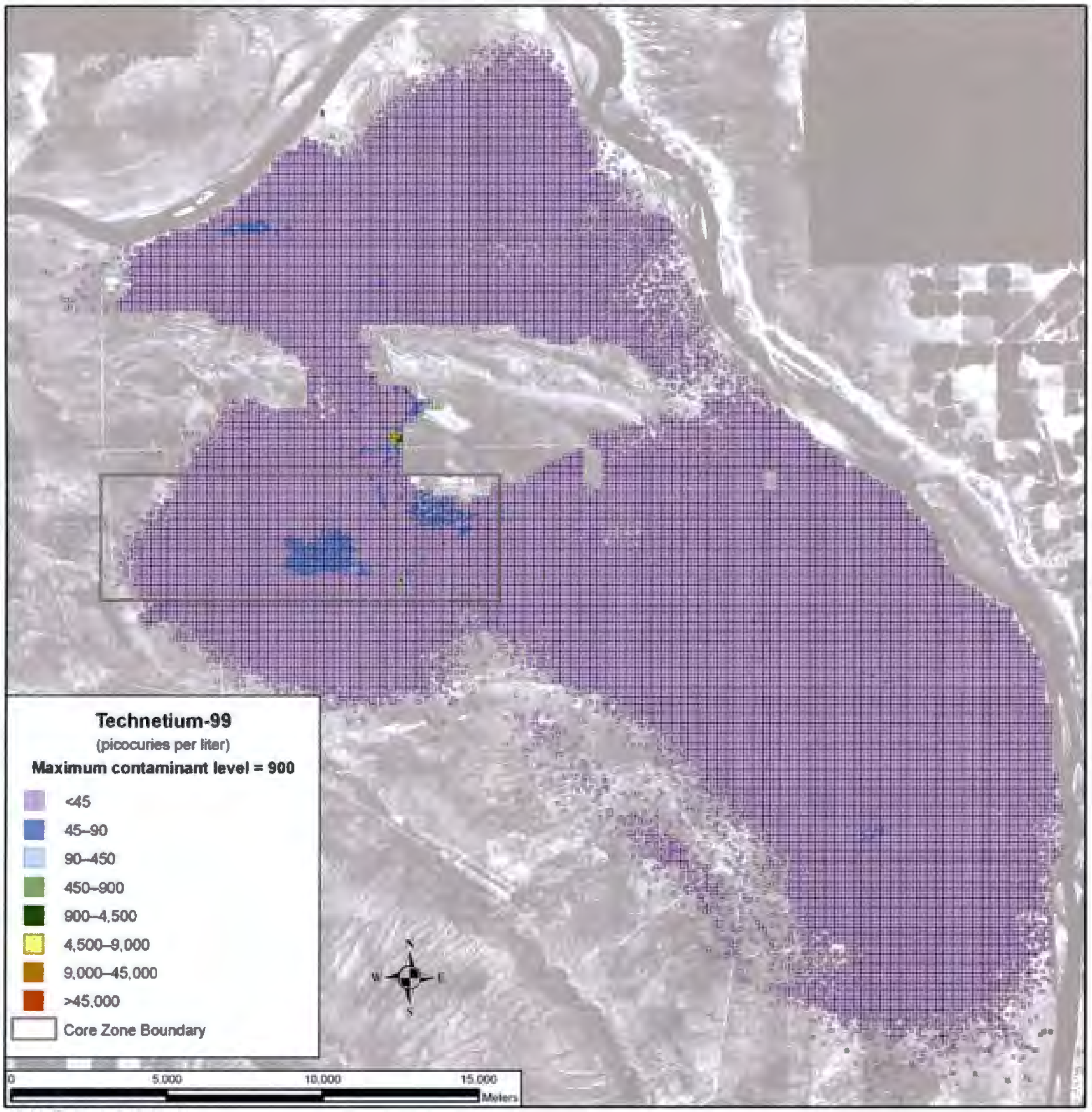
Note: To convert meters to feet, multiply by 3.281

Figure U–17. Spatial Distribution of Groundwater Strontium-90 Concentration (Non–*TC & WM EIS* Sources), Calendar Year 2005



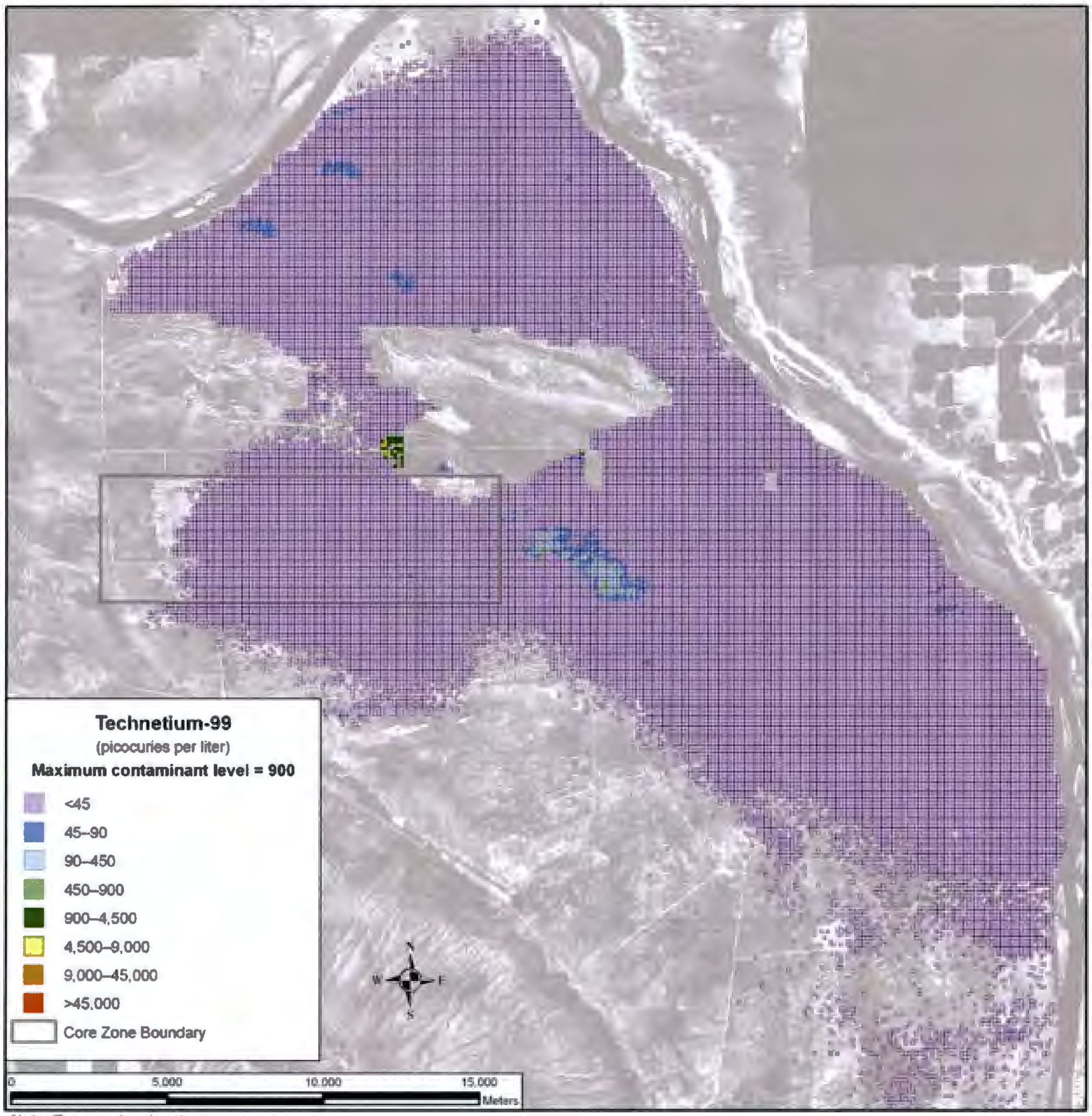
Note: To convert meters to feet, multiply by 3.281

Figure U–18. Spatial Distribution of Groundwater Strontium-90 Concentration (Non–*TC & WM EIS* Sources), Calendar Year 2135



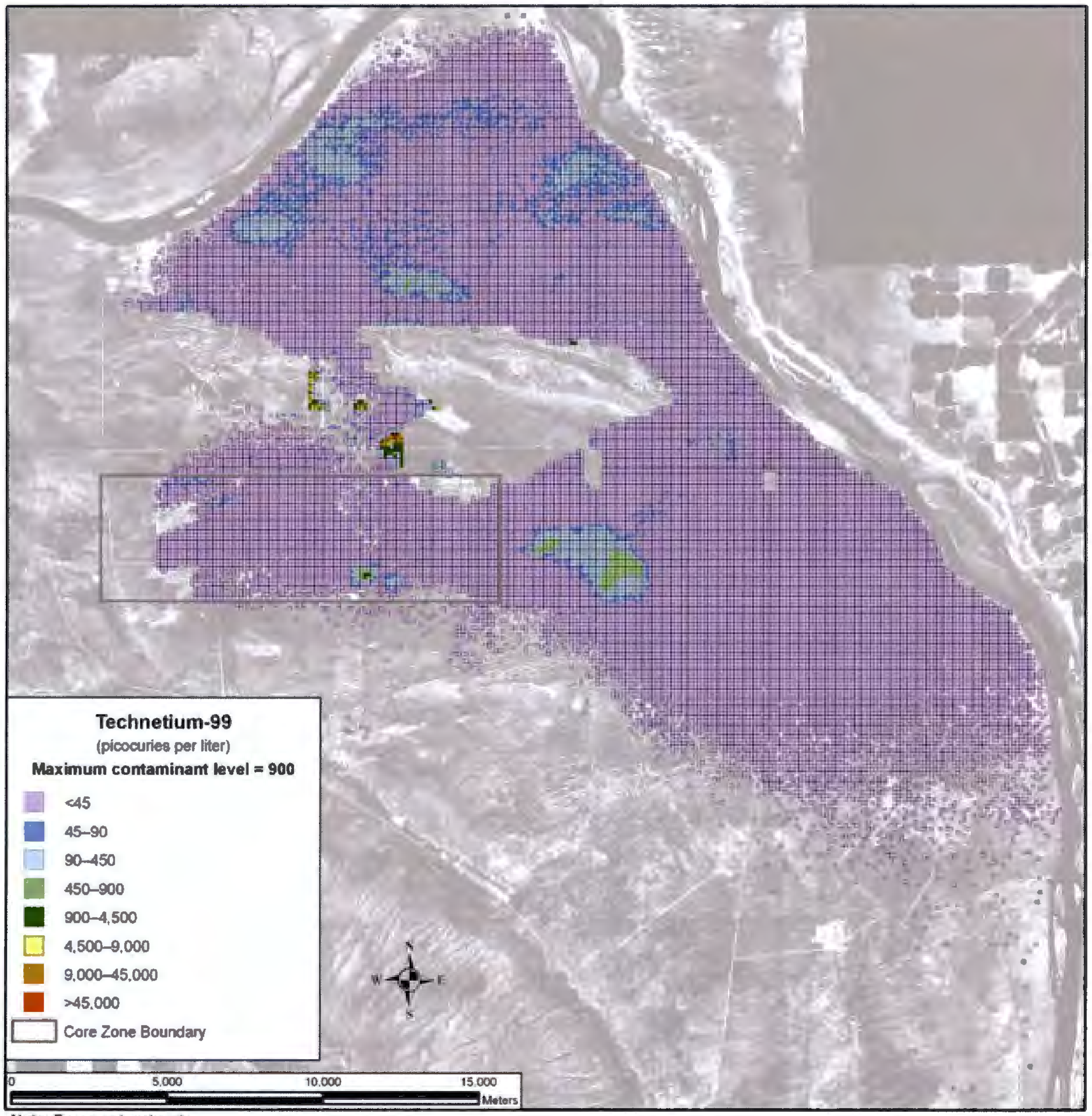
Note: To convert meters to feet, multiply by 3.281

Figure U–19. Spatial Distribution of Groundwater Technetium-99 Concentration (Non–*TC & WM EIS* Sources), Calendar Year 2005



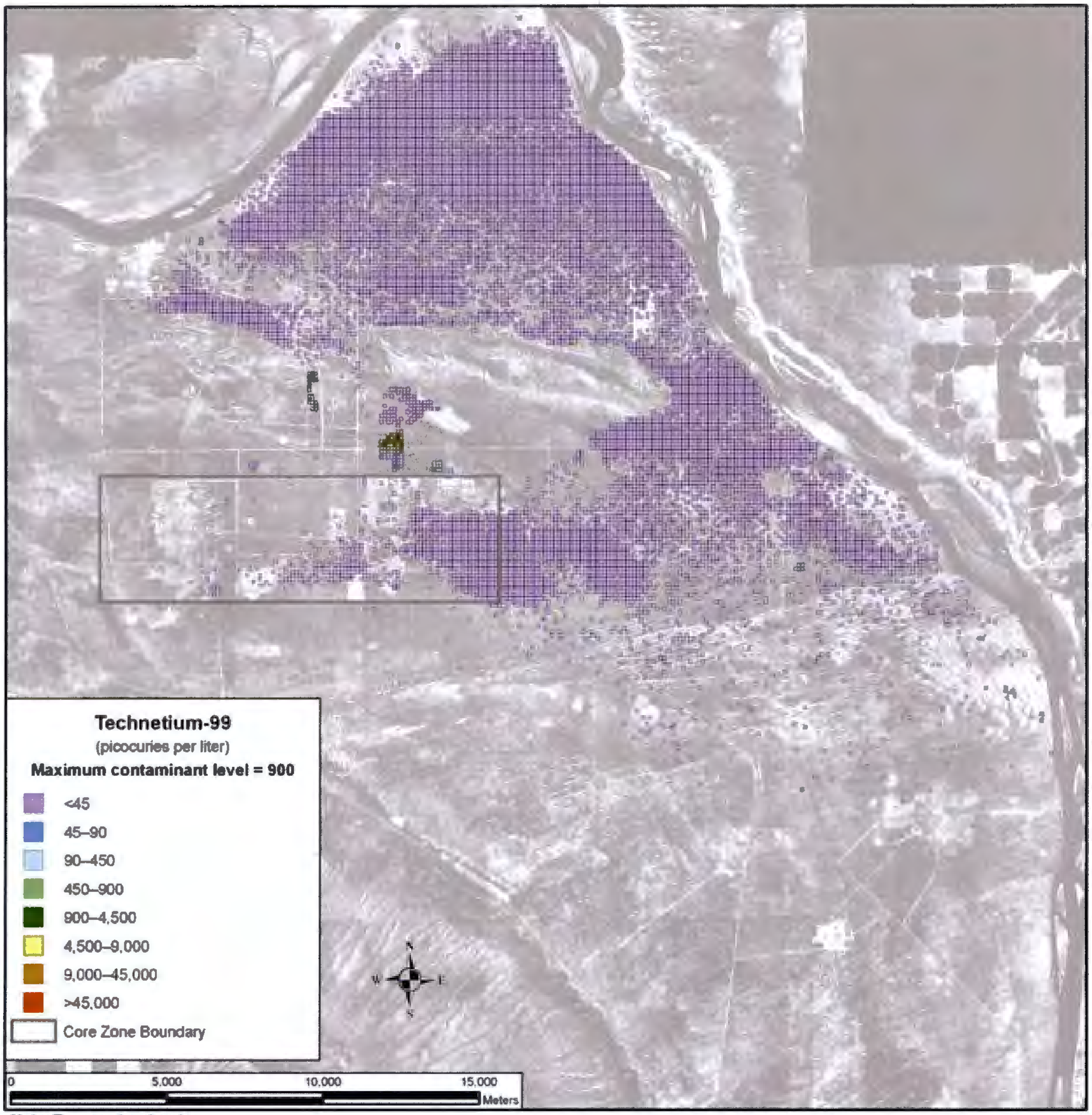
Note: To convert meters to feet, multiply by 3.281

Figure U–20. Spatial Distribution of Groundwater Technetium-99 Concentration (Non–*TC & WM EIS* Sources), Calendar Year 2135



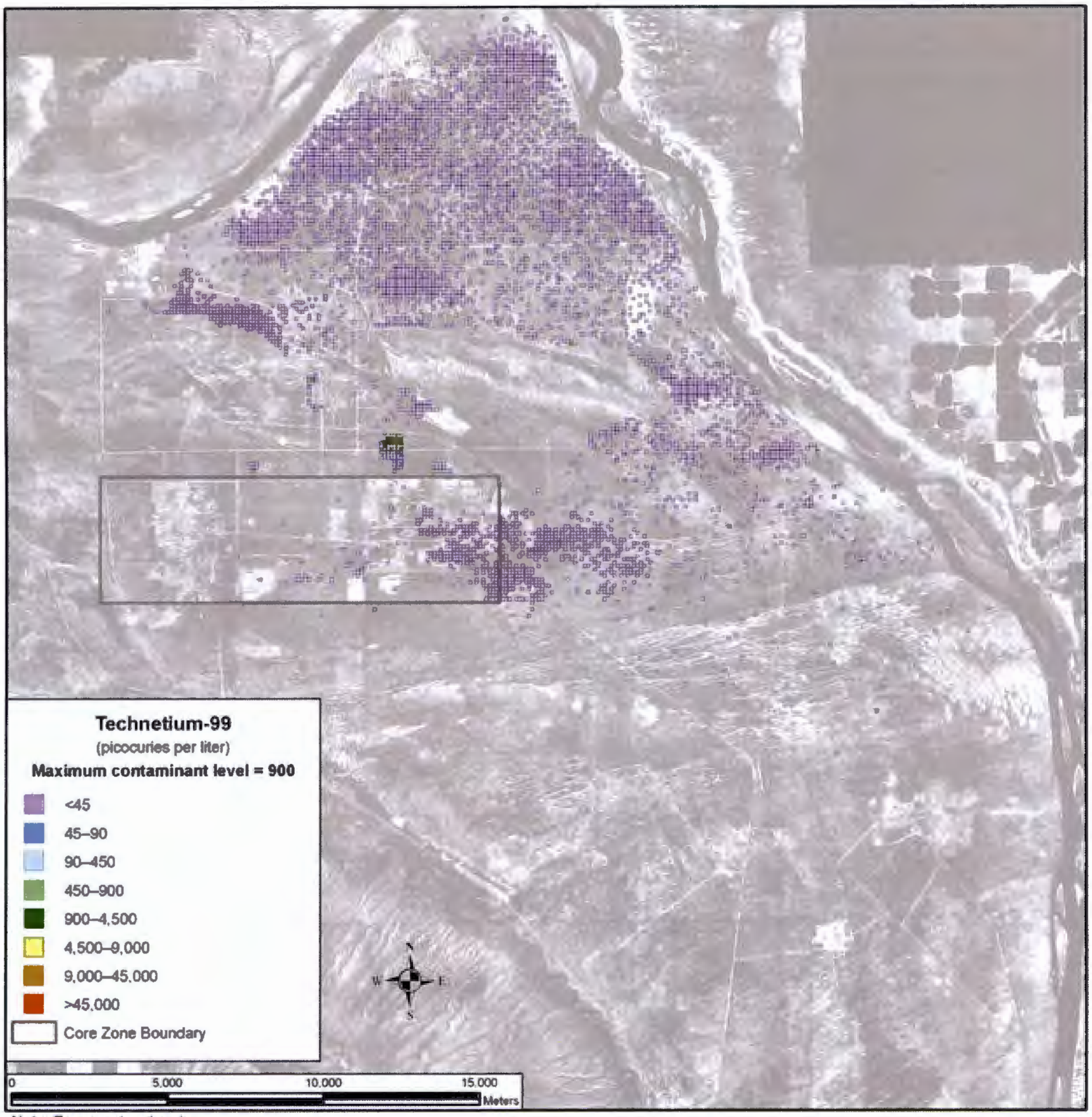
Note: To convert meters to feet, multiply by 3.281

Figure U–21. Spatial Distribution of Groundwater Technetium-99 Concentration (Non–*TC & WM EIS* Sources), Calendar Year 3890



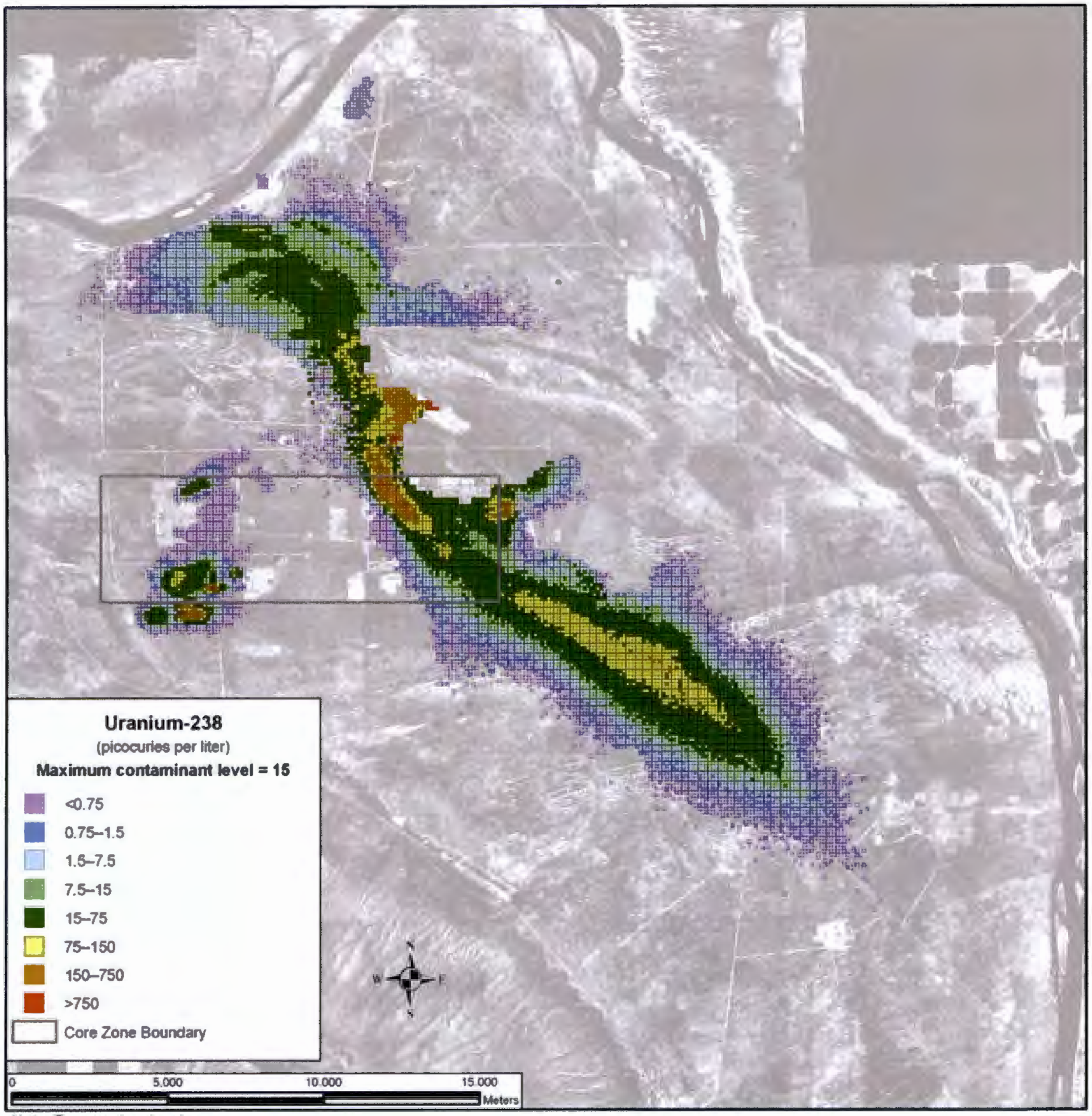
Note: To convert meters to feet, multiply by 3.281

Figure U–22. Spatial Distribution of Groundwater Technetium-99 Concentration (Non–*TC & WM EIS* Sources), Calendar Year 7140



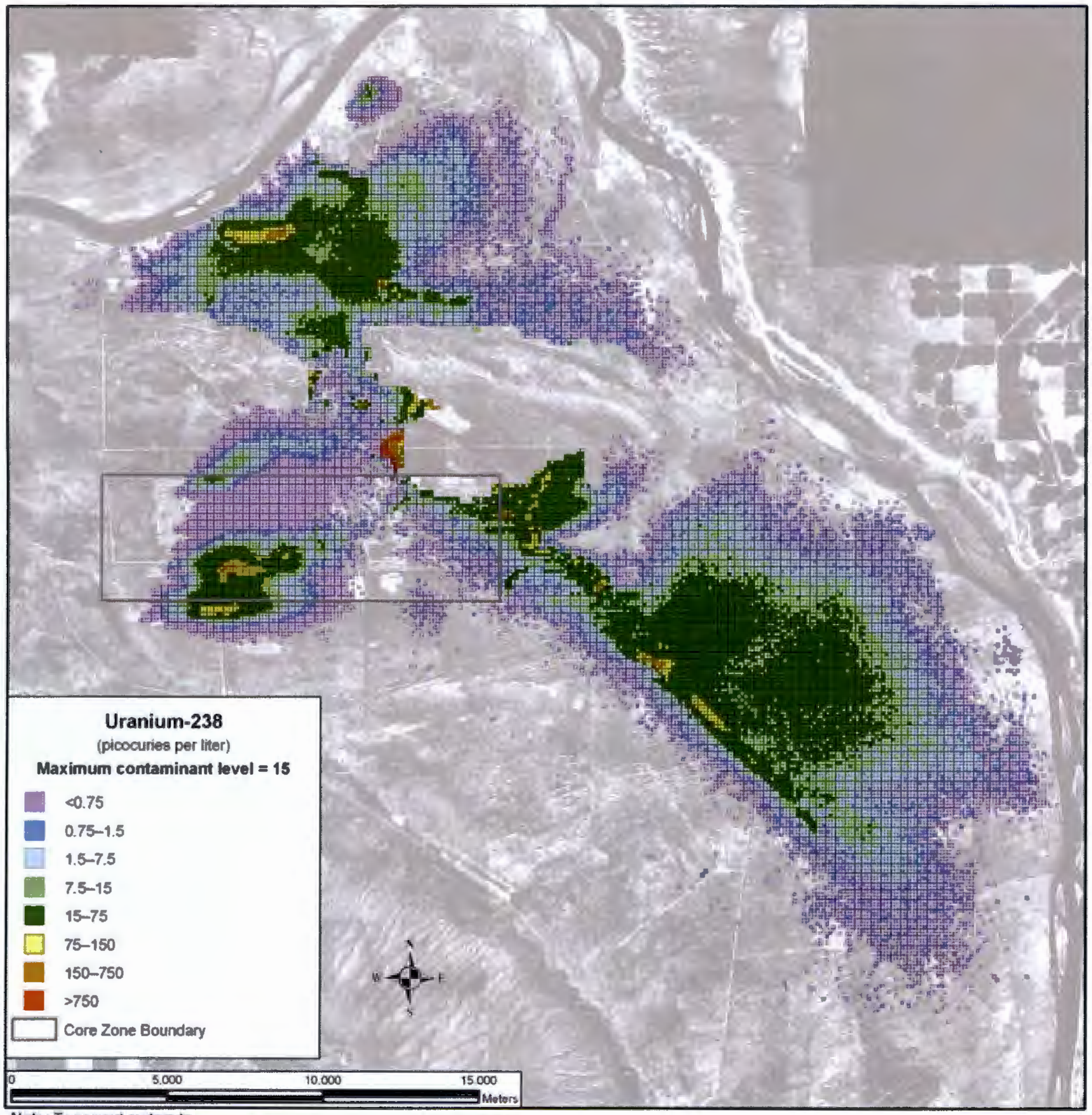
Note: To convert meters to feet, multiply by 3.281

Figure U–23. Spatial Distribution of Groundwater Technetium-99 Concentration (Non–*TC & WM EIS* Sources), Calendar Year 11,885



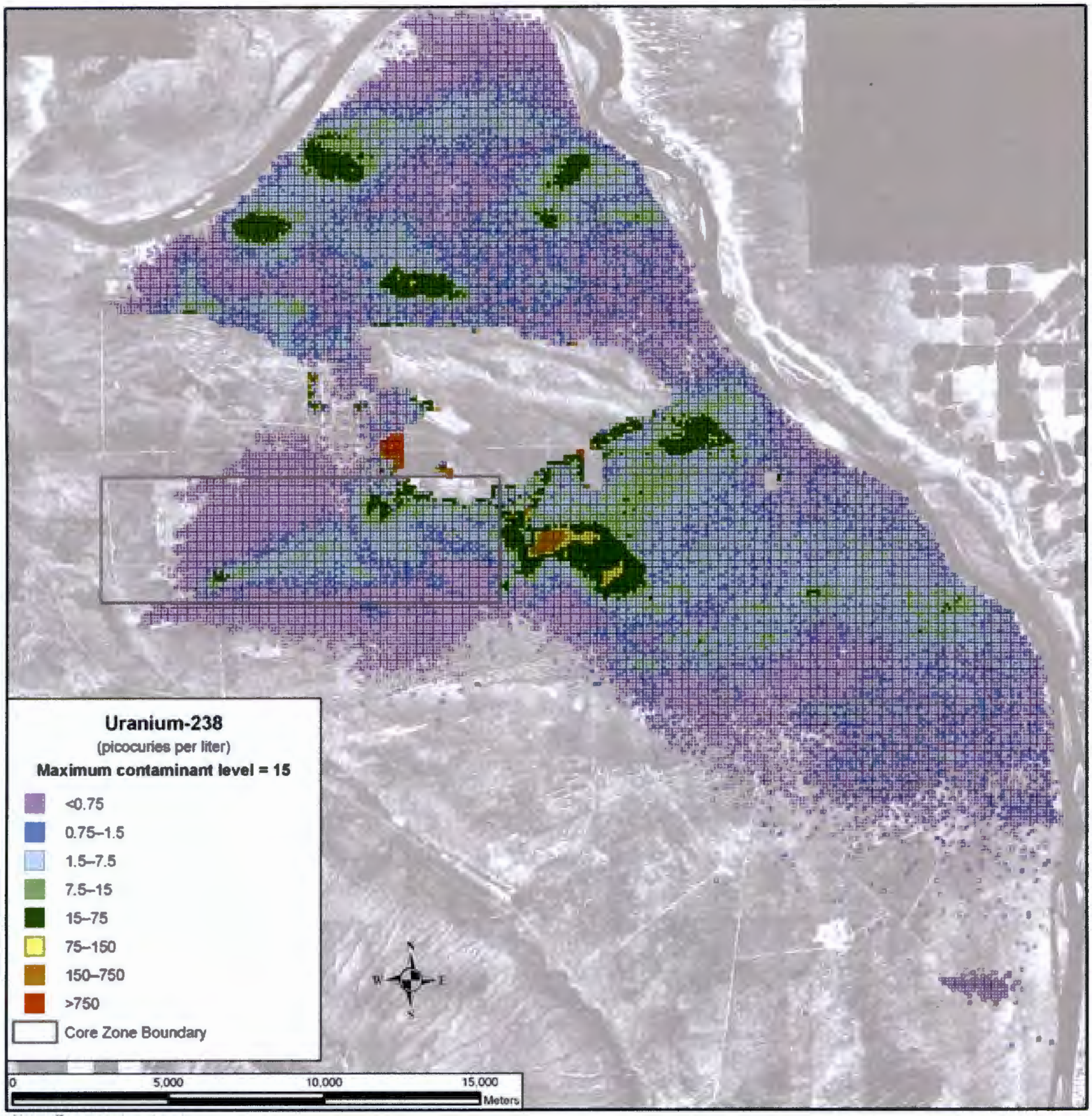
Note: To convert meters to feet, multiply by 3.281

Figure U–24. Spatial Distribution of Groundwater Uranium-238 Concentration (Non–*TC & WM EIS* Sources), Calendar Year 2005



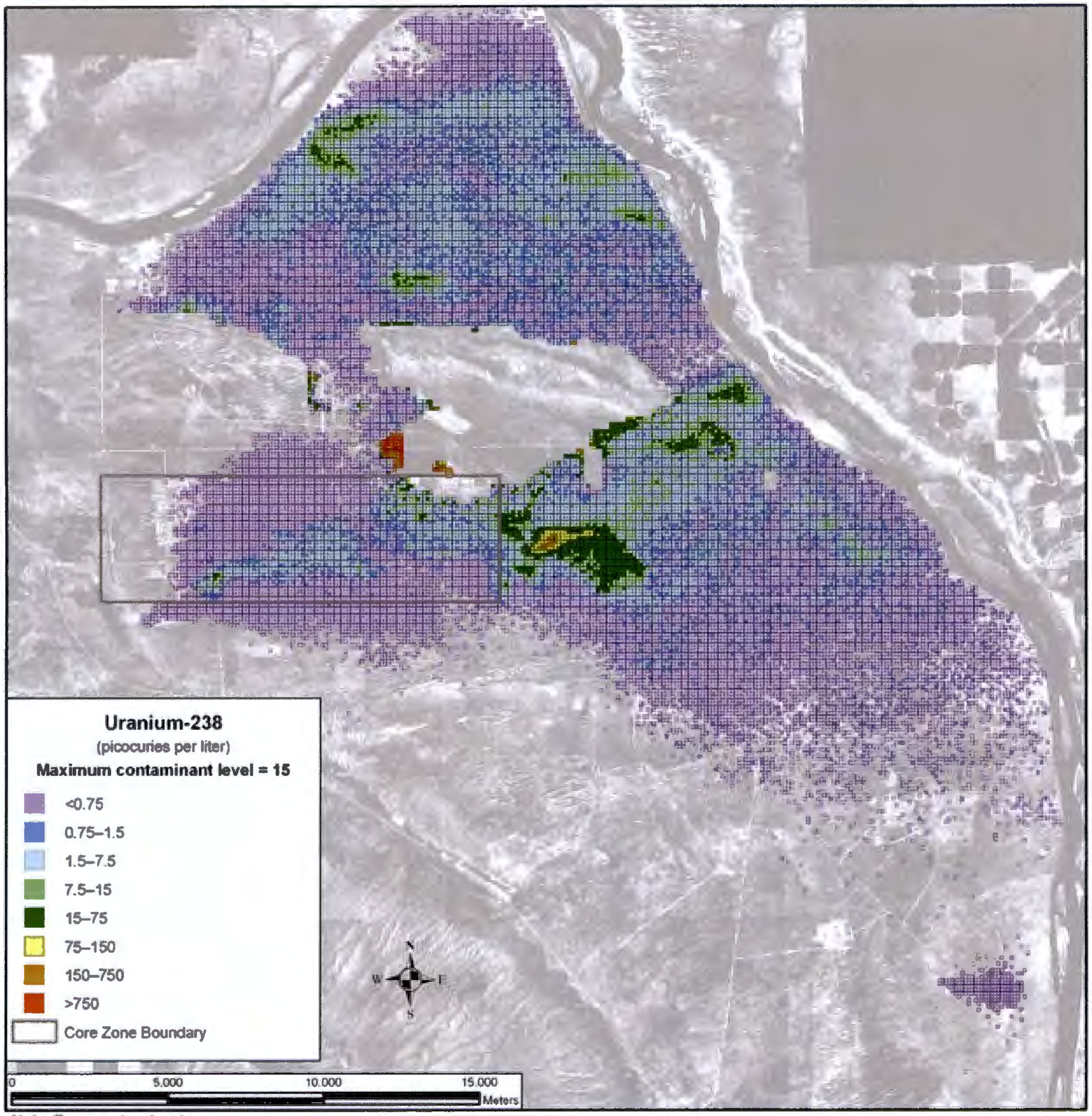
Note: To convert meters to feet, multiply by 3.281

Figure U–25. Spatial Distribution of Groundwater Uranium-238 Concentration (Non–*TC & WM EIS* Sources), Calendar Year 2135



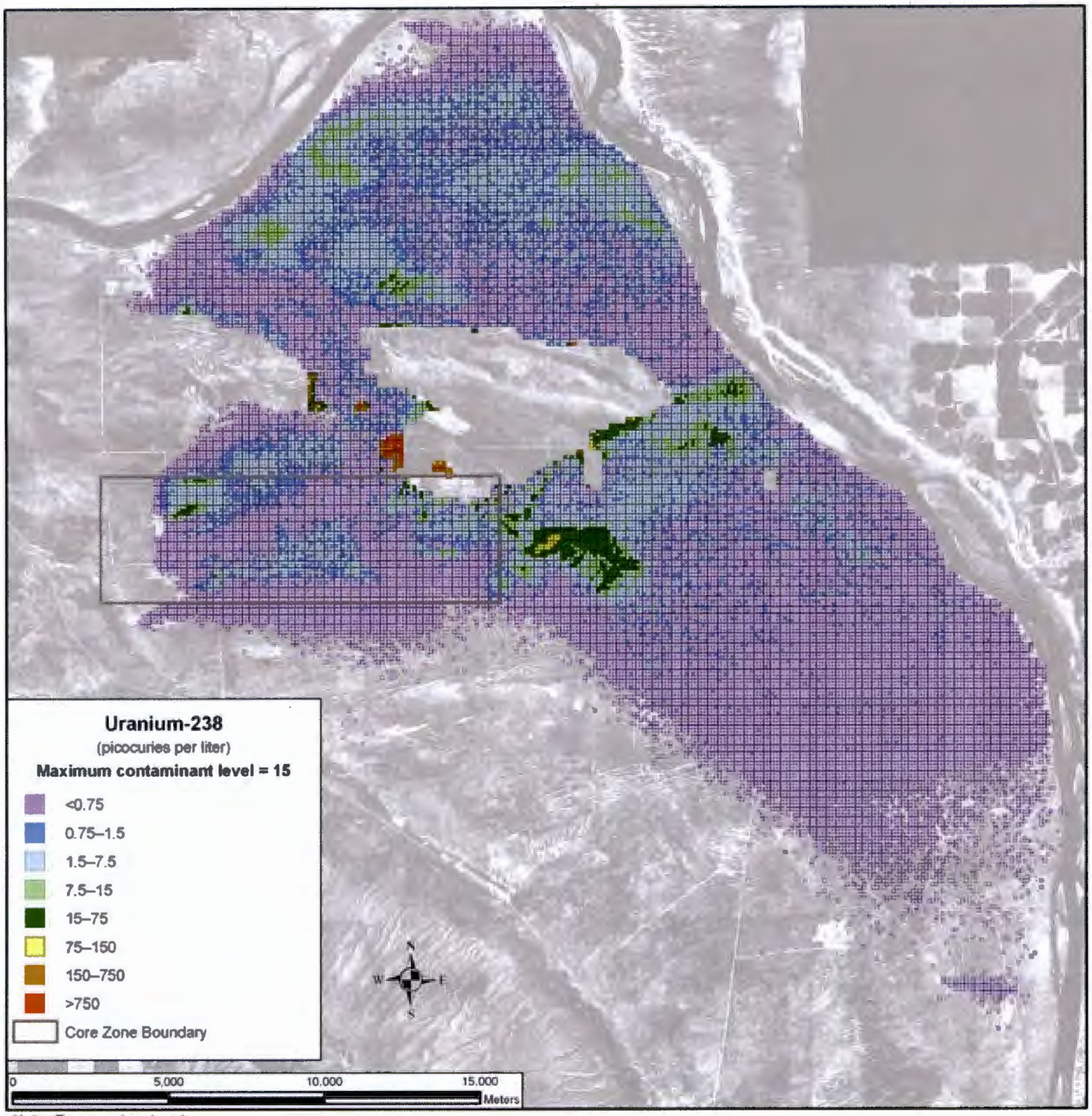
Note: To convert meters to feet, multiply by 3.281

Figure U–26. Spatial Distribution of Groundwater Uranium-238 Concentration (Non–*TC & WM EIS* Sources), Calendar Year 3890



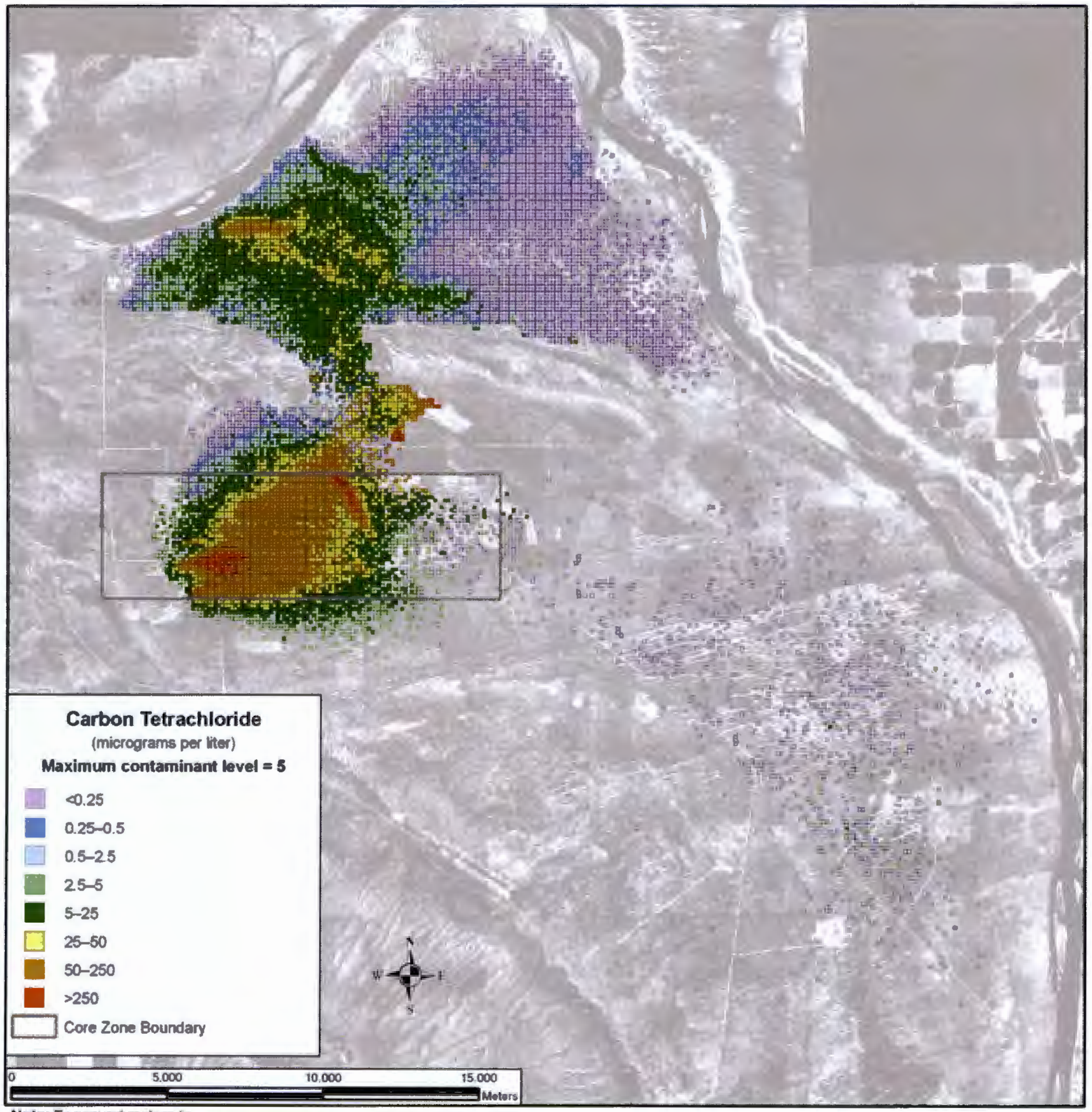
Note: To convert meters to feet, multiply by 3.281

Figure U–27. Spatial Distribution of Groundwater Uranium-238 Concentration (Non–*TC & WM EIS* Sources), Calendar Year 7140



Note: To convert meters to feet, multiply by 3.281

Figure U–28. Spatial Distribution of Groundwater Uranium-238 Concentration (Non–*TC & WM EIS* Sources), Calendar Year 11,885



Note: To convert meters to feet, multiply by 3.281

Figure U–29. Spatial Distribution of Groundwater Carbon Tetrachloride Concentration (Non–*TC & WM EIS* Sources), Calendar Year 2005

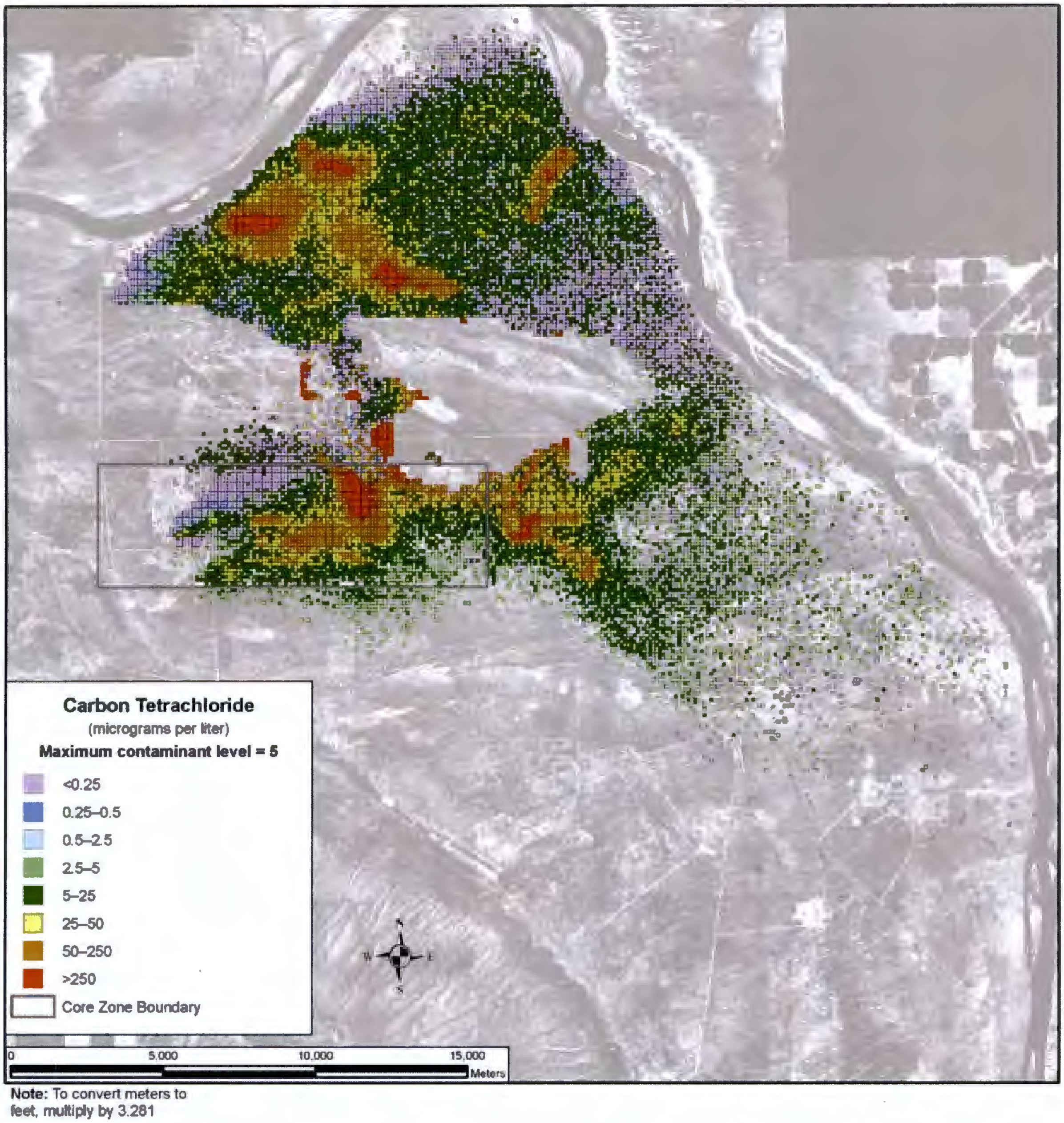
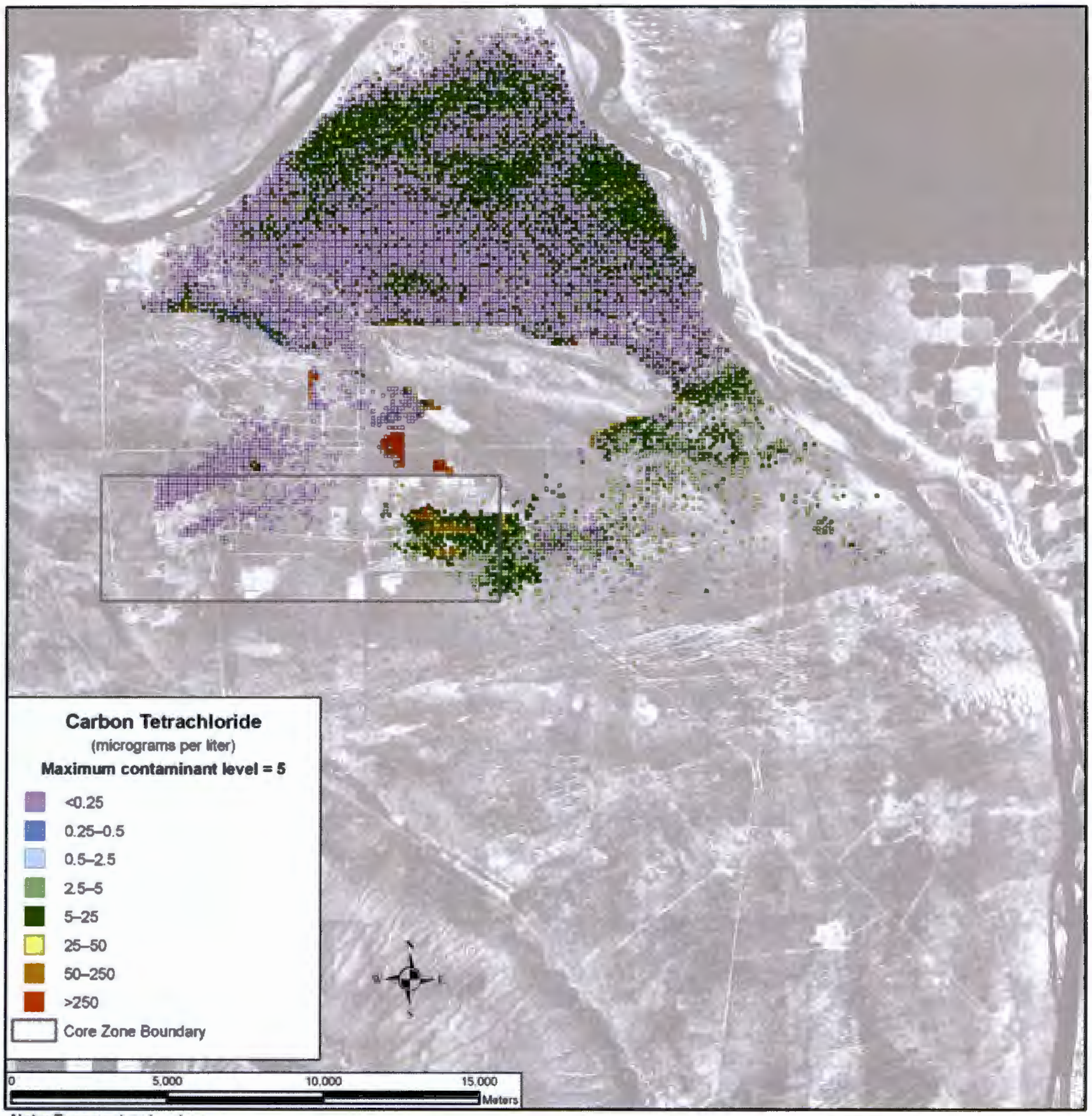
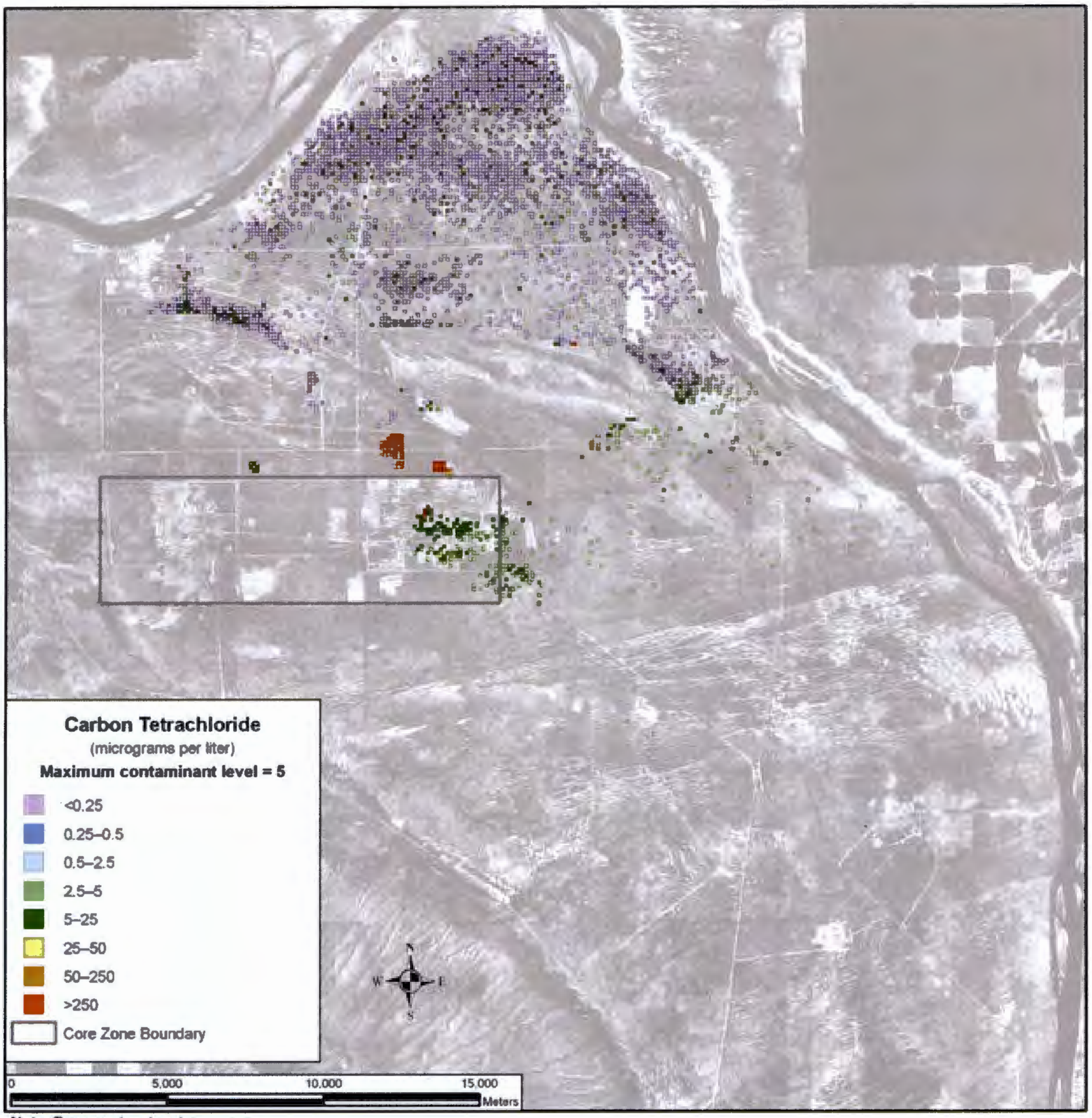


Figure U–30. Spatial Distribution of Groundwater Carbon Tetrachloride Concentration (Non–*TC & WM EIS* Sources), Calendar Year 2135



Note: To convert meters to feet, multiply by 3.281

Figure U–31. Spatial Distribution of Groundwater Carbon Tetrachloride Concentration (Non–*TC & WM EIS* Sources), Calendar Year 3890

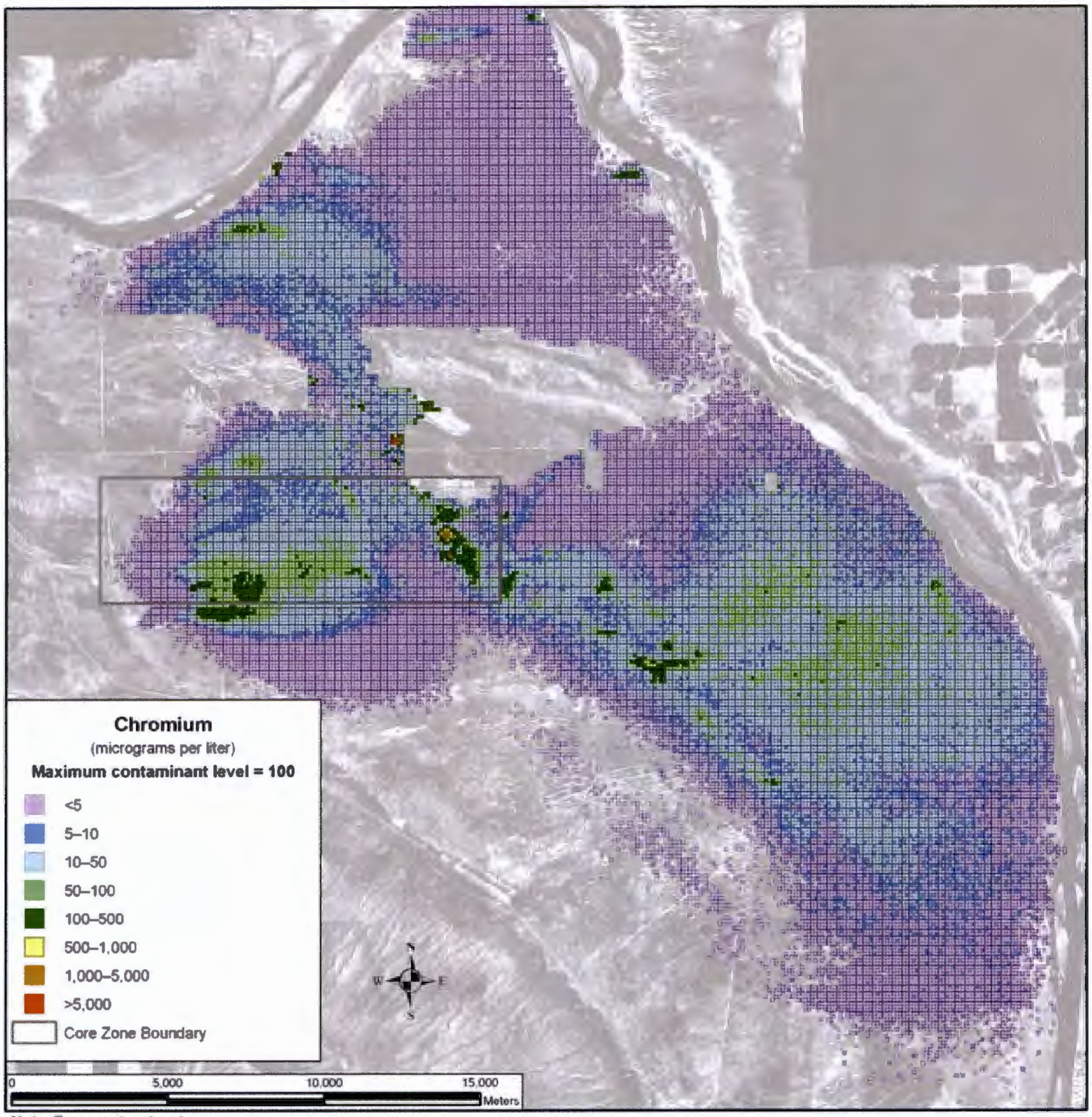


Note: To convert meters to feet, multiply by 3.281

Figure U–32. Spatial Distribution of Groundwater Carbon Tetrachloride Concentration (Non–*TC & WM EIS* Sources), Calendar Year 7140

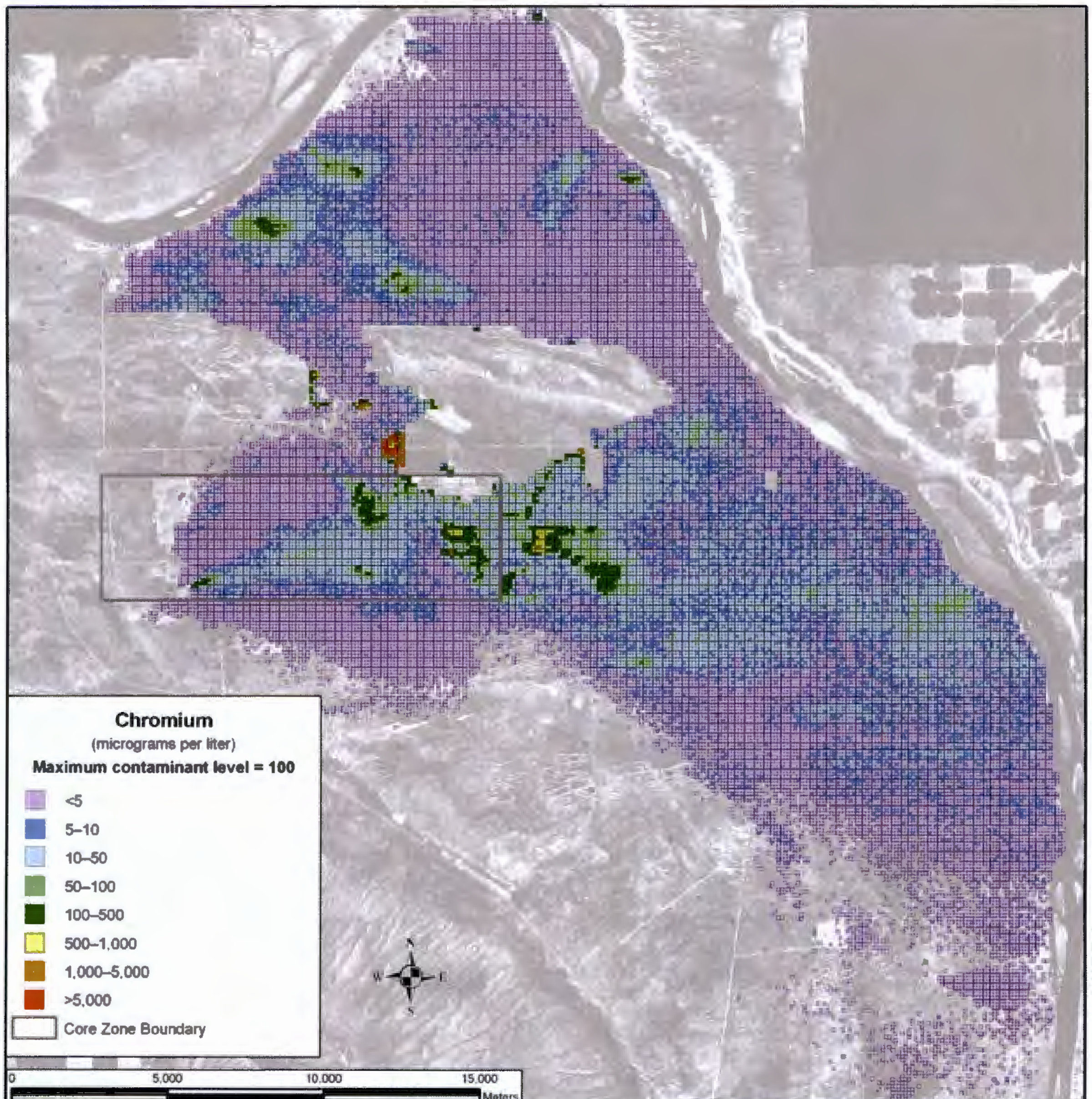
Note: To convert meters to feet, multiply by 3.281

Figure U–33. Spatial Distribution of Groundwater Carbon Tetrachloride Concentration (Non–*TC & WM EIS* Sources), Calendar Year 11,885



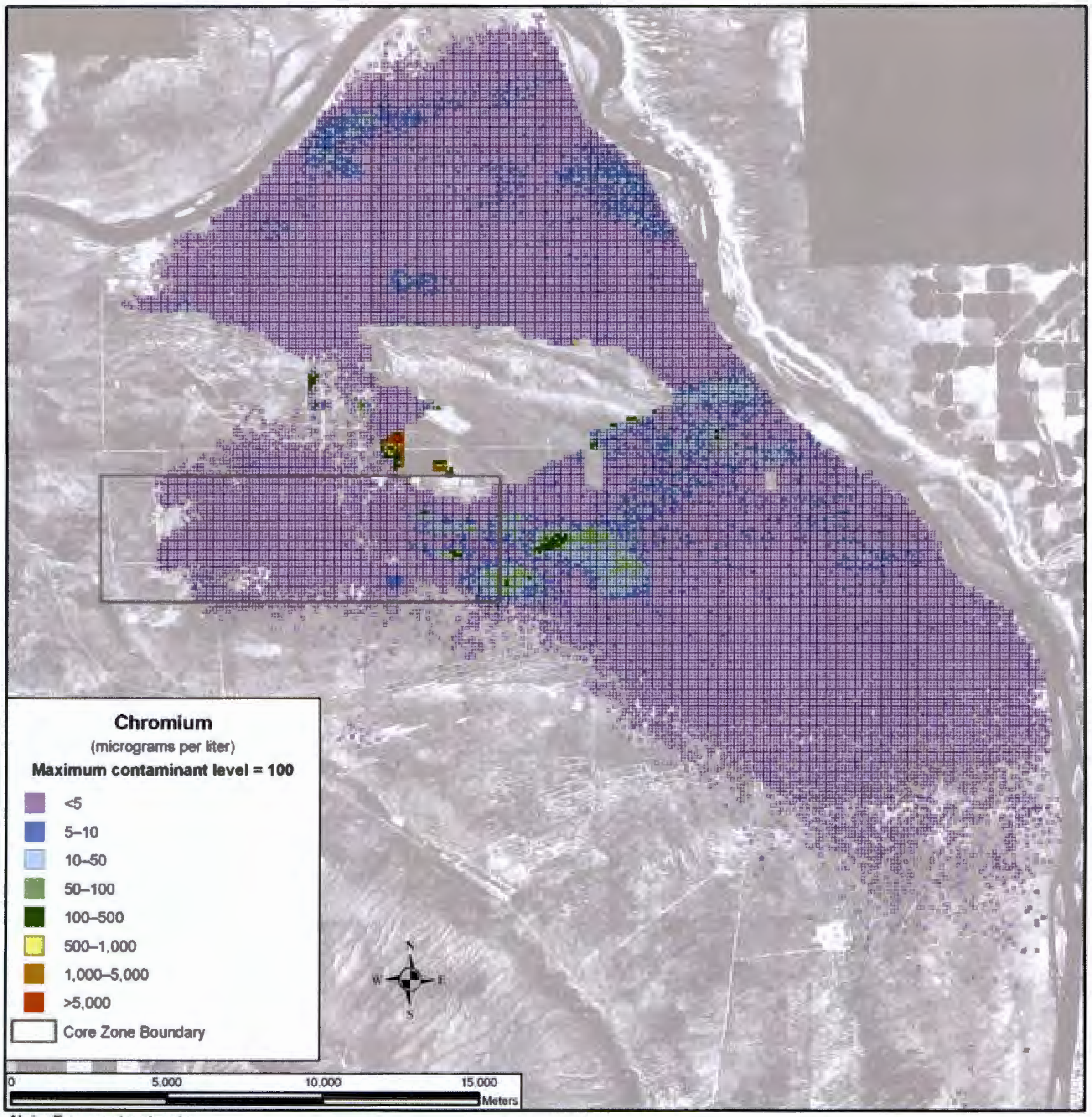
Note: To convert meters to feet, multiply by 3.281

Figure U–34. Spatial Distribution of Groundwater Chromium Concentration (Non–*TC & WM EIS* Sources), Calendar Year 2005



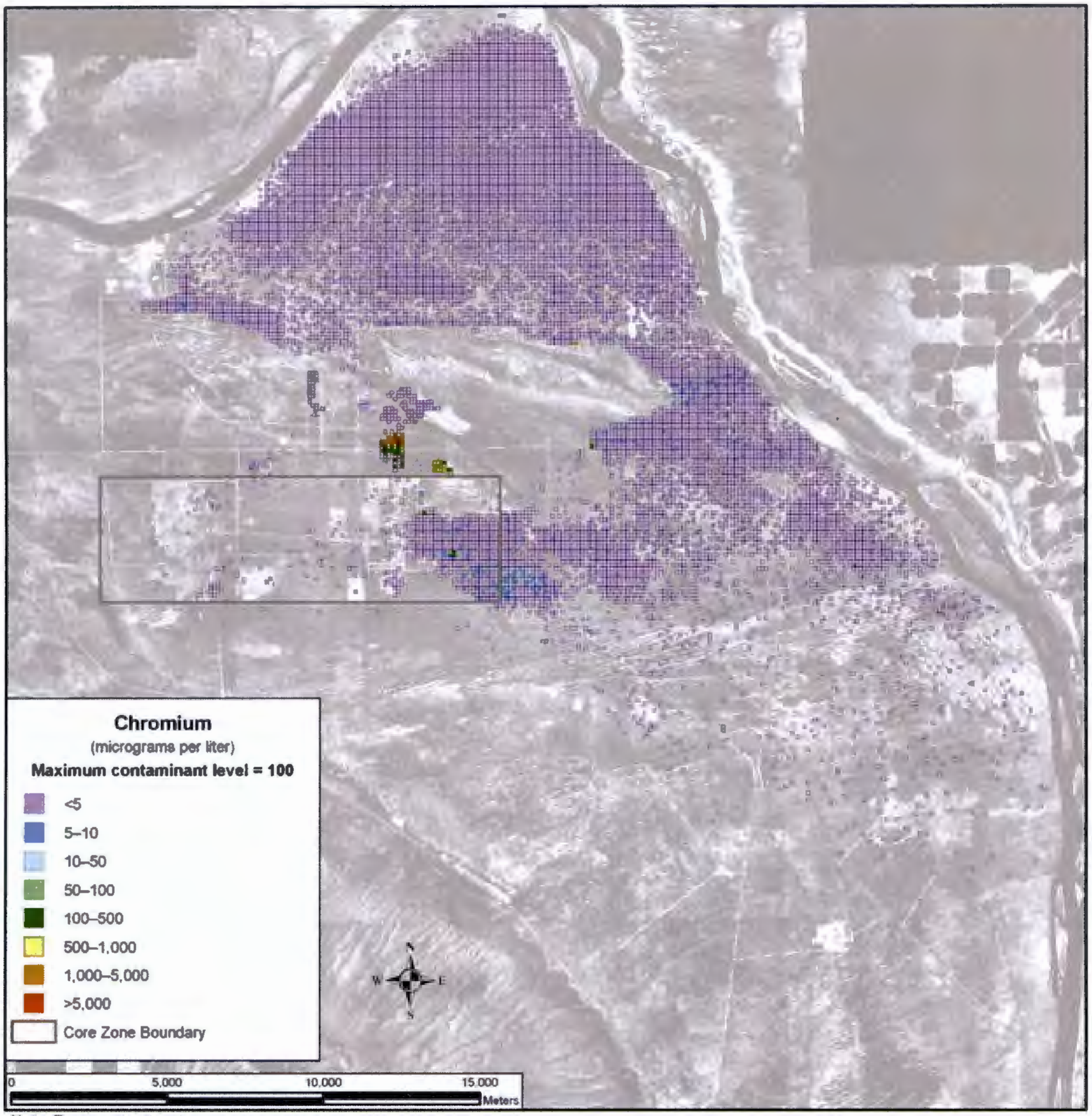
Note: To convert meters to feet, multiply by 3.281

Figure U–35. Spatial Distribution of Groundwater Chromium Concentration (Non–*TC & WM EIS* Sources), Calendar Year 2135



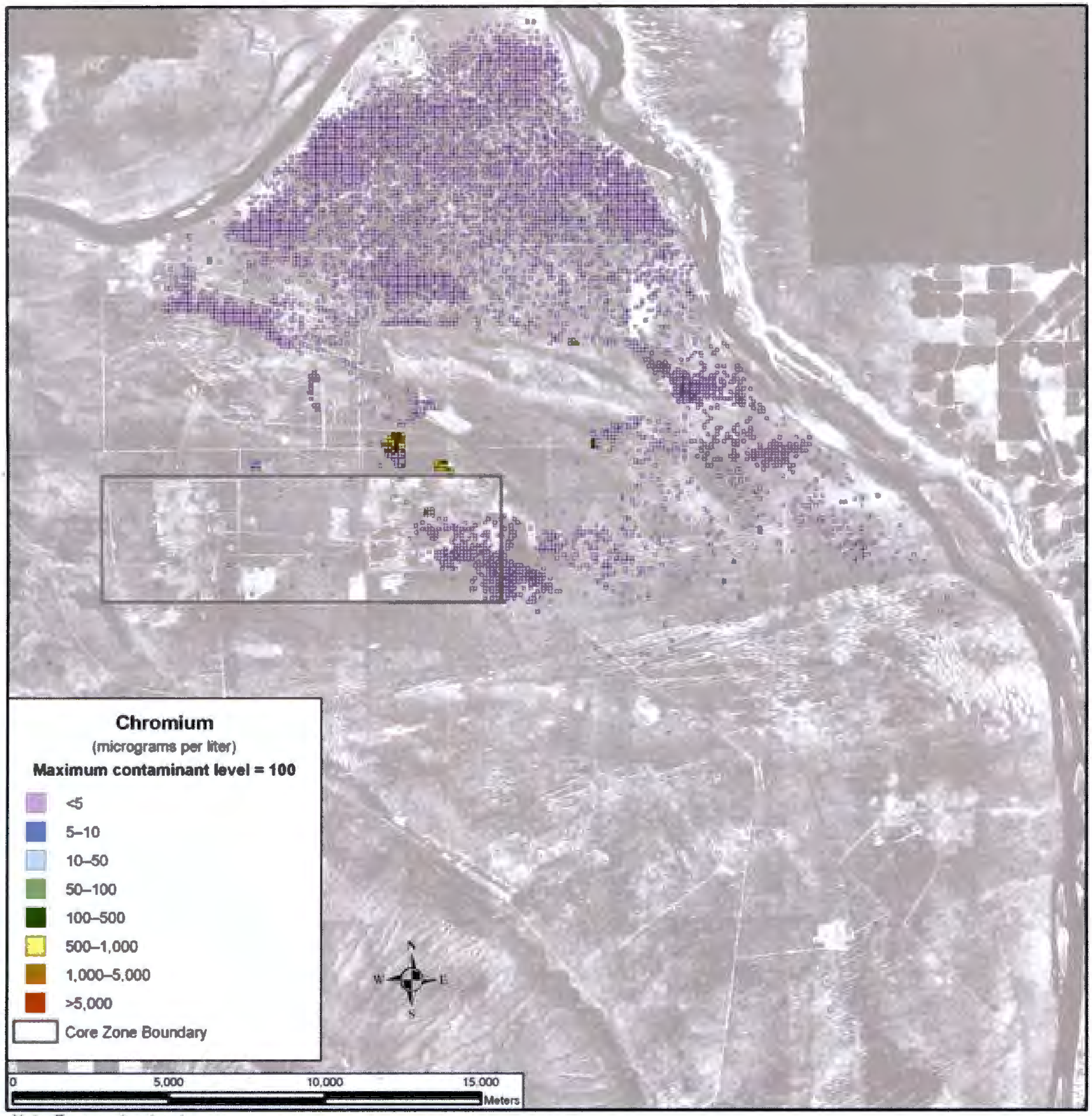
Note: To convert meters to feet, multiply by 3.281

Figure U–36. Spatial Distribution of Groundwater Chromium Concentration (Non–*TC & WM EIS* Sources), Calendar Year 3890



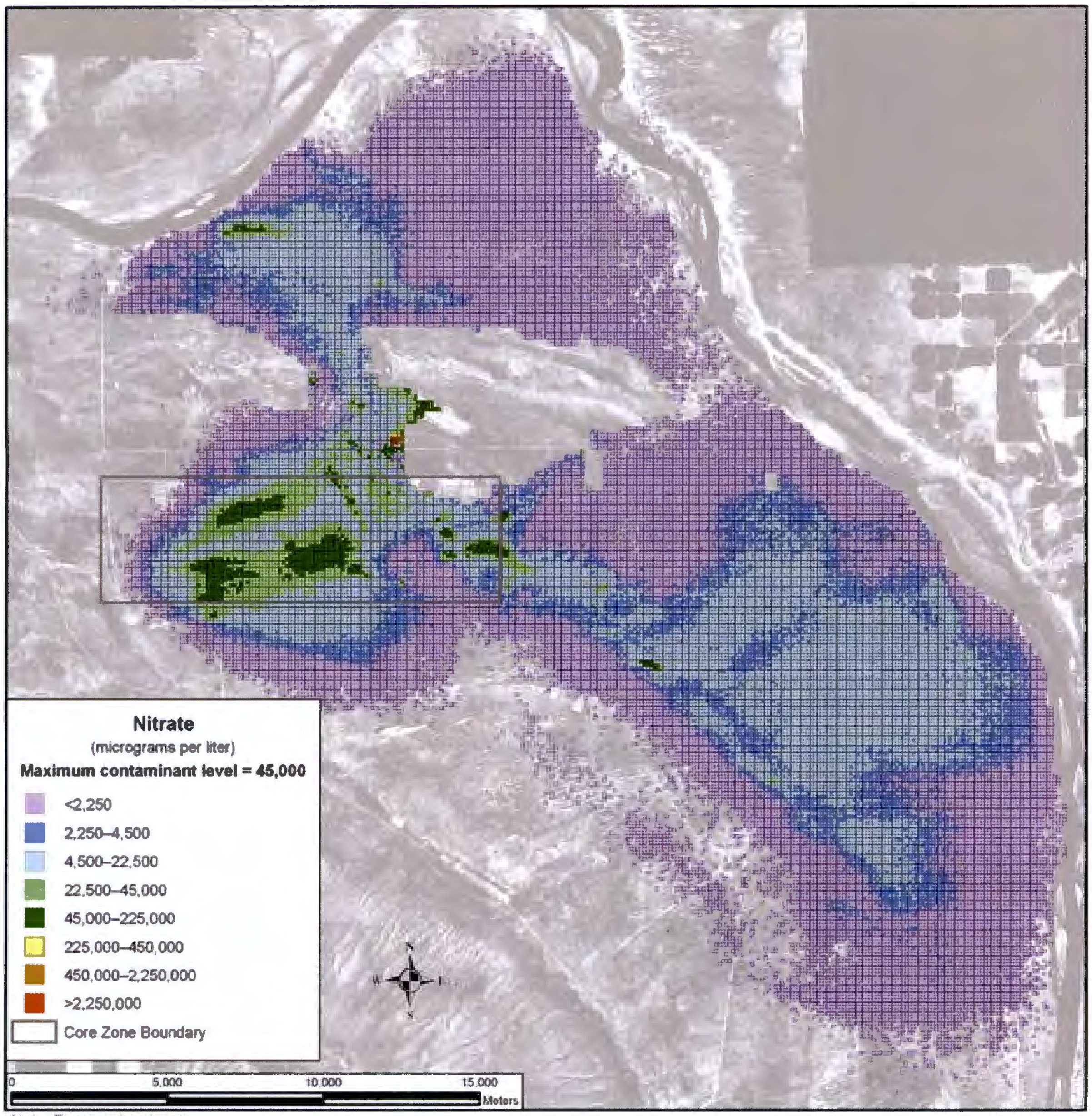
Note: To convert meters to feet, multiply by 3.281

Figure U–37. Spatial Distribution of Groundwater Chromium Concentration (Non–*TC & WM EIS* Sources), Calendar Year 7140



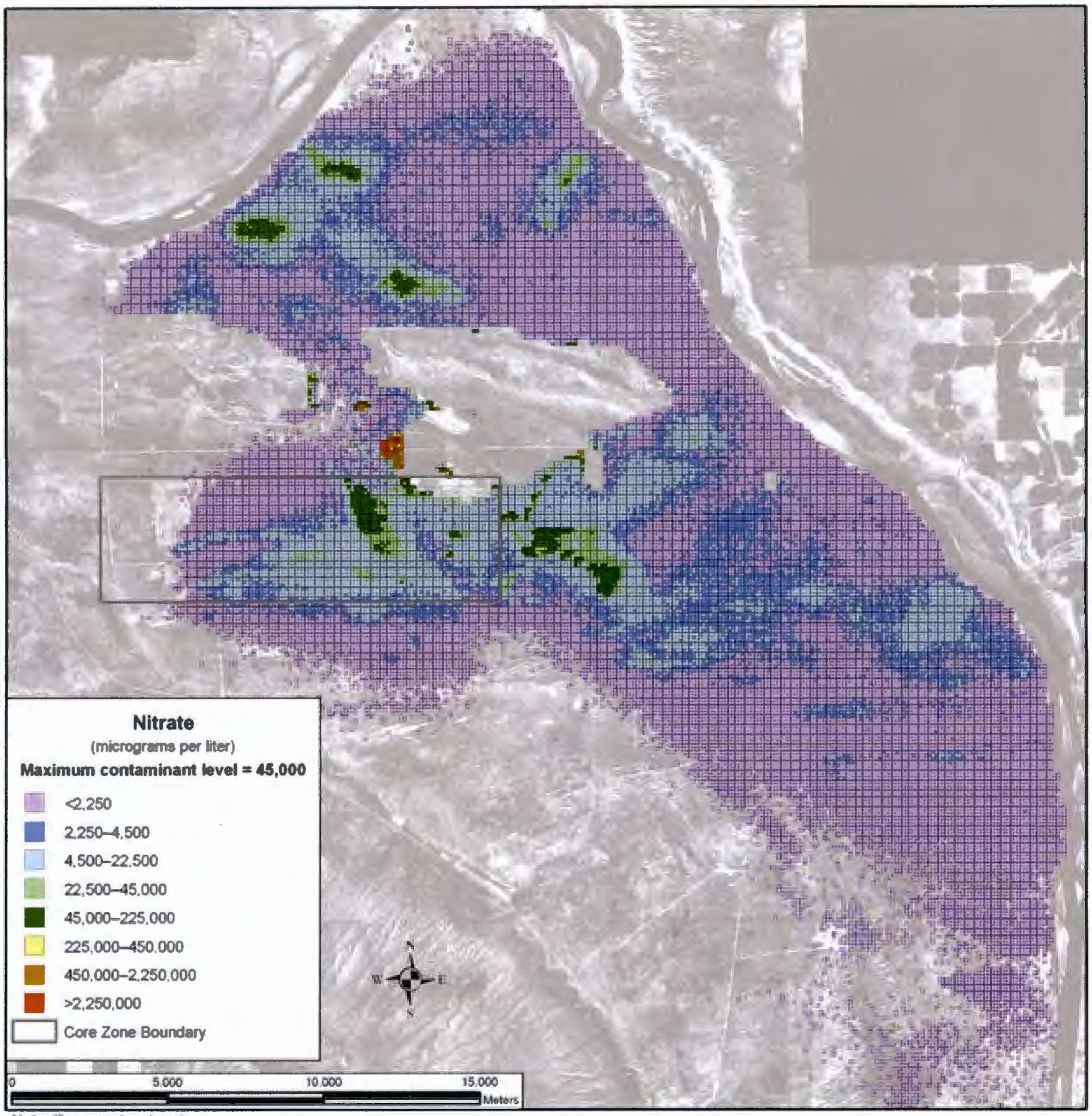
Note: To convert meters to feet, multiply by 3.281

Figure U–38. Spatial Distribution of Groundwater Chromium Concentration (Non–*TC & WM EIS* Sources), Calendar Year 11,885



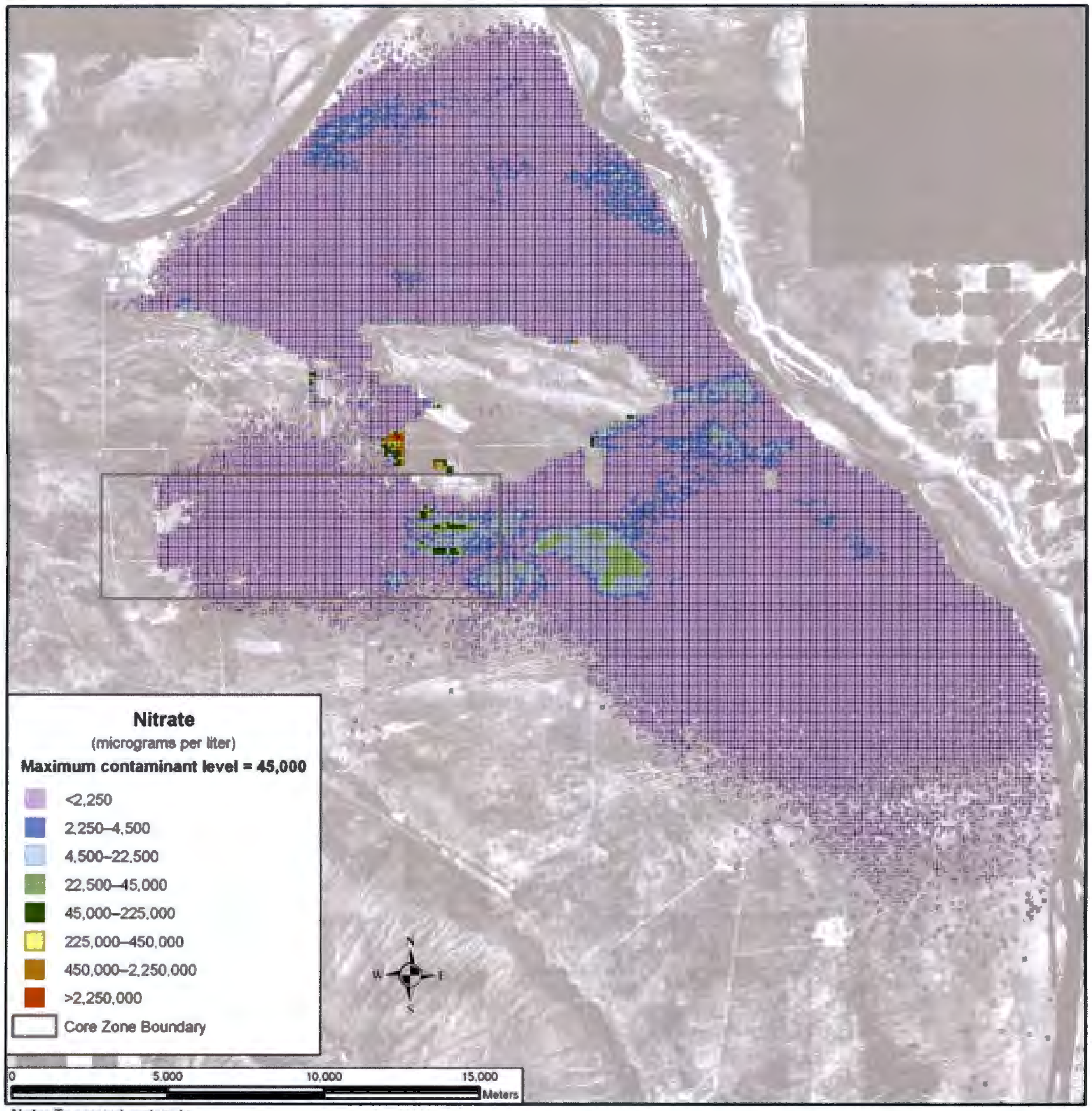
Note: To convert meters to feet, multiply by 3.281

Figure U–39. Spatial Distribution of Groundwater Nitrate Concentration (Non–*TC & WM EIS* Sources), Calendar Year 2005



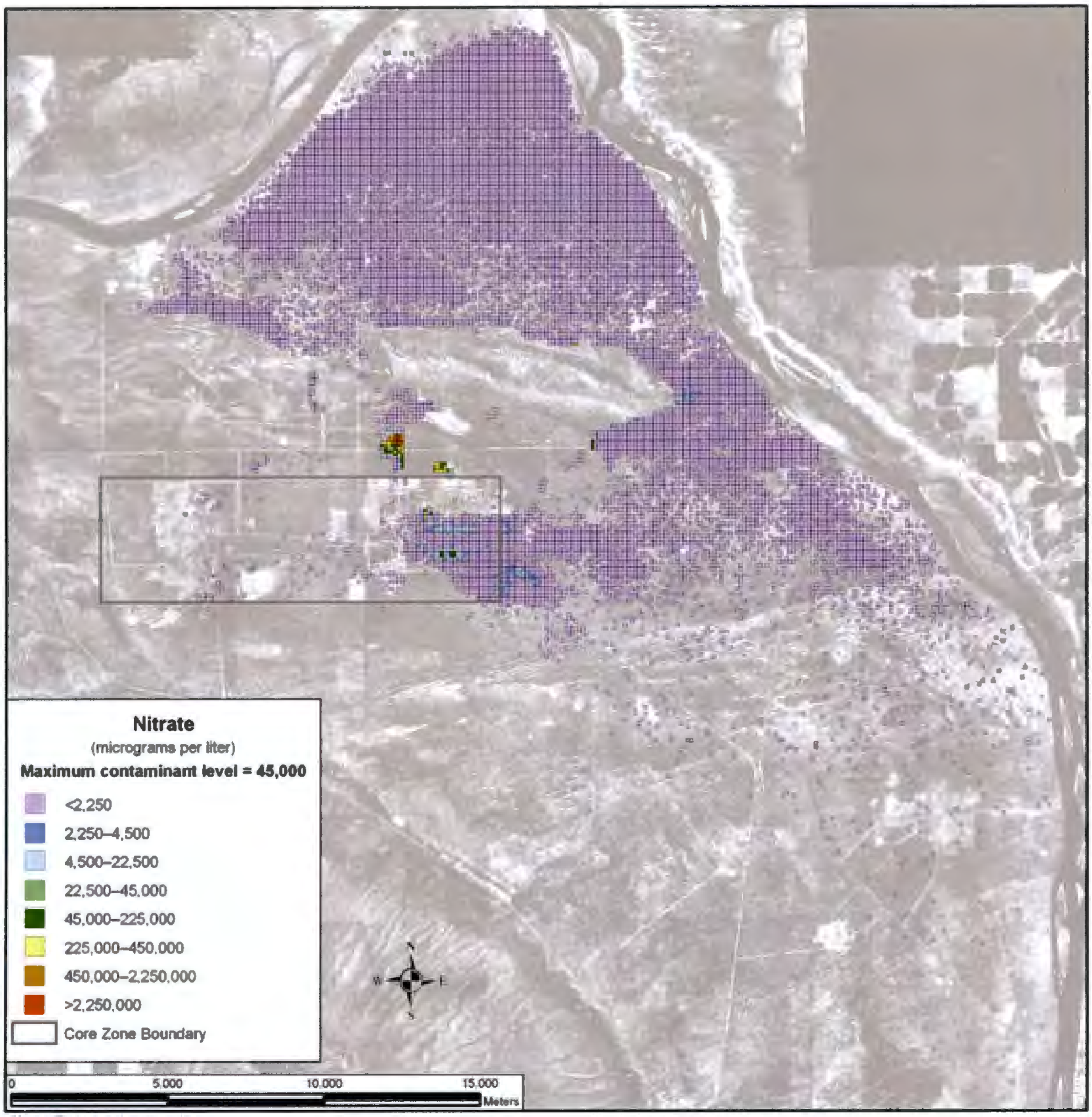
Note: To convert meters to feet, multiply by 3.281

Figure U–40. Spatial Distribution of Groundwater Nitrate Concentration (Non–*TC & WM EIS* Sources), Calendar Year 2135



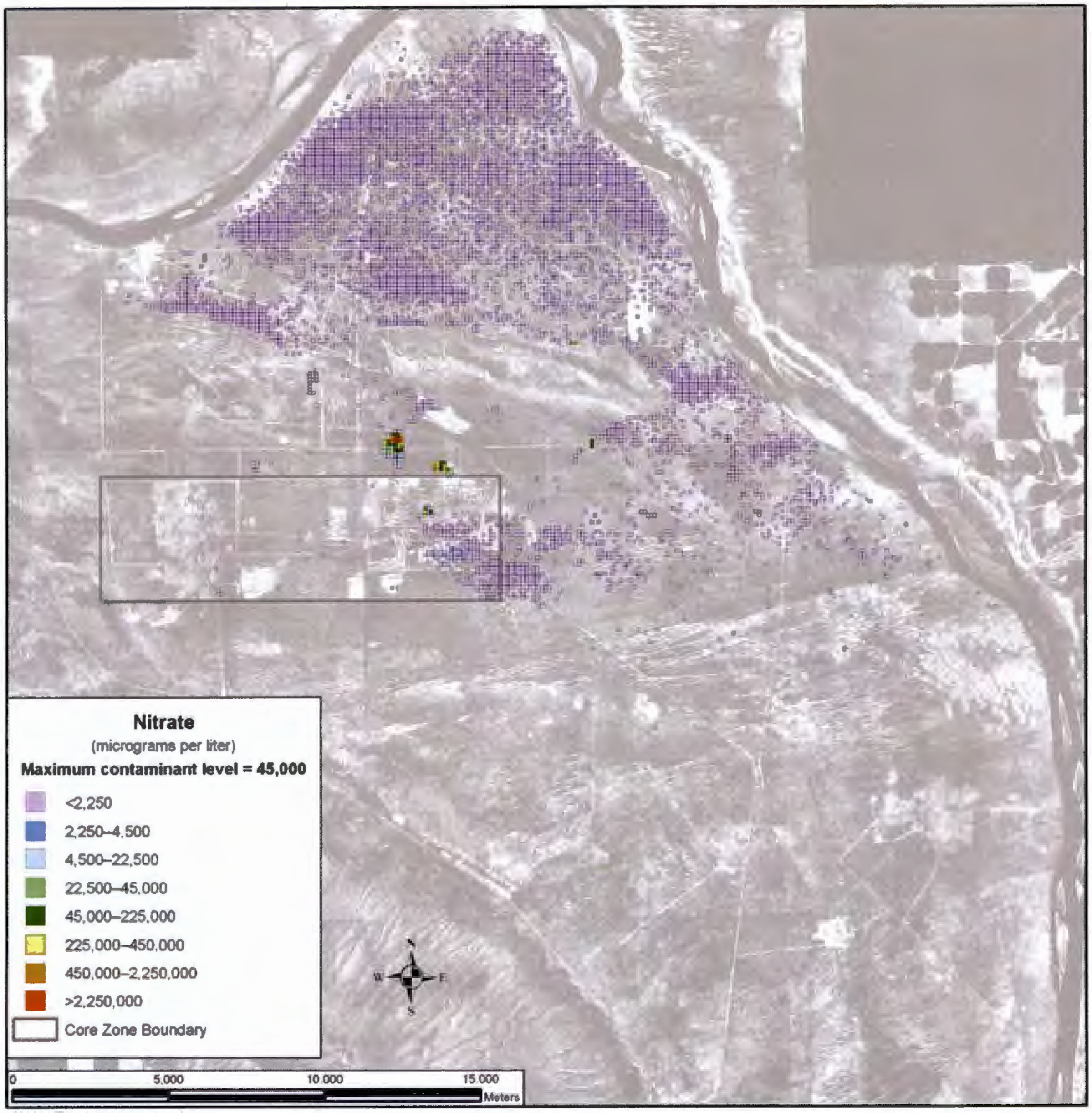
Note: To convert meters to feet, multiply by 3.281

Figure U–41. Spatial Distribution of Groundwater Nitrate Concentration (Non–*TC & WM EIS* Sources), Calendar Year 3890



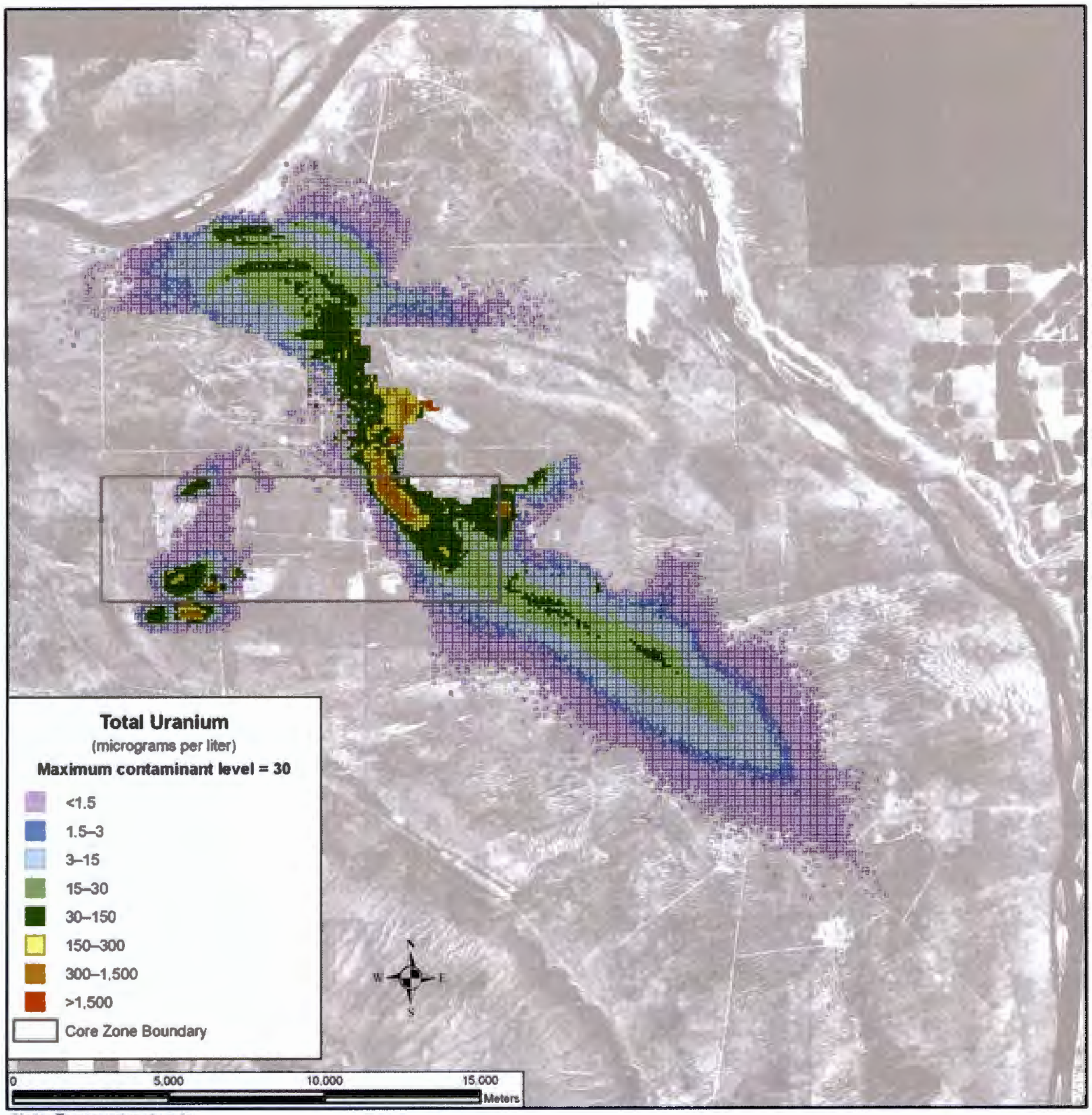
Note: To convert meters to feet, multiply by 3.281

Figure U–42. Spatial Distribution of Groundwater Nitrate Concentration (Non–*TC & WM EIS* Sources), Calendar Year 7140



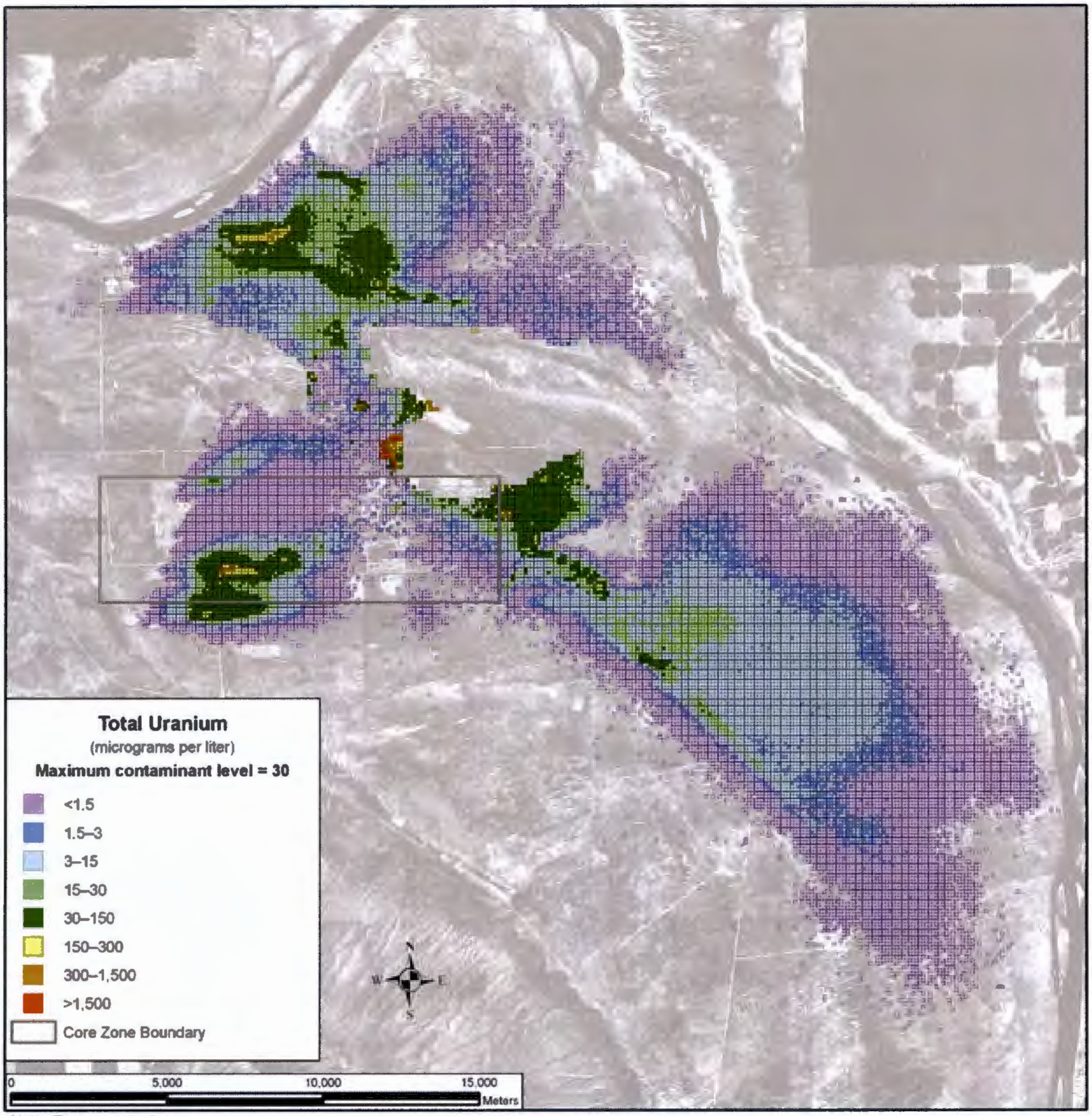
Note: To convert meters to feet, multiply by 3.281

Figure U–43. Spatial Distribution of Groundwater Nitrate Concentration (Non–*TC & WM EIS* Sources), Calendar Year 11,885



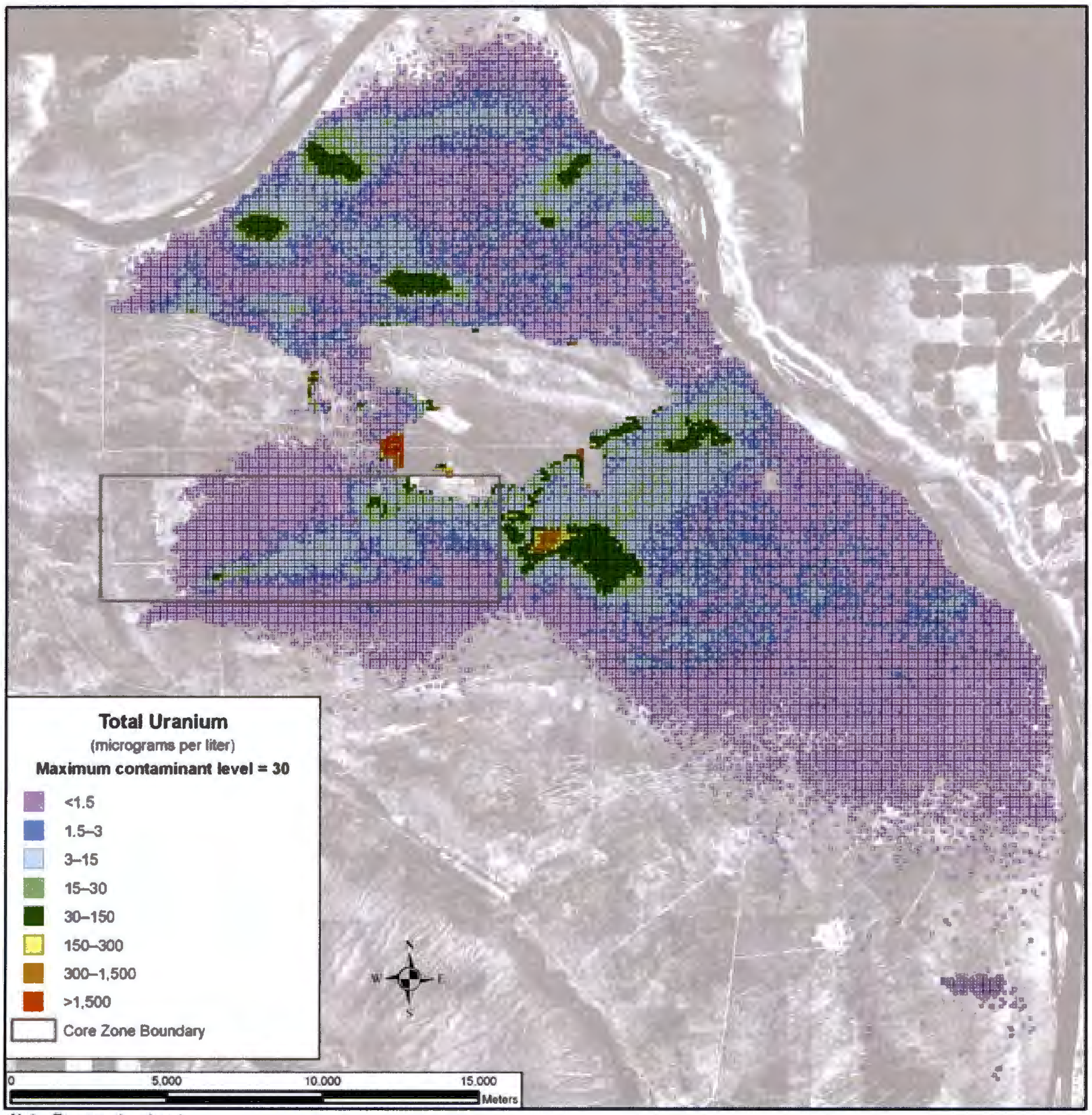
Note: To convert meters to feet, multiply by 3.281

Figure U–44. Spatial Distribution of Groundwater Total Uranium Concentration (Non–*TC & WM EIS* Sources), Calendar Year 2005



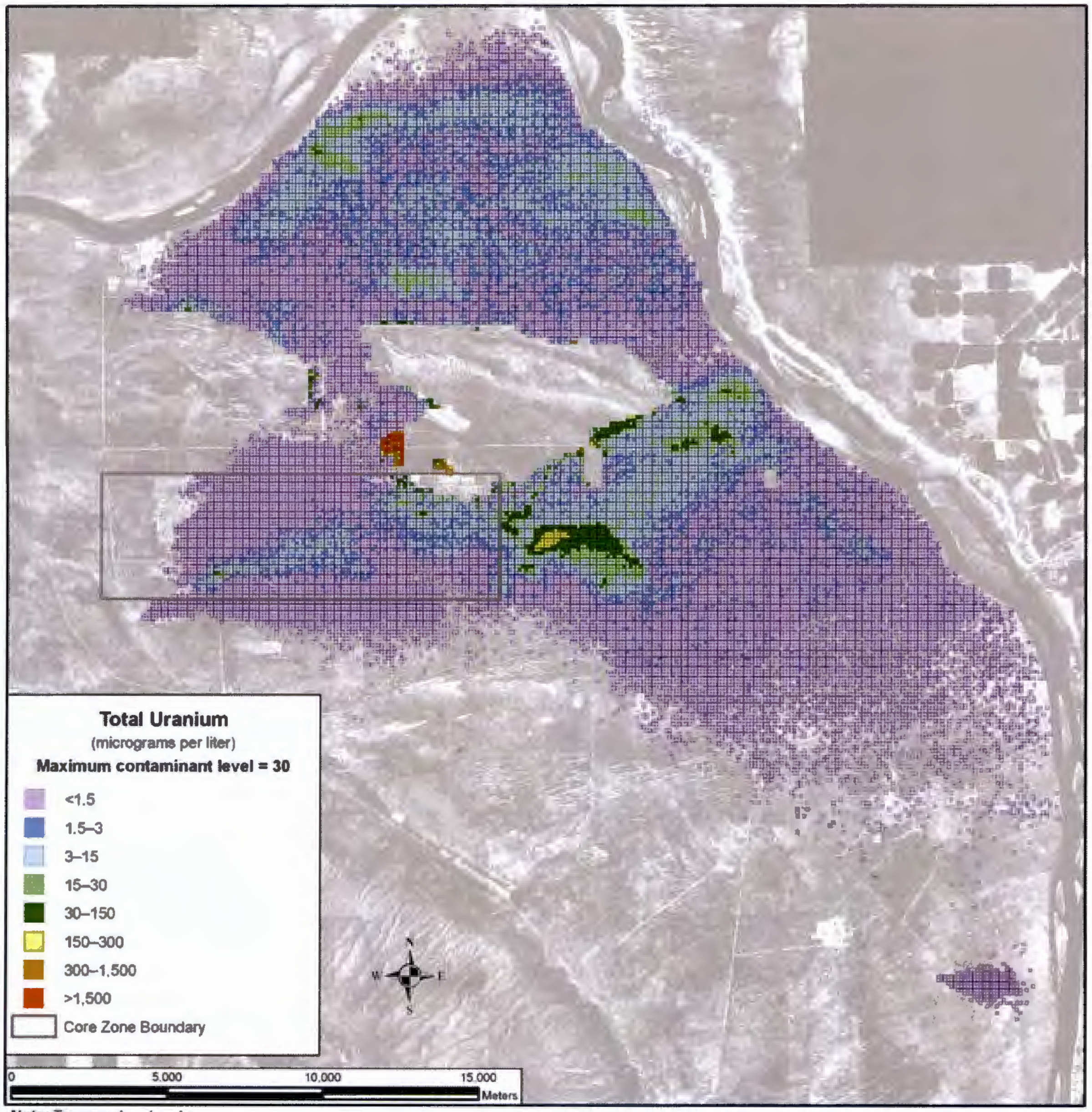
Note: To convert meters to feet, multiply by 3.281

Figure U–45. Spatial Distribution of Groundwater Total Uranium Concentration (Non–*TC & WM EIS* Sources), Calendar Year 2135



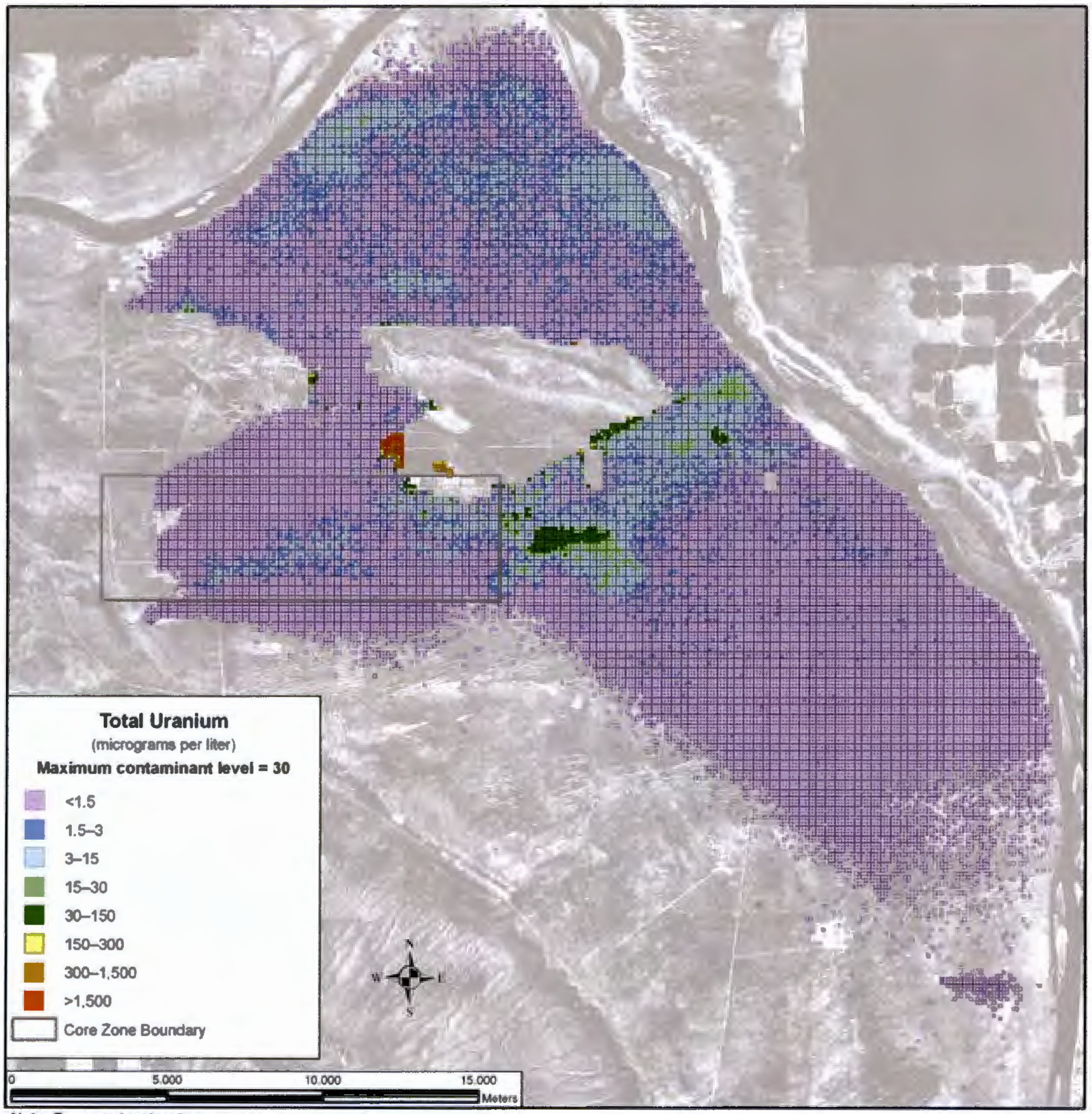
Note: To convert meters to feet, multiply by 3.281

Figure U–46. Spatial Distribution of Groundwater Total Uranium Concentration (Non–*TC & WM EIS* Sources), Calendar Year 3890



Note: To convert meters to feet, multiply by 3.281

Figure U–47. Spatial Distribution of Groundwater Total Uranium Concentration (Non–*TC & WM EIS* Sources), Calendar Year 7140



Note: To convert meters to feet, multiply by 3.281

Figure U–48. Spatial Distribution of Groundwater Total Uranium Concentration (Non–*TC & WM EIS* Sources), Calendar Year 11,885

U.2 HUMAN HEALTH

This section presents the results of the long-term cumulative impacts analysis for human health. The same methodology used for the alternatives analysis was used to analyze cumulative impacts. A description of this methodology is presented in Appendix Q.

The long-term human health impacts due to release of radionuclides are estimated as dose and as lifetime risk of incidence of cancer. Potential human health impacts due to release of chemical constituents include both carcinogenic effects and other forms of toxicity. Impacts of carcinogenic chemicals are estimated as lifetime risk of incidence of cancer. Noncarcinogenic effects are estimated as a Hazard Quotient, the ratio of the long-term intake of an individual chemical to the intake that produces no observable effect, and as a Hazard Index, the sum of the Hazard Quotient of a group of individual chemical constituents.

As with the individual alternatives, four measures of human health impacts are considered in this analysis—lifetime risk of developing cancer from radiological constituents, lifetime risk of developing cancer from chemical constituents, dose from radiological constituents, and Hazard Index from chemical constituents. These measures are calculated each year for 10,000 years for applicable receptors at three locations of analysis (i.e., Core Zone Boundary, Columbia River nearshore, and Columbia River surface water). This is a large amount of information that must be summarized to allow interpretation of results. The method chosen is to present dose for the year of maximum dose, risk for the year of maximum risk, and Hazard Index for the year of maximum Hazard Index. This choice is based on regulation of radiological impacts as dose and the observation that peak risk and peak noncarcinogenic impacts expressed as Hazard Index may occur at times other than that of peak dose.

The three onsite locations of analysis are the Core Zone Boundary, the Columbia River nearshore, and the Columbia River. The offsite location of analysis is for population centers downstream of the site. The total offsite population is assumed to be 5 million people.

Consistent with DOE guidance (DOE Guide 435.1-1), the potential consequences of loss of administrative or institutional control are considered by estimations of impacts on onsite receptors. Because DOE does not anticipate loss of control of the site, these onsite receptors are considered hypothetical and are used to develop estimates for past and future periods of time.

Four types of receptors are considered. The first type, a drinking-water well user, uses groundwater as a source of drinking water. The second type, a resident farmer, uses groundwater for drinking water consumption and irrigation of crops. Garden size and crop yield are adequate to produce approximately 25 percent of average requirements of crops and animal products. The third type, an American Indian resident farmer, also uses groundwater for drinking water consumption and irrigation of crops. Garden size and crop yield are adequate to produce the entirety of average requirements of crops and animal products. The fourth type, an American Indian hunter-gatherer, is impacted by both groundwater and surface water because he drinks surface water and consumes both wild plant materials, which use groundwater, and game animals, which use surface water.

The significance of dose impacts is evaluated by comparison against the 100-millirem-per-year all-pathway standard specified for protection of the public and the environment in DOE Order 5400.5. The level of protection provided for the drinking water pathway is evaluated by comparison against applicable drinking water standards presented in Chapter 5, Section 5.1.1. The significance of noncarcinogenic chemical health effects is evaluated by comparison against a Hazard Index guideline value of less than unity.

Potential human health impacts of the past, present, and reasonably foreseeable future actions (non–*TC & WM EIS* actions) are summarized in Tables U–3 through U–5. The key radiological constituent contributors to human health risk are tritium, carbon-14, strontium-90, technetium-99, iodine-129, cesium-137, uranium isotopes, neptunium-237, and plutonium isotopes. The chemical risk and hazard drivers are 1-butanol, carbon tetrachloride, chromium, fluoride, hydrazine/hydrazine sulfate, manganese, mercury, nickel (soluble salts), nitrate, total uranium, and trichloroethylene. As shown in Tables U–3 through U–5, the peak radiological dose and risk have already occurred for all locations and all receptors. For the peak Hazard Index and nonradiological risk, the peak has either already occurred or would occur between the years 2200 and 2500. For the period of time prior to calendar year 2000, lifetime radiological risks for the year of peak risk at the Core Zone Boundary and Columbia River locations were high, approaching unity. For the period after calendar year 2000, risks remain high, with values between 1×10^{-3} and 1×10^{-2}. The estimate of radiological dose for the years of peak dose for the offsite population is 215 person-rem per year, approximately 0.01 percent of the average background dose.

Table U–3. Human Health Impacts of Past, Present, and Reasonably Foreseeable Future Non–*TC & WM EIS* Actions at the Core Zone Boundary

	Drinking-Water Well User			Resident Farmer			American Indian Resident Farmer		
Radioactive Constituent	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)
Hydrogen-3 (tritium)	1.04×10^{-1}	1.22×10^{4}	1.16×10^{-1}	1.04×10^{-1}	1.94×10^{4}	2.02×10^{-1}	1.04×10^{-1}	3.56×10^{4}	4.04×10^{-1}
Carbon-14	3.87×10^{-5}	6.21×10^{1}	1.31×10^{-3}	3.87×10^{-5}	1.25×10^{2}	2.95×10^{-3}	3.87×10^{-5}	4.10×10^{2}	1.04×10^{-2}
Strontium-90	1.79×10^{-4}	1.31×10^{4}	2.19×10^{-1}	1.79×10^{-4}	1.68×10^{4}	3.14×10^{-1}	1.79×10^{-4}	2.79×10^{4}	5.95×10^{-1}
Technetium-99	2.24×10^{-7}	3.92×10^{-1}	1.35×10^{-5}	2.24×10^{-7}	1.01	4.42×10^{-5}	2.24×10^{-7}	2.05	9.64×10^{-5}
Iodine-129	5.24×10^{-9}	1.49	1.70×10^{-5}	5.24×10^{-9}	1.73	2.29×10^{-5}	5.24×10^{-9}	2.14	3.30×10^{-5}
Cesium-137	2.47×10^{-13}	9.00×10^{-6}	1.64×10^{-10}	2.47×10^{-13}	7.78×10^{-4}	1.74×10^{-8}	2.47×10^{-13}	2.34×10^{-3}	5.25×10^{-8}
Uranium isotopes (includes U-233, -234, -235, -238)	1.47×10^{-6}	1.83×10^{2}	2.07×10^{-3}	1.47×10^{-6}	1.90×10^{2}	2.21×10^{-3}	1.47×10^{-6}	2.03×10^{2}	2.50×10^{-3}
Neptunium-237	4.64×10^{-8}	1.36×10^{1}	6.28×10^{-5}	4.64×10^{-8}	1.37×10^{1}	6.59×10^{-5}	4.64×10^{-8}	1.64×10^{1}	7.42×10^{-5}
Total	1.04×10^{-1}	2.55×10^{4}	3.38×10^{-1}	1.04×10^{-1}	3.65×10^{4}	5.22×10^{-1}	1.04×10^{-1}	6.42×10^{4}	1.00
Year of peak impact	1997	1997	1997	1997	1997	1997	1997	1997	1997
	Drinking-Water Well User			**Resident Farmer**			**American Indian Resident Farmer**		
Chemical Constituent	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)
1-Butanol	7.89×10^{-1}	2.25×10^{-1}	0.00	7.89×10^{-1}	4.09×10^{-1}	0.00	7.89×10^{-1}	1.14	0.00
Carbon tetrachloride	3.35	1.37×10^{2}	5.33×10^{-3}	3.35	8.59×10^{2}	3.35×10^{-2}	3.35	3.74×10^{3}	1.46×10^{-1}
Chromium	1.88	1.79×10^{1}	0.00	1.88	1.79×10^{1}	7.38×10^{-9}	1.88	2.62×10^{1}	3.38×10^{-4}
Fluoride	1.44×10^{1}	6.87	0.00	1.44×10^{1}	7.07	0.00	1.44×10^{1}	7.60	0.00
Manganese	6.96×10^{-7}	1.42×10^{-7}	0.00	6.96×10^{-7}	1.82×10^{-7}	0.00	6.96×10^{-7}	8.25×10^{-7}	0.00
Mercury	4.69×10^{-4}	4.47×10^{-2}	0.00	4.69×10^{-4}	5.91×10^{-2}	0.00	4.69×10^{-4}	8.80×10^{-2}	0.00
Nitrate	9.65×10^{2}	1.72×10^{1}	0.00	9.65×10^{2}	2.27×10^{1}	0.00	9.65×10^{2}	4.45×10^{1}	0.00
Total uranium	5.57×10^{-1}	5.31	0.00	5.57×10^{-1}	5.37	0.00	5.57×10^{-1}	5.56	0.00
Total	9.86×10^{2}	1.84×10^{2}	5.33×10^{-3}	9.86×10^{2}	9.13×10^{2}	3.35×10^{-2}	9.86×10^{2}	3.83×10^{3}	1.46×10^{-1}
Year of peak impact	2270	2270	2270	2270	2270	2270	2270	2270	2270

Note: Concentrations are those reported for groundwater at the specified location. Total concentrations, although reported, are not used in the analysis.

Key: *TC & WM EIS=Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington.*

Table U–4. Human Health Impacts of Past, Present, and Reasonably Foreseeable Future Non–*TC & WM EIS* Actions at the Columbia River Nearshore

Radioactive Constituent	Drinking-Water Well User			Resident Farmer			American Indian Resident Farmer		
	Concentration at Year of Peak Dose (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)
Hydrogen-3 (tritium)	3.76×10^{-3}	4.39×10^{2}	4.17×10^{-3}	2.90×10^{-3}	5.39×10^{2}	5.63×10^{-3}	2.90×10^{-3}	9.91×10^{2}	1.12×10^{-2}
Carbon-14	1.06×10^{-7}	1.70×10^{-1}	3.60×10^{-6}	8.53×10^{-8}	2.77×10^{-1}	6.51×10^{-6}	8.53×10^{-8}	9.03×10^{-1}	2.29×10^{-5}
Strontium-90	4.16×10^{-3}	3.04×10^{5}	1.00	3.88×10^{-3}	3.65×10^{5}	1.00	3.88×10^{-3}	6.05×10^{5}	1.00
Technetium-99	1.12×10^{-6}	1.96	6.74×10^{-5}	1.23×10^{-7}	5.53×10^{-1}	2.43×10^{-5}	1.23×10^{-7}	1.13	5.30×10^{-5}
Iodine-129	2.90×10^{-9}	8.27×10^{-1}	9.41×10^{-6}	1.68×10^{-9}	5.54×10^{-1}	7.33×10^{-6}	1.68×10^{-9}	6.84×10^{-1}	1.06×10^{-5}
Cesium-137	9.63×10^{-4}	3.51×10^{4}	6.41×10^{-1}	1.31×10^{-3}	4.14×10^{6}	1.00	1.31×10^{-3}	1.24×10^{7}	1.00
Uranium isotopes (includes U-233, -234, -235, -238)	7.36×10^{-6}	9.14×10^{2}	1.03×10^{-2}	9.38×10^{-6}	1.21×10^{3}	1.41×10^{-2}	9.38×10^{-6}	1.29×10^{3}	1.59×10^{-2}
Neptunium-237	1.04×10^{-8}	3.03	1.40×10^{-5}	1.03×10^{-8}	3.06	1.47×10^{-5}	1.03×10^{-8}	3.65	1.65×10^{-5}
Plutonium isotopes (includes Pu-239, -240)	2.94×10^{-6}	1.99×10^{3}	8.68×10^{-3}	3.33×10^{-6}	2.36×10^{3}	1.06×10^{-2}	3.33×10^{-6}	2.92×10^{3}	1.23×10^{-2}
Total	8.89×10^{-3}	3.42×10^{5}	1.00	8.10×10^{-3}	4.51×10^{6}	1.00	8.10×10^{-3}	1.31×10^{7}	1.00
Year of peak impact	1991	1991	1991	1985	1985	1985	1985	1985	1985

Chemical Constituent	Drinking-Water Well User			Resident Farmer			American Indian Resident Farmer		
	Concentration at Year of Peak Hazard Index (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)
Carbon tetrachloride	1.10×10^{-3}	4.49×10^{-2}	9.66×10^{-5}	1.10×10^{-3}	2.82×10^{-1}	6.07×10^{-4}	1.10×10^{-3}	1.23	4.79×10^{-5}
Chromium	1.61×10^{1}	1.53×10^{2}	0.00	1.61×10^{1}	1.54×10^{2}	4.27×10^{-10}	1.61×10^{1}	2.24×10^{2}	2.90×10^{-3}
Fluoride	1.35×10^{1}	6.44	0.00	1.35×10^{1}	6.63	0.00	1.35×10^{1}	7.13	0.00
Manganese	1.50×10^{-5}	3.07×10^{-6}	0.00	1.50×10^{-5}	3.93×10^{-6}	0.00	1.50×10^{-5}	1.78×10^{-5}	0.00
Mercury	1.76×10^{-2}	1.67	0.00	1.76×10^{-2}	2.22	0.00	1.76×10^{-2}	3.30	0.00
Nitrate	4.04×10^{2}	7.22	0.00	4.04×10^{2}	9.50	0.00	4.04×10^{2}	1.86×10^{1}	0.00
Total uranium	5.03	4.79×10^{1}	0.00	5.03	4.85×10^{1}	0.00	5.03	5.02×10^{1}	0.00
Total	4.39×10^{2}	2.17×10^{2}	9.66×10^{-5}	4.39×10^{2}	2.21×10^{2}	6.07×10^{-4}	4.39×10^{2}	3.05×10^{2}	2.95×10^{-3}
Year of peak impact	1978	1978	2527	1978	1978	2527	1978	1978	1978

Note: Concentrations are those reported for groundwater at the specified location. Total concentrations, although reported, are not used in the analysis.

Key: *TC & WM EIS=Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington.*

Table U–5. Human Health Impacts of Past, Present, and Reasonably Foreseeable Future Non–*TC & WM EIS* Actions at the Columbia River Surface Water

Radioactive Constituent	Resident Farmer			American Indian Resident Farmer			American Indian Hunter-Gatherer		
	Concentration at Year of Peak Dose (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)
Hydrogen-3 (tritium)	2.56×10^{-8}	4.75×10^{-3}	4.96×10^{-8}	2.56×10^{-8}	8.84×10^{-3}	1.00×10^{-7}	2.90×10^{-3}	9.15×10^{2}	1.12×10^{-2}
Carbon-14	2.35×10^{-14}	8.40×10^{-8}	2.01×10^{-12}	2.35×10^{-14}	6.65×10^{-5}	1.81×10^{-9}	8.53×10^{-8}	5.93×10^{-2}	1.62×10^{-6}
Strontium-90	3.35×10^{-10}	3.16×10^{-2}	5.89×10^{-7}	3.35×10^{-10}	4.82×10^{-1}	9.99×10^{-6}	3.88×10^{-3}	2.32×10^{5}	1.00
Technetium-99	1.56×10^{-12}	7.04×10^{-6}	3.09×10^{-10}	1.56×10^{-12}	1.63×10^{-5}	7.70×10^{-10}	1.23×10^{-7}	1.35×10^{-3}	7.40×10^{-8}
Iodine-129	6.94×10^{-14}	2.30×10^{-5}	3.05×10^{-10}	6.94×10^{-14}	3.75×10^{-4}	9.02×10^{-9}	1.68×10^{-9}	3.33×10^{-3}	8.16×10^{-8}
Cesium-137	1.64×10^{-12}	5.18×10^{-3}	1.16×10^{-7}	1.64×10^{-12}	2.54×10^{-2}	5.70×10^{-7}	1.31×10^{-3}	8.32×10^{6}	1.00
Uranium isotopes (includes U-233, -234, -235, -238)	1.06×10^{-11}	1.37×10^{-3}	1.59×10^{-8}	1.06×10^{-11}	3.77×10^{-3}	5.33×10^{-8}	9.38×10^{-6}	9.33×10^{1}	1.18×10^{-3}
Neptunium-237	4.31×10^{-15}	1.28×10^{-6}	6.12×10^{-12}	4.31×10^{-15}	1.25×10^{-5}	7.54×10^{-11}	1.03×10^{-8}	3.28×10^{-1}	1.67×10^{-6}
Plutonium isotopes (includes Pu-239, -240)	6.75×10^{-15}	4.87×10^{-6}	2.19×10^{-11}	6.75×10^{-15}	7.62×10^{-4}	4.27×10^{-9}	3.33×10^{-6}	3.63×10^{2}	1.32×10^{-3}
Total	2.59×10^{-8}	4.29×10^{-2}	7.71×10^{-7}	2.59×10^{-8}	5.22×10^{-1}	1.07×10^{-5}	8.10×10^{-3}	8.56×10^{6}	1.00
Year of peak impact	1985	1985	1985	1985	1985	1985	1985	1985	1985
	Resident Farmer			**American Indian Resident Farmer**			**American Indian Hunter-Gatherer**		
Chemical Constituent	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)
1-Butanol	0.00	0.00	0.00	0.00	0.00	0.00	1.77×10^{-3}	2.05×10^{-3}	0.00
Boron and compounds	0.00	0.00	0.00	0.00	0.00	0.00	1.20×10^{-4}	1.19×10^{-6}	0.00
Carbon tetrachloride	5.25×10^{-7}	1.35×10^{-4}	3.41×10^{-8}	2.31×10^{-7}	2.67×10^{-4}	7.93×10^{-9}	6.07×10^{-2}	6.53×10^{1}	5.94×10^{-3}
Chromium	8.06×10^{-5}	7.68×10^{-4}	2.92×10^{-14}	7.88×10^{-5}	1.20×10^{-3}	1.01×10^{-10}	1.09×10^{-1}	2.40×10^{-1}	9.79×10^{-6}
Fluoride	3.70×10^{-5}	1.81×10^{-5}	0.00	2.92×10^{-5}	2.02×10^{-5}	0.00	2.15	3.15×10^{-1}	0.00
Hydrazine/hydrazine sulfate	0.00	0.00	0.00	0.00	0.00	6.09×10^{-7}	8.72×10^{-13}	3.18×10^{-210}	4.09×10^{-10}
Manganese	2.59×10^{-15}	6.78×10^{-16}	0.00	2.59×10^{-15}	1.05×10^{-14}	0.00	8.97×10^{-2}	5.67×10^{-2}	0.00

Table U–5. Human Health Impacts of Past, Present, and Reasonably Foreseeable Future Non–*TC & WM EIS* Actions at the Columbia River Surface Water *(continued)*

Chemical Constituent	Resident Farmer			American Indian Resident Farmer			American Indian Hunter-Gatherer		
	Concentration at Year of Peak Hazard Index (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)
Mercury	2.92×10^{-12}	3.69×10^{-10}	0.00	1.95×10^{-14}	6.88×10^{-11}	0.00	5.62×10^{-6}	2.15×10^{-4}	0.00
Nickel (soluble salts)	0.00	0.00	0.00	0.00	0.00	0.00	3.94×10^{-1}	7.35×10^{-1}	0.00
Nitrate	1.97×10^{-3}	6.79×10^{-5}	0.00	2.68×10^{-3}	2.52×10^{-1}	0.00	1.08×10^{1}	4.39×10^{-1}	0.00
Total uranium	1.59×10^{-5}	1.53×10^{-4}	0.00	1.61×10^{-5}	2.14×10^{-4}	0.00	7.39×10^{-2}	3.28×10^{-2}	0.00
Trichloroethylene (TCE)	0.00	0.00	0.00	0.00	0.00	5.06×10^{-10}	1.87×10^{-12}	7.28×10^{-10}	3.74×10^{-14}
Total	2.10×10^{-3}	1.14×10^{-3}	3.41×10^{-8}	2.81×10^{-3}	2.54×10^{-1}	6.18×10^{-7}	2.05×10^{1}	6.71×10^{1}	5.95×10^{-3}
Year of peak impact	1965	1965	1990	1962	1962	3243	2527	2527	2527

Note: Concentrations are those reported for groundwater at the specified location. Total concentrations, although reported, are not used in the analysis.

Key: *TC & WM EIS=Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington.*

Potential human health impacts of Alternative Combination 1, with the past, present, and reasonably foreseeable future (non–*TC & WM EIS*) actions discussed above, are summarized in Tables U–6 through U–8. The key radiological constituent contributors to human health risk are tritium, carbon-14, strontium-90, technetium-99, iodine-129, cesium-137, uranium isotopes, neptunium-237, and plutonium isotopes. The chemical risk and hazard drivers are 1-butanol, acetonitrile, boron and boron compounds, carbon tetrachloride, chromium, fluoride, hydrazine/hydrazine sulfate, manganese, mercury, nickel (soluble salts), nitrate, total uranium, and trichloroethylene. The impacts of Alternative Combination 1 are dominated by the impacts of non–*TC & WM EIS* sources. The estimate of radiological dose for the year of peak dose for the offsite population is 215 person-rem per year, approximately 0.01 percent of average background dose.

Table U–6. Alternative Combination 1 Cumulative Human Health Impacts at the Core Zone Boundary

Radioactive Constituent	Drinking-Water Well User			Resident Farmer			American Indian Resident Farmer		
	Concentration at Year of Peak Dose (curies per cubic meter)	Dose at Year of Peak Dose (millirem per year)	Radiological Risk at Year of Peak Radiological Risk (unitless)	Concentration at Year of Peak Dose (curies per cubic meter)	Dose at Year of Peak Dose (millirem per year)	Radiological Risk at Year of Peak Radiological Risk (unitless)	Concentration at Year of Peak Dose (curies per cubic meter)	Dose at Year of Peak Dose (millirem per year)	Radiological Risk at Year of Peak Radiological Risk (unitless)
Hydrogen-3 (tritium)	1.04×10^{-1}	1.22×10^{4}	1.16×10^{-1}	1.04×10^{-1}	1.94×10^{4}	2.03×10^{-1}	1.04×10^{-1}	3.56×10^{4}	4.04×10^{-1}
Carbon-14	3.87×10^{-5}	6.21×10^{1}	1.31×10^{-3}	3.87×10^{-5}	1.25×10^{2}	2.95×10^{-3}	3.87×10^{-5}	4.10×10^{2}	1.04×10^{-2}
Strontium-90	1.79×10^{-4}	1.31×10^{4}	2.19×10^{-1}	1.79×10^{-4}	1.68×10^{4}	3.14×10^{-1}	1.79×10^{-4}	2.79×10^{4}	5.95×10^{-1}
Technetium-99	2.98×10^{-6}	5.22	1.79×10^{-4}	2.98×10^{-6}	1.34×10^{1}	5.88×10^{-4}	2.98×10^{-6}	2.73×10^{1}	1.28×10^{-3}
Iodine-129	7.65×10^{-9}	2.18	2.48×10^{-5}	7.65×10^{-9}	2.53	3.35×10^{-5}	7.65×10^{-9}	3.12	4.82×10^{-5}
Cesium-137	2.47×10^{-13}	9.00×10^{-6}	1.64×10^{-10}	2.47×10^{-13}	7.78×10^{-4}	1.74×10^{-8}	2.47×10^{-13}	2.34×10^{3}	5.25×10^{-8}
Uranium isotopes (includes U-233, -234, -235, -238)	1.47×10^{-6}	1.83×10^{2}	2.07×10^{-3}	1.47×10^{-5}	1.90×10^{2}	2.21×10^{-3}	1.47×10^{-6}	2.03×10^{2}	2.50×10^{-3}
Neptunium-237	4.64×10^{-8}	1.36×10^{1}	6.28×10^{-5}	4.64×10^{-8}	1.37×10^{1}	6.59×10^{-5}	4.64×10^{-8}	1.64×10^{1}	7.42×10^{-5}
Total	1.04×10^{-1}	2.55×10^{4}	3.38×10^{-1}	1.04×10^{-1}	3.66×10^{4}	5.22×10^{-1}	1.04×10^{-1}	6.42×10^{4}	1.00
Year of peak impact	1997	1997	1997	1997	1997	1997	1997	1997	1997

Chemical Constituent	Drinking-Water Well User			Resident Farmer			American Indian Resident Farmer		
	Concentration at Year of Peak Hazard Index (grams per cubic meter)	Hazard Index at Year of Peak Hazard Index (unitless)	Nonradiological Risk at Year of Peak Nonradiological Risk (unitless)	Concentration at Year of Peak Hazard Index (grams per cubic meter)	Hazard Index at Year of Peak Hazard Index (unitless)	Nonradiological Risk at Year of Peak Nonradiological Risk (unitless)	Concentration at Year of Peak Hazard Index (grams per cubic meter)	Hazard Index at Year of Peak Hazard Index (unitless)	Nonradiological Risk at Year of Peak Nonradiological Risk (unitless)
1-Butanol	2.61×10^{-2}	7.47×10^{-3}	0.00	7.89×10^{-1}	4.09×10^{-1}	0.00	7.89×10^{-1}	1.14	0.00
Acetonitrile	0.00	0.00	0.00	1.61×10^{-2}	9.56×10^{-2}	0.00	1.61×10^{-2}	1.73×10^{-1}	0.00
Carbon tetrachloride	4.06×10^{-1}	1.66×10^{1}	5.33×10^{-3}	3.35	8.59×10^{2}	3.35×10^{-2}	3.35	3.74×10^{3}	1.46×10^{-1}
Chromium	2.94×10^{1}	2.80×10^{2}	0.00	3.19	3.04×10^{1}	1.25×10^{-8}	3.19	4.44×10^{1}	5.75×10^{-4}
Fluoride	2.59	1.23	0.00	1.44×10^{1}	7.07	0.00	1.44×10^{1}	7.60	0.00
Manganese	0.00	0.00	0.00	6.96×10^{-7}	1.82×10^{-7}	0.00	6.96×10^{-7}	8.25×10^{-7}	0.00
Mercury	0.00	0.00	0.00	4.69×10^{-4}	5.91×10^{-2}	0.00	4.69×10^{-4}	8.80×10^{-2}	0.00
Nitrate	1.36×10^{4}	2.43×10^{2}	0.00	1.35×10^{3}	3.17×10^{1}	0.00	1.35×10^{3}	6.21×10^{1}	0.00
Total uranium	1.28×10^{-1}	1.22	0.00	5.57×10^{-1}	5.37	0.00	5.57×10^{-1}	5.56	0.00
Total	1.36×10^{4}	5.42×10^{2}	5.33×10^{-3}	1.37×10^{3}	9.34×10^{2}	3.35×10^{-2}	1.37×10^{3}	3.86×10^{3}	1.47×10^{-1}
Year of peak impact	1956	1956	2270	2270	2270	2270	2270	2270	2270

Note: Concentrations are those reported for groundwater at the specified location. Total concentrations, although reported, are not used in the analysis.

Table U–7. Alternative Combination 1 Cumulative Human Health Impacts at the Columbia River Nearshore

	Drinking-Water Well User			Resident Farmer			American Indian Resident Farmer		
Radioactive Constituent	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)
Hydrogen-3 (tritium)	3.76×10^{-3}	4.39×10^{2}	4.17×10^{-3}	2.90×10^{-3}	5.39×10^{2}	5.63×10^{-3}	2.90×10^{-3}	9.91×10^{2}	1.12×10^{-2}
Carbon-14	1.06×10^{-7}	1.70×10^{-1}	3.60×10^{-6}	8.53×10^{-8}	2.77×10^{-1}	6.51×10^{-6}	8.53×10^{-8}	9.03×10^{-1}	2.29×10^{-5}
Strontium-90	4.16×10^{-3}	3.04×10^{5}	1.00	3.88×10^{-3}	3.65×10^{5}	1.00	3.88×10^{-3}	6.05×10^{5}	1.00
Technetium-99	1.15×10^{-6}	2.01	6.90×10^{-5}	1.36×10^{-7}	6.10×10^{-1}	2.68×10^{-5}	1.36×10^{-7}	1.24	5.84×10^{-5}
Iodine-129	2.93×10^{-9}	8.35×10^{-1}	9.50×10^{-6}	1.71×10^{-9}	5.65×10^{-1}	7.48×10^{-6}	1.71×10^{-9}	6.98×10^{-1}	1.08×10^{-5}
Cesium-137	9.63×10^{-4}	3.51×10^{4}	6.41×10^{-1}	1.31×10^{-3}	4.14×10^{6}	1.00	1.31×10^{-3}	1.24×10^{7}	1.00
Uranium isotopes (includes U-233, -234, -235, -238)	7.36×10^{-6}	9.14×10^{2}	1.03×10^{-2}	9.38×10^{-6}	1.21×10^{3}	1.41×10^{-2}	9.38×10^{-6}	1.29×10^{3}	1.59×10^{-2}
Neptunium-237	1.04×10^{-8}	3.03	1.40×10^{-5}	1.03×10^{-8}	3.06	1.47×10^{-5}	1.03×10^{-8}	3.65	1.65×10^{-5}
Plutonium isotopes (includes Pu-239, -240)	2.94×10^{-6}	1.99×10^{3}	8.68×10^{-3}	3.33×10^{-6}	2.36×10^{3}	1.06×10^{-2}	3.33×10^{-6}	2.92×10^{3}	1.23×10^{-2}
Total	8.89×10^{-3}	3.42×10^{5}	1.00	8.10×10^{-3}	4.51×10^{6}	1.00	8.10×10^{-3}	1.31×10^{7}	1.00
Year of peak impact	1991	1991	1991	1985	1985	1985	1985	1985	1985

	Drinking-Water Well User			Resident Farmer			American Indian Resident Farmer		
Chemical Constituent	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)
Carbon tetrachloride	1.10×10^{-3}	4.49×10^{-2}	9.66×10^{-5}	1.10×10^{-3}	2.82×10^{-1}	6.07×10^{-4}	1.10×10^{-3}	1.23	4.79×10^{-5}
Chromium	1.61×10^{1}	1.53×10^{2}	0.00	1.61×10^{1}	1.54×10^{2}	5.55×10^{-10}	1.61×10^{1}	2.24×10^{2}	2.90×10^{-3}
Fluoride	1.35×10^{1}	6.44	0.00	1.35×10^{1}	6.63	0.00	1.35×10^{1}	7.13	0.00
Manganese	1.50×10^{-5}	3.07×10^{-6}	0.00	1.50×10^{-5}	3.93×10^{-6}	0.00	1.50×10^{-5}	1.78×10^{-5}	0.00
Mercury	1.76×10^{-2}	1.67	0.00	1.76×10^{-2}	2.22	0.00	1.76×10^{-2}	3.30	0.00
Nitrate	4.08×10^{2}	7.29	0.00	4.08×10^{2}	9.59	0.00	4.08×10^{2}	1.88×10^{1}	0.00
Total uranium	5.03	4.79×10^{1}	0.00	5.03	4.85×10^{1}	0.00	5.03	5.02×10^{1}	0.00
Total	4.43×10^{2}	2.17×10^{2}	9.66×10^{-5}	4.43×10^{2}	2.21×10^{2}	6.07×10^{-4}	4.43×10^{2}	3.05×10^{2}	2.95×10^{-3}
Year of peak impact	1978	1978	2527	1978	1978	2527	1978	1978	1978

Note: Concentrations are those reported for groundwater at the specified location. Total concentrations, although reported, are not used in the analysis.

Table U–8. Alternative Combination 1 Cumulative Human Health Impacts pat the Columbia River Surface Water

	Resident Farmer			American Indian Resident Farmer			American Indian Hunter-Gatherer		
Radioactive Constituent	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)
Hydrogen-3 (tritium)	2.56×10^{-8}	4.76×10^{-3}	4.97×10^{-8}	2.56×10^{-8}	8.85×10^{-3}	1.00×10^{-7}	2.90×10^{-3}	9.15×10^{2}	1.12×10^{-2}
Carbon-14	2.35×10^{-14}	8.40×10^{-8}	2.01×10^{-12}	2.35×10^{-14}	6.65×10^{-5}	1.81×10^{-9}	8.53×10^{-8}	5.93×10^{-2}	1.62×10^{-6}
Strontium-90	3.35×10^{-10}	3.16×10^{-2}	5.89×10^{-7}	3.35×10^{-10}	4.82×10^{-1}	9.99×10^{-6}	3.88×10^{-3}	2.32×10^{5}	1.00
Technetium-99	8.15×10^{-12}	3.67×10^{-5}	1.61×10^{-9}	8.15×10^{-12}	8.47×10^{-5}	4.01×10^{-9}	1.36×10^{-7}	1.53×10^{-3}	8.34×10^{-8}
Iodine-129	7.79×10^{-14}	2.58×10^{-5}	3.42×10^{-10}	7.79×10^{-14}	4.21×10^{-4}	1.01×10^{-8}	1.71×10^{-9}	3.49×10^{-3}	8.54×10^{-8}
Cesium-137	1.64×10^{-12}	5.18×10^{-3}	1.16×10^{-7}	1.64×10^{-12}	2.54×10^{-2}	5.70×10^{-7}	1.31×10^{-3}	8.32×10^{6}	1.00
Uranium isotopes (includes U-233, -234, -235, -238)	1.06×10^{-11}	1.37×10^{-3}	1.59×10^{-8}	1.06×10^{-11}	3.77×10^{-3}	5.33×10^{-8}	9.38×10^{-6}	9.33×10^{1}	1.18×10^{-3}
Neptunium-237	4.31×10^{-15}	1.28×10^{-6}	6.12×10^{-12}	4.31×10^{-15}	1.25×10^{-5}	7.54×10^{-11}	1.03×10^{-8}	3.28×10^{-1}	1.67×10^{-6}
Plutonium isotopes (includes Pu-239, -240)	6.75×10^{-15}	4.87×10^{-6}	2.19×10^{-11}	6.75×10^{-15}	7.62×10^{-4}	4.27×10^{-9}	3.33×10^{-6}	3.63×10^{2}	1.32×10^{-3}
Total	2.60×10^{-8}	4.30×10^{-2}	7.73×10^{-7}	2.60×10^{-8}	5.22×10^{-1}	1.07×10^{-5}	8.10×10^{-3}	8.56×10^{6}	1.00
Year of peak impact	1985	1985	1985	1985	1985	1985	1985	1985	1985

	Resident Farmer			American Indian Resident Farmer			American Indian Hunter-Gatherer		
Chemical Constituent	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)
1-Butanol	0.00	0.00	0.00	0.00	0.00	0.00	1.77×10^{-3}	2.05×10^{-3}	0.00
Acetonitrile	0.00	0.00	0.00	0.00	0.00	0.00	2.12×10^{-3}	1.26×10^{-2}	0.00
Boron and compounds	0.00	0.00	0.00	0.00	0.00	0.00	1.20×10^{-4}	1.19×10^{-6}	0.00
Carbon tetrachloride	3.25×10^{-6}	8.35×10^{-4}	3.41×10^{-8}	2.31×10^{-7}	2.67×10^{-4}	7.93×10^{-9}	6.07×10^{-2}	6.53×10^{1}	5.94×10^{-3}
Chromium	2.23×10^{-5}	2.12×10^{-4}	5.10×10^{-14}	8.32×10^{-5}	1.27×10^{-3}	5.05×10^{-10}	1.41×10^{-1}	3.12×10^{-1}	1.27×10^{-5}
Fluoride	4.63×10^{-5}	2.27×10^{-5}	0.00	2.92×10^{-5}	2.02×10^{-5}	0.00	2.15	3.15×10^{-1}	0.00
Hydrazine/hydrazine sulfate	0.00	0.00	0.00	0.00	0.00	6.09×10^{-7}	8.72×10^{-13}	3.18×10^{-210}	4.09×10^{-10}

Table U–8. Alternative Combination 1 Cumulative Human Health Impacts at the Columbia River Surface Water *(continued)*

Chemical Constituent	Resident Farmer			American Indian Resident Farmer			American Indian Hunter-Gatherer		
	Concentration at Year of Peak Hazard Index (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)
Manganese	8.07×10^{-13}	2.11×10^{-13}	0.00	2.59×10^{-15}	1.05×10^{-14}	0.00	8.97×10^{-2}	5.67×10^{-2}	0.00
Mercury	1.30×10^{-9}	1.64×10^{-7}	0.00	1.95×10^{-14}	6.88×10^{-11}	0.00	5.62×10^{-6}	2.15×10^{-4}	0.00
Nickel (soluble salt)	7.20×10^{-19}	1.31×10^{-18}	0.00	0.00	0.00	0.00	3.94×10^{-1}	7.35×10^{-1}	0.00
Nitrate	3.46×10^{-3}	1.20×10^{-4}	0.00	4.90×10^{-3}	4.60×10^{-1}	0.00	2.03×10^{1}	8.10×10^{-1}	0.00
Total uranium	5.64×10^{-6}	5.43×10^{-5}	0.00	1.61×10^{-5}	2.14×10^{-4}	0.00	7.39×10^{-2}	3.28×10^{-2}	0.00
Trichloroethylene (TCE)	0.00	0.00	0.00	0.00	0.00	5.06×10^{-10}	1.87×10^{-12}	7.28×10^{-10}	3.74×10^{-14}
Total	3.54×10^{-3}	1.24×10^{-3}	3.41×10^{-8}	5.03×10^{-3}	4.62×10^{-1}	6.18×10^{-7}	3.01×10^{1}	6.76×10^{1}	5.95×10^{-3}
Year of peak impact	1984	1984	1990	1962	1962	3243	2527	2527	2527

Note: Concentrations are those reported for groundwater at the specified location. Total concentrations, although reported, are not used in the analysis.

Potential human health impacts of Alternative Combination 2, with the past, present, and reasonably foreseeable future (non–*TC & WM EIS*) actions discussed above, are summarized in Tables U–9 through U–11. The key radiological constituent contributors to human health risk are tritium, carbon-14, strontium-90, technetium-99, iodine-129, cesium-137, uranium isotopes, neptunium-237, and plutonium isotopes. The chemical risk and hazard drivers are 1-butanol, boron compounds, carbon tetrachloride, chromium, fluoride, hydrazine/hydrazine sulfate, manganese, mercury, nickel (soluble salts), nitrate, total uranium, and trichloroethylene. The impacts of Alternative Combination 2 are dominated by the impacts of non–*TC & WM EIS* sources. The estimate of radiological dose for the year of peak dose for the offsite population is 215 person-rem per year, approximately 0.01 percent of the average background dose.

Table U–9. Alternative Combination 2 Cumulative Human Health Impacts at the Core Zone Boundary

Radioactive Constituent	Drinking-Water Well User			Resident Farmer			American Indian Resident Farmer		
	Concentration at Year of Peak Dose (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)
Hydrogen-3 (tritium)	1.04×10^{-1}	1.22×10^{4}	1.16×10^{-1}	1.04×10^{-1}	1.94×10^{4}	2.03×10^{-1}	1.04×10^{-1}	3.56×10^{4}	4.04×10^{-1}
Carbon-14	3.87×10^{-5}	6.21×10^{1}	1.31×10^{-3}	3.87×10^{-5}	1.25×10^{2}	2.95×10^{-3}	3.87×10^{-5}	4.10×10^{2}	1.04×10^{-2}
Strontium-90	1.79×10^{-4}	1.31×10^{4}	2.19×10^{-1}	1.79×10^{-4}	1.68×10^{4}	3.14×10^{-1}	1.79×10^{-4}	2.79×10^{4}	5.95×10^{-1}
Technetium-99	1.78×10^{-6}	3.11	1.07×10^{-4}	1.78×10^{-6}	7.99	3.51×10^{-4}	1.78×10^{-6}	1.63×10^{1}	7.66×10^{-4}
Iodine-129	8.79×10^{-9}	2.50	2.85×10^{-5}	8.79×10^{-9}	2.91	3.85×10^{-5}	8.79×10^{-9}	3.59	5.54×10^{-5}
Cesium-137	2.47×10^{-13}	9.00×10^{-6}	1.64×10^{-10}	2.47×10^{-13}	7.78×10^{-4}	1.74×10^{-8}	2.47×10^{-3}	2.34×10^{-3}	5.25×10^{-8}
Uranium isotopes (includes U-233, -234, -235, -238)	1.47×10^{-6}	1.83×10^{2}	2.07×10^{-3}	1.47×10^{-6}	1.90×10^{2}	2.21×10^{-3}	1.47×10^{-6}	2.03×10^{2}	2.50×10^{-3}
Neptunium-237	4.64×10^{-8}	1.36×10^{1}	6.28×10^{-5}	4.64×10^{-8}	1.37×10^{1}	6.59×10^{-5}	4.64×10^{-8}	1.64×10^{1}	7.42×10^{-5}
Total	1.04×10^{-1}	2.55×10^{4}	3.38×10^{-1}	1.04×10^{-1}	3.66×10^{4}	5.22×10^{-1}	1.04×10^{-1}	6.42×10^{4}	1.00
Year of peak impact	1997	1997	1997	1997	1997	1997	1997	1997	1997

Chemical Constituent	Drinking-Water Well User			Resident Farmer			American Indian Resident Farmer		
	Concentration at Year of Peak Hazard Index (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)
1-Butanol	2.61×10^{-2}	7.47×10^{-3}	0.00	7.89×10^{-1}	4.09×10^{-1}	0.00	7.89×10^{-1}	1.14	0.00
Carbon tetrachloride	4.06×10^{-1}	1.66×10^{1}	5.33×10^{-3}	3.35	8.59×10^{2}	3.35×10^{-2}	3.35	3.74×10^{3}	1.46×10^{-1}
Chromium	2.88×10^{1}	2.74×10^{2}	0.00	2.84	2.70×10^{1}	1.11×10^{-8}	2.84	3.95×10^{1}	5.11×10^{-4}
Fluoride	2.59	1.23	0.00	1.44×10^{1}	7.07	0.00	1.44×10^{1}	7.60	0.00
Manganese	0.00	0.00	0.00	6.96×10^{-7}	1.82×10^{-7}	0.00	6.96×10^{-7}	8.25×10^{-7}	0.00
Mercury	0.00	0.00	0.00	4.69×10^{-4}	5.91×10^{-2}	0.00	4.69×10^{-4}	8.80×10^{-2}	0.00
Nitrate	1.31×10^{4}	2.34×10^{2}	0.00	1.48×10^{3}	3.48×10^{1}	0.00	1.48×10^{3}	6.83×10^{1}	0.00
Total uranium	1.28×10^{-1}	1.22	0.00	5.57×10^{-1}	5.37	0.00	5.57×10^{-1}	5.56	0.00
Total	1.32×10^{4}	5.27×10^{2}	5.33×10^{-3}	1.50×10^{3}	9.34×10^{2}	3.35×10^{-2}	1.50×10^{3}	3.86×10^{3}	1.46×10^{-1}
Year of peak impact	1956	1956	2270	2270	2270	2270	2270	2270	2270

Note: Concentrations are those reported for groundwater at the specified location. Total concentrations, although reported, are not used in the analysis.

Table U–10. Alternative Combination 2 Cumulative Human Health Impacts at the Columbia River Nearshore

	Drinking-Water Well User			Resident Farmer			American Indian Resident Farmer		
Radioactive Constituent	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)
Hydrogen-3 (tritium)	3.76×10^{-3}	4.39×10^{2}	4.17×10^{-3}	2.90×10^{-3}	5.39×10^{2}	5.63×10^{-3}	2.90×10^{-3}	9.91×10^{2}	1.12×10^{-2}
Carbon-14	1.06×10^{-7}	1.70×10^{-1}	3.60×10^{-6}	8.53×10^{-8}	2.77×10^{-1}	6.51×10^{-6}	8.53×10^{-8}	9.03×10^{-1}	2.29×10^{-5}
Strontium-90	4.16×10^{-3}	3.04×10^{5}	1.00	3.88×10^{-3}	3.65×10^{5}	1.00	3.88×10^{-3}	6.05×10^{5}	1.00
Technetium-99	1.13×10^{-6}	1.98	6.82×10^{-5}	1.49×10^{-7}	6.71×10^{-1}	2.95×10^{-5}	1.49×10^{-7}	1.37	6.43×10^{-5}
Iodine-129	2.94×10^{-9}	8.38×10^{-1}	9.54×10^{-6}	1.70×10^{-9}	5.60×10^{-1}	7.42×10^{-6}	1.70×10^{-9}	6.92×10^{-1}	1.07×10^{-5}
Cesium-137	9.63×10^{-4}	3.51×10^{4}	6.41×10^{-1}	1.31×10^{-3}	4.14×10^{6}	1.00	1.31×10^{-3}	1.24×10^{7}	1.00
Uranium isotopes (includes U-233, -234, -235, -238)	7.36×10^{-6}	9.14×10^{2}	1.03×10^{-2}	9.38×10^{-6}	1.21×10^{3}	1.41×10^{-2}	9.38×10^{-6}	1.29×10^{3}	1.59×10^{-2}
Neptunium-237	1.04×10^{-8}	3.03	1.40×10^{-5}	1.03×10^{-8}	3.06	1.47×10^{-5}	1.03×10^{-8}	3.65	1.65×10^{-5}
Plutonium isotopes (includes Pu-239, -240)	2.94×10^{-6}	1.99×10^{3}	8.68×10^{-3}	3.33×10^{-6}	2.36×10^{3}	1.06×10^{-2}	3.33×10^{-6}	2.92×10^{3}	1.23×10^{-2}
Total	8.89×10^{-3}	3.42×10^{5}	1.00	8.10×10^{-3}	4.51×10^{6}	1.00	8.10×10^{-3}	1.31×10^{7}	1.00
Year of peak impact	1991	1991	1991	1985	1985	1985	1985	1985	1985
	Drinking-Water Well User			**Resident Farmer**			**American Indian Resident Farmer**		
Chemical Constituent	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)
Carbon tetrachloride	1.10×10^{-3}	4.49×10^{-2}	9.66×10^{-5}	1.10×10^{-3}	2.82×10^{-1}	6.07×10^{-4}	1.10×10^{-3}	1.23	4.79×10^{-5}
Chromium	1.61×10^{1}	1.53×10^{2}	0.00	1.61×10^{1}	1.54×10^{2}	5.13×10^{-10}	1.61×10^{1}	2.24×10^{2}	2.90×10^{-3}
Fluoride	1.35×10^{1}	6.44	0.00	1.35×10^{1}	6.63	0.00	1.35×10^{1}	7.13	0.00
Manganese	1.50×10^{-5}	3.07×10^{-6}	0.00	1.50×10^{-5}	3.93×10^{-6}	0.00	1.50×10^{-5}	1.78×10^{-5}	0.00
Mercury	1.76×10^{-2}	1.67	0.00	1.76×10^{-2}	2.22	0.00	1.76×10^{-2}	3.30	0.00

Table U-10. Alternative Combination 2 Cumulative Human Health Impacts at the Columbia River Nearshore *(continued)*

	Drinking-Water Well User			Resident Farmer			American Indian Resident Farmer		
Chemical Constituent	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)
Nitrate	4.08×10^{2}	7.28	0.00	4.08×10^{2}	9.59	0.00	4.08×10^{2}	1.88×10^{1}	0.00
Total uranium	5.03	4.79×10^{1}	0.00	5.03	4.85×10^{1}	0.00	5.03	5.02×10^{1}	0.00
Total	4.42×10^{2}	2.17×10^{2}	9.66×10^{-5}	4.42×10^{2}	2.21×10^{2}	6.07×10^{-4}	4.42×10^{2}	3.05×10^{2}	2.95×10^{-3}
Year of peak impact	1978	1978	2527	1978	1978	2527	1978	1978	1978

Note: Concentrations are those reported for groundwater at the specified location. Total concentrations, although reported, are not used in the analysis.

Table U–11. Alternative Combination 2 Cumulative Human Health Impacts at the Columbia River Surface Water

Radioactive Constituent	Resident Farmer			American Indian Resident Farmer			American Indian Hunter-Gatherer		
	Concentration at Year of Peak Dose (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)
Hydrogen-3 (tritium)	2.56×10^{-8}	4.76×10^{-3}	4.98×10^{-8}	2.56×10^{-9}	8.86×10^{-3}	1.01×10^{-7}	2.90×10^{-3}	9.15×10^{2}	1.12×10^{-2}
Carbon-14	2.35×10^{-14}	8.40×10^{-8}	2.01×10^{-12}	2.35×10^{-14}	6.65×10^{-5}	1.81×10^{-9}	8.53×10^{-8}	5.93×10^{-2}	1.62×10^{-6}
Strontium-90	3.35×10^{-10}	3.16×10^{-2}	5.89×10^{-7}	3.35×10^{-10}	4.82×10^{-1}	9.99×10^{-6}	3.88×10^{-3}	2.32×10^{5}	1.00
Technetium-99	7.24×10^{-12}	3.26×10^{-5}	1.43×10^{-9}	7.24×10^{-12}	7.52×10^{-5}	3.56×10^{-9}	1.49×10^{-7}	1.67×10^{-3}	9.13×10^{-8}
Iodine-129	7.73×10^{-14}	2.56×10^{-5}	3.39×10^{-10}	7.73×10^{-14}	4.18×10^{-4}	1.00×10^{-8}	1.70×10^{-9}	3.46×10^{-3}	8.47×10^{-8}
Cesium-137	1.64×10^{-12}	5.18×10^{-3}	1.16×10^{-7}	1.64×10^{-12}	2.54×10^{-2}	5.70×10^{-7}	1.31×10^{-3}	8.32×10^{6}	1.00
Uranium isotopes (includes U-233, -234, -235, -238)	1.06×10^{-11}	1.37×10^{-3}	1.59×10^{-8}	1.06×10^{-11}	3.77×10^{-3}	5.33×10^{-8}	9.38×10^{-6}	9.33×10^{1}	1.18×10^{-3}
Neptunium-237	4.31×10^{-15}	1.28×10^{-6}	6.12×10^{-12}	4.31×10^{-15}	1.25×10^{-5}	7.54×10^{-11}	1.03×10^{-8}	3.28×10^{-1}	1.67×10^{-6}
Plutonium isotopes (includes Pu-239, -240)	6.75×10^{-15}	4.87×10^{-6}	2.19×10^{-11}	6.75×10^{-15}	7.62×10^{-4}	4.27×10^{-9}	3.33×10^{-6}	3.63×10^{2}	1.32×10^{-3}
Total	2.60×10^{-8}	4.30×10^{-2}	7.73×10^{-7}	2.60×10^{-8}	5.22×10^{-1}	1.07×10^{-5}	8.10×10^{-3}	8.56×10^{6}	1.00
Year of peak impact	1985	1985	1985	1985	1985	1985	1985	1985	1985
Chemical Constituent	**Resident Farmer**			**American Indian Resident Farmer**			**American Indian Hunter-Gatherer**		
	Concentration at Year of Peak Hazard Index (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)
1-Butanol	0.00	0.00	0.00	0.00	0.00	0.00	1.77×10^{-3}	2.05×10^{-3}	0.00
Boron and compounds	0.00	0.00	0.00	0.00	0.00	0.00	1.20×10^{-4}	1.19×10^{-6}	0.00
Carbon tetrachloride	3.25×10^{-6}	8.35×10^{-4}	3.41×10^{-8}	2.31×10^{-7}	2.67×10^{-4}	7.93×10^{-9}	6.07×10^{-2}	6.53×10^{1}	5.94×10^{-3}
Chromium	2.26×10^{-5}	2.15×10^{-4}	5.16×10^{-14}	8.31×10^{-5}	1.27×10^{-3}	1.38×10^{-10}	1.31×10^{-1}	2.88×10^{-1}	1.18×10^{-5}
Fluoride	4.63×10^{-5}	2.27×10^{-5}	0.00	2.92×10^{-5}	2.02×10^{-5}	0.00	2.15	3.15×10^{-1}	0.00
Hydrazine/hydrazine sulfate	0.00	0.00	0.00	0.00	0.00	6.09×10^{-7}	8.72×10^{-13}	3.18×10^{-210}	4.09×10^{-10}
Manganese	8.07×10^{-13}	2.11×10^{-13}	0.00	2.59×10^{-5}	1.05×10^{-14}	0.00	8.97×10^{-2}	5.67×10^{-2}	0.00
Mercury	1.30×10^{-9}	1.64×10^{-7}	0.00	1.95×10^{-14}	6.88×10^{-11}	0.00	5.62×10^{-6}	2.15×10^{-4}	0.00

Table U–11. Alternative Combination 2 Cumulative Human Health Impacts at the Columbia River Surface Water *(continued)*

Chemical Constituent	Resident Farmer			American Indian Resident Farmer			American Indian Hunter-Gatherer		
	Concentration at Year of Peak Hazard Index (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)
Nickel (soluble salts)	7.20×10^{-19}	1.31×10^{-18}	0.00	0.00	0.00	0.00	3.94×10^{-1}	7.35×10^{-1}	0.00
Nitrate	3.47×10^{-3}	1.20×10^{-4}	0.00	4.86×10^{-3}	4.57×10^{-1}	0.00	1.65×10^{1}	6.65×10^{-1}	0.00
Total uranium	5.64×10^{-6}	5.43×10^{-5}	0.00	1.61×10^{-5}	2.14×10^{-4}	0.00	7.39×10^{-2}	3.28×10^{-2}	0.00
Trichloroethylene (TCE)	0.00	0.00	0.00	0.00	0.00	5.06×10^{-10}	1.87×10^{-12}	7.28×10^{-10}	3.74×10^{-14}
Total	3.55×10^{-3}	1.25×10^{-3}	3.41×10^{-8}	4.99×10^{-3}	4.59×10^{-1}	6.18×10^{-7}	2.63×10^{1}	6.74×10^{1}	5.95×10^{-3}
Year of peak impact	1984	1984	1990	1962	1962	3243	2527	2527	2527

Note: Concentrations are those reported for groundwater at the specified location. Total concentrations, although reported, are not used in the analysis.

Potential human health impacts of Alternative Combination 3, with the past, present, and reasonably foreseeable future (non–*TC & WM EIS*) actions discussed above, are summarized in Tables U–12 through U–14. The key radiological constituent contributors to human health risk are tritium, carbon-14, strontium-90, technetium-99, iodine-129, cesium-137, uranium isotopes, neptunium-237, and plutonium isotopes. The chemical risk and hazard drivers are 1-butanol, boron and boron compounds, carbon tetrachloride, chromium, fluoride, hydrazine/hydrazine sulfate, manganese, mercury, nickel (soluble salts), nitrate, total uranium, and trichloroethylene. The impacts of Alternative Combination 3 are dominated by the impacts of non–*TC & WM EIS* sources. The estimate of radiological dose for the year of peak dose for the offsite population is 215 person-rem per year, approximately 0.01 percent of the average background dose.

With the addition of the alternative combinations to the past, present, and reasonably foreseeable future (non–*TC & WM EIS*) actions, and comparing among the alternative combinations, the peaks for the dose, risk, and Hazard Index occur at similar times and concentrations. A more-detailed discussion of the results of the cumulative impact analyses is presented in Chapter 6.

Table U–12. Alternative Combination 3 Cumulative Human Health Impacts at the Core Zone Boundary

Radioactive Constituent	Drinking-Water Well User: Concentration at Year of Peak Dose (curies per cubic meter)	Drinking-Water Well User: Dose at Year of Peak Dose (millirem per year)	Drinking-Water Well User: Radiological Risk at Year of Peak Radiological Risk (unitless)	Resident Farmer: Concentration at Year of Peak Dose (curies per cubic meter)	Resident Farmer: Dose at Year of Peak Dose (millirem per year)	Resident Farmer: Radiological Risk at Year of Peak Radiological Risk (unitless)	American Indian Resident Farmer: Concentration at Year of Peak Dose (curies per cubic meter)	American Indian Resident Farmer: Dose at Year of Peak Dose (millirem per year)	American Indian Resident Farmer: Radiological Risk at Year of Peak Radiological Risk (unitless)
Hydrogen-3 (tritium)	1.04×10^{-1}	1.22×10^{4}	1.16×10^{-1}	1.04×10^{-1}	1.94×10^{4}	2.03×10^{-1}	1.04×10^{-1}	3.56×10^{4}	4.04×10^{-1}
Carbon-14	3.87×10^{-5}	6.21×10^{1}	1.31×10^{-3}	3.87×10^{-5}	1.25×10^{2}	2.95×10^{-3}	3.87×10^{-5}	4.10×10^{2}	1.04×10^{-2}
Strontium-90	1.79×10^{-4}	1.31×10^{4}	2.19×10^{-1}	1.79×10^{-4}	1.68×10^{4}	3.14×10^{-1}	1.79×10^{-4}	2.79×10^{4}	5.95×10^{-1}
Technetium-99	1.85×10^{-6}	3.24	1.11×10^{-4}	1.85×10^{-6}	8.31	3.65×10^{-4}	1.85×10^{-6}	1.69×10^{1}	7.96×10^{-4}
Iodine-129	8.46×10^{-9}	2.41	2.74×10^{-5}	8.46×10^{-9}	2.80	3.70×10^{-5}	8.46×10^{-9}	3.45	5.33×10^{-5}
Cesium-137	2.47×10^{-13}	9.00×10^{-6}	1.64×10^{-10}	2.47×10^{-13}	7.78×10^{-4}	1.74×10^{-8}	2.47×10^{-13}	2.34×10^{-3}	5.25×10^{-8}
Uranium isotopes (includes U-233, -234, -235, -238)	1.47×10^{-6}	1.83×10^{2}	2.07×10^{-3}	1.47×10^{-6}	1.90×10^{2}	2.21×10^{-3}	1.47×10^{-6}	2.03×10^{2}	2.50×10^{-3}
Neptunium-237	4.64×10^{-8}	1.36×10^{1}	6.28×10^{-5}	4.64×10^{-8}	1.37×10^{1}	6.59×10^{-5}	4.64×10^{-8}	1.64×10^{1}	7.42×10^{-5}
Total	1.04×10^{-1}	2.55×10^{4}	3.38×10^{-1}	1.04×10^{-1}	3.66×10^{4}	5.22×10^{-1}	1.04×10^{-1}	6.42×10^{4}	1.00
Year of peak impact	1997	1997	1997	1997	1997	1997	1997	1997	1997

Chemical Constituent	Drinking-Water Well User: Concentration at Year of Peak Hazard Index (grams per cubic meter)	Drinking-Water Well User: Hazard Index at Year of Peak Hazard Index (unitless)	Drinking-Water Well User: Nonradiological Risk at Year of Peak Nonradiological Risk (unitless)	Resident Farmer: Concentration at Year of Peak Hazard Index (grams per cubic meter)	Resident Farmer: Hazard Index at Year of Peak Hazard Index (unitless)	Resident Farmer: Nonradiological Risk at Year of Peak Nonradiological Risk (unitless)	American Indian Resident Farmer: Concentration at Year of Peak Hazard Index (grams per cubic meter)	American Indian Resident Farmer: Hazard Index at Year of Peak Hazard Index (unitless)	American Indian Resident Farmer: Nonradiological Risk at Year of Peak Nonradiological Risk (unitless)
1-Butanol	2.61×10^{-2}	7.47×10^{-3}	0.00	7.89×10^{-1}	4.09×10^{-1}	0.00	7.89×10^{-1}	1.14	0.00
Carbon tetrachloride	4.06×10^{-1}	1.66×10^{1}	5.33×10^{-3}	3.35	8.59×10^{2}	3.35×10^{-2}	3.35	3.74×10^{3}	1.46×10^{-1}
Chromium	2.88×10^{1}	2.74×10^{2}	0.00	2.77	2.64×10^{1}	1.09×10^{-8}	2.77	3.86×10^{1}	4.99×10^{-4}
Fluoride	2.59	1.23	0.00	1.44×10^{1}	7.07	0.00	1.44×10^{1}	7.60	0.00
Manganese	0.00	0.00	0.00	6.96×10^{-7}	1.82×10^{-7}	0.00	6.96×10^{-7}	8.25×10^{-7}	0.00
Mercury	0.00	0.00	0.00	4.69×10^{-4}	5.91×10^{-2}	0.00	4.69×10^{-4}	8.80×10^{-2}	0.00
Nitrate	1.31×10^{4}	2.34×10^{2}	0.00	1.48×10^{3}	3.47×10^{1}	0.00	1.48×10^{3}	6.81×10^{1}	0.00
Total uranium	1.28×10^{-1}	1.22	0.00	5.57×10^{-1}	5.37	0.00	5.57×10^{-1}	5.56	0.00
Total	1.32×10^{4}	5.27×10^{2}	5.33×10^{-3}	1.50×10^{3}	9.33×10^{2}	3.35×10^{-2}	1.50×10^{3}	3.86×10^{3}	1.46×10^{-1}
Year of peak impact	1956	1956	2270	2270	2270	2270	2270	2270	2270

Note: Concentrations are those reported for groundwater at the specified location. Total concentrations, although reported, are not used in the analysis.

Table U–13. Alternative Combination 3 Cumulative Human Health Impacts at the Columbia River Nearshore

	Drinking-Water Well User			Resident Farmer			American Indian Resident Farmer		
Radioactive Constituent	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)
Hydrogen-3 (tritium)	3.76×10^{-3}	4.39×10^{2}	4.17×10^{-3}	2.90×10^{-3}	5.39×10^{2}	5.63×10^{-3}	2.90×10^{-3}	9.91×10^{2}	1.12×10^{-2}
Carbon-14	1.06×10^{-7}	1.70×10^{-1}	3.60×10^{-6}	8.53×10^{-8}	2.77×10^{-1}	6.51×10^{-6}	8.53×10^{-8}	9.03×10^{-1}	2.29×10^{-5}
Strontium-90	4.16×10^{-3}	3.04×10^{5}	1.00	3.88×10^{-3}	3.65×10^{5}	1.00	3.88×10^{-3}	6.05×10^{5}	1.00
Technetium-99	1.13×10^{-6}	1.98	6.82×10^{-5}	1.49×10^{-7}	6.72×10^{-1}	2.95×10^{-5}	1.49×10^{-7}	1.37	6.44×10^{-5}
Iodine-129	2.94×10^{-9}	8.38×10^{-1}	9.54×10^{-6}	1.70×10^{-9}	5.61×10^{-1}	7.42×10^{-6}	1.70×10^{-9}	6.92×10^{-1}	1.07×10^{-5}
Cesium-137	9.63×10^{-4}	3.51×10^{4}	6.41×10^{-1}	1.31×10^{-3}	4.14×10^{6}	1.00	1.31×10^{-3}	1.24×10^{7}	1.00
Uranium isotopes (includes U-233, -234, -235, -238)	7.36×10^{-6}	9.14×10^{2}	1.03×10^{-2}	9.38×10^{-6}	1.21×10^{3}	1.41×10^{-2}	9.38×10^{-6}	1.29×10^{3}	1.59×10^{-2}
Neptunium-237	1.04×10^{-8}	3.03	1.40×10^{-5}	1.03×10^{-8}	3.06	1.47×10^{-5}	1.03×10^{-8}	3.65	1.65×10^{-5}
Plutonium isotopes (includes Pu-239, -240)	2.94×10^{-6}	1.99×10^{3}	8.68×10^{-3}	3.33×10^{-6}	2.36×10^{3}	1.06×10^{-2}	3.33×10^{-6}	2.92×10^{3}	1.23×10^{-2}
Total	8.89×10^{-3}	3.42×10^{5}	1.00	8.10×10^{-3}	4.51×10^{6}	1.00	8.10×10^{-3}	1.31×10^{7}	1.00
Year of peak impact	1991	1991	1991	1985	1985	1985	1985	1985	1985
	Drinking-Water Well User			**Resident Farmer**			**American Indian Resident Farmer**		
Chemical Constituent	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)
Carbon tetrachloride	1.10×10^{-3}	4.49×10^{-2}	9.66×10^{-5}	1.10×10^{-3}	2.82×10^{-1}	6.07×10^{-4}	1.10×10^{-3}	1.23	4.79×10^{-5}
Chromium	1.61×10^{1}	1.53×10^{2}	0.00	1.61×10^{1}	1.54×10^{2}	5.11×10^{-10}	1.61×10^{1}	2.24×10^{2}	2.90×10^{-3}
Fluoride	1.35×10^{1}	6.44	0.00	1.35×10^{1}	6.63	0.00	1.35×10^{1}	7.13	0.00
Manganese	1.50×10^{-5}	3.07×10^{-6}	0.00	1.50×10^{-5}	3.93×10^{-6}	0.00	1.50×10^{-5}	1.78×10^{-5}	0.00
Mercury	1.76×10^{-2}	1.67	0.00	1.76×10^{-2}	2.22	0.00	1.76×10^{-2}	3.30	0.00
Nitrate	4.08×10^{2}	7.28	0.00	4.08×10^{2}	9.59	0.00	4.08×10^{2}	1.88×10^{1}	0.00
Total uranium	5.03	4.79×10^{1}	0.00	5.03	4.85×10^{1}	0.00	5.03	5.02×10^{1}	0.00
Total	4.42×10^{2}	2.17×10^{2}	9.66×10^{-5}	4.42×10^{2}	2.21×10^{2}	6.07×10^{-4}	4.42×10^{2}	3.05×10^{2}	2.95×10^{-3}
Year of peak impact	1978	1978	2527	1978	1978	2527	1978	1978	1978

Note: Concentrations are those reported for groundwater at the specified location. Total concentrations, although reported, are not used in the analysis.

Table U–14. Alternative Combination 3 Cumulative Human Health Impacts at the Columbia River Surface Water

Radioactive Constituent	Resident Farmer			American Indian Resident Farmer			American Indian Hunter-Gatherer		
	Concentration at Year of Peak Dose (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)	**Concentration at Year of Peak Dose** (curies per cubic meter)	**Dose at Year of Peak Dose** (millirem per year)	**Radiological Risk at Year of Peak Radiological Risk** (unitless)
Hydrogen-3 (tritium)	2.56×10^{-8}	4.76×10^{-3}	4.98×10^{-8}	2.56×10^{-8}	8.86×10^{-3}	1.01×10^{-7}	2.90×10^{-3}	9.15×10^{2}	1.12×10^{-2}
Carbon-14	2.35×10^{-14}	8.40×10^{-8}	2.01×10^{-12}	2.35×10^{-14}	6.65×10^{-5}	1.81×10^{-9}	8.53×10^{-8}	5.93×10^{-2}	1.62×10^{-6}
Strontium-90	3.35×10^{-10}	3.16×10^{-2}	5.89×10^{-7}	3.35×10^{-10}	4.82×10^{-1}	9.99×10^{-6}	3.88×10^{-3}	2.32×10^{5}	1.00
Technetium-99	7.24×10^{-12}	3.26×10^{-5}	1.43×10^{-9}	7.24×10^{-12}	7.52×10^{-5}	3.56×10^{-9}	1.49×10^{-7}	1.68×10^{-3}	9.14×10^{-8}
Iodine-129	7.73×10^{-14}	2.56×10^{-5}	3.39×10^{-10}	7.73×10^{-14}	4.18×10^{-4}	1.01×10^{-8}	1.70×10^{-9}	3.47×10^{-3}	8.48×10^{-8}
Cesium-137	1.64×10^{-12}	5.18×10^{-3}	1.16×10^{-7}	1.64×10^{-12}	2.54×10^{-2}	5.70×10^{-7}	1.31×10^{-3}	8.32×10^{6}	1.00
Uranium isotopes (includes U-233, -234, -235, -238)	1.06×10^{-11}	1.37×10^{-3}	1.59×10^{-8}	1.06×10^{-11}	3.77×10^{-3}	5.33×10^{-8}	9.38×10^{-6}	9.33×10^{1}	1.18×10^{-3}
Neptunium-237	4.31×10^{-15}	1.28×10^{-6}	6.12×10^{-12}	4.31×10^{-15}	1.25×10^{-5}	7.54×10^{-11}	1.03×10^{-8}	3.28×10^{-1}	1.67×10^{-6}
Plutonium isotopes (includes Pu-239, -240)	6.75×10^{-15}	4.87×10^{-6}	2.19×10^{-11}	6.75×10^{-15}	7.62×10^{-4}	4.27×10^{-9}	3.33×10^{-6}	3.63×10^{2}	1.32×10^{-3}
Total	2.60×10^{-8}	4.30×10^{-2}	7.73×10^{-7}	2.60×10^{-8}	5.22×10^{-1}	1.07×10^{-5}	8.10×10^{-3}	8.56×10^{6}	1.00
Year of peak impact	1985	1985	1985	1985	1985	1985	1985	1985	1985
	Resident Farmer			**American Indian Resident Farmer**			**American Indian Hunter-Gatherer**		
Chemical Constituent	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)
1-Butanol	0.00	0.00	0.00	0.00	0.00	0.00	1.77×10^{-3}	2.05×10^{-3}	0.00
Boron and compounds	0.00	0.00	0.00	0.00	0.00	0.00	1.20×10^{-4}	1.19×10^{-6}	0.00
Carbon tetrachloride	3.25×10^{-6}	8.35×10^{-4}	3.41×10^{-8}	2.31×10^{-7}	2.67×10^{-4}	7.93×10^{-9}	6.07×10^{-2}	6.53×10^{1}	5.94×10^{-3}
Chromium	2.26×10^{-5}	2.15×10^{-4}	5.16×10^{-14}	8.31×10^{-5}	1.27×10^{-3}	1.32×10^{-10}	1.30×10^{-1}	2.87×10^{-1}	1.17×10^{-5}
Fluoride	4.63×10^{-5}	2.27×10^{-5}	0.00	2.92×10^{-5}	2.02×10^{-5}	0.00	2.15	3.15×10^{-1}	0.00
Hydrazine/hydrazine sulfate	0.00	0.00	0.00	0.00	0.00	6.09×10^{-7}	8.72×10^{-13}	3.18×10^{-210}	4.09×10^{-10}
Manganese	8.07×10^{-13}	2.11×10^{-13}	0.00	2.59×10^{-15}	1.05×10^{-14}	0.00	8.97×10^{-2}	5.67×10^{-2}	0.00

Table U–14. Alternative Combination 3 Cumulative Human Health Impacts at the Columbia River Surface Water *(continued)*

Chemical Constituent	Resident Farmer			American Indian Resident Farmer			American Indian Hunter-Gatherer		
	Concentration at Year of Peak Hazard Index (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)	**Concentration at Year of Peak Hazard Index** (grams per cubic meter)	**Hazard Index at Year of Peak Hazard Index** (unitless)	**Nonradiological Risk at Year of Peak Nonradiological Risk** (unitless)
Mercury	1.30×10^{-9}	1.64×10^{-7}	0.00	1.95×10^{-14}	6.88×10^{-11}	0.00	5.62×10^{-6}	2.15×10^{-4}	0.00
Nickel (soluble salts)	7.20×10^{-19}	1.31×10^{-18}	0.00	0.00	0.00	0.00	3.94×10^{-1}	7.35×10^{-1}	0.00
Nitrate	3.47×10^{-3}	1.20×10^{-4}	0.00	4.86×10^{-3}	4.57×10^{-1}	0.00	1.64×10^{1}	6.59×10^{-1}	0.00
Total uranium	5.64×10^{-6}	5.43×10^{-5}	0.00	1.61×10^{-5}	2.14×10^{-4}	0.00	7.39×10^{-2}	3.28×10^{-2}	0.00
Trichloroethylene (TCE)	0.00	0.00	0.00	0.00	0.00	5.06×10^{-10}	1.87×10^{-12}	7.28×10^{-10}	3.74×10^{-14}
Total	3.55×10^{-3}	1.25×10^{-3}	3.41×10^{-8}	4.99×10^{-3}	4.59×10^{-1}	6.18×10^{-7}	2.62×10^{1}	6.74×10^{1}	5.95×10^{-3}
Year of peak impact	1984	1984	1990	1962	1962	3243	2527	2527	2527

Note: Concentrations are those reported for groundwater at the specified location. Total concentrations, although reported, are not used in the analysis.

U.3 REFERENCES

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Hartman, M.J., and W.D. Webber, eds., 2008, *Hanford Site Groundwater Monitoring for Fiscal Year 2007*, DOE/RL-2008-01, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington, March.

Code of Federal Regulations

40 CFR 141, U.S. Environmental Protection Agency, "National Primary Drinking Water Regulations."

40 CFR 1508.7, Council on Environmental Quality, "Terminology and Index: Cumulative Impact."

U.S. Department of Energy Guides and Orders

DOE Guide 435.1-1, *Implementation Guide for Use with DOE M 435.1-1*, July 9, 1999.

DOE Order 5400.5, *Radiation Protection of the Public and the Environment*, Change 2, January 7, 1993.

APPENDIX V
BLACK ROCK RESERVOIR SENSITIVITY ANALYSIS

This appendix describes a variant of the regional-scale groundwater flow model for the Hanford Site.

V.1 BACKGROUND

The development of the *Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington (TC & WM EIS)* Base Case flow model that was used to analyze long-term groundwater impacts for the alternative and cumulative impact analyses is presented in Appendix L. The variant discussed in this appendix is presented to provide information on the potential influence of a reasonably foreseeable future scenario—construction of the Black Rock Reservoir (BRR) west of the Hanford Site (Hanford). Previous studies (see Section V.3.1) suggested that leakage from this reservoir has the potential to impact groundwater elevations and flow velocities beneath Hanford, which could in turn affect the comparison of the long-term impacts of the alternatives examined in this *TC & WM EIS*.

V.2 SENSITIVITY ANALYSIS PURPOSE AND SCOPE

V.2.1 Purpose of Analysis

The overall goal of the analysis is to illustrate the consequences of leakage from the proposed BRR on the potential differences among *TC & WM EIS* alternatives with respect to long-term groundwater impacts.

Specific purposes of this analysis are to determine the following:

- The change in water table elevation and flow velocities beneath Hanford resulting from water flux added by leakage from the BRR.
- Potential changes in vadose zone contaminant transport times resulting from a shortened vadose zone.
- Potential changes in groundwater plume predictions resulting from mobilization of vadose zone contaminants under rising water table supply activities. Excluded are evaluation of the BRR's impact on human health and the environment, as well as the comprehensive, long-term (10,000-year) impacts of any alternative addressed in this *TC & WM EIS*.

V.2.2 Scope of Modeling Effort

The scope of the modeling effort included:

- Obtaining predictions of the additional groundwater flux induced by leakage from the proposed BRR from the U.S. Department of the Interior, Bureau of Reclamation (BOR)
- Inserting these fluxes into the Base Case MODFLOW [modular three-dimensional finite-difference groundwater flow model] and predicting changes in water table elevation and flow velocities
- Comparing the BRR flow field with the Base Case flow field
- Using the STOMP [Subsurface Transport Over Multiple Phases] model (see Appendix N) to predict vadose zone travel times under shortened vadose zone conditions

- Comparing the BRR and Base Case flow fields with respect to the time to appearance of peak concentrations of technetium-99 at the Columbia River from a 1-curie release from various 200 Area release locations

- Evaluating the results to determine any differential impacts across the *TC & WM EIS* alternatives

V.3 MODEL DEVELOPMENT

V.3.1 Previous Studies

In preparation of the BRR sensitivity analysis performed by Science Applications International Corporation (SAIC), the following documents were reviewed:

1. *Final Planning Report/Environmental Impact Statement, Yakima River Basin Water Storage Feasibility Study, Yakima Project, Washington*, December 2008 (BOR 2008)

   This document "examined the feasibility and acceptability of storage augmentation for the benefit of fish, irrigation, and future municipal water supply for the Yakima River basin." In efforts to supply additional water storage in the Yakima River basin, the document considered three alternatives other than the No Action Alternative: (1) the Black Rock Reservoir Alternative, (2) the Wymer Dam and Reservoir Alternative, and (3) the Wymer Dam plus Yakima River Pump Exchange Alternative. Other programmatic joint alternatives discussed within the document include the Enhanced Water Conservation Alternative, the Market-Based Reallocation of Water Resources Alternative, and the Groundwater Storage Alternative. For a variety of reasons, most notably issues related to the cost-benefit ratio assessments of each alternative, BOR identified the No Action Alternative as the Preferred Alternative. No site-specific Hanford Reservation groundwater modeling was performed for the examined alternatives. SAIC utilized the document for background knowledge regarding the Black Rock Reservoir Alternative.

2. *Modeling Groundwater Hydrologic Impacts of the Potential Black Rock Reservoir: A Component of the Yakima River Basin Water Storage Feasibility Study, Washington Pacific Northwest Region*, September 2007 (BOR 2007)

   As a component of the *Final Planning Report/Environmental Impact Statement, Yakima River Basin Water Storage Feasibility Study, Yakima Project, Washington* (discussed above), this document was published to further examine the Black Rock Reservoir Alternative. The report documents results pertaining to a potential groundwater seepage analysis of the BRR. The analysis quantifies potential reservoir seepage to surrounding aquifers and provides an indication of flow direction associated with the seepage. The modeling in this report, performed using various MODFLOW software packages, further characterizes potential impacts on the western boundary of Hanford (e.g., increased hydraulic head, estimated groundwater flux, surface-water discharge). The analysis does not examine proposed seepage mitigation controls nor examine potential site-specific impacts on the Hanford Reservation.

   This seepage analysis, performed by BOR, ultimately provided flux values along the western boundary of Hanford, which were used to develop SAIC's BRR variant flow field model discussed in this "Black Rock Reservoir Sensitivity Analysis." The BOR flux values used by SAIC were requested via a formal data request (Schmidt 2007). Further discussion of development of the BRR variant flow field model is included in Section V.3.2. Initially, two BRR permeability cases were developed for analysis as proposed by BOR—BRR Permeability Case 1 and BRR Permeability Case 2. During this analysis, direction was given to SAIC to only proceed with Permeability Case 2.

3. *Potential Impact of Leakage from Black Rock Reservoir on the Hanford Site Unconfined Aquifer: Initial Hypothetical Simulations of Flow and Contaminant Transport,* March 2007 (Freedman 2008)

   This analysis was performed by Pacific Northwest National Laboratory (PNNL) to identify potential impacts associated with the development of the BRR at Hanford. Simulated lateral recharge (or flux) along the western boundary of Hanford was calculated using water table elevations (hydraulic head values) no greater than the highest groundwater elevation attained in the Central Plateau of Hanford during the Hanford operational period. PNNL developed three steady state flow fields to assess the fate and transport of site contaminants; varying western boundary fluxes of (1) 27,000 acre-feet/year, (2) 16,000 acre-feet/year, and (3) a no additional flux Base Case of 365 acre-feet/year. The transport of four radionuclides (hydrogen-3 [tritium], iodine-129, technetium-99, and uranium-238) was modeled over a 300-year period. Simulated radionuclide concentration distributions across Hanford in 2005 were used as initial model conditions prior to running each model. Model transport analysis provided (1) peak concentration downstream and points of compliance, (2) areas of Hanford contaminated above drinking water standards, and (3) the total activity within the model domain at the end of transport simulation.

   PNNL's analysis results of all three simulated BRR models indicated that the models (1) "had little impact on regional flow directions," (2) "accelerated contaminant transport," and (3) "the accelerated transport caused dilution and a more-rapid decline of concentration relative to the Base Case." Further, PNNL results indicated that increased western boundary flux caused an increase in the highly retarded uranium-238, but the concentrations were found not to exceed drinking water standards. PNNL noted no significant effects of contaminant concentrations at the designated Hanford Core Zone or the Columbia River.

   No specific data or results derived from the PNNL study were used for the BRR variant flow field analysis discussed in this appendix. The PNNL study was used as background information only.

V.3.2 Relationship to *TC & WM EIS* Modeling Framework

The *TC & WM EIS* Base Case groundwater flow model was developed for input to the *TC & WM EIS* groundwater transport model, which is used for simulating the fate and transport of contaminants to analyze the alternatives and cumulative impacts. The Base Case groundwater flow model development and the associated flow field extraction methods are discussed in Appendix L. The *TC & WM EIS* Base Case groundwater transport model development and application are discussed in Appendix O.

The Base Case groundwater flow and transport models are calibrated to historical field observations of groundwater hydraulic heads and contaminant concentrations. This calibration to historical field observations provides an indication that the Base Case models can reasonably predict future hydraulic heads and contaminant concentrations. The calibrated results produced in the Base Case groundwater modeling simulations are used as inputs to the long-term impacts analysis in this *TC & WM EIS.*

The BRR is considered to be a reasonably foreseeable future scenario that may impact groundwater flow and transport beneath Hanford. BOR has developed a separate groundwater flow model that simulates the additional water flux to groundwater in areas surrounding the proposed reservoir, including Hanford.

The BOR flow model covers an area of about 4,480.7 square kilometers (1,730 square miles) with discrete model cells that range from 0.2 to 0.83 square kilometers (0.08 to 0.32 square miles) (Schmidt 2007). The *TC & WM EIS* groundwater flow model covers an area of about 1,942.5 square kilometers (750 square miles) with discrete model cells that cover 0.039 square kilometers (0.015 square miles) each. The larger scale and coarser gridding of the BOR model allow macro-level encoding of model properties and macro-level analysis, which are appropriate for the BOR study; however, the smaller scale and finer gridding of the *TC & WM EIS* Base Case flow model is preferred to make predictions about the impacts of the proposed reservoir on contaminant fate and transport beneath Hanford.

To simulate the impacts on Hanford resulting from the proposed BRR, the *TC & WM EIS* groundwater modeling team worked with the BOR groundwater modeling team to identify a line of model interface (line of flux), where the agreed-upon line is included geographically in both the BOR model and the *TC & WM EIS* Base Case flow model. This line of flux or interface was then used to represent the changes in flux into and out of the *TC & WM EIS* model based on the results of the BOR flow model simulation. The line of model interface (as encoded into the *TC & WM EIS* Base Case model) is illustrated in Figure V–1.

This line of water flux from the BOR model was provided to SAIC's *TC & WM EIS* groundwater modeling team in "Data Request #279 Related to Hanford *Tank Closure & Waste Management Environmental Impact Statement*" (Schmidt 2007). This data set provided flux values along the line of flux based on the model gridding in the BOR model. This data set was processed by the *TC & WM EIS* groundwater modeling team to translate the locations and values from the coarser BOR model gridding to the finer *TC & WM EIS* model gridding. This revised data set was then encoded as recharge flux into a BRR variant of the *TC & WM EIS* Base Case flow model. Encoded flux values include positive and negative values and are from the perspective of the BOR model. Therefore, negative values represent fluxes into the BRR variant model, and positive values represent fluxes out of the BRR variant model. Cell (model row and column) specific flux values are included in Table V–1. Within the BRR variant model, row 1 is the first row starting from the north, and column 1 is the first column starting from the west.

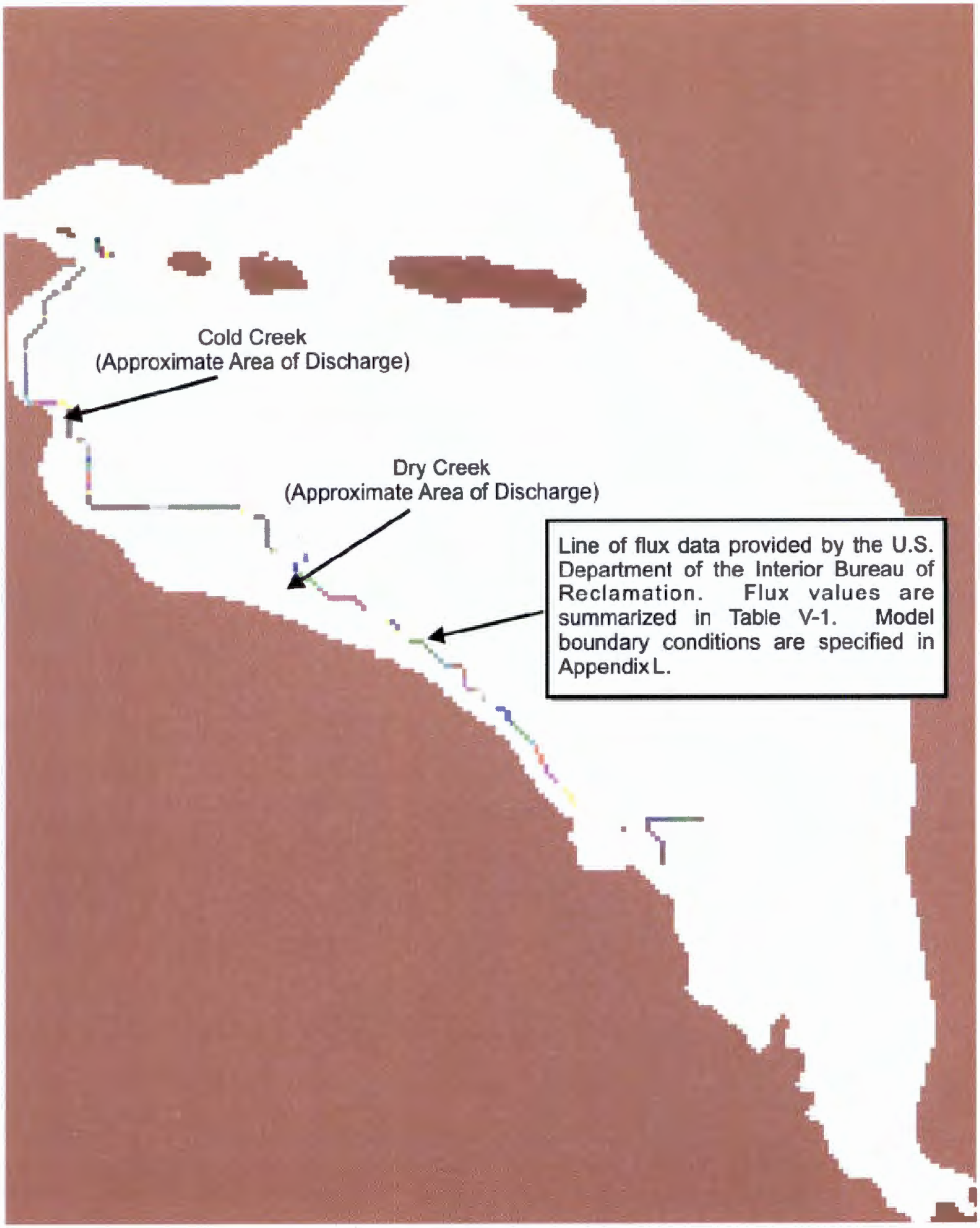


Figure V–1. Black Rock Reservoir Variant Flow Field – Additional Recharge Cell Locations

Table V–1. Black Rock Reservoir Variant Flow Field Flux Values

Model Row	Model Column	BRR Variant Model Cell Specific Flux Values (mm/yr)		Model Row	Model Column	BRR Variant Model Cell Specific Flux Values (mm/yr)[a]
57	1	5.37		93	8	539.65
57	2	5.37		93	9	539.65
57	3	3,467.07		93	10	539.65
57	4	3,467.07		93	11	539.65
57	5	3,467.07		93	12	222.91
58	6	3,467.07		93	13	222.91
59	7	3,467.07		94	14	222.91
60	8	3,032.67		95	14	130.78
61	9	3,032.67		96	14	38.65
62	10	3,032.67		97	14	38.65
62	11	3,032.67		98	14	282.98
62	12	3,085.83		99	14	527.31
62	13	3,085.83		100	14	263.66
63	14	3,085.83		101	15	0.00
64	13	3,085.83		101	16	219.00
65	12	707.64		101	17	438.01
66	11	1,670.54		102	18	438.01
66	10	1,670.54		103	18	200.93
67	9	1,670.54		104	18	200.93
68	9	1,670.54		105	18	327.97
69	9	575.08		106	18	455.00
70	9	575.08		107	18	458.16
71	9	575.08		108	18	461.32
72	9	575.08		109	18	461.32
73	9	973.90		110	18	314.17
74	9	1,372.73		111	18	314.17
75	9	1,372.73		112	18	300.40
76	9	1,372.73		113	18	286.63
77	8	1,372.73		114	18	200.61
78	7	743.31		115	19	114.59
79	6	743.31		115	20	114.59
80	5	743.31		115	21	888.35
81	5	743.31		115	22	888.35
82	5	396.77		115	23	888.35
83	5	50.23		115	24	888.35
84	5	50.23		115	25	888.35
85	5	50.23		115	26	1,518.69
86	5	50.23		115	27	1,518.69
87	5	191.19		115	28	1,518.69
88	5	191.19		115	29	1,518.69
89	5	191.19		115	30	6,650.76
90	5	191.19		115	31	11,782.83
91	5	28.52		115	32	11,782.83
92	5	134.14		115	33	11,782.83

Table V–1. Black Rock Reservoir Variant Flow Field Flux Values *(continued)*

Model Row	Model Column	BRR Variant Model Cell Specific Flux Values (mm/yr)		Model Row	Model Column	BRR Variant Model Cell Specific Flux Values (mm/yr)[a]
93	6	134.14		115	34	11,782.83
93	7	336.89		115	35	10,320.61
115	40	23,680.24		115	36	10,320.61
115	41	23,680.24		115	37	10,320.61
115	42	23,680.24		115	38	10,320.61
115	43	23,680.24		115	39	17,000.42
115	44	19,860.70		143	85	1,447.49
115	45	19,860.70		143	86	1,447.49
115	46	19,860.70		143	87	1,447.49
115	47	19,860.70		144	88	1,447.49
115	48	31,186.16		145	89	1,447.49
115	49	42,511.63		146	90	189.80
116	50	21,255.81		147	91	189.80
117	51	0.00		148	92	189.80
117	52	0.00		148	93	189.80
117	53	35,797.38		148	94	855.88
117	54	35,797.38		148	95	855.88
118	55	35,797.38		149	96	855.88
119	55	16,700.60		150	96	855.88
120	55	16,700.60		151	96	211.89
121	55	17,731.08		152	96	211.89
122	55	18,761.56		153	97	211.89
123	55	9,380.78		153	98	429.64
124	56	0.00		153	99	1,071.18
124	57	8,256.15		154	100	1,071.18
124	58	16,512.31		155	100	535.59
125	59	9,447.78		156	100	0.00
126	59	2,383.26		157	101	0.00
127	60	2,383.26		157	102	0.00
128	61	2,383.26		157	103	543.89
129	62	5,675.52		157	104	543.89
130	63	5,675.52		158	105	543.89
130	64	5,675.52		159	105	543.89
131	65	5,675.52		160	105	255.88
132	66	3,152.26		161	105	255.88
133	67	629.01		162	105	255.88
134	68	629.01		163	106	255.88
134	69	629.01		164	107	136.23
134	70	629.01		165	108	16.58
134	71	2,256.53		166	109	16.58
134	72	2,256.53		167	110	16.58
134	73	2,256.53		168	111	16.58
135	74	2,256.53		169	112	33.72
136	75	2,256.53		170	113	33.72
137	76	0.00		171	114	33.72

Table V–1. Black Rock Reservoir Variant Flow Field Flux Values *(continued)*

Model Row	Model Column	BRR Variant Model Cell Specific Flux Values (mm/yr)		Model Row	Model Column	BRR Variant Model Cell Specific Flux Values (mm/yr)[a]
138	77	0.00		172	115	33.72
139	78	0.00		173	116	3.94
139	79	0.00		174	117	25.83
139	80	1,424.88		175	118	25.83
139	81	2,849.75		176	118	25.83
140	82	2,849.75		177	118	25.83
141	82	1,424.88		178	118	0.00
142	82	0.00		179	118	0.00
143	83	0.00		180	119	0.00
143	84	0.00		180	120	0.00
180	125	403.84		180	121	403.84
180	126	183.45		182	134	421.85
180	127	183.45		183	135	780.18
180	128	183.45		184	136	780.18
180	129	183.45		185	137	780.18
180	130	302.65		186	137	780.18
180	131	421.85		187	137	423.08
180	132	421.85		188	137	423.08
181	133	421.85		189	137	423.08
180	123	403.84		180	122	403.84
180	124	403.84		180	123	403.84

[a] Encoded flux values include positive and negative values and are from the perspective of the U.S. Department of the Interior, Bureau of Reclamation model. Therefore, negative values represent fluxes into the BRR variant model, and positive values represent fluxes out of the BRR variant model.

Note: Values provided by the U.S. Department of the Interior, Bureau of Reclamation.

Key: BRR=Black Rock Reservoir; mm/yr=millimeters per year.

This BRR variant flow field model of the *TC & WM EIS* Base Case flow model included the following modifications to the Base Case flow model:

- Removed all anthropogenic recharge zones except for the long-term expected water fluxes and extractions from the city of Richland, the North Richland Well Field (NR-1100B), and the Richland Wellsian Way Well Field (1182 Pump House)
- Added the water flux values from the BOR flow model, as described above
- Changed the model time-stepping algorithm to ramp up to the BOR total flux values over a period of 45 years to aid model convergence
- Changed the duration of the simulation to 500 years

Sections V.3.3 and V.3.5 describe the methodology and application of the BRR variant flow field model to analyze the impacts of the additional water flux values from the BOR flow model.

Section V.3.4 describes the methodology for evaluating changes to vadose zone thickness and travel times and uses variants of the *TC & WM EIS* Base Case STOMP models. The *TC & WM EIS* Base Case STOMP model development and application are described in Appendix N.

V.3.3 Methodology for Evaluating Changes in Flow Field and Transport Patterns

The BRR variant flow field spread of recharge (flux along the western model domain boundary) extends from Cold Creek (northeastern region of the model domain) surface water discharge, along the western model domain past the Dry Creek discharge regions, to near the northern reaches of West Richland. To aid model convergence, the BRR flux was stepped in at 20 percent flux intervals over the first five model time periods prior to reaching the full designated flux volume.

To evaluate and characterize how the BRR variant flow field model's additional western boundary fluxes affect the flow and transport patterns across Hanford, the following investigative methods were used:

1. **Steady state flow field head distribution analysis generated by MODFLOW.** The BRR variant flow field head distributions were compared to the head distributions in the *TC & WM EIS* Base Case flow field. Standard color ramp scales were used to compare model hydraulic head values. Head information was provided at the end-of-time (long-term steady state) model simulation time step of both models.

2. **Hanford Central Plateau directional flow field tracers (particle pathlines) analysis.** Central Plateau–originating directional flow pathlines (generated by MODPATH [MODFLOW particle-tracking postprocessing package]) from the long-term steady state flow field of the BRR variant flow field model were compared to those from the long-term steady state *TC & WM EIS* Base Case flow model.

3. **Steady state flow field vector analysis.** Groundwater Vistas, Version 4.2.5, Build 22 (ESI 2004), was utilized to interpret MODFLOW-generated flow field vectors within the BRR variant flow field model and compare them to the *TC & WM EIS* Base Case flow model vectors. Groundwater Vistas utilizes end-of-time (long-term steady state) MODFLOW output files to internally calculate model cell X and Y flow vectors. Vector length is on a logarithmic scale for display purposes. Standard color ramp and logarithmic scales used to distinguish vector lengths equally represent the velocities in the two flow fields. Contour lines are used to indicate a relative ratio of velocities between the two models.

The results of these analyses are included in Section V.4.1.

V.3.4 Methodology for Evaluating Vadose Zone Inundation

To determine the inundation depth to be applied to each Base Case STOMP model result, the *TC & WM EIS* Base Case flow model and the BRR variant flow field model were interrogated at each STOMP model location across Hanford to determine the inundation depth resulting from the additional flux from the BOR flow model. The inundation depth at these locations is equal to the calculated difference between the hydraulic head or water table elevation (above mean sea level [amsl]) in the *TC & WM EIS* Base Case flow model and the hydraulic head in the BRR variant flow field model. The inundation depth results from the rising water table. A calculation of the vadose zone decrease in depth (percentage) under BRR variant conditions compared to *TC & WM EIS* Base Case vadose zone depths was also performed.

The results of this analysis are included in Section V.4.2.

V.3.5 Methodology for Evaluating Changes to Vadose Zone Thickness and Travel Times

Analysis of the movement of water and various solutes through the vadose zone (unsaturated zone between the ground surface and groundwater) was required to evaluate the *TC & WM EIS* long-term impacts on groundwater quality. Within this *TC & WM EIS*, simulations of site-specific vadose zones were completed using the STOMP computer code. Further description of the *TC & WM EIS* STOMP modeling effort is included in Appendix N.

To evaluate the effects of the additional flux as described by the BOR model, vadose zone thickness (depth) must first be obtained at selected Hanford sites within the BRR variant flow field model and compared to the same location within the *TC & WM EIS* Base Case flow field model. Selected locations were interrogated in both models to determine the change in vadose zone thickness resulting from the additional BRR flux. The change of vadose zone thickness is the calculated difference between the hydraulic head in the *TC & WM EIS* Base Case model and the hydraulic head in the BRR variant flow field model. Table V–2 provides a summary of the *TC & WM EIS* Base Case model and the BRR variant flow field model head comparisons at selected locations related to the *TC & WM EIS* alternatives presented in Chapter 2.

Table V–2. Changes to Vadose Zone Thickness (Inundation Depth) Resulting from Black Rock Reservoir—Selected Hanford Site Locations Related to the *TC & WM EIS* Alternatives

Hanford Site Location	*TC & WM EIS* Base Case Flow Model Hydraulic Head	BRR Variant Flow Field Model Hydraulic Head	BRR Variant Change to Vadose Zone Thickness
	(meters)		
Core Zone, 200-East Area Integrated Disposal Facility	122.8	124.5	–1.7
Core Zone, 200-West Area Integrated Disposal Facility	137.5	146.9	–9.4
Core Zone, River Protection Project Disposal Facility	128.5	134.8	–6.3
200-West Area, trenches 31 and 34	136.8	146.3	–9.5

Note: To convert meters to feet, multiply by 3.281.

Key: BRR=Black Rock Reservoir; *TC & WM EIS=Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington.*

Selection of these Hanford locations for vadose zone analysis was based on a preference for the Waste Management alternatives involving the greatest variety of waste forms evaluated in this *TC & WM EIS*. Those Waste Management alternatives are described in Chapter 2.

Using the change to vadose zone thickness results included in Table V–1, variants to the *TC & WM EIS* Base Case STOMP models used at the selected locations were developed by removing an equivalent number of nodes at the bottom of the STOMP model to account for a shortened vadose zone. Further, the bottom boundary condition was adjusted accordingly to the lowest active layer. These site-specific BRR variant STOMP models and site-equivalent *TC & WM EIS* Base Case STOMP models were run at identical Waste Management alternative locations (10,000 years) using 1 curie of technetium-99, as described in Appendix N. Technetium-99 was chosen as a conservative tracer radionuclide because it is highly mobile and has a relatively long half-life of 2.13×10^5 years (decays approximately 3.2 percent in 10,000 years).

The results of this analysis are included in Section V.4.2.

V.3.6 Methodology for Evaluating Changes to the Year of Peak Concentration at the Columbia River

A groundwater flow and transport analysis was performed using the BRR variant flow field and *TC & WM EIS* Base Case flow field to evaluate peak concentration arrival time to the Columbia River. Particle tracking computer code was used to simulate the migration of contaminants through each flow field (aquifer). Comprehensive discussion of the Base Case flow field development and extraction for use is included in Appendix L. Detailed groundwater transport information can be found in Appendix O.

Contaminant transport analysis was performed to compare the concentration results for technetium-99 at the Columbia River for the *TC & WM EIS* Base Case model and BRR variant model flow fields during the 500-year Hanford postoperational period (1940–2440). This comparison was based on the release of 1 curie of technetium-99 from each of the 10 barriers (A, B, S, T, and U Barrier boundaries; trenches 31 and 34; the 200-East and 200-West Area Integrated Disposal Facilities; the Fast Flux Test Facility (FFTF); and the River Protection Project Disposal Facility). For purposes of analysis, this unit release is assumed to have occurred in calendar year 2090, a time after which the BRR will have achieved long-term steady state condition. These releases occurred in the center of each barrier in a 10- by 10-meter (32.8- by 32.8-foot) square. The peak concentrations results for technetium-99 at the Columbia River for both the *TC & WM EIS* Base Case model and BRR variant model flow fields are further discussed in Section V.4.3.

V.4 MODEL RESULTS

This section describes the results of the analyses described in Sections V.3.3, V.3.4, V.3.5, and V.3.6. In all analyses, the BRR variant flow field model was compared and contrasted with the *TC & WM EIS* Base Case flow model.

V.4.1 Changes to Flow Field and Transport Patterns

Steady State Head Distribution

Model long-term steady state groundwater head values are illustrated in Figure V–2 (*TC & WM EIS* Base Case flow field model), Figure V–3 (BRR variant flow field model), and Figure V–4 (hydraulic head difference between the *TC & WM EIS* Base Case and BRR variant flow field models).

The distribution of head values across the *TC & WM EIS* Base Case flow model indicates a progressive slope across the model from west to east towards the Columbia River. Groundwater head is the highest along the western regions of the model between Cold Creek and Dry Creek at 156 meters (512 feet); the lowest modeled groundwater head along the Columbia River (or eastern model domain) ranges from 106 to 114 meters (348 to 374 feet).

Unlike the *TC & WM EIS* Base Case model, the distribution of head values across the BRR variant flow field model has a steeper slope west to east across the model domain. A mounded groundwater head, 162 meters (532 feet) at its highest point, is observed within the northwestern portion of the model between Cold Creek and Dry Creek east of the flux line provided by BOR. This mound within the western region of the flow field is due to the prominence of relatively low hydraulic conductivity values of the Ringold Formation along with increased recharge from BRR along the western regions of the model. The mounded slope (west to east) of groundwater caused by the increased recharge quickly dissipates in the middle of the model (east of Gable Mountain–Gable Butte Gap [Gable Gap] and east of the 400 Area) where higher hydraulic conductivity values of the Hanford formation are encountered. Eastern region head values in the BRR variant flow field model resemble the head values observed in the *TC & WM EIS* Base Case flow model.

Within the Core Zone of the BRR variant flow field model, the west to east slope of hydraulic head values is steep. Compared to the *TC & WM EIS* Base Case flow field, the head values in the 200-West Area are 9 to 14 meters (30 to 46 feet) higher and those in the 200-East Area are 1 to 2 meters (3 to 7 feet) higher. Tables V–1 and V–2 list the various head differences between the two models at specific site locations.

For comparison, in general, the Hanford operational period increased the groundwater elevation beneath the Core Zone more than 20 meters (66 feet) in the 200-West Area and approximately 10 meters (33 feet) in the 200-East Area through direct injection of wastewater discharge from the surface (Freedman 2008). The BRR variant flow field rise in groundwater elevation in the Core Zone (compared to the *TC & WM EIS* Base Case flow field) is less than the elevations observed during the Hanford operational period.

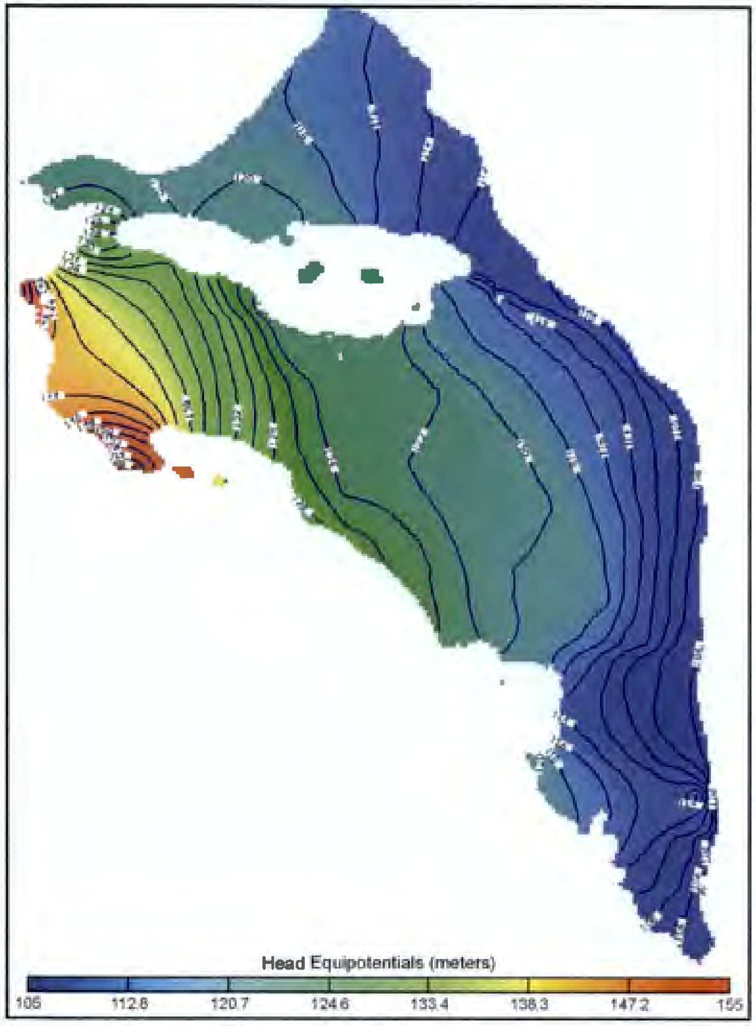


Figure V–2. ***TC & WM EIS*** **Base Case Flow Model – Long-Term Steady State Head Distribution (Hydraulic Head from Model Layer 19, 105–110 meters above mean sea level)**

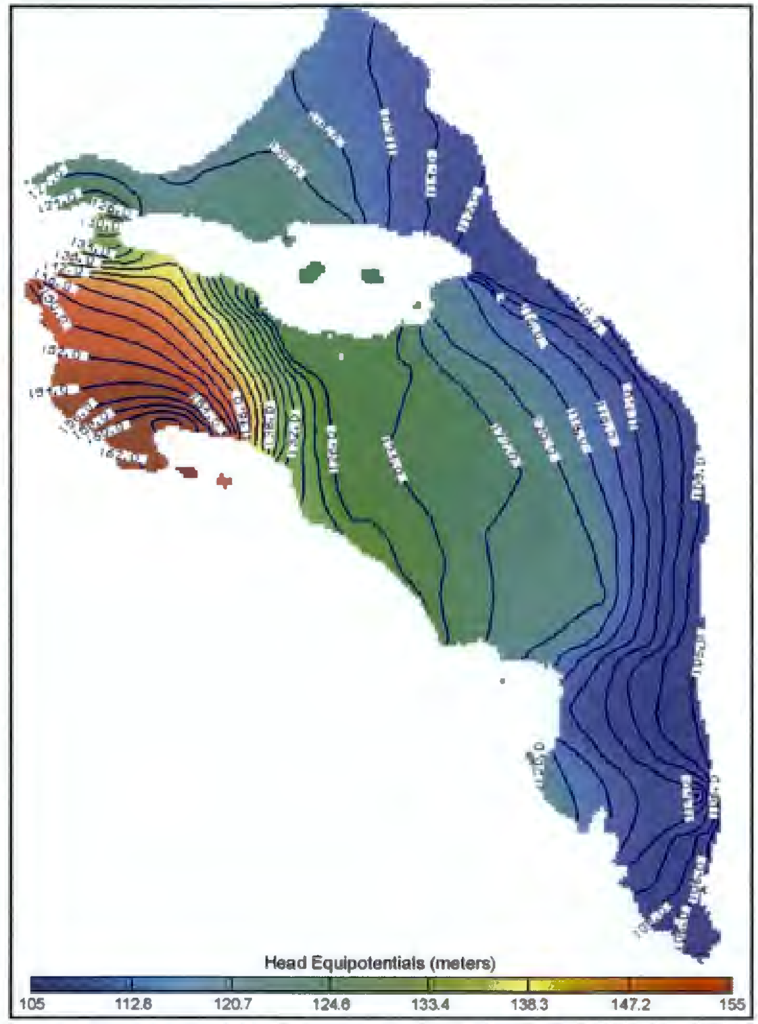


Figure V–3. Black Rock Reservoir Variant Flow Field Model – Long-Term Steady State Head Distribution (Hydraulic Head from Model Layer 19, 105–110 meters above mean sea level)

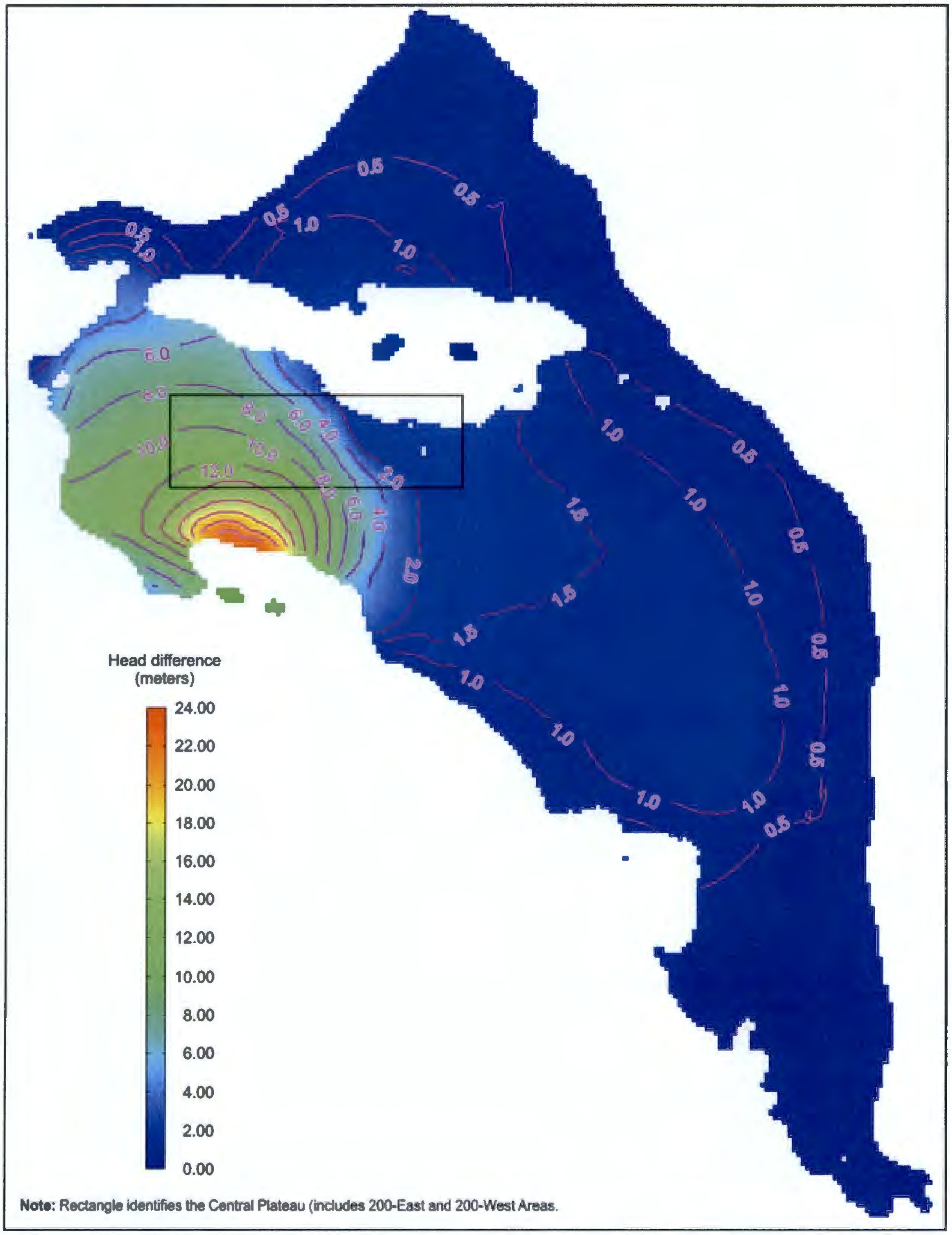


Figure V–4. Hydraulic Head Difference (meters) Between the Base Case Flow Model and Black Rock Reservoir Variant Flow Field Model (Hydraulic Head Difference from Model Layer 19, 105–110 meters above mean sea level)

Hanford Central Plateau Flow Field Particle Pathlines

The Central Plateau is an area located just south of Gable Gap. The Hanford Core Zone, which includes the 200-East and 200-West Areas, is part of the Central Plateau identified by the rectangle in Figure V–4. For particles released from the Central Plateau, there are significant differences in the direction of particle pathlines between the BRR variant flow field and the *TC & WM EIS* Base Case flow field. Directional flow field particle pathlines originating from a fixed Central Plateau regional box (64 square kilometers [24.7 square miles]) are illustrated in Figure V–5 (*TC & WM EIS* Base Case flow model) and Figure V–6 (BRR variant flow field model). In general, under BRR variant conditions, there is a western shift of the bifurcated groundwater divide separating flow to the north through Gable Gap and flow to the east across the flow field. Table V–3 summarizes the differences in the Central Plateau groundwater divide area between the *TC & WM EIS* Base Case flow field and the BRR variant flow field.

Table V–3. Central Plateau Particle Pathline Direction to the Columbia River

Flow Field Model	Area of Central Plateau with Particles Directed North Through Gable Mountain–Gable Butte Gap to the Columbia River		Area of Central Plateau with Particles Directed East to the Columbia River	
	Area (square kilometers)	Area (percent)	Area (square kilometers)	Area (percent)
TC & WM EIS Base Case flow field	24.8	39	39.2	61
BRR variant flow field	39.2	61	24.9	39

Note: To convert square kilometers to square miles, multiply by 0.3861.

Key: BRR=Black Rock Reservoir; *TC & WM EIS=Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington.*

In the *TC & WM EIS* Base Case flow model, the majority of particles released in the Central Plateau travel east towards the Columbia River. In general, particles released in the 200-East Area and the southern reaches of the 200-West Area are directed east. Approximately 61 percent (39.2 square kilometers [15.14 square miles]) of the particles released from the Central Plateau Area move to the east. For the remaining 39 percent (24.8 square kilometers [9.58 square miles]) of the Central Plateau, the majority of the 200-West Area, particles flow north through Gable Gap. Once through Gable Gap, the majority of particles move east towards the Columbia River, with a relatively small quantity of particles continuing in a northern direction also towards the Columbia River.

In contrast to the *TC & WM EIS* Base Case flow field, the BRR variant flow field shows significantly more particles in the Central Plateau directed northerly through Gable Gap. Approximately 39 percent (24.9 square kilometers [9.61 square miles]) of the particles released from the Central Plateau move east towards the Columbia River and approximately 61 percent (39.2 square kilometers [15.14 square miles]) move north through Gable Gap. Once through Gable Gap, particles in the BRR variant flow field model have a greater tendency to continue north towards the Columbia River rather than take the longer track turning east towards the Columbia River.

In general, the BRR variant flow field model has a greater amount of particles reaching the Columbia River in a shorter distance (directly north through Gable Gap). Unlike the *TC & WM EIS* Base Case flow field, the BRR variant flow field model shows a larger portion of particles released in the 200-East Area flowing to the north rather than across the model to the east. These additional redirected portions in the 200-East Area include the northern B, BX, and BY tank farms (and associated cribs and trenches [ditches]) and the proposed location of the River Protection Project Disposal Facility located in the northern part of the Central Plateau between the 200-East and 200-West Areas.

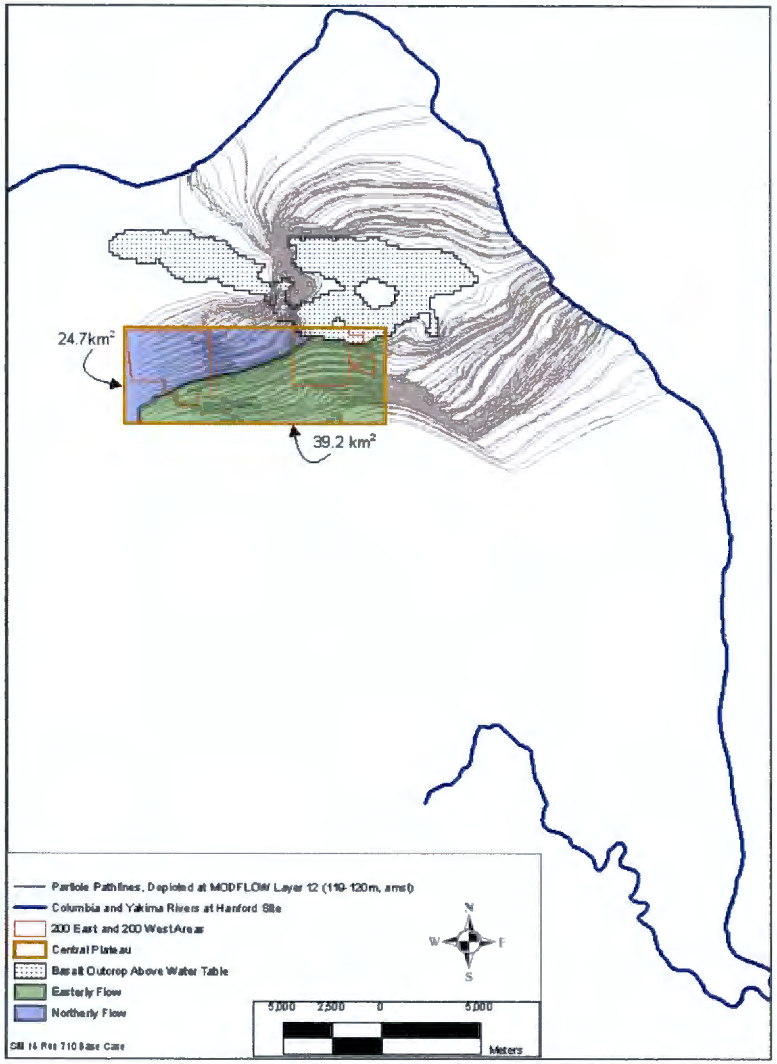


Figure V–5. Base Case Flow Field – Central Plateau Delineated Particle Pathlines

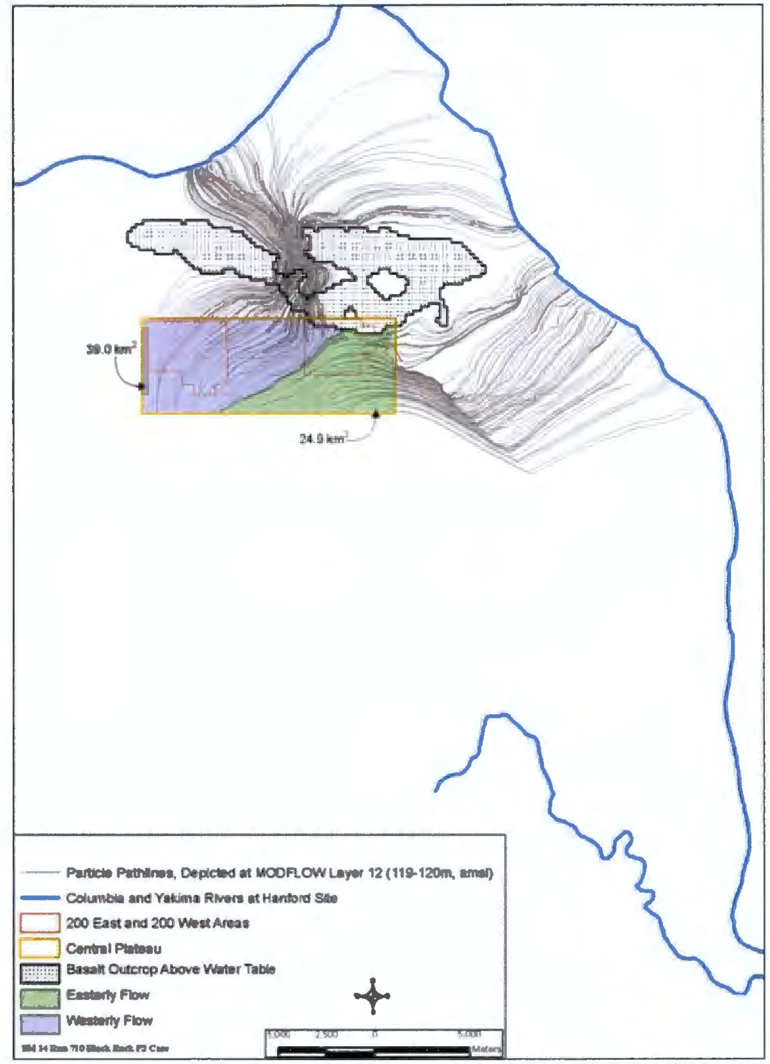


Figure V–6. Black Rock Reservoir Variant Flow Field – Central Plateau Delineated Particle Pathlines

<u>Steady State Flow Field Vectors</u>

Considering that the BRR variant flow field significantly increased recharge flux along the western model boundary and the subsequent increase in hydraulic gradient, groundwater flow velocities have increased relative to the *TC & WM EIS* Base Case flow field. Model cell X and Y steady state vector velocities are used to help quantify lateral flow direction of the BRR variant flow field relative to the *TC & WM EIS* Base Case flow field. Figures V–7 through V–20 are flow field vector illustrations generated by Groundwater Vistas comparing multiple layers within the BRR variant and *TC & WM EIS* Base Case flow fields. Groundwater Vistas utilizes end-of-time (long-term steady state) MODFLOW output files to internally calculate model cell X and Y flow vectors. Vector length is calculated using a logarithmic scale for purposes of display clarity. Standardized color ramps and logarithmic scales are used to uniformly distinguish and equally compare groundwater vectors between the two flow fields. Contour lines are used within the BRR variant flow field vector illustrations to indicate a relative ratio of velocity compared to the *TC & WM EIS* Base Case flow field. Model layers range in thickness but are identical in both models. Depending on model layer elevation, portions of Hanford may not have groundwater available for vector analysis (e.g., the model layer is above the specified water table elevation). Appendix L, Section L.4, further discusses groundwater flow field model grid design, cell properties, and boundary conditions and includes a sample cross section illustrating the depth of each model layer.

Model Layers 3 (135 to 140 meters [442.9 to 459.3 feet] amsl), 9 (122 to 123 meters [400.3 to 403.6 feet] amsl), 11 (120 to 121 meters [393.7 to 397 feet] amsl), 14 (117 to 118 meters [383.9 to 387.2 feet] amsl), 15 (116 to 117 meters [380.6 to 383.9 feet] amsl), 16 (115 to 116 meters [377.3 to 380.6 feet] amsl), and 20 (100 to 105 meters [328.1 to 344.5 feet] amsl) were compared between the two models.

The highest groundwater elevations that are easily comparable are observed in Layer 3 (135 to 140 meters [442.9 to 459.3 feet] amsl) of each model. In Layer 3, groundwater flow is only represented in the western reaches of the model domain near Cold Creek. The area of saturation within the model domain at this elevation is greater in the BRR model. BRR velocities within the Central Plateau are slightly higher, and there is a tendency for vectors to indicate direction to the north rather than to the east (as displayed in the *TC & WM EIS* Base Case model) beneath the Central Plateau. South of the Central Plateau, unlike the *TC & WM EIS* Base Case model, velocities are higher in the BRR model due to saturation of highly conductive Hanford formations due to the rising water table.

In Layer 9 (122 to 123 meters [400.3 to 403.6 feet] amsl) of both models, groundwater covers the entire Central Plateau. In general, velocities (0.1 to 1.5 meters [0.33 to 4.9 feet]/day) found in the area are similar beneath the Central Plateau with the exception of velocities closest to and within Gable Gap, where there is significantly greater velocity (greater than 10 meters [32.8 feet]/day) directed to the north within the BRR variant flow field model. In general, a larger area of the Hanford formation within the BRR model is covered with groundwater flow at this model layer elevation. Within the BRR variant flow field model, significantly more groundwater is flowing at higher velocities between the 200-East Area and the 400 Area, where the highly conductive Hanford formation is encountered.

Similar to Layer 9, Layer 11 (120 to 121 meters [393.7 to 397 feet] amsl) of both models indicates vectors beneath the western regions of the Central Plateau are similar, except the BRR model vector has a general tendency more to the north, while the *TC & WM EIS* Base Case model vector has a general tendency to the east. Order of magnitude velocity differences between the two models are noted in and north of Gable Gap. Unlike the *TC & WM EIS* Base Case model, the BRR model indicates a relatively high velocity channel of groundwater tracking through Gable Gap in a northwestern direction towards the Columbia River. This northwestern channel is further supplied by high velocity flow emitting from another shallow basalt gap west of Gable Gap. No significant differences in flow vectors between the two models are noted in the central and southern regions of Hanford.

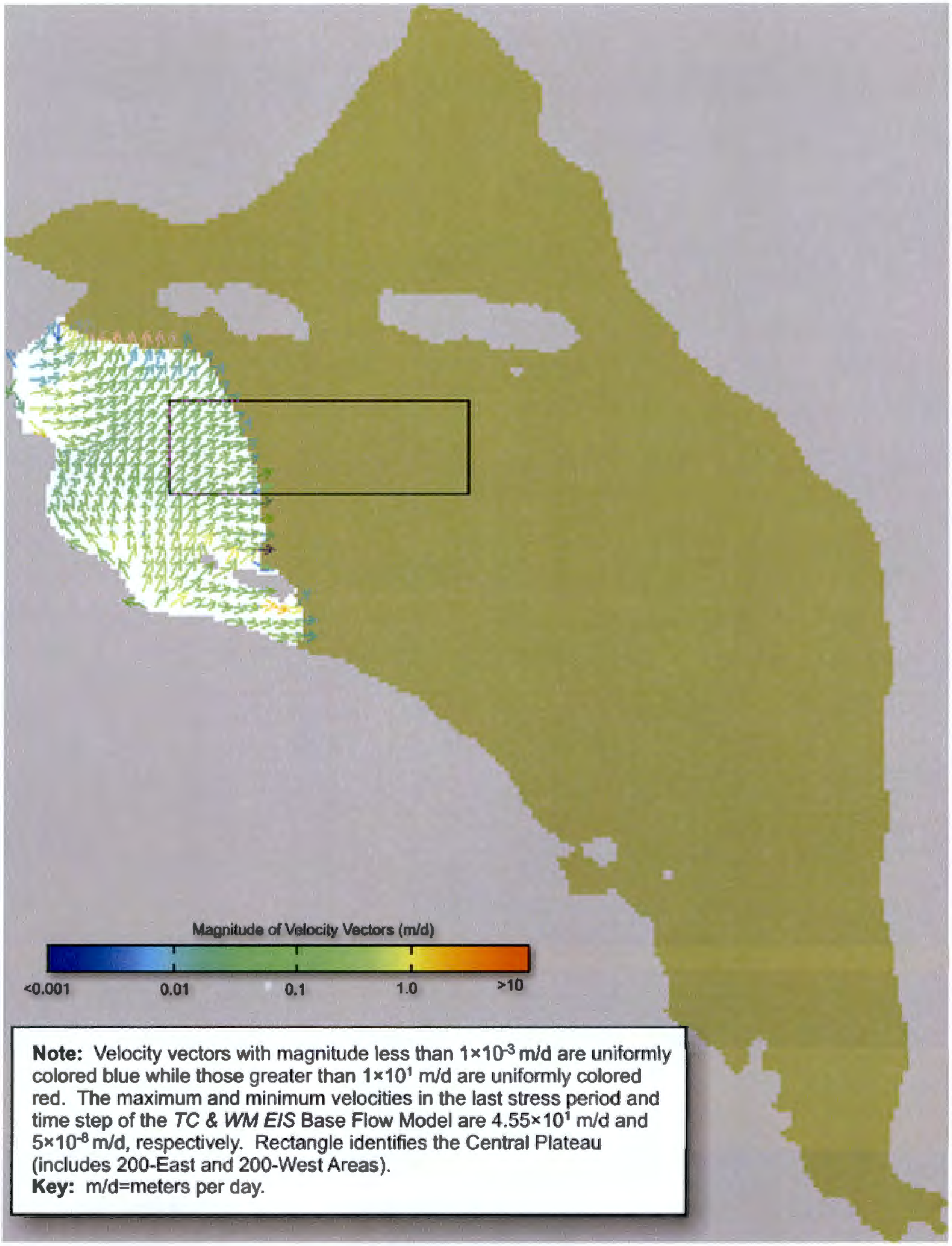


Figure V–7. Base Case Flow Model, Layer 3 (135–140 meters above mean sea level) Vector Velocities

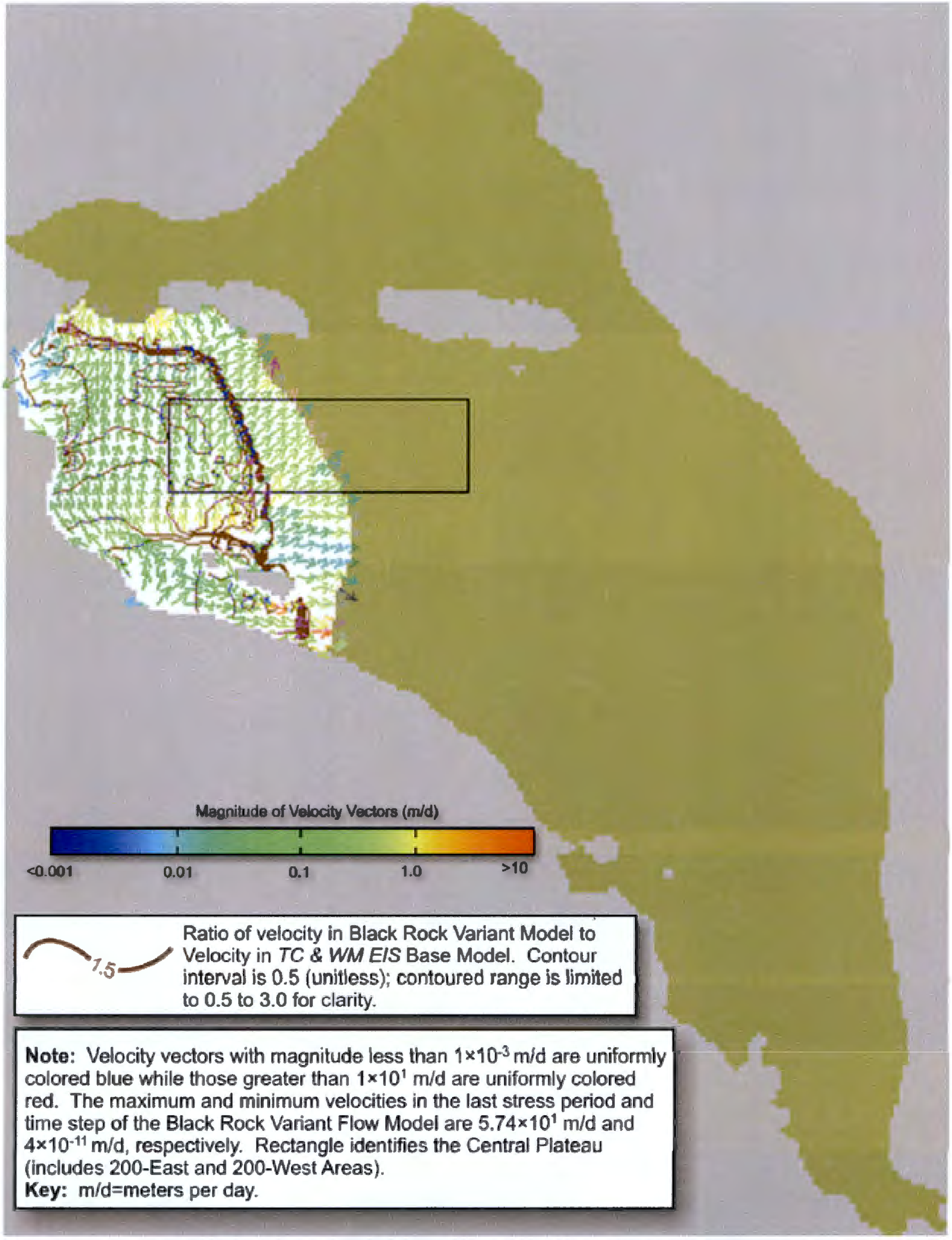


Figure V–8. Black Rock Reservoir Variant Flow Field Model, Layer 3 (135–140 meters above mean sea level) Vector Velocities

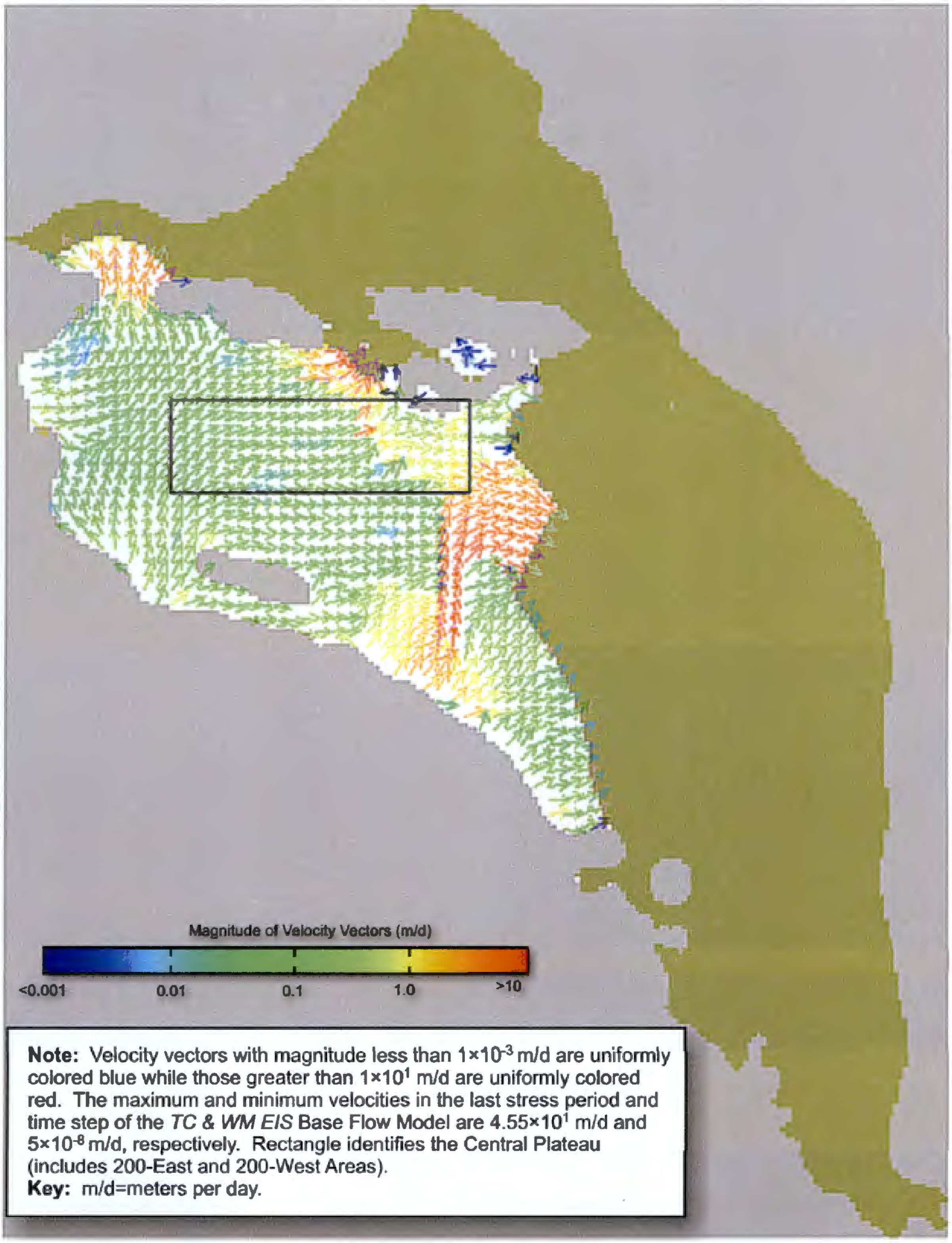


Figure V–9. Base Case Flow Model, Layer 9 (122–123 meters above mean sea level) Vector Velocities

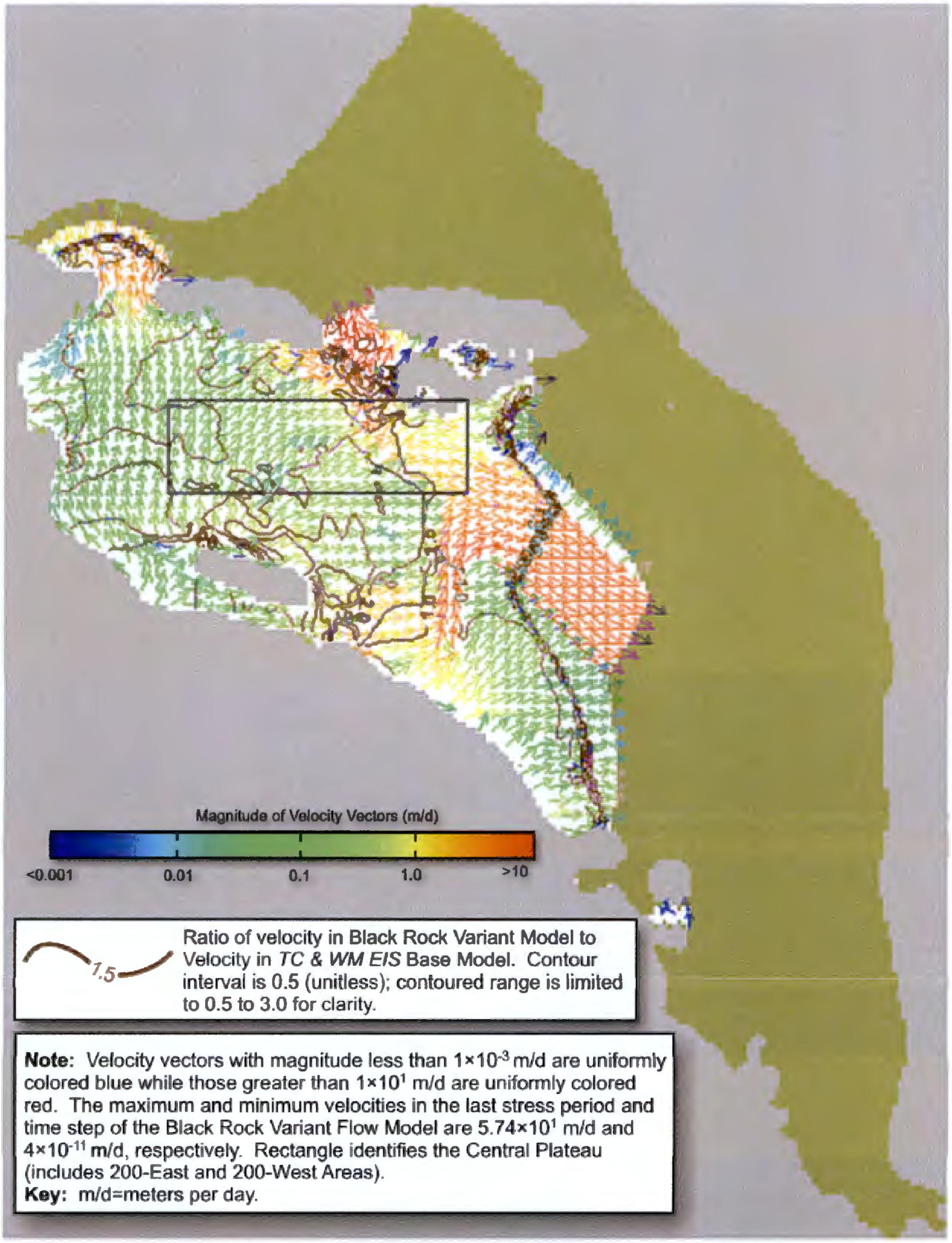


Figure V–10. Black Rock Reservoir Variant Flow Field Model, Layer 9 (122–123 meters above mean sea level) Vector Velocities

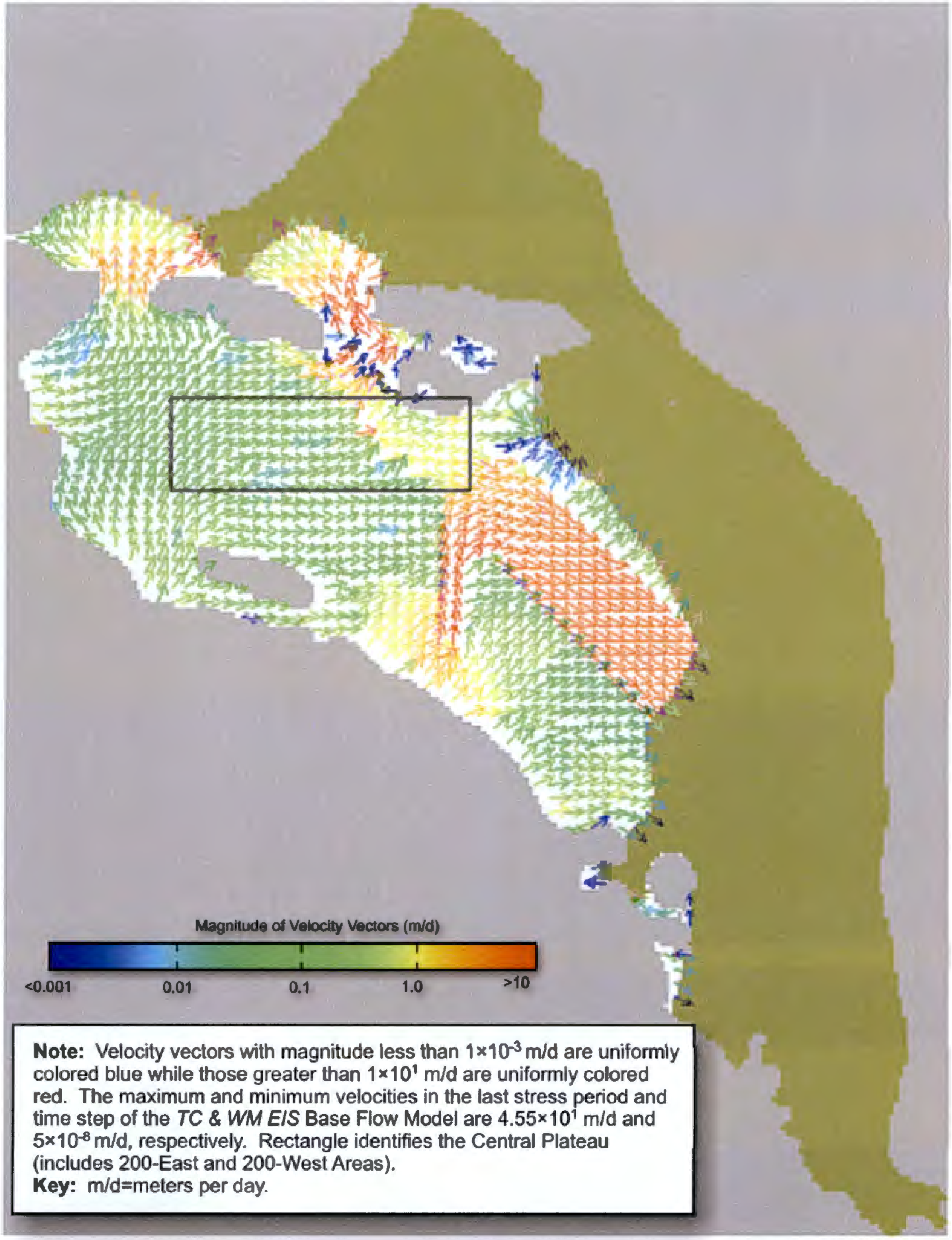


Figure V–11. Base Case Flow Model, Layer 11 (120–121 meters above mean sea level) Vector Velocities

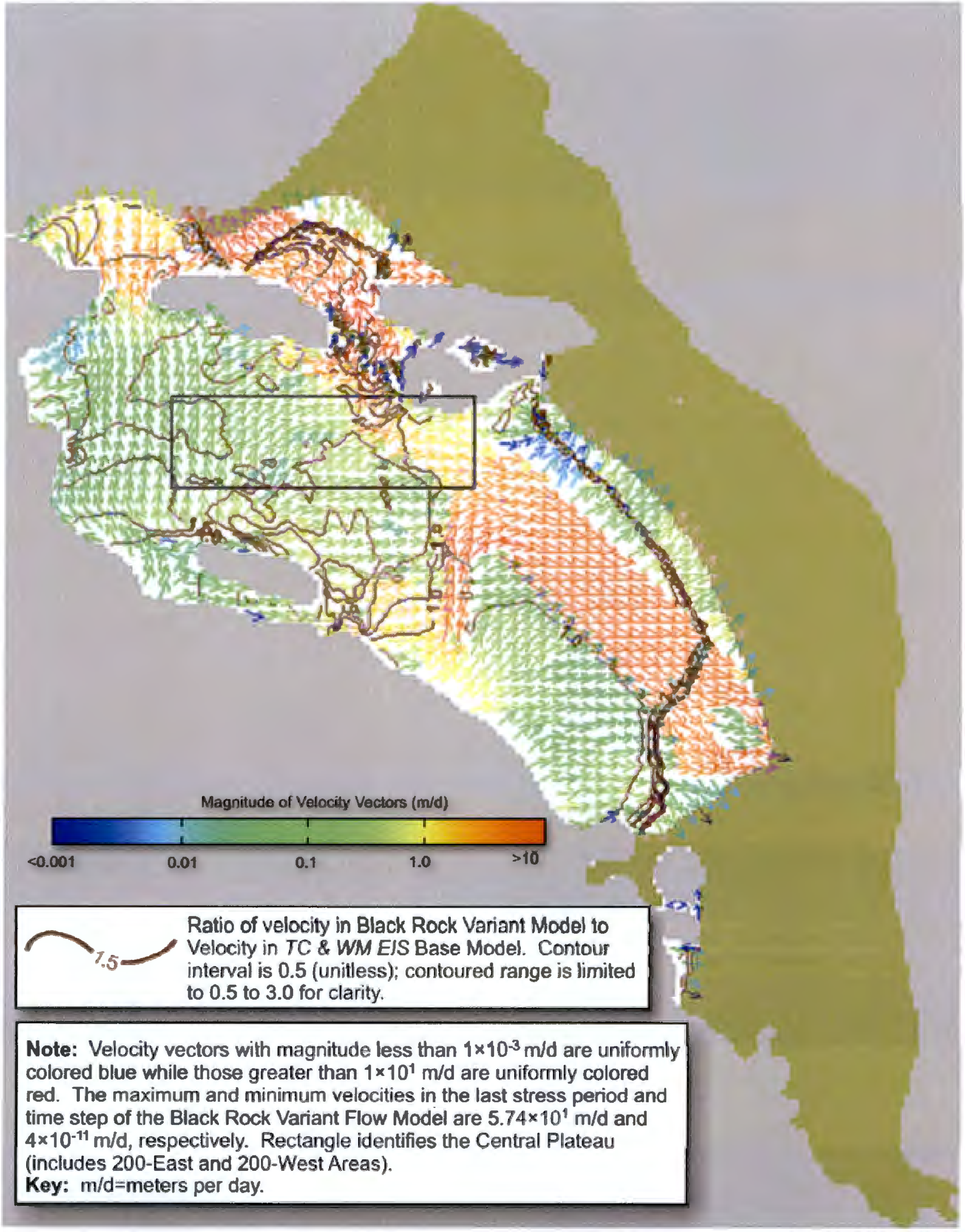
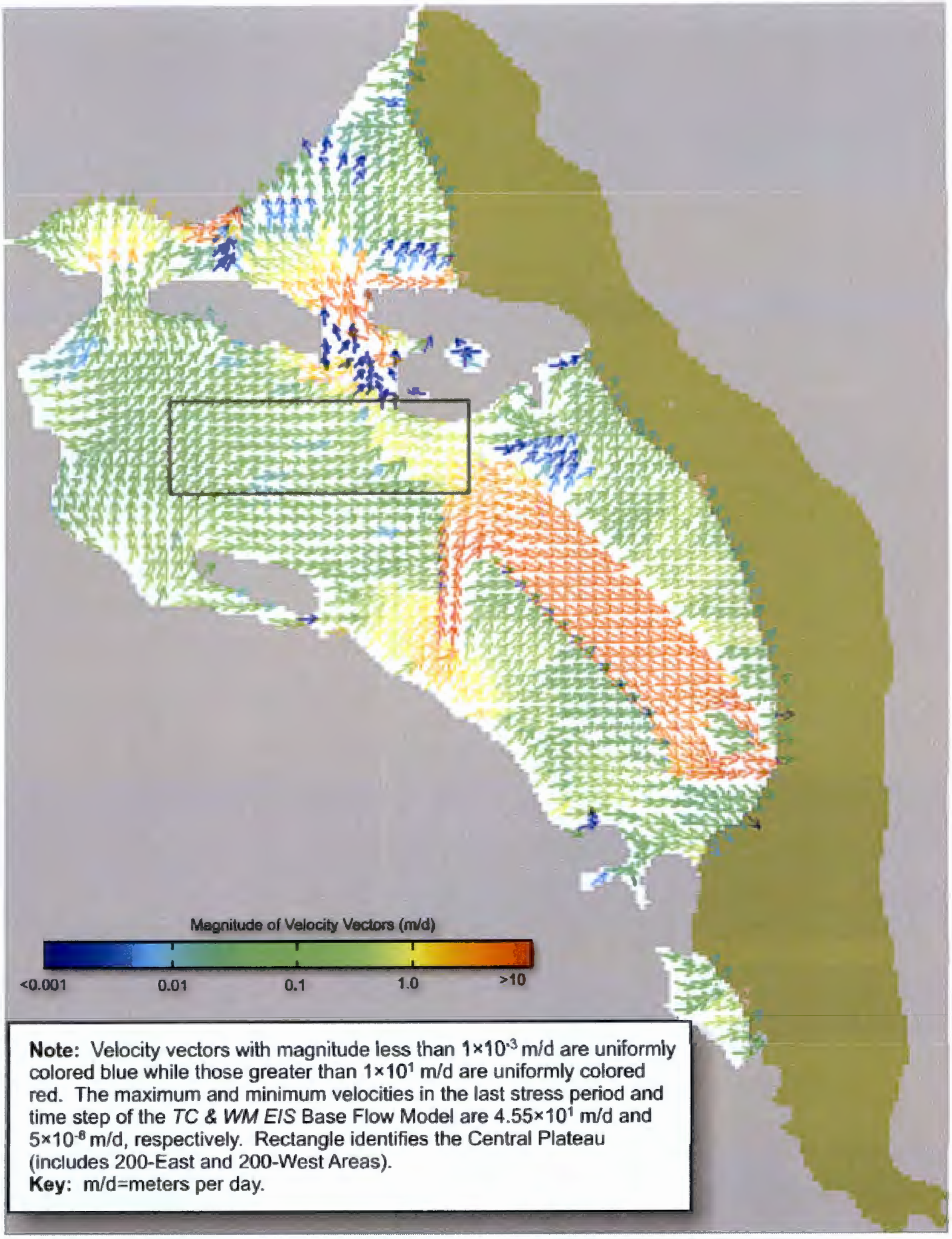


Figure V–12. Black Rock Reservoir Variant Flow Field Model, Layer 11 (120–121 meters above mean sea level) Vector Velocities



Note: Velocity vectors with magnitude less than 1×10^{-3} m/d are uniformly colored blue while those greater than 1×10^{1} m/d are uniformly colored red. The maximum and minimum velocities in the last stress period and time step of the *TC & WM EIS* Base Flow Model are 4.55×10^{1} m/d and 5×10^{-8} m/d, respectively. Rectangle identifies the Central Plateau (includes 200-East and 200-West Areas).
Key: m/d=meters per day.

Figure V–13. Base Case Flow Model, Layer 14 (117–118 meters above mean sea level) Vector Velocities

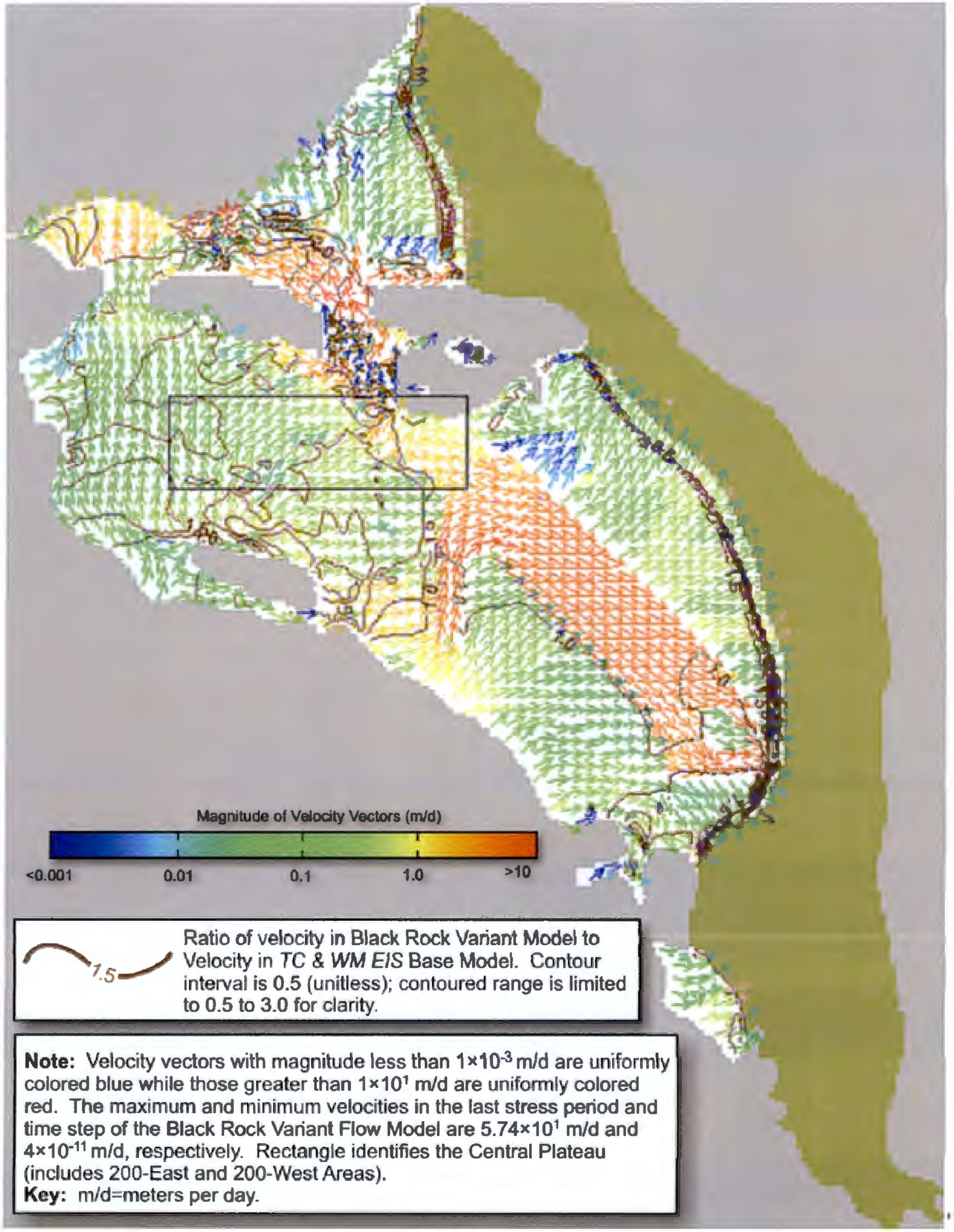


Figure V–14. Black Rock Reservoir Variant Flow Field Model, Layer 14 (117–118 meters above mean sea level) Vector Velocities

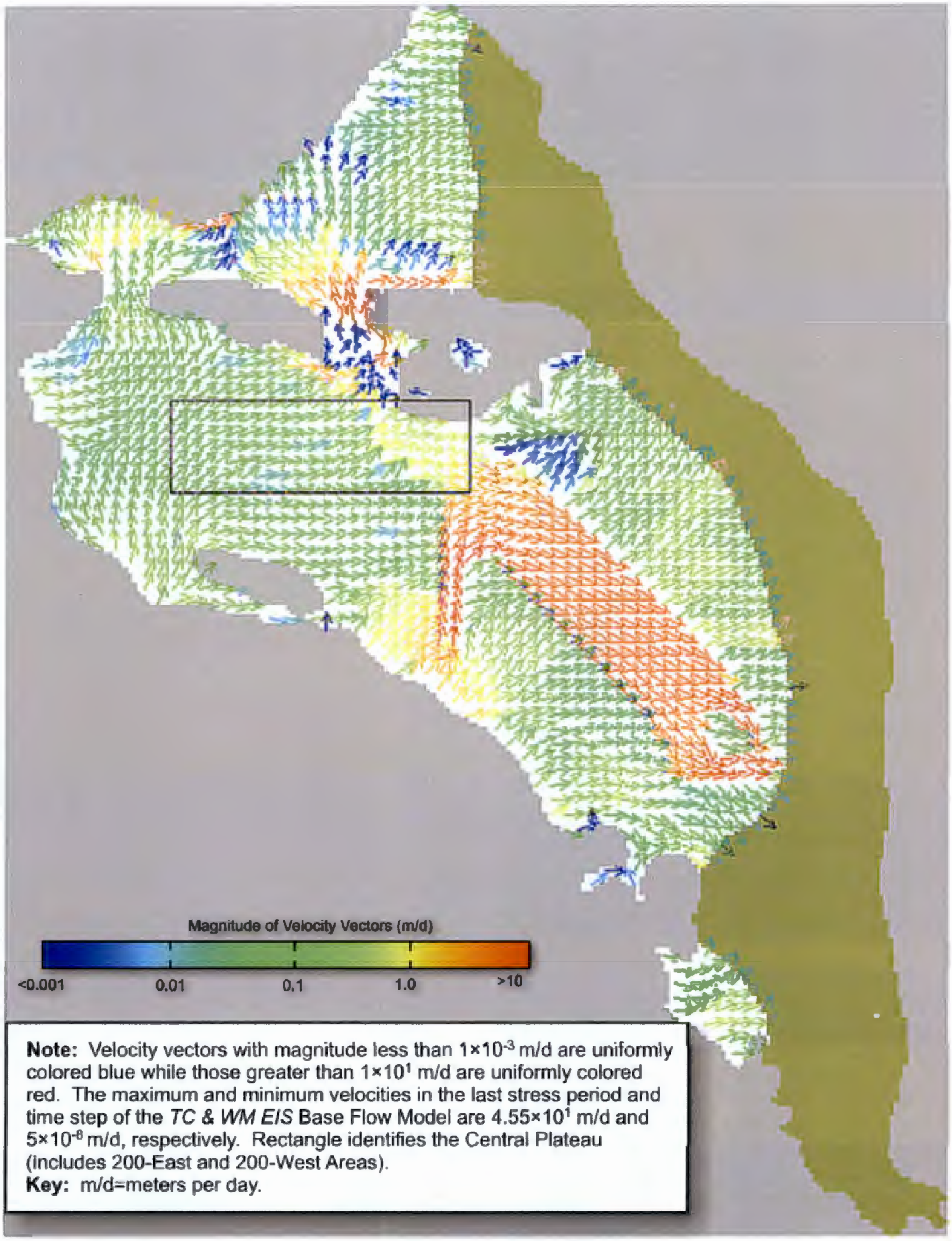


Figure V–15. Base Case Flow Model, Layer 15 (116–117 meters above mean sea level) Vector Velocities

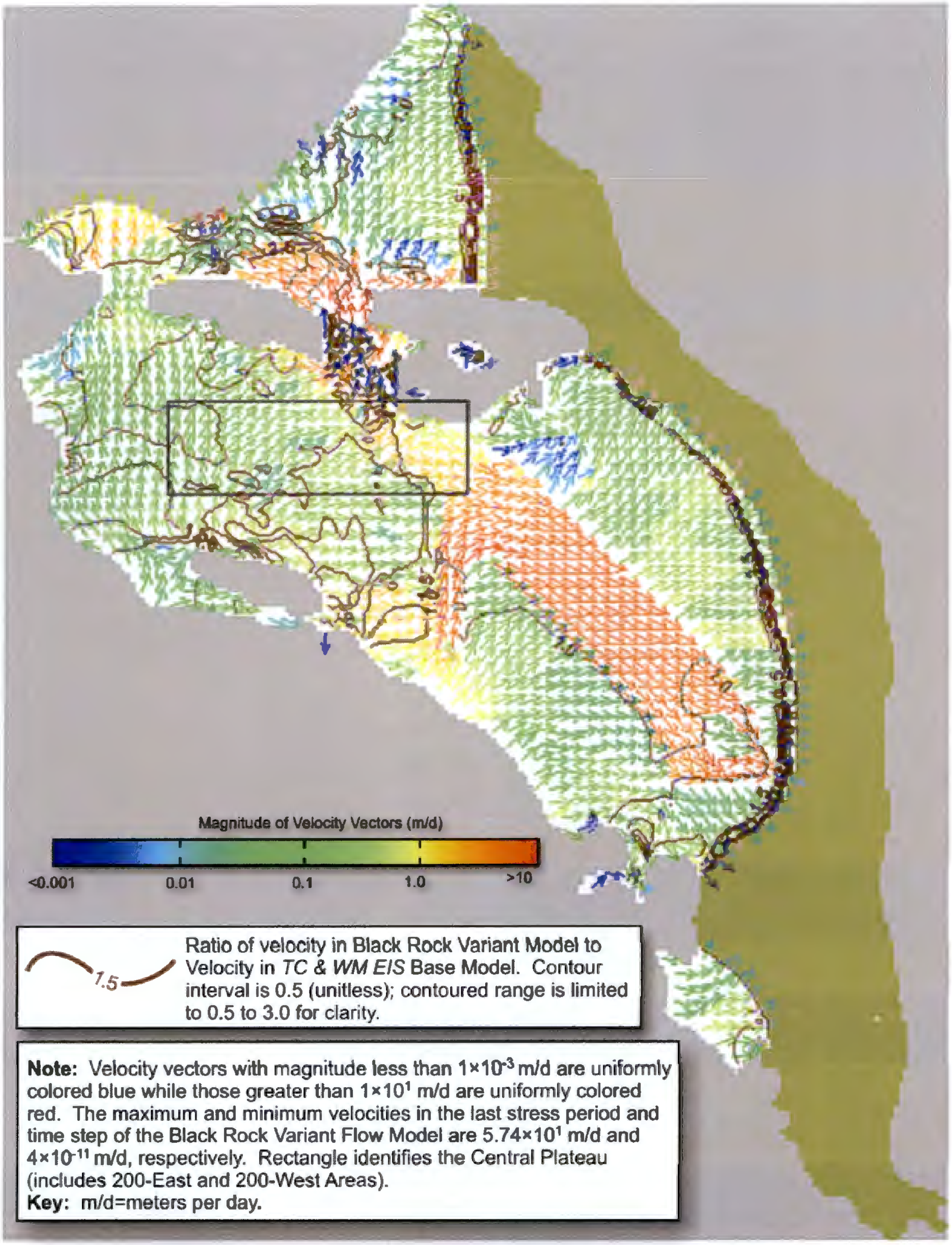


Figure V–16. Black Rock Reservoir Variant Flow Field Model, Layer 15 (116–117 meters above mean sea level) Vector Velocities

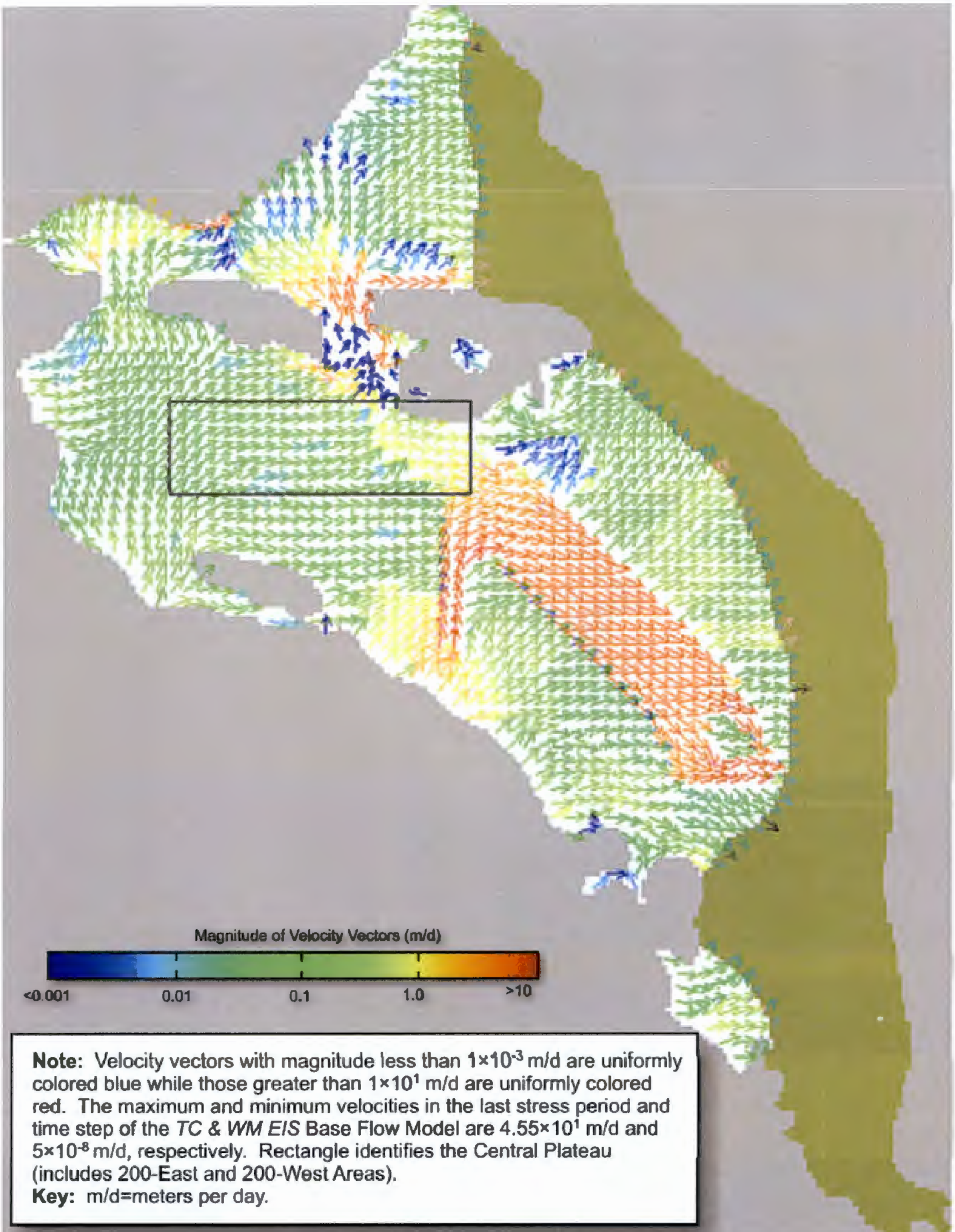


Figure V–17. Base Case Flow Model, Layer 16 (115–116 meters above mean sea level) Vector Velocities

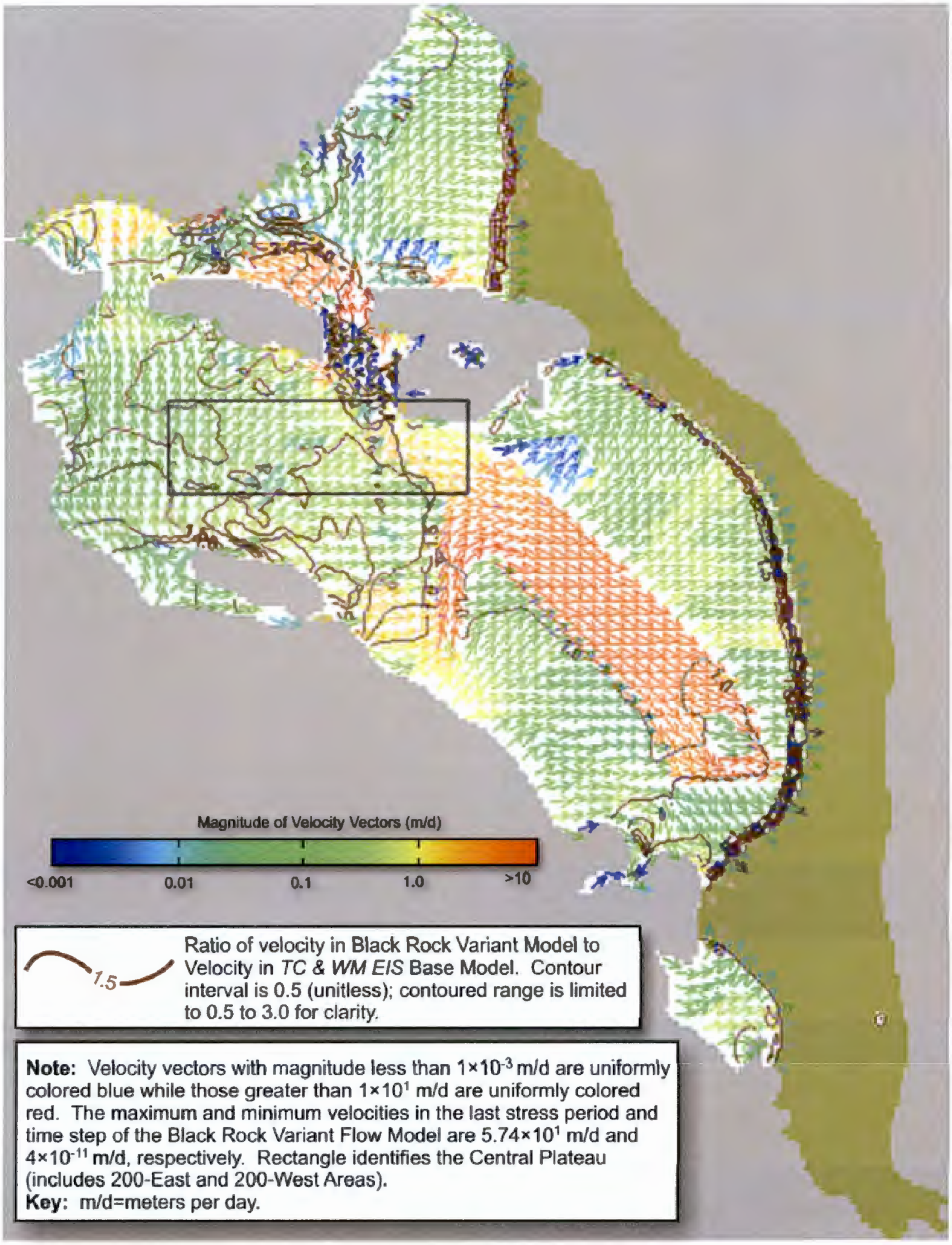


Figure V–18. Black Rock Reservoir Variant Flow Field Model, Layer 16 (115–116 meters above mean sea level) Vector Velocities

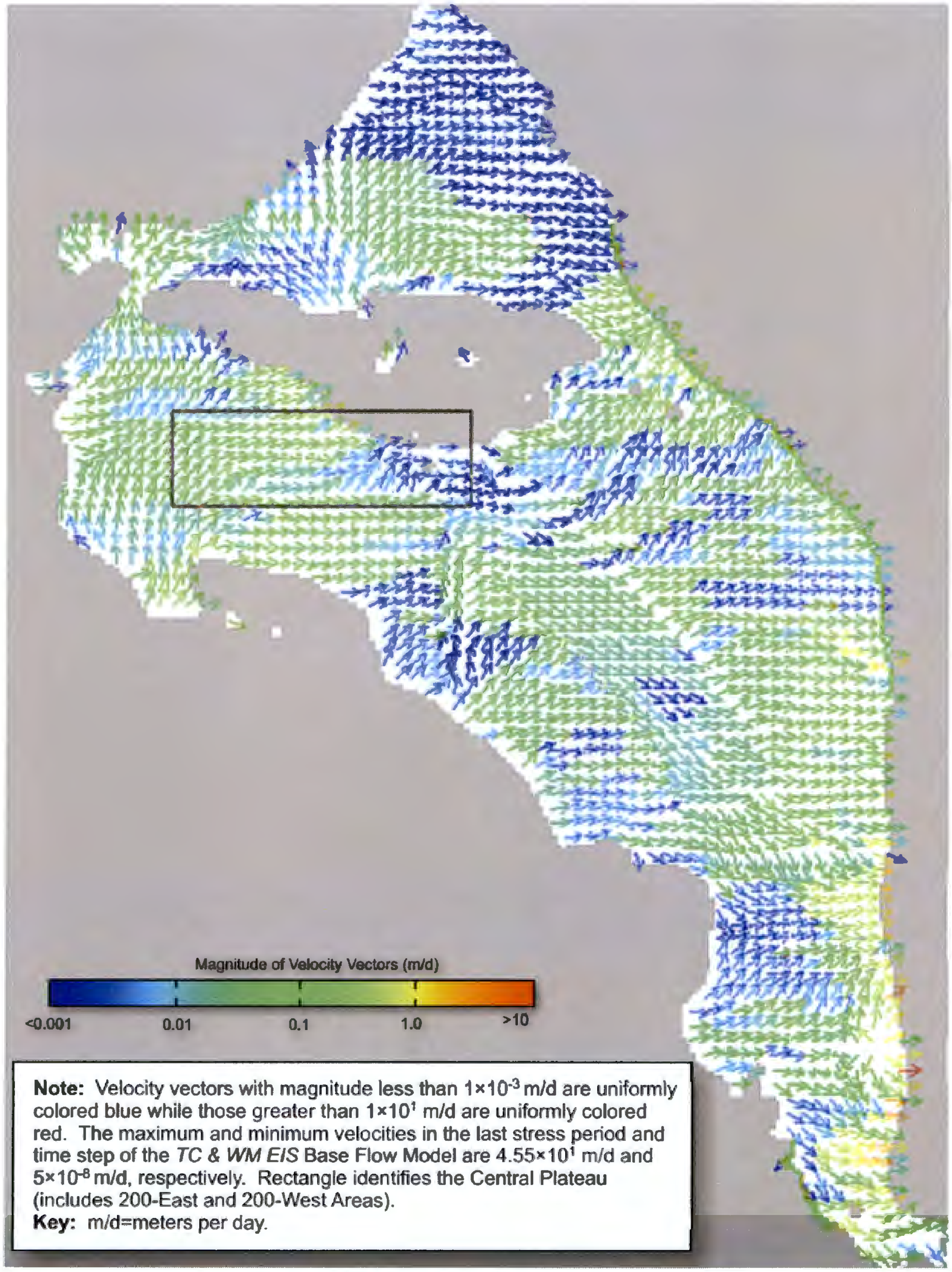


Figure V–19. Base Case Flow Model, Layer 20 (100–105 meters above mean sea level) Vector Velocities

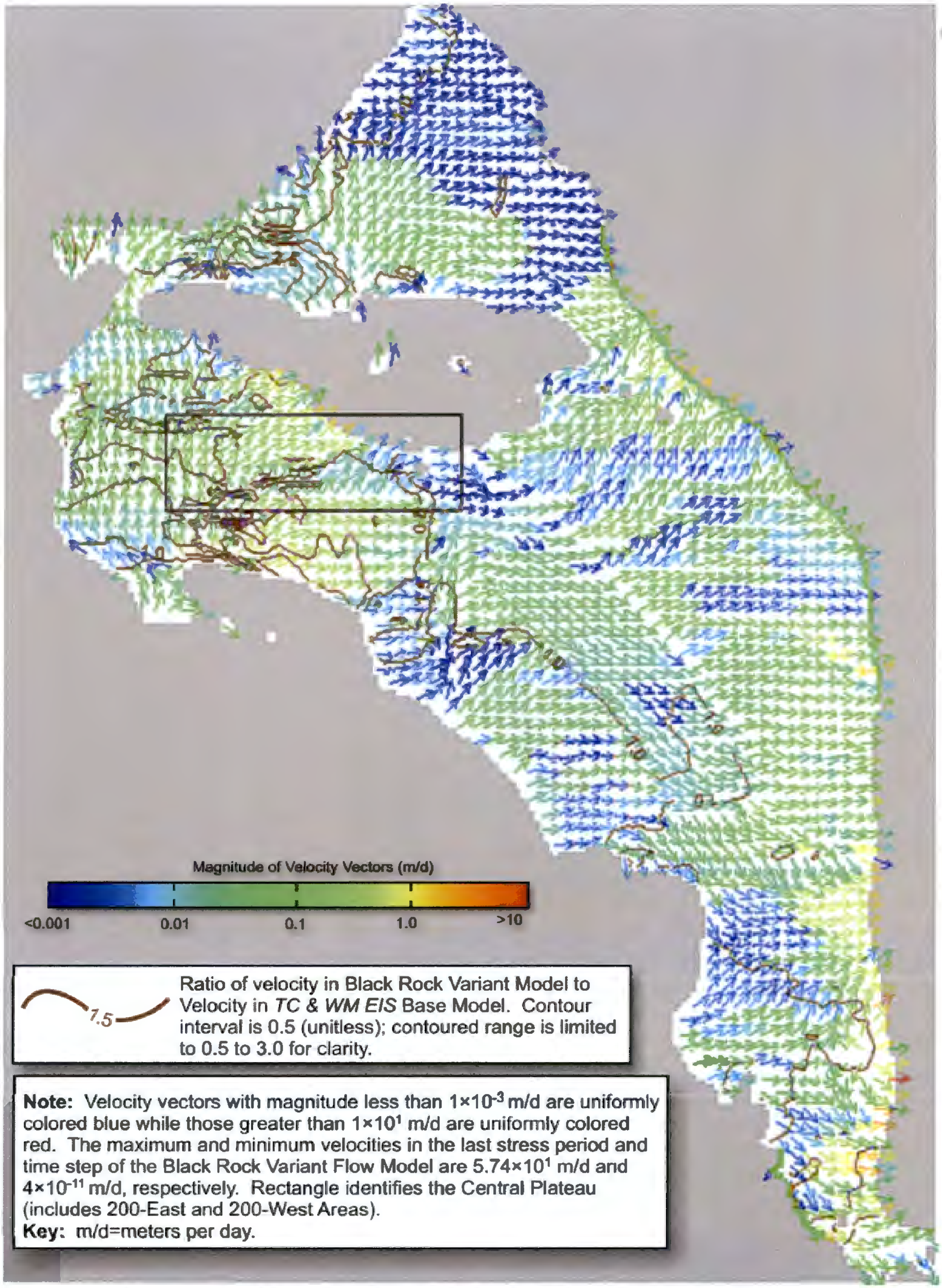


Figure V–20. Black Rock Reservoir Variant Flow Field Model, Layer 20 (100–105 meters above mean sea level) Vector Velocities

In Layers 14 (117 to 118 meters [383.9 to 387.2 feet] amsl), 15 (116 to 117 meters [380.6 to 383.9 feet] amsl), 16 (115 to 116 meters [377.3 to 380.6 feet] amsl), and 20 (100 to 105 meters [328.1 to 344.5 feet] amsl), only minor differences in groundwater flow vectors are noted between the models, with the exception of the tendency of flow through the Central Plateau to the north-northeast and into Gable Gap depicted in the BRR model. In general, the *TC & WM EIS* Base Case model depicts the area in the Central Plateau moving to the east at relatively low velocities. In all layers, unlike the *TC & WM EIS* Base Case model, the BRR model depicts a high velocity of flow channel through Gable Gap and in a northwesterly direction toward the Columbia River.

V.4.2 Changes to Vadose Zone Depth and Transport Travel Times

The inundation depth results from the rising water table associated with the BRR variant model are summarized in Table V–4. A calculation of the vadose zone decrease in depth (percentage) under BRR variant conditions compared to *TC & WM EIS* Base Case vadose zone depths is also included in Table V–4.

Table V–4. Inundation Depths Resulting from the Black Rock Reservoir Variant Flow Field Model – All Hanford Site STOMP Model Locations

Location	*TC & WM EIS* Base Case Flow Field Head (meters)	BRR Variant Flow Field Head (meters)	*TC & WM EIS* Base Case Vadose Zone Length (meters)	BRR Variant Inundation Depth (meters)	BRR Variant Decrease in Vadose Zone (percent)
T Barrier[a]	135.6	145.3	77	9.7	12.6
U Barrier[a]	136.6	148.4	68	11.8	17.4
S Barrier[a]	137.2	150.6	72	13.5	18.8
B Barrier[a]	122.8	124.5	81	1.7	2.1
A Barrier[a]	122.7	124.5	83	1.8	2.2
IDFW Barrier[a]	137.5	146.9	74	9.4	12.7
IDFE Barrier[a]	122.8	124.5	100	1.7	1.7
RPPDF Barrier[a]	128.5	134.8	90	6.3	7.0
FFTF Barrier[a]	119.3	120.7	44	1.4	3.2
T31 & T34 Barrier[a]	136.8	146.3	74	9.5	12.8
116-B-4	120.0	120.2	20	0.2	<1
116-B-6B	120.0	120.3	24	0.3	1.3
116-K-2d	118.6	118.8	12	0.2	1.7
116-K-2e	118.6	118.8	12	0.2	1.7
116-KE-4	118.9	119.3	18	0.4	2.2
116-KW-3	118.7	119	24	0.3	1.3
116-KE-1	119.0	119.5	24	0.5	2.1
116-KW-1	119.0	119.4	24	0.4	1.7
116-KE-2	119.0	119.4	24	0.4	1.7
120-KE-1	119.3	120.0	32	0.7	2.2
116-N-1a	118.2	118.2	24	0.0	0
116-N-1b	118.2	118.2	24	0.0	0
316-5	105.9	105.9	16	0.0	0
116-N-1c	118.2	118.2	24	0.0	0
116-N-1d	118.2	118.2	24	0.0	0
116-N-1e	118.2	118.2	24	0.0	0
116-N-1f	118.2	118.2	24	0.0	0
116-N-3a	118.1	118.2	24	0.1	<1

Table V–4. Inundation Depths Resulting from the Black Rock Reservoir Variant Flow Field Model – All Hanford Site STOMP Model Locations *(continued)*

Location	***TC & WM EIS*** **Base Case Flow Field Head (meters)**	**BRR Variant Flow Field Head (meters)**	***TC & WM EIS*** **Base Case Vadose Zone Length (meters)**	**BRR Variant Inundation Depth (meters)**	**BRR Variant Decrease in Vadose Zone (percent)**
116-N-3b	118.1	118.2	24	0.1	<1
116-N-3c	118.1	118.2	24	0.1	<1
116-N-3d	118.1	118.2	24	0.1	<1
116-N-3e	118.1	118.2	24	0.1	<1
116-N-3f	118.1	118.2	24	0.1	<1
316-1	105.7	105.8	12	0.1	<1
UPR-100-N-7	118.3	118.3	24	0.0	0
UPR-100-N-3	118.3	118.3	24	0.0	0
216-B-14	123.2	125.6	106	2.4	2.3
216-B-15	123.2	125.6	106	2.4	2.3
216-B-16	123.5	126.1	106	2.6	2.5
216-B-17	123.7	126.6	106	2.9	2.7
216-B-18	123.7	126.6	106	2.9	2.7
216-B-19	123.7	126.6	106	2.9	2.7
216-B-20	123.7	126.6	106	2.9	2.7
216-B-21	123.9	127.1	106	3.2	3.0
316-2	105.7	105.7	16	0.0	0
216-B-22	123.9	127.1	106	3.2	3.0
216-B-23	123.9	127.1	106	3.2	3.0
216-B-24	123.9	127.1	106	3.2	3.0
216-B-25	124.1	127.6	106	3.5	3.3
216-B-26	124.1	127.6	106	3.5	3.3
216-B-27	124.1	127.6	106	3.5	3.3
216-B-28	124.1	127.6	106	3.5	3.3
216-B-29	123.8	126.9	106	3.1	2.9
216-B-30	123.8	126.9	106	3.1	2.9
216-B-31	124.1	127.5	106	3.4	3.2
316-4	114.5	115.4	22	0.9	4.1
216-B-32	124.1	127.5	106	3.4	3.2
216-B-33	124.1	127.5	106	3.4	3.2
216-B-34	124.1	127.5	106	3.4	3.2
216-B-52	123.9	127.1	106	3.2	3.0
216-B-53A	123.6	126.4	106	2.8	2.6
216-B-53B	123.6	126.4	106	2.8	2.6
216-B-58	123.9	127.1	106	3.2	3.0
600 NRDWL[b]	122.0	123.6	42	1.6	3.8
600-148[b]	130.0	139.9	90	9.9	11.0
USEcol[b]	125.6	130.8	104	5.2	5.0
618-9	107.3	107.4	16	0.1	<1
200-E-103	122.7	124.5	100	1.8	1.8
200-E-107	122.7	124.5	100	1.8	1.8
200-E-136	122.8	124.5	100	1.7	1.7
200-E-54	122.7	124.5	100	1.8	1.8
200-E-61	122.7	124.5	100	1.8	1.8

Table V–4. Inundation Depths Resulting from the Black Rock Reservoir Variant Flow Field Model – All Hanford Site STOMP Model Locations *(continued)*

Location	*TC & WM EIS* Base Case Flow Field Head (meters)	BRR Variant Flow Field Head (meters)	*TC & WM EIS* Base Case Vadose Zone Length (meters)	BRR Variant Inundation Depth (meters)	BRR Variant Decrease in Vadose Zone (percent)
200-E-78	122.7	124.5	100	1.8	1.8
200-E-85	122.8	124.5	100	1.7	1.7
201-C	122.8	124.5	90	1.7	1.9
216-A-1	122.7	124.5	86	1.8	2.1
216-A-10	122.8	124.5	98	1.7	1.7
618-11	117.7	118.9	20	1.2	6.0
216-A-13	122.8	124.5	100	1.7	1.7
216-A-15	122.7	124.5	100	1.8	1.8
216-A-16	122.7	124.5	90	1.8	2.0
216-A-17	122.7	124.5	90	1.8	2.0
216-A-18	122.7	124.5	86	1.8	2.1
216-A-19	122.7	124.4	86	1.7	2.0
216-A-2	122.7	124.5	100	1.8	1.8
216-A-20	122.7	124.4	86	1.7	2.0
216-A-21	122.7	124.5	98	1.8	1.8
216-A-22	122.7	124.5	100	1.8	1.8
316-3	105.8	105.8	18	0.0	0
216-A-24	122.7	124.4	64	1.7	2.7
216-A-26	122.7	124.5	100	1.8	1.8
216-A-26A	122.7	124.5	100	1.8	1.8
216-A-27	122.7	124.5	98	1.8	1.8
216-A-28	122.7	124.5	100	1.8	1.8
216-A-3	122.7	124.5	100	1.8	1.8
216-A-30	122.7	124.4	86	1.7	2.0
216-A-31	122.7	124.5	98	1.8	1.8
216-A-32	122.7	124.5	100	1.8	1.8
216-A-35	122.8	124.5	100	1.7	1.7
UPR-300-1	106.0	106.1	14	0.1	<1
216-A-36-A	122.7	124.5	98	1.8	1.8
216-A-36-B	122.7	124.5	98	1.8	1.8
216-A-37-1	122.7	124.4	86	1.7	2.0
216-A-37-2	122.7	124.4	86	1.7	2.0
216-A-39	122.7	124.5	82	1.8	2.2
216-A-4	122.7	124.5	100	1.8	1.8
216-A-40	122.7	124.5	90	1.8	2.0
216-A-41	122.7	124.5	90	1.8	2.0
216-A-45	122.8	124.5	100	1.7	1.7
216-A-5	122.7	124.5	98	1.8	1.8
309-WS-1	106.1	106.1	20	0.0	0
216-A-6	122.7	124.5	92	1.8	2.0
216-A-7	122.7	124.5	86	1.8	2.1
216-A-8	122.7	124.4	86	1.7	2.0
216-A-9	122.7	124.5	90	1.8	2.0
216-C-1	122.8	124.5	90	1.7	1.9

Table V–4. Inundation Depths Resulting from the Black Rock Reservoir Variant Flow Field Model – All Hanford Site STOMP Model Locations *(continued)*

Location	*TC & WM EIS* Base Case Flow Field Head (meters)	BRR Variant Flow Field Head (meters)	*TC & WM EIS* Base Case Vadose Zone Length (meters)	BRR Variant Inundation Depth (meters)	BRR Variant Decrease in Vadose Zone (percent)
216-C-10	122.8	124.5	88	1.7	1.9
216-C-2	122.8	124.5	90	1.7	1.9
216-C-3	122.8	124.5	90	1.7	1.9
216-C-4	122.8	124.5	90	1.7	1.9
216-C-5	122.8	124.5	90	1.7	1.9
116-C-2A	120.0	120.4	36	0.4	1.1
300-264	106.3	106.3	14	0.0	0
216-C-6	122.8	124.5	90	1.7	1.9
216-C-9	122.8	124.5	88	1.7	1.9
218-C-9	122.8	124.5	88	1.7	1.9
218-E-1	122.8	124.5	100	1.7	1.7
218-E-12A	122.8	124.5	72	1.7	2.4
218-E-12B[b]	124.3	124.3	72	0.0	0
218-E-14	122.7	124.5	94	1.8	1.9
218-E-15	122.7	124.5	94	1.8	1.9
218-E-8	124.0	N/A	72	N/A	N/A
241-CX-72	122.8	124.5	90	1.7	1.9
216-B-3[b]	122.7	124.4	56	1.7	3.0
242-A	122.7	124.5	90	1.8	2.0
291-C-1	122.8	124.5	90	1.7	1.9
UPR-200-E-145	122.7	124.5	86	1.8	2.1
UPR-200-E-39	122.7	124.5	100	1.8	1.8
UPR-200-E-40	122.7	124.5	100	1.8	1.8
UPR-200-E-86	122.7	124.5	72	1.8	2.5
200-W-22	136.4	150.3	72	13.9	19.3
200-W-69	136.4	150.3	72	13.9	19.3
202-S	136.5	150.9	72	14.4	20.0
216-S-1&2	137.0	150.5	74	13.5	18.2
200-E-28	122.8	124.6	100	1.8	1.8
216-S-10P	138.4	154.2	72	15.8	21.9
216-S-11P	138.4	154.2	72	15.8	21.9
216-S-12	136.0	149.7	74	13.7	18.5
216-S-13	136.8	150.7	72	13.9	19.3
216-S-14	136.3	151.2	72	14.9	20.7
216-S-16P[b]	140.5	156.2	72	15.7	21.8
216-S-17[b]	139.1	154.8	72	15.6	21.7
216-S-19	135.8	151.2	72	15.4	21.4
216-S-20	136.1	150.5	72	14.4	20.0
216-S-22	135.6	149.7	74	14.1	19.1
200-E-30	122.8	124.6	100	1.8	1.8
216-S-23	136.3	148.5	74	12.2	16.5
216-S-25	137.8	151.4	68	13.6	20.0
216-S-26	136.1	150.8	72	14.7	20.4
216-S-3	136.8	149.6	74	12.8	17.3

Table V–4. Inundation Depths Resulting from the Black Rock Reservoir Variant Flow Field Model – All Hanford Site STOMP Model Locations *(continued)*

Location	*TC & WM EIS* Base Case Flow Field Head (meters)	BRR Variant Flow Field Head (meters)	*TC & WM EIS* Base Case Vadose Zone Length (meters)	BRR Variant Inundation Depth (meters)	BRR Variant Decrease in Vadose Zone (percent)
216-S-5	138.3	153.5	72	15.2	21.1
216-S-6	138.6	153.8	72	15.2	21.1
216-S-7	136.8	150.7	74	13.9	18.8
216-S-8	137.0	150.5	74	13.5	18.2
216-S-9	136.4	149.2	74	12.8	17.3
218-W-7	136.1	150.3	72	14.2	19.7
200-E-55	122.8	124.6	100	1.8	1.8
233-S	136.4	150.4	72	14.0	19.4
291-S	136.0	149.7	72	13.7	19.0
UPR-200-W-61	136.5	150.9	72	14.4	20.0
UPR-200-W-95	137.3	151.7	72	14.4	20.0
200-W-PP	135.5	145.9	76	10.4	13.7
200-W-45	133.7	142.5	88	8.8	10.0
200-W-9	134.3	143.4	88	9.1	10.3
216-T-1	134.0	142.6	88	8.6	9.8
216-T-12	135.7	144.7	86	9.0	10.5
216-T-13	135.8	145.5	72	9.7	13.5
200-E-95	122.8	124.6	100	1.8	1.8
216-T-2	134.3	143.4	88	9.1	10.3
216-T-20	135.4	145.5	70	10.1	14.4
216-T-27	135.6	145.5	70	9.9	14.1
216-T-29	133.7	142.5	88	8.8	10.0
216-T-3	134.6	143.8	86	9.2	10.7
216-T-33	134.0	143.0	88	9.0	10.2
216-T-34	134.4	143.1	82	8.7	10.6
216-T-35	134.7	143.6	82	8.9	10.9
216-T-36	135.7	145.1	72	9.4	13.1
216-T-4A[b]	135.7	144.8	76	9.1	12.0
200-E-97	122.8	124.6	100	1.8	1.8
216-T-6	135.0	144.3	86	9.3	10.8
216-T-8	133.9	142.8	88	8.9	10.1
216-TY-201	135.5	145.1	74	9.6	13.0
216-W-LWC	134.1	143.9	82	9.8	12.0
224-T	134.3	143.4	88	9.1	10.3
241-T-361	134.6	143.8	86	9.2	10.7
200-W-20a	134.0	143.0	88	9.0	10.2
200-W-20b	134.0	143.0	88	9.0	10.2
TRUSAF	134.3	143.4	88	9.1	10.3
UPR-200-W-102	134.3	143.4	88	9.1	10.3
2101-M-Pond	122.9	124.6	100	1.7	1.7
UPR-200-W-135	135.4	145.5	70	10.1	14.4
UPR-200-W-21	134.0	143.0	88	9.0	10.2
UPR-200-W-28	135.4	145.5	70	10.1	14.4
UPR-200-W-29	135.4	145.5	74	10.1	13.6

Table V–4. Inundation Depths Resulting from the Black Rock Reservoir Variant Flow Field Model – All Hanford Site STOMP Model Locations *(continued)*

Location	*TC & WM EIS* Base Case Flow Field Head (meters)	BRR Variant Flow Field Head (meters)	*TC & WM EIS* Base Case Vadose Zone Length (meters)	BRR Variant Inundation Depth (meters)	BRR Variant Decrease in Vadose Zone (percent)
UPR-200-W-38	134.3	143.4	88	9.1	10.3
UPR-200-W-97	135.5	145.1	74	9.6	13.0
200-W-44	134.8	145.7	78	10.9	14.0
207-U	136.3	148.0	72	11.7	16.3
216-S-21	137.1	150.1	68	13.0	19.1
216-S-4	137.5	150.5	68	13.0	19.1
212-B-CLS	122.8	124.6	100	1.8	1.8
216-U-1&2	135.7	147.1	78	11.4	14.6
216-U-10[b]	137.7	149.7	68	12.0	17.6
216-U-12	135.7	148.4	80	12.7	15.9
216-U-13	136.7	148.3	68	11.6	17.1
216-U-15	135.4	146.7	78	11.3	14.5
216-U-16	135.8	147.6	78	11.8	15.1
216-U-17	134.6	146.0	80	11.4	14.3
216-U-3	136.5	148.4	68	11.9	17.5
216-U-4	135.4	146.7	78	11.3	14.5
216-U-4A	135.4	146.7	78	11.3	14.5
216-B-10A	122.8	124.6	100	1.8	1.8
216-U-5	134.8	145.7	78	10.9	14.0
216-U-6	134.8	145.7	78	10.9	14.0
216-U-7	134.8	145.7	78	10.9	14.0
216-U-8	135.2	147.0	80	11.8	14.8
221-U	135.4	146.7	78	11.3	14.5
241-U-361	135.7	147.1	78	11.4	14.6
241-WR-Vault	134.8	145.7	78	10.9	14.0
UPR-200-W-101	135.4	146.7	78	11.3	14.5
UPR-200-W-138	134.8	145.7	78	10.9	14.0
UPR-200-W-163	135.0	146.5	76	11.5	15.1
116-C-2C	120.0	120.4	36	0.4	1.1
216-B-10B	122.8	124.6	100	1.8	1.8
UPR-200-W-39	135.4	146.7	78	11.3	14.5
216-Z-1&2	136.8	147.9	76	11.1	14.6
216-Z-10	136.5	147.1	76	10.6	13.9
216-Z-11	136.7	148.3	70	11.6	16.6
216-Z-12	137.1	148.2	76	11.1	14.6
216-Z-13	136.8	147.9	74	11.1	15.0
216-Z-14	136.8	147.9	74	11.1	15.0
216-Z-15	136.7	147.5	74	10.8	14.6
216-Z-16	136.5	147.1	76	10.6	13.9
216-B-11A & B	122.8	124.5	78	1.7	2.2
216-Z-17	136.5	147.1	76	10.6	13.9
216-Z-18	136.9	148.3	76	11.4	15.0
216-Z-1A	136.8	147.9	76	11.1	14.6
216-Z-20	136.6	147.9	70	11.3	16.1

Table V–4. Inundation Depths Resulting from the Black Rock Reservoir Variant Flow Field Model – All Hanford Site STOMP Model Locations *(continued)*

Location	*TC & WM EIS* Base Case Flow Field Head (meters)	BRR Variant Flow Field Head (meters)	*TC & WM EIS* Base Case Vadose Zone Length (meters)	BRR Variant Inundation Depth (meters)	BRR Variant Decrease in Vadose Zone (percent)
216-Z-21	136.1	147.1	72	11.0	15.3
216-Z-3	136.8	147.9	76	11.1	14.6
216-Z-4	136.5	147.1	76	10.6	13.9
216-Z-5	136.5	147.1	76	10.6	13.9
216-Z-6	136.5	147.1	76	10.6	13.9
216-Z-7	136.2	146.7	70	10.5	15.0
216-B-12	122.8	124.5	90	1.7	1.9
216-Z-8	136.3	147.1	68	10.8	15.9
216-Z-9	136.3	147.1	72	10.8	15.0
218-W-1	136.6	146.7	74	10.1	13.6
218-W-1A[b]	134.3	142.9	82	8.6	10.5
218-W-2	136.7	147.1	74	10.4	14.1
218-W-2A[b]	135.8	145.0	76	9.2	12.1
218-W-3	136.6	146.3	78	9.7	12.4
218-W-3A[b]	136.0	145.0	74	9.0	12.2
218-W-3AE[b]	135.4	144.2	74	8.8	11.9
218-W-4A[b]	136.3	146.1	78	9.8	12.6
216-B-4	122.8	124.6	100	1.8	1.8
218-W-4B	137.2	147.8	74	10.6	14.3
218-W-4C[b]	137.0	148.8	76	11.8	15.5
218-W-5[b]	136.6	145.8	74	9.2	12.4
231-Z-PuIF	136.5	147.1	76	10.6	13.9
232-Z	136.8	147.9	74	11.1	15.0
236-Z-PuRF	136.7	147.5	74	10.8	14.6
241-Z-361	136.8	147.9	72	11.1	15.4
242-Z-AmRF	136.7	147.5	74	10.8	14.6
2736-Z-PuFP	136.8	147.9	74	11.1	15.0
216-B-5	122.8	124.5	84	1.7	2.0
291-Z-EFCH	136.8	147.9	74	11.1	15.0
UPR-200-W-103	136.8	147.9	74	11.1	15.0
216-B-50	122.8	124.4	76	1.6	2.1
216-B-51	122.8	124.5	72	1.7	2.4
216-B-54	123.9	127.1	106	3.2	3.0
216-B-55	122.8	124.6	90	1.8	2.0
216-B-57	122.8	124.5	76	1.7	2.2
116-B-1	119.9	119.9	16	0.0	0
216-B-59	122.8	124.5	84	1.7	2.0
216-B-6	122.8	124.5	100	1.7	1.7
216-B-60	122.8	124.6	100	1.8	1.8
216-B-62	122.8	124.5	90	1.7	1.9
216-B-63	122.7	124.5	78	1.8	2.3
216-B-9	122.8	124.5	84	1.7	2.0
218-E-10[b]	122.8	124.5	86	1.7	2.0
218-E-2	122.8	124.5	84	1.7	2.0

Table V–4. Inundation Depths Resulting from the Black Rock Reservoir Variant Flow Field Model – All Hanford Site STOMP Model Locations *(continued)*

Location	*TC & WM EIS* Base Case Flow Field Head (meters)	BRR Variant Flow Field Head (meters)	*TC & WM EIS* Base Case Vadose Zone Length (meters)	BRR Variant Inundation Depth (meters)	BRR Variant Decrease in Vadose Zone (percent)
218-E-4	122.8	124.5	84	1.7	2.0
218-E-5	122.8	124.5	84	1.7	2.0
116-B-11	119.9	119.9	16	0.0	0
218-E-5A	122.8	124.5	84	1.7	2.0
221-B-BPS	122.8	124.5	100	1.7	1.7
224-B	122.8	124.6	100	1.8	1.8
241-B-361	122.8	124.5	84	1.7	2.0
UPR-200-E-7	122.8	124.5	84	1.7	2.0
UPR-200-E-77	122.8	124.5	90	1.7	1.9
UPR-200-E-78	122.8	124.5	84	1.7	2.0
UPR-200-E-79	122.8	124.5	80	1.7	2.1
UPR-200-E-84	122.8	124.6	80	1.8	2.3
UPR-200-E-85	122.8	124.5	100	1.7	1.7
116-C-1	119.7	119.8	16	0.1	<1
UPR-200-E-87	122.8	124.6	100	1.8	1.8
UPR-200-E-9	122.8	124.5	76	1.7	2.2
WESF	122.8	124.6	100	1.8	1.8
116-D-1A	117.3	117.4	26	0.1	<1
116-D-1B	117.3	117.4	26	0.1	<1
116-DR-7	117.4	117.5	28	0.1	<1
116-D-7	117.5	117.5	20	0.0	0
116-DR-1&2	117.3	117.3	20	0.0	0
116-DR-9	117.3	117.4	20	0.1	<1
116-DR-6	117.2	117.4	28	0.2	<1
116-C-5	119.9	120.0	16	0.1	<1
116-F-6	113.8	113.9	14	0.1	<1
116-F-10	113.8	113.9	14	0.1	<1
116-F-4	113.9	114.0	14	0.1	<1
116-F-3	113.8	113.9	14	0.1	<1
116-F-2	113.6	113.7	18	0.1	<1
116-F-14	113.6	113.7	18	0.1	<1
116-F-9	113.7	113.7	18	0.0	0
216-A-25a[b]	121.3	123.1	16	1.8	11.3
216-A-25b	123.0	N/A	16	N/A	N/A
216-A-25a[b]	121.3	123.1	16	1.8	11.3
216-A-25b	123.0	N/A	16	N/A	N/A
216-A-25c	123.0	N/A	16	N/A	N/A
116-B-5	120.0	120.2	20	0.2	<1
216-A-25d	123.0	N/A	16	N/A	N/A
216-A-25e	123.0	N/A	16	N/A	N/A
216-A-25f	123.0	N/A	16	N/A	N/A
216-N-1	125.5	128.2	54	2.7	5.0
216-N-2	125.5	N/A	54	N/A	N/A
216-N-3	125.5	N/A	54	N/A	N/A

Table V–4. Inundation Depths Resulting from the Black Rock Reservoir Variant Flow Field Model – All Hanford Site STOMP Model Locations *(continued)*

Location	*TC & WM EIS* Base Case Flow Field Head (meters)	BRR Variant Flow Field Head (meters)	*TC & WM EIS* Base Case Vadose Zone Length (meters)	BRR Variant Inundation Depth (meters)	BRR Variant Decrease in Vadose Zone (percent)
216-N-4	122.8	123.9	54	1.1	2.0
216-N-5	121.5	122.8	54	1.3	2.4
216-N-6	121.7	123.3	58	1.6	2.8
216-N-7	121.0	122.8	54	1.8	3.3
116-B-6A	120.0	120.3	24	0.3	1.3
116-H-3	115.4	115.4	16	0.0	0
116-H-4	115.5	115.5	16	0.0	0
116-H-1	115.2	115.2	14	0.0	0
116-H-7	115.2	115.3	14	0.1	<1
116-H-2	115.5	115.5	16	0.0	0
100-H-33	115.3	115.4	14	0.1	<1
116-K-1	118.6	118.8	8	0.2	2.5
116-K-2a	118.6	118.8	12	0.2	1.7
116-K-2b	118.6	118.8	12	0.2	1.7
116-K-2c	118.6	118.8	12	0.2	1.7

[a] Average values were calculated at barriers. These values were used for all sites within that barrier for STOMP models used in the *TC & WM EIS* alternatives impact analysis. All other STOMP model sites were part of the *TC & WM EIS* cumulative impact analyses.

[b] Site footprint covers more than one model cell. Head values are expressed as an average of all model cells covered.

Note: N/A indicates that the top of basalt is above the water table at these waste sites. To convert meters to feet, multiply by 3.281.

Key: BRR=Black Rock Reservoir; FFTF=Fast Flux Test Facility; IDFE=200-East Area Integrated Disposal Facility; IDFW=200-West Area Integrated Disposal Facility; N/A=not applicable; NRDWL=Nonradioactive Dangerous Waste Landfill; RPPDF=River Protection Project Disposal Facility; STOMP=Subsurface Transport Over Multiple Phases; *TC & WM EIS=Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington*; WESF=the Waste Encapsulation and Storage Facility.

The results comparing vadose zone travel times under BRR variant flow field model conditions (elevated water table) and *TC & WM EIS* Base Case flow model conditions are illustrated in vadose zone STOMP flux output graphs, included as Figures V–21 through V–32. STOMP vadose zone transport simulations were run at identical Waste Management alternative locations (10,000 years) for each of the compared flow fields using 1 curie of technetium-99. The Hanford *TC & WM EIS* STOMP vadose zone simulation Waste Management alternative descriptions are summarized in Table V–5. Further description of the STOMP modeling process can be found in Appendix N.

Figures V–21 through V–32 are vadose zone STOMP flux output graphs comparing the BRR variant STOMP model conditions to the *TC & WM EIS* Base Case STOMP model conditions. Each graph displays flux output to the flow field (bottom of the vadose zone/top of the water table) over the 10,000-year period of analysis. Output to the flow field is measured in three concentric areas: "Flux 1," "Flux 2," and "Flux 3." "Flux 1" is the solute flux amount released to the flow field in a rectangular area directly below the source of technetium-99, "Flux 2" is the solute flux amount released to the flow field along a 50-meter (164.1-foot) perimeter surrounding the "Flux 1" area, and "Flux 3" is the solute flux amount released to the flow field along the outermost area of the site-specific STOMP modeled domain.

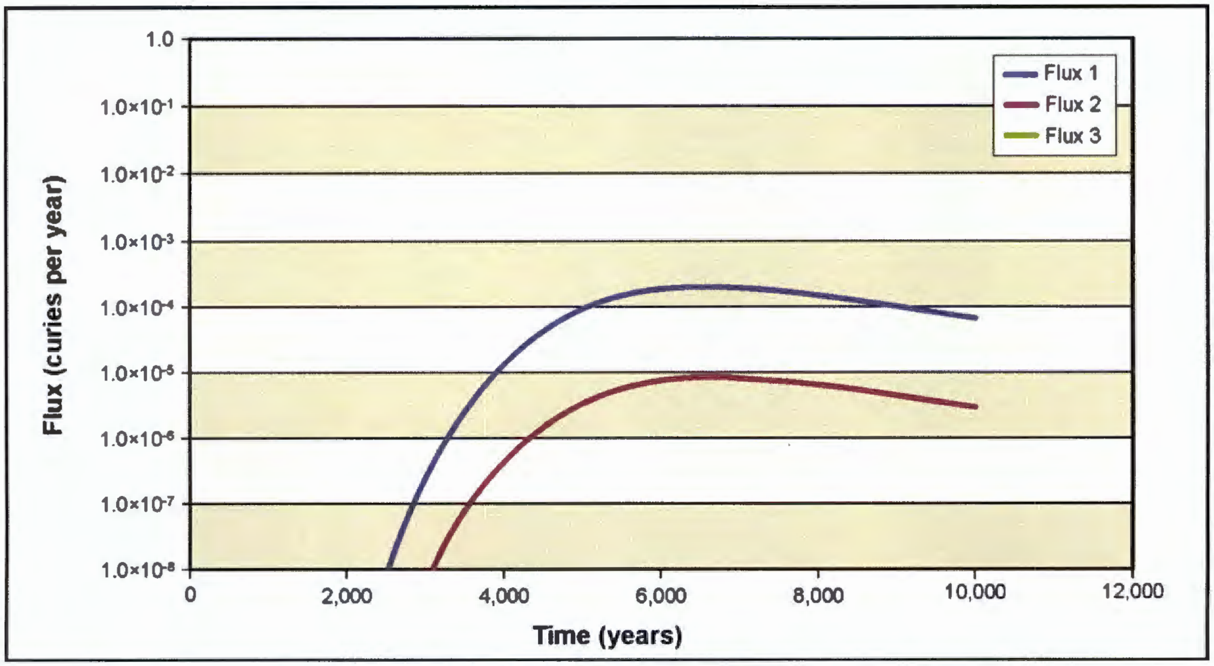


Figure V–21. Base Case Flow Model – Vadose Zone Flux Release over Time, 200-East Area Integrated Disposal Facility

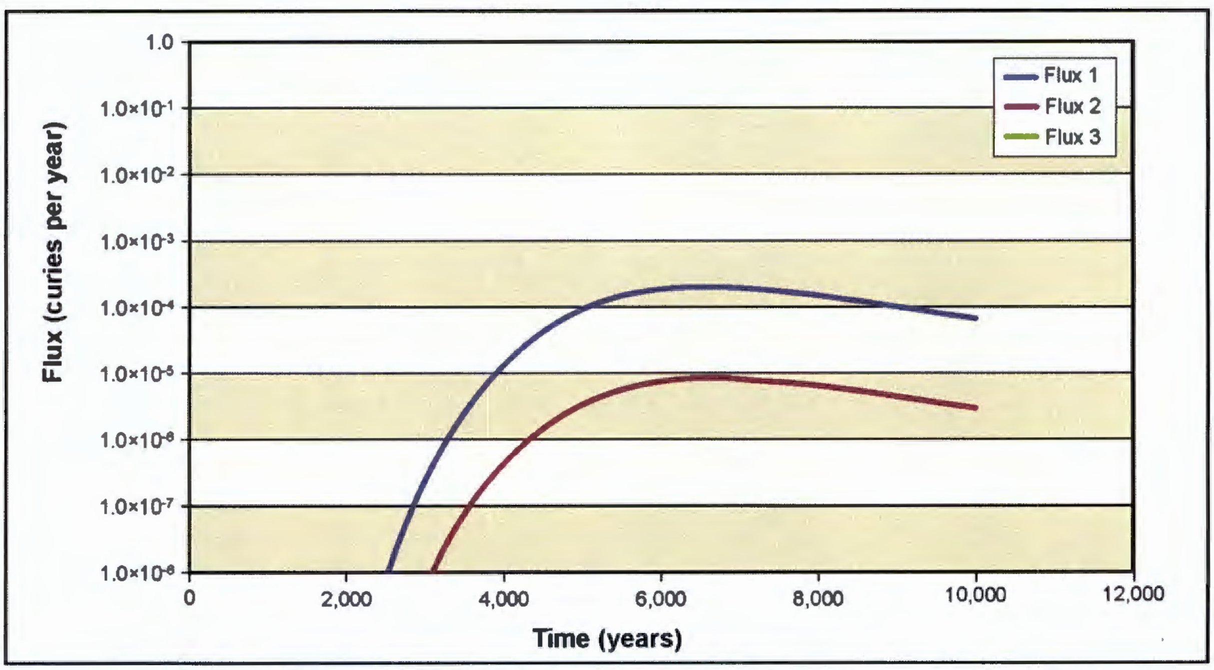


Figure V–22. Black Rock Reservoir Variant Flow Field Model – Vadose Zone Flux Release over Time, 200-East Area Integrated Disposal Facility

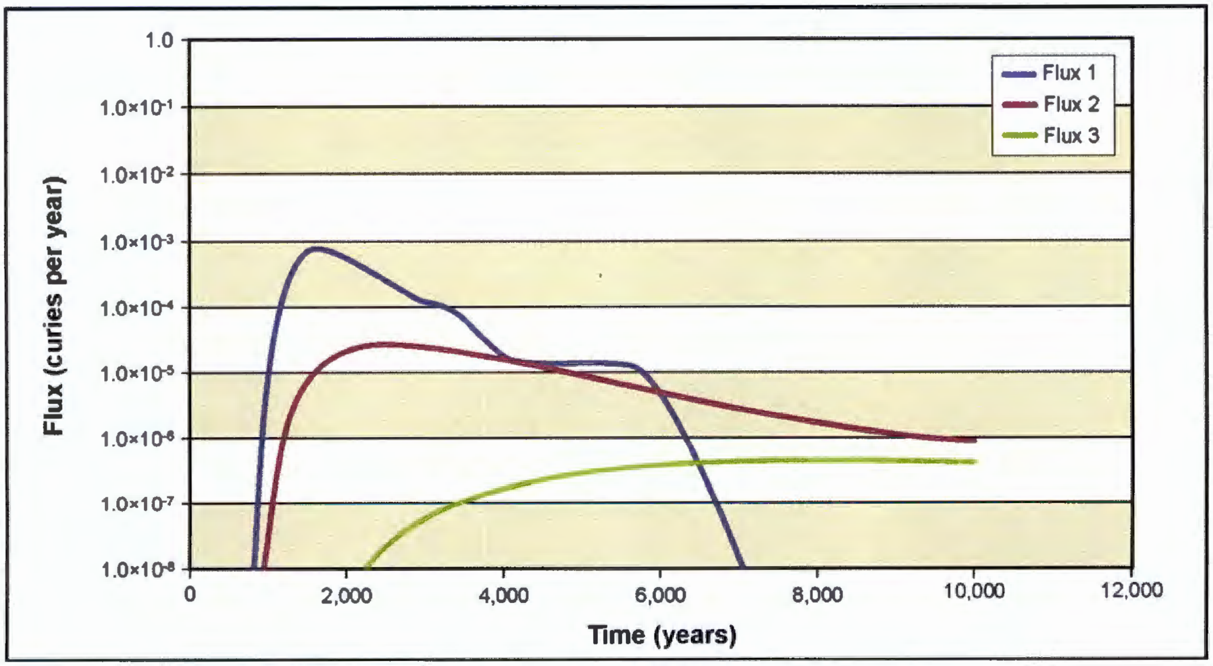


Figure V–23. Base Case Flow Model – Vadose Zone Flux Release over Time, 200-West Area Integrated Disposal Facility

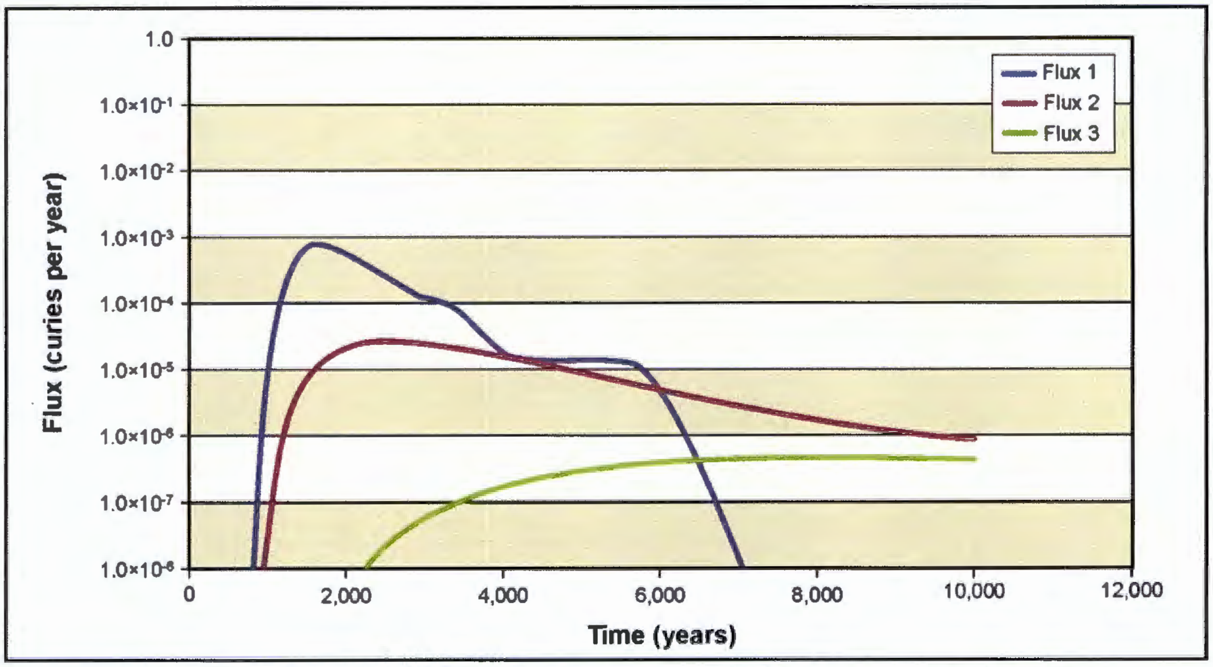


Figure V–24. Black Rock Reservoir Variant Flow Field Model – Vadose Zone Flux Release over Time, 200-West Area Integrated Disposal Facility

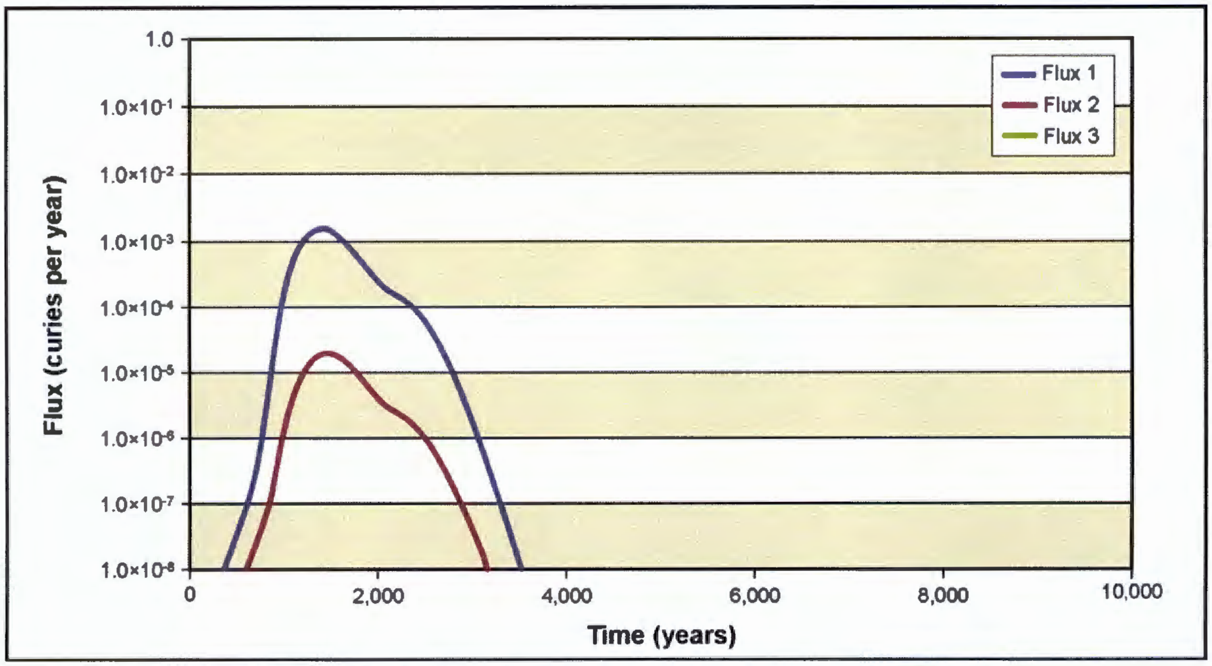


Figure V–25. Base Case Flow Model – Vadose Zone Flux Release over Time, 200-West Area, Trench 31

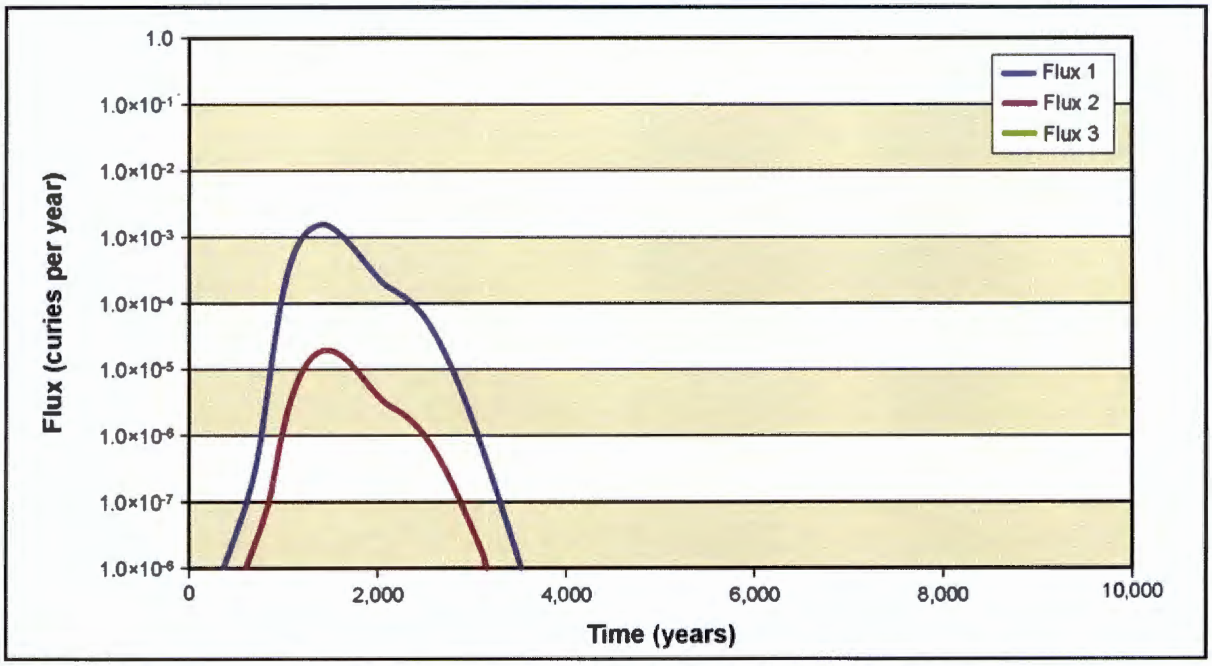


Figure V–26. Black Rock Reservoir Variant Flow Field Model – Vadose Zone Flux Release over Time, 200-West Area, Trench 31

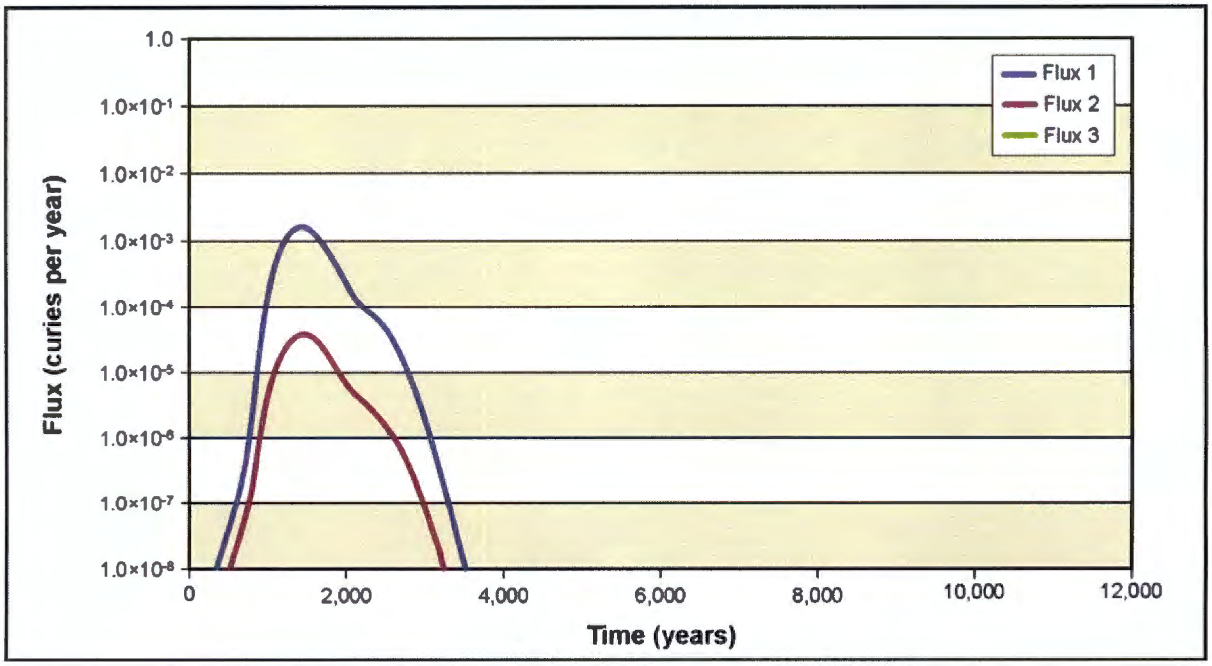


Figure V–27. Base Case Flow Model – Vadose Zone Flux Release over Time, 200-West Area, Trench 34

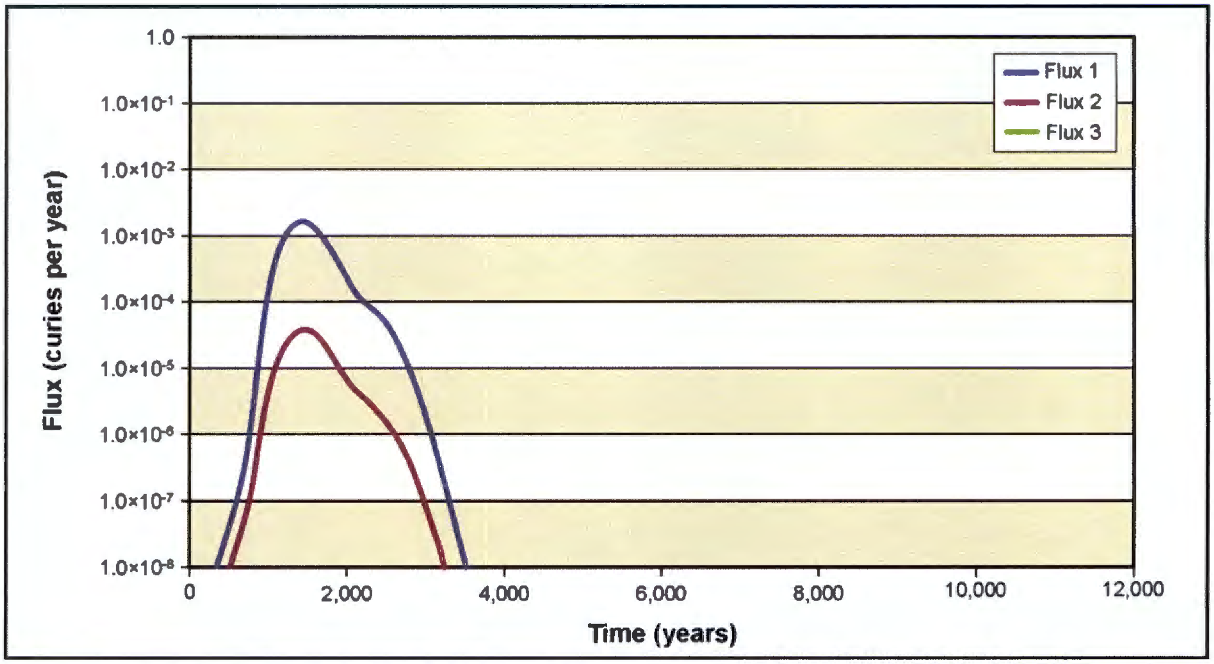


Figure V–28. Black Rock Reservoir Variant Flow Field Model – Vadose Zone Flux Release over Time, 200-West Area, Trench 34

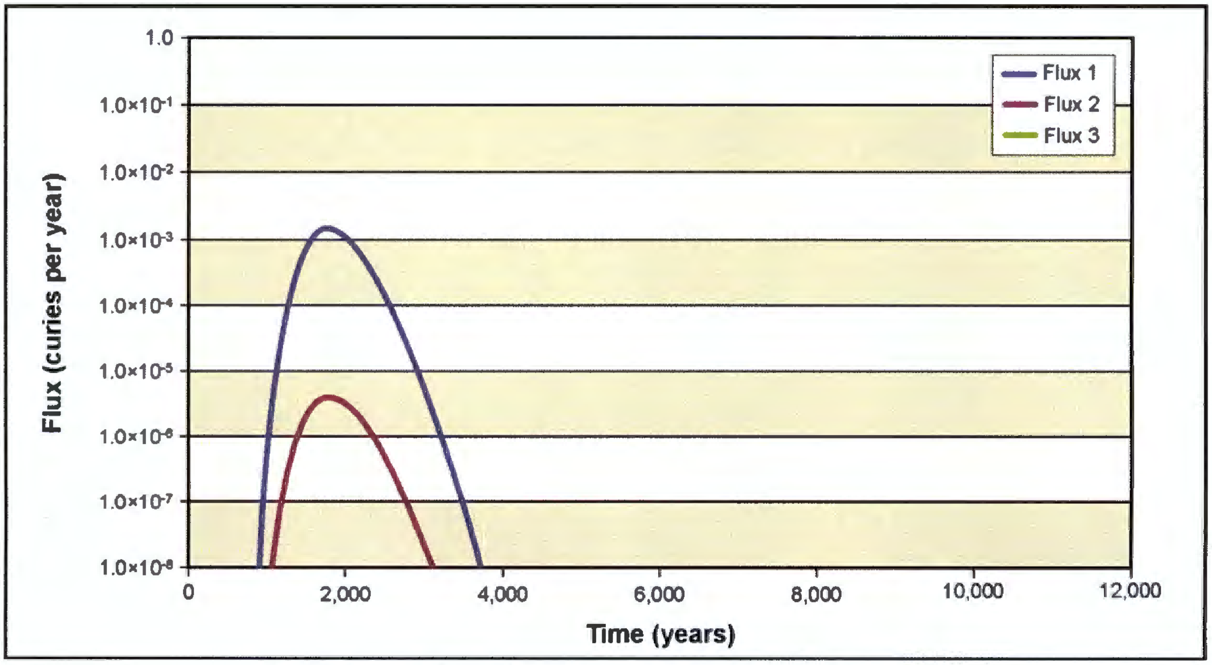


Figure V–29. Base Case Flow Model – Vadose Zone Flux Release over Time, River Protection Project Disposal Facility

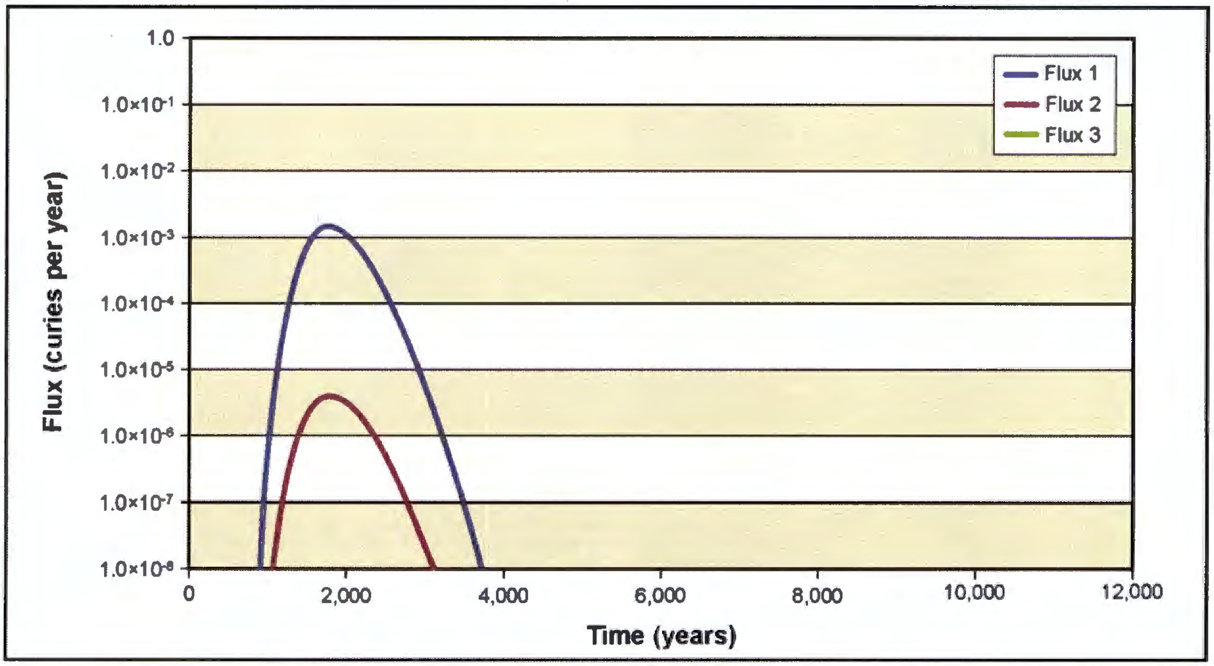


Figure V–30. Black Rock Reservoir Variant Flow Field Model – Vadose Zone Flux Release over Time, River Protection Project Disposal Facility

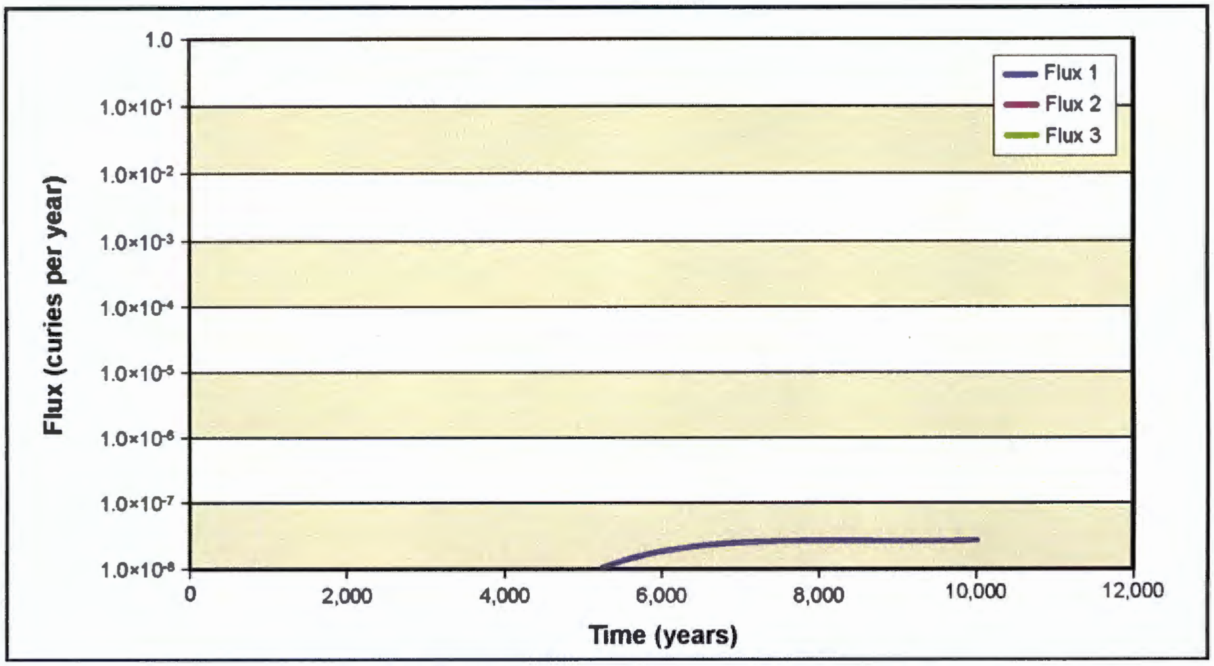


Figure V–31. Base Case Flow Model – Vadose Zone Flux Release over Time, 200-East Area Integrated Disposal Facility

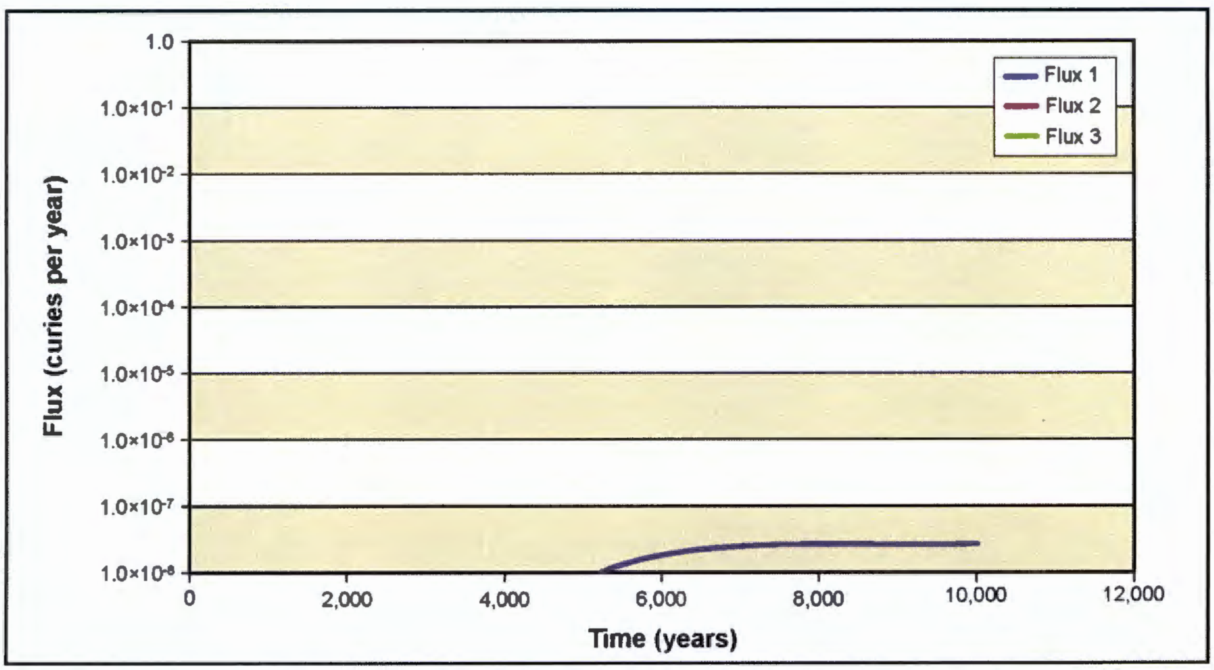


Figure V–32. Black Rock Reservoir Variant Flow Field Model – Vadose Zone Flux Release over Time, 200-East Area Integrated Disposal Facility

Table V–5. STOMP Vadose Zone Waste Management Simulation Summary

Hanford Site Disposal Location	*TC & WM EIS* Waste Management Alternative Description[a]	Solute Modeled (1 Curie)	Vadose Zone Release to Flow Field (Flux/Time) Figure Number	
			TC & WM EIS Base Case Flow Model	BRR Variant Flow Field Model
200-East Area Integrated Disposal Facility	Waste Management Alternative 2, Disposal Group 1 – Offsite waste (waste meeting Hanford Waste Acceptance Criteria, grouted waste form)	Tc-99	Figure V–20	Figure V–21
200-West Area Integrated Disposal Facility	Waste Management Alternative 3, Disposal Group 1 – Offsite waste (waste meeting Hanford Waste Acceptance Criteria, grouted waste form)	Tc-99	Figure V–22	Figure V–23
200-West Area—trench 31	Waste Management Alternative 1, Non-CERCLA Waste – miscellaneous waste meeting Hanford Waste Acceptance Criteria, stored in 55-gallon drums	Tc-99	Figure V–24	Figure V–25
200-West Area—trench 34	Waste Management Alternative 1, Non-CERCLA Waste – miscellaneous waste meeting Hanford Waste Acceptance Criteria, stored in 55-gallon drums	Tc-99	Figure V–26	Figure V–27
Central Plateau—River Protection Project Disposal Facility	Waste Management Alternative 2, Disposal Group 1 – Onsite-generated contaminated soils and decommissioned ancillary equipment	Tc-99	Figure V–28	Figure V–29
200-East Area Integrated Disposal Facility	Waste Management Alternative 2, Disposal Group 1 – immobilized low-activity waste, poured glass in steel canisters	Tc-99	Figure V–30	Figure V–31

[a] Additional details regarding the Waste Management alternatives are included in Chapter 2 of this *TC & WM EIS*.

Key: BRR=Black Rock Reservoir; CERCLA=Comprehensive Environmental Response, Compensation, and Liability Act; STOMP=Subsurface Transport Over Multiple Phases; Tc=technetium; *TC & WM EIS=Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington.*

In all waste management scenarios examined (see Table V–4), the results of the STOMP modeled long-term vadose zone transport simulations indicate essentially no differences in either timing of the release or the amount released between the BRR variant flow field conditions and the *TC & WM EIS* Base Case conditions.

Additional sensitivity analysis regarding vadose zone transport within this *TC & WM EIS* can be found in Appendix N, Section N.3, "Sensitivity Analysis."

V.4.3 Changes to Timing of Groundwater Peak Concentrations at the Columbia River

Groundwater flow and transport analysis was performed using the BRR variant flow field and the *TC & WM EIS* Base Case flow field to evaluate peak concentration arrival time to the Columbia River from a 1-curie release of technetium-99 at each barrier location. Table V–6 provides the results of this analysis. The year of peak concentration arrival at the Columbia River from all releases is earlier in the BRR variant model. In general, the peak year variances are minimal compared to the overall period of waste release and the length of the *TC & WM EIS* Base Case transport simulation (10,000 years).

Table V–6. Technetium-99 (1-Curie Release) Peak Concentration at Columbia River

Release Location[a]	*TC & WM EIS* Base Case Model: Peak Concentration (picocuries/liter)	*TC & WM EIS* Base Case Model: Peak Year	BRR Variant Model: Peak Concentration (picocuries/liter)	BRR Variant Model: Peak Year	Peak Year Variance[b]
A Barrier	6.44×10^{-1}	2206	6.43×10^{-1}	2190	–16
B Barrier	1.09	2207	1.04	2102	–105
FFTF	9.05×10^{-2}	2171	9.05×10^{-2}	2138	–33
T Barrier	1.02	2211	1.55	2119	–92
U Barrier	7.52×10^{-1}	2242	1.09	2120	–122
S Barrier	5.94×10^{-1}	2373	1.01	2171	–202
IDF-East	3.89	2149	3.62	2151	–2
IDF-West	1.20	2201	8.18×10^{-1}	2127	–74
Trenches 31 and 34	1.30	2238	1.18	2125	–113
RPPDF	1.02	2191	1.64	2101	–90

[a] Particle released (1 curie) in center of location. Particle released in 2090, at a time after which the BRR is expected to have reached steady state equilibrium.

[b] Difference between the peak year of the BRR variant model and that of the *TC & WM EIS* Base Case model.

Key: BRR=Black Rock Reservoir; FFTF=Fast Flux Test Facility; IDF-East=200-East Area Integrated Disposal Facility; IDF-West=200-West Area Integrated Disposal Facility; RPPDF=River Protection Project Disposal Facility; *TC & WM EIS=Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington.*

V.5 SUMMARY OF IMPLICATIONS FOR THE *TC & WM EIS* ALTERNATIVES

Comprehensive descriptions of the various Tank Closure, FFTF Decommissioning, and Waste Management alternatives can be found in Chapter 2 of this *TC & WM EIS*. In addition, analysis regarding groundwater constituent of potential concern driver identification and discussion can be found in Chapter 5 and Chapter 6 of this *TC & WM EIS.*

In summary, based on results presented in Section V.4, the following conclusions can be made regarding the BRR variant model:

- Localized changes in the flow field are noted primarily in the northwestern region of Hanford. Groundwater is more likely to flow north (rather than east) through Gable Gap toward the Columbia River. A decrease in vadose zone thickness (due to elevated water table) at various sites is minimal.
- The BRR variant model has no discernible effects on the short-term Tank Closure and associated long-term Waste Management alternatives presented in this *TC & WM EIS.*
- The BRR variant model has no discernible effects on additional mobilization of deep vadose zone contaminants.

V.6 REFERENCES

BOR (U.S. Bureau of Reclamation), 2007, *Modeling Groundwater Hydrologic Impacts of the Potential Black Rock Reservoir: A Component of the Yakima River Basin Water Storage Feasibility Study, Washington Pacific Northwest Region*, Technical Series No. TS-YSS-19, Pacific Northwest Region, Boise, Idaho, September.

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Schmidt, R., 2007, U.S. Department of the Interior, Bureau of Reclamation, Boise, Idaho, personal communication (email) to M. Burandt, U.S. Department of Energy, Office of River Protection, Richland, Washington, "Data Request #279 Related to Hanford *Tank Closure & Waste Management Environmental Impact Statement*," September 6.