L3.2.2 Spatial Analysis of Soil Radionuclides and Aerial Surveys

Measurements of the presence of radionuclides were available from direct soil measurements, as well as from laterally extensive radiological aerial surveys. Soil measurements were expressed as activities per unit mass (pCi/g) suitable for estimation of exposure for risk assessment, but provide only limited understanding of the spatial distribution of concentrations. Data obtained from aerial surveys interrogates much larger areas, but expressed as gross counts for gamma emitting radionuclides. The aerial survey data were not directly applicable to estimation of potential exposure without calibration to directly measured soil concentrations.

For purposes of the NPE, aerial survey data were calibrated against measured soil Cs-137 activity data. Geostatistical methods were used in a preliminary study to develop a spatially explicit relationship between soil activity measurements and aerial survey gross counts within the BCCA. Detailed geostatistical analysis was conducted within the BCCA because high-resolution aerial survey data and relatively high-density soil sampling were available for this area. The preliminary analysis of the BCCA data was used as a pilot study to support determination to proceed with development of a more extensive site wide model based on less resolved, but more laterally extensive aerial surveys of all of the Hanford Site. The results of the site wide model were used to draw conclusions regarding the distribution of Cs-137 (a contaminant of potential concern related to Hanford Site operations) specific to the nonoperational area.

Aerial surveys conducted in 1996 (DOE-0335, *An Aerial Radiological Survey of the Hanford Reservation Richland Washington, Date of Survey: February 29 to March 21, 1996*) and 2009 (SGW-45563, *An Aerial Radiological Survey of the Hanford BC Controlled Area and West Lake Area*) were combined with ground radiological surveys and soil sampling and analytical data for Cs-137 in the BCCA to establish a relationship to the aerial survey results and measured concentrations in soil. A statistical model of the probability that soil Cs-137 levels exceed selected threshold levels (1.05, 1.5, 3.1, and 6.2 pCi/g) was developed as a function of gross counts of gamma emitting radionuclides using site-wide aerial survey results. The statistical model was validated against a set of waste sites in the 200-MG-1 OU, where radiological surveys and soil sampling and analysis had been conducted as part of interim remedial actions.

The logistic regression models provide estimates of the probability of exceeding threshold levels, which can be interpreted as estimates of the proportion of an area that would be expected to exceed those levels if one were to sample them. Figure L-7 provides a map corresponding to the fitted probability model for the 1.05 pCi/g threshold level for the entire Hanford Site and for the 300 Area, respectively. It can be seen that probabilities reflect the gross patterns of variation seen in aerial survey gross counts. The highest probabilities are clearly in proximity to known radiological sources. Figure L-8 shows the spatial distribution of the probability of exceeding 6.2 pCi/g threshold level, with the same color scale as that used for the 1.05 pCi/g threshold level, and it can be seen that nearly all of the nonoperational area have less than 2.5 percent probability of exceeding the 6.2 pCi/g threshold level. The nearly uniformly dark color of the map shows the much lower probability that surface soil samples are expected to exceed 6.2 pCi/g as compared to the probability of exceeding 1.05 pCi/g shown in Figure L-8. This illustrates the high degree of sensitivity to the selection of threshold levels regarding the area of the site that might be expected to exceed them.

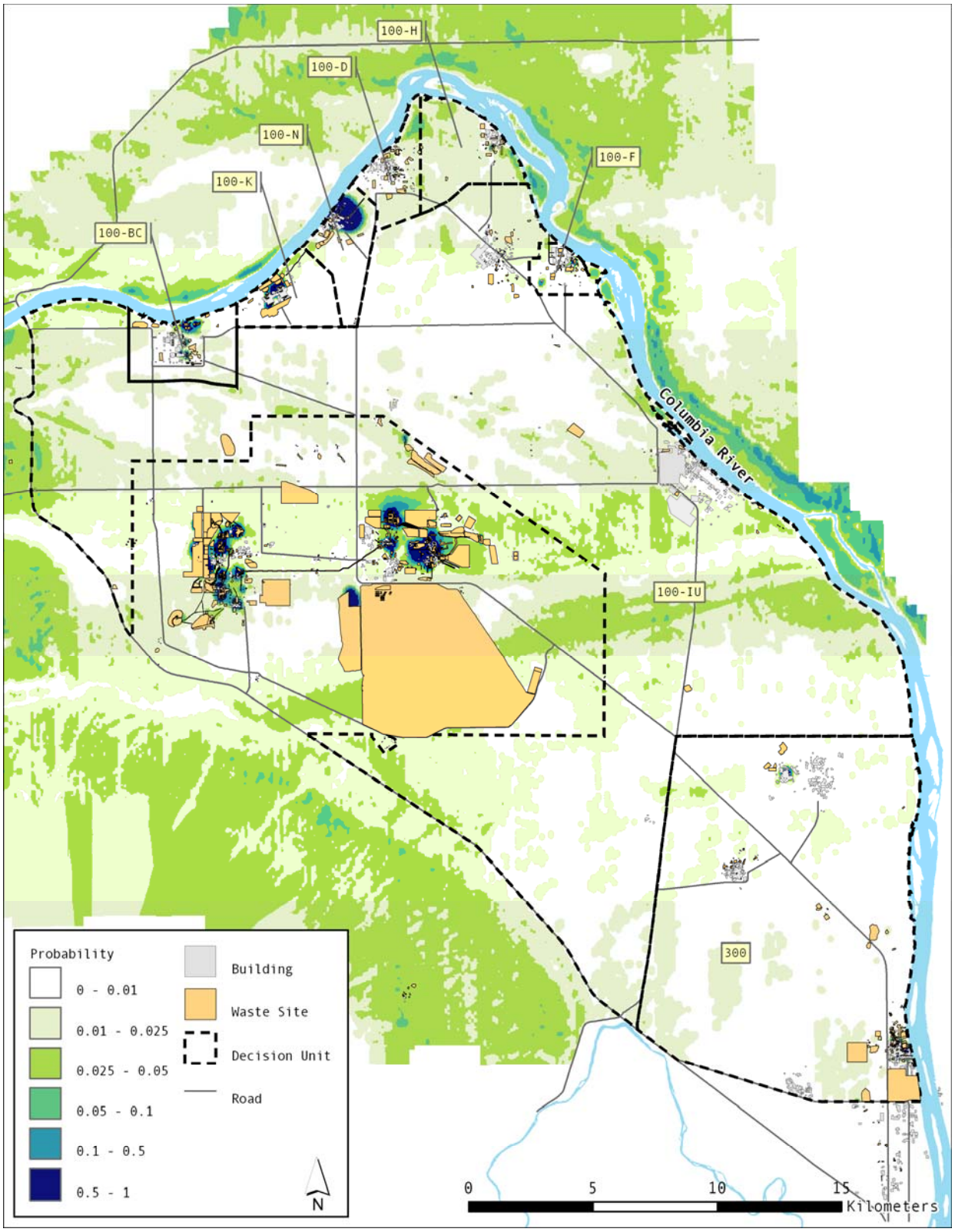

Figure L-7. Modeled Probability that Soil Cs-137 Exceeds 1.05 pCi/g in the Hanford Site

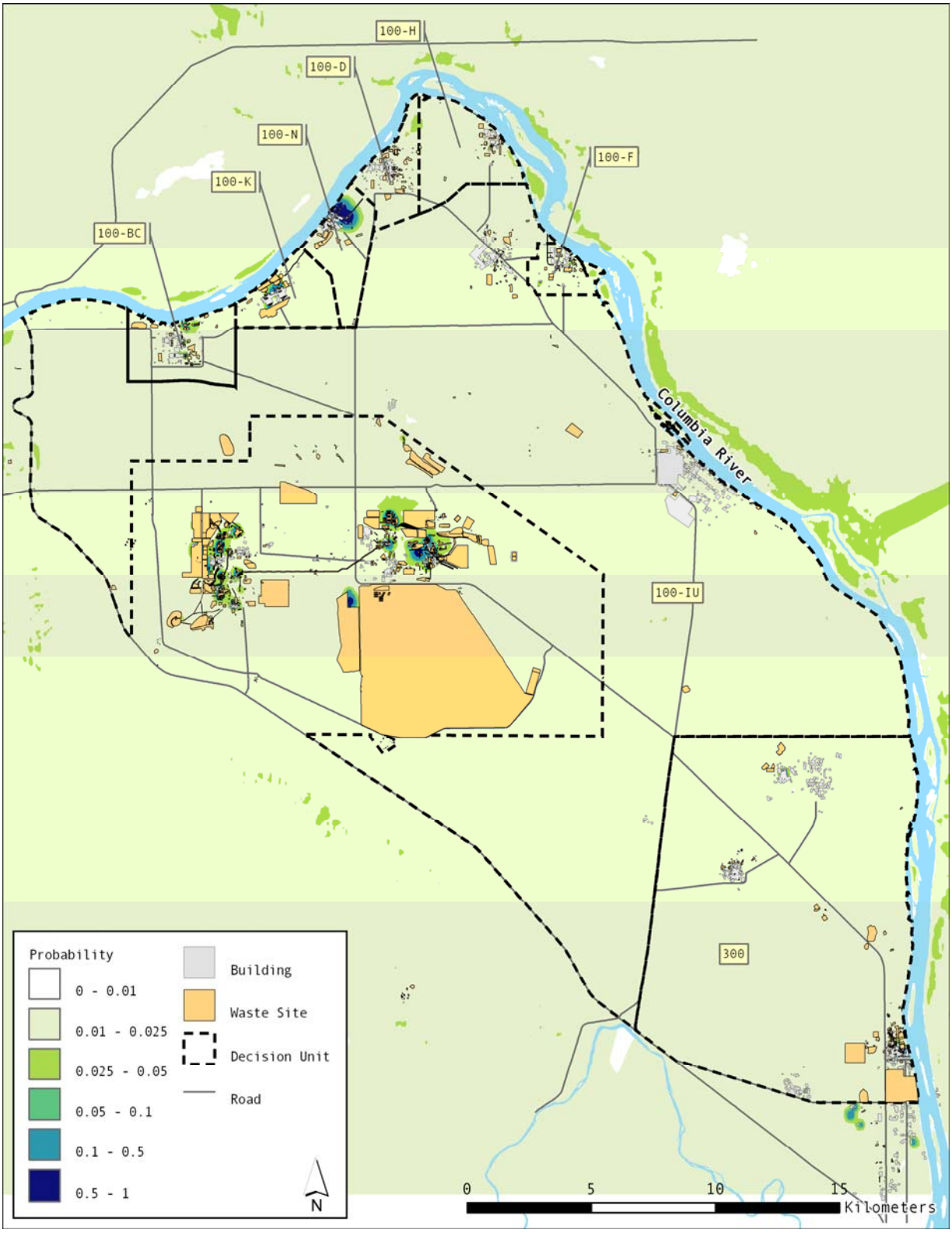

Figure L-8. Modeled Probability that Soil Cs-137 Exceeds 6.2 pCi/g in the Hanford Site

L3.3 Orphan Sites Evaluation

The results from historical research, field walkdowns, GIS mapping and geophysical surveys for the 300 Area are summarized in OSR-2010-0002, *300 Area Orphan Sites Evaluation Report*. The 300 Area OSE encompasses much of the 300-FF-2 OU, including the 300 Area and an expanded field walkdown area primarily to the west. In addition, the 300-FF-1 OU was reevaluated as part of the field walkdown. The total coverage area was approximately 829 ha (2,048 ac). Eighteen orphan features were identified during the 300 Area OSE and submitted for acceptance into WIDS. There were 13 features categorized as miscellaneous restoration items and documented as part of the 300 Area OSE.

The coverage for the Segment 5 OSE includes an area of approximately 14,178 ha (35,033 ac) including approximately 4,222 ha (10,432 ac) that was excluded from the OSE process. The areas excluded include the Hanford Patrol Training Area Firing Range, Energy Northwest, HAMMER, and three active electrical substations (HJ Ashe, White Bluffs, and Benton). One orphan site and 17 miscellaneous restoration features were identified in the OSE for Segment 5.

L4 Conclusions

Multiple lines of evidence were reviewed to evaluate conditions in the 300 Area nonoperational area (and the River Corridor more generally) based on potential release and transport mechanisms. Surveillance and monitoring programs, in combination with the OSE, have comprehensively identified all waste sites within the 300 Decision Area. In addition, the surveillance and monitoring programs, in combination with studies conducted as part of the HEDR, have demonstrated that emissions to the air either from windblown dust or from stack emissions have not impacted nonoperational area soils with radionuclides. The surveillance and monitoring programs also have verified that biointrusion has not resulted in a spread of contamination into the nonoperational areas.

Statistical analysis of the geographical distribution of waste sites based on man-made features and topography describes the likely locations of waste sites near the 300 Decision Area. The results from this analysis reinforce the findings from the OSE, which has systematically identified the remaining waste sites within 300 Decision Area. Statistical analysis of the distribution of radionuclide concentrations observable from aerial surveys has confirmed that the probability of detecting elevated radionuclide concentrations in nonoperational area soils is very small.

Based on the evaluation of these multiple lines of evidence, the probability of identifying waste sites or contaminant dispersal from Hanford Site operations in 300 Area nonoperational areas is considered negligible.

L5 References

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Appendix K

Cost Estimate

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ENVIRONMENTAL COST ESTIMATE

ECE-300FF511-00011

Environmental Cost Estimate for 300 Area Waste Sites and Groundwater RI/FS

Revision 1

Date: December 14, 2011

Project: CH2M HILL Plateau Remediation Company

Topic: Cost Analysis

Lead Estimator: S. Ferries

Senior Review: K. Klink

Administrative Use

ECE-300FF11-00011 12/14/2011

CHPRC ENVIRONMENTAL COST ESTIMATE COVER PAGE

Part 1: To be completed by the ER&QA Lead Cost Estimator

Project: 300 Area RI/FS | **Date:** 12/14/2011

Calculation Title & Description: Environmental Cost Estimate for 300 Area Waste Sites and Groundwater RI/FS, Rev 1

S. Ferries **Project Cost Estimator(s)**	**Basis of Qualification:** Geologist with 27 years of experience in environmental remediation, 15 years in cost estimating, and 13 years of RACER experience.
N/A **Cost Estimate Checker**	**Basis of Qualification:**
K. Klink **ER & QA Lead Cost Estimator**	**Basis of Qualification:** Chemical Engineer with 31 years of experience; including 20 years of hazardous and radioactive waste site characterization and remediation and cost estimating, including development and application leading parametric models, CORA, RACER, and private corporate models.

Part 2: To be completed by Project Cost Estimator

Calculation No.: ECE-300FF511-00011 **Revision No.:** 1

Revision History:

Revision No.	Description	Date	Affected Pages
0	Environmental Cost Estimate for 300 Area Waste Sites and Groundwater RI/FS, Rev 0	10/18/2011	All
1	updated the scope of work, alternatives, site list, cost table and appendix	12/14/2011	pages, 12, 13-18, 30-68

Part 3: Document Review & Approval

Project Cost Estimator:	S. Ferries/Sr. Cost Estimator NAME/POSITION SIGNATURE	12/14/11 DATE
Cost Estimate Checker:	N/A NAME/POSITION SIGNATURE	DATE
ER & QA Lead Cost Estimator:	K. Klink/Sr. Engineer NAME/POSITION SIGNATURE	12/14/11 DATE
Project Manager:	M. Doornbos/Project Manager NAME/POSITION SIGNATURE	12/14/11 DATE

ECE-300FF11-00011 12/14/2011

CHPRC ENVIRONMENTAL COST ESTIMATE COVER PAGE

Responsible Manager:	R. Brunke/Manager Environmental Integration **NAME/POSITION**	
	SIGNATURE	12/14/2011 **DATE**

Terms

AACE	Association for the Advancement of Cost Engineering International
CHPRC	CH2M HILL Plateau Remediation Company
DOE	U.S. Department of Energy
ECE	Environmental Cost Estimate
ECF	Environmental Calculation File
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
FICA	*Federal Insurance Contributions Act*
FP	Fixed-price
G&A	General and administrative
HSSA	Hanford Site Stabilization Agreement
MS Excel™	Microsoft Excel (Electronic Spreadsheet Software)
O&M	Operation and Maintenance
OMB	Office of Management and Budget
PRC	Plateau Remediation Company
PW	Present Worth
RACER™	Remedial Action Cost Engineering and Requirements System (Cost Estimating Software)
RCTs	Radiological Control Technicians

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Appendix

Table 5 - Site Specific Costs
Table 6 - Alternatives & Technologies
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Introduction

CHPRC has prepared this Environmental Cost Estimate (ECE) to support the evaluation of remedial action alternatives to be documented in the *Remedial Investigation/ Feasibility Study: 300 Area, DOE/RL-2010-99*.

This cost estimate was developed in accordance with EPA/540/R-00/002, A Guide to Developing and Documenting Cost Estimates During the Feasibility Study, OSWER 9355.0-75 (EPA, 2000), and PRC-PRO-EP-40282 Cost Estimating Procedure for Response Action Decision-Making (PRC, 2010). The cost estimates for each waste site, presented in this ECE, have been prepared using the information available from the 300 Area Project at the time of preparation. The cost estimates reflect specific response action approaches, and scope assumptions and exclusions as well as cost estimating methodologies. The response action cost estimates have expected ranges of accuracy described in the "Estimate Classification" section. The final costs of the selected response alternative(s) will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule, and other factors.

1 Purpose of Estimate

This ECE and backup material supports the response action alternatives analysis for the 300 Area Feasibility Study project.

The purpose of this ECE is to:

- Describe the methodology applied in performing the cost estimates.
- Describe the general and response action-specific assumptions and cost inputs applied to the subject cost estimates.
- Summarize the response action alternative cost estimates.

This ECE also documents the references that provide additional scope and cost estimate information used to prepare these estimates.

2 General Project Description

In 1989, the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), and the Washington State Department of Ecology (Ecology), known as the Tri Parties, signed the Hanford Federal Facility Agreement and Consent Order (hereafter called Tri Party Agreement [TPA] [Ecology et al., 1989a]) to provide a framework for the cleanup of the Hanford Site. The scope of the agreement addressed the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) remediation of inactive hazardous waste sites, active waste management operations, Resource Conservation and Recovery Act of 1976 (RCRA) corrective action for solid waste management units, and closure of RCRA treatment, storage, and/or disposal (TSD) units across the Hanford Site.

For the purpose of CERCLA cleanup, four sections of the Hanford Site were placed on the National Priorities List (NPL) as separate areas: 100 Area (Reactor Operations), 200 Area (Irradiated Fuel Reprocessing and Waste Management), 300 Area (Nuclear Fuel Production and Research and Development), and 1100 Area (Equipment and Maintenance). The 400 Area waste sites were consolidated into the 300 Area NPL Site because of their proximity to the 300 Area and because of the few number of waste sites within the 400 Area. Because of the large number of waste sites, unplanned releases (UPRs), and extensive groundwater contamination, the areas were further divided into source and groundwater operable units (OUs) for management of the investigation and remediation. The River Corridor is the area adjacent to the Columbia River (Figure 1).

The initial mission of the 300 Area industrial complex was the fabrication of uranium fuel elements for the 100 Area reactors. The 300 Area facilities included the fuel fabrication buildings, raw material storage, waste storage, finished product storage, technical support, service support, and research and development (R&D) related to fuel fabrication and other Hanford Site processes. Waste generated from these operations was the major source of contamination in the 300 Area industrial complex.

As the Hanford Site production reactors were being shut down, fuel fabrication activities in the 300 Area decreased; at the same time, R&D activities increased. The newer buildings in the 300 Area primarily housed laboratory operations and large scale test facilities. Over the operational history of the 300 Area, 228 facilities were built to support fuel fabrication and research projects.

The 300 FF 1 OU includes the large ponds, trenches, and burial ground waste sites. The 300 FF 2 OU contains the remaining waste sites. To avoid confusion within the RI/FS, the larger area that encompasses all the waste sites and groundwater beneath them will be referred to as the “300 Decision Area.” The 300 FF 5 OU includes the groundwater impacted by the 300 Decision Area waste sites. The 300 Decision Area is comprised of four separate subregions (the 300 Area industrial complex, the 400 Area, 618 11, and 316 4 and 618 10). In addition, within the 300 Decision Area boundary are facilities that are currently active and will continue to be for the foreseeable future. Examples include the Energy Northwest nuclear power plant, Hanford Patrol firing range and the Hazardous Materials Management and Emergency Response (HAMMER) buildings, and facilities that are scheduled to be decontaminated and demolished by other actions, such as the Fast Flux Test Facility (FFTF), which are not included in this RI/FS. Figure 2 shows key areas within the 300 Decision Area.

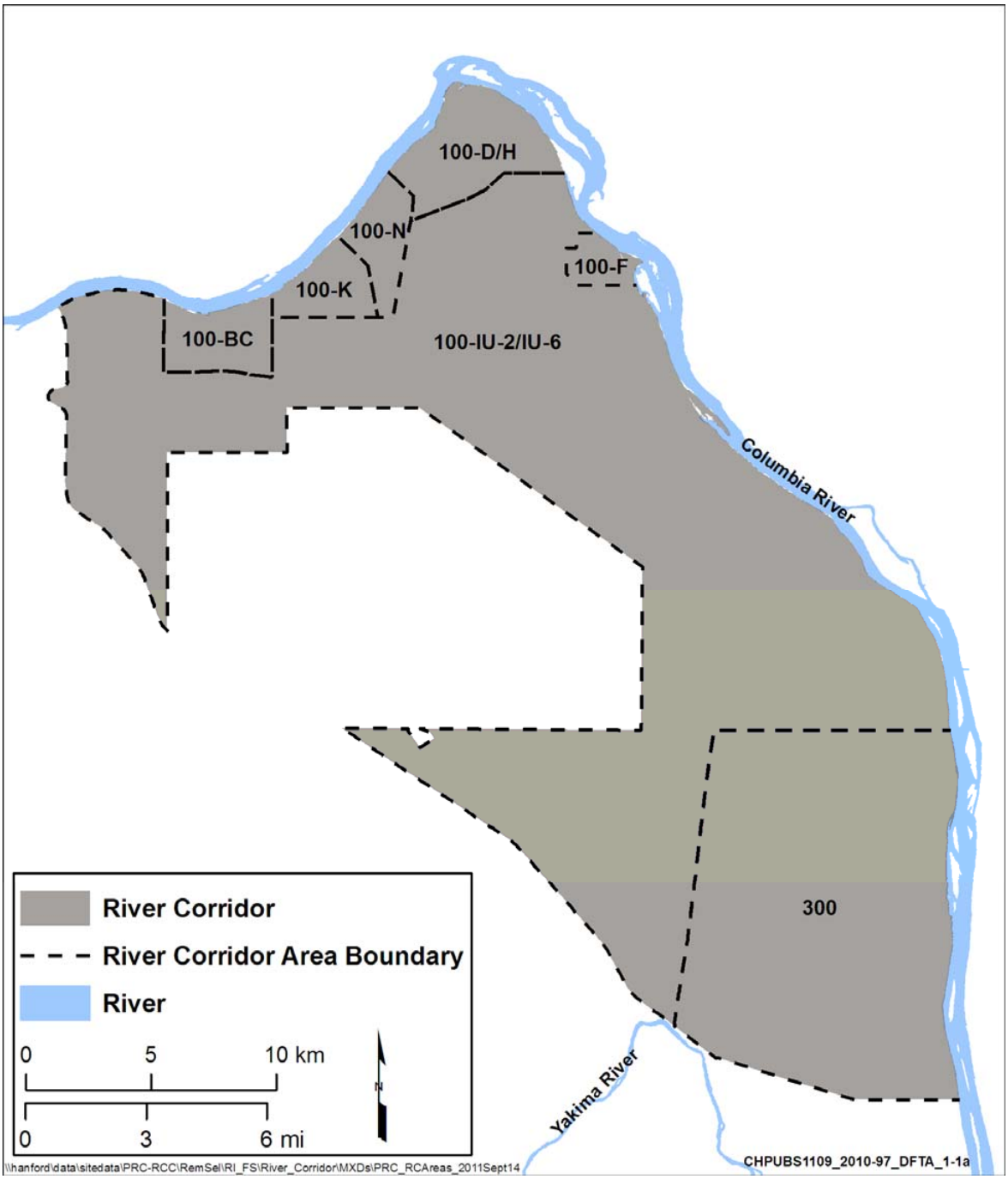

Figure 1. River Corridor Area Boundaries

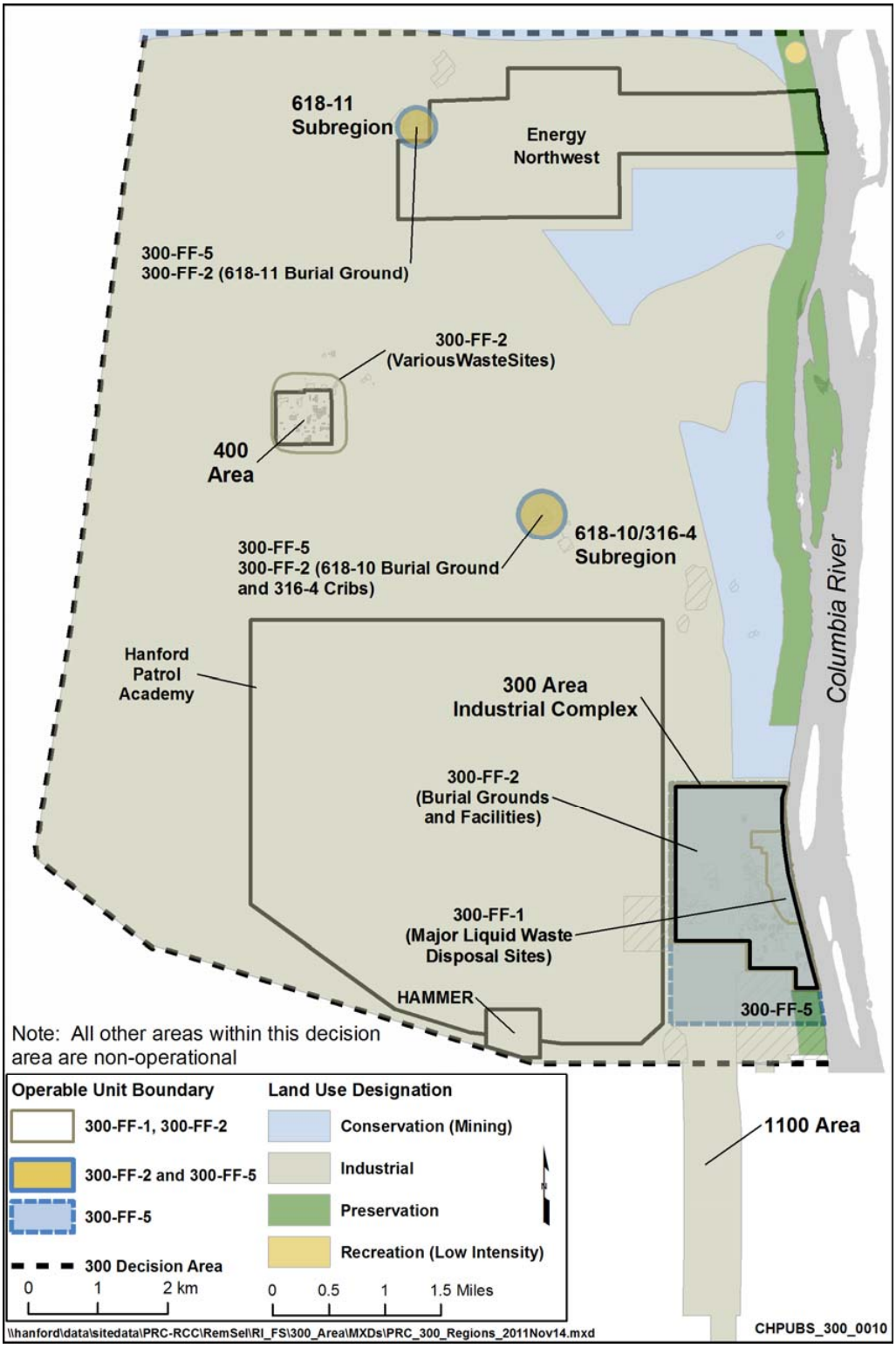

Figure 2. Illustration in Plan View Showing 300 Decision Area

This cost estimate encompasses the cost of the five alternatives evaluated in the 300 Area Feasibility Study: Alternative 1 – No Action; Alternative 2 – Shallow RTD and Groundwater Monitoring; Alternative 3 – Shallow RTD, Uranium Sequestration, and Groundwater Monitoring; Alternative 4 – Shallow RTD, Uranium Sequestration, Focused Deep RTD, and Groundwater Monitoring; and Alternative 5 – Expanded RTD and Groundwater Monitoring.

The five FS alternatives are being considered for remediation of the following sites within the 300 area:

Table 1-Sites within the 300 AREA included in this cost estimate (Costs for these sites provided by WCH)*

***300RLWS**	**300-292**	**325-WTF**
***300RRLWS**	**300-293**	**331-LSLT1**
***300-11**	**300-294**	**331-LSLT2**
300-15	**300-295**	**340 COMPLEX**
300-175	**300-296**	**400 PPSS**
300-2	***300-32**	**400-37**
***300-214**	**300-34**	**400-38**
***300-22**	***300-39**	**600-290**
***300-255**	**300-4**	**600-290:2**
***300-257**	***300-5**	**600-367**
***300-263**	**300-7**	**600-63**
***300-265**	**300-9**	**618-1**
300-269	***309-WS-1**	***618-11**
300-277	***309-WS-2**	**618-2**
***300-279**	***309-WS-3**	**618-3**
300-280	***309-TW-1**	**UPR-300-10**
300-281	***309-TW-2**	**UPR-300-12**
300-282	***309-TW-3**	**UPR-300-2**
300-283	**316-1**	**UPR-300-48**
300-284	**316-2**	**UPR-300-5**
300-286	**316-3**	
300-287	**316-5**	
300-288	***323-TANK 1**	
300-289	***323-TANK 2**	
300-290	***323-TANK 3**	
300-291	***323-TANK 4**	

3 Scope of Work

Quantities used in the creation of this estimate were based on the information provided by the technical project manager in the Environmental Calculation File (ECF) document, ECF-300FF5-11-0171, Rev 1. December 13, 2011. The ECF defines the project assumptions and cost quantity inputs for the following five response action alternatives:

Table 2. Waste Sites to Be Remediated under the Preferred Alternative

Technology/Approach	Waste Site[a]
RTD (0 to 4.5 m [0 to15 ft] or less) - 62 waste sites	300-15, 300-175, 300-2, 300-214, 300-22, 300-255, 300-263, 300-265, 300-269, 300-277, 300-279, 300-280, 300-281, 300-282, 300-284, 300-283, 300-286, 300-287, 300-288, 300-289, 300-290, 300-291, 300-292, 300-293, 300-294, 300-296, 300-32, 300-34, 300-39 , 309-TW-1, 300-TW-2, 300-TW-3, 309-WS-1, 309-WS-2, 309-WS-3, UPR-300-5, 300-4, 300-5, 300-7, 300-9, 316-3[b], 323 TANK 1, 323 TANK 2, 323 TANK 3, 323 TANK 4, 325 WTF, 331 LSLT1, 331 LSLT2, 340 Complex, 400 PPSS, 400-37, 400-38, 600-290:2, 600-290, 600-63, 618-11, UPR-300-10, UPR-300-12, UPR-300-2, UPR-300-48, 300-295, 600-367
Deep RTD (0 to attainment of cleanup levels) - 4 waste sites	300 RLWS, 300 RRLWS, 300-11, 300-257
Uranium Sequestration - 6 waste sites	316-1, 316-2, 316-5, 618-1, 618-2, 618-3
Waste Sites to Be Remediated under Existing Interim ROD - 43 waste sites	300-121, 300-123, 300-16, 300-16:1, 300-16:2, 300-16:3, 300-218, 300-219, 300-224, 300-24, 300-249, 300-251, 300-258, 300-264, 300-268, 300-270, 300-273, 300-274, 300-276, 300-28, 300-40, 300-43, 300-46, 300-48, 300-6, 300-80, 307 Retention Basins, 313 ESSP, 333 WSTF, 3712 USSA, 600-117, 618-10, UPR-300-1, UPR-300-11, UPR-300-38, UPR-300-39, UPR-300-4, UPR-300-40, UPR-300-42, UPR-300-45, UPR-600-22, 300-25, 316-4
Consolidated Sites - 40 waste sites	300-131, 300-132, 300-133, 300-134, 300-135, 300-136, 300-137, 300-138, 300-139, 300-140, 300-141, 300-142, 300-143, 300-144, 300-145, 300-146, 300-147, 300-148, 300-149, 300-150, 300-81, 300-82, 300-83, 300-84, 300-92, 333 ESHTSSA, UPR-300-44, UPR-600-1, UPR-600-10, UPR-600-2, UPR-600-3, UPR-600-4, UPR-600-5, UPR-600-6, UPR-600-7, UPR-600-8, UPR-600-9, 333 LHWSA, UPR-300-13, UPR-300-14

Total waste sites - 155

a. Remediation of the other waste sites presented in Table 4 will be performed under the ongoing Interim Remedial Action for 300-FF-2 waste sites.

b. Waste site 316-3 is identified for RTD (0 to 4.5 m [0 to 15 ft]) is also identified for uranium sequestration for deep contamination.

3.1 Waste Site and Groundwater Alternatives:

3.1.1.1 Alternative 1—No Action Alternative

The NCP (40 CFR 300.430(e)(6)) requires consideration of a No Action Alternative. The No Action Alternative, which serves as a baseline for evaluating other remediation action alternatives, is retained throughout the FS process. No action means that remediation would not be implemented. For this alternative, all site remedial activities and interim actions, with the possible exception of backfilling any open excavations, will be discontinued in December 2012, (no backfilling assumed in this estimate). This includes ceasing operation of the existing pump and treat systems and any additional monitoring.

Design concepts were not developed and cost estimates were not prepared for Alternative 1 because no actions are proposed.

3.1.1.2 Alternative 2 – RTD and Groundwater Monitoring.

Alternative 2 uses primarily shallow RTD (less than 4.6 m [15 ft] bgs) for 300-FF-2 OU waste sites, MNA for tritium in groundwater, and monitoring for uranium in groundwater. For residual soil contamination at remediated 300-FF-2 OU waste sites that are evaluated in the FS because of cleanup level exceedances, this alternative builds off the interim actions previously completed. For waste sites that have not undergone interim actions, the actions will vary depending on the nature and extent of contamination at the waste site. The actions will include one or more of the following:

- RTD of shallow vadose zone areas, including demolition of structures (e.g., slabs and vaults) when necessary
- RTD of waste sites exceeding surface/groundwater protection criteria for COCs other than uranium
- RTD for pipelines shallower than 4.6 m (15 ft) bgs and pipelines that transported the majority of the uranium waste to the disposal sites (i.e., waste sites 316-1, 316-2, 316-3, and 316-5)
- Monitoring for uranium in groundwater
- MNA for tritium in groundwater
- ICs to mitigate exposure, where required

Temporary surface caps will be installed over waste sites adjacent to 300 Area facilities and utilities that will remain in operation through about 2027 (long-term facilities). In addition, pipelines associated with long-term facilities will be void filled during the interim period . When the long-term facilities are removed (approximately 2027), the waste sites and pipelines will be remediated as described above.

3.1.1.3 Alternative 3 – RTD, Uranium Sequestration, and Groundwater Monitoring.

Alternative 3 uses primarily shallow RTD (less than 4.6 m [15 ft] bgs) for 300-FF-2 OU waste sites, uranium sequestration for waste site residual contamination causing the uranium groundwater plume, MNA for tritium in groundwater, and monitoring for uranium in groundwater. For residual soil contamination at remediated 300-FF-1 and 300-FF-2 waste sites being evaluated in the FS because of cleanup level exceedances, this alternative builds off the interim actions previously completed. For 300-FF-2 waste sites that have not undergone interim actions, the actions will vary depending on the nature and extent of contamination at the waste site. The actions will include one or more of the following:

- RTD of shallow vadose zone areas, including demolition of structures (e.g., slabs and vaults) when necessary
- RTD of waste sites exceeding surface/groundwater protection criteria for COCs other than uranium
- RTD for pipelines shallower than 4.6 m (15 ft) bgs and pipelines that transported the majority of the uranium waste to the disposal sites (i.e., waste sites 316-1, 316-2, 316-3, and 316-5)
- Uranium sequestration (phosphate infiltration) for 300-FF-2 OU waste sites exceeding surface/groundwater protection criteria for uranium

- Phased uranium sequestration (phosphate infiltration and PRZ injection) for residual source mass in the vadose zone and PRZ associated with the 300-FF-1 source OU causing the 300-FF-5 uranium groundwater plume
- Monitoring for uranium in groundwater, which is coupled with uranium source control achieved through phased uranium sequestration
- MNA for tritium in groundwater
- ICs to mitigate exposure, where required

Temporary surface caps will be installed over waste sites adjacent to 300 Area facilities and utilities that will remain in operation through about 2027 (long-term facilities). In addition, pipelines associated with long-term facilities will be void filled during the interim period. When the long-term facilities are removed (approximately 2027), the waste sites and pipelines will be remediate as described above.

3.1.1.4 Alternative 4 – RTD, Uranium Sequestration, Focused Deep RTD, and Groundwater Monitoring.

Alternative 4 uses primarily shallow RTD (less than 4.6 m [15 ft] bgs) for 300 FF-2 OU waste sites, focused deep RTD and uranium sequestration for 300-FF-1 OU waste site residual contamination causing the uranium groundwater plume, MNA for tritium in groundwater, and monitoring for uranium in groundwater. For residual soil contamination at remediated waste sites that are evaluated in the FS because of cleanup level exceedances, this alternative builds off the interim actions previously completed. For waste sites that have not undergone interim actions, the actions will vary depending on the nature and extent of contamination at the waste site. The actions will include one or more of the following:

- RTD of shallow vadose zone areas, including demolition of structures (e.g., slabs and vaults) when necessary
- RTD of waste sites exceeding surface/groundwater protection criteria for COCs other than uranium
- RTD for pipelines shallower than 4.6 m (15 ft) bgs and pipelines that transported the majority of the uranium waste to the disposal sites (i.e., waste sites 316-1, 316-2, 316-3, and 316-5)
- Uranium sequestration (phosphate infiltration) for 300-FF-2 OU waste sites exceeding surface/groundwater protection criteria for uranium
- Optimized remediation of residual uranium source mass in the vadose zone and PRZ associated with the 300-FF-1 source OU that is causing the 300-FF-5 OU uranium groundwater plume, using either focused deep RTD or uranium sequestration (phosphate infiltration)
- Monitoring for uranium in groundwater, which is coupled with uranium source control achieved through focused deep RTD and uranium sequestration
- MNA for tritium in groundwater
- ICs to mitigate exposure, where required

Temporary surface caps will be installed over waste sites adjacent to 300 Area facilities and utilities that will remain in operation through about 2027 (long-term facilities). In addition, pipelines associated with long-term facilities will be void filled during the interim period. When the long-term facilities are removed (approximately 2027), the waste sites and pipelines will be remediate as described above.

3.1.1.5 Alternative 5 – Expanded RTD and Groundwater Monitoring. Alternative 5 uses RTD almost exclusively for 300-FF-2 OU waste sites and 300-FF-1 OU residual contamination contributing to the uranium groundwater plume. It also relies on groundwater monitoring for uranium and MNA for tritium in groundwater.

Alternative 5 will achieve the RAOs most rapidly and with a greater degree of certainty. For residual soil contamination at remediated 300-FF-2 OU waste sites that are evaluated in the FS because of PRG exceedances, this alternative builds off the interim actions previously completed. For 300-FF-2 OU waste sites that have not undergone interim actions, the actions will vary depending on the nature and extent of contamination at the waste site. The actions will include one or more of the following:

- RTD for 300-FF-2 OU waste sites (including pipelines), with excavation until standards are achieved. RTD would also include demolition of structures (e.g., slabs and vaults) when necessary
- Expanded RTD of residual uranium source mass in the vadose zone and PRZ associated with the 300-FF-1 OU that is causing the 300-FF-5 uranium groundwater plume
- Monitoring for uranium in groundwater, which is coupled with uranium source control achieved through expanded RTD in the vadose zone and PRZ
- MNA for tritium in groundwater
- ICs to mitigate exposure, where required

Temporary surface caps will be installed over waste sites adjacent to 300 Area facilities and utilities that will remain in operation through about 2027 (long-term facilities). In addition, interim void filling will be performed for pipelines associated with long-term facilities. When the long-term facilities are removed (approximately 2027), the waste sites and pipelines will be remediate as described above.

4 Overall Costs

Starting with “Total Duration (years)”, Table 3 (see below) presents key scope information for each alternative. The cost summary lists total capital, annual, and periodic costs along with a non-discounted total for these three cost components, and the percentage that each component represents out of the non-discounted total. Total discounted costs, the discount rate used, and the corresponding order-of-magnitude discounted cost range are presented for each alternative.

Table 3-GW and Waste Site Key Scope Parameter and Cost Summary

COMPARISON OF TOTAL COST OF RESPONSE ACTION ALTERNATIVES*					
Site:	300 Area Waste Sites			**Base Year:**	2013
Location:	Hanford, WA			**Date:**	December-11
Phase:	FS			**Rev:**	1
	Alternative 1	**Alternative 2 (GW & Waste Sites)**	**Alternative 3 (GW & Waste Sites)**	**Alternative 4 (GW & Waste Sites)**	**Alternative 5 (GW & Waste Sites)**
	No Action	**Shallow RTD and GW Monitoring**	**Shallow RTD, Uranium Sequestration, and GW Monitoring**	**Shallow RTD, Uranium Sequestration, Focused Deep RTD, and GW Monitoring**	**Expanded RTD and Groundwater Monitoring**
COST SUMMARY					
Capital Cost	$0	$123,491,000	$158,243,000	$346,762,000	$1,011,003,000
% of Total Non-discounted cost	-	35.24%	33.60%	54.24%	81.96%
Total Annual Cost	$0	$11,589,000	$82,363,000	$40,938,000	$8,422,000
% of Total Non-discounted cost	-	3.31%	17.49%	6.40%	0.68%
Total Periodic Cost	$0	$154,809,000	$168,163,000	$162,328,000	$154,073,000
% of Total Non-discounted cost	-	44%	36%	25%	12%
Non-Discounted	**$0**	**$350,387,000**	**$470,919,000**	**$639,364,000**	**$1,233,546,000**
Real Discount Rate	-	**1.6%**	**1.6%**	**1.6%**	**1.6%**
Total Present Value of Alternative (Discounted)	-	**$300,993,000**	**$413,125,000**	**$556,096,000**	**$1,158,378,000**
Expected Accuracy Range for total present value is +50%/-30%					
-30%	-	**$210,696,000**	**$289,188,000**	**$389,268,000**	**$810,865,000**
50%	-	**$451,490,000**	**$619,688,000**	**$834,144,000**	**$1,737,567,000**

*Notes:
Range of accuracy is expected to be +50%/-30%

Table 5(see Appendix) presents site specific capital, annual, periodic, total non-discounted, and total discounted (present value) costs for each of the seventy-two 300 Area waste sites and the associated groundwater zone with assumed integrated in-situ soil treatment. Totals are presented at the bottom of the table for the specific capital, annual, periodic, total non-discounted, and total discounted (present value) costs for the combined waste sites and for the groundwater alternatives, and then separate site-specific subtotals are presented for each of the waste sites and for each of the key groundwater components.

5 Major Assumptions

There are two different types of assumptions and inputs for response action cost estimation; general and response-activity specific.

5.1 General Assumptions and Inputs

General assumptions apply to all response action cost estimates. The general assumptions discussed in the sections below include direct and indirect cost assumptions and other general pricing assumptions.

5.1.1 General Direct Cost Assumptions

Direct costs include all costs that can be attributed to a particular construction activity or item of work required to accomplish the project. Typical direct cost items include: labor, material, equipment and subcontract items. Direct cost assumptions for this estimate include:

- Scope and bid contingencies, see Section 8.
- Project management, remedial design, and construction management capital costs, see Section 9.
- Construction labor is discussed in Section 15.
- Material such as: backfill soil, grout, worker health and safety protective items, HDPE pipe, and phosphate chemicals are included in the estimates. Material costs were based on operating Hanford systems costs, RACER 2010 unit costs, and Means 2010a, *Building Construction Cost Data*; *and* 2010b, *Heavy Construction Cost Data*, Richardson's *Process Plant Construction Estimating Standards*.
- Equipment such as: trucks, backhoes, drill rigs, tanks, pumps, mixers, process treatment panels and controls are included in the estimates. Equipment units were estimated based on standard commercial estimating resources and databases: Means 2001, *ECHOS Environmental Remediation Cost Data – Unit Price (escalated to 2010)*; Means 2010a, *Building Construction Cost Data*; *and* 2010b, *Heavy Construction Cost Data*, Richardson's *Process Plant Construction Estimating Standards*; and the Equipment Watch *Rental Rate Blue Book for Construction Equipment*.
- The units may have been factored or adjusted by the estimator as appropriate to reflect influences by contract, work site, or other identified project or special conditions.
- Site preparation costs such as site access enhancements and controls, utility connections, site clearing and leveling, were included as allowances based on estimator judgment.
- Cost impacts for performing work under specific levels of worker health safety protection:
    - Work assumed to be performed under worker health and safety level D was assumed to be at the standard TRACE V2 unit cost rates.
    - Worker health and safety levels beyond level D were assumed to be not needed for any of the remediation activities in this estimate.

5.1.2 General Indirect Cost Assumptions

Indirect costs are costs not directly attributable to the completion of an activity. Indirect costs are typically allocated or spread across all activities on a predetermined basis. Indirect costs items can include the following job-related overhead items: taxes; project-specific insurance; bonds; permits and licenses;

general supervision; temporary office personnel; schedules; preparatory work and testing services; temporary project facilities; temporary utilities; operations and maintenance of temporary project-site facilities; project vehicles; personal protective equipment and OSHA requirements; quality controls; mobilization and demobilization; and site security.

General indirect cost assumptions for this estimate include:

- Markups are included for profit and G&A, see Section 7.
- Mobilization/demobilization and bonding/insurance – a standard TRACE V2 percentage allowance was used based on project size and using the high percentage value from the low, medium, and high percentages presented by TRACE V2 for the project size.

5.1.3 Other General Cost Assumptions

Remedial action assumptions and cost inputs used in this cost estimate were provided by the technical team in the Environmental Calculation File, (ECF-300FF5-11-0171, Rev 1)300 Area Cost Estimate Scoping Forms For Feasibility Study Alternative Costing. Any changes from the original quantities and any additional cost estimate basis assumptions are documented below in this section.

5.2 Response Activity-Specific Assumptions and Inputs

Assumptions specific (see Appendix) to the proposed remedial activities for this cost estimate are described below. Quantity inputs used in the TRACE V2 cost estimating workbook are summarized for the waste sites and groundwater estimates in Tables 6 and 7, respectively.

5.2.1 Summary of Cost by Site:

The costs for the three 300 Area remedial action alternatives were calculated both individually and combined as a total cost, with itemized waste site costs and itemized groundwater remediation costs included in each alternative, See Appendix, Table 5. Costs for each of the seventy-two waste sites and groundwater zone were calculated and summarized separately from the alternative total costs by:

- Breaking out and summing each of the site-specific costs for each site.
- Allocating a portion of the overall mobilization/demobilization/bonding/insurance, site preparation, and alternative markup costs to each specific site based on the site subtotal cost of the overall alternative cost.

5.2.2 Modified Standard TRACE V2 Unit Costs

The following unit costs were used in the cost estimate and were added to the original TRACE V2 default costs. The source of the unit cost is listed beside the item in the list below:

From the waste site cost estimate:

Capital Costs

- 60 foot soil boring and sample for Uranium per year – RACER 2010 and WSCF Laboratory Costs 2011 ($30,600/LS)
- Phosphate Infiltration Development & Implementation Plans – for ALT 4 ($250,000)
- Phosphate Injection/Infiltration Development & Implementation Plans – for ALT 3 ($500,000)
- Misc. Phosphate System Mechanical, Electrical & I&C – for combined sites 316-1, 316-2. 316-3, & 316-5, Phase I – ($138,218/LS)

- Misc. Phosphate System Mechanical, Electrical & I&C – for combined sites 316-1, 316-2. 316-3, & 316-5, Phase II – ($242,405/LS)
- Phosphate Injection Process Systems and Building – for ALT 3, Phase I ($1,000,000)
- Phosphate Injection Process Systems and Building – for ALT 3, Phase II ($2,000,000)
- Misc. Phosphate System Mechanical, Electrical & I&C – for site 618-1 ($10,443/LS)
- Misc. Phosphate System Mechanical, Electrical & I&C – for Site 618-2 ($6,223/LS)
- Misc. Phosphate System Mechanical, Electrical & I&C – for Site 618-3 ($10,805/LS)

O&M Costs

- Annual O&M for Phosphate Sequestering (excl. chemistry) ($0.033/CuFt)
- Capping (Barrier) O&M Annual Maintenance Cost ($30,000/Yr)
- Phosphate System Decommissioning and Removal – 618-1 ($28,576/LS)
- Phosphate System Decommissioning and Removal – 618-2 ($15,589/LS)
- Phosphate System Decommissioning and Removal – 618-5 ($29,047/LS)
- Phosphate System Decommissioning and Removal – Alt 3, Phase I ($416,270/LS)
- Phosphate System Decommissioning and Removal – Alt 3, Phase II ($1,342,982/LS)
- Phosphate System Decommissioning and Removal – Alt 4 (from Phase I $329,684/LS)
- Phosphate System Decommissioning and Removal – Alt 4 (from Phase II $501,726/LS)
- Annual chemistry for Phosphate Injection (80%/20% ortho/poly $ xanthum gum) – $38,000/well per injection
- Annual O&M for Phosphate Injection (excl. chemistry) – $7,000/well per injection

From the groundwater cost estimate:

Capital Costs

Only TRACE V2 standard default unit costs were used.

O&M Costs

Only TRACE V2 standard default unit costs were used.

5.2.3 Specific Assumptions

The following specific assumptions were included in the cost estimates:

- Excavation – density of soil, assumed 1.5 tons per bank cy.
- Site Preparation – estimator's judgment at $25,000 to 50,000 for each individual waste site estimate which may include establishing the site cleanup boundaries, evaluation of the physical characteristics of the site, assessing surfaces and land areas of interest, it may also include

characteristics of the site, assessing surfaces and land areas of interest, it may also include removing equipment and materials that restrict access to surfaces, etc.; and $100,000 to $250,000 for the larger, multi-acre phosphate systems for uranium sequestration in the vadose zone.

- A single mobilization/demobilization for each overall waste site remediation alternative and for each groundwater remediation alternative.
- All waste site estimates assume ERDF Disposal of contaminated soil and replacement of uncontaminated soil back in the excavation. Extra soil needed to fill in excavation is assumed to come from on the Hanford site.
- Pipe grouting assumes that the grout can be pumped 300 feet. A 10 foot by 10 foot excavation is assumed to be at the beginning of the pipe run, and again at every 300 feet and at the end. The cost consists of a 4 person crew, pump, 2 sets of flexible hose for grout placement, and a plug at each end and at every 300 foot excavation.
- Each excavation cost contains sampling of soil as it is excavated per ton as well as sampling ERDF waste every 1,330 tons per Hanford guidance.

6 Exclusions

This section identifies costs that have not been included in the estimate. The following items have been excluded from the estimate:

- Escalation - Escalation has not been included in these calculations. All capital costs are present day (fiscal year 2011), and from this basis the PV analysis is performed.
- Costs for remediating the sites individually under separate contracts. The costs in this estimate assume that the sites are remediated under one contract corresponding to the specific alternative, or at most one waste site and one groundwater contract. If the sites are remediated separately, the individual site costs would be expected to be higher than shown for the individual sites in Table 5, since certain fixed costs would not be spread over a group of sites, and certain project efficiencies would not be realized.

7 Markups

The following markups have been included in the Cost Estimate:

- Contractor Overhead at 10 percent.
- Contractor Profit at 5 percent.
- PRC general and administrative (G&A) costs have been applied at a rate of 9.6[1] percent to all PRC labor, material, and equipment. G&A is also applied to the FP contractor costs. This markup includes a number of job-related overhead items:

[1] G&A rate is obtained from CH2M Hill Plateau Remediation Company (DRAFT) FY 2011 Rates/Multipliers, effective 10/1/10 \rates\FY11 Rates\FY11 Rates Multipliers.xls

- Taxes
- Project-specific insurance
- Bonds
- Permits and licenses
- General supervision
- Temporary office personnel
- Schedules
- Preparatory work and testing services
- Temporary project facilities and O&M of these facilities
- Temporary utilities (e.g. phone, electrical)
- Project vehicles
- Personal protective equipment and Occupational Health and Safety requirements
- Quality controls
- Mobilization and demobilization
- Site security

8 Contingencies

Contingency is factored into a cost estimate to cover unknowns, unforeseen circumstances, or unanticipated conditions that are not possible to evaluate from the available data at the time the estimate is prepared. It is used to reduce the risk of possible cost overruns.

- Scope Contingency. Contingency rates have been applied to the capital costs based on consideration of the range of 15 to 55 percent as per EPA/540/R-00/002, Section 5.4 for soil excavation and 15 to 35% for groundwater management. The scope contingencies for this estimate for Alternatives 2, 3, 4 and 5 were set at 55% for the waste site estimates. The scope contingencies for this estimate for Alternatives 2, 3, 4, and 5 were set at 35% for the groundwater estimates.
- Bid Contingency. The range for bid contingency is typically from 10 to 20 percent. The bid contingency for this estimate for Alternatives 2, 3, 4 and 5 have been set at 20% for the waste site estimates and for the groundwater estimates.
- O&M Contingency. The O&M contingency has been estimated for Alternatives 2, 3, 4 and 5 have been set to be 30% for the waste site estimates, and for the groundwater estimates.

9 Project Management, Remedial Design, and Construction Management Costs

Project management, remedial design, and construction management capital costs are estimated using factors based on EPA/540/R-00/002, Exhibit 5-8. Table 4 below lists the alternative specific cost percentages used:

Table 4 – Project Management, Remedial Design, and Construction Management Costs

	Construction costs	**Project Management cost percentage**	**Remedial Design cost percentage**	**Construction Management cost percentage**
Alternative 1	$0	NA	NA	NA
Alternative 2 - groundwater	>$2M, <$10M	5%	8%	6%
Alternative 2 – waste sites	>$10M	5%	6%	6%
Alternative 3 - groundwater	>$10M	5%	6%	6%
Alternative 3 – waste sites	>$10M	5%	6%	6%
Alternative 4 - groundwater	>$10M	5%	6%	6%
Alternative 4 – waste sites	>$10M	5%	6%	6%
Alternative 5 - groundwater	>$2M, <$10M	5%	8%	6%
Alternative 5 – waste sites	>$10M	5%	6%	6%

- For projects with construction costs less than $100,000 – remedial design is planned at 20 percent, project management is planned at 10 percent, and construction management is planned at 15 percent of the construction cost.
- For projects with construction costs from $100,000 to $500,000 – remedial design is planned at 15 percent, project management is planned at 8 percent, and construction management is planned at 10 percent of the construction cost.
- For projects with construction costs from $500,000 to $2 million – remedial design is planned at 12 percent, project management is planned at 6 percent, and construction management is planned at 8 percent of the construction cost.

- For projects with construction costs from $2 million to $10 million – remedial design is planned at 8 percent, project management is planned at 5 percent, and construction management is planned at 6 percent of the construction cost.
- For projects with construction costs greater than $10 million – remedial design is planned at 6 percent, project management is planned at 5 percent, and construction management is planned at 6 percent of the construction cost.

10 Present Worth

As per EPA Guidance, EPA/540/R-00/002, *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study***,** OSWER 9355.0-75 (EPA, 2000) the estimate includes present worth calculations for work performed in out years.

The costs are presented as present worth values. The present worth value method establishes a common baseline for evaluating costs that occur during different time periods, thus allowing for direct cost comparisons between different alternatives. The present worth value represents the dollars that would need to be set aside today, at the defined real discount rate, to ensure that funds would be available in the future as they are needed to perform the response action alternative.

Present worth costs were estimated using the real discount rate published in Appendix C of the Office of Management and Budget (OMB) Circular No. A-94, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, effective through January 2012* (OMB, 2010). Based on this guidance and a duration of 14 years for vadose zone alternatives 2, 3, 4 and 5, a real discount rate of 1.6 percent was used in cost estimate present value calculations for these alternatives. Based on this guidance and durations of 38 yrs for groundwater Alt 2 and 17 to 18 years for groundwater Alts 3, 4 and 5, a real discount rate of 2.3 percent was used for Alt2, and a real discount rate of 1.9 percent was used for cost estimate present value calculations for groundwater alternatives 3, 4, and 5.

11 Estimate Classification

This estimate was prepared in accordance with the guidelines of "*A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, EPA 540-R-00-002, OSWER 9355.0-75, July 2000. It's important to remember that at the FS stage, the design for the response action project is still conceptual, not detailed, and the cost estimate is considered to be "order-of-magnitude." The expected accuracy range of the cost estimate at this stage is approximately plus 50 percent, minus 30 percent.

The expected accuracy range is an indication of the degree to which the final cost outcome for a given project could vary from the estimated cost. Accuracy is traditionally expressed as a +/- percentage range around the point estimate after application of contingency, with a stated level of confidence that the actual cost outcome would fall within this range (+/- measures are a useful simplification, given that actual cost outcomes have different frequency distributions for different types of projects). Typically, this results in a 90% confidence that the actual cost will fall within the bounds of the low and high ranges.

The accuracy range of an estimate is dependent upon a number of characteristics of the estimate input information and the estimating process. The extent and the maturity of the input information as measured

by percentage completion (and related to level of project definition) is an important determinant of accuracy. However, there are factors besides the available input information that also greatly affect estimate accuracy measures. Primary among these are the state of technology in the project and the quality of reference cost estimating data.

The accuracy of any given estimate is not fixed or determined by its classification category. Significant variations in accuracy from estimate to estimate are possible if any of the determinants of accuracy, such as technology, quality of reference cost data, quality of the estimating process, and skill and knowledge of the estimator vary. Accuracy is also not necessarily determined by the methodology used or the effort expended. Estimate accuracy must be evaluated on an estimate-by estimate basis, usually in conjunction with some form of risk analysis process.

12 Cost Resources

The following is a list of the cost resources used in the development of the cost estimate.

- TRACE V2 (ECF-Hanford-11-0098 through 0107)
- RACER™
- RS Means
- UP-1 previous cost estimate 2010
- Hanford historical actual costs
- Estimator judgment

13 Estimate Methodology

The cost estimate for the 100 K project was developed in accordance with EPA/540/R-00/002, *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study***,** OSWER 9355.0-75 (EPA, 2000), and PRC-PRO-EP-40282 *Cost Estimating Procedure for Response Action Decision-Making* (PRC, 2010). The TRACE V2 cost estimating workbook in conjunction with the RACER™ Cost Estimator software were used to develop the cost estimate for each of the removal action alternatives.

This cost estimate has been prepared for guidance in project evaluation from the information available at the time of the estimate. The final cost of the project will depend on final design, selected scope of work, actual labor and material costs, competitive market conditions, implementation schedule and other variable factors. As a result, the final project costs will vary from the estimate presented here. Because of this, project feasibility and funding needs must be carefully reviewed prior to making specific financial decisions to help ensure proper project evaluation and adequate funding.

14 Sensitivity Analysis

Sensitivity analysis for this cost estimate was not performed. The following factors might cause the estimate to significantly change.

- *Levels of contamination*
- *Depth and extent of contamination encountered during RTD of vadose zone sites*
- *Duration and actual operations and maintenance requirements for phosphate infiltration/sequestration systems*
- *Less favorable working conditions and/or increased monitoring requirements that would significantly increase the impact of working in health and safety protection and/or increase the health and safety protection requirements.*

Because of these factors:

1. The remedy selection process must consider differences in response action cost uncertainties/cost risks in addition to response action-specific cost estimates and ranges.
2. Funding needs must be carefully reviewed before making specific financial decisions or establishing final budgets.

15 Labor Costs

Fixed-price (FP) construction craft labor rates are those listed in Appendix A of the Site Stabilization Agreement for All Construction Work for the U.S. Department of Energy at the Hanford Site (commonly known as the Hanford Site Stabilization Agreement [HSSA]). The HSSA rates include base wage, fringe benefits, and other compensation as negotiated between CH2M HILL Plateau Remediation Company (CHPRC) and the National Building and Construction Trades Department American Federation of Labor-Congress of Industrial Organizations (AFL-CIO). Other factors that account for additional costs (Workman's Compensation, Federal Insurance Contributions Act (FICA), and state and Federal unemployment insurance) to develop a fully burdened rate by craft, have been incorporated. The labor rates used are for 2011.

Plateau Remediation Contractor (PRC) labor rates for management, engineering, safety oversight, and technical support are based on the PRC-approved planning rates for fiscal year 2011.

16 Sales Tax

Washington State sales tax has been applied to estimate materials and equipment purchases at 8.3 percent and is included in the PRC general and administrative (G&A) percentage discussed in section 5.

17 References

EPA 540-R-00-002, 2000, *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, OSWER 9355.0-75, Office of Emergency and Remedial Response, U.S. Environmental Protection Agency, Washington, D.C.

PRC-PRO-EP-40282, 2010, *Cost Estimating Procedure for Response Action Decision-Making*, Rev. 0, Chg. 0, CH2M HILL Plateau Remediation Company, Richland, Washington.

Means, R. S., 2001, ECHOS *Environmental Remediation Cost Date Unit Price*, Robert S. Means Company, Kingston, Massachusetts.

Means, R. S., 2010a, *Building Construction Cost Book*, 68th annual ed., Robert S. Means Company, Kingston, Massachusetts.

Means, R. S., 2010b, *Heavy Construction Cost Data*, 24th annual ed., Robert S. Means Company, Kingston, Massachusetts.

OMB Circular No. A-94, 2011, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" (memorandum for Heads of Executive Departments and Establishments), Appendix C, "Discount Rates for Cost-Effectiveness, Lease Purchase, and Related Analyses," as revised, Office of Management and Budget, Washington, D.C.

Site Stabilization Agreement for All Construction Work for the U.S. Department of Energy at the Hanford Site, 1984, as amended, commonly known as the Hanford Site Stabilization Agreement (HSSA)(original title, *Site Stabilization Agreement, Hanford Site, between J.A. Jones Construction Services Company and Morrison-Knudsen Company, Inc., and the Building and Construction Trades Department of the AFL-CIO and its affiliated international unions, and the International Brotherhood of Teamsters, Chauffeurs, Warehousemen, and Helpers of America.*

ECF-Hanford-11-0098, Environmental Calculation File for PCRAD V1 Overall-Overview

ECF-Hanford-11-0099, Environmental Calculation File for PCRAD V1-Actual Costs

ECF-Hanford-11-0100, Environmental Calculation File for PCRAD V1- RACER Costs

ECF-Hanford-11-0101, Environmental Calculation File for PCRAD V1-Calculations

ECF-Hanford-11-0102 Environmental Calculation File for PCRAD Unit Costs

ECF-Hanford-11-0103, Environmental Calculation File for PCRAD V1-Capital Cost

ECF-Hanford-11-0104, Environmental Calculation File for PCRAD V1-O&M Cost

ECF-Hanford-11-0105, Environmental Calculation File for PCRAD V1-O&M Distribution

ECF-Hanford-11-0106, Environmental Calculation File for PCRAD V1-Present Value

ECF-Hanford-11-0107, Environmental Calculation File for PCRAD V1-Totals

ECF-Hanford-11-0164, Tool for Response Action Cost Estimating (TRACE), TRACE V2 – Site Cost Distribution

APPENDIX

Table 5 – Waste Site Specific Costs

COMPARISON OF TOTAL COST OF RESPONSE ACTION ALTERNATIVES*

Site:	300 Area Waste Sites	**Base Year:**	2013
Location:	Hanford, WA	**Date:**	December-11
Phase:	FS	**Rev:**	1

	Alternative 1	Alternative 2 (VZ)	Alternative 3 (VZ)	Alternative 4 (VZ)	Alternative 5 (VZ)
COST SUMMARY					
Capital Cost	$0	$122,935,000	$155,854,000	$344,373,000	$1,010,447,000
% of Total Non-discounted cost	-	35.87%	34.26%	55.00%	82.17%
Total Annual Cost	$0	$5,759,000	$72,696,000	$33,883,000	$5,759,000
% of Total Non-discounted cost	-	1.68%	15.98%	5.41%	0.47%
Total Periodic Cost	$0	$153,493,000	$164,149,000	$158,504,000	$153,493,000
% of Total Non-discounted cost	-	45%	36%	25%	12%
Non-Discounted	**$0**	**$342,686,000**	**$454,849,000**	**$626,097,000**	**$1,229,747,000**
Real Discount Rate	**-**	**1.6%**	**0.0%**	**1.6%**	
Total Present Value of Alternative (Discounted)	**-**	**$295,857,000**	**$399,666,000**	**$544,801,000**	**$1,155,200,000**
Expected Accuracy Range for total present value is +50%/-30%					
-30%	**-**	**$207,100,000**	**$279,767,000**	**$381,361,000**	**$808,640,000**
50%	**-**	**$443,786,000**	**$599,499,000**	**$817,202,000**	**$1,732,800,000**

*Notes:
Range of accuracy is expected to be +50%/-30%

	Waste Site		WCH	CHPRC	CHPRC	CHPRC	CHPRC
				Alt 2	Alt 3	Alt 4	Alt 5
		ND = Non Discounted	$ IN MILLIONS	$ IN MILLIONS	$ IN MILLIONS	$ IN MILLIONS	$ IN MILLIONS
WCH	300RLWS	Individual Site (non discounted)	$1.31	$1.31	$1.31	$1.31	$1.31
WCH	300RLWS	Discounted (PV)	**$1.03**	**$1.03**	**$1.03**	**$1.03**	**$1.03**
WCH	300RRLWS	Individual Site (non discounted)	$3.00	$3.00	$3.00	$3.00	$3.00
WCH	300RRLWS	Discounted (PV)	**$2.91**	**$2.91**	**$2.91**	**$2.91**	**$2.91**
WCH	300-11	Individual Site (non discounted)	$0.15	$0.15	$0.15	$0.15	$0.15
WCH	300-11	Discounted (PV)	$0.15	**$0.15**	**$0.15**	**$0.15**	**$0.15**
PRC	300-15-PIPE						
			Capital Cost	$3.34	$3.34	$3.34	$3.34
			Annual	$0.41	$0.41	$0.41	$0.41
			Periodic	$54.64	$54.64	$54.64	$54.64
			Individual Site (non discounted)	$58.39	$58.39	$58.39	$58.39
			Discounted (PV)	**$45.98**	**$45.98**	**$45.98**	**$45.98**
PRC	300-175						
			Capital Cost	$0.39	$0.39	$0.39	$0.39
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$0.39	$0.39	$0.39	$0.39
			Discounted (PV)	**$0.38**	**$0.38**	**$0.38**	**$0.38**
PRC	300-2						
			Capital Cost	$0.45	$0.45	$0.45	$0.00
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$0.45	$0.45	$0.45	$0.00
			Discounted (PV)	**$0.44**	**$0.44**	**$0.44**	**$0.00**
WCH	300-214	Individual Site (non discounted)	$0.26	$0.26	$0.26	$0.26	$0.26
WCH	300-214	Discounted (PV)	**$0.25**	**$0.25**	**$0.25**	**$0.25**	**$0.25**
WCH	300-22	Individual Site (non discounted)	$0.06	$0.06	$0.06	$0.06	$0.06
WCH	300-22	Discounted (PV)	**$0.06**	**$0.06**	**$0.06**	**$0.06**	**$0.06**
WCH	300-255	Individual Site (non discounted)	$0.01	$0.01	$0.01	$0.01	$0.01
WCH	300-255	Discounted (PV)	**$0.01**	**$0.01**	**$0.01**	**$0.01**	**$0.01**
WCH	300-257	Individual Site (non discounted)	$0.34	$0.34	$0.34	$0.34	$0.34
WCH	300-257	Discounted (PV)	$0.33	**$0.33**	**$0.33**	**$0.33**	**$0.33**
WCH	300-263	Individual Site (non discounted)	$0.09	$0.09	$0.09	$0.09	$0.09
WCH	300-263	Discounted (PV)	**$0.09**	**$0.09**	**$0.09**	**$0.09**	**$0.09**
WCH	300-265	Individual Site (non discounted)	$0.10	$0.10	$0.10	$0.10	$0.10
WCH	300-265	Discounted (PV)	**$0.08**	**$0.08**	**$0.08**	**$0.08**	**$0.08**
PRC	300-269						
			Capital Cost	$1.49	$1.49	$1.49	$1.49
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$1.49	$1.49	$1.49	$1.49
			Discounted (PV)	**$1.45**	**$1.45**	**$1.45**	**$1.45**
PRC	300-277						
			Capital Cost	$5.30	$5.30	$5.30	$5.30
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$5.30	$5.30	$5.30	$5.30
			Discounted (PV)	**$5.13**	**$5.13**	**$5.13**	**$5.13**
WCH	300-279	Individual Site (non discounted)	$0.05	$0.05	$0.05	$0.05	$0.05
WCH	300-279	Discounted (PV)	**$0.05**	**$0.05**	**$0.05**	**$0.05**	**$0.05**
PRC	300-280						
			Capital Cost	$1.60	$1.60	$1.60	$1.60
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$1.60	$1.60	$1.60	$1.60
			Discounted (PV)	**$1.55**	**$1.55**	**$1.55**	**$1.55**
PRC	300-281						
			Capital Cost	$0.37	$0.37	$0.37	$0.37
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$0.37	$0.37	$0.37	$0.37

	Waste Site		WCH	CHPRC	CHPRC	CHPRC	CHPRC
				Alt 2	Alt 3	Alt 4	Alt 5
		ND = Non Discounted	$ IN MILLIONS	$ IN MILLIONS	$ IN MILLIONS	$ IN MILLIONS	$ IN MILLIONS
			Discounted (PV)	**$0.36**	**$0.36**	**$0.36**	**$0.36**
PRC	300-282	$0.00	No cost, this site is considered part of site 300-15				
PRC	300-283						
			Capital Cost	$0.44	$0.44	$0.44	$0.44
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$0.44	$0.44	$0.44	$0.44
			Discounted (PV)	**$0.43**	**$0.43**	**$0.43**	**$0.43**
PRC	300-284						
			Capital Cost	$0.15	$0.15	$0.15	$0.15
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$0.15	$0.15	$0.15	$0.15
			Discounted (PV)	**$0.15**	**$0.15**	**$0.15**	**$0.15**
PRC	300-286						
			Capital Cost	$0.39	$0.39	$0.39	$0.39
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$0.39	$0.39	$0.39	$0.39
			Discounted (PV)	**$0.38**	**$0.38**	**$0.38**	**$0.38**
PRC	300-287						
			Capital Cost	$0.33	$0.33	$0.33	$0.33
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$0.33	$0.33	$0.33	$0.33
			Discounted (PV)	**$0.32**	**$0.32**	**$0.32**	**$0.32**
PRC	300-288						
			Capital Cost	$0.33	$0.33	$0.33	$0.33
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$0.33	$0.33	$0.33	$0.33
			Discounted (PV)	**$0.32**	**$0.32**	**$0.32**	**$0.32**
PRC	300-289						
			Capital Cost	$0.48	$0.48	$0.48	$0.48
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$0.48	$0.48	$0.48	$0.48
			Discounted (PV)	**$0.47**	**$0.47**	**$0.47**	**$0.47**
PRC	300-290						
			Capital Cost	$0.41	$0.41	$0.41	$0.41
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$0.41	$0.41	$0.41	$0.41
			Discounted (PV)	**$0.40**	**$0.40**	**$0.40**	**$0.40**
PRC	300-291						
			Capital Cost	$0.27	$0.27	$0.27	$0.27
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$0.27	$0.27	$0.27	$0.27
			Discounted (PV)	**$0.26**	**$0.26**	**$0.26**	**$0.26**
PRC	300-292						
			Capital Cost	$3.00	$3.00	$3.00	$3.00
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$3.00	$3.00	$3.00	$3.00
			Discounted (PV)	**$2.91**	**$2.91**	**$2.91**	**$2.91**
PRC	300-293						
			Capital Cost	$12.41	$12.41	$12.41	$12.41

	Waste Site		WCH	CHPRC	CHPRC	CHPRC	CHPRC
				Alt 2	Alt 3	Alt 4	Alt 5
		ND = Non Discounted	$ IN MILLIONS	$ IN MILLIONS	$ IN MILLIONS	$ IN MILLIONS	$ IN MILLIONS
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$12.41	$12.41	$12.41	$12.41
			Discounted (PV)	**$12.02**	**$12.02**	**$12.02**	**$12.02**
PRC	300-294						
			Capital Cost	$0.30	$0.30	$0.30	$0.30
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$0.30	$0.30	$0.30	$0.30
			Discounted (PV)	**$0.29**	**$0.29**	**$0.29**	**$0.29**
PRC	300-295						
			Capital Cost	$3.00	$3.00	$3.00	$3.00
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$3.00	$3.00	$3.00	$3.00
			Discounted (PV)	**$2.91**	**$2.91**	**$2.91**	**$2.91**
PRC	300-296						
			Capital Cost				
			Annual				
			Periodic				
			Individual Site (non discounted)	$60.00	$60.00	$60.00	$60.00
			Discounted (PV)	**$47.28**	**$47.28**	**$47.28**	**$47.28**
WCH	300-32	Individual Site (non discounted)	$0.09	$0.09	$0.09	$0.09	$0.09
WCH	300-32	Discounted (PV)	$0.09	**$0.09**	**$0.09**	**$0.09**	**$0.09**
PRC	300-34			No cost, this site is considered part of site 300-15			
WCH	300-39	Individual Site (non discounted)	$3.40	$3.40	$3.40	$3.40	$3.40
WCH	300-39	Discounted (PV)	$3.29	**$3.29**	**$3.29**	**$3.29**	**$3.29**
PRC	300-4						
			Capital Cost	$0.05	$0.05	$0.05	$0.05
			Annual	$1.44	$1.44	$1.44	$1.44
			Periodic	$1.26	$1.26	$1.26	$1.26
			Individual Site (non discounted)	$2.75	$2.75	$2.75	$2.75
			Discounted (PV)	**$2.27**	**$2.27**	**$2.27**	**$2.27**
WCH	300-5	Individual Site (non discounted)	$0.18	$0.18	$0.18	$0.18	$0.18
WCH	300-5	Discounted (PV)	$0.14	**$0.14**	**$0.14**	**$0.14**	**$0.14**
PRC	300-7						
			Capital Cost				
			Annual				
			Periodic	$5.68	$5.68	$5.68	$5.68
			Individual Site (non discounted)	$5.68	$5.68	$5.68	$5.68
			Discounted (PV)	**$5.50**	**$5.50**	**$5.50**	**$5.50**
PRC	300-9						
			Capital Cost				
			Annual				
			Periodic	$5.68	$5.68	$5.68	$5.68
			Individual Site (non discounted)	$5.68	$5.68	$5.68	$5.68
			Discounted (PV)	**$5.50**	**$5.50**	**$5.50**	**$5.50**
WCH	309-WS-1						
WCH	309-WS-2						
WCH	309-WS-3						
	309-TW-1						
	309-TW-2						
	309-TW-3						
WCH	316-3	Individual Site (non discounted)	$2.02	$2.02	$2.02	$2.02	$2.02
	316-3	Discounted (PV)	$1.96	**$1.96**	**$1.96**	**$1.96**	**$1.96**
WCH	323-TANK 1	Individual Site (non discounted)	$0.10	$0.10	$0.10	$0.10	$0.10
	323-TANK 1	Discounted (PV)	$0.10	**$0.10**	**$0.10**	**$0.10**	**$0.10**
	323 TANK 2	Individual Site (non discounted)	$0.10	$0.10	$0.10	$0.10	$0.10
	323 TANK 2	Discounted (PV)	$0.10	**$0.10**	**$0.10**	**$0.10**	**$0.10**
	323 TANK 3	Individual Site (non discounted)	$0.10	$0.10	$0.10	$0.10	$0.10
	323 TANK 3	Discounted (PV)	$0.10	**$0.10**	**$0.10**	**$0.10**	**$0.10**
	323 TANK 4	Individual Site (non discounted)	$0.10	$0.10	$0.10	$0.10	$0.10

	Waste Site		WCH	CHPRC	CHPRC	CHPRC	CHPRC
				Alt 2	Alt 3	Alt 4	Alt 5
		ND = Non Discounted	$ IN MILLIONS	$ IN MILLIONS	$ IN MILLIONS	$ IN MILLIONS	$ IN MILLIONS
	323 TANK 4	Discounted (PV)	$0.10	**$0.10**	**$0.10**	**$0.10**	**$0.10**
PRC	325-WTF						
			Capital Cost	$0.00	$0.00	$0.00	$0.00
			Annual	$0.21	$0.21	$0.21	$0.21
			Periodic	$2.44	$2.44	$2.44	$2.44
			Individual Site (non discounted)	$2.65	$2.65	$2.65	$2.65
			Discounted (PV)	**$2.08**	**$2.08**	**$2.08**	**$2.08**
PRC	331-LSLT1						
			Capital Cost	$0.00	$0.00	$0.00	$0.00
			Annual	$0.21	$0.21	$0.21	$0.21
			Periodic	$0.43	$0.43	$0.43	$0.43
			Individual Site (non discounted)	$0.64	$0.64	$0.64	$0.64
			Discounted (PV)	**$0.52**	**$0.52**	**$0.52**	**$0.52**
PRC	331-LSLT2						
			Capital Cost	$0.00	$0.00	$0.00	$0.00
			Annual	$0.21	$0.21	$0.21	$0.21
			Periodic	$0.43	$0.43	$0.43	$0.43
			Individual Site (non discounted)	$0.64	$0.64	$0.64	$0.64
			Discounted (PV)	**$0.52**	**$0.52**	**$0.52**	**$0.52**
PRC	340 COMPLEX	$5.08					
			Capital Cost	$11.76	$11.76	$11.76	$11.76
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$11.76	$11.76	$11.76	$11.76
			Discounted (PV)	**$11.39**	**$11.39**	**$11.39**	**$11.39**
PRC	400 PPSS						
			Capital Cost	$0.00	$0.00	$0.00	$0.00
			Annual	$0.21	$0.21	$0.21	$0.21
			Periodic	$4.05	$4.05	$4.05	$4.05
			Individual Site (non discounted)	$4.25	$4.25	$4.25	$4.25
			Discounted (PV)	**$3.32**	**$3.32**	**$3.32**	**$3.32**
PRC	400-37						
			Capital Cost	$0.00	$0.00	$0.00	$0.00
			Annual	$0.21	$0.21	$0.21	$0.21
			Periodic	$0.46	$0.46	$0.46	$0.46
			Individual Site (non discounted)	$0.67	$0.67	$0.67	$0.67
			Discounted (PV)	**$0.54**	**$0.54**	**$0.54**	**$0.54**
PRC	400-38						
			Capital Cost	$0.47	$0.47	$0.47	$0.47
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$0.47	$0.47	$0.47	$0.47
			Discounted (PV)	**$0.45**	**$0.45**	**$0.45**	**$0.45**
PRC	600-290	600-290:2					
			Capital Cost	$14.36	$14.36	$14.36	$14.36
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$14.36	$14.36	$14.36	$14.36
			Discounted (PV)	**$13.91**	**$13.91**	**$13.91**	**$13.91**
PRC	600-367						
			Capital Cost	$61.39	$61.39	$61.39	$61.39
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$61.39	$61.39	$61.39	$61.39
			Discounted (PV)	**$59.48**	**$59.48**	**$59.48**	**$59.48**
PRC	600-63			This site is a RCRA site which is cost uder the RCRA closure program			
PRC	618-1						
			Capital Cost	$0.00	$0.71	$0.71	$23.72
			Annual	$0.00	$0.83	$0.83	$0.00

	Waste Site		WCH	CHPRC Alt 2	CHPRC Alt 3	CHPRC Alt 4	CHPRC Alt 5
		ND = Non Discounted	$ IN MILLIONS	$ IN MILLIONS	$ IN MILLIONS	$ IN MILLIONS	$ IN MILLIONS
			Periodic	$0.00	$0.99	$0.99	$0.00
			Individual Site (non discounted)	$0.00	$2.53	$2.53	$23.72
			Discounted (PV)	**$0.00**	**$2.53**	**$2.53**	**$22.98**
PRC	618-2						
			Capital Cost	$0.00	$0.57	$0.57	$10.93
			Annual	$0.00	$0.38	$0.38	$0.00
			Periodic	$0.00	$0.83	$0.83	$0.00
			Individual Site (non discounted)	$0.00	$1.77	$1.77	$10.93
			Discounted (PV)	**$0.00**	**$1.77**	**$1.77**	**$10.59**
PRC	618-3						
			Capital Cost	$0.00	$0.71	$0.71	$10.53
			Annual	$0.00	$0.45	$0.45	$0.00
			Periodic	$0.00	$0.86	$0.86	$0.00
			Individual Site (non discounted)	$0.00	$2.01	$2.01	$10.53
			Discounted (PV)	**$0.00**	**$2.01**	**$2.01**	**$10.20**
WCH	618-11	Individual Site (non discounted)	$64.72	$64.72	$64.72	$64.72	$64.72
	618-11	Discounted (PV)	$51.00	**$51.00**	**$51.00**	**$51.00**	**$51.00**
PRC	UPR-300-10	$0.28					
			Capital Cost	$0.00	$0.00	$0.00	$0.00
			Annual	$0.21	$0.21	$0.21	$0.21
			Periodic	$0.77	$0.77	$0.77	$0.77
			Individual Site (non discounted)	$0.97	$0.97	$0.97	$0.97
			Discounted (PV)	**$0.77**	**$0.77**	**$0.77**	**$0.77**
PRC	UPR-300-12	$0.21		No cost, it's assumed th	NO COST	NO COST	NO COST
PRC	UPR-300-2						
			Capital Cost	$0.91	$0.91	$0.91	$0.91
			Annual	$0.00	$0.00	$0.00	$0.00
			Periodic	$0.00	$0.00	$0.00	$0.00
			Individual Site (non discounted)	$0.91	$0.91	$0.91	$0.91
			Discounted (PV)	**$0.88**	**$0.88**	**$0.88**	**$0.88**
PRC	UPR-300-48	$0.13					
			Capital Cost	$0.00	$0.00	$0.00	$0.00
			Annual	$0.21	$0.21	$0.21	$0.21
			Periodic	$0.36	$0.36	$0.36	$0.36
			Individual Site (non discounted)	$0.56	$0.56	$0.56	$0.56
			Discounted (PV)	**$0.46**	**$0.46**	**$0.46**	**$0.46**
PRC	UPR-300-5		$0.00	No cost, it's assumed th	NO COST	NO COST	NO COST
PRC	316-1						
			Capital Cost	$0.00	$7.30	$60.45	$261.67
			Annual	$0.62	$18.22	$10.09	$0.62
			Periodic	$0.29	$2.28	$1.36	$0.29
			Individual Site (non discounted)	$0.91	$27.81	$80.87	$262.58
			Discounted (PV)	**$0.77**	**$25.17**	**$69.27**	**$254.26**
PRC	316-2						
			Capital Cost	$0.00	$5.76	$29.29	$212.93
			Annual	$0.62	$13.01	$8.81	$0.62
			Periodic	$0.29	$1.82	$1.10	$0.29
			Individual Site (non discounted)	$0.91	$20.59	$46.96	$213.84
			Discounted (PV)	**$0.77**	**$18.85**	**$37.63**	**$207.05**
PRC	316-3 (phos & GW source RTD)						
			Capital Cost	$0.00	$4.72	$23.02	$149.10
			Annual	$0.62	$12.01	$5.64	$0.62
			Periodic	$0.29	$1.62	$0.58	$0.29
			Individual Site (non discounted)	$0.91	$18.35	$34.58	$150.01
			Discounted (PV)	**$0.77**	**$16.59**	**$29.02**	**$145.20**
PRC	316-5						
			Capital Cost	$0.00	$13.16	$106.69	$218.64
			Annual	$0.62	$26.16	$6.05	$0.62
			Periodic	$0.29	$3.43	$0.47	$0.29

	Waste Site		WCH	CHPRC	CHPRC	CHPRC	CHPRC
				Alt 2	Alt 3	Alt 4	Alt 5
		ND = Non Discounted	$ IN MILLIONS	$ IN MILLIONS	$ IN MILLIONS	$ IN MILLIONS	$ IN MILLIONS
			Individual Site (non discounted)	$0.91	$42.75	$118.34	$219.55
			Discounted (PV)	**$0.77**	**$39.95**	**$109.77**	**$212.57**
			Total Capital (Non-discounted)	$122,935,000.00	$155,854,000.00	$344,373,000.00	$1,010,447,000.00
			Total Annual (Non-discounted)	$5,759,000.00	$72,696,000.00	$33,883,000.00	$5,759,000.00
			Total Periodic (Non-discounted)	$153,493,000.00	$164,149,000.00	$158,504,000.00	$153,493,000.00
			Total Non-Discounted	$342,686,000.00	$454,849,000.00	$626,097,000.00	$1,229,747,000.00
			Total Discounted (PV)	**$295,857,000.00**	**$399,666,000.00**	**$544,801,000.00**	**$1,155,200,000.00**

Table 6 – Groundwater Costs

	B	C	D	F	G	H
2	**COMPARISON OF TOTAL COST OF RESPONSE ACTION ALTERNATIVES***					
4	**Site:**	300 Area (GW only)			**Base Year:**	2013
5	**Location:**	Hanford, WA			**Date:**	December-11
6	**Phase:**	FS			**Rev:**	0
8		**Alternative 1**	**Alternative 2 (GW)**	**Alternative 3 (GW)**	**Alternative 4 (GW)**	**Alternative 5 (GW)**
9		**No Action**	**GW MNA & monitoring**	**GW MNA & monitoring, and performance monitoring for phosphate infiltr. & injection**	**GW MNA & monitoring, and performance monitoring for phosphate infiltration**	**GW MNA & monitoring**
10	Total Duration (years)	**0**	**38**	**18**	**17**	**17**
11	Tritium MNA years	**-**	**17**	**17**	**17**	**17**
12	Uranium & COCs Performance Monitoring years	**-**	**38**	**18**	**12**	**10**
17	GW Monitoring Wells for GW OU MNA		**6**	**6**	**6**	**6**
18	GW Monitoring Wells for Phosphate Addition		**NA**	**22**	**22**	**NA**
19	GW Monitoring Duration for Phosphate Addition (years)		**NA**	**2**	**2**	**NA**
36	**Cost Summary**					
37	Capital Cost	$0	$556,000	$2,389,000	$2,389,000	$556,000
38	% of Total Non-discounted cost	-	7.22%	14.87%	18.01%	14.64%
39	Total Annual Cost	$0	$5,830,000	$9,667,000	$7,055,000	$2,663,000
40	% of Total Non-discounted cost	-	75.70%	60.16%	53.18%	70.10%
41	Total Periodic Cost	$0	$1,316,000	$4,014,000	$3,824,000	$580,000
42	% of Total Non-discounted cost	-	17%	25%	28.8%	15%
43	**Non-Discounted**	**$0**	**$7,701,000**	**$16,070,000**	**$13,267,000**	**$3,799,000**
44	**Real Discount Rate**	**-**	**2.3%**	**1.9%**	**1.9%**	**1.9%**
45	**Total Present Value of Alternative (Discounted)**	**-**	**$5,136,000**	**$13,459,000**	**$11,295,000**	**$3,178,000**
46	**Expected Accuracy Range for total present value is +50%/-30%**					
47	**-30%**	**-**	**$3,596,000**	**$9,422,000**	**$7,907,000**	**$2,225,000**
48	**50%**	**-**	**$7,704,000**	**$20,189,000**	**$16,943,000**	**$4,767,000**
49						
50	*Notes:					
51	Range of accuracy is expected to be +50%/-30%					
52						

Table 7 – Alternatives & Technologies

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Attachment 1. Summary of Cost Estimate Inputs

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300 RLWS	The 300 Area Radioactive Liquid Waste Sewer (RLWS) consists of a network of underground, double-encased, stainless-steel pipe (encased in reinforced-fiberglass or plastic pipe as secondary containment) that transfers radioactive liquid wastes from the generating facilities (324, 325, 325-A, 326, 327, and 329 Buildings) to the 340 Complex. The system was retired in 1998. Contaminants would include uranium, acids, bases, metals, solvents, and fission products. Contaminated soil and piping is estimated to be 8,000 m^3 (280,000 ft^3).	Post-ROD To-Go Site	Pipeline	6.43 acres	6.4 m (21 ft)	Uranium, radionuclides, metals, organics	1) Void fill or RTD 6.43 acres of pipeline to 6.4 m (21 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) Void fill or RTD 6.43 acres of pipeline to 6.4 m (21 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) Void fill or RTD 6.43 acres of pipeline to 6.4 m (21 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) Void fill or RTD 6.43 acres of pipeline to 6.4 m (21 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.
300 RRLWS	A network of single-walled, stainless-steel piping and carbon-steel fittings buried between 3 and 6 m (10 and 20 ft) below grade. Received radioactive wastes from various 300 Area facilities including the fuel fabrication and R&D laboratories. Wastes discharged to the sewer included water and small quantities of chemicals, decontamination solutions, aqueous fuel fabrication solutions, acids, and bases. Contaminants of potential concern would include uranium, mercury, acids, bases, fission products, metals, and solvents.	Post-ROD To-Go Site	Pipeline	20 cm (8 in) 457 m (1,500 ft)	6 m (20 ft)	Uranium, radionuclides, metals, organics	1) Void fill or RTD pipeline length of 457 m (1,500 ft) to 6 m (20 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) Void fill or RTD pipeline length of 457 m (1,500 ft) to 6 m (20 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) Void fill or RTD pipeline length of 457 m (1,500 ft) to 6 m (20 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) Void fill or RTD pipeline length of 457 m (1,500 ft) to 6 m (20 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.
300-11	The unmarked site is comprised of gasoline-impacted, subsurface soil from a gasoline UST. The release was discovered after leak test failure in 1992. The UST was removed. Contaminated remains unremediated.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	7.43 m2 (80 ft2)	Ranges from to 1.6 m to 6.25m (5.4 to 20.5 ft)	Petroleum hydrocarbons	1) RTD area of 7.43 m2 (80 ft2) to 6.25 m (20.5 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 7.43 m2 (80 ft2) to 6.25 m (20.5 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 7.43 m2 (80 ft2) to 6.25 m (20.5 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 7.43 m^2 (80 ft2) to 6.25 m (20.5 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-15	This underground, process sewer extends throughout the 300 Area. Transfers process wastes (potable water, cooling water, precipitation runoff, waste brine solution [NaCl with Mg salts], Cr, Cu, U, nitrate, sulfate, and fluoride ions with Pb, Ag, acetone, and cyanide. The sewer network includes the original system (20-cm [8-in.-]-diameter vitrified clay piping with acid-proof joints) which directed liquid waste eastward to the 316-1 and 316-2 Process Pond until 1975, then to the 300 Area Trenches from 1975 to 1994. Starting in 1994, the discharges utilized a new pipeline to the 300 Area TEDF for treatment and release to the Columbia River. Initially, the system received low-level liquid wastes from the 313 and 314 Buildings, and later from the 3706 and 321 Laboratories. The 321 Building connected to the main 20-cm (8-in.)-diameter lines through a combination of 8-cm (3-in)-diameter stainless-steel, 20-cm (8-in.)-diameter wrought iron, and 15-cm (6-in.)-diameter earthenware pipes, all of acid-proof construction. By 1994, more than 50 facilities were connected to the process sewer. As the system was updated and expanded, pipe materials included the original vitrified clay, and iron, steel, concrete, PVC, and stainless steel piping.	Post-ROD To-Go Site	Site exceeds groundwater protection criteria for total uranium isotopes and ecological risk criteria for Arochlor-1248. (Chapter 5 and 7). However, portions of the site remain unremediated (handled as a Post-ROD To Go Site).	Pipeline length of 14,645 m (48,048 ft)	variable	Metals, cyanide, organics	1) Void fill or RTD pipeline length of 14,645 m (48,048 ft) to variable depths (assume 4.6 m [15 ft] for cost estimate). Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) Void fill or RTD pipeline length of 14,645 m (48,048 ft) to variable depths (assume 4.6 m [15 ft] for cost estimate). Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) Void fill or RTD pipeline length of 14,645 m (48,048 ft) to variable depths (assume 4.6 m [15 ft] for cost estimate). Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipeline length of 14,645 m (48,048 ft) to variable depths (assume 4.6 m [15 ft] for cost estimate). Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.
300-175	The site is a concrete French drain, with a metal lid, that received non-dangerous/ nonradioactive steam condensate. The operational flow rate was <0.04 L/min (0.01 gal/min).	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	9.29 m2 (100 ft2)	soil beneath foundation removal to 4.6 m (15 ft)	Non-radionuclides	1) RTD area of 9.29 m2 (100 ft2) to 4.6 m (15 ft) after demolition of structure. Remediate after 2027 with building 325. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 9.29 m2 (100 ft2) to 4.6 m (15 ft) after demolition of structure. Remediate after 2027 with building 325. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 9.29 m2 (100 ft2) to 4.6 m (15 ft) after demolition of structure. Remediate after 2027 with building 325. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 9.29 m2 (100 ft2) to 4.6 m (15 ft) after demolition of structure. Remediate after 2027 with building 325. 2) Disposal at ERDF or other approved disposal facility.

Attachment 1. Summary of Cost Estimate Inputs

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300-2	About 189,250 L (50,000 gal) of secondary cooling water and other contaminated water containing 33 mCi of I-133 and 12 mCi of I-131 were discharged to the ground. About 10 µCi of alpha emitters (calculated as Pu-239) and about 40 mCi of non-volatile beta emitters, plus rutheniums, were transferred to the trench during the first 36 hours of the incident. A small number of short pumpings were made after that. However, the total volume and radioisotopic inventory are insignificant in comparison to those during the first 36 hours.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	18 m2 (194 ft2)	4.6 m (15 ft)	Radionuclides	1) RTD area of 18 m2 (194 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 18 m2 (194 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 18 m2 (194 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 18 m2 (194 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.
300-214	The site is a subsurface, carbon-steel and PVC pipeline that transfers liquid waste from the 308, 324, 325, 326, 327, and 329 Buildings to the 307 Retention Basins. The waste discharged to the RPS is nonhazardous, potentially radioactive waste (not to exceed 5,000 pCi/L). In FY 1998, approximately 12 million L (3 million gal) flowed through the RPS to the 307 Retention Basins.	Post-ROD To-Go Site	Pipeline	1,344 m (4,409 ft) in length	4.6 m (15 ft)	Radionuclides	1) RTD pipeline length of 1344 m (4409 ft) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipeline length of 1344 m (4409 ft) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipeline length of 1344 m (4409 ft) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipeline length of 1344 m (4409 ft) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-22	The site is a UPR from a parted hose coupling that contaminated the ground outside the emergency airlock of the 309 Building on 9/20/1962. The site is covered with new asphalt. The asphalt area is roped off and trucks are not allowed on the asphalt. The rupture loop annex is present below ground at the site.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	15 m2 (162 ft2)	4.6 m (15 ft)	Radionuclides	1) RTD area of 15 m2 (162 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 15 m2 (162 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 15 m2 (162 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 15 m2 (162 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-255	Soil contamination exists inside the 309 Building Tank Farm fenced area. The source of the contamination was probably the piping related to tanks 309-TW-1, -2 and -3. Potential radioactive contaminants are Cs-137, Co-60, and Am-241. Potential hazardous contaminants are Ba, Cd, Cr, Pb, and Se.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	528 m2 (5,683 ft2)	4.6 m (15 ft)	Radionuclides and metals	1) RTD area of 528 m2 (5,683 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 528 m2 (5,683 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 528 m2 (5,683 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 528 m2 (5,683 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.
300-257	The site is process sewer piping that originally discharged radioactive, liquid waste from the 309 Building's Rupture Loop Holding Tank to the Columbia River. The waste is the process sewer piping. The tank was removed in the late 1970s. Concurrently, the Rupture Loop Holding Tank was removed to a 200 Area burial ground, and the RLWS connections were severed and plugged. The former Rupture Loop Holding Tank area is not a parking lot.	Post-ROD To-Go Site	Pipeline with Human Health Direct Contact and/or Ecological risk likely in shallow soil	0.9 m (2.95 ft) diameter, 451 m (1,480 ft)	5.9 m (19.3 ft)	Radionuclides	1) RTD length of 451 m (1,480 ft) to 5.9 m (19.3 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD length of 451 m (1,480 ft) to 5.9 m (19.3 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD length of 451 m (1,480 ft) to 5.9 m (19.3 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD length of 451 m (1,480 ft) to 5.9 m (19.3 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-263	The site is an inactive, unused catch tank. Hazardous or radioactive waste was never transferred from the 324 Building to the tank, which is isolated, and the pipelines are capped. Sample results indicated Cs-137 to be 509 pCi/L. Gross beta was 1,700 pCi/L. During sampling, 15.2 cm (6 in.) of rainwater had accumulated in the sample area. The water is believed to have come from intrusion because many of the flange bolts were missing. The contamination may have been from surface contamination.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	38 m2 (409 ft2)	4.6 m (15 ft)	Cesium-137	1) RTD area of 38 m2 (409 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 38 m2 (409 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 38 m2 (409 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 38 m2 (409 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.

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Attachment 1. Summary of Cost Estimate Inputs

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300-265	The transfer line carried liquid High-Level Waste from spent nuclear fuel processing.	Post-ROD To-Go Site	Pipeline	The pipes are 3/8 and 3/4" and are encased within a 2" which is encased in a 4" pipe. There are 2 pipelines laid in parallel that would be excavated with 1 trench or 328 m (1076 ft).	2.29 m (7.5 ft)	Radionuclides	1) RTD 328 m (1076 ft) length to 2.29 m (7.5 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD 328 m (1076 ft) length to 2.29 m (7.5 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD 328 m (1076 ft) length to 2.29 m (7.5 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD 328 m (1076 ft) length to 2.29 m (7.5 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.
300-269	The site is a rectangular concrete building foundation. The 331-A Building was used for biological research and demolished in 2000. Residual contamination may be on the pad from past releases at the building.	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	465 m^2 (5,005 ft^2)	Soil beneath foundation removal to 4.6 m (15 ft)	Radionuclides	1) RTD area of 465 m2 (5,005 ft2) to 4.6 m (15 ft) bgs, after demolition of structure	1) RTD area of 465 m2 (5,005 ft2) to 4.6 m (15 ft) bgs, after demolition of structure	1) RTD area of 465 m2 (5,005 ft2) to 4.6 m (15 ft) bgs, after demolition of structure	1) RTD area of 465 m2 (5,005 ft2) to 4.6 m (15 ft) bgs, after demolition of structure
300-277	Unplanned Release. Truck being screened with instruments in the que leaving the IRA area for ERDF.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	16,248 m2 (174,892 ft2)	1 m (3 ft)	Radionuclides suspected	1) RTD area of 16,248 m2 (174,892 ft2) to 1 m (3 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 16,248 m2 (174,892 ft2) to 1 m (3 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 16,248 m2 (174,892 ft2) to 1 m (3 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 16,248 m2 (174,892 ft2) to 1 m (3 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-279	This feature consists of the historical location of underground diesel and gasoline storage tanks that were located to the north of the original 313 Bldg. (M-2885 sheet 1 rev 0), and east of the original 3716 Automotive Repair Bldg. location. The northern expansion of the 313 Bldg. was over this area where the tanks were located.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	37 m2 (398 ft2)	4.6 m (15 ft)	Petroleum hydrocarbons	1) RTD area of 37 m2 (398 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 37 m2 (398 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 37 m2 (398 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 37 m2 (398 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-280	The construction debris disposal pit was a rectangular 13 m by 38 m (42 ft by 124 ft) pit aligned northwest to southeast with a 6 m (20 ft) wide gravel road ramping into the northwest end of the pit (M-3904, sheet 16, rev 1).	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	491 m2 (5,285 ft2)	4.6 m (15 ft)	Radionuclides and metals suspected	1) RTD area of 491 m2 (5,285 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 491 m2 (5,285 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 491 m2 (5,285 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 491 m2 (5,285 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-281	This is the suspected site of a septic tank that was shown on a drawing (H-3-45154). The drawing calls for removal of the septic tank. However, the entire drawing was placed on hold for future construction and it is unclear if the septic tank was ever removed. The drawing was for a facility that was never built.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	7.1 m2 (76.4 ft2)	4.6 m (15 ft)	Radionuclides suspected	1) RTD area of 7.1 m2 (76.4 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 7.1 m2 (76.4 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 7.1 m2 (76.4 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 7.1 m2 (76.4 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.
300-282	This feature consists of the historical location of temporary experimental autoclaves with a settling tank that was connected to a wooden French drain. (DDTS-Generated-3822).	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	Assumed 0.5-acres for cost estimating purposes.	4.6 m (15 ft)	Radionuclides and metals suspected	1) Institutional Controls 2) RTD area of 0.5-acres to 4.6 m (15 ft) bgs. 3) Disposal at ERDF or other approved disposal facility.	1) Institutional Controls 2) RTD area of 0.5-acres to 4.6 m (15 ft) bgs. 3) Disposal at ERDF or other approved disposal facility.	1) Institutional Controls 2) RTD area of 0.5-acres to 4.6 m (15 ft) bgs. 3) Disposal at ERDF or other approved disposal facility.	1) Institutional Controls 2) RTD area of 0.5-acres to 4.6 m (15 ft) bgs. 3) Disposal at ERDF or other approved disposal facility.

Attachment 1. Summary of Cost Estimate Inputs

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300-283	The site is a suspected release to soil. The site is currently used as an entry road/parking lot for 300 Area D4 activities.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	68 m2 (729 ft2)	4.6 m (15 ft)	Radionuclides suspected	1) RTD area of 68 m2 (729 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 68 m2 (729 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 68 m2 (729 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 68 m2 (729 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-284	This feature is the historical location of the sand blasting area associated with the former 3221 building location.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	229 m2 (2,465 ft2)	0.6 m (2 ft)	Radionuclides and metals suspected	1) RTD area of 229 m2 (2,465 ft2) to 0.6 m (2 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 229 m2 (2,465 ft2) to 0.6 m (2 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 229 m2 (2,465 ft2) to 0.6 m (2 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 229 m2 (2,465 ft2) to 0.6 m (2 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-286	This site consists of three discrete locations and the underlying soil of a potentially contaminated French drain and drywells and their associated below grade piping components. A drywell and a French drain were discovered during the Orphan Site Evaluation (OSE) historical review, and the remaining drywell was discovered during a field walkdown of the area under investigation. Each of the facilities that the French drains and drywells are associated with, were identified and process or function of the facilities determined. Details of inlet pipes, French drains, drywells and source facilities are provided when available. Drain number 1 (FD-1) (Orphan site feature 300-FF2-019) is a 61 cm (24 in) diameter drywell constructed in accordance with Hanford standard AC-4-30 (H-3-14950 & H-3-14947). The drain received liquids from two 0.3 m x 0.3 m x 0.3 m (1 ft x 1 ft x 1ft) sumps located in the 309 Building exhaust filter pit. A 2.5 cm (1 in) schedule 40 steel drain line from each sump joined a (2 in) schedule 40 steel line that drained to the French drain. Thee is a locked metal cover over the drywell. Drain number 2 (FD-28) is a stormwater catch basin and 4-inch slotted drain pipe (corrugated polyethylene with a smooth interior). It is not visible in the field. Drain number 3 (FD-33) is a French drain with a 15.2-cm (6-inch) pipe that empties into it. The pipe was traced 11 meters due west using geophysics. The traced end of the pipe is 3 meters (10 feet) east of FD-21 (NFE), which was associated with the 3701-N guardhouse.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	9.29 m2 (100 ft2)	4.6 m (15 ft)	Radionuclides, metals, organics suspected	1) RTD area of 9.29 m2 (100 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 9.29 m2 (100 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 9.29 m2 (100 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 9.29 m2 (100 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-287	This feature consists of broken corrugated transite in a pile approximately 0.5 meters by 1.5 meters.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	2 m2 (21.5 ft2)	4.6 m (15 ft)	Asbestos	1) RTD area of 2 m2 (21.5 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 2 m2 (21.5 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 2 m2 (21.5 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 2 m2 (21.5 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-288	This feature consists of two piles of garnet sand within a 5 m (16.4 ft) diameter area. The total volume is approximately 15 cubic meters (20 cubic yards), and each pile is estimated to be 5% garnet sand and 95% soil.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	34 m2 (368 ft2)	4.6 m (15 ft)	Radionuclides and metals suspected	1) RTD area of 34 m2 (368 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 34 m2 (368 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 34 m2 (368 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 34 m2 (368 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-289	This feature consists of bare ground, with crusting and two drum bung plugs.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	22 m2 (240 ft2)	4.6 m (15 ft)	Radionuclides, metals, organics suspected	1) RTD area of 22 m2 (240 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 22 m2 (240 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 22 m2 (240 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 22 m2 (240 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.

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Attachment 1. Summary of Cost Estimate Inputs

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300-290	The site is a posted RMA (Radiological Materials Area) approximately 64 square meters. The material in the RMA consisted mostly of rusted metal automotive parts, scraps of crumpled sheet metal, electrical wire debris and engine gaskets.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	58 m2 (624 ft2)	4.6 m (15 ft)	Radionuclides, metals, organics suspected	1) RTD area of 58 m2 (624 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 58 m2 (624 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 58 m2 (624 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 58 m2 (624 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-291	This feature consists of garnet sand on a gravel road bed.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	270 m2 (2,906 ft2)	1.2 m (4 ft)	Radionuclides and metals suspected	1) RTD area of 270 m^2 (2,906 ft^2) to 1.2 m (4 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 270 m^2 (2,906 ft^2) to 1.2 m (4 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 270 m^2 (2,906 ft^2) to 1.2 m (4 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 270 m^2 (2,906 ft^2) to 1.2 m (4 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-292	This site includes ten (10) abandoned nonhazardous waste pipeline segments associated with the process sewers from the 315 Water Filter Plant (filter backwash) in the 300 Area (Other04102010). The site includes pipeline segments identified during the 300-FF-1 Orphan Site Evaluation for disposition with the 300-FF-2 Operable Unit evaluations (038509) and additional undocumented pipeline segments, manholes, sumps and diversion boxes discovered during the 300-FF-2 Orphan Site Evaluation (OSE). The OSE reference number for these segments is 300FF2-266.The site consists of abandoned pipeline segments and associated features (manholes, junction boxes, sumps, etc.) that transported filter backwash waste solutions from the 315 Water Filter Plant. These waste solutions were routed to Filter Backwash Ponds (e.g. 300 RFBP, 300 FBP:1, 300 FBP:2).The original 315 Water Filter Plant process sewer ran east from the 315 Building process sewer sump (315-22) to an outfall into the Columbia River. In 1975, the 315 process sewer pipeline to the river outfall was isolated and sealed at a diversion box (315-23) installed to redirect the 315 Building process sewer flow north to discharge into on-site sedimentation ponds (see attached map and tables). The east branch of the 315 Water Filter Plant process sewer from the diversion box (315-23) was accepted as WIDS Waste Site 300-261; it was later closed out ("rejected") with Waste Site Reclassification Form 99-044.The most recent waste site associated with these pipeline segments was the lined 300 FBP:2 Filter Backwash Pond (aka 315-C Sedimentation Pond) that was shutdown in 1998 (2000-116). During the last period of operation, any filter backwash waste solutions were to be settled in the pond and the pond overflow was to drain into a lift station for discharge to the 300 Area Process Sewer (300-15).	Post-ROD To-Go Site	Pipeline	20 cm (8 in) diameter 1000 m (1,480 ft) length	assume to 4.6 m (15 ft)	Radionuclides, metals, organics suspected	1) RTD 1000 m (1,480 ft) pipeline length to 4.6 m (15 ft) bgs after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD 1000 m (1,480 ft) pipeline length to 4.6 m (15 ft) bgs after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD 1000 m (1,480 ft) pipeline length to 4.6 m (15 ft) bgs after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD 1000 m (1,480 ft) pipeline length to 4.6 m (15 ft) bgs after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.
300-293	The subsite consists of underground utility lines (UGL) in the 300 Area that has been identified as being greater than 2.5 feet below the ground surface (bgs). The UGLs without an approximate depth were also assigned to this subsite.	Post-ROD To-Go Site	Pipeline	1,794.7 m (5,888 ft)	0.75 m (2.5 ft)	Radionuclides, metals, organics suspected	1) RTD pipe length of 1,794.7 m (5,888 ft) to 0.75 m (2.5 ft) after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipe length of 1,794.7 m (5,888 ft) to 0.75 m (2.5 ft) after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipe length of 1,794.7 m (5,888 ft) to 0.75 m (2.5 ft) after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipe length of 1,794.7 m (5,888 ft) to 0.75 m (2.5 ft) after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.
300-294	This feature consists of garnet sand on a gravel road bed.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	270 m2 (2,906 ft2)	1.2 m (4 ft)	Radionuclides and metals suspected	1) RTD area of 270 m2 (2,906 ft2) to 1.2 m (4 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 270 m2 (2,906 ft2) to 1.2 m (4 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 270 m2 (2,906 ft2) to 1.2 m (4 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 270 m2 (2,906 ft2) to 1.2 m (4 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.

Attachment 1. Summary of Cost Estimate Inputs

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300-295	This site includes four (4) abandoned nonhazardous waste pipeline segments and associated features (diversion valve box, manholes, etc.) that serviced the 384 Power House coal ash waste disposal by sluicing to the 300 Ash Pits and/or to the 315-C Sedimentation Pond (Other11092009). The site includes pipeline segments identified during the 300-FF-1 Orphan Site Evaluation for disposition with the 300-FF-2 Operable Unit evaluations (038509) and additional undocumented pipeline segments discovered during the 300-FF-2 Orphan Site Evaluation (OSE).The coal ash waste site (300 Ash Pit) associated with these pipeline segments was reclassified to a status of "No Action" (98-004, Control Number 115) based on the past practice knowledge (DOE/RL-94-49) that the waste streams were nonhazardous and based on post-remediation characterization results for the 300-FF-1 Operable Unit waste sites (CVP 2003-02, DOE/RL-2004-74).The most recent waste site associated with these pipeline segments was the lined 300 FBP:2 Filter Backwash Pond (aka 315-C Sedimentation Pond) that was shutdown in 1998 (2000-116). No coal ash slurries were routed to the 315 C Filter Backwash Sedimentation Pond (300 FPB:2) via Segment 14, the most recent coal ash sluicing pipeline (see Site Comments). This site is listed as 300FF2-269 in the Orphan Sites Evaluation Report (OSR-2010-0002).	Post-ROD To-Go Site	Pipeline	450 m (1,480 ft) of pipe.	4.6 m (15 ft)	Radionuclides, metals, organics suspected	1) RTD pipe length of 450 m (1,480 ft) to 4.6 m (15 ft). 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipe length of 450 m (1,480 ft) to 4.6 m (15 ft). 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipe length of 450 m (1,480 ft) to 4.6 m (15 ft). 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipe length of 450 m (1,480 ft) to 4.6 m (15 ft). 2) Disposal at ERDF or other approved disposal facility.
300-296	Unplanned Release. Soil below building 324 B Cell. Very high contamination with rads (14K rad per hour). 9000 rad per hour in soil under building. Assume building 324 D&D'ed.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	501 m2 (5,393 ft2)	assume to 4.6 m (15 ft)	Radionuclides and metals suspected	Internal Government Cost Estimate (IGCE) used for cost estimate	IGCE used for cost estimate	IGCE used for cost estimate	IGCE used for cost estimate
300-32	The site is the remaining contaminated components of the former 333 Building, including the concrete pad, any subgrade soils and piping. Chemical wastes included nitric, sulfuric, hydrofluoric, chromic-nitric-sulfuric, and other acids, along with degreasers TCE in the 1960s and early 1970s, and PCE and 111-TCA in the 1970s and 1980s. Heat treatment salts included sodium nitrate, sodium and potassium nitrite, and sodium and potassium chloride. Additionally, many alcohol and acetone cleansers were used throughout the building's history.	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	3,655 m2 (39,342 ft2)	soil beneath foundation removal to 4.6 m (15 ft)	Metals, organics	1) RTD area of 3,655 m2 (39,342 ft2) to 4.6 m (15 ft) bgs, after demolition of structure 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 3,655 m2 (39,342 ft2) to 4.6 m (15 ft) bgs, after demolition of structure 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 3,655 m2 (39,342 ft2) to 4.6 m (15 ft) bgs, after demolition of structure 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 3,655 m2 (39,342 ft2) to 4.6 m (15 ft) bgs, after demolition of structure 2) Disposal at ERDF or other approved disposal facility.
300-34	An unplanned release to soil was discovered during excavation to install a new manhole (PS-87). Radioactive-contaminated soil was found at ~3.65 m (12 ft) below ground surface. Maximum contamination levels were beta/gamma 10,000 dpm. Soil samples emitted 525 pCi/g total beta and 91 pCi/g total alpha.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	9.3 m2 (100 ft2)	3.7 m (12 ft)	Radionuclides	Included with 300-15	Included with 300-15	Included with 300-15	Included with 300-15
300-39	The waste is radioactively contaminated equipment and structures.	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	72 m2 (775 ft2)	soil beneath foundation removal to 4.6 m (15 ft)	Radionuclides	1) RTD area of 72 m2 (775 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 72 m2 (775 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 72 m2 (775 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 72 m2 (775 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.
300-4	The site consists of uranium-contaminated soil inside the southwest corner of the fenced (active) electrical substation. A potential exists for PCB impact to soil from substation equipment, based on soil samples that contained PCBs at concentrations from 1 to 3 mg/kg. EPA (2001) also lists solvents as a potential contaminant at this site.	Post-ROD To-Go Site	Adjacent to long-term facility Human Health Direct Contact and/or Ecological risk likely in shallow soil	420 m2 (4,521 ft2)	4.6 m (15 ft)	Uranium, PCBs	1) Temporary Surface Barrier until 2027. 2) RTD area of 420 m2 (4,521 ft2) to 4.6 m (15 ft) bgs [after 2027]. 3) Disposal at ERDF or other approved disposal facility.	1) Temporary Surface Barrier until 2027. 2) RTD area of 420 m2 (4,521 ft2) to 4.6 m (15 ft) bgs [after 2027]. 3) Disposal at ERDF or other approved disposal facility.	1) Temporary Surface Barrier until 2027. 2) RTD area of 420 m2 (4,521 ft2) to 4.6 m (15 ft) bgs [after 2027]. 3) Disposal at ERDF or other approved disposal facility.	1) Temporary Surface Barrier until 2027. 2) RTD area of 420 m2 (4,521 ft2) to 4.6 m (15 ft) bgs [after 2027]. 3) Disposal at ERDF or other approved disposal facility.

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Attachment 1. Summary of Cost Estimate Inputs

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300-5	The site was two underground fuel tanks, the pump island, ancillary piping, and contaminated soil. An unknown quantity of contaminated soil, under the fuel dispensing island at the 3709-A Building (300 Area Fire Station) was discovered on 4/10/1992. These tanks were removed on 4/14/1992.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	58.3 m2 (628 ft2)	4.6 m (15 ft)	Petroleum hydrocarbons	1) RTD area of 58.3 m2 (628 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 58.3 m2 (628 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 58.3 m2 (628 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 58.3 m2 (628 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-7	The vegetated site contains solid construction debris (concrete, metallic waste, asbestos, and uranium contamination). Surface debris piles are visible. Subsurface disturbances have been identified with GPR.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	6,225 m2 (67,005 ft2)	4.6 m (15 ft)	Uranium, metals, asbestos	At DOEs request, WCHs costs have been applied for cost estimating purposes	At DOEs request, WCHs costs have been applied for cost estimating purposes	At DOEs request, WCHs costs have been applied for cost estimating purposes	At DOEs request, WCHs costs have been applied for cost estimating purposes
300-9	This "Early Burial Ground" and its burial inventory are not well documented. Uranium-contaminated aluminum shavings are scattered on the ground surface. Other surface contaminants may include aluminum-silicon alloy and beryllium-contaminated aluminum. Process knowledge suggests the waste would consist of the uranium-contaminated waste from very early 300 Area experimental processes.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	462 m2 (4,973 ft2)	4.6 m (15 ft)	Uranium, metals	At DOEs request, WCHs costs have been applied for cost estimating purposes	At DOEs request, WCHs costs have been applied for cost estimating purposes	At DOEs request, WCHs costs have been applied for cost estimating purposes	At DOEs request, WCHs costs have been applied for cost estimating purposes
309-TW-1	The unit received aqueous nonhazardous radioactive wastes from the operation of the PRTR. Residual contamination may be present in the empty tanks.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	5.46 m2 (58.8 ft2)	assume to 4.6 m (15 ft)	Radionuclides, metals, organics suspected	Included with 300-39	Included with 300-39	Included with 300-39	Included with 300-39
309-TW-2	The unit received aqueous nonhazardous radioactive wastes from the operation of the PRTR. Residual contamination may be present in the tanks.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	414 m2 (4,456 ft2)	assume to 4.6 m (15 ft)	Radionuclides, metals, organics suspected	Included with 300-39	Included with 300-39	Included with 300-39	Included with 300-39
309-TW-3	The unit received aqueous nonhazardous radioactive wastes from the operation of the PRTR. Residual contamination may be present in the tank.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	414 m2 (4,456 ft2)	assume to 4.6 m (15 ft)	Radionuclides, metals, organics suspected	Included with 300-39	Included with 300-39	Included with 300-39	Included with 300-39
309-WS-1	The site is a plutonium recycle test reactor ion exchanger vault. Following deactivation activities, residual radiological contamination and chemical contamination from the ion exchange resin may be present on surfaces in the vault. Contaminants of potential concern are Cs-137 and Sr-90. The rainwater (in the lower vault) and ion exchange columns were removed in 1995.	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	Approximately 40 m3 (1,412 ft3) of concrete removal; Approximately 20 m3 (706 ft3) of soil removal	soil beneath foundation removal to 4.6 m (15 ft)	Cesium and Strontium	Included with 300-39	Included with 300-39	Included with 300-39	Included with 300-39
309-WS-2	Stabilized radiological contamination is present on vault surfaces. Contaminants of potential concern are TRU, Cs-137, and Co-60. Before stabilization, survey reports indicate radiological contamination levels were as high as 70,000 dpm cm^2 beta/gamma and 28,000 dpm cm^2 alpha, with contact dose rates up to 2.5 rem/hr. After cleanout and stabilization, contamination levels were <1,000 dpm/cm^2 beta/gamma, <background (3 counts/min) alpha, and a dose rate of <0.5 millirem/hr.	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	Approximately 18 m3 (636 ft3) of concrete removal; Approximately 23 m3 (812 ft3) of soil removal	soil beneath foundation removal to 4.6 m (15 ft)	Radionuclides, TRU	Included with 300-39	Included with 300-39	Included with 300-39	Included with 300-39

Attachment 1. Summary of Cost Estimate Inputs

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
309-WS-3	The brine tank stored brine salt to be used by the process water/brine tanks within the basement of the 309 Building.	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	36 m2 (388 ft2)	soil beneath foundation removal to 4.6 m (15 ft)	Metals suspected	Included with 300-39	Included with 300-39	Included with 300-39	Included with 300-39
316-1	The original unlined percolation pond surface area was 45,522 m^2 (490,000 ft^2), at 1.5 m (5 ft) deep, and was separated into five sections. It originally received cooling water and low-level liquid wastes from fuel fabrication facilities and early laboratories (313, 314, 3706, and 321 Buildings). Facilities contaminants included U, Cu, Co, and small amounts of Pu. Combined process wastes discharged from the fuel fabrication facilities to the South and North Process Ponds ranged from 1.5 to 11.4 Million L/day (400,000 to 3 Million gal/day). In August 1945, the pond overflowed easterward toward the Columbia River. A crushed-rock and earten dike was built in September 1945. Accumulation of aluminum/uranium hydroxide precipitate had affected the infiltration rate. In October 1948, the SPP dike breached on the northwest side, releasing the bulk of the pond's contents including 5.4 to 27.7 kg (12 to 61 lb) or uranium into the Columbia River. The breach was attributed aluminum/uranium hydroxide precipitate accumulated on the pond bottom. The 316-2 Nort Process Pond was built as a substitute for the SPP, while repairs were made, and the bottom was dredged. Afterward, the ponds were regularly maintained by dredging. Dredge sediments were deposited on the surrounding dikes and on the scrapings disposal area. The site was Closed Out under EPA/ROD/R10-96/143. Approximately 234,000 metric tons (257,000 US tons) of material were removed from the site.	Residual source mass causing uranium groundwater plume	Residual source mass causing uranium groundwater plume	56,950 m2 (613,000 ft2)	12 m (40 ft) bgs	Uranium	No Action	Phased uranium sequestration via phosphate infiltration over 56,950 m2 (613,000 ft2) and phosphate PRZ injection over 10,540 m2 (113,450 ft2)	1) Focused deep RTD area of 10,540 m2 (113,450 ft2) to 12 m (40 ft) bgs. 2) Uranium sequestration via phosphate infiltration and injection over 46,410 m2 (499,550 ft2)	Expanded deep RTD area of 56,950 m2 (613,000 ft2) to 12 m (40 ft) bgs.
316-2	Seven sections separated by 3.7-m (12-ft-) wide dikes, with the entire 40,000 m^2 (10-acre) area surrounded by a dike 4.6 m (15 ft) wide and ~3 m (10 ft) high. It was built to receive waste in 1948, after a dike failure at the SPP. The site originally received cooling water and low-level liquid process wastes from the fuel fabrication facilities and the early laboratories (313, 314, 3706, and 321 Buildings). In 1955, the 316-2 North Process Pond was taken out of service for 14 months to manage accumulated uranium-bearing. Dredging recovered 4,672 kg (10,300 lb) of uranium from deposits up to 22.9 cm (9-in.) thick in two locations in the southwest region of the pond. Pre-1954, ~21,955 L (5,800 gal) per month of sodium aluminate containing 22.7 kg (50 lb) of uranium, was released to the 316-1 adn 316-2 ponds, resulting in 2,722 kg (6,000 lb) of uranium. An estimated 8,684 kg (19,145 lb) of mostly depleted U-235 was discharged to the ponds from the 321 Building. By 1956, sodium aluminate was included in the 313 Building waste stream instead of being discharged to the ponds. The South and North Process Ponds were phased out in 1974 and 1975. The North Process Pond was Closed Out under EPA/ROD/R10-96/143.	Residual source mass causing uranium groundwater plume	Residual source mass causing uranium groundwater plume	59,940 m2 (645,190 ft2)	12 m (40 ft) bgs		No Action	Phased uranium sequestration via phosphate infiltration over 59,940 m2 (645,190 ft2) and phosphate PRZ injection over 12,880 m2 (138,640 ft2)	1) Focused deep RTD area of 12,880 m2 (138,640 ft2) to 12 m (40 ft) bgs. 2) Uranium sequestration via phosphate infiltration and injection over 47,060 m2 (506,550 ft2)	Expanded deep RTD area of 59,940 m2 (645,190 ft2) to 12 m (40 ft) bgs.

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Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
316-5	Served as the discharge site for the 300 Area Process Sewer System. The 468-m (1,535-ft) long, 3-m (10-ft) wide ponds, spaced 15 m (50 ft) apart were constructed to receive the low-level waste that had previously gone to the South and North Process Ponds (316-1 and 316-2). The two trenches operated alternately with one being filled to a predetermined level before switching to the other one, usually every 2 to 6 months. The site received approximately 9.8 million L/day (2.6 million gal/day) of water. This water was chlorinated by the water filter plant for the 300 Area and contained minerals added to the water during use. Water discharged to the process sewer was used primarily for cooling and was not modified. Other discharge sources included steam condensates, floor washing/waxing janitorial solutions, water treatment (primarily salt), laboratories, process water from fuel fabrication, and other aqueous solutions not designated as dangerous wastes (WAC 173-303). In 1991, an Expedited Response Action removed contaminated soil and sludge from the trenches sides and bottoms. Excavated sediments were used to fill the north end of the trenches and were immobilized in the Process Trench Spoils Area. Excavation activities removing lifts of 0.3 m (1 ft) of contaminated soil from the sides and 1.3 m (4 ft) from the bottom of each trench. The 300 Area Process Trenches Waste Site was closed out under EPA/ROD/R10-96/143.	Residual source mass causing uranium groundwater plume	Residual source mass causing uranium groundwater plume	29,970 m2 (322,590 ft2)	12 m (40 ft) bgs	Uranium	No Action	Phased uranium sequestration via phosphate infiltration over 29,970 m2 (322,593 ft2) and phosphate PRZ injection over 12,880 m2 (138,640 ft2)	1) Focused deep RTD area of 12,880 m2 (138,640 ft2) to 12 m (40 ft) bgs. 2) Uranium sequestration via phosphate infiltration and injection over 17,090 m2 (183,954 ft2)	Expanded deep RTD area of 29,970 m2 (322,590 ft2) to 12 m (40 ft) bgs.
316-3	The site received wastes from the 300 Area Laboratory expansion facilities (329 Biophysics Laboratory, 327 Radiometallurgy Building, 324 Radiochemistry Building, 326 Pile Technology Building, and 329 Mechanical Development Building). The wastes first went through the 307 Retention Basins. Retention Basin waste below discharge limits was released to the trenches.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil Groundwater/surface water protection risk likely for uranium and other COCs.	555 m2 (5,974 ft2)	12 m (40 ft) bgs	Uranium, radionuclides, metals, organics	1) RTD area of 555 m2 (5,974 ft2) to 4.6 m (15 ft) bgs 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 555 m2 (5,974 ft2) to 4.6 m (15 ft) bgs 2) Phased uranium sequestration via phosphate infiltration over 28,480 m2 (306,560 ft2) and phosphate PRZ injection over 3,360 m2 (36,170 ft2)	1) Focused deep RTD area 3,360 m2 (36,170 ft2) to 4.6 m (15 ft) bgs. 2) Uranium sequestration via phosphate infiltration and injection over 25,120 m2 (270,390 ft2)	Expanded deep RTD area of 28,480 m2 (306,560 ft2) to 12 m (40 ft) bgs.
323 TANK 1	The tank received neutralized uranium-contaminated water and/or basic aluminum cladding waste solutions from reprocessing R&D activities in the 321 Building and the 3706 Building (via the hot sink drains in the 321 Building laboratories), including those related to bismuth phosphate chemical separations, REDOX, Uranium Metal Recovery, PUREX, RECUPLEX, the Thorex program, and medical isotope extraction. The tank was emptied in 1952 or 1953.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	2,323 m2 (25,000 ft2)	assume to 4.6 m (15 ft)	Uranium, metals	1) RTD area of 2,323 m2 (25,000 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 2,323 m2 (25,000 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 2,323 m2 (25,000 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 2,323 m2 (25,000 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.
323 TANK 2	The tank received neutralized uranium-contaminated water and/or basic aluminum cladding waste solutions from reprocessing R&D activities in the 321 Building and the 3706 Building (via the hot sink drains in the 321 Building laboratories), including those related to bismuth phosphate chemical separations, REDOX, Uranium Metal Recovery, PUREX, RECUPLEX, the Thorex program, and medical isotope extraction. The tank was emptied in 1952 or 1953.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	2,323 m2 (25,000 ft2)	assume to 4.6 m (15 ft)	Uranium, metals	Encompassed in same concrete encasement as 323 TANK 1.	Encompassed in same concrete encasement as 323 TANK 1.	Encompassed in same concrete encasement as 323 TANK 1.	Encompassed in same concrete encasement as 323 TANK 1.
323 TANK 3	The tank received neutralized uranium-contaminated water and/or basic aluminum cladding waste solutions from reprocessing R&D activities in the 321 Building and the 3706 Building (via the hot sink drains in the 321 Building laboratories), including those related to bismuth phosphate chemical separations, REDOX, Uranium Metal Recovery, PUREX, RECUPLEX, the Thorex program, and medical isotope extraction. The tank was emptied in 1952 or 1953.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	2,323 m2 (25,000 ft2)	assume to 4.6 m (15 ft)	Uranium, metals	Encompassed in same concrete encasement as 323 TANK 1.	Encompassed in same concrete encasement as 323 TANK 1.	Encompassed in same concrete encasement as 323 TANK 1.	Encompassed in same concrete encasement as 323 TANK 1.

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Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
323 TANK 4	The tank received neutralized uranium-contaminated water and/or basic aluminum cladding waste solutions from reprocessing R&D activities in the 321 Building and the 3706 Building (via the hot sink drains in the 321 Building laboratories), including those related to bismuth phosphate chemical separations, REDOX, Uranium Metal Recovery, PUREX, RECUPLEX, the Thorex program, and medical isotope extraction. The tank was emptied in 1952 or 1953. Between 1968 and 1987, the tank received waste from the 323 Building, including the hot cell drain, the cleanup box drain, and overflow from the process water sump. The tank has not received waste since 1987, when it contained liquid and sludge. Significant uranium and aluminum were detected, but no thorium in either the liquid or the sludge. The uranium and aluminum contamination would have entered the tank before 1967.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	2,323 m2 (25,000 ft2)	assume to 4.6 m (15 ft)	Uranium, metals	Encompassed in same concrete encasement as 323 TANK 1.	Encompassed in same concrete encasement as 323 TANK 1.	Encompassed in same concrete encasement as 323 TANK 1.	Encompassed in same concrete encasement as 323 TANK 1.
325 WTF	The waste treatment facilities treated radioactive-mixed wastes generated in R&D activities. The 325 Waste Treatment Facility also served to test and evaluate the effectiveness of various waste treatment technologies.	Post-ROD To-Go Site	Underneath long-term facility (no temporary barrier needed) Human Health Direct Contact and/or Ecological risk likely in shallow soil	1250 m2 (13,456 ft2)	soil beneath foundation removal to 4.6 m (15 ft)	Radionuclides	1) RTD area of 1250 m2 (13,456 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 1250 m2 (13,456 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 1250 m2 (13,456 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 1250 m2 (13,456 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.
331 LSLT1	The Life Sciences Laboratory Trench received sanitary wastewater and animal waste from the animal waste pit. Since most of the animal studies involved the use of radio isotopes, animal waste was segregated by activity. Solid animal waste, exceeding 200 pCi/g specific activity, was transported to 100-F trenches regularly. All other solid animal waste (<200 pCi/g specific activity) was flushed into the 331 Waste System. Specific contamination cases occurred at the 331 Complex.	Post-ROD To-Go Site	Underneath long-term facility (no temporary barrier needed) Human Health Direct Contact and/or Ecological risk likely in shallow soil	4.41 m2 (47.5 ft2)	4.6 m (15 ft)	Radionuclides	1) RTD area of 4.41 m2 (47.5 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 4.41 m2 (47.5 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 4.41 m2 (47.5 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 4.41 m2 (47.5 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.
331 LSLT2	The Life Sciences Laboratory Trench received liquid animal waste from the animal waste pit. Animal wastes were the most prominent wastes, in terms of volume, generated by the 331 Complex. Originally, liquid animal wastes from the complex including wash downs from the “hog and dog runs”, were disposed to a large, unlined pit, east of the 331-D Building. Sewers carrying animal waste from the 331 Complex were also connected to this pit.	Post-ROD To-Go Site	Underneath long-term facility (no temporary barrier needed) Human Health Direct Contact and/or Ecological risk likely in shallow soil	4.41 m2 (47.5 ft2)	4.6 m (15 ft)	Radionuclides	1) RTD area of 4.41 m2 (47.5 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 4.41 m2 (47.5 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 4.41 m2 (47.5 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 4.41 m2 (47.5 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.

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Attachment 1. Summary of Cost Estimate Inputs

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
340 Complex	The 340 Complex consists of Buildings 340, 340-A, 340-B, 3707-F, office trailers, 307 Retention Basins, two vaulted underground tanks, six 340A tanks, underground transfer pipes, load-out and decontamination equipment, instrumentation, and before 1963, the 316-3 Trenches, which disposed of retention process waste that met release criteria. The site supported the 325, 326, 237, and 329 Buildings, relieved stress on the 316-1 and 316-2 Process Ponds, and received potentially contaminated "retention" waste liquids. Waste liquids passed through the RPS line to the 307 Retention Basins to reduce radioactivity to less than threshold values before transfer to the 307 Trenches. Threshold-exceeding liquid was transferred to 56,780-L (15,000-gal) capacity collection tanks in the 340 Building before disposal at the 200 Area. Discharge to the basins was 4 g/L gross beta and 0.5 g/L plutonium, later changed to 50,000 pCi/L. The RLWS collected liquid process waste from the laboratories and the 308, 309, and 324 Buildings, and transferred the wastes to the 340 Building tanks. The 307 Trenches received 1 Million L (264,172 gal) of uncontaminated low-level radioactive waste liquid from the 307 Retention Basins once the waste streams were less than discharge limits. After 1963 removal from service, the 307 Trenches waste liquids were transferred to the process sewer for disposal in the Process Ponds. The 307 Trenches were excavated, and contaminated soil was transported to the 618-10 Burial Ground. In 1965, the trenches were backfilled with 7,645 m^3 (25,082 ft^3) of uranium-contaminated sediment from the SPP and fly ash. A leak test in 1976, of the single-walled RLWS network showed widespread system leaks. The system was replaced in 1978 to 1979, with double-walled, stainless steel pipes and a leak detection system. During replacement, contaminated soil was removed, but the RLWS piping and low radioactive level soil remains.	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	6,403 m2 (68,921 ft2)	soil beneath foundation removal to 4.6 m (15 ft)	Radionuclides	1) RTD area of 6,403 m2 (68,921 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 6,403 m2 (68,921 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 6,403 m2 (68,921 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 6,403 m2 (68,921 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.
400 PPSS	This site is the 400 Area Secondary Cooling Water (400 Area Process Pond and Sewer System). The unit consists of underground piping, a control structure, and the 4608B and 4608C percolation ponds. The process sewer, which empties into the process ponds, is for discharging water from cooling systems, and non-sanitary drains and sumps in the 400 Area facilities, including the FFTF. Water from the FFTF and FMEF cooling towers contains non-regulated quantities of algaecides and other treatment chemicals, including a biocide (Dearcide 702), microbiocide (sodium hypochlorite), and softening agent (Dearborn 878). Chemicals used for secondary cooling water testing (Dearborn Code 550, 562, 595, 899, 904) are present in unregulated quantities.	Post-ROD To-Go Site	Pipeline with Human Health Direct Contact and/or Ecological risk likely in shallow soil	3,006 m2 (32,356 ft2)	4.6 m (15 ft)	Metals, organics suspected	1) RTD area of 3,006 m2 (32,356 ft2) to 4.6 m (15 ft) bgs, after demolition of structure in 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 3,006 m2 (32,356 ft2) to 4.6 m (15 ft) bgs, after demolition of structure in 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 3,006 m2 (32,356 ft2) to 4.6 m (15 ft) bgs, after demolition of structure in 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 3,006 m2 (32,356 ft2) to 4.6 m (15 ft) bgs, after demolition of structure in 2027. 2) Disposal at ERDF or other approved disposal facility.
400-37	The site is an underground fuel oil tank. No visual evidence of the tank exists on the surface. The tank supplied diesel fuel to a standby electric generator. Drawing H-4-152061 has a written notation that the fuel oil tank was abandoned in place and that the exact location of the fuel line is unknown. It is believed to have been filled with sand.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	51.83 m2 (557.9 ft2)	4.6 m (15 ft)	Petroleum hydrocarbons	1) RTD area of 51.83 m2 (557.9 ft2) to 4.6 m (15 ft) bgs. Remediation to start in 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 51.83 m2 (557.9 ft2) to 4.6 m (15 ft) bgs. Remediation to start in 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 51.83 m2 (557.9 ft2) to 4.6 m (15 ft) bgs. Remediation to start in 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 51.83 m2 (557.9 ft2) to 4.6 m (15 ft) bgs. Remediation to start in 2027. 2) Disposal at ERDF or other approved disposal facility.
400-38	The site is an underground fuel tank that supported 4722A. There is no visual evidence of the tank on the surface. Drawing H-4-152061 has a notation reading "buried fuel tank." It is possible the tank has been filled with sand, but documentation has not been found.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	21 m2 (225 ft2)	4.6 m (15 ft)	Petroleum hydrocarbons	1) RTD area of 21 m2 (225 ft2) to 4.6 m (15 ft) bgs. Remediation to start in 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 21 m2 (225 ft2) to 4.6 m (15 ft) bgs. Remediation to start in 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 21 m2 (225 ft2) to 4.6 m (15 ft) bgs. Remediation to start in 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 21 m2 (225 ft2) to 4.6 m (15 ft) bgs. Remediation to start in 2027. 2) Disposal at ERDF or other approved disposal facility.

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Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
600-290	The site was a contaminated pad and loading dock near the 618-13 soil mound that was used for loading waste drums. Rust-colored drum ring patterns on the concrete suggest temporary storage of 208-L (55-gal) drums.	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	110 m2 (1184 ft2); 110 m3 (35 ft3) of concrete	soil beneath foundation removal to 4.6 m (15 ft)	Metals, organics suspected	No Alternative; addressed with sub-sets (600-290:1 and -290:2)	No Alternative; addressed with sub-sets (600-290:1 and -290:2)	No Alternative; addressed with sub-sets (600-290:1 and -290:2)	No Alternative; addressed with sub-sets (600-290:1 and -290:2)
600-290:2	The subsite includes the remaining area covered by the WIDS boundary. The majority of the area was enclosed by a fence and was used for storage of contaminated equipment. A portion of the site extends north of the fence where anomalies were visible in an old aerial photograph.	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	7,882 m2 (84,812 ft2)	soil beneath foundation removal to 4.6 m (15 ft)	Radionuclides, metals, organics suspected	1) RTD area of 7,882 m2 (84,812 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 7,882 m2 (84,812 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 7,882 m2 (84,812 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 7,882 m2 (84,812 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.
600-367	The site is a large, open field with a high soil mound in the center. Several pipes extend vertically through the soil surface in some areas. A small pallet containing damaged bags of bentonite is located in the southeast corner of the area adjacent to some vertical pipes. Two steel-hinged plates cover access holes to underground culverts used as monitoring stations for buried waste tests. Only simulated buried waste was placed at this test site.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	35,000 m2 (376,736 ft2)	4.6 m (15 ft)	Metals, organics suspected	1) RTD area of 35,000 m2 (376,736 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 35,000 m2 (376,736 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 35,000 m2 (376,736 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 35,000 m2 (376,736 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
600-63	The site includes potentially contaminated soil and equipment, and is enclosed within barbed, chain-link fencing with a locking gate. A considerable amount of surface debris is observed outside the fenced area. A trace amount of Co-60 was mixed in 1 cm (0.4 in.) of soil and placed 60 cm (24 in.) below the surface of two of the drainage lysimeters. Trace amounts of tritium were placed in two other lysimeters. Contaminant migration was monitored. Buried equipment, including caissons, lysimeters, associated instrumentation, and solar panels are noted, and may be contaminated with Co-60 and tritium.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	1,600 m2 (17,222 ft2)	4.6 m (15 ft)	Cobalt-60 and tritium	BPA lease site. Site will be remediated after ROD, but costs are not included in FS.	BPA lease site. Site will be remediated after ROD, but costs are not included in FS.	BPA lease site. Site will be remediated after ROD, but costs are not included in FS.	BPA lease site. Site will be remediated after ROD, but costs are not included in FS.
618-1	Two trenches received waste from early 300 Area facility operations, including the 305 Reactor, 3706 Laboratory, and 3741 Building. The site contains large quantities (14,500 kg [~16 tons]) of uranium from fuel fabrication activities, and small quantities of plutonium and fission products from laboratory operations. Radiological readings indicated 6,000 dpm alpha and 15 mr/hr beta/gamma. An August 1946, monthly report mentions burial of a bronze crucible that read 170 mR/hr (179 mrads/hr) and 5.5 mR/hr (5.5 mrads/hr) at 10.2 cm (4 in.).	Risk Exceedance	Groundwater Protection risk for Total Uranium Isotopes in deep soil	5,000 m2 (53,820 ft2)	20 m (32.8 ft)	Uranium	No Action	1) Institutional Controls 2) Phosphate Sequestration	1) Institutional Controls 2) Phosphate Sequestration	1) RTD area of 5,000 m2 (53,820 ft2) to 20 m (32.8 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
618-11	The site consists of three V-shaped trenches, two large-diameter caissons, and 50 VPUs. The burial ground received a variety of waste from the 300 Area operations. Low-level activity waste and large items were placed into the burial trenches. Some high-activity liquid waste or plutonium contaminated liquid was placed inside barrels and sealed with concrete. The burial ground was surface stabilized with additional clean soil and planted with wheat grass in 1983.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	34,770 m2 (374,261 ft2) [fenced] 4,111 m2 (42,250 ft2) [trenches]	variable	Radionuclides	1) RTD area of 62,012 m2 (667,489 ft2) to variable depths (assume 4.6 m [15 ft] for cost estimate). 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 62,012 m2 (667,489 ft2) to variable depths (assume 4.6 m [15 ft] for cost estimate). 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 62,012 m2 (667,489 ft2) to variable depths (assume 4.6 m [15 ft] for cost estimate). 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 62,012 m2 (667,489 ft2) to variable depths (assume 4.6 m [15 ft] for cost estimate). 2) Disposal at ERDF or other approved disposal facility.

DOE/RL-2010-99, DRAFT A
DECEMBER 2011

Attachment 1. Summary of Cost Estimate Inputs

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
618-2	The waste site consisted of three east-west trenches. In 1995, GPR identified three distinct trenches. Historical documents stated that there were either three or four trenches. The discrepancy of whether there are three or four trenches could be because the geometry of the middle trench is broken into two pieces at the east end. The unit was used for disposal of uranium-contaminated equipment and materials, plutonium, and fission products. The uranium waste was typically solid metallic uranium oxides in the form of metal cuttings from Reactor Fuel Fabrication facilities in the 300 Area. Plutonium and fission products came from 300 Area laboratory facilities that began to operate in 1953. The burial ground may also contain tin from the triple dip canning process and lead from the lead dip process. In December 2004, during remedial excavation, bottles with liquid were found in a combination lock safe.	Risk Exceedance	Groundwater Protection risk for Total Uranium Isotopes in deep soil	441 m2 (4,747 ft2) [north]; 810 m2 (8,719 ft2) [middle]; 825 m2 (8,800 ft2) [south]	20 m (32.8 ft)	Uranium	No Action	1) Institutional Controls 2) Phosphate Sequestration over 2,076 m2 (22,346 ft2)	1) Institutional Controls 2) Phosphate Sequestration over 2,076 m2 (22,346 ft2)	1) RTD area of 2,076 m2 (22,346 ft2) to 20 m (32.8 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
618-3	The site consists of uranium-contaminated waste, primarily building materials from the remodeling of the 313 Building. It may also contain waste from the 303-J and K upgrades. In 1986, the volume of contaminated soil was estimated to be 12,549 m^3 (443,160 ft^3), with 12,643 m^3 (446,480 ft^3) of overburden.	Risk Exceedance	Human Health Direct Contact and Groundwater Protection risk for Uranium in shallow soil	6,222 m2 (66,973 ft2)	4 m (13 ft) bgs	Uranium	No Action	1) Institutional Controls 2) Phosphate Sequestration over 6,222 m2 (66,973 ft2)	1) Institutional Controls 2) Phosphate Sequestration over 6,222 m2 (66,973 ft2)	1) RTD area of 6,222 m2 (66,973 ft2) to 4 m (13 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
UPR-300-10	The site was a UPR to the soil beneath the northwest corner of the 325 Building. UPR-300-10 occurred in the radioactive waste sewer line that served the 325-B Hot Cells, between the 325 Building's west basement wall of Room 32 and the north foundation wall of Room 202. The release included waste from dissolution of highly radioactive samples including irradiated reactor fuels.	Post-ROD To-Go Site	Underneath long-term facility (no temporary barrier needed) Human Health Direct Contact and/or Ecological risk likely in shallow soil	232 m2 (2,497 ft2)	4.6 m (15 ft)	Radionuclides	1) RTD area of 232 m2 (2,497 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 232 m2 (2,497 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 232 m2 (2,497 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 232 m2 (2,497 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.
UPR-300-12	UPR-300-12 occurred in the basement floor of the 325-A Building. The waste migrated through cracks in the floor to the soil beneath the building. The site received radioactive rinse water overflow containing nitrate ions, Pm-147, fission products, and TRU nuclides. Total rinse water activity was estimated at 70 Ci (95% Pm-147). The rinse water contained nitrate ions, Pm-147, fission products, and TRU radionuclides. Nitrate ions, but no radionuclides, were detected in samples from a nearby groundwater monitoring well. PNNL sampled the underlying soil in January 1979. Decontamination efforts on Room 50-A were completed. Removal of the contaminated soil under the building was considered a threat to the integrity of the 325 Building.	Post-ROD To-Go Site	Underneath long-term facility (no temporary barrier needed) Human Health Direct Contact and/or Ecological risk likely in shallow soil	3.6 m2 (38.75 ft2)	4.6 m (15 ft)	Radionuclides and TRU	Shallow soil contamination under building will be removed during 325-A Building demolition. Costs are not included in FS.	Shallow soil contamination under building will be removed during 325-A Building demolition. Costs are not included in FS.	Shallow soil contamination under building will be removed during 325-A Building demolition. Costs are not included in FS.	Shallow soil contamination under building will be removed during 325-A Building demolition. Costs are not included in FS.
UPR-300-2	Multiple releases occurred from ongoing decontamination and waste handling activities starting in January 1954. It is unknown if this was related to a single event or all events over the period (1954 to date). An estimated 10 mCi of Cs-137 may have been released.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	241 m2 (2,594 ft2)	4.6 m (15 ft)	Cesium-137, radionuclides	1) RTD area of 241 m2 (2,594 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 241 m2 (2,594 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 241 m2 (2,594 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 241 m2 (2,594 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.

Attachment 1. Summary of Cost Estimate Inputs

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
UPR-300-48	The site received radioactive liquid from a leak in the process sewer drainpipe. The site was discovered during dye testing of drains during development of the Facility Effluent Monitoring Plan development for the 325 Building. The contamination may have resulted from routine releases and accumulated in the soil under the crack. Radioactivity up to 1,700 dpm alpha was detected. The TCLP results were below regulatory limits. Radioactivity levels were sufficiently low to permit fixing the contamination in place. This activity was reported as an off normal occurrence in October 1991 (RL-PNL-325-1991-1023).	Post-ROD To-Go Site	Underneath long-term facility (no temporary barrier needed) Human Health Direct Contact and/or Ecological risk likely in shallow soil	37.3 m2 (400 ft2)	4.6 m (15 ft)	Radionuclides	1) RTD area of 37.3 m2 (400 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 37.3 m2 (400 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 37.3 m2 (400 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 37.3 m2 (400 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.
UPR-300-5	The site was a release that contaminated the storage basin area, the filter vault, the stack base, the truck stall, and the truck ramp outside the 309 Building. The waste was low-level radioactive water. The primary isotope was Cs-137.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	7.32 m2 (78.8 ft2)	4.6 m (15 ft)	Cesium-137, radionuclides	Shallow soil contamination under building will be removed during 309 Building demolition. Costs are not included in FS.	Shallow soil contamination under building will be removed during 309 Building demolition. Costs are not included in FS.	Shallow soil contamination under building will be removed during 309 Building demolition. Costs are not included in FS.	Shallow soil contamination under building will be removed during 309 Building demolition. Costs are not included in FS.

Table 8 – Waste Site and GW Important Quantities

Table 9-8. Waste Site Alternative Numerical Components

	Waste Site Alternative Components											
	No Action/ No Further Action	Remove Treat and Dispose (RTD)		Void Filling		Uranium Sequestration						
Alternative	Number of Sites	Number of Sites	Excavation Volume (yd^3)	Linear Feet of Pipe Filled	Volume of Extrusion/ Grout (gal)	Number of Sites	Total Drip Emitter System Treatment Area (ac)	Total PRZ Injection Wells	Volume of Soil Treated (yd^3)	Number of Reagent Mixing Plants	Infiltration Rate (gpm)	Aboveground Piping (ft)
Alternative 1	75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Alternative 2	75	75	3,216,108	21,957	2,500	4	N/A	N/A	N/A	N/A	N/A	N/A
Alternative 3	75	75	3,216,108	21,957	2,500	4	43	176	2,795,000	6	215	12,000
Alternative 4	75	75	4,496,900	21,957	2,500	4	34	N/A	2,163,000	5	165	9,500
Alternative 5	75	75	7,957,437	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

Does not include consolidated sites.

Number of sites with no action/ no further action under Alternatives 2 through 5 corresponds to Pre-ROD To-Go sites.

N/A = not applicable to alternative

	B	C	D	E	F
1298	**IMPORTANT QUANTITIES (not linked to Totals)**				
1299	Alternative Name	Alt 2 (VZ)	618-1,2&3	Alt 3 (VZ)	
1300	**Excavation**				
1301	Site Name/Number				
1302	**300 RLWS**	WCH costs used			
1319	**300 RRLWS**	WCH costs used			
1336	**300-11**	WCH costs used			
1387	**300-15 Pipeline**				
1388	Start Date	Jan. 2027	NA	NA	NA
1389	Length, ft	37488	NA	NA	NA
1390	Width, ft	**3**	NA	NA	NA
1391	Depth, ft	**15**	NA	NA	NA
1392	Area, ac	NA	NA	NA	NA
1393	Depth, ft	NA	NA	NA	NA
1394	Depth of Excavation below Water Table (ft)	NA	NA	NA	NA
1395	Expected Safety Level	NA	NA	NA	NA
1396	Manual Product Removal	NA	NA	NA	NA
1397	Existing Cover (ft)	NA	NA	NA	NA
1398	Replacement Cover	NA	NA	NA	NA
1399	Dewatering Required	NA	NA	NA	NA
1400	Waste Site Base Area (sf)	112464	NA	NA	NA
1401	Waste Site Ground Surface Area (sf)	1801584	NA	NA	NA
1402	Total Volume of Excavation (cy)	611432	NA	NA	NA
1403	Total Volume Contaminated (cy)	71852	NA	NA	NA
1404	**300-175**				
1405	Start Date	Jan. 2013	NA	NA	NA
1406	Length, ft	10	NA	NA	NA
1407	Width, ft	10	NA	NA	NA
1408	Depth, ft	15	NA	NA	NA
1409	Area, ac	NA	NA	NA	NA
1410	Depth, ft	NA	NA	NA	NA
1411	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
1412	Expected Safety Level	D	NA	NA	NA
1413	Manual Product Removal	NO	NA	NA	NA
1414	Existing Cover (ft)	Sand/gravel	NA	NA	NA
1415	Replacement Cover	Sand/seeding	NA	NA	NA
1416	Dewatering Required	NO	NA	NA	NA
1417	Waste Site Base Area (sf)	100	NA	NA	NA
1418	Waste Site Ground Surface Area (sf)	3025	NA	NA	NA
1419	Total Volume of Excavation (cy)	998	NA	NA	NA
1420	Total Volume Contaminated (cy)	64	NA	NA	NA
1421	**300-2**				
1422	Start Date	Jan. 2013	NA	NA	NA
1423	Length, ft	14	NA	NA	NA
1424	Width, ft	14	NA	NA	NA
1425	Depth, ft	15	NA	NA	NA
1426	Area, ac	NA	NA	NA	NA
1427	Depth, ft	NA	NA	NA	NA
1428	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
1429	Expected Safety Level	D	NA	NA	NA
1430	Manual Product Removal	NO	NA	NA	NA
1431	Existing Cover (ft)	Sand/gravel	NA	NA	NA
1432	Replacement Cover	Sand/seeding	NA	NA	NA
1433	Dewatering Required	NO	NA	NA	NA
1434	Waste Site Base Area (sf)	196	NA	NA	NA
1435	Waste Site Ground Surface Area (sf)	3481	NA	NA	NA
1436	Total Volume of Excavation (cy)	1175	NA	NA	NA
1437	Total Volume Contaminated (cy)	125	NA	NA	NA
1438	**300-214**	WCH costs used			
1455	**300-22**	WCH costs used			
1489	**300-255**	WCH costs used			
1506	**300-257**	WCH costs used			
1540	**300-263**	WCH costs used			
1574	**300-265**	WCH costs used			
1608	**300-269**				
1609	Start Date	Jan. 2013	NA	NA	NA
1610	Length, ft	102	NA	NA	NA
1611	Width, ft	49	NA	NA	NA
1612	Depth, ft	15	NA	NA	NA
1613	Area, ac	NA	NA	NA	NA
1614	Depth, ft	NA	NA	NA	NA
1615	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
1616	Expected Safety Level	D	NA	NA	NA
1617	Manual Product Removal	NO	NA	NA	NA
1618	Existing Cover (ft)	Sand/gravel	NA	NA	NA
1619	Replacement Cover	Sand/seeding	NA	NA	NA
1620	Dewatering Required	NO	NA	NA	NA
1621	Waste Site Base Area (sf)	5004	NA	NA	NA
1622	Waste Site Ground Surface Area (sf)	13819	NA	NA	NA
1623	Total Volume of Excavation (cy)	6013	NA	NA	NA

	B	C	D	E	F
1298	**IMPORTANT QUANTITIES (not linked to Totals)**				
1299	Alternative Name	Alt 2 (VZ)	618-1,2&3	Alt 3 (VZ)	
1624	Total Volume Contaminated (cy)	3197	NA	NA	NA
1642	**300-283**				
1643	Start Date	**Jan. 2013**	NA	NA	NA
1644	Length, ft	**27.0**	NA	NA	NA
1645	Width, ft	**27.0**	NA	NA	NA
1646	Depth, ft	15	NA	NA	NA
1647	Area, ac	NA	NA	NA	NA
1648	Depth, ft	NA	NA	NA	NA
1649	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
1650	Expected Safety Level	**C**	NA	NA	NA
1651	Manual Product Removal	NO	NA	NA	NA
1652	Existing Cover (ft)	Sand/gravel	NA	NA	NA
1653	Replacement Cover	Sand/seeding	NA	NA	NA
1654	Dewatering Required	NO	NA	NA	NA
1655	Waste Site Base Area (sf)	729	NA	NA	NA
1656	Waste Site Ground Surface Area (sf)	5184	NA	NA	NA
1657	Total Volume of Excavation (cy)	1889	NA	NA	NA
1658	Total Volume Contaminated (cy)	466	NA	NA	NA
1659	**300-277**				
1660	Start Date	Jan. 2013	NA	NA	NA
1661	Length, ft	**420**	NA	NA	NA
1662	Width, ft	**420**	NA	NA	NA
1663	Depth, ft	3	NA	NA	NA
1664	Area, ac	NA	NA	NA	NA
1665	Depth, ft	NA	NA	NA	NA
1666	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
1667	Expected Safety Level	D	NA	NA	NA
1668	Manual Product Removal	NO	NA	NA	NA
1669	Existing Cover (ft)	Sand/gravel	NA	NA	NA
1670	Replacement Cover	Sand/seeding	NA	NA	NA
1671	Dewatering Required	NO	NA	NA	NA
1672	Waste Site Base Area (sf)	176400	NA	NA	NA
1673	Waste Site Ground Surface Area (sf)	184041	NA	NA	NA
1674	Total Volume of Excavation (cy)	23028	NA	NA	NA
1675	Total Volume Contaminated (cy)	22540	NA	NA	NA
1693	**300-279**	WCH costs used			
1710	**300-280**				
1711	Start Date	Jan. 2013	NA	NA	NA
1712	Length, ft	98	NA	NA	NA
1713	Width, ft	56	NA	NA	NA
1714	Depth, ft	15	NA	NA	NA
1715	Area, ac	NA	NA	NA	NA
1716	Depth, ft	NA	NA	NA	NA
1717	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
1718	Expected Safety Level	D	NA	NA	NA
1719	Manual Product Removal	NO	NA	NA	NA
1720	Existing Cover (ft)	Sand/gravel	NA	NA	NA
1721	Replacement Cover	Sand/seeding	NA	NA	NA
1722	Dewatering Required	NO	NA	NA	NA
1723	Waste Site Base Area (sf)	5491	NA	NA	NA
1724	Waste Site Ground Surface Area (sf)	14455	NA	NA	NA
1725	Total Volume of Excavation (cy)	6371	NA	NA	NA
1726	Total Volume Contaminated (cy)	3508	NA	NA	NA
1727	**300-281**				
1728	Start Date	Jan. 2013	NA	NA	NA
1729	Length, ft	13	NA	NA	NA
1730	Width, ft	6	NA	NA	NA
1731	Depth, ft	15	NA	NA	NA
1732	Area, ac	NA	NA	NA	NA
1733	Depth, ft	NA	NA	NA	NA
1734	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
1735	Expected Safety Level	D	NA	NA	NA
1736	Manual Product Removal	NO	NA	NA	NA
1737	Existing Cover (ft)	Sand/gravel	NA	NA	NA
1738	Replacement Cover	Sand/seeding	NA	NA	NA
1739	Dewatering Required	NO	NA	NA	NA
1740	Waste Site Base Area (sf)	70	NA	NA	NA
1741	Waste Site Ground Surface Area (sf)	2908	NA	NA	NA
1742	Total Volume of Excavation (cy)	951	NA	NA	NA
1743	Total Volume Contaminated (cy)	45	NA	NA	NA
1744	**300-282**	still on list but should have no cost, part of site 300-15			
1761	**300-284**				
1762	Start Date	Jan. 2013	NA	NA	NA
1763	Length, ft	63	NA	NA	NA
1764	Width, ft	39	NA	NA	NA
1765	Depth, ft	2	NA	NA	NA
1766	Area, ac	NA	NA	NA	NA
1767	Depth, ft	NA	NA	NA	NA

	B	C	D	E	F
1298	**IMPORTANT QUANTITIES (not linked to Totals)**				
1299	Alternative Name	Alt 2 (VZ)	618-1,2&3	Alt 3 (VZ)	
1768	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
1769	Expected Safety Level	D	NA	NA	NA
1770	Manual Product Removal	NO	NA	NA	NA
1771	Existing Cover (ft)	Sand/gravel	NA	NA	NA
1772	Replacement Cover	Sand/seeding	NA	NA	NA
1773	Dewatering Required	NO	NA	NA	NA
1774	Waste Site Base Area (sf)	2478	NA	NA	NA
1775	Waste Site Ground Surface Area (sf)	3128	NA	NA	NA
1776	Total Volume of Excavation (cy)	239	NA	NA	NA
1777	Total Volume Contaminated (cy)	211	NA	NA	NA
1778	**300-286**				
1779	Start Date	Jan. 2013	NA	NA	NA
1780	Length, ft	10	NA	NA	NA
1781	Width, ft	10	NA	NA	NA
1782	Depth, ft	15	NA	NA	NA
1783	Area, ac	NA	NA	NA	NA
1784	Depth, ft	NA	NA	NA	NA
1785	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
1786	Expected Safety Level	D	NA	NA	NA
1787	Manual Product Removal	NO	NA	NA	NA
1788	Existing Cover (ft)	Sand/gravel	NA	NA	NA
1789	Replacement Cover	Sand/seeding	NA	NA	NA
1790	Dewatering Required	NO	NA	NA	NA
1791	Waste Site Base Area (sf)	100	NA	NA	NA
1792	Waste Site Ground Surface Area (sf)	3025	NA	NA	NA
1793	Total Volume of Excavation (cy)	998	NA	NA	NA
1794	Total Volume Contaminated (cy)	64	NA	NA	NA
1795	**300-287**				
1796	Start Date	Jan. 2013	NA	NA	NA
1797	Length, ft	9	NA	NA	NA
1798	Width, ft	3	NA	NA	NA
1799	Depth, ft	15	NA	NA	NA
1800	Area, ac	NA	NA	NA	NA
1801	Depth, ft	NA	NA	NA	NA
1802	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
1803	Expected Safety Level	D	NA	NA	NA
1804	Manual Product Removal	NO	NA	NA	NA
1805	Existing Cover (ft)	Sand/gravel	NA	NA	NA
1806	Replacement Cover	Sand/seeding	NA	NA	NA
1807	Dewatering Required	NO	NA	NA	NA
1808	Waste Site Base Area (sf)	22	NA	NA	NA
1809	Waste Site Ground Surface Area (sf)	2547	NA	NA	NA
1810	Total Volume of Excavation (cy)	821	NA	NA	NA
1811	Total Volume Contaminated (cy)	14	NA	NA	NA
1812	**300-288**				
1813	Start Date	Jan. 2013	NA	NA	NA
1814	Length, ft	23	NA	NA	NA
1815	Width, ft	16	NA	NA	NA
1816	Depth, ft	15	NA	NA	NA
1817	Area, ac	NA	NA	NA	NA
1818	Depth, ft	NA	NA	NA	NA
1819	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
1820	Expected Safety Level	D	NA	NA	NA
1821	Manual Product Removal	NO	NA	NA	NA
1822	Existing Cover (ft)	Sand/gravel	NA	NA	NA
1823	Replacement Cover	Sand/seeding	NA	NA	NA
1824	Dewatering Required	NO	NA	NA	NA
1825	Waste Site Base Area (sf)	355	NA	NA	NA
1826	Waste Site Ground Surface Area (sf)	4103	NA	NA	NA
1827	Total Volume of Excavation (cy)	1424	NA	NA	NA
1828	Total Volume Contaminated (cy)	227	NA	NA	NA
1829	**300-289**				
1830	Start Date	Jan. 2013	NA	NA	NA
1831	Length, ft	20	NA	NA	NA
1832	Width, ft	12	NA	NA	NA
1833	Depth, ft	15	NA	NA	NA
1834	Area, ac	NA	NA	NA	NA
1835	Depth, ft	NA	NA	NA	NA
1836	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
1837	Expected Safety Level	D	NA	NA	NA
1838	Manual Product Removal	NO	NA	NA	NA
1839	Existing Cover (ft)	Sand/gravel	NA	NA	NA
1840	Replacement Cover	Sand/seeding	NA	NA	NA
1841	Dewatering Required	NO	NA	NA	NA
1842	Waste Site Base Area (sf)	242	NA	NA	NA
1843	Waste Site Ground Surface Area (sf)	3712	NA	NA	NA

	B	C	D	E	F
1298	**IMPORTANT QUANTITIES (not linked to Totals)**				
1299	Alternative Name	Alt 2 (VZ)	618-1,2&3	Alt 3 (VZ)	
1844	Total Volume of Excavation (cy)	1263	NA	NA	NA
1845	Total Volume Contaminated (cy)	155	NA	NA	NA
1846	**300-290**				
1847	Start Date	Jan. 2013	NA	NA	NA
1848	Length, ft	24	NA	NA	NA
1849	Width, ft	26	NA	NA	NA
1850	Depth, ft	15	NA	NA	NA
1851	Area, ac	NA	NA	NA	NA
1852	Depth, ft	NA	NA	NA	NA
1853	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
1854	Expected Safety Level	D	NA	NA	NA
1855	Manual Product Removal	NO	NA	NA	NA
1856	Existing Cover (ft)	Sand/gravel	NA	NA	NA
1857	Replacement Cover	Sand/seeding	NA	NA	NA
1858	Dewatering Required	NO	NA	NA	NA
1859	Waste Site Base Area (sf)	612	NA	NA	NA
1860	Waste Site Ground Surface Area (sf)	4864	NA	NA	NA
1861	Total Volume of Excavation (cy)	1749	NA	NA	NA
1862	Total Volume Contaminated (cy)	391	NA	NA	NA
1863	**300-291**				
1864	Start Date	Jan. 2013	NA	NA	NA
1865	Length, ft	151	NA	NA	NA
1866	Width, ft	20	NA	NA	NA
1867	Depth, ft	4	NA	NA	NA
1868	Area, ac	NA	NA	NA	NA
1869	Depth, ft	NA	NA	NA	NA
1870	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
1871	Expected Safety Level	D	NA	NA	NA
1872	Manual Product Removal	NO	NA	NA	NA
1873	Existing Cover (ft)	Sand/gravel	NA	NA	NA
1874	Replacement Cover	Sand/seeding	NA	NA	NA
1875	Dewatering Required	NO	NA	NA	NA
1876	Waste Site Base Area (sf)	2970	NA	NA	NA
1877	Waste Site Ground Surface Area (sf)	5161	NA	NA	NA
1878	Total Volume of Excavation (cy)	693	NA	NA	NA
1879	Total Volume Contaminated (cy)	506	NA	NA	NA
1880	**300-292**				
1881	Start Date	NA	NA	Jan. 2013	NA
1882	Length, ft	NA	NA	**1480**	NA
1883	Width, ft	NA	NA	**3**	NA
1884	Depth, ft	NA	NA	15	NA
1885	Area, ac	NA	NA	NA	NA
1886	Depth, ft	NA	NA	NA	NA
1887	Depth of Excavation below Water Table (ft)	NA	NA	0	NA
1888	Expected Safety Level	NA	NA	D	NA
1889	Manual Product Removal	NA	NA	NO	NA
1890	Existing Cover (ft)	NA	NA	Sand/gravel	NA
1891	Replacement Cover	NA	NA	Sand/seeding	NA
1892	Dewatering Required	NA	NA	NO	NA
1893	Waste Site Base Area (sf)	NA	NA	4440	NA
1894	Waste Site Ground Surface Area (sf)	NA	NA	73200	NA
1895	Total Volume of Excavation (cy)	NA	NA	24802	NA
1896	Total Volume Contaminated (cy)	NA	NA	2837	NA
1897	**300-293**				
1898	Start Date	NA	NA	Jan. 2013	NA
1899	Length, ft	NA	NA	5888	NA
1900	Width, ft	NA	NA	3	NA
1901	Depth, ft	NA	NA	3	NA
1902	Area, ac	NA	NA	NA	NA
1903	Depth, ft	NA	NA	NA	NA
1904	Depth of Excavation below Water Table (ft)	NA	NA	0	NA
1905	Expected Safety Level	NA	NA	D	NA
1906	Manual Product Removal	NA	NA	NO	NA
1907	Existing Cover (ft)	NA	NA	Sand/gravel	NA
1908	Replacement Cover	NA	NA	Sand/seeding	NA
1909	Dewatering Required	NA	NA	NO	NA
1910	Waste Site Base Area (sf)	NA	NA	5897	NA
1911	Waste Site Ground Surface Area (sf)	NA	NA	12	NA
1912	Total Volume of Excavation (cy)	NA	NA	70764	NA
1913	Total Volume Contaminated (cy)	NA	NA	5650	NA
1914	**300-294**				
1915	Start Date	Jan. 2013	NA	NA	NA
1916	Length, ft	**54**	NA	NA	NA
1917	Width, ft	**54**	NA	NA	NA
1918	Depth, ft	4	NA	NA	NA
1919	Area, ac	NA	NA	NA	NA
1920	Depth, ft	NA	NA	NA	NA

	B	C	D	E	F
1298	**IMPORTANT QUANTITIES (not linked to Totals)**				
1299	Alternative Name	Alt 2 (VZ)	618-1,2&3	Alt 3 (VZ)	
1921	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
1922	Expected Safety Level	D	NA	NA	NA
1923	Manual Product Removal	NO	NA	NA	NA
1924	Existing Cover (ft)	Sand/gravel	NA	NA	NA
1925	Replacement Cover	Sand/seeding	NA	NA	NA
1926	Dewatering Required	NO	NA	NA	NA
1927	Waste Site Base Area (sf)	2905	NA	NA	NA
1928	Waste Site Ground Surface Area (sf)	4343	NA	NA	NA
1929	Total Volume of Excavation (cy)	617	NA	NA	NA
1930	Total Volume Contaminated (cy)	495	NA	NA	NA
1931	**300-295**				
1932	Start Date	NA	NA	Jan. 2013	NA
1933	Length, ft	NA	NA	1480	NA
1934	Width, ft	NA	NA	3	NA
1935	Depth, ft	NA	NA	15	NA
1936	Area, ac	NA	NA	NA	NA
1937	Depth, ft	NA	NA	NA	NA
1938	Depth of Excavation below Water Table (ft)	NA	NA	0	NA
1939	Expected Safety Level	NA	NA	D	NA
1940	Manual Product Removal	NA	NA	NO	NA
1941	Existing Cover (ft)	NA	NA	Sand/gravel	NA
1942	Replacement Cover	NA	NA	Sand/seeding	NA
1943	Dewatering Required	NA	NA	NO	NA
1944	Waste Site Base Area (sf)	NA	NA	4440	NA
1945	Waste Site Ground Surface Area (sf)	NA	NA	73200	NA
1946	Total Volume of Excavation (cy)	NA	NA	24802	NA
1947	Total Volume Contaminated (cy)	NA	NA	2837	NA
1948	**300-296**	these numbers came from WCH baseline $$ (32 MSR_RCC_IPB_CPR_by_WBSL2WG567) 2011			
1965	**300-32**	WCH costs used			
1982	**300-34**	No cost, this site is considered part of site 300-15			
2016	**300-39**	WCH costs used			
2033	**300-4**				
2034	Start Date	Jan. 2027	NA	NA	NA
2035	Length, ft	66	NA	NA	NA
2036	Width, ft	69	NA	NA	NA
2037	Depth, ft	15	NA	NA	NA
2038	Area, ac	NA	NA	NA	NA
2039	Depth, ft	NA	NA	NA	NA
2040	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
2041	Expected Safety Level	D	NA	NA	NA
2042	Manual Product Removal	NO	NA	NA	NA
2043	Existing Cover (ft)	Sand/gravel	NA	NA	NA
2044	Replacement Cover	Sand/seeding	NA	NA	NA
2045	Dewatering Required	NO	NA	NA	NA
2046	Waste Site Base Area (sf)	4520	NA	NA	NA
2047	Waste Site Ground Surface Area (sf)	12597	NA	NA	NA
2048	Total Volume of Excavation (cy)	5468	NA	NA	NA
2049	Total Volume Contaminated (cy)	2888	NA	NA	NA
2084	**300-5**	WCH costs used			
2101	**300-7**	these numbers came from WCH baseline $$ (32 MSR_RCC_IPB_CPR_by_WBSL2WG567) 2011			
2118	**300-9**	these numbers came from WCH baseline $$ (32 MSR_RCC_IPB_CPR_by_WBSL2WG567) 2011			
2203	**309-WS-1**	combined with 300-39			
2220	**309-WS-2**	combined with 300-39			
2237	**309-WS-3**	combined with 300-39			
2271	**323 TANK 1**	WCH costs used			
2288	**323 TANK 2**	WCH costs used			
2305	**323 TANK 3**	WCH costs used			
2322	**323 TANK 4**	WCH costs used			
2339	**325 WTF**				
2340	Start Date	Jan. 2027	NA	NA	NA
2341	Length, ft	116	NA	NA	NA
2342	Width, ft	116	NA	NA	NA
2343	Depth, ft	15	NA	NA	NA
2344	Area, ac	NA	NA	NA	NA
2345	Depth, ft	NA	NA	NA	NA
2346	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
2347	Expected Safety Level	D	NA	NA	NA
2348	Manual Product Removal	NO	NA	NA	NA
2349	Existing Cover (ft)	Sand/gravel	NA	NA	NA
2350	Replacement Cover	Sand/seeding	NA	NA	NA
2351	Dewatering Required	NO	NA	NA	NA
2352	Waste Site Base Area (sf)	13456	NA	NA	NA
2353	Waste Site Ground Surface Area (sf)	25921	NA	NA	NA
2354	Total Volume of Excavation (cy)	12579	NA	NA	NA
2355	Total Volume Contaminated (cy)	8597	NA	NA	NA
2356	**331 LSLT1**				
2357	Start Date	Jan. 2027	NA	NA	NA
2358	Length, ft	7	NA	NA	NA

	B	C	D	E	F
1298	**IMPORTANT QUANTITIES (not linked to Totals)**				
1299	Alternative Name	Alt 2 (VZ)	618-1,2&3	Alt 3 (VZ)	
2359	Width, ft	7	NA	NA	NA
2360	Depth, ft	15	NA	NA	NA
2361	Area, ac	NA	NA	NA	NA
2362	Depth, ft	NA	NA	NA	NA
2363	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
2364	Expected Safety Level	D	NA	NA	NA
2365	Manual Product Removal	NO	NA	NA	NA
2366	Existing Cover (ft)	Sand/gravel	NA	NA	NA
2367	Replacement Cover	Sand/seeding	NA	NA	NA
2368	Dewatering Required	NO	NA	NA	NA
2369	Waste Site Base Area (sf)	49	NA	NA	NA
2370	Waste Site Ground Surface Area (sf)	2704	NA	NA	NA
2371	Total Volume of Excavation (cy)	879	NA	NA	NA
2372	Total Volume Contaminated (cy)	31	NA	NA	NA
2373	**331 LSLT2**				
2374	Start Date	Jan. 2027	NA	NA	NA
2375	Length, ft	7	NA	NA	NA
2376	Width, ft	7	NA	NA	NA
2377	Depth, ft	15	NA	NA	NA
2378	Area, ac	NA	NA	NA	NA
2379	Depth, ft	NA	NA	NA	NA
2380	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
2381	Expected Safety Level	D	NA	NA	NA
2382	Manual Product Removal	NO	NA	NA	NA
2383	Existing Cover (ft)	Sand/gravel	NA	NA	NA
2384	Replacement Cover	Sand/seeding	NA	NA	NA
2385	Dewatering Required	NO	NA	NA	NA
2386	Waste Site Base Area (sf)	49	NA	NA	NA
2387	Waste Site Ground Surface Area (sf)	2704	NA	NA	NA
2388	Total Volume of Excavation (cy)	879	NA	NA	NA
2389	Total Volume Contaminated (cy)	31	NA	NA	NA
2390	**340 Complex**				
2391	Start Date	Jan. 2013	NA	NA	NA
2392	Length, ft	263	NA	NA	NA
2393	Width, ft	263	NA	NA	NA
2394	Depth, ft	15	NA	NA	NA
2395	Area, ac	NA	NA	NA	NA
2396	Depth, ft	NA	NA	NA	NA
2397	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
2398	Expected Safety Level	D	NA	NA	NA
2399	Manual Product Removal	NO	NA	NA	NA
2400	Existing Cover (ft)	Sand/gravel	NA	NA	NA
2401	Replacement Cover	Sand/seeding	NA	NA	NA
2402	Dewatering Required	NO	NA	NA	NA
2403	Waste Site Base Area (sf)	68906	NA	NA	NA
2404	Waste Site Ground Surface Area (sf)	94556	NA	NA	NA
2405	Total Volume of Excavation (cy)	52217	NA	NA	NA
2406	Total Volume Contaminated (cy)	44023	NA	NA	NA
2407	**400 PPSS**				
2408	Start Date	2027	NA	NA	NA
2409	Length, ft	180	NA	NA	NA
2410	Width, ft	180	NA	NA	NA
2411	Depth, ft	15	NA	NA	NA
2412	Area, ac	NA	NA	NA	NA
2413	Depth, ft	NA	NA	NA	NA
2414	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
2415	Expected Safety Level	D	NA	NA	NA
2416	Manual Product Removal	NO	NA	NA	NA
2417	Existing Cover (ft)	Sand/gravel	NA	NA	NA
2418	Replacement Cover	Sand/seeding	NA	NA	NA
2419	Dewatering Required	NO	NA	NA	NA
2420	Waste Site Base Area (sf)	32400	NA	NA	NA
2421	Waste Site Ground Surface Area (sf)	50625	NA	NA	NA
2422	Total Volume of Excavation (cy)	26522	NA	NA	NA
2423	Total Volume Contaminated (cy)	20700	NA	NA	NA
2424	**400-37**				
2425	Start Date	2027	NA	NA	NA
2426	Length, ft	**23.6**	NA	NA	NA
2427	Width, ft	**23.6**	NA	NA	NA
2428	Depth, ft	15	NA	NA	NA
2429	Area, ac	NA	NA	NA	NA
2430	Depth, ft	NA	NA	NA	NA
2431	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
2432	Expected Safety Level	D	NA	NA	NA
2433	Manual Product Removal	NO	NA	NA	NA
2434	Existing Cover (ft)	Sand/gravel	NA	NA	NA
2435	Replacement Cover	Sand/seeding	NA	NA	NA

	B	C	D	E	F
1298	**IMPORTANT QUANTITIES (not linked to Totals)**				
1299	Alternative Name	Alt 2 (VZ)	618-1,2&3	Alt 3 (VZ)	
2436	Dewatering Required	NO	NA	NA	NA
2437	Waste Site Base Area (sf)	557	NA	NA	NA
2438	Waste Site Ground Surface Area (sf)	4706	NA	NA	NA
2439	Total Volume of Excavation (cy)	1681	NA	NA	NA
2440	Total Volume Contaminated (cy)	356	NA	NA	NA
2441	**400-38**				
2442	Start Date	Jan. 2013	NA	NA	NA
2443	Length, ft	15	NA	NA	NA
2444	Width, ft	15	NA	NA	NA
2445	Depth, ft	15	NA	NA	NA
2446	Area, ac	NA	NA	NA	NA
2447	Depth, ft	NA	NA	NA	NA
2448	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
2449	Expected Safety Level	D	NA	NA	NA
2450	Manual Product Removal	NO	NA	NA	NA
2451	Existing Cover (ft)	Sand/gravel	NA	NA	NA
2452	Replacement Cover	Sand/seeding	NA	NA	NA
2453	Dewatering Required	NO	NA	NA	NA
2454	Waste Site Base Area (sf)	225	NA	NA	NA
2455	Waste Site Ground Surface Area (sf)	3600	NA	NA	NA
2456	Total Volume of Excavation (cy)	1222	NA	NA	NA
2457	Total Volume Contaminated (cy)	144	NA	NA	NA
2492	**600-367**	post_ROD-to to site			
2493	Start Date	2013	NA	NA	NA
2494	Length, ft		NA	NA	NA
2495	Width, ft		NA	NA	NA
2496	Depth, ft		NA	NA	NA
2497	Area, ac	8.65	NA	NA	NA
2498	Depth, ft	15	NA	NA	NA
2499	Depth of Excavation below Water Table (ft)		NA	NA	NA
2500	Expected Safety Level		NA	NA	NA
2501	Manual Product Removal		NA	NA	NA
2502	Existing Cover (ft)		NA	NA	NA
2503	Replacement Cover		NA	NA	NA
2504	Dewatering Required		NA	NA	NA
2505	Waste Site Base Area (sf)		NA	NA	NA
2506	Waste Site Ground Surface Area (sf)	434064	NA	NA	NA
2507	Total Volume of Excavation (cy)	259024	NA	NA	NA
2508	Total Volume Contaminated (cy)	240730	NA	NA	NA
2509	**600-290**				
2510	Start Date	Jan. 2013	NA	NA	NA
2511	Length, ft	364	NA	NA	NA
2512	Width, ft	233	NA	NA	NA
2513	Depth, ft	15	NA	NA	NA
2514	Area, ac	NA	NA	NA	NA
2515	Depth, ft	NA	NA	NA	NA
2516	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
2517	Expected Safety Level	D	NA	NA	NA
2518	Manual Product Removal	NO	NA	NA	NA
2519	Existing Cover (ft)	Sand/gravel	NA	NA	NA
2520	Replacement Cover	Sand/seeding	NA	NA	NA
2521	Dewatering Required	NO	NA	NA	NA
2522	Waste Site Base Area (sf)	84822	NA	NA	NA
2523	Waste Site Ground Surface Area (sf)	113717	NA	NA	NA
2524	Total Volume of Excavation (cy)	63422	NA	NA	NA
2525	Total Volume Contaminated (cy)	54192	NA	NA	NA
2526	**600-58**	This site is a RCRA site which is cost uder the RCRA closure program			
2543	**600-59**	This site is a RCRA site which is cost uder the RCRA closure program			
2560	**600-60**	This site is a RCRA site which is cost uder the RCRA closure program			
2577	**600-62**	This site is a RCRA site which is cost uder the RCRA closure program			
2594	**600-63**	This site is a RCRA site which is cost uder the RCRA closure program			
2611	**618-1**				
2612	Start Date			2013	
2613	Length, ft				
2614	Width, ft				
2615	Depth, ft				
2616	Area, ac			1.24	
2617	Depth, ft			33	
2618	Depth of Excavation below Water Table (ft)				
2619	Expected Safety Level			D	
2620	Manual Product Removal				
2621	Existing Cover (ft)				
2622	Replacement Cover				
2623	Dewatering Required				
2624	Waste Site Base Area (sf)				
2625	Waste Site Ground Surface Area (sf)			109435	
2626	Total Volume of Excavation (cy)			114173	

	B	C	D	E	F
1298	**IMPORTANT QUANTITIES (not linked to Totals)**				
1299	Alternative Name	Alt 2 (VZ)	618-1,2&3	Alt 3 (VZ)	
2627	Total Volume Contaminated (cy)			**75460**	
2628	**618-10**	No cost, currently remediating			
2645	**618-11**	WCH costs used			
2662	**618-2**				
2663	Start Date			2013	
2664	Length, ft				
2665	Width, ft				
2666	Depth, ft				
2667	Area, ac			0.51	
2668	Depth, ft			32.80	
2669	Depth of Excavation below Water Table (ft)				
2670	Expected Safety Level			D	
2671	Manual Product Removal				
2672	Existing Cover (ft)				
2673	Replacement Cover				
2674	Dewatering Required				
2675	Waste Site Base Area (sf)				
2676	Waste Site Ground Surface Area (sf)			61231	
2677	Total Volume of Excavation (cy)			58289	
2678	Total Volume Contaminated (cy)			**31036**	
2679	**618-3**				
2680	Start Date			2013	
2681	Length, ft				
2682	Width, ft				
2683	Depth, ft				
2684	Area, ac			1.54	
2685	Depth, ft			13.00	
2686	Depth of Excavation below Water Table (ft)				
2687	Expected Safety Level			D	
2688	Manual Product Removal				
2689	Existing Cover (ft)				
2690	Replacement Cover				
2691	Dewatering Required				
2692	Waste Site Base Area (sf)				
2693	Waste Site Ground Surface Area (sf)			88806	
2694	Total Volume of Excavation (cy)			43158	
2695	Total Volume Contaminated (cy)			**37144**	
2764	**UPR-300-10**				
2765	Start Date	Jan. 2027	NA	NA	NA
2766	Length, ft	50	NA	NA	NA
2767	Width, ft	50	NA	NA	NA
2768	Depth, ft	15	NA	NA	NA
2769	Area, ac	NA	NA	NA	NA
2770	Depth, ft	NA	NA	NA	NA
2771	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
2772	Expected Safety Level	D	NA	NA	NA
2773	Manual Product Removal	NO	NA	NA	NA
2774	Existing Cover (ft)	Sand/gravel	NA	NA	NA
2775	Replacement Cover	Sand/seeding	NA	NA	NA
2776	Dewatering Required	NO	NA	NA	NA
2777	Waste Site Base Area (sf)	2500	NA	NA	NA
2778	Waste Site Ground Surface Area (sf)	9025	NA	NA	NA
2779	Total Volume of Excavation (cy)	3682	NA	NA	NA
2780	Total Volume Contaminated (cy)	1597	NA	NA	NA
2798	**UPR-300-12**				
2832	**UPR-300-2**				
2833	Start Date	Jan. 2013	NA	NA	NA
2834	Length, ft	51	NA	NA	NA
2835	Width, ft	51	NA	NA	NA
2836	Depth, ft	15	NA	NA	NA
2837	Area, ac	NA	NA	NA	NA
2838	Depth, ft	NA	NA	NA	NA
2839	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
2840	Expected Safety Level	D	NA	NA	NA
2841	Manual Product Removal	NO	NA	NA	NA
2842	Existing Cover (ft)	Sand/gravel	NA	NA	NA
2843	Replacement Cover	Sand/seeding	NA	NA	NA
2844	Dewatering Required	NO	NA	NA	NA
2845	Waste Site Base Area (sf)	2591	NA	NA	NA
2846	Waste Site Ground Surface Area (sf)	9197	NA	NA	NA
2847	Total Volume of Excavation (cy)	3765	NA	NA	NA
2848	Total Volume Contaminated (cy)	1655	NA	NA	NA
2866	**UPR-300-48**				
2867	Start Date	Jan. 2027	NA	NA	NA
2868	Length, ft	20	NA	NA	NA
2869	Width, ft	20	NA	NA	NA
2870	Depth, ft	15	NA	NA	NA
2871	Area, ac	NA	NA	NA	NA

	B	C	D	E	F
1298	**IMPORTANT QUANTITIES (not linked to Totals)**				
1299	Alternative Name	Alt 2 (VZ)	618-1,2&3	Alt 3 (VZ)	
2872	Depth, ft	NA	NA	NA	NA
2873	Depth of Excavation below Water Table (ft)	0	NA	NA	NA
2874	Expected Safety Level	D	NA	NA	NA
2875	Manual Product Removal	NO	NA	NA	NA
2876	Existing Cover (ft)	Sand/gravel	NA	NA	NA
2877	Replacement Cover	Sand/seeding	NA	NA	NA
2878	Dewatering Required	NO	NA	NA	NA
2879	Waste Site Base Area (sf)	400	NA	NA	NA
2880	Waste Site Ground Surface Area (sf)	4225	NA	NA	NA
2881	Total Volume of Excavation (cy)	1477	NA	NA	NA
2882	Total Volume Contaminated (cy)	256	NA	NA	NA
2883	**UPR-300-5**	No cost, it's assumed that this site is part of site 309			
2917	**Void Fill Grouting**				
2918	**300 RLWS**				
2923	**300 RRLWS**				
2928	**300-15**				
2929	Pipe Diameter, in	2"	NA	NA	NA
2930	Length, feet	10560	NA	NA	NA
2931	Depth to invert, feet	15	NA	NA	NA
2932	Expect Safety Level	D	NA	NA	NA
2933	**300-214**				
2938	**300-265**				
2943	**300-292**				
2944	Pipe Diameter, in	0	NA	NA	NA
2945	Length, feet	0	NA	NA	NA
2946	Depth to invert, feet	0	NA	NA	NA
2947	Expect Safety Level	D	NA	NA	NA
2948	**300-293:2**				
2949	Pipe Diameter, in	0	NA	NA	NA
2950	Length, feet	0	NA	NA	NA
2951	Depth to invert, feet	3	NA	NA	NA
2952	Expect Safety Level	D	NA	NA	NA
2953	**300-295**				
2954	Pipe Diameter, in	8	NA	NA	NA
2955	Length, feet	3097	NA	NA	NA
2956	Depth to invert, feet	15	NA	NA	NA
2957	Expect Safety Level	D	NA	NA	NA
2958	**Capping/Barrier**				
2959	**300-4**				
2960	Cap Type	RCRA D	NA	NA	NA
2961	Area, (ac)	0.104	NA	NA	NA
2962	Safety Level	D	NA	NA	NA
2963	Notes	Maintain cap until 2027	NA	NA	NA
2964	Area, sf	4521	NA	NA	NA
2965	**LUC/ICs**				
2966	**300-282**	x			
2967	Start Date	Jan. 2013	NA	NA	NA
2968	Restrictive Covenants	2	NA	NA	NA
2969	GIS Overlay Maps	1	NA	NA	NA
2970	Duration of Monitoring/Enforcement (yrs)	3	NA	NA	NA
2971	# of site visits/Inspections	3	NA	NA	NA
2972	How often	1/year	NA	NA	NA
2973	Expected Safety Level	D	NA	NA	NA
2974	Duration, days	1	NA	NA	NA
2975	# of people	1	NA	NA	NA
2976	Type of IC	No-dig and no-irrigation ICs	NA	NA	NA
2977	**300-4**	x			
2978	Start Date	Jan. 2013	NA	NA	NA
2979	Restrictive Covenants	2	NA	NA	NA
2980	GIS Overlay Maps	1	NA	NA	NA
2981	Duration of Monitoring/Enforcement (yrs)	3	NA	NA	NA
2982	# of site visits/Inspections	3	NA	NA	NA
2983	How often	1/year	NA	NA	NA
2984	Expected Safety Level	D	NA	NA	NA
2985	Duration, days	1	NA	NA	NA
2986	# of people	1	NA	NA	NA
2987	Type of IC	No-dig and no-irrigation ICs	NA	NA	NA
2988	**316-4**	x			
2999	**618-1**	x			
3010	**618-2**	x			
3021	**618-5**	x			
3032	**Phosphate Sequestration**				
3033	**300-282**				
3034	length, ft	149	NA	NA	NA
3035	Width, ft	149	NA	NA	NA
3036	Emitter Area, ac	0.500	NA	NA	NA
3037	Backfill Material	Gravel	NA	NA	NA
3038	Expected Safety Level	D	NA	NA	NA
3039	Flow Mechanism	Force main	NA	NA	NA

	B	C	D	E	F
1298	**IMPORTANT QUANTITIES (not linked to Totals)**				
1299	Alternative Name	Alt 2 (VZ)	618-1,2&3	Alt 3 (VZ)	
3040	Distance from water source to emitter sys	1000	NA	NA	NA
3041	Transfer piping dia, in	4	NA	NA	NA
3042	Equalization tank size	8000	NA	NA	NA
3043	# of Equalization tank	1	NA	NA	NA
3044	Phosphate tank size, gal	2000	NA	NA	NA
3045	pump (size)	25 GPM, 1 hp	NA	NA	NA
3046	# of pumps	1	NA	NA	NA
3047	Volume of treatment area, ft3	888040	NA	NA	NA
3048	Phosphate infiltration timeframe (yrs or months)	2 yrs	NA	NA	NA
3049	**316-4**				
3065	**618-1**				
3066	length, ft				
3067	Width, ft				
3068	Emitter Area, ac		1.24	1.24	
3069	Backfill Material		Gravel	Gravel	
3070	Expected Safety Level		D	D	
3071	Flow Mechanism		Force main	Force main	
3072	Distance from water source to emitter sys		500	500.00	
3073	Transfer piping dia, in		3	3.00	
3074	Equalization tank size		4000	4000.00	
3075	# of Equalization tank		1	1.00	
3076	Phosphate tank size, gal		1000	1000.00	
3077	pump (size)		25 GPM, 1 hp	25 GPM, 1 hp	
3078	# of pumps		2	2.00	
3079	Volume of treatment area, ft3		1765296	1765296.00	
3080	Phosphate infiltration timeframe (yrs or months)		2 yrs	2 yrs	
3081	**618-2**				
3082	length, ft				
3083	Width, ft				
3084	Emitter Area, ac		0.51	0.51	
3085	Backfill Material		Gravel	Gravel	
3086	Expected Safety Level		D	D	
3087	Flow Mechanism		Force main	Force main	
3088	Distance from water source to emitter sys		250	250.00	
3089	Transfer piping dia, in		3	3.00	
3090	Equalization tank size		2000	2000.00	
3091	# of Equalization tank		1	1.00	
3092	Phosphate tank size, gal		500	500.00	
3093	pump (size)		25 GPM, 1 hp	25 GPM, 1 hp	
3094	# of pumps		2	2.00	
3095	Volume of treatment area, ft3		732949	732948.80	
3096	Phosphate infiltration timeframe (yrs or months)		2 yrs	2 yrs	
3097	**618-3**				
3098	length, ft				
3099	Width, ft				
3100	Emitter Area, ac		1.54	1.54	
3101	Backfill Material		Gravel	Gravel	
3102	Expected Safety Level		D	D	
3103	Flow Mechanism		Force main	Force main	
3104	Distance from water source to emitter sys		500	500.00	
3105	Transfer piping dia, in		3	3.00	
3106	Equalization tank size		4000	4000.00	
3107	# of Equalization tank		1	1.00	
3108	Phosphate tank size, gal		1000	1000.00	
3109	pump (size)		25 GPM, 1 hp	25 GPM, 1 hp	
3110	# of pumps		2	2.00	
3111	Volume of treatment area, ft3		870649	870649.00	
3112	Phosphate infiltration timeframe (yrs or months)		2 yrs	2 yrs	
3113	**Monitoring**				
3114	**300-282**	x			
3115	Start Date	Jan. 2013	NA	NA	NA
3116	Average Sample Depth, ft	60	NA	NA	NA
3117	# of Events (First Year)	1	NA	NA	NA
3118	Samples/Event (First Year)	1	NA	NA	NA
3119	# of Yrs (Out Years)	3	NA	NA	NA
3120	Events per Yr (Out Years)	1	NA	NA	NA
3121	Samples/Event (Out Years)	1/year	NA	NA	NA
3122	Comments	Drill one boring every year (for 3 yrs) adjacent to the waste site and collect one soil sample for Ur analysis (plus QA/QC).	NA	NA	NA
3123	**316-4**	x			
3132	**618-1**	x			
3141	**618-2**	x			
3150	**618-5**				
3159					

Sites estimated by WCH

Excavation	
300RLWS	
Area (AC)	6.43
Depth, ft	**21**
Total Volume of Excavation (cy)	282123
Total Volume Contaminated (cy)	250526
300RRLWS	
Length, ft	1500
Width, ft	**5**
Depth, ft	**20**
Total Volume of Excavation (cy)	46383
Total Volume Contaminated (cy)	6389
300-11	
Area (AC)	0.0018
Depth, ft	**20**
Total Volume of Excavation (cy)	2059
Total Volume Contaminated (cy)	68
300-214	
Length, ft	4400
Width, ft	**5**
Depth, ft	**15**
Total Volume of Excavation (cy)	78024
Total Volume Contaminated (cy)	14056
300-22	
Area (AC)	0.0037
Depth, ft	**15**
Total Volume of Excavation (cy)	1113
Total Volume Contaminated (cy)	102
300-255	
Area (AC)	0.131
Depth, ft	**15**
Total Volume of Excavation (cy)	6459
Total Volume Contaminated (cy)	3642
300-257	
Length, ft	1500
Width, ft	**5**
Depth, ft	**19**
Total Volume of Excavation (cy)	42095
Total Volume Contaminated (cy)	6069
300-263	
Area (AC)	0.00941
Depth, ft	**15**
Total Volume of Excavation (cy)	1491
Total Volume Contaminated (cy)	262
300-265	

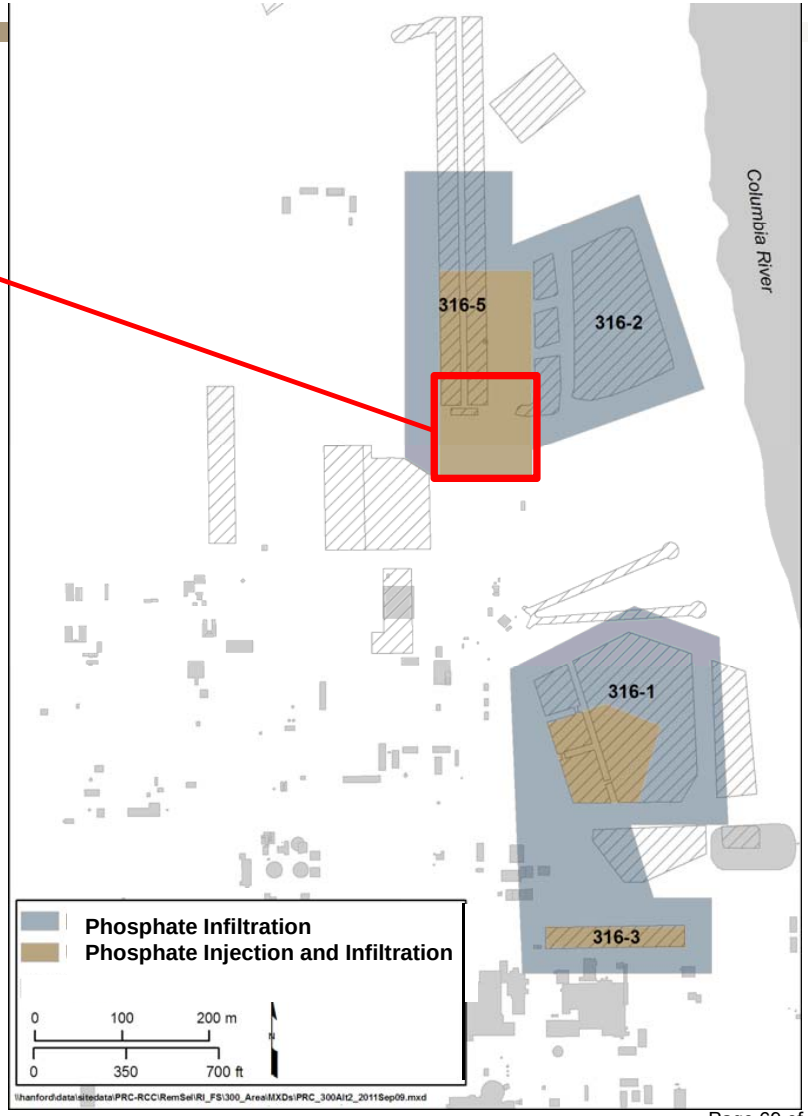
Length, ft	1076
Width, ft	**7**
Depth, ft	**8**
Total Volume of Excavation (cy)	6379
Total Volume Contaminated (cy)	2406
300-279	
Area (AC)	0.00914
Depth, ft	**15**
Total Volume of Excavation (cy)	1475
Total Volume Contaminated (cy)	254
300-32	
Area (AC)	0.918
Depth, ft	**15**
Total Volume of Excavation (cy)	31952
Total Volume Contaminated (cy)	25555
300-39	
Area (AC)	0.0178
Depth, ft	**15**
Total Volume of Excavation (cy)	1942
Total Volume Contaminated (cy)	495
300-5	
Length, ft	25
Width, ft	**25**
Depth, ft	**15**
Total Volume of Excavation (cy)	1765
Total Volume Contaminated (cy)	399
316-3	
Area (AC)	0.1371
Depth, ft	**15**
Total Volume of Excavation (cy)	6686
Total Volume Contaminated (cy)	3817
316-4	
Area (AC)	0.0158
Depth, ft	**15**
Total Volume of Excavation (cy)	1842
Total Volume Contaminated (cy)	440
323-Tank1	
Area (AC)	0.574
Depth, ft	**15**
Total Volume of Excavation (cy)	21165
Total Volume Contaminated (cy)	15972
323-Tank 2	
Area (AC)	0.574
Depth, ft	**15**
Total Volume of Excavation (cy)	21165
Total Volume Contaminated (cy)	15972

323-Tank3	
Area (AC)	0.574
Depth, ft	**15**
Total Volume of Excavation (cy)	21165
Total Volume Contaminated (cy)	15972
323-Tank4	
Area (AC)	0.574
Depth, ft	**15**
Total Volume of Excavation (cy)	21165
Total Volume Contaminated (cy)	15972
618-10	
Area (AC)	3.3
Depth, ft	**15**
Total Volume of Excavation (cy)	102801
Total Volume Contaminated (cy)	91287
618-11	
Area (AC)	15.3
Depth, ft	**15**
Total Volume of Excavation (cy)	450585
Total Volume Contaminated (cy)	426450

Alternative 3 Phased Approach

Phase 1
(injection and infiltration)

Phase 2 encompasses remaining treatment area



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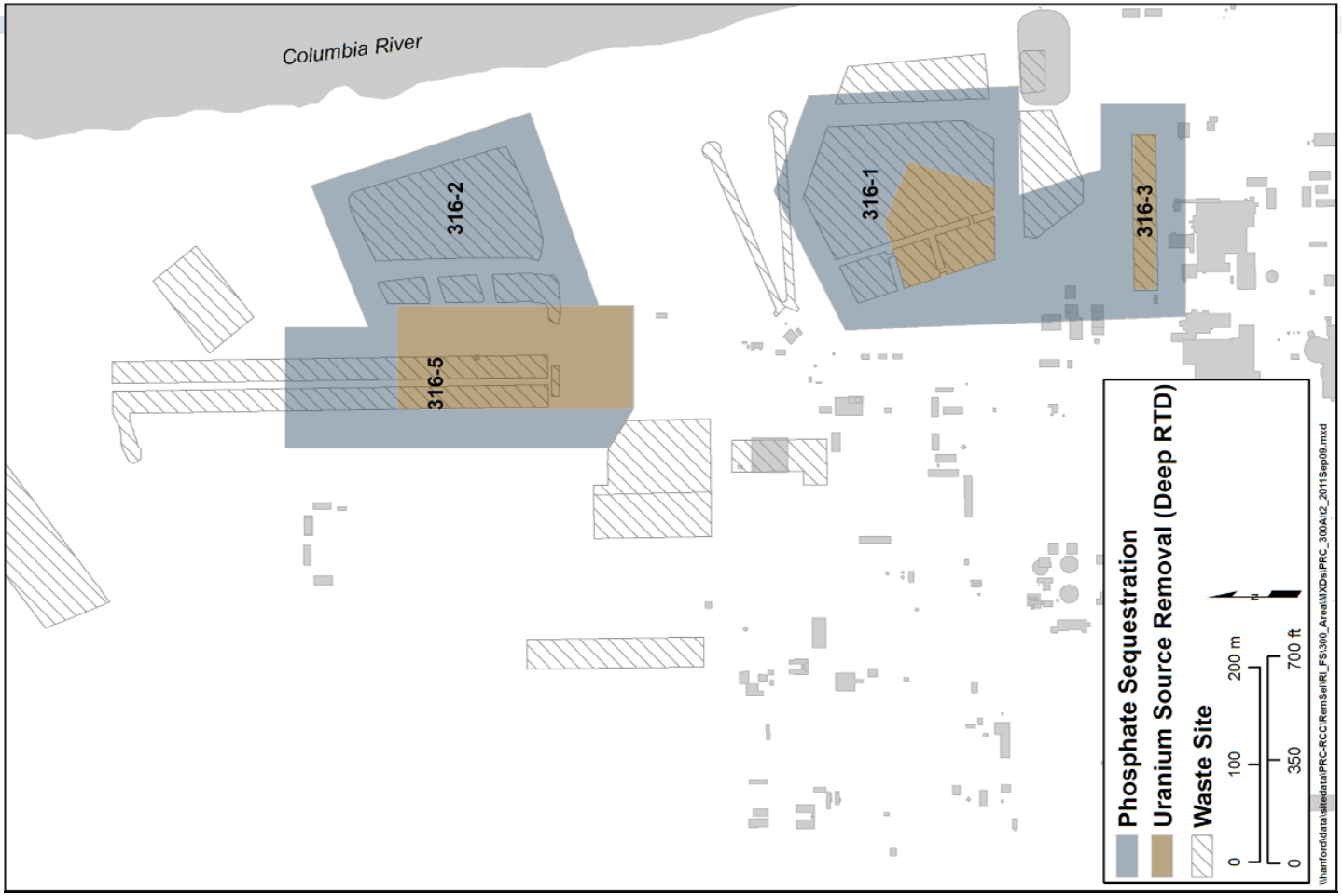
Alternative 4



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CH2MHILL 6
Plateau Remediation Company

Alternative 5

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Appendix J

Technology Screening—Not Retained Technologies

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Terms

BFS	blast furnace slag
bgs	below ground surface
bph pathway	biphenyl pathway
CBA	chlorobenzoic acid
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CNF	Central Neutralization Facility
COC	constituent of concern
CSTR	continuous stirred-tank bioreactor
CVOC	chlorinated volatile organic compound
DCE	dichloroethylene
DNAPL	dense non-aqueous phase liquid
DOE	U.S. Department of Energy
Ecology	Washington State Department of Ecology
EPA	U.S. environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
ESS	ex situ solidification/stabilization
GCW	groundwater circulation well
HRC®	hydrogen release compound
HTTD	high-temperature thermal desorption
ISCO	in situ chemical oxidation
ISGR	in situ gaseous reduction
ISTD	in situ thermal desorption
ISV	in situ vitrification
LTTD	low-temperature thermal desorption
MnO_4	permanganate
mT/ha	metric-ton-per-hectare
NAPL	non-aqueous phase liquid
NZVI	nano-scale zero-valent iron
O&M	operation and maintenance

ORNL	Oak Ridge National Laboratory
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PCP	penta-chloro-phenol
PNNL	Pacific Northwest National Laboratory
ppm	parts per million
RCRA	*Resource Conservation and Recovery Act of 1976*
RO	reverse osmosis
ROI	radius of influence
RPO	remediation process optimization
SLM	supported liquid membrane
SRB	sulfate- reducing bioreactor
SVE	soil vapor extraction
SVOC	semivolatile organic compound
TCE	trichloroethylene
TCLP	toxicity characteristic leaching procedure
TSCA	*Toxic Substances Control Act of 1976*
TVS	transportable vitrification system
VSEP®	vibratory shear-enhanced processing
VOC	volatile organic compound
WSRC	Westinghouse Savannah River Company
WTP	Waste Treatment and Immobilization Plant

J1 Additional Information on Technologies Not Retained for Waste Site Treatment

This appendix presents information regarding technologies that were not retained for further evaluation for treatment of waste site soil contaminated with uranium and other constituents of concern (COCs).

J1.1 Ex Situ Treatment and Processing

Following excavation, soils can be treated with ex situ methods to reduce contaminant concentrations or toxicity, remove contaminants (transfer to different media), or reduce volume, and allow for less costly disposal. Ex situ treatment technologies not retained for further consideration are discussed in this section.

For this effort, ex situ treatment does not include treatment performed for ultimate disposal (such as at the Environmental Restoration Disposal Facility [ERDF]). Treatment performed as required to meet disposal restrictions is included in the disposal to the onsite landfill process option. It only covers technologies that could be used to treat the soils so that part or all of the soil volume could be backfilled at the locations from which it was removed.

J1.1.1 Ex Situ Solidification/Stabilization

Ex situ solidification/stabilization (ESS) was not retained for treatment of soils contaminated with mobile to semimobile radionuclides and other COCs.

J1.1.1.1 Description

ESS is a treatment process that uses a binding agent to reduce the mobility of contaminants by physically binding or enclosing contaminated soil particles within a stabilized mass (solidification), or via chemical reactions between stabilizing agents and contaminants. ESS can be performed ex situ to meet disposal requirements. A wide variety of solidification/stabilization agents is available, including Portland cement, or other pozzolans, silicates, bitumen, and acrylic polymers. Portland cements typically consist of calcium silicates, aluminosilicates, aluminoferrites, and sulfates. Metals are immobilized in cement type binders as hydroxides or other stable solids. Phosphate or other chemical reagents can also be added to chemically bind metals. Polymeric compounds can be used to bind metal and radionuclides by micro-encapsulation (*Central Plateau Vadose Zone Remediation Technology Screening Evaluation* [RPP-ENV-34028]).

ESS is targeted at reducing the mobility of contaminants. It does not necessarily treat or detoxify contaminants. Consequently, it is not applicable to contaminants that are a risk to human health or the environment because of the potential for direct exposure to contaminants in the top 4.5 m (15 ft) of soil. It is only applicable to contaminants that are a risk as a result of migration to groundwater.

J1.1.1.2 Relevant Demonstration Projects

Cement solidification has been a widely used technique for treatment and ultimate disposal of hazardous, low-level, and mixed wastes. A cement solidification/stabilization treatability study was completed at the Fernald Environmental Management Project (*100 Area Source Operable Unit Focused Feasibility Study Report* [DOE/RL-94-61]). The test was completed at six waste pits, all of which contained radionuclide-impacted waste (primarily uranium). Portland cement (Type I/II) and blast furnace slag (BFS) were used as binders; additives included Type F fly ash, site fly ash, absorbents, and sodium silicate. The study indicated the toxicity characteristic leaching procedure (TCLP) was met, and leachability of uranium was controlled except when present at high concentrations. The study also indicated a significant increase in waste volume resulted from the cement stabilization process (DOE/RL-94-61).

The U.S. Department of Energy (DOE) has demonstrated polyethylene encapsulation to treat a number of radionuclides (e.g., cesium and strontium), and toxic metals (including chromium, lead, and cadmium). DOE's technology information profile (DOE/EM-0235) detailed polyethylene encapsulation to be applicable for stabilization of low-level radioactive and heavy metal waste components that may be in media such as aqueous salt concentrates, salt cake, sludge, fly ash, and ion exchange resins. Scale-up from bench-scale tests demonstrated the feasibility of this process to treat wastes at approximately 907 kg (2,000 lb) per hour (*Technology Catalogue, Second Edition* [DOE/EM-0235]).

J1.1.1.3 Evaluation and Screening Rationale

The effectiveness of ESS is considered low to moderate for immobilizing mobile contaminants in soil that could leach to groundwater. The stabilized mass must be protected from weathering and seismic activity for long-term durability. Although this is a well-established technology, site-specific studies would need to be completed to evaluate equipment required and appropriate cement agents. ESS was screened out in favor of the safer alternative of disposal in the ERDF, a centralized facility engineered to protect against weathering and seismic activity.

J1.1.2 Ex Situ Treatment Soil Washing

Ex situ soil washing was not retained for excavated sediment and soils contaminated with uranium or technetium-99.

J1.1.2.1 Description

Soil washing is an ex situ process that applies a water-based solution to a soil relying upon physical and chemical separation and extraction to remove contaminants sorbed onto fine soil particles from bulk soil. The process uses mechanical scouring, tank emersion, or pressure sprays. The wash water may be augmented by a basic leaching agent, surfactant, or chelating agent or by pH adjustment to help remove the contaminant. According to the U.S. Environmental Protection Agency (EPA), the wash water and various soil size fractions are usually separated using gravity settling ("Soil Washing/Soil Flushing" [EPA/542/B-93/012]).

The soil washing process is applicable to contaminants that preferentially sorb or collect in the small particle fraction. The process requires relatively short contact times and rapid kinetics, thus it is not applicable generally to chemically bound, or relatively insoluble uranium deposits on sediments in the 300 Areas. Use of strong extracting solutions such as acids requires complex and costly down-stream process equipment that exceeds the customary scope of soil washing technology. Use of soil washing would likely result in relatively dilute liquid process streams that would require concentration by ion exchange prior to discharge. Assuming washed sediment adequately lower uranium or technetium-99 concentrations to levels to preclude further threat of groundwater contamination, the soil residual would require backfill to excavations. Soil washing technology generally is applied to soil contaminated with semivolatile organic compounds (SVOCs), hydrocarbons, and heavy metals. The technology may be used on selected volatile organic compounds (VOCs) and pesticides. Soil size distribution controls the equipment design and operation. Soil washing is used extensively in Europe. Commercialization in the United States is less extensive ("4.19 Soil Washing" [FRTR, 2011]).

J1.1.2.2 Relevant Demonstration Projects

Limited experience with uranium soil washing is available; however, one application of soil washing of uranium-contaminated soil using a heated bicarbonate solution in a rotary reactor is documented. The pilot demonstration was conducted on uranium-contaminated soil at the RMI Titanium Company Extrusion Plant in Ashtabula, Ohio. The process involved a 0.2 M $NaHCO_3$ solution at 46°C (115°F) and retention time of 1.5 hours. The reactor was a 0.4 cubic meter (15 ft^3) cement mixer. The equipment

processed 0.9 to 1.8 metric tons (1 to 2 tons) of soil contaminated with particulates from uranium extrusion operations per batch. The process used a 30 percent solids slurry ratio. A total of 58 metric tons (64 tons) of contaminated soil were treated between January 7, 1997 and February 14, 1997 in 38 batches. The soil consisted of high clay content silt loams and clay loams with low concentrations of organic material. Concentrations of uranium in the treated soil ranged generally between 14 and 47 pCi/g as hexavalent uranium [U(VI)]; however, an elevated concentration of 587 pCi/g U(VI) was treated with only partial success. The treated soil had an overall removal efficiency of approximately 82 percent with a volume reduction to fines of 95 percent. Less than 5 percent of the residual waste required offsite disposal. Difficulties with meeting the cleanup goal were encountered with the very highly contaminated soil (i.e., 587 pCi/g uranium). The total cost for the pilot work, including equipment mobilization and de-mobilization, analyses, treatment and disposal of waste was $638,670. Full-scale costs were estimated to range between $250 and $350 in 1997 dollars per ton (*Cost and Performance Report: Chemical Extraction for Uranium Contaminated Soil at the RMI Titanium Company Extrusion Plant, Ashtabula, Ohio* [FRTR, 1998]). The cost for soil washing using 2006 Remedial Action Cost Engineering and Requirements software (FRTR, 2011) for a large site such as the 300 Area is estimated to be $70 per m^3 using water.

J1.1.2.3 Evaluation and Screening Rationale

Soil washing is considered to have low to moderate effectiveness because the resistant nature of the adhesion of uranium to sediment. Wash solution more aggressive than water would likely be required to remove uranium from excavated sediment. The use of caustic or acid wash solutions complicates the equipment and material handling of the wash process. It is presently unknown whether large-scale wash technology would be sufficiently effective to reduce sorbed uranium on sediment to adequately reduce risk to groundwater contamination of the treated and backfilled sediment. Soil washing is moderately implementable with existing mechanically intense slurry contact equipment and conventional aggregate washing and screening technology. Disposal and post-wash handling of the wash solutions may be problematic, therefore reducing the implementability of the technology. The relative cost of ex situ soil washing is moderately high because of material handling and post-wash liquid treatment and disposal costs. High-end costs for soil washing under Hanford Site conditions could exceed $70 per m^3 of sediment by a factor of 3.

J1.1.3 Ex Situ Vitrification

Ex situ vitrification was not retained for treatment of soils contaminated with radionuclides and other COCs.

J1.1.3.1 Description

Vitrification processes are solidification methods that use heat (1,100 to 2,000°C) to melt and convert waste materials into glass or other glass and crystalline products. This technology is considered highly effective in the treatment of contaminants, and in permanently reducing the mobility, toxicity, and volume of contaminants. The high temperatures destroy any organic constituents with very few byproducts. Materials such as heavy metals and radionuclides are incorporated into the glass structure, which is strong, durable, and resistant to leaching. In addition to solids, waste materials can be liquids, wet, or dry sludges, or combustible materials. Borosilicate and soda lime are the principal glass formers and provide the basic matrix of the vitrified product. When the molten mass cools, it solidifies into a vitreous and crystalline rock-like monolith that is substantially reduced in volume (20 to 50 percent) (RPP-ENV-34028).

Ex situ joule heating vitrification uses furnaces that have evolved from the glass melters used in the glass industry. The electric furnace uses a ceramic-lined, steel-shelled melter to contain the molten glass and waste material (DOE/RL-94-61).

J1.1.3.2 Relevant Demonstration Projects

In the early 1990s, DOE developed a transportable vitrification system (TVS) to effectively vitrify applicable mixed-waste sludges and solids across the various DOE complex sites (*Transportable Vitrification System: Mixed Waste Focus Area* [DOE-1998]). Multiple studies were completed in collaboration with Westinghouse Savannah River Company (WSRC), Oak Ridge National Laboratory (ORNL), and Clemson University. A mixed-waste demonstration was completed in 1997 using Savannah River B&C pond sludge and a mix of B&C pond sludge and Central Neutralization Facility (CNF) sludge. The study indicated the system vitrified 84 m^3 (276 ft^3) of mixed waste into 34 m^3 (112 ft^3) of glass waste, resulting in a 60 percent waste volume reduction. Results of the study indicated the need for high capital costs and extensive upfront development; however, results also indicated the technology is capable of producing highly durable glass waste forms with long-term integrity, and a significant reduction in waste volume as compared to other stabilization techniques.

A vitrification plant is currently being constructed to treat tank wastes at the Hanford Site. The Waste Treatment and Immobilization Plant (WTP) will cover 26 hectares (65 acres) and will consist of four nuclear facilities: Pretreatment, Low-Activity Waste vitrification, High-Level Waste vitrification, and an Analytical Laboratory (http://www.hanfordvitplant.com). Construction activities began in 2002, and it is anticipated that the plant will be operational in 2019. A number of tests have been performed to support the process and design associated with this facility; however, treatability tests on contaminated soil have not been preformed. Information regarding the WTP Research and Technology Program is presented in the WTP Project Execution Plan (*Project Execution Plan for the River Protection Project Waste Treatment and Immobilization Plant* [DOE/ORP-2003-01]).

J1.1.3.3 Evaluation and Screening Rationale

Ex situ vitrification is considered to have low implementability given that highly complex equipment is required. Similarly, given the relative high cost and potential application of other technologies with high effectiveness and implementability, ex situ vitrification is not considered favorable for implementation for treatment of contaminated soil at the 300 Area.

Complex system requirements are inherent to this technology, such as pretreatment to segregate high-level and low-level waste, and multiple vitrification systems to support both the treatment requirements of each type of waste and to allow for an accelerated cleanup strategy. After treatment, the resulting glass structures would need to be tested to ensure the glass produced by the facility meets regulatory requirements and standards. Ultimately, the glass produced still would require final disposal in an alternate facility.

As presented in RPP-ENV-34028, estimated costs for implementation of this technology can range from \$500 to \$1,000 per yd^3. These costs include soil excavation, screening to remove debris, installation of the vitrification system and off-gas treatment system, operation and maintenance (O&M), utilities, site management, and sampling support, and onsite disposal of vitrified material and off-gas treatment. For the WTP facility, DOE/ORP-2003-01 indicated that the total project cost for the WTP is estimated to be \$5.781 billion.

Because of the complexity of the equipment and associated high cost, this remedial technology is not retained for further evaluation.

J1.1.4 Ex Situ Thermal Desorption

Ex situ thermal desorption was not retained for treatment of soils contaminated with organic compounds.

J1.1.4.1 Description

Ex situ thermal desorption involves the direct application of heat to increase the temperature of soil and volatilize organic compounds from the soil. A carrier gas or vacuum system then transports the organic rich vapors to be further treated. All thermal desorption systems require treatment of off-gas in order to remove particulates and contaminants. The process does not involve incineration or pyrolysis. Typically, ex situ thermal desorption involves use of rotary drums or similar mechanical heating devices, vapor capture, and a vacuum system to extract volatilized water and organics to the gas treatment system.

Treatment to low levels of organic contaminants can be achieved with this technology. Based on the operating temperatures, thermal desorption processes can be categorized as either high-temperature thermal desorption (320 to 560ºC) or low-temperature thermal desorption (90 to 320ºC). High-temperature thermal desorption (HTTD) targets SVOCs, polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and pesticides. VOCs can also be treated with HTTD, although the process is less cost effective. Low-temperature thermal desorption (LTTD) targets non-halogenated VOCs and fuel, and can treat SVOCs but at a reduced effectiveness.

J1.1.4.2 Relevant Demonstration Projects

A full-scale demonstration project was completed in 1992 at the Outboard Marine Corporation site in Waukegan, Illinois, for the treatment of PCBs from soils, sediments, and sludges using thermal desorption. The demonstration involved treatment using an anaerobic thermal processor licensed by SoilTech ATP Systems, Inc. The study indicates that a total of 224 tons (448,000 lb) of PCB-contaminated soil were treated, and treatment efficiencies for removal of PCB of approximately 99.9 percent were achieved (*SoilTech Anaerobic Thermal Processor: Outboard Marine Corporation Site*: *Soil Tech ATP Systems, Inc.*, [EPA/540/MR-92/078]).

J1.1.4.3 Evaluation and Screening Rationale

Ex situ thermal desorption can be a highly effective technology. However, given the relatively low volumes of petroleum-contaminated soil that are likely to be present, and the high mobilization costs, onsite disposal of soil is likely to be much more cost effective. Although equipment for implementation of this technology is readily available, it is mechanically complex and poses technical implementability challenges. Transportability of equipment becomes challenging when the amount of soil to treat is small, and the complexity of the equipment requires skilled operators to treat the soil. For these reasons, ex situ thermal desorption was not retained for further consideration.

J1.2 In Situ Treatment—Reagent Approach

This section discusses reagents/technologies that could be used for in situ treatment of the COCs. Delivery of these reagents is discussed in the following section. These reagents/technologies were not retained for further consideration.

J1.2.1 In Situ Solidification

In situ solidification was not retained for treatment of soils containing mobile COCs including uranium, other radionuclides, and organic compounds such as chlorinated volatile organic compounds (CVOCs).

J1.2.1.1 Description

Solidification/stabilization alters the physical and/or chemical characteristics of a soil or sediment through the addition of binders, including cements, to enclose or coat contaminated soil and thereby immobilize contaminants. Immobilization technologies primarily work by coating and isolation, which make the contaminants less prone to leaching or dissolution. The application of solidifying agents in situ is a form of grouting. Multiple types of grouting/binding materials and emplacement techniques have been developed and demonstrated. Jet grouting and permeation grouting are the two general grout approaches potentially applicable for subsurface contaminant solidification in 300 Area vadose zone sediments. Jet grouting uses high-energy emplacement of cement or chemical grout materials whereby the sediment is displaced and mixed with the grouting material. Permeation grouting is injection of a liquid grout that fills the natural porosity of the formation and then gels to form a solid void-filling material. While permeation grouting is a relatively mature technology for many geotechnical applications, there are uncertainties with grout for in situ contaminant stabilization (*Evaluation of Vadose Zone Treatment Technologies to Immobilize Tc-99* [WMP-27397]). The uncertainties include: (1) the effectiveness of delivery depends upon subsurface heterogeneity; and (2) the presence of fines (which likely contain the higher proportion of sorbed uranium) adversely affect grout placement. Generally, grout is emplaced via an array of closely spaced vertical boreholes into the subsurface volume to be stabilized.

Two types of grout materials may be used: particulate (cement) grouts and chemical grouts. Cement grouts use Portland cement as the primary component. Portland cement is a mixture of preprocessed mineral solids pulverized, fired, and ground into a fine solid dust. This product is combined with up to 5 percent gypsum, and mixed with water and small quantities of additives to form a flowable mixture of solids and water composing a suspended solids grout. A chemical grout is a solution comprised of a binder (other than Portland cement) that reacts in place to form a gel or solid after injection into a porous subsurface soil, sediment, or rock volume. Chemical grouts do not contain mineral solids in suspension, and therefore their delivery in the subsurface is not limited by particle filtration. Instead, delivery is a function of grout viscosity and gelling time.

J1.2.1.2 Relevant Demonstration Projects

It is important to distinguish applications of injection of grouts into the subsurface at waste sites. The more common approach is to use grouts to form a hydraulic barrier to isolate waste. The second approach is to inject grout into contaminated zones in an attempt to encapsulate contaminated sediment or soil and thereby effect in situ solidification. This second approach is the goal of the technology evaluated in this discussion. In situ solidification is distinct from barrier or waste isolation technology.

Several DOE sites, including the Hanford Site, ORNL, Brookhaven National Laboratory, Idaho National Laboratory, Savannah River Site, and Sandia National Laboratories have evaluated, tested, and/or implemented in situ grouting for shallow waste isolation applications as summarized below. In situ grouting has been evaluated at the Hanford Site for application to waste site isolation (e.g., near surface formation of in situ waste barriers) through a number of efforts in the 1990s, documented in the following reports:

- "Injectable Barriers for Waste Isolation" (Persoff et al., 1995)
- "Feasibility of Permeation Grouting for Constructing Subsurface Barriers" (SAND94-0786)
- "Durability of Polymers for Containment Barriers" (Heiser et al., 1994)
- *Summary Report on Close-Coupled Subsurface Barrier Technology Initial Field Trials to Full-Scale Demonstration* (BNL-52531)

- *In Situ Remediation Integrated Program FY 1994 Program Summary* (DOE/RL-95-32)

These efforts provide laboratory and field data for jet grouting techniques applied to shallow waste isolation at the Hanford Site and Brookhaven National Laboratory.

In situ permeation grouting using colloidal silica to develop a hydraulic barrier was evaluated and tested for application at Brookhaven National Laboratory ("Evaluation of Alternative Designs for an Injectable Subsurface Barrier at the Brookhaven National Laboratory Site, Long Island, New York" [Moridis et al., 1999]). Lawrence Berkeley National Laboratory also led a significant program on this application, as documented in the following reports:

- *Physical Barriers Formed from Gelling Liquids: 1. Numerical Design of Laboratory and Field Experiments* (LBL-35113)
- *Injectable Barriers for Waste Isolation* (LBL-36739)
- "Effect of Dilution and Contaminants on Sand Grouted with Colloidal Silica Gel" (Persoff et al., 1999)
- *A Field Test of Permeation Grouting in Heterogeneous Soils Using a New Generation of Barrier Liquids* (LBL-37554)
- *A Design Study for a Medium-Scale Field Demonstration of the Viscous Barrier Technology* (LBNL-38916)
- *A Field Test of a Waste Containment Technology Using a New Generation of Injectable Barrier Liquids* (LBNL-38817)

Shallow permeation grouting was conducted at ORNL to reduce hydraulic conductivity (*Field Grouting Summary Report on the WAG 4 Seeps 4 and 6 Removal Action Project* [ORNL/ER-401/V1]). Jet injection of standard and microfine cement grout into waste trench material at ORNL improved soil stability, but did not create low hydraulic conductivity conditions (*In Situ Grouting of Low-Level Burial Trenches with a Cement-Based Grout at Oak Ridge National Laboratory* [ORNL/TM-11838]). Other efforts at ORNL included injection of a polyacrylamide grout into a waste trench that enhanced soil stability and had a moderate (2 orders of magnitude) impact on the hydraulic conductivity ("Field Demonstration of In Situ Grouting of Radioactive Solid Waste Burial Trenches with Polyacrylamide," [Spalding and Fontaine, 1992]). Detailed evaluation and treatability testing for in situ grouting of waste sites was completed at Idaho National Laboratory demonstrating the potential viability of grouting to stabilize waste (in situ solidification) in near-surface sites. The following reports provided a thorough review of in situ grouting for shallow waste sites at Idaho National Laboratory and retained this technology as a potential alternative in a feasibility study for Operable Unit 7-13/14 based on the likely ability of the technology to stabilize the waste and reduce hydraulic conductivity in localized hot spots.

- *Final Results Report, In Situ Grouting Technology for Application in Buried Transuranic Waste Sites, Volume 1: Technology Description and Treatability Study Results for OU 7-13/14* (INEEL/EXT-02-00233)
- *Feasibility Study for Operable Unit 7-13/14* (DOE/ID-11268)

The Savannah River Site has implemented in situ grouting for shallow waste sites such as the F Area seepage basins (*Corrective Measures Implementation/Remedial Design Report/Remedial Action Work Plan (CMI/RDR/RAWP) for the F-Area Seepage Basin (904-49G) (U)* [WSRC-RP-97-854]).

J1.2.1.3 Evaluation and Screening Rationale

In situ solidification using commercially available grouting equipment with cement grouts is considered to have moderate to high implementability when applied over smaller areas relative to the large 300 Area. Such limited areas might extend over a total area of up to 0.2 hectare (0.5 acre) and to depths of 4 to 5 m (13 to 16 ft). However, there is little experience with large-scale grouting of soil volumes extending over 19 acres to depths of 10 to 13 m (32 to 42 ft) in proximity to a dynamic groundwater interface. With the large extent and site conditions, the implementability of in situ solidification is ranked as moderate. The effectiveness of in situ solidification is a function of the distribution of the grout into the formation and the degree of encapsulation of contaminated sediment particles. Effective emplacement of grout assumes a typical 0.6 m (2 ft) effective diameter grout column with 0.5 m (16 ft) spacing. Such high-density emplacement provides moderate to high effectiveness but is relatively expensive. Using estimated installation costs for in situ solidification using a jet grouting at Idaho National Engineering and Environmental Laboratory (Holdren et al., 2007) unit costs in excess of $1,960 per cubic meter ($1,500 per yd^3) are estimated. Consequently, the relative capital cost is high. The relative O&M cost would be low assuming good contact and stable binder chemistry provides a permanent encapsulation. Because of the high capital cost and potential for incomplete contact of grout in the targeted groundwater interface zone, in situ solidification is not retained for further evaluation.

J1.2.2 In Situ Chemical Reduction

In situ chemical reduction is not retained for treatment of soils contaminated with uranium.

J1.2.2.1 Description

Considerable technical development and study of manipulating subsurface geochemical conditions to sequester or immobilize inorganic contaminants have been pursued over the past 25 years. Chemical reducing agents, such as diluted hydrogen sulfide gas, may be used to transform contaminants to a less mobile or less toxic form such as hexavalent chromium to trivalent chromium by means of injection into the vadose zone (*In Situ Gaseous Reduction Pilot Demonstration—Final Report* [PNNL-12121)]. Alternative chemical reducing agents include calcium polysulfide, dithionite, ferrous sulfate, zero valent iron. The alternate chemical agents delivered as solids or liquids have the inherent limitation of fully contacting the targeted sediment contamination in the vadose zone. Fundamental to reduction of uranium in the vadose zone is the fact that uranium geochemistry is much more complicated and reversible relative to reduction of other contaminants. It is possible for uranium to form a relatively insoluble form, uranous ion (U^{+4}) and stabilize as sparingly soluble compounds such as uranite (UO_2) and coffinite ($USiO_4$). In a reducing environment promoted by the injection of a strong reducing agent such as hydrogen sulfide, soluble/mobile oxidized forms of uranium may be converted to relatively insoluble forms. The fatal flaw with such redox manipulation in the shallow, naturally oxidizing environment of the 300 Area vadose zone and fluctuating groundwater interface zone is the reversibility of the reaction. Constant, permanent maintenance of the reducing conditions in the shallow vadose zone would be required to sustain uranium stabilization.

J1.2.2.2 Relevant Demonstration Projects

In situ chemical reduction of radionuclides such as technetium-99 has been attempted at the Hanford Site in the deep vadose zone of the 200 Area using reducing agents including dithionite and hydrogen sulfide gas. Gas phase chemical reduction has been studied by various investigators (PNNL-12121 and *Hanford Site Groundwater Monitoring for Fiscal Year 2002* [PNNL-14187]). Chemical reduction by aqueous solutions of sodium dithionite has also been studied and implemented full-scale at the Hanford Site (*Abiotic Reduction of aquifer Materials by Dithionite: A Promising In-Situ Remediation Technology* [PNL-SA-24505] and *Area In Situ Redox Treatability Test for Chromate-Contaminated Groundwater*

[PNNL-13349]). Other aqueous solutions such as those containing iron(II), copper(I), or tin(II) may also reduce technetium-99. However, no attempt to reduce uranium or treat shallow vadose sediments in the 300 Area has been made.

J1.2.2.3 Evaluation and Screening Rationale

Depending upon the delivery method, in situ reduction technologies have low to moderate implementability in the context of the shallow treatment zone. The application of toxic hydrogen sulfide gas to the near surface carries significant risk. The application of liquid reducing agents to uniformly contact contaminated sediment particularly in the groundwater interface zone is problematic. The caustic nature of reducing agents is a health and safety concern during application. The effectiveness of reducing agents in the shallow vadose zone is judged to be low for multiple reasons. High application rates would be required to overcome sediment oxidation capacity from other residuals such as nitrates. The reversibility of the uranium reduction geochemistry would require repeated treatments in perpetuity to maintain uranium immobilization. In addition, the aerobic nature of the shallow, relatively permeable groundwater interface zone that is in frequent contact with high dissolved oxygen groundwater influenced by the Columbia River makes effective maintenance of a reduced zone difficult. The relative capital cost for applying reducing agents to the shallow vadose zone is low to moderate, depending upon the area of application and safety controls implemented for the reagent chosen. Because of the requirement for repeated treatment to maintain reducing conditions, the relative O&M cost is estimated to be moderate to high depending upon required renewal frequency.

J1.2.3 In Situ Chemical Oxidation

In situ chemical oxidation (ISCO) was not retained for treatment of soils contaminated with organic compounds. ISCO is not an applicable technology for the treatment of soils contaminated with radionuclides and metals.

J1.2.3.1 Description

ISCO involves the subsurface delivery of chemical oxidants to destroy organic COCs. Commercially available oxidants used in field applications include hydrogen peroxide, ozone, permanganate, persulfate, and percarbonate. The technology is capable of achieving high treatment efficiencies in unsaturated aliphatic and aromatic compounds. Petroleum hydrocarbons and PAHs can be treated with a variety of oxidants (including peroxide, percarbonate, persulfate, and ozone); however, there are limited case studies demonstrating the successful treatment of PCBs with ISCO.

J1.2.3.2 Relevant Demonstration Projects

A pilot study was conducted in fall 2006 to evaluate the effectiveness of permanganate injection to treat CVOCs in shallow unsaturated heterogeneous soils (Borchert and Raphael, 2008). The treatment zone was 4.8 by 5.4 m (16 by 18 ft) in area and 2.7 m (9 ft) deep. The site geology consisted of silty clay in the upper 1.7 m (5.5 ft) with traces of sand and gravel and an intermittent sandy layer from 0.3 to 0.6 m (1 to 2 ft) below ground surface (bgs), and gravelly sand with some silt and clay from 1.7 to 4.3 m (5.5 to 14 ft) bgs with a discontinuous sandy and silty clay layer from 2.4 to 2.7 m (8 to 9 ft) bgs. Groundwater was encountered between 2.4 and 3 m (8 and 10 ft) bgs.

The maximum concentrations of trichloroethylene (TCE) and cis-1, 2-dichloroethylene (cis-1,2-DCE) were 66,000 and 2,400 µg/kg, respectively. The permanganate soil oxidant demand ranged from about 3 to 17.1 g/kg. Approximately 1,040 L (275 gal) of 40 percent by weight permanganate (about 1,360 kg [3,000 lb]) were injected at nine locations within the pilot study area. Where oxidant was observed visually, the radius of influence (ROI) ranged from 0.8 to 3 m (2.5 to 10 ft); however, several visual borings had limited evidence of permanganate. Performance monitoring indicated that TCE and cis-1,

2-DCE concentrations in soil decreased between 44 and 93 percent, respectively. However, concentrations in groundwater increased up to 10-fold. Results from the pilot study indicated that a majority of oxidant migrated into the shallow groundwater and was consumed by CVOCs and high oxidant demand (up to 20.7 g/kg permanganate [MnO_4]). Obtaining good distribution of an oxidant solution in shallow silty clay was difficult, even with controlled low pressures and flows and closely spaced injection points. Creating temporarily saturated zones for aqueous-based ISCO reactions in the unsaturated zone was also difficult, particularly in permeable portions of the formation. Based on the results of the pilot study, excavation was selected as a more cost-effective remedial alternative for shallow soil.

An ozone gas vadose zone sparging system for treating PAHs was operated during the summer of 2001 at the Former Fuel Oil Distribution Terminal in Ilion, New York (ITRC, 2005). Adsorbed PAHs were delineated from approximately 0.6 to 2.4 m (2 to 8 ft) bgs, and initial total PAH concentrations exceeded 30 mg/kg. The subsurface contained both fill materials and native soil consisting primarily of silty sand. Groundwater was encountered 2.1 to 2.4 m (7 to 8 ft) bgs. To achieve a target 60-day period for project completion, a nominal 23-kg (50-lb)/day ozone-generation system was used to inject both ozone and oxygen. Ten initial sparge points were installed at the site by direct-push methodology. A shallow vapor extraction system was installed to control emissions. The injection system operated over a period of 8weeks. Post-remediation soil sampling results indicated no remaining PAH (primarily benzo(a)anthracene, benzo(a)pyrene, and chrysene) concentrations above method detection limits, achieving the remedial goals of 90 percent concentration reduction in 60 days. Naphthalene was also reduced to below New York Department of Environmental Control Technical and Administrative Guidance Memorandum standards. Average reduction of naphthalene was greater than 32 percent in 60 days.

An ozone gas vadose zone sparging demonstration for treating penta-chloro-phenol (PCP) and creosote (PAHs) was performed in 1998 at the Former Wood Treatment Site, Sonoma County, California (ITRC, 2005). The former wood treatment facility contained creosote and PCP dip tanks used for treatment of wood poles. Maximum pretreatment soil concentrations were 220 mg/kg PCP and 5,680 mg/kg total PAHs. High levels of dissolved contamination and non-aqueous phase liquid (NAPL) existed in the vadose zone prior to treatment. The site subsurface consisted of very heterogeneous stratified silty sands and clays, and the depth to water varied 1.2 to 4.5 m (4 to 15 ft). The ozone treatment system design included treatment of both the saturated and unsaturated zones. Therefore, ozone gas delivery modes included ozone sparging and ozone gas injection above the water table. Field operation and monitoring of the in situ ozonation demonstration project were conducted from December 1997 through December 1998. Approximately 3,600 kg (8,000 lb) of oxidant were delivered to the subsurface, with an average oxidant dose of approximately 1.9 g ozone per kg of soil (3.8 pounds ozone per ton of soil). Soil samples collected showed an average 93 percent reduction in PCP and PAHs. Concentration at the maximum pretreatment soil contamination was reduced greater than 98 percent, from an initial value of 220 mg/kg PCP and 5,680 mg/kg total PAHs, to below detection limits. Significant contaminant mass reduction was reflected not only in soils data, but also in substantial reductions in aqueous-phase concentrations of PCP and PAHs.

J1.2.3.3 Evaluation and Screening Rationale

The treatment effectiveness of ISCO can be hindered by non-uniform oxidant distribution due to high soil oxidant demand levels in shallow fine-grained soil, and rapid oxidant reaction rates. It may also be difficult to maintain saturated conditions where oxidant can be delivered, to allow the aqueous-based ISCO reactions to occur. Successful treatment of organic COCs has been demonstrated using ozone gas injection into the vadose zone. However, given the uncertainties in oxidant delivery effectiveness,

difficulties with installing a density of injection wells, and higher relative cost compared to other in situ treatment technologies for organics (bioventing and soil vapor extraction [SVE]), ISCO was not retained for further consideration.

J1.2.4 In Situ Biological Reduction

In situ biological reduction is not retained for treatment of soils contaminated with uranium.

J1.2.4.1 Description

Bioreduction involves the concept of promoting the growth of bacteria in reducing and anaerobic environments to utilize soluble U(VI) as an electron acceptor and form the more stable U(IV). The process is also applicable for dechlorination of chlorinated solvents. The process involves the addition of a carbon substrate such as molasses, ethanol, emulsified oil to contaminated groundwater. Because the process requires saturation of the sediment in water, the viability of the microbial process is very limited in the vadose zone and may only be feasible in the periodically rewetted zone at the fluctuating water table interface. The process requires the absence of oxygen.

J1.2.4.2 Relevant Demonstration Projects

No field scale application of the technology on uranium has been attempted in the vadose zone, and may not be possible due to the unsaturated nature of vadose zones. Laboratory studies have shown indications of the process possibly affecting uranium geochemistry ("Denitrification Across Landscapes and Waterscapes: A Synthesis" [Seitzinger et al., 2006]). Some work on bioreduction of uranium has been conducted at the Oak Ridge Nuclear Reservation ("Bacterial Community Succession During In Situ Uranium Bioremediation: Spatial Similarities Along Controlled Flow Paths" [Hwang et al., 2008]). No work to deploy in situ bioreduction for uranium in experimental pilot studies at the Hanford Site in the vadose zone has been made to date.

J1.2.4.3 Evaluation and Screening Rationale

The treatment effectiveness of in situ bioreduction in the vadose zone in the 300 Area is constrained by the difficulty of uniformly supplying carbon substrate, and sustaining a reducing environment in a naturally aerobic environment to maintain a sufficient microbial biomass to affect bioreduction. The reversibility of the uranium reduction geochemistry would require repeated treatments in perpetuity to maintain uranium immobilization. This technology is judged to have low effectiveness. The implementability of in situ bioreduction is judged to be low to moderate. Although nutrient and substrate infiltration may be feasible but subject to conventional percolation method limitations, methods to deliver and maintain microorganism in the relatively dry, heterogeneous sediment of the vadose zone is unproven. The capital and O&M costs of implementing this technology are estimated to be low to moderate and moderate relative to other technologies.

J1.2.5 In Situ Gaseous Ammonia Reduction

Gaseous ammonia injection is not retained for treatment of vadose zone sediments containing mobile contaminants of concern.

J1.2.5.1 Description

Gaseous ammonia injection is a conceptual process postulated to increase pH in a soil or sediment matrix to a sufficiently high degree that silica dissolves and over time reacts to form aluminosilicate minerals, which in turn may immobilize inorganic contaminants on sediment grains. This prospective technology is being investigated by the Pacific Northwest National Laboratory (PNNL) with respect to possible application to the Hanford Central Plateau (*Remediation of Uranium in the Hanford Vadose Zone Using Gas-Transported Reactants: Laboratory-Scale Experiments* [PNNL-18879]).

J1.2.5.2 Relevant Demonstration Projects

This is a proposed technology and has not been tested in the field. PNNL is presently conducting a laboratory study as part of an ongoing gas-transported reactant study for remediation of uranium in the deep vadose zone sediments at the Hanford Site. It is not presently viewed as a treatment for the shallow vadose zone in the 300 Area.

J1.2.5.3 Evaluation and Screening Rationale

Gaseous ammonia injection is an unproven conceptual technology. The effectiveness of a mildly alkaline ammonia gas in the relatively dry vadose zone in promoting mineral phase dissolution of silica aluminum and other metals is unknown and may be marginal. The geochemical reaction is reversible and remobilization of any immobilized uranium is possible with exposure to oxygen-saturated water. The implementability of the process is unknown at full scale. Furthermore, considerable health and safety and environmental concerns exist with the injection of ammonia gas near the surface in the 300 Area and along the Columbia River. Since the laboratory technology evaluation results remain to be determined, the implementation costs for the technology is undetermined. Gaseous ammonia injection is not retained for further consideration.

J1.2.6 In Situ Reductive Dechlorination Using Zero-Valent Metals and Bioremediation

Reductive dechlorination using zero-valent metals and bioremediation was not retained for treatment of soils contaminated with PCBs.

J1.2.6.1 Description

Both biological and abiotic methods are potentially applicable for reductive dechlorination of PCBs. During bioremediation, anaerobic bacteria replace chlorine atoms with the electron-donating hydrogen on the PCB molecule. A similar abiotic process occurs with zero-valent metals. Zero-valent metals include iron, palladium, and other combinations (called bi-metals). Bi-metals have been found to be more reactive. Nano-particle-sized bi-metals have also been shown to be superior to micro-sized zero-valent iron (*Emerging Technologies for the In Situ Remediation of PCB-Contaminated Soils and Sediments: Bioremediation and Nanoscale Zero-Valent Iron* [Mikszewski, 2004]). The bioremediation process involves mixing an electron donor (such as lactate) with the contaminated soil and maintaining anaerobic conditions for a number of months. A similar process is used with the zero-valent metals.

J1.2.6.2 Relevant Demonstration Projects

A review of emerging technologies for in situ remediation of PCB-contaminated sediments and soils was presented in (Mikszewski, 2004). The study focused on the use of nano-scale zero-valent iron (NZVI) and bioremediation for reductive dechlorination.

The technology review indicated that NZVI particles are capable of reducing a wide range of environmental pollutants including PCBs. In particular, the properties of NZVI and other nano-scale metals (high surface area-to-volume ratios, high surface energies, and a large fraction of stepped surface, zero valency) make them extremely chemically reactive. Several laboratory and field-scale demonstrations have been conducted demonstrating the performance of using NZVI for PCB dechlorination. Results of the studies show conflicting results. Where complete dechlorination could be achieved, percent reduction of PCBs ranged from 25 to 84 percent. In the field study where 84 percent reduction was achieved ("In-Situ Dechlorination of Polychlorinated Biphenyls in Sediments Using Zero-Valent Iron" [Gardner, 2004]), complete dechlorination was achieved in only 1 day. In another study ("Development and In Situ Application of Sorbent/Reagent-Amended 'Active' Sediment Caps for Managing HOC-Contaminated Sediments," [Lowry et al., 2004]), NZVI was shown to dechlorinate PCBs

with congener half-lives ranging from 40 days to 77 years, with no biphenyl production noted (indicating incomplete dechlorination).

The technology review indicates that at present, anaerobic reductive dechlorination is not a viable stand-alone PCB remediation technology. A field treatability study conducted by the U.S. Army Corps of Engineers in Mississippi (*Project 3: PCB Bioremediation Strategies and Potential Intermediates of Toxicological Significance, 2001 Progress* [Tiedje, 2004]) highlighted the inherent limitation of anaerobic reductive dechlorination of PCBs. Significant dechlorination of PCBs can take several years under optimal environmental conditions. Aside from length of time required for dechlorination, the limited bioavailability of PCBs severely inhibits reductive dechlorination, as PCBs are often tightly bound to soil and sediment particles, rendering them resistant to the enzymes of dechlorinating organisms. Furthermore, it is difficult to establish and stimulate PCB-dechlorinating organisms at remediation sites. More field studies must be conducted to test methods of bioaugmentation and biostimulation for PCB dechlorinators.

The potential for aerobic bioremediation of PCBs was also discussed. PCBs are broken down aerobically by the catabolic "biphenyl pathway" (or *bph* pathway) ("Genetically Modified Organisms to Remediate Polychlorinated Biphenyls. Where Do We Stand?" [Sylvestre, 2004]). A broad range of gram-negative and gram-positive aerobic bacteria is capable of cometabolically degrading PCBs via the *bph* pathway. However, the complete mineralization of PCB by the *bph* pathway is extremely rare. Most of the time, the enzymes degrade the ring with fewer chlorines while releasing the second ring as a chlorobenzoic acid (CBA). This is problematic because CBAs can be toxic and inhibitory to PCB degraders. As a result, genetic engineering has become a necessary tactic to produce organisms with the *bph* pathway and a CBA degradation pathway. Even with the recent advances of genetically engineered strains, the major problem in field application would be, as it is with anaerobic dechlorination, the limited bioavailability of the PCBs.

J1.2.6.3 Evaluation and Screening Rationale

The effectiveness of these treatment technologies is considered to be poorly known, given the limited availability of published testing results, and/or conflicting technology demonstration data. Implementability is considered moderate because it could be implemented by soil mixing or conventional excavation equipment if the treatment depth is shallow. However, the issue common with all these technologies is the limited availability of PCBs in soils and sediments. The hydrophobic nature of PCBs allows them to tightly adsorb to organic matrices within soils and sediments, rendering them resistant to microbial attack and chemical reduction. Because reductive dechlorination using zero-valent metals and bioremediation are not proven technologies, they were not retained for further consideration.

J1.2.7 In Situ Gaseous Reduction with Chemical Reductant or Biological Substrate

In situ gaseous reduction was not retained for treatment of soils contaminated with uranium and technetium-99.

J1.2.7.1 Description

In situ gaseous reduction (ISGR) is a vadose zone remediation technology that uses a gasses reagents (such as hydrogen sulfide/nitrogen gas mixture) to reduce or treat contaminants. It is applicable to redox sensitive contaminants (e.g., radionuclides and metals), and the objective is to chemically reduce the contaminant to a less mobile, and sometimes less toxic form, thereby preventing further migration and reducing the risk of contaminating the groundwater. For contaminants such as uranium and technetium, the reduced species are significantly less mobile than the oxidized species. With the reduction of iron associated with sediment, the ISGR technology creates a reducing zone within the subsurface that

continues to reduce contaminants or other oxidants (e.g., oxygen) that migrate into the treatment zone until the reducing capacity becomes depleted (RPP-ENV-34028).

J1.2.7.2 Relevant Demonstration Projects

An ISGR pilot demonstration test was completed at the White Sands Missile Range in New Mexico between 1996 and 1998 (PNNL-12121). A combination of gas injection and vacuum extraction wells was used to distribute hydrogen sulfide gas. In the demonstration, six extraction wells surrounded a central vacuum well in a hexagonal pattern. The study indicated that 70 percent of the Cr(VI) was reduced to its trivalent state. Highest treatment efficiencies were seen at 1.2 to 3 m (4 to 10 ft) bgs, which was the zone of highest contaminant concentration. Low treatment efficiencies were seen at 3 to 4.9 m (10 to 16 ft) bgs. The study concluded that the treatment gas mixture was largely channeled through the upper zone and bypassed the less-permeable, lower-zone soil (PNNL-12121).

A second demonstration test was planned at the former 183-DR facility in the 100-D/DR Area of the Hanford Site, which is associated with a significant groundwater contaminant plume (*Characterization Activities Conducted at the 183-DR Site in Support of an In Situ Gaseous Reduction Demonstration* [PNNL-13486]). Site characterization efforts were completed in 2001 in order to obtain information regarding distribution of Cr(VI) and other chemical and geological data that could support an ISGR demonstration. Site characterization data collected from two boreholes at the site failed to show signs of a Cr(VI) vadose zone source for the groundwater plume; therefore, the project was suspended until additional site characterization could be completed.

J1.2.7.3 Evaluation and Screening Rationale

As evaluated in RPP-ENV-34028, the use of a gas as the reducing agent is advantageous compared to a liquid-based delivery method because there is less risk of mobilizing contaminants and better diffusion of reagent is expected. However, significant uncertainties have been identified regarding the effectiveness of ISGR. Key uncertainties (as identified in WMP-27397) include:

- Physical heterogeneity of the vadose zone sediments presents a challenge for an even distribution of the hydrogen sulfide gas. Fine-grained soils are likely to contain more contaminants and are more difficult to treat.
- Heterogeneity occurs in the distribution of reducible iron.
- Re-oxidation of the treated zone is likely because of flux of oxygen in soil air into the pore spaces.

Technetium-99, and to some extent uranium, readily re-oxidizes under aerobic conditions, requiring periodic treatment to maintain reducing conditions. Strong reducing conditions can mobilize other constituents (e.g., arsenic and manganese); however, these constituents would likely re-oxidize fairly rapidly once they mobilize outside the treatment zone.

The equipment and processes required to implement ISGR are readily available and have been demonstrated in the field. The major challenge for ISGR is the number of wells that must be installed to achieve overlapping ROIs. Boreholes drilled through large vertical contaminated zones would generate substantial amounts of waste. Implementation of this technology could also lead to risk to workers with respect to exposure and safety. Hydrogen sulfide gas is extremely hazardous, and it would be necessary to install effective engineering controls to mitigate risk to worker safety (RPP-ENV-34028).

Better tools are needed to evaluate potential designs for vadose zone remediation using reactive gases. For example, a multiphase flow model would assist in the evaluating the applicability of reactive gas technologies to the deep vadose zone. Because in situ gaseous reduction has the potential to immobilize

technetium-99 and uranium and has been demonstrated at the field scale for similar applications, it has been included for further study in the Deep Vadose Zone Treatability Test Plan for the Hanford Central Plateau (*Deep Vadose Zone Treatability Test Plan for the Hanford Central Plateau* [DOE/RL-2007-56]).

Additional information resulting from the treatability studies is required prior to making decisions about the full-scale application of ISGR at the Hanford Site. For this reason, ISGR was not retained for further consideration.

J1.2.8 In Situ Leaching

In situ leaching was not retained for treatment of vadose sediments at the fluctuating groundwater interface zone or sediments below the water table contaminated with uranium.

J1.2.8.1 Description

In situ leaching, sometimes termed in situ recovery or "solution mining" in the context of uranium mining consists of injecting a leaching solution (lixiviant) into an ore zone, dissolving uranium, pumping the uranium-bearing solution out of the aquifer, and processing the solution to recover uranium. This process is not generally applied to recover uranium contamination residing on shallow sediments. Application of the process assumes that the targeted uranium resides in a deep, confined aquifer where the lixiviant can thoroughly contact the saturated sediment and that hydrogeologic flow conditions within the aquifer allow controlled recovery of dissolved uranium.

An array of vertical injection/production wells is used to apply and recover the leaching solution. Two types of leaching solutions are applied: alkaline solutions such as ammonium or sodium carbonate/bicarbonate with oxygen or hydrogen peroxide, or acid solutions such as sulfuric acid. The lixiviant solution serves two functions: (1) it oxidizes and dissolves uranium minerals, and (2) it provides a ligand, which forms stable complexes with uranium to facilitate solution transport. (NUREG/CR-3104, PNL-4583).

The efficiency of the leaching process depends upon the leaching solution used and sediment/aquifer flow characteristics. The recovery efficiency depends upon the aquifer groundwater flow conditions and the arrangement and withdrawal capability of the extraction wells. A variety of multiple well patterns may be applied, but in all cases, the extraction well is usually surrounded by multiple injection wells.

Within a mining or resource recovery context, the process must employ an aquifer restoration process. The introduction of the caustic or acid solutions severely impacts the surface mineralology and water quality of the sediment, and degrades the aquifer relative to environmental quality and regulatory standards. Attempts to restore aquifers to pre-leaching chemical conditions employ natural processes such as promoting the natural influx of water to wash, disperse, and geochemically neutralize the lixiviant residuals and effects, which results in a secondary process of remediation following the uranium-leaching process. The sweep water is disposed of by deep well injection, and surface neutralization followed by injection or surface storage and evaporation. Generally, surface disposal of sweep water to nearby surface water is not permitted by regulators.

The capability of in situ leaching to adequately contact uranium sorbed on sediments in the vadose zone and groundwater interface zone is subject to the same delivery method constraints discussed below for in situ treatment in general.

J1.2.8.2 Relevant Demonstration Projects

While there are numerous examples of in situ mining for uranium production, there are no known applications of the technology to remedy uranium contamination, particularly in shallow, unconfined aquifer situations such as at the 300 Area. Modern in situ uranium leaching began in the 1960s. Since

1996, as many as six commercial in situ leach facilities operated in the United States in Wyoming, Texas, and Nebraska. (*Domestic Uranium Production Report-Quarterly* [EIA, 2010]). Additional applications of the process have been applied at uranium mines in Germany, the Czech Republic, Bulgaria, Ukraine, and Russia using sulfuric acid. All of these applications have been in deep sedimentary deposit aquifers. Restoration of the extracted strati has been problematic. Multiple spills through pipe or well failure and uncontrolled lixiviant excursions in the subsurface have occurred in at least nine instances (EIA, 2010).

J1.2.8.3 Evaluation and Screening Rationale

The treatment effectiveness of In Situ Leaching is a function of the ability of the lixiviant to contact sorbed uranium on sediments in proximity to a fluctuating groundwater table. The heterogeneity and temporal variations of the water table in the 300 Area make effective contact problematic. Uranium that would be mobilized by the leaching solution must be controlled and collected. The dynamic hydrogeology of the Hanford Site aquifer in the application area(s) makes effective recovery of the mobilized uranium difficult. Significant uncontrolled leakage of caustic lixiviant solution with uranium to down gradient aquifer and the Columbia River is likely. Since successful in situ leaching has not been previously known to have been achieved in shallow, unconfined strata near a water table, the implementability of this technology is unproven. In addition, capital and O&M costs for in situ leaching in shallow, unconfined aquifer zones are unknown. Given the uncertainties of lixiviant delivery, difficulties in controlling and capturing leached uranium, risk to the environment with lixiviants, and indeterminate costs, in situ leaching was not retained for further consideration.

J1.3 In Situ Treatment—Delivery Method

This section presents technologies for the delivery of reagents for the in situ treatment of waste site soils. The previous section discussed possible reagents.

J1.3.1 Deep Soil Mixing

Deep soil mixing was not retained for treatment of soils contaminated with radionuclides and other COCs.

J1.3.1.1 Description

Deep soil mixing uses large-diameter augers or horizontally rotating heads to blend in reactants and homogenize soil. The diameter of the augers can vary from 0.3 to 4 m (0.98 to 13 ft) ("Containment, Stabilization and Treatment of Contaminated Soils Using In-Situ Soil Mixing" [Day and Ryan, 1995]). Reports indicate depths ranging from 35 m (114 ft) (Day and Ryan, 1995) to 50 m (164 ft) ("In-Situ Stabilization and Fixation of Contaminated Soils By Soil Mixing" [Jasperse and Ryan, 1992]) can be achieved with this technology.

The technology provides the opportunity for uniform mixing in the soil column, and good contact and reaction between contaminants and amendments. The reactants could be chemical reductants, biological substrates, or solidification/stabilization agents. Soil mixing by means of auger emplacement and incorporation of agents may be effective for shallow, near surface contamination. Overlapping auger borings effectively ensures continuity of reagent emplacement. Effective depth varies, depending upon site-specific conditions. Generally, this method increases soil volume, and excess soil could require disposal. Auger penetration would be substantially reduced, or even refused, in large gravels or well-cemented materials. A backhoe may be required to move the large cobbles.

J1.3.1.2 Relevant Demonstration Projects

Deep soil mixing was used to remediate an abandoned transformer repair facility in Miami, Florida (Jasperse and Ryan, 1992). PCB concentrations over the affected area ranged from 200 to 600 parts per

million (ppm), with a maximum concentration of 1,000 ppm. Impacted media was encountered to approximately 15 m bgs (49 ft) bgs. Laboratory bench-scale tests were completed to evaluate potential reagents, and a proprietary pozzolanic additive containing clay absorbents was selected. Full-scale implementation involved use of a four-shaft deep soil-mixing rig and a reagent mixing plant complete with a four-line pump and control system. Reagents were mixed at a rate of 275 kg/m^3 of soil mixed. Results from the study show a decrease in concentrations of PCB after treatment, as well as an increase in unconfined strength and decrease in permeability of the mixed samples over time (Jasperse and Ryan, 1992).

J1.3.1.3 Evaluation and Screening Rationale

Deep soil mixing is considered effective at delivering reagents to contaminated soils. Chemical agents are mixed uniformly with the soil column, providing good contact and reaction between the contaminant of concern and the chemical. Cement or bentonite clay can also be mixed with the chemical slurry to reduce the hydraulic conductivity and leachability of the soil. Implementability of deep soil mixing is considered marginal at the Hanford Site due to the presence of cobbles and boulders in the subsurface. Because the equipment cannot mix to depths significantly deeper than the reach of a backhoe, and the ERDF is available for soil disposal at the Hanford Site, excavating the soil and disposing of it at the ERDF is a much more straightforward and proven option. Because implementability will be limited by site conditions and required depth of treatment, deep soil mixing is not retained for further evaluation.

J1.3.2 Foam Delivery of Reagents

Foam delivery of reagents was not retained for treatment of soils contaminated with radionuclides, Cr(VI), other metals, and organic compounds.

J1.3.2.1 Description

Foam delivery is a relatively new method of delivering chemical reactants to the vadose zone. The foam is created by a surfactant solution and mixed with a chemical such as calcium polysulfide. This mixture is then injected into the vadose zone via vertical wells. The foam helps to move the reactants out horizontally from the injection well, rather than just downward. Depending on the reactant used, it could be used to treat Cr(VI), technetium-99, and uranium.

J1.3.2.2 Relevant Demonstration Projects

Foams have not yet been applied to field-scale dissemination of reagents to remediate sediment contamination. A preliminary evaluation of delivery technologies for lateral injection was conducted by PNNL in 2010 (*Evaluation of Reagent Emplacement Techniques for Phosphate-based Treatment of the Uranium Contamination Source in the 300 Area* [PNNL-19461]). The evaluation concluded that, given the available laboratory research conducted, the lateral application of reagents like phosphate to periodically wetted sediments using foam is inferior to other delivery methods such as injection in a solution with a shear-thinning agent. Foam, in the limited range of laboratory conditions tested thus far, appears to be limited by a very high pressure at the injection point that reduces the distance of foam propagation; this distance may be as constrained as 1.5 m (5 ft). However, no information is currently available on how far the foam will move out from an injection well in field conditions. Foam delivery of reagent also has the inherent limitation of having only a small percentage of its volume (generally less than 5 percent depending upon the foam quality) available for conveying dissolved reagent. Consequently, a greater quantity of foam relative to a direct liquid application may be required to adequately contact a given volume of contaminated sediment.

J1.3.2.3 Evaluation and Screening Rationale

The technology evaluation has been limited to laboratory column tests; thus, effectiveness, implementability, and costs at the field scale are unknown. The spacing between injection points is also unknown; however, the estimated distance of foam propagation in the field is approximately 1.5 m (5 ft). Evaluation of results from the ongoing treatability study is needed prior to making a decision regarding its full-scale use at the Hanford Site. For this reason, foam delivery of reagents is not retained for further consideration.

J1.3.3 Gaseous Delivery of Reagents (In Situ Gaseous Reduction)

In situ gaseous reduction was not retained for treatment of soils contaminated with radionuclides and other COCs.

J1.3.3.1 Description

In situ gaseous reduction (ISGR) is a vadose zone remediation technology that uses a gasses reagents (such as hydrogen sulfide/nitrogen gas mixture) to reduce or treat contaminants. It is applicable to redox sensitive contaminants, and the objective is to chemically reduce the contaminant (metal or radionuclide) to a less mobile, and sometimes less toxic form, preventing further migration and reducing the risk of contaminating the groundwater. For contaminants such as uranium and technetium, the reduced species are significantly less mobile than the oxidized species. With the reduction of iron associated with sediment, the ISGR technology creates a reducing zone within the subsurface that continues to reduce contaminants or other oxidants (e.g., oxygen) that migrate into the treatment zone until the reducing capacity becomes depleted (RPP-ENV-34028).

J1.3.3.2 Relevant Demonstration Projects

An ISGR pilot demonstration test was completed at the White Sands Missile Range in New Mexico between 1996 and 1998 (PNNL-12121). A combination of gas injection and vacuum extraction wells were used to distribute hydrogen sulfide gas. In the demonstration, six extraction wells surrounded a central vacuum well in a hexagonal pattern. The study indicated that 70 percent of the Cr(VI) was reduced to its trivalent state. Highest treatment efficiencies were seen at 1.2 to 3 m (4 to 10 ft) bgs, which was the zone of highest contaminant concentration. Low treatment efficiencies were seen at 3 to 4.8 m (10 to 16 ft) bgs. The study concluded that the treatment gas mixture was largely channeled through the upper zone and bypassed the less-permeable, lower-zone soil (PNNL-12121).

A second demonstration test was planned at the former 183-DR facility in the 100-D/DR Area of the Hanford Site, which is associated with a significant groundwater contaminant plume (PNNL-13486). Site characterization efforts were completed in 2001 in order to obtain information regarding distribution of Cr(VI) and other chemical and geological data that could support an ISGR demonstration. Site characterization data collected from two boreholes at the site failed to show signs of a Cr(VI) vadose zone source for the groundwater plume; therefore, the project was suspended until additional site characterization could be completed.

J1.3.3.3 Evaluation and Screening Rationale

As evaluated in RPP-ENV-34028, the use of a gas as the reducing agent is advantageous compared to a liquid-based delivery method, as there is less risk of mobilizing contaminants, and better diffusion of reagent is expected. However, significant uncertainties have been identified regarding the effectiveness of ISGR. Key uncertainties (as identified in WMP-27397) include:

- Physical heterogeneity of the vadose zone sediments presents a challenge for an even distribution of the hydrogen sulfide gas. Fine-grained soils are likely to contain more contaminants and are more difficult to treat.
- Heterogeneity occurs in the distribution of reducible iron.
- Re-oxidation of the treated zone is likely because of flux of oxygen in soil air into the pore spaces.

Uranium and technetium-99 readily re-oxidizes under aerobic conditions, requiring periodic treatment to maintain reducing conditions. Strong reducing conditions can mobilize other constituents (e.g., arsenic and manganese); however, these constituents would likely re-oxidize rapidly once they mobilize outside the treatment zone.

The equipment and processes required to implement ISGR are readily available and have been demonstrated in the field. The major challenge for ISGR is the number of wells that must be installed to achieve overlapping ROIs. Boreholes drilled through large vertical contaminated zones would generate substantial amounts of waste. Implementation of this technology could also lead to risk to workers with respect to exposure and safety. Hydrogen sulfide gas is extremely hazardous, and effective engineering controls would need to be installed to mitigate risk to worker safety (RPP-ENV-34028).

Better tools are needed to evaluate potential designs for vadose zone remediation using reactive gases. For example, a multiphase flow model would assist in evaluating the applicability of reactive gas technologies to the deep vadose zone. Because ISGR has the potential to immobilize technetium-99 and uranium and has been demonstrated at the field scale for similar applications, it has been included for further study in the Deep Vadose Zone Treatability Test Plan for the Hanford Central Plateau (DOE/RL-2007-56).

Additional information resulting from the treatability studies is required prior to making decisions about the full-scale application of in situ gas reduction at the Hanford Site. For this reason, ISGR was not retained for further consideration.

J1.3.4 Horizontal Injection Wells

Delivery of substrates using horizontal injection wells was not retained for treatment of soils contaminated with radionuclides and other COCs.

J1.3.4.1 Description

Horizontal injection wells involve the delivery of amendments through wells installed using horizontal drilling techniques. Horizontal injection may have benefits over vertical injection in shallow treatment areas, and where COCs are characterized within a certain discrete depth interval.

J1.3.4.2 Relevant Demonstration Projects

An unsuccessful horizontal well technology demonstration was conducted at the Hanford Site 100-D Area from November 2009 through January 2010 (SGW-45974). The scope of work consisted of two phases. First, a surface casing was installed at a 16-degree angle from horizontal through the Hanford formation to an estimated depth of 15 m (50 ft) bgs. The second phase was to drill through the Ringold Formation using horizontal directional drilling techniques and drilling mud. Once this drilling was complete, the drill bit would have been knocked off and the well screen installed inside the drill pipe. Installation of surface casing was required to facilitate circulation of drilling mud in the very porous Hanford formation. The casing was advanced with much difficulty to approximately 6 m (20 ft) bgs (85 linear ft) when downward progress ceased because of inadequate force on the down-hole hammer and difficulty removing cuttings

from the inclined casing. Rotary-mud directional drilling through the casing and into the Hanford formation was attempted but progress was slow and circulation was never established.

J1.3.4.3 Evaluation and Screening Rationale

As with vertical injection wells, the effectiveness of horizontal injection wells can be hindered by soil heterogeneity, which causes preferential flow paths and limits the treatment effectiveness of lower permeability soil. With anisotropies in vertical hydraulically conductivity more pronounced than horizontal hydraulically conductivity, amendment distribution over a larger depth interval would be more challenging compared to vertical wells. Furthermore, maintaining target borehole depth and alignment with horizontal drilling in gravelly/cobbly lithologies would be difficult; this issue was encountered during the technology demonstration at the Hanford Site. Given the increased difficulty in installation and amendment delivery compared to vertical injection wells, horizontal injection well technology was not retained for further evaluation.

J1.3.5 Jet Grouting

Jet grouting was not retained for treatment of soils contaminated with radionuclides and other COCs.

J1.3.5.1 Description

As mentioned in DOE/RL-2007-56, grout injection addresses subsurface contaminants by injection of a grout or binding agent into the subsurface to physically or chemically bind or encapsulate contaminants. Grout injection technologies using multiple types of grouting materials have been applied and are currently undergoing testing for in situ contaminant stabilization at other sites. Similarly, more standard grouting techniques also potentially may be useful for selected applications.

J1.3.5.2 Relevant Demonstration Projects

As presented in RPP-ENV-34028, in situ grouting has been approved by regulating agencies and implemented at several small-scale sites, although in situ grouting has not been applied to large-scale sites with many radiological and chemical hazards (RPP-ENV-34028).

PNNL conducted a study in 2010 to evaluate water jet injection of phosphate and apatite into subsurface sediments in the Hanford Site 100-N Area (*Hanford 100-N Area In Situ Apatite and Phosphate Emplacement by Groundwater and Jet Injection: Geochemical and Physical Core Analysis* [PNNL-19524]). Sediments that were jet injected with sodium phosphate or fish-bone apatite (or both) showed high phosphate concentrations with multiple (six), closely spaced (approximately 1.5 m [5 ft] spacing) injection points. However, with samples taken very close to injection points, it was difficult to assess the relevant areal extent at greater distance (i.e., 1.5 to 6 m [5 to 20 ft]) and to make recommendations regarding future injection point spacing greater than 1.5 m (5 ft) apart. In addition, jet injection also appeared to deposit more phosphate in finer grained sediments, so the spatial variability of the phosphate mass was much greater compared to groundwater injections. A mechanism that could explain these results is that finer grained sediments are involved in liquefaction during jet injections, which could result in more complete mixing of the phosphate in the sediment, whereas dendritic fracture patterns may develop with jet injection into coarser grained sediments. This may also cause some change in the sediment hydraulic conductivity.

This technology was briefly considered for treating technetium-99 in the vadose zone at the Hanford Site (WMP-27397). Grouting had been used as a stabilizer in several demonstrations and remedial actions had involved limited and contained volumes (e.g., beryllium reflector blocks and outshim control cylinders). However, it was not considered practicable for use in the Hanford Site vadose zone because of the

number of boreholes that would be required for complete coverage of the grout, the cost of drilling to depth, and the difficulty in confirming a continuous volume (RPP-ENV-34028).

Grouting of buried mixed waste at the DOE's Savannah River Site was rejected as a remedial technology (DOE/RL-94-61). Evaluations concluded that grouting would not fill enough voids without creating uncontrolled surface cracking and surface releases of grout contaminated with hazardous and radioactive constituents.

J1.3.5.3 Evaluation and Screening Rationale

There are significant uncertainties with use of grouting for in situ contaminant stabilization, especially for the deep vadose zone, as discussed in WMP-27397. The principal challenges to implement this technology are small injection point spacing, heterogeneous amendment distribution, transport of the grout to the deep vadose zone, and verification of proper placement. The vertical variations in stratigraphy, with some levels having relatively low potential permeability to grout flow, pose significant challenges for the technology.

Because grouting technologies have the potential for use as part of a remedy for the deep vadose zone, further efforts to evaluate the performance of grouting technologies are included in the Deep Vadose Zone Treatability Test Plan for the Hanford Central Plateau (DOE/RL-2007-56). Additional information resulting from the treatability studies is required prior to making decisions about the full-scale application of grouting technologies at the Hanford Site. Currently, jet grouting is considered to be cost prohibitive because of the close well spacing required, and with potentially limited effectiveness. For these reasons, jet grouting is not retained for further evaluation.

J1.4 In Situ Treatment—Other

J1.4.1 In Situ Desiccation

Desiccation was not retained for treatment of soils contaminated with radionuclides and other COCs.

J1.4.1.1 Description

As mentioned in DOE/RL-2007-56, desiccation involves drying a targeted portion of the vadose zone by injecting dry air and extracting soil moisture at SVE wells. Because desiccation removes water already in the vadose zone, it reduces the amount of pore fluid available to support downward transport of contaminants in the deep vadose zone, impedes water movement, and augments the impact of surface water infiltration control.

The impact of desiccation on the movement of COCs is based on physical removal of water from the subsurface. Removing moisture from the contaminated material reduces the driving force for continued vertical migration. Theoretically, desiccation would be effective in immobilizing contaminants to the extent that moisture content is lowered below the point for unsaturated flow to occur. The longevity of the “dry” conditions depends on the soil moisture infiltration rate, the relative humidity of atmospheric air, and the proximity to groundwater. In time, moisture levels recover to pre-extraction levels (RPP-ENV-34028). Without surface infiltration control, moisture content would eventually return to a state of equilibrium with surface infiltration rates. Therefore, this technology is considered not to be effective in the long term without concurrent infiltration control. A more detailed evaluation of this technology, including some initial feasibility calculations was presented in WMP-27397.

J1.4.1.2 Relevant Demonstration Projects

A very limited desiccation test showing that subsurface airflow can be induced in the Central Plateau vadose zone has been performed in conjunction with a leak detection test (*Summary of Hanford Subsurface Air Flow and Extraction (SAFE) Activities for Fiscal Year 2002* [PNNL-13820]).

J1.4.1.3 Evaluation and Screening Rationale

Equipment and technology required for implementation of desiccation is well established and common. Soil vapor extraction is a well-established technology, and moisture extraction has been safely demonstrated at the Hanford Site (RPP-ENV-34028). However, there is uncertainty with the number of wells, well spacing, and well configuration details required for optimal field/full-scale implementation. There also are uncertainties with specific aspects of implementation and long-term effectiveness. Desiccation was included in the March 2008 Deep Vadose Zone Treatability Test Plan for the Hanford Central Plateau Site (DOE/RL-2007-56) and is expected to assist in addressing the abovementioned uncertainties.

Additional information resulting from the treatability studies is required prior to making decisions about the full-scale application of desiccation at the Hanford Site. Therefore, desiccation was not considered for further evaluation.

J1.4.2 In Situ Thermal Desorption

In situ thermal desorption (ISTD) was not retained for treatment of soils contaminated with organic compounds.

J1.4.2.1 Description

ISTD involves the direct application of heat (e.g., using electrical current to heat soil, electrical heater elements, injection of hot air, steam or hot water, or radio frequency) to increase the temperature of soil and destroy or volatilize organic compounds. The use of electrical heating elements installed in closely spaced soil borings (1.5 to 3 m [5 to 10 ft] apart) is the most common approach for implementing ISTD. With heating elements, conductive heating is the primary mechanism that transmits heat to the soil. The technology can achieve rapid removal/destruction of a mix of VOCs and SVOCs, and achieve low residual concentrations. Vapors would be extracted from extraction wells or trenches using a vacuum pump. The vapor stream would be pre-conditioned by a moisture separator or heat exchanger, and treated by a vapor treatment system.

J1.4.2.2 Relevant Demonstration Projects

Field demonstrations were performed in 1993 and 1994 at the Savannah River Site and the Hanford 300 Area to evaluate six-phase heating (a form of electrical resistive heating) as a vadose remedial technology for tetrachloroethane (PCE) and TCE (*Six-Phase Soil Heating* [DOE/EM-0272]). The demonstration site at the Hanford Site was located in the 300 Area at an uncontaminated, undisturbed site. The objective of the 300 Area demonstration was to refine the design of the six-phase electrodes and other system components and address scale-up issues in the field. The demonstration site at Savannah River Site was located at one of the source areas within the 1 mi^2 VOC groundwater plume. The contaminated target zone was a 3 m (10 ft) thick clay layer at a depth of approximately 12 m (40 ft). TCE and PCE concentrations in sediments ranged from 0 to 181 µg/kg and 0 to 4,529 µg/kg. Six electrodes were placed in the ground in a 9 m (30 ft) (diameter) hexagonal pattern. An extraction well was placed in the center of the hexagon. One to 7.6 L (2 gal)/hour of water with 500 mg/L NaCl were added at each electrode to replenish evaporated water and provide and electrically conductive solution. The soil surrounding each electrode was supplied with water through a drip system. A vacuum system removed contaminant vapors from the subsurface, which were passed through a condenser to remove the steam.

The extracted VOCs were treated by electrically heated catalytic oxidation. Key results of the demonstration at SRS indicate 99.7 percent removal of contaminants from within the electrode array. Outside the array, 93 percent of contaminants were removed at a distance of 2.4 m (8 ft) from the array. Clays were heated more rapidly than the adjacent sands, due to their higher moisture content (and, thus, electrical conductivity). Completion of a cost-benefit analysis by Los Alamos National Laboratory showed that six-phase soil heating could be performed for a cost of $115/cubic meter ($88/yd^3), assuming that a contaminated site of 30 m (100 ft) in diameter and 6 to 37 m (20 to 120 ft) deep could be remediated in 5 years.

A full-scale thermal conductive heating treatment system was operated at a confidential chemical manufacturing facility in Portland, Indiana from July to December 1997 (EPA, 2003). The two target treatment areas were 45 by 15 m (150 by 50 ft) to a depth of 5.5 m (18 ft), and 9 by 6 m (30 by 20 ft) to a depth of 3.4 m (11 ft). Target source areas contained TCE up to 79 mg/kg and PCE up to 3,500 mg/kg. The site geology included fill, a combination of sand, clayey sand and construction debris, to a depth of about 2 m (7 ft). Till consisting of moist, damp, silty clay extended to a depth ranging from 5.5 to 5.8 m (18 to 19 ft), with sand seams running through the till. Below the till was a sand and gravel layer extending to a depth of 9 m (30 ft) and consisting of poorly sorted sand. Groundwater was encountered in the sand and gravel layer at depths of 6.7 to 7.6 m (22 to 25 ft). Heater/vacuum wells were installed on a 2.9 m (7.5 ft) triangular spacing with approximately one well per 4.6 m^2 (50 ft^2)of surface area treated. Wells were operated at 760 to 872°C (1,400 to 1,600°F) and soil gas was extracted through the wells using a vacuum pump. The surface area between wells was covered by an impermeable silicone rubber sheet to prevent fugitive emissions, and thermally insulated mats were used to minimize surface heat loss. The maximum soil temperature in the treatment area at a depth of 4 m (13 ft) ranged from 100 to 260°C (212 to 500°F). Off-gases were treated with a 51,000 specific L per minute (1,800 specific cubic feet per minute) flameless thermal oxidizer with an operating temperature range of 980 to 1,040°C (1,800 to 1,900°F). Results of confirmatory sampling showed that concentrations of PCE and TCE in both areas were reduced to below the cleanup goals of 8 mg/kg for PCE and 25 mg/kg for TCE.

J1.4.2.3 Evaluation and Screening Rationale

With ISDT, contaminants are primarily removed as vapors and treated above ground. Collection of volatilized COCs requires a means of active vapor recovery, typically an SVE network, in conjunction with a vapor barrier constructed over the entire treatment area. ISDT was rejected in favor of other technologies (bioventing and SVE), given that ISTD is mechanically complex and not a cost-competitive alternative.

J1.4.3 In Situ Vitrification

In situ vitrification (ISV) was not retained for treatment of soils contaminated with radionuclides and other COCs.

J1.4.3.1 Description

Vitrification processes are solidification methods that use temperatures between 1,200 and 2,000°C (2,200 to 3,600°F)—depending on the composition of the mixture being melted—to melt and convert waste materials into glass or other glass and crystalline products. In addition to solids, waste materials can be liquids, wet or dry sludges, or combustible materials. Borosilicate and soda lime are the principal glass formers and provide the basic matrix of the vitrified product. Off-gases generated by the process are contained under a hood covering the treatment area and are drawn to an off-gas treatment system. Organic contaminants are destroyed by pyrolysis, which occurs as the temperature increases before the actual melting, and by catalytic dechlorination reactions, which occur as contaminated soils approach melt temperatures under reducing conditions. Heavy metals and radionuclides are distributed throughout the

melt because of the relatively low viscosity of the molten glass and the convective flow that occurs within the melt. When electrical power is shut off, the molten mass cools and solidifies into a vitreous rock-like monolith with excellent physical, chemical, and weathering properties. The resulting product typically is 10 times stronger than concrete, and 10 to 100 times more resistant to leaching than glasses typically used to immobilize high-level wastes. The radionuclides and heavy metals are retained within the melt.

ISV involves passing current through the soil using an array of electrodes. If the soil is too dry, enhancements must be placed to provide an initial flow path for the electrical current. Large areas are treated by fusing together multiple vitrification treatment zones (Dzombak et al., 1997). To accommodate soil densification, clean overburden is placed over the melt zone before the melt is initiated, thereby avoiding subsidence issues while increasing thermal efficiency and radionuclide retention. Excessive water vapor passing through the melt may disrupt or displace the melt; therefore, soil with high moisture content must be treated to remove water prior to ISV. The process requires 700 to 900 kWh/ton of soil to be treated, including soil water. The overall oxide composition of the soil determines the fusion, melt temperature, and viscosity, and it is essential that the media contain sufficient monovalent alkali earth oxides to provide the electrical conductivity required (RPP-ENV-34028).

J1.4.3.2 Relevant Demonstration Projects

Between 1980, when the ISV process was conceived of by PNNL for the DOE, and 1997, more than 200 tests, demonstrations, and commercial operations of the technology have been conducted (RPP-ENV-34028). A 1997 DOE Case Study Abstract document (*Case Study Abstract: In Situ Vitrification* [DOE, 1997]) presented information on a case study conducted at the Hanford Site. Information specific to the DOE Hanford Case Study is limited; however, it does specify that a *Toxic Substances Control Act of 1976* (TSCA) demonstration showed destruction and removal efficiency for PCBs of greater than 99.9999 percent (EPA, 1997).

A large-scale ISV test was completed at the 116-B-6A Crib site in 1990 (*In Situ Vitrification of a Mixed-Waste Contaminated Soil Site: The 116-B-6A Crib at Hanford* [PNL-8281]). The site contained mixed waste (chromium, lead, and cesium-137) at an approximate depth of 6 m (20 ft) bgs. The treatability test consumed 550 MWh of electrical energy, and resulted in a 770-metric ton (850-ton) block of vitrified soil. Results from data collection indicated the vitrified block retained over 99.99 percent of chromium and lead, and over 99.98 percent of cesium-137, indicating the favorable resistance of the treated material to leaching. Results also indicated greater treatment depths were in homogeneous soils. The final depth achieved during the treatability test was 4.3 m (14 ft), 1.8 m (6 ft) less than the required treatment depth. The 4.3 m (14 ft) vitrified depth coincided with a cobble layer detected below the crib during the post-treatment core drilling. The rate of melt progression above the cobble layer was satisfactory, indicating the effect of the cobble layer on the achieved treatment depth (PNL-8281).

Geosafe Corporation licensed the technology from PNNL and has applied it commercially. In 1995, Geosafe Corporation evaluated the application of ISV under the EPA Superfund Innovative Technology Evaluation Program at the former site of Parsons Chemical Works, Inc. in Grand Ledge, Michigan (*Geosafe Corporation In Situ Vitrification, Innovative Technology Evaluation Report* [EPA/540/R-94/520]). The technology evaluation report summarized the findings associated with a demonstration of the ISV process and its ability to treat pesticides and mercury below EPA Region V mandated limits. The technology was evaluated against the nine *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) feasibility study guidance criteria for decision-making in a Superfund facility. ISV was considered to be effective in destroying organic contamination, immobilizing inorganic material, and as mentioned, in reducing the likelihood of contaminants leaching from the treated soil. Among some of the limitations, the report stated that ISV is

not recommended for sites that contain organic content greater than 7 to 10 percent by weight, metal content greater than 25 percent by weight, and inorganic contaminants in excess of 20 percent by volume (EPA/540/R-94/520). The report also noted that ISV would not be appropriate for sites where contaminated soil exists adjacent to buildings, other structures, or the property line.

A subsurface planar method was recently applied in a demonstration project to treat a portion of a mixed low-level radioactive liquid waste adsorption bed at the Los Alamos National Laboratory's MDA-V site ("Demonstration of Non-Traditional In Situ Vitrification Technology at Los Alamos National Laboratory," [Coel-Roback., 2003). Nontraditional planar ISV uses the same general process as in traditional ISV; however, this technology involves joule-heated melting within the subsurface. In contrast to the horizontally oriented melt normally started at or near the surface, this process establishes two vertically oriented planar melts in the subsurface between pairs of electrodes. The planar melts can be initiated at the desired depth and separation within the subsurface, depending on the target treatment volume (RPP-ENV-34028). The *Demonstration of Non-Traditional In Situ Vitrification Technology at Los Alamos National Laboratory* report indicated an average treatment depth of 7.9 m (26 ft) bgs at the electrode locations. Radioactive contaminants were seen to have been distributed uniformly through the melt and concentrations were reduced by more than an order of magnitude (Huddleston et al., 2003).

J1.4.3.3 Evaluation and Screening Rationale

As mentioned in RPP-ENV-34028, the effective treatment depth of this technology is approximately 7.6 m (25 ft) bgs, and treatment area is limited by cost. Elevated worker safety and exposure concerns could be associated with this process as a result of volatilization; however, the risk is considered lower than that of excavating highly contaminated and radioactive soil. Working in proximity to high voltage and high temperatures also requires appropriate safety precautions.

The cost associated with implementation of ISV, as compared to other technologies is considered high, where electric power is generally the most significant contributor. As presented in Table 9-1 of RPP-ENV-34028, ISV has the highest of all relative technology-specific costs. Given the complex equipment requirements and challenging implementation, as well as the relative high cost, ISV was not retained for further evaluation.

J1.4.4 In Situ Flushing

In situ flushing was not retained for treatment of soils containing soluble contaminants, for example uranium.

J1.4.4.1 Description

In situ flushing consists of flooding contaminated soils with a solution that moves contaminants in the vadose zone soil to the water table and by high rates of groundwater extraction removing the dissolved contaminant. The extracted groundwater with contaminant is treated by an ex situ process that separates, concentrates, and transforms the contaminant. The flushing solution consists of either water or water with additives to enhance solubilization and movement of the contaminant. Uranium contamination may be treated with an acid solution. The flushing solution is either applied by injection into multiple vertical wells with a quantity of water sufficient to raise the groundwater table to sufficiently contact the contaminated zone or to vertically flood contaminated vadose zone sediments. An even higher quantity and rate of water is extracted by multiple extraction wells in the upper aquifer to control, contain, and recover the mobilized contaminant. In the case of uranium, ex situ treatment options including ion exchange may be considered. Mobilized contaminant recovery is of paramount importance; otherwise, soil flushing will increase contaminant concentrations and extent in the groundwater.

J1.4.4.2 Relevant Demonstration Projects

Most documented applications of soil flushing used water to treat hydrocarbon or organic contaminants at contaminated sites. Surfactants were added in some cases. The only application of soil flushing applied to metal contamination in the EPA Superfund database is the use of water to flush chromium from vadose zone soil to groundwater at the United Chrome Products, Inc. Superfund Site, Corvallis, Oregon between 1988 and 2003. Between August 1991 and February 1994, 21 million L (5.5 million gal) of groundwater was injected. Performance of the operation with respect to removal of chromium from vadose zone is undocumented. No documented applications of full-scale soil flushing of uranium in soil have been found. However, considerable laboratory research on flushing with aqueous carbonate/bicarbonate solutions has shown the potential to accelerate mobilization of U(VI) from contaminated soil (Zhou and Gu, 2005).

J1.4.4.3 Evaluation and Screening Rationale

The treatment effectiveness of soil flushing is a function of the solubility of the uranium deposits on sediment and the ability of the wash water to contact the contamination. Laboratory column leaching studies on sorbed uranium associated with vadose zone sediments from the 300 Area have documented that such uranium is not amenable to removal by flushing. The release of U(VI) was found to be very slow and require extensive water volume for even partial removal of the sorbed U(VI) on sediment. U(VI) desorption was found to be a kinetic and not an equilibrium process. Long term leaching experiments removed only 1 to 8 percent of the total U(VI) (PNNL-15121). In addition, the heterogeneity and temporal variations of the water table in the 300 Area make effective contact of the flushing water difficult. The relatively dynamic groundwater velocities and changes in direction would make effective recovery of the flushing solution in the aquifer problematic. Consequently, the effectiveness of soil flushing is ranked low. The implementability of soil flushing is ranked low to moderate. Application of large quantities of flushing solution is constrained by the subsurface stratigraphy. Infiltration tests in the 300 Area have thus far been disappointing. Although extraction of flushing solutions using the well established technology of multiple vertical extraction wells is common, the high permeability of the Hanford aquifer would require very high pumping rates on the order of hundreds of gallons per minute per well to effect capture and control. Such high pumping rates would require moderate capital and relatively high operational expenditures. Consequently, soil flushing is not retained for further consideration.

J1.4.5 Phytoremediation

Phytoremediation was not retained for treatment of soils contaminated with bioavailable metals and organic compounds.

J1.4.5.1 Description

Phytoremediation is the use of plants and microorganisms associated with plant roots to extract, evapotranspire, immobilize, contain, or degrade contaminants. In the case of the radionuclides and metals, degradation would not be among the phytoremediation mechanisms, although it is conceivable that microorganisms could reduce reducible metals and radionuclides to some unknown extent. Phytoremediation typically is used as a polishing step and not for high concentrations of contaminants.

J1.4.5.2 Relevant Demonstration Projects

A treatability demonstration project is being conducted at the Hanford Site for treatment of strontium-90 in soil and groundwater along the banks of the Columbia River in the 100-N area using coyote willows. The coyote willow is considered the most suitable plant for use along the Columbia River shore. Known for its rapid and robust regrowth abilities, coyote willow is already used extensively along the Columbia

and Yakima Rivers for bank stabilization and revegetation purposes. As part of a treatment train of remedial technologies aimed at treating strontium-90 in the 100-K Decision Unit, phytoremediation using coyote willow would be the final polishing step.

A pilot study began in the late spring of 2007, with the planting of 50 Coyote willow starts in a fenced area at the 100-K Area of the Hanford Site (*100-N Area Strontium-90 Treatability Demonstration Project: Food Chain Transfer Studies for Phytoremediation Along the 100-N Columbia River Riparian Zone* [PNNL-18294] and *Project Work Plan 100-N Area Strontium-90 Treatability Demonstration Project: Phytoremediation Along the 100-N Columbia River Riparian Zone* [PNNL-SA-49953]). This part of the study targeted plant growth rather than phytoremediation capabilities as this location is not contaminated with strontium-90. Often flooded by the annual high Columbia River stage well into June, this site is a severe test of the willow shrubs' ability to survive realistic field conditions.

Greenhouse, laboratory (growth chamber), and field studies have shown that strontium-90 is a nutritional analog of calcium, a plant macronutrient. As such, the Coyote willows will actively accumulate strontium-90 in their leaves and stems to concentrations more than 70 times those present in the soil pore water surrounding their roots. Given the steadily increasing growth rate of the trees at the 100-K Decision Unit following yearly harvests of their aboveground tissue, this type of plant can remove significant amounts of contamination from the shoreline area without disturbing the natural sediment structure. Laboratory studies have also shown that herbivorous insects such as aphids or moth larvae would not be a source of strontium-90 offsite transport from the trees. Further, controlled harvesting schedules, and engineered barriers (fencing and netting), would prevent animal intrusion and plant detritus release (PNNL-18294).

The phytoremediation demonstration is ongoing at the 100-K Decision Unit. Biomass production over the first 3 years followed a typical growth curve. On a metric-ton-per-hectare (mT/ha) basis, biomass production amounted to 0.2 mT/ha in 2007, 0.87 mT/ha in 2008, and 4.3 mT/ha in 2009. Growth curve extrapolation predicts 13.2 mT/ha during a fourth year and potentially 29.5 mT/ha during a fifth year. The most recent report concludes that the projected biomass yields suggest the trees could prove effective in removing the strontium-90 from the 100-NR-2 riparian zone (*100-N Area Strontium-90 Treatability Demonstration Project: Phytoextraction Along the 100-N Columbia River Riparian Zone—Field Treatability Study* [PNNL-19120]).

Phytoremediation was implemented at the DOE Idaho National Engineering and Environmental Laboratory OU 21 with limited effectiveness. Contaminants of concern in surface soil to be treated using phytoremediation included metals (mercury, zinc, chromium, and selenium) and cesium-137. Based on bench-scale testing, it was determined that phytoremediation would not be successful in meeting remedial action objectives in two areas of concern. Similarly, based on greenhouse experiments, it was determined that phytoremediation would take longer to achieve cleanup goals then what was estimated in the site Record of Decision.

J1.4.5.3 Evaluation and Screening Rationale

Implementability of phytoremediation is considered moderate. It is usually implemented over long time scales, such as years or decades. The sparse vegetation that naturally grows on the Hanford Site suggests that significant efforts and inputs (such as organic matter and water) would be required to establish a vigorous plant community. Accordingly, capital costs are moderate. Once the plants are established, O&M costs would be relatively low or moderate because requirements to sustain them are low (i.e., food and water). However, metals concentrations and radionuclide activities may accumulate in the plants to the point that they must periodically be disposed of in a secure facility, such as the ERDF. Ultimately, the plants would need to be disposed of (e.g., at the ERDF) to avoid returning contaminants to the soils from

which they were originally extracted (as plants decompose) if phytoremediation is used for contaminants that are not transformed to innocuous forms by the plants or microorganisms.

Phytoremediation is effective only when the plants are active; therefore, the technology would not be effective during the winter. In addition, phytoremediation is only effective to the approximate depth of the plant roots; thus, only shallow soils would be treated. There are also concerns about contaminants entering the food chain as animals eat the vegetation or bees pollinate flowers.

In summary, the technology would be effective only for low concentrations of contaminants in shallow soils over long periods, and many metals and radionuclides would accumulate in the plants and not actually be treated, posing risks to ecological receptors. For these reasons, phytoremediation was not retained for further evaluation.

J1.5 Containment

Containment technologies that were not retained for treatment of soils contaminated with radionuclides and other COCs are presented below.

J1.5.1 Infiltration Reduction via Surface Barrier

All forms of hydraulic infiltration reduction via a variety of horizontal surface barriers were not retained as methods of reducing the rate of uranium flux into the groundwater beneath the 300 Area.

J1.5.1.1 Description

Horizontal surface barriers are engineered geotechnical structures covering the ground surface over a subsurface repository of contaminated sediment or waste. The barriers are generally designed to be impermeable to prevent surface water infiltration through the vadose zone and limit contaminant leaching to groundwater. The source of the water infiltration may be meteoric precipitation or surface runoff onto areas where subsurface contamination are located. Surface barriers are often constructed with topographical surfaces that direct precipitation off and to the sides of the cover. The barrier may also serve as a physical barrier to prevent penetration by roots, burrowing animals or human contact. Surface barriers or caps range in complexity, durability, and capability from simple compacted soil covers to multi-layer structures composed of barrier, drainage, and membrane components.

There are several types of surface barriers. A modified *Resource Conservation and Recovery Act of 1976* (RCRA) Subtitle C Barrier consists of at least three layers: a low hydraulic conductivity geomembrane /soil layer, a drainage layer, and a top vegetation/soil layer. A RCRA Subtitle D Barrier for a site such as the 300 Area with no confining layer at the bottom would consist of a similar profile of compacted clay, flexible membrane liner and top soil with no drainage layer. Asphalt/concrete caps consist of asphalt or concrete layers substituting clay and membrane sandwiched between the upper cover soil and an optional gravel bottom layer. Vegetative cap barriers (*Evapotranspiration Caps for the Idaho National Engineering and Environmental Laboratory: A Summary of Research and Recommendations* [STOLLER-ESR-56]) are specific for arid climates and are designed to promote evapotranspiration from deep soil layers that utilize native vegetation to remove moisture accumulations in the layer, thereby precluding deeper infiltration below into contaminated sediment. The design rather than using preventing infiltration by clay or membrane layers, manages the limited infiltration quantities of the arid climate over an annual period by temporarily storing moisture in an engineered soil layer and then using plants to remove that moisture before the moisture is able to penetrate the cap.

J1.5.1.2 Relevant Demonstration Projects

Several demonstration projects have been conducted on surface barriers or caps at the Hanford Site. A prototype Hanford barrier was constructed in 1994 over the 216-B-57 Crib. Ongoing monitoring of barrier stability, vegetative cover, evidence of plant and animal intrusion, and the main components of the water balance, including precipitation, runoff, storage, drainage, and deep percolation has been conducted to the physical and hydrological performance of the barrier (*200-BP-1 Prototype Hanford Barrier Annual Monitoring Report for Fiscal Years 2005 Through 2007* [PNNL-17176]). In addition, numerous pilot studies have been conducted on a variety of barrier configurations at various locations including other DOE facilities in arid climates ("The Prototype Surface Barrier Project" [PNNL-SA-35711]).

J1.5.1.3 Evaluation and Screening Rationale

Because the residual uranium contamination in the lower vadose zone enters groundwater by water table excursions in the fluctuating groundwater interface zone, all surface barrier configurations would have minimal effectiveness in mitigating uranium mobility into the aquifer. A surface barrier over a 300 Area source will have low effectiveness for mitigating uranium mobility in the deep vadose zone. Depending upon the degree of complexity, the various types of surface barriers have a range of implementability. A Hanford barrier would be moderately implementable while an asphalt/concrete cap would be relatively simple to construct using conventional paving techniques and equipment. The relative capital cost of a surface barrier ranges from high to low depending upon the complexity of its design. The O&M cost for all surface barriers would be relatively low, requiring annual inspection and occasional repair. Because surface barriers do not mitigate the primary mechanism of uranium mobilization to groundwater from the vadose zone, surface barrier technology is not considered further.

J2 Additional Information on Technologies Not Retained for Groundwater Treatment

Information is presented here regarding technologies that were not retained for further evaluation for treatment of groundwater contaminated with uranium and other COCs.

J2.1 Removal

Contaminated groundwater may be removed by either pumped extraction directly or in conjunction with the associated aquifer matrix of sediment with water, as in the extreme remedy of aquifer removal.

J2.1.1 Aquifer Excavation

Aquifer excavation was not retained for treatment of groundwater contaminated with uranium and other COCs.

J2.1.1.1 Description

Aquifer excavation involves the removal of groundwater during the process of excavating sediment in the upper levels of an aquifer. The technique is analogous to open pit mining below the surrounding water table. Overlying vadose zone sediments are removed to the fluctuating groundwater interface zone as well as a shallow (less than 0.5 m) extent of sediment within the excavation footprint into the saturated aquifer. In order to reach such depths, the excavation is designed to have setbacks, side slopes, and/or cut-off walls to safely retain the sides of the excavation and prevent slumping or side failures. The sidewall slopes may employ a variety of support techniques including sheetpile, concrete diaphragm walls, slurry cut-off trenches, injected grouts, or freezing depending upon conditions. In addition, multiple pumped extraction wells are used to reduce the hydraulic head behind the sidewall groundwater exclusion system. Depending upon the depth, excavation may employ backhoes, clam shovels, or drag lines. Excavated sediment, initially unsaturated, is transferred to either ex situ treatment or disposal. Excavated wet

sediment may be placed into a temporary dewatering facility before ex situ processing. Contaminated waters draining from sediment, pumped water within and entering into the excavation, and effluent from dewatering wells are treated by an ex situ treatment process. Because of the complexity and risk associated with the excavation, this technology is generally applied only on highly concentrated, localized groundwater contamination situations where the contaminated groundwater is immediately associated with the uppermost aquifer sediment.

J2.1.1.2 Relevant Demonstration Projects

No known application of aquifer excavation for a uranium contamination site could be found in the literature. However, a review of case studies for remediation at 118 locations for dense non-aqueous phase liquid (DNAPL) indicates that 9 percent of the sites reviewed used source removal by soil excavation as a remedy (*Assessing the Feasibility of DNAPL Source Zone Remediation: Review of Case Studies* [CR-04-002-ENV]). At least one of the cases apparently excavated below the water table where difficulty was encountered in completing the desired excavation.

J2.1.1.3 Evaluation and Screening Rationale

As a groundwater remediation technology, aquifer excavation is marginally effective. Indirectly as a method of source removal in the wetted zone, excavation can be highly effective to the extent that the source of uranium is removed. The problem is finding and removing the bulk of the source. Implementation of aquifer excavation is very difficult. Although conventional exaction of the vadose zone sediment to reach aquifer sediment would use conventional equipment, the need to dewater or control groundwater as the excavation is extended into the aquifer over a large area is problematic. Cobbles and large gravel make driven sheet pile, curtain walls, and grout very difficult to install. The very high permeability of the aquifer would require very high pumping rates. There are few if any successful precedents for aquifer excavation on the scale required for the 300 Area. Such excavation is rated as having relatively low implementability. The capital costs for excavation, dewatering with water treatment, materials handling, and successful reconstruction of the excavated aquifer is relatively high. Unless the excavation of the vadose zone and upper portion of the aquifer were to be combined with a presently unforeseen civil construction project such as a marina facility, the high cost and low implementability of aquifer excavation precludes further consideration of the technology.

J2.1.2 Aquifer Dredging

Aquifer dredging was not retained for treatment of groundwater contaminated with uranium and other COCs.

J2.1.2.1 Description

Aquifer dredging involves the removal of groundwater within the immediate sediment removed in the process of dredging sediment in the upper levels of an aquifer. The technique is similar to the previous technology of aquifer excavation except that at the level of the water table dredging, equipment such as draglines is utilized without concern for dewatering or controlling groundwater inflow to the excavation. Following removal of the overlying vadose zone sediments, contaminated sediment in the saturated zone is removed. In order to reach such depths, the excavation is designed to have setbacks, side slopes, and/or cut-off walls to safely retain the sides of the excavation and prevent slumping or side failures. Minimal effort to maintain sidewall stability would be conducted, although the operating area of the dredge equipment would need to be protected. Excavated sediment, initially unsaturated, would be transferred for either ex situ treatment or disposal. Wet sediment when excavated may be placed into a temporary dewatering facility before ex situ processing. Contaminated water draining from sediment may be returned to the excavation or treated by an ex situ treatment process.

J2.1.2.2 Relevant Demonstration Projects

No known examples of aquifer dredging for a uranium contamination site could be found in the literature. However, dredging is common technology used for navigation improvements along shorelines of lakes and harbors and deepening of ship channels and rivers. Dredging has been occasionally employed in cleanup of contaminated sediments in wetlands or shallow surface waters. Dredging is not generally deployed to remedy aquifer contamination.

J2.1.2.3 Evaluation and Screening Rationale

As a groundwater remediation technology, aquifer dredging would be marginally effective. Indirectly as a method of source removal in the wetted zone, dredging could be effective to remove uranium sorbed to sediment. The overall effectiveness of such sediment removal, even if located and completed is questionable. Removal of contaminated sediments with associated groundwater in the aquifer would address less than 6 to 8 percent of the total uranium contamination mass. Remediation of the source uranium in the fluctuating groundwater interface and vadose zone is far more efficient. Implementation of aquifer dredging would be a technical challenge. Although excavation of the vadose zone sediment to reach aquifer sediment would use conventional equipment, dredging within the excavation is problematic if the aquifer covers a large area. The depth of the excavation/dredging would require large setbacks or extensive shoring. There are few if any successful precedents for aquifer dredging within a previously excavated depression such as would be required for the 300 Area. Such dredging is rated as having relatively low implementability. The capital costs for excavation, dewatering with water treatment, materials handling, and successful reconstruction of the excavated aquifer is relatively high. Unless the excavation of the vadose zone and upper portion of the aquifer were to be combined with a presently unforeseen civil construction project such as a marina facility, the high cost and low implementability of aquifer excavation precludes further consideration of the technology.

J2.1.3 Pump-and-Treat (Includes Hydraulic Containment via Extraction)

Pump-and-treat was not retained for treatment of groundwater contaminated with uranium and other COCs.

J2.1.3.1 Description

Pump-and-treat groundwater remediation consists of extracting groundwater from one or more wells to the surface, treating the water to remove contaminants, and then either recharging the treated water back into the aquifer or discharging the water to a surface water body or sewage treatment plant. On the surface, contaminants may be removed from the water to very low concentrations using a variety of established technologies. However, pumping contaminated groundwater does not guarantee complete removal of contamination from the aquifer. The solubility of the contaminants, location of contaminant residuals, recharge, or replenishment of contaminants, and the aquifer characteristics may adversely affect the removal process. Generally, multiple pore volumes relative to the contaminated aquifer must be removed even if rapid and complete solubilization of the contaminant applies. For aquifers with slowly mobile contaminant sources and contaminant recharge from infiltration through the vadose zone, tens to hundreds of pore volumes may be required to reduce groundwater concentrations to cleanup levels.

Pump-and-treat systems may be designed to meet one of two different objectives: (1) containment to prevent the contamination from spreading, and (2) restoration to remove the contaminant mass. This section focuses on the latter objective. Pump-and-treat systems designed for restoration generally significantly higher pumping rates than systems intended to contain. The costs of the two approaches vary corresponding to the pumping rate.

J2.1.3.2 Relevant Demonstration Projects

No pump-and-treat systems have been deployed in the 300 Area.

Pump-and-treat has been the principal method of groundwater remediation prior to the 21st century. At the Hanford Site, several pump-and-treat systems have been constructed and operated. Since the 1990s, several interim pump-and-treat systems have been deployed to contain groundwater contamination. Interim systems were installed near several of the Hanford Site's former plutonium production reactors and near processing facilities in the 200 Area. Currently, there are several interim remediation systems in operation, including five pump-and-treat systems. Over 151 million L (40 million gal) of groundwater are treated every month with these interim systems. This has helped to contain contamination plumes and in some cases, to shrink them.

J2.1.3.3 Evaluation and Screening Rationale

Effective pump-and-treat in the 300 Area will be very difficult in the very permeable Hanford aquifer. The permeability of the course sand and gravel formation exhibits hydraulic conductivity greater than 2,000 m/day (2.9×10^6 gal/day/ft^2). Depending upon hydraulic gradients, groundwater flow velocities as high as 15 m/day (50 ft/day) result. Contaminated groundwater extraction is ineffective in such a permeable aquifer. Long-term pumping from a well in the south portion of the 300 Area demonstrates this lack of effect. The water supply well (399-4-12 supplies water for aquariums in the 331 Building) has a pumping rate that typically varies in the range of 757 to 2,271 L/min (200 to 600 gal/min) and has been in operation since approximately 1982. Assuming an average pumping rate of 1,235 L (350 gal) per minute for 29 years, and an average uranium concentration of 30 µg/L during the period, approximately 490 kg (1,080 lb) of uranium has been withdrawn from this well. However, monitoring of uranium concentrations of groundwater from this well has indicated no reduction of uranium concentration over the years of extraction. A pump-and-treat system is highly implementable using proven technology. Pump-and-treat systems are deployed and operating at other locations in the River Corridor. The relative capital cost of the wells and pumping system may be relatively high depending on the well density and total extraction rate that required ex situ treatment. The energy costs for operation and maintenance costs range from moderate to high depending upon the number of wells, pumping rates, and O&M duration. The potential for high long-term operating costs and low effectiveness because of the high aquifer permeability makes pump-and-treat unsuitable for remediation of groundwater in the 300 Area. Pump-and-treat has not been retained for further consideration.

J2.2 Ex Situ Treatment

Following extraction of groundwater via extraction wells, groundwater is treated with ex situ methods to remove COCs from the water stream, or to reduce COC concentrations prior to discharge. The ex situ treatment options that were not retained are discussed in this section.

J2.2.1 Chemical Reduction and Precipitation

Ex situ chemical precipitation was not retained for treatment of groundwater contaminated with uranium.

J2.2.1.1 Description

Ex situ chemical precipitation involves the introduction of chemicals to transform dissolved contaminants into insoluble solids, which are removed by sedimentation and filtration. Chemicals used can include ferrous chloride, ferrous sulfide, zero-valent iron, sulfur dioxide, and various sulfites (Section 4.2 of SGW-38338). Ferrous iron is commonly used for industrial wastewaters, such as from metal plating. Effective post-treatment for solids removal and conditioning is required. Solids removal would likely include flocculation and/or coagulation, settling, and filtration. Sludge handling, dewatering, and disposal

are also required. The volume and/or mass of the sludge generated can be extremely large and would need to be disposed of at the ERDF. Site-specific jar testing would be required to obtain design and operational parameters.

J2.2.1.2 Relevant Demonstration Projects

A remediation process optimization (RPO) evaluation was performed for the 100-D Area with a goal of reducing the cost and improving the performance of the existing ex situ ion exchange groundwater treatment systems (Section 6 of *Remedial Process Optimization for the 100-D Area Technical Memorandum Document* [SGW-38338]). Design criteria, pre-conceptual designs, and rough order-of-magnitude cost estimates were developed for three technologies: ion exchange with onsite regeneration, ion exchange with offsite regeneration, and ferrous chloride reduction. The technology with the lowest estimated O&M cost was ion exchange with onsite regeneration, followed by the ferrous chloride process, whose estimated O&M costs are approximately 20 percent higher. By far, the largest solid waste stream is generated by the ferrous chloride process, whose annual solid waste mass is approximately 4 times that of ion exchange with onsite regeneration, and more than 60 times that of ion exchange with offsite regeneration.

J2.2.1.3 Evaluation and Screening Rationale

Based on the RPO evaluation for the 100-D Area, chemical reduction using ferrous chloride would have a higher estimated operations cost than ion exchange with on-site regeneration. Chemical reduction would also generate a much larger waste stream compared to either ion exchange with onsite regeneration or ion exchange with offsite regeneration. For these reasons, chemical reduction was not retained for further evaluation.

J2.2.2 Electrocoagulation

Electrocoagulation was not retained for treatment of groundwater contaminated with uranium.

J2.2.2.1 Description

Electrocoagulation is a form of chemical reduction and precipitation. It is used to remove a variety of suspended solids and dissolved pollutants from aqueous solutions. An electric field is applied to metal plates, which release ions into the water. To remove oxidized species such as uranium, iron plates typically are used. The iron ions reduce uranium to insoluble uranous (U(IV)) forms, which co-precipitates with iron oxy-hydroxide in a composite precipitate, which is subsequently removed from the water. However, the precipitate is not permanent because the reaction is reversed as the precipitate ages.

J2.2.2.2 Relevant Demonstration Projects

A 2007 treatability test evaluated the potential for this technology for the 100 D Area of the Hanford Site (*Treatability Test Report for the Removal of Chromium from Groundwater at 100-D Area Using Electrocoagulation* [DOE/RL-2008-13]). The test objectives were to: (1) determine the operability, robustness, and treatment efficiency of an electrocoagulation system; (2) characterize the volume and composition of the resulting waste; and (3) obtain design data for scaling the process from a 190 L/min (50 gal/min) to a 1,900 L/min (500 gal/min) system.

The test setup included an electrocoagulation unit and a downstream water treatment system that consisted of a clarifier, filters, and a filter press to dewater the sludge. The water passed through the electrocoagulation unit, precipitates were removed, and the water was re-oxygenated and then reinjected into the aquifer.

The performance objective of the treatability study was to determine Cr(VI) removal efficiency with the goal of decreasing Cr(VI) concentrations to 20 µg/L or less. The test consisted of a startup phase from May 3 to July 20, 2007; a continuous testing phase from July 23 to October 12, 2007; and a final testing phase conducted on October 16 and October 17, 2007, using groundwater augmented with higher concentrations of Cr(VI). Over the course of the test period, the test system treated 10.3 million L (2.8 million gal) of groundwater.

The data evaluation at the conclusion of the test suggested that electrocoagulation could achieve the treatment goal in more than 90 percent of the samples with one or more passes through the treatment system, but that the treatment system could not operate unattended. Therefore, it was concluded that cost and operational factors do not favor the use of this technology.

J2.2.2.3 Evaluation and Screening Rationale

The effectiveness of electrocoagulation for the 300 Area is anticipated to be low to moderate, particularly in light of the challenges encountered in the above-described pilot test. The technology is not widely used for uranium, and additional challenges may result from the fact that uranium reduction is reversible. Implementability is also considered low to moderate because further development of the process would be required and the process may render the treated water less suitable for re-injection. Capital costs are moderate or high, as are the O&M costs. Part of the high cost is due to the production of significant volumes of sludge that must be managed and disposed of. Because of poor performance and implementability, as well as high cost, the technology was not retained for further evaluation.

J2.2.3 Wetlands

Wetlands were not retained for treatment of groundwater contaminated with nitrate.

J2.2.3.1 Description

Constructed wetlands can be described as artificial swamps that act as biofilters for removing contaminants, and are common processes in wastewater treatment. A constructed wetland typically would require a much larger area and a much longer hydraulic retention time compared to a bioreactor, but it typically would not require added nutrients and would require less operational oversight. Wetlands can also be used to treat nitrate, petroleum, and TCE. Several removal mechanisms have been identified with biological treatment of nitrate in water such as decomposition, nitrification/ denitrification, settling, volatilization, adsorption, and nutrient uptake (*Literature Survey for Groundwater Treatment Options for Nitrate, Iodine-129, and Uranium, 200-ZP-1 Operable Unit, Hanford Site* [SGW-37783]). Biodegradation is an important mechanism for removal of petroleum hydrocarbons, and uptake by plants is an important mechanism for removal of TCE. Phytoremediation (one component of wetland treatment) has been used to treat strontium-90, but it is not known to treat other radionuclides (*Alternative Remediation Technology Study for Groundwater Treatment at 200-PO-1 Operable Unit at Hanford Site* [SGW-34562]).

J2.2.3.2 Relevant Demonstration Projects

A number of demonstration projects using wetlands to remove nitrate are reported in SGW-37783, including a constructed wetland used to remove nitrate from the municipal drinking water supply in Orange County, California. Up to 1.5 m^3/s (33 million gal/day) were treated prior to groundwater recharge. The influent contained 3.1 to 10.9 mg/L of nitrate (as nitrogen). The average nitrate removal was 522 mg of nitrate (as nitrogen) per m^2/day (1.07×10^{-4} pounds of nitrate [as nitrogen] per ft^2/day), and exiting nitrate concentrations sometimes fell to as low as 0.1 mg/L nitrate (as nitrogen), with hydraulic detention times from 0.3 to 9.6 days. Bacterial denitrification was concluded to be the primary nitrate loss mechanism. A review of 19 surface flow wetlands showed that nearly all reduced total

nitrogen. A comparison of surface and subsurface flow wetlands showed that subsurface flow wetlands outperformed surface flow wetlands and yielded lower effluent nitrate concentrations (ranging from less than 1 to less than 10 mg/L).

J2.2.3.3 Evaluation and Screening Rationale

The land area required for wetlands is likely to be very large for the volume of groundwater that will be treated at the 300 Area, even under favorable (warm) conditions. Even more area would be required for effective treatment in the winter, when plants and microorganisms in the wetland would be less active. Problems with freezing would be likely, as average minimum temperatures are below freezing more than half of the year (*Hanford Site National Environmental Policy Act (NEPA) Characterization* [PNNL-6415]). Therefore, the technology is not well suited to the climate at the Hanford Site. The effectiveness of this technology at the site is considered moderate and implementability is considered low to moderate. Construction of wetlands at the Hanford Site would require lining to prevent the infiltration of the water as well as provision of organic substrate to support wetland plants.

Although wetlands provide a potentially more sustainable (or greener) technology compared to other ex situ treatment technologies (in terms of energy use and because they are natural systems), the logistics would be difficult, especially during winter months, and land area requirements would be extensive. For these reasons, this technology was not retained for further evaluation.

J2.2.4 Ex Situ Bioreactors

Ex situ bioreactors were not retained for treatment of groundwater contaminated with nitrates and possibly uranium.

J2.2.4.1 Description

Ex situ bioreactors can be used to denitrify nitrate as well as possibly biologically reducing and precipitating uranium. For example, a fluidized bed bioreactor, much like that being constructed for the 200 West plant, could be used.

J2.2.4.2 Relevant Demonstration Projects

Bioreactors for nitrate removal have been pilot tested at the Hanford Site in the past (*Development of a Biological Treatment System for Hanford Groundwater Remediation: FY 1989 Status Report* [PNL-7290]). A pilot-scale test was conducted in 1989 using simulated Hanford Site groundwater with a continuous stirred-tank bioreactor (CSTR). The CSTR system was operated continuously for 5 months with a simulated groundwater influent containing 400 mg/L nitrate. Using acetate as the primary carbon source for microbial growth, a nitrate removal efficiency of greater than 99 percent was maintained at an influent flow rate of 6 L/hr (8-hour residence time).

The biological processes involved in biological treatment of reducible metals like Cr(VI) are similar to those involved in other bioreactor concepts used in the remediation industry, such as sulfate- reducing bioreactors (SRBs) that are used to treat acid mine drainage. Based on case studies for SRBs, the effectiveness of bioreactors has been demonstrated at temperatures between 2 and 16ºC ("Passive Treatment of Acid Mine Drainage in Bioreactors Using Sulfate-Reducing Bacteria: Critical Review and Research Needs" [Neculita et al., 2007]). Daily average low temperatures at the Hanford Site are typically below 0ºC during the winter months, which may necessitate heating/insulating portions of the ex situ bioreactor system to maintain the viability of the microbes.

J2.2.4.3 Evaluation and Screening Rationale

An ex situ bioreactor would be very similar to the system being constructed at 200 West (although nitrate concentrations are somewhat lower in the 300 Area than they are in 200 West). These systems can be rather complex because they will include the anaerobic bioreactor, substrate feed system, aerobic reactors to re-aerated the water, solids removal systems, and a biomass handling system. As a result, they can be relatively expensive to construct and operate. It is not likely that an ex situ bioreactors would be as implementable or cost effective as other ex situ treatment technologies. Therefore, ex situ bioreactors have not been retained for further evaluation.

J2.2.5 Phytoremediation

Phytoremediation was not retained for treatment of groundwater contaminated with nitrates and possibly uranium.

J2.2.5.1 Description

Phytoremediation is the use of plants and microorganisms associated with plant roots to extract, evapotranspire, immobilize, contain, or degrade contaminants. In the case of the radionuclides and metals, degradation would not be among the phytoremediation mechanisms, although it is conceivable that microorganisms could reduce reducible metals and radionuclides to some unknown extent. Phytoremediation is typically used as a polishing step and not for high concentrations of contaminants.

Phytoremediation is limited to the depth to which the plants can extract water. Water cannot be wicked and delivered vertically more than about 6 m (20 ft); thus, the potentiometric surface must be within 3 or 6 m (10 or 20 ft) of the bottom of the root mass for this system to be viable (WSRC-TR-2005-00198, *Enhanced Attenuation: Approaches to Increase the Natural Treatment Capacity of a System*). Because of this limitation, unless groundwater was first extracted (by pumping) and then phytoremediated (i.e., the plants would be irrigated with the contaminated groundwater, phytoremediation would not be suitable for groundwater remediation at the Hanford Site except immediately adjacent to the river. There are methods of encouraging plant roots to grow deeper, but not to the depths that would be required at most of the 300 Area of the Hanford Site. Phytoremediation systems (including by land application) are only operational when the soil is warm and plants are active, so treatment effectiveness would be reduced in the winter. The land requirements for phytoremediation are also relatively large.

J2.2.5.2 Relevant Demonstration Projects

Uptake of Cr(VI) by a variety of plants has been documented ("Enhancement of Cr(III) Phytoaccumulation," [Shahandeh and Hossner, 2000]). Cr(VI) can accumulate in the plants and may become toxic to them. A land application/irrigation system has been installed at a confidential site in California with groundwater containing Cr(VI). Subsurface application of the groundwater is conducted via a drip irrigation system and the Cr(VI) is primarily microbially reduced in the shallow soils.

Perhaps the best example of deep rooting of trees is at Argonne National Laboratory in Illinois. Hybrid poplars were deep rooted in Treewells, plastic-lined holes bored to a depth of 10 m (30 ft). Boreholes were filled with topsoil and then surface capped, which isolates the tree from surface water and forces the roots to utilize contaminated groundwater. Root extension of 3 m (10 ft) has been observed (*Enhanced Attenuation: A Reference Guide on Approaches to Increase the Natural Treatment Capacity of a System* [WSRC-TR-2005-00198]).

A treatability demonstration project is being conducted at the Hanford Site for treatment of strontium-90 in soil and groundwater along the banks of the Columbia River in the 100-N area using coyote willows. The coyote willow is considered the most suitable plant for use along the Columbia River shore. Known

for its rapid and robust regrowth abilities, coyote willow is already used extensively along the Columbia and Yakima Rivers for bank stabilization and revegetation purposes. As part of a treatment train of remedial technologies aimed at treating strontium 90 in the 100-K Decision Unit, phytoremediation using coyote willow would be the final polishing step.

A pilot study began in the late spring of 2007, with the planting of 50 coyote willow starts in a fenced area at the 100-K Area of the Hanford Site (PNNL-18294 and PNNL-SA-49953). This part of the study targeted plant growth rather than phytoremediation capabilities because this location is not contaminated with strontium-90. Often flooded by the annual high Columbia River stage well into June, this site is a severe test of the willow shrubs' ability to survive realistic field conditions.

Greenhouse, laboratory (growth chamber), and field studies have shown that strontium-90 is a nutritional analog of calcium, a plant macronutrient. As such, the Coyote willows will actively accumulate strontium-90 in their leaves and stems to concentrations over 70 times those present in the soil pore water surrounding their roots. Given the steadily increasing growth rate of the trees at the 100-K Decision Unit following yearly harvests of their aboveground tissue, this type of plant can remove significant amounts of contamination from the shoreline area while not disturbing the natural sediment structure. Laboratory studies have also shown that herbivorous insects such as aphids or moth larvae would not be a source of strontium-90 offsite transport from the trees. Further, controlled harvesting schedules and engineered barriers (fencing and netting) would prevent animal intrusion and plant detritus release (PNNL-18294).

The phytoremediation demonstration is ongoing at the 100-K Decision Unit. Biomass production over the first 3 years followed a typical growth curve. On a mT/ha basis, biomass production amounted to 0.2 mT/ha in 2007, 0.87 mT/ha in 2008, and 4.3 mT/ha in 2009. Growth curve extrapolation predicts 13.2 mT/ha during a fourth year and potentially 29.5 mT/ha during a fifth year. The most recent report concludes that the projected biomass yields suggest the trees could prove effective in removing strontium-90 from the 100-NR-2 riparian zone (PNNL-19120).

J2.2.5.5.3 Evaluation and Screening Rationale

Because of the large depth to groundwater at most of the Hanford Site, phytoremediation would only be feasible immediately adjacent to the river. Implementability of phytoremediation, therefore, is considered low. It is usually implemented over long time scales, such as years or decades. The sparse vegetation that naturally grows on the Hanford Site suggests that significant efforts and inputs (such as organic matter and water) would be required to establish a vigorous plant community. However, capital costs would still be relatively low. Once the plants are established, O&M costs would also be low because requirements to sustain them are low (i.e., food and water). However, metals concentrations and radionuclide activities may accumulate in the plants to the point that they must periodically be disposed of in a secure facility, such as the ERDF. Ultimately, the plants would need to be disposed of (e.g., at the ERDF) to avoid returning contaminants to the soils from which they were originally extracted (as plants decompose) if phytoremediation is used for contaminants that are not transformed to innocuous forms by the plants or microorganisms.

Phytoremediation is most effective when the plants are active and, thus, the technology would not be very effective during the winter; therefore, effectiveness is considered low to moderate. There are also concerns about contaminants entering the food chain as animals eat the vegetation or bees pollinate flowers. In summary, the technology would only be effective for low concentrations of contaminants where groundwater is shallow over long periods. Many metals and radionuclides would accumulate in the plants and not actually be treated, posing risks to ecological receptors. For these reasons, phytoremediation was not retained for further evaluation.

J2.2.6 Membrane-Based Separation (Reverse Osmosis, Coupled Transport, and Electrodialysis)

Membrane-based separation (includes reverse osmosis [RO], coupled transport, and electrodialysis) was not retained for treatment of groundwater contaminated with uranium and other COCs.

J2.2.6.1 Description

RO is a pressure-driven process that uses semi-permeable membranes to purify water. The water that is being purified is passed through the membrane while the contaminants are contained within the membrane. The water that is allowed to pass through the membrane is called the permeate, and typically contains only a small fraction (less than 5 percent) of the ions in the feed solution. The water that does not pass through the membrane (containing the ions that do not pass through the membrane) is called the retentate or brine, concentrate, reject, or brine. It has a high total dissolved solids concentration and would contain most of the COCs being treated. With appropriately sized membranes and multiple stages of membranes, very low concentrations of ions can be achieved. In New Hampshire, the typical production efficiency of RO for nitrate removal is approximately 25 percent. That is, for every 15 L (4 gal) of untreated water entering the device, only 3.8 L (1 gal) of treated water is produced (WD-WSEB-3-9). This low efficiency is a result of New Hampshire's cold groundwater temperatures, which are likely similar to groundwater temperatures at the Hanford Site.

Membrane-based coupled transport is a process where inorganic ions are removed from groundwater utilizing a supported liquid membrane (SLM). Selected ions are transported from the bulk solution on one side of the SLM into a strip of solution on the other side of the SLM. The SLM is a micro-porous membrane with an organic extractant help in the pores by capillary forces. The strip solution is chemically formulated to dissociate the ions from the extractant complex, in effect stripping the ion off the membrane. The coupled transport process results in a clean effluent stream, and a concentrate stream that will require further treatment prior to discharge. Membrane based coupled transport is a developing technology and is not yet in common use (DOE/RL-93-22).

Electrodialysis uses a direct current electrical field and ion-exchange membranes to separate ionic species from solution. The electrodialysis process consists of an electrolytic cell containing an anode and cathode separated by cation- and anion-selective membranes. The feed water enters the cell between the two selective membranes. When a direct current charge is applied to the cell, cations are attracted to the cathode and anions to the anode. Ions pass through the appropriate membrane and are concentrated in two brine solutions. Electrodialysis has limited waste treatment applications because of the sensitivity of the membranes to fouling (DOE/RL-93-22).

Brine production is a significant issue with membrane-based separation processes; the need to minimize and manage (e.g., evaporate) the brine can lead to significant increases in water treatment costs. Options for managing brine and other process residuals include discharge to a suitable surface water body, discharge to a sanitary sewer, deep well injection, land application, or treatment with supernatant recycle and solids disposal. The treatment processes can include clarification, sedimentation in lagoons, gravity thickening, centrifuging, belt filter pressing, and evaporation (*Membrane Filtration Guidance Manual* [EPA 815-R-06-009]).

J2.2.6.2 Relevant Demonstration Projects

A process was bench tested at the 200 West Area of the Hanford Site that combines three different membrane technologies (RO, coupled transport, and nanofiltration) to purify 72 L (19 gal) of groundwater while extracting and concentrating uranium, technetium, and nitrate into separate solutions. (Significant Cr(VI) concentrations were not present.) This separation allows for the future use of the radionuclides, if needed, and reduces the amount of waste that will need to be disposed of. This process has the potential to

concentrate the contaminants into solutions with volumes in a ratio of 1/10,000 of the feed volume, compared to volume reductions of 10 to 100 for ion exchange and stand-alone RO (*Testing of a Benchscale Reverse Osmosis/Coupled Transport System for Treating Contaminated Groundwater* [WHC-SA-2755-FP]). The experiment demonstrated the effectiveness of the process as theorized for all ions except for technetium, suggesting that design modifications may be necessary.

The Effluent Treatment Facility in the 200 East Area of the Hanford Site treats liquid effluent to remove toxic metals, radionuclides, and ammonia, and to destroy organic compounds. The treatment process constitutes best available technology and includes pH adjustment, filtration, ultraviolet light, and hydrogen peroxide destruction of organic compounds, RO to remove dissolved solids, and ion exchange to remove the last traces of contaminants. The facility began operating in December 1995. The maximum treatment capacity of the facility is 570 L/min (150 gal/min) per minute (*Hanford Site Environmental Report for Calendar Year 2008* [PNNL-18427]).

A pilot test of RO with vibratory shear-enhanced processing (VSEP®) to minimize brine production was conducted at a Central Arizona Project water treatment plant (*Reverse Osmosis Treatment of Central Arizona Project Water—Brine Minimization Via Vibratory Shear-enhanced Processing* [Corral and Yenal, 2009]). Whereas brine production without VSEP® was approximately equal to 20 to 25 percent of the volume of the water being treated, VSEP® reduced brine production to 2 to 4 percent of the initial volume treated. The cost of VSEP® treatment was significant but less than the costs of RO without VSEP® associated with increased brine disposal and lost drinking water supply.

J2.2.6.3 Evaluation and Screening Rationale

The effectiveness of RO is considered high; however, implementability is considered low to moderate, and capital and O&M costs are high. Membrane based coupled transport is a developing technology and is not yet in common use. Electrodialysis has limited waste treatment applications because of the sensitivity of the membranes to fouling. A major disadvantage of these membrane-based separation processes is the large volume of brine that typically is generated. The volume will vary depending primarily on groundwater characteristics. The brine would contain uranium and other COCs, which would require further treatment and then disposal. It would also have a high concentration of total dissolved solids, which could be a problem for disposal. Brine production was the primary reason that membrane-based separation was not retained for this evaluation.

J2.2.7 Electrolysis

Electrolysis was not retained for treatment of groundwater contaminated with dissolved radionuclides and other metals.

J2.2.7.1 Description

Electrolysis of aqueous solutions is a separation process in which metal ions are electrochemically changed to their elemental form at a charged cathode immersed with the contaminated water. The process is generally applied to solutions with concentrations of metal salts that are high relative to most environmental situations. The process emanates from commercial, industrial applications in the metal plating industry. The captured metal is generally recycled or disposed of offsite. This process facilitates the electrochemistry of chromium. However, separation of uranium is not generally pursued.

J2.2.7.2 Relevant Demonstration Projects

No applications of electrolysis of aqueous metal contaminants in extracted groundwater at typical environmental concentrations are presently known. The process is used in industrial wastewater situations, particularly to reduce chromate reductions in cooling tower blow-down. Electric current is

applied to iron electrodes to release ferrous ions into solution that in turn reduce Cr(VI) to Cr(III) and precipitate a sludge.

J2.2.7.3 Evaluation and Screening Rationale

Electrolysis can be moderately effective depending upon suitable water chemistry and the equipment design accounts for the relatively low environmental metal concentration to be treated. However, generally electrolysis has a low degree of implementability under most environmental conditions because high electric power consumption is required. The relative capital and O&M costs for electrolysis are high. Electrolysis with its limited applicability is not retained for further consideration.

J2.2.8 Evaporation/Distillation

Evaporation/distillation was not retained for treatment of groundwater contaminated with uranium and other COCs.

J2.2.8.1 Description

Distillation is a process in which a liquid or vapor mixture of two or more substances is separated into its component fractions by the application and removal of heat. Evaporation relates to the phase change of liquid water to water vapor by the application of heat. With the phase change of water in a solution, the solutes or dissolved contaminants may be separated from the water. When the water vapor condenses, the water condensate is purified. Evaporation/distillation requires very high quantities of energy relative to the mass of water treated. Distillation is a common chemical separation process used in industry. Distillation of contaminated water often results in a more concentrated condensate waste effluent. The process is not typically employed in remediation processing of contaminated water.

J2.2.8.2 Relevant Demonstration Projects

No field-scale application of evaporation/distillation for environmental water remediation is known with the exception of evaporation ponds for salt production. However, in such batch solar evaporation processes the water is rarely retrieved except in the form of atmospheric precipitation.

J2.2.8.3 Evaluation and Screening Rationale

Distillation generally results in more concentrated contaminated solution, which may be treated by a follow-up process. However, as a single-step technology it relatively ineffective. The implementability of evaporation/distillation ranges from low to moderate. Evaporation ponds require large land areas, risk secondary release to the subsurface of contaminants, and therefore have low implementability. Distillation is a mature, commercial technology for the process industry, but of moderate implementability for environmental remediation. Because of the energy requirements and equipment or space requirements, relatively high capital and O&M costs constrain implementation of evaporation/distillation. Evaporation/distillation is not considered further.

J2.3 In Situ Treatment

J2.3.1 In Situ Chemical Reduction

In situ chemical reduction was not retained for treatment of groundwater contaminated with uranium.

J2.3.1.1 Description

Chemical reducing agents such as calcium polysulfide or dithionite are injected into the contaminated groundwater plume to promote the reduction of soluble uranium (VI) to less soluble uranium (IV), thereby facilitating lower concentrations of uranium in groundwater.

J2.3.1.2 Relevant Demonstration Projects

Corresponding to the discussion of in situ chemical reduction applied to the vadose zone in Section A1.2.4, considerable research has been conducted on reduction of radionuclides such as technetium-99 in the 200 Area. However, no attempts to reduce uranium or treat groundwater in situ by chemical reduction in the 300 Area have been conducted.

J2.3.1.3 Evaluation and Screening Rationale

The rapid reaction rate of chemical reducing agents makes effective treatment of groundwater difficult. In addition, the high groundwater velocities observed in the 300 Area aquifer lowers the effectiveness of chemical reduction. Most of the reducing reaction would occur rapidly near each injection well. Consequently, sustained application would be required through many closely positioned wells to affect significant aquifer volume. The high exchange rate of groundwater with aerated river water will also tend to reverse the reducing effectiveness and thereby reverse the uranium stabilization reaction. Chemical reduction is moderately implementable as it uses commercially available reducing agents and employs conventional injection well technology. However, the high density of wells reduces the ability implement the technology. Relative capital costs range from moderate to high depending upon the number and type of wells. Relative operation and maintenance costs are moderate and depend upon the frequency of reinjection required to maintain uranium remobilization. Chemical reduction of ground water in situ is not considered further because of the reversibility of the process.

J2.3.2 Water Flushing

Flushing the aquifer with injection of clean water was not retained as a treatment method for uranium and nitrate.

J2.3.2.1 Description

Uncontaminated water without reagents is injected through multiple wells in the attempt to enhance solubilization of sorbed contamination and increase mobilization of contaminants through the aquifer and promote capture by optional extraction wells configured as a pump-and-treat system. The remediation technique would be somewhat analogous to in situ leaching but without the lixiviant. The recovery efficiency depends upon the aquifer groundwater flow conditions and the arrangement and withdrawal capability of the extraction wells. The process would have minimal effect on the principal sources of the groundwater contamination above the water table.

J2.3.2.2 Relevant Demonstration Projects

The ongoing dynamics of the groundwater under the 300 Area has been de facto a natural water flushing process. The transient water fluxes from and to the Columbia River in the relatively high porosity aquifer has been operative since the first contamination releases since the 1940s. The 1993 conceptual model of the uranium in groundwater interaction which was the basis of the 1995 interim Remedial Investigation/ Feasibility Study assumed that groundwater concentrations of uranium would decline to less than 20 µg/L in 3 to 10 years by natural flushing ("Uranium Reactive Transport in the Hanford 300 Area Vadose Zone-Aquifer-River System" [PNNL-SA-54465]). Actual uranium response in the aquifer has demonstrated that water flushing even on the large aquifer scale is inadequate to achieve a timely result.

J2.3.2.3 Evaluation and Screening Rationale

Water flushing is judged to have low effectiveness. The residual contamination on the aquifer sediments that would be addressed by flushing contributes a relatively small loading to the groundwater contamination problem. The flushing would affect the major source of contamination in the lower vadose zone and periodically wetted zone marginally as a function of the river induced groundwater elevation

changes. Natural flushing has demonstrated a very slow removal process. Flushing has moderate implementability because standard vertical wells would be used for delivery. The system would require installation and operation of a groundwater extraction system to capture mobilized uranium. Capital costs for flushing related to an extensive pump-and-treat system and injection well array would be moderate. The relative O&M costs of a water flushing system would be moderate because of the long-term continuous operation required.

J2.3.3 Groundwater Circulation Wells

Groundwater circulation wells (GCWs) were not retained as a delivery method for treatment of groundwater contaminated with uranium and other COCs.

J2.3.3.1 Description

Groundwater circulation wells are installed as a single well with two isolated screened zones. Groundwater is typically hydraulically pumped or air-lifted out of the formation from the lower screen, and injected back into the formation at the upper screen. A three-dimensional flow pattern (circulation cell) is created in the formation. Depending on site-specific conditions, both upward (re-injection into the upper screen) and downward (re-injection into the lower screen) circulation modes can be utilized.

The recirculated groundwater can be aerated and re-injected into the formation to enhance aerobic biodegradation, stripped in-well to remove VOCs, treated with in-well reactive media, or amended in-well with soluble biological or chemical reagents. The circulation of groundwater can also be used to enhance the distribution of amendments or reagent directly injected into the formation within the circulation cell.

The zone of influence that can be achieved with groundwater circulation wells are highly sensitive to site lithologic conditions. A viable circulation cell may not develop if vertical anisotropy in lithology (i.e., the presence of laterally extensive silty-clay layers) impede the circulation flow path or if there is not enough anisotropy. Typically, this technology will not be successful when the ratio of horizontal to vertical hydraulic conductivity is greater than 10 (*Groundwater Circulating Well Technology Assessment* [NRL/PU/6115-99-384]). A single thin layer of low-permeability material can also prevent development of a recirculation cell. If the anisotropy is too low, the radius of the circulation cell will be very small. This could be the case at the Hanford Site. Other common problems include well clogging related to changing redox conditions within the GCW and down well equipment (e.g., packers) problems.

J2.3.3.2 Relevant Demonstration Projects

A summary and analysis of more than 50 GCW field demonstrations was provided in "Groundwater Circulating Well Technology Assessment" (NRL/PU/6115-99-384). One case study was a Department of Defense-sponsored GCW demonstration that was originally to be performed at the Hanford Site, but was relocated to Edwards Air Force Base, Operable Unit 1, Site 19. This site was selected based on its high hydraulic conductivity (KH=10 ft/d, KV=1 ft/d) and the presence of TCE contamination. One GCW was installed to 15 m (50 ft) bgs and operated for 191 days during the demonstration. Results of the demonstration indicate an ROI of approximately 9 m (30 ft), an asymmetrical circulation cell, and groundwater flow short-circuiting near the GCW. Post-operation data showed contaminant rebound in monitoring wells.

Of the remaining GCW case studies, there were few sites demonstrating clear success, and just as many sites where the technology failed to meet remedial objectives. Most of the case studies, however, indicated that the data collected were insufficient to demonstrate the efficacy of the GCW technology.

J2.3.3.3 Evaluation and Screening Rationale

It is likely that a large number of wells would be required to implement this technology at the Hanford Site because of the highly permeable nature of the site lithology, which would result in a small ROI. Even if implemented with tight well spacing, asymmetrical groundwater flow, groundwater flow short-circuiting, and contaminant rebound would ultimately limit the effectiveness of GCWs. Given the high cost of installing wells and the likelihood of limited treatment effectiveness, this technology was not retained for further evaluation.

J2.3.4 Horizontal Wells

Horizontal wells were not retained as a delivery method of treated groundwater that was contaminated with uranium or other COCs.

J2.3.4.1 Description

Horizontal wells are horizontally drilled or trenched screened borings installed along or across the plumes. Horizontal wells can be used to extract soil vapor and groundwater, or inject water, chemical reagents, or biological substrates. Horizontal well technology has been incorporated into many current environmental remediation applications (and associated contaminants), such as in situ bioremediation, air sparging, vacuum extraction, soil flushing, and free product recovery, etc. This technology is most applicable to sites with relatively shallow soil and/or groundwater contamination, and can potentially enhance remediation efforts at sites with low hydraulic conductivities (*Technology Overview Report: Horizontal Wells* [Miller, 1996]).

Horizontal wells have an advantage over vertical wells in that their long horizontal screens can contact a larger plume area, and may more effectively transmit amendments. Because of their superior alignment with natural lithologic stratigraphy, horizontal wells may also be more efficient recovering groundwater or soil vapor. When installed with directionally drilling techniques, horizontal wells can be installed in areas where surface and subsurface obstructions would preclude other remediation alternatives.

Disadvantages of horizontal wells are primarily associated with the physical and operational limitation of directional drilling techniques.

J2.3.4.2 Relevant Demonstration Projects

An unsuccessful horizontal well technology demonstration was conducted at the Hanford Site 100-D Area from November 2009 through January 2010 (*Treatability Demonstration Report for Directional Drilling in the 100-D Area* [SGW-45974]). The scope of work consisted of two phases. First, a surface casing was installed at a 16-degree angle from horizontal through the Hanford formation to an estimated depth of 15 m (50 ft) bgs. The second phase was to drill through the Ringold Formation using horizontal directional drilling techniques and drilling mud. Once this drilling was complete, the drill bit was knocked off and the well screen installed inside the drill pipe.

Installation of surface casing was required to facilitate circulation of drilling mud in the porous Hanford formation. The casing was advanced with significant difficulty to approximately 6 m (20 ft) bgs (85 linear ft) when downward progress ceased because of inadequate force on the down hole hammer and difficulty removing cuttings from the inclined casing. Rotary mud directional drilling through the casing and into the Hanford formation was attempted but progress was slow and circulation was never established.

J2.3.4.3 Evaluation and Screening Rationale

Based on the unsuccessful technology demonstration at the Hanford Site, horizontal wells were not retained as a groundwater remediation delivery technology.

J2.4 Containment

J2.4.1 Containment Wall

A containment wall was not retained as a method of containing groundwater contaminated with uranium or other COCs.

J2.4.1.1 Description

Containment walls include soil bentonite slurry walls, grout walls, and sheetpile walls. Walls have been used successfully to assist with hydraulic containment of groundwater plumes at many hazardous waste sites. Groundwater pumping or diversion upgradient of the containing wall is required to prevent groundwater mounding and bypassing of the wall. Containing walls increase the potential to achieve effective hydraulic containment and they may reduce the amount of water that needs to be treated. Installation methods include conventional or continuous trenching with soil/bentonite slurry, vibrating beam cut-offs, mixed-in-place walls, tangent caisson walls, and driven sheetpiles.

J2.4.1.2 Relevant Demonstration Projects

In 1994, the Washington State Department of Ecology (Ecology) and EPA issued an action memorandum to DOE to immediately initiate groundwater remedial actions at the 100-N Area, to include the design, construction, and operation of a pump-and-treat system and the construction of a sheetpile barrier wall at N-Springs. However, 6 months later, Ecology and EPA concurred with DOE that installation of the sheetpile wall could not be achieved in the manner specified, based on results of a construction test in late 1994. The two agencies subsequently directed DOE to proceed with the pump-and-treat system only (*Annual Summary Report Calendar Year 2000 for the 100-HR-3, 100-KR-4, and 100-NR-2 Operable Units and Pump-and-Treat Operations* [DOE/RL-2001-04]). A grouted-hinge sheetpile barrier in the aquifer near the river's edge had been specified, but attempts to install a sheetpile barrier were unsuccessful (Coordination of Groundwater Activities in the 100 N Area [WHC-EP-0878]).

J2.4.1.3 Evaluation and Screening Rationale

Most of the installation methods would be technically challenging at the Hanford Site because of the depths of the unconfined aquifer and the presence of cobbles and coarse gravels. Cobbles will prevent or deflect most insertion methods or items such as sheetpiles, vibrating beams, and drilled caissons. While conventional trenches can likely be kept open in this formation, slurry loss may be excessive in zones of clean coarse cobbles or gravels. Sudden loss of slurry due to penetration into such a zone could lead to trench instability.

Effectiveness of this technology is considered moderate for several reasons: (1) it depends on the ability to key into a low-permeability unit; (2) it does not treat contamination; and (3) groundwater upgradient of the wall must be removed. Implementability is low, as evidenced by failed attempts to install a sheetpile wall at N-Springs. Capital costs would be high and O&M costs would be low or moderate. Because of installation challenges and high costs, containing walls were not retained for further evaluation.

J2.4.2 Reactive Chemical Barrier

Reactive chemical barriers were not retained for containment of groundwater contaminated with uranium or nitrate.

J2.4.2.1 Description

Reactive chemical barriers involve the subsurface delivery and/or recirculation of chemicals along cross-gradient rows transecting the plume. Residual reducing chemicals are retained in the aquifer matrix so that COCs are passively treated or sequestered removed as groundwater moves through the treatment zone barriers. Zero-valent iron, zeolite, and apatite may be used as chemicals.

J2.4.2.2 Relevant Demonstration Projects

PNNL conducted a study in 2010 to evaluate water jet injection of phosphate and apatite into subsurface sediments in the Hanford Site 100-N Area (*Hanford 100-N Area In Situ Apatite and Phosphate Emplacement by Groundwater and Jet Injection: Geochemical and Physical Core Analysis* [PNNL-19524]). Sediments that were jet injected with sodium phosphate or fish-bone apatite (or both) showed high phosphate concentrations with multiple (six), closely spaced (approximately 1.5 m [5 ft] spacing) injection points. However, with samples taken very close to injection points, it was difficult to assess the relevant areal extent at greater distance (i.e., 1.5 to 6 m [5 to 20 ft]) and to make recommendations regarding future injection point spacing greater than 1.5 m (5 ft) apart. In addition, jet injection also appeared to deposit more phosphate in finer grained sediments, so the spatial variability of the phosphate mass was much greater compared to groundwater injections.

The use of a zero valent iron barrier has been field testing in the 100-D area for the treatment of Cr(VI). A calcium polysulfide reductive barrier was implemented to passively treat Cr(VI) contamination in the 100-D southern plume and prevent the discharge of elevated levels of Cr(VI) to the Columbia River (EPA et al., 1999). When performance monitoring data indicated that Cr(VI) was breaking through the reductive barrier treatment zone, scientists proposed that fortifying the barrier with additional reduced iron would increase the long-term effectiveness of the barrier. Consequently, a treatability study was conducted to evaluate whether augmentation of the ISRM barrier with nano-scale ZVI would be an effective approach to augmenting the performance and longevity of this passive treatment system. The field injection test was conducted in August 2008 at 100-D. Over a period of approximately 5 days, 370,970 L (98,000 gal) of the RNIP-M2 solution was injected into the Ringold Formation aquifer at a rate of 53 L/min (14 gal/min). The ZVI was communicated at least 3 m (9.8 ft) away from the injection well. A borehole was drilled 7 m (23 ft) from the injection well in March 2009 to evaluate the ROI. Analysis of aquifer materials showed that approximately 4 weight percent ZVI was present in the targeted permeable layer near the bottom of the aquifer. This verified that the goal of emplacing ZVI at least 7 m (23 ft) into the aquifer was successfully accomplished. Monitoring has shown the area near the test is strongly reducing, and Cr(VI) has been reduced to immobile trivalent chromium.

J2.4.2.3 Evaluation and Screening Rationale

Effectiveness is deemed low to moderate. Given the highly oxic groundwater flowing at relatively high rates, amendment of reductive chemicals would likely need to be frequent to maintain reducing conditions. Maintaining reducing conditions is especially critical for uranium, which can re-oxidize if reducing conditions are not maintained. For sequestering chemicals, the long-term stability of uranium sequestered via apatite is also dependent on the chemical speciation of uranium, surface speciation of apatite, and the mechanism of retention, which are all highly dependent on the changes in geochemical conditions. For these reasons, reactive chemical barriers were not retained for further evaluation.

J2.4.3 Reactive Biological Barrier

Reactive biological barriers were not retained as a method of containing groundwater contaminated with uranium and nitrate.

J2.4.3.1 Description

Reactive biological barriers involve the subsurface delivery and/or recirculation of biological substrate along cross-gradient rows transecting the plume. Residual reducing by-products and biomass are retained in the aquifer matrix so that uranium, nitrate, and organics like TCE are passively removed as groundwater moves through the treatment zone. Biological barriers would operate much like the ISRM. Rejuvenation of the barrier by re-injection of biological substrate will be required periodically to maintain reducing power. Commons substrates include acetate, molasses, cow manure, fruit juice, lactate, whey, polylactate and sulfur-containing products (e.g., Metals Remediation Compound), and waste organic material (e.g., from beer manufacturing) (*Chromium Treatment Technology Information Exchange for Remediation of Chromium in Groundwater at the Department of Energy Hanford Site* [SGW-38255]). The indigenous organisms utilize the substrate as a carbon source for biomass generation and as an electron donor for energy production through a number of metabolic processes.

J2.4.3.2 Relevant Demonstration Projects

A field experiment was conducted at the Hanford Site using hydrogen release compound (HRC®), a slow-release glycerol polylactate, to bioimmobilize Cr(VI) (*In Situ Long-Term Reductive Bioimmobilization of Cr(VI) in Groundwater Using Hydrogen Release Compound* [Faybishenko, 2009]). The results of this experiment show that a single HRC® injection into groundwater stimulated an increase in biomass, a depletion of terminal electron acceptors oxygen, nitrate, and sulfate, and an increase in ferrous iron, resulting in a significant decrease in soluble Cr(VI). The Cr(VI) concentration remained below the background concentration in the downgradient pumping/monitoring well and below the detection limit in the injection well for at least three years after the HRC® injection. The degree of sustainability of hexavalent reductive bioimmobilization under different redox conditions at this and other contaminated sites was currently under study as of the publication date.

Molasses and lactate were injected at a Cr(VI)-contaminated site near Flanders, Belgium, in 2005 to 2006 ("Stimulation of In Situ Bioprecipitation for the Removal of Cr(VI) from Contaminated Groundwater," Vanbroekhoven et al., 2007). Frequent reinjections were important to maintain reduced conditions. Results of this pilot test showed efficient Cr(VI) removal from the groundwater for the lactate injection zone within 200 days, while for the molasses zone-efficient removal was observed only after approximately 400 days. Based on the success of this pilot test, a full-scale process was planned.

A recent study evaluated a biological barrier comprised of sand and sawdust that had been treating nitrate for 15 years ("Nitrate Removal Rates in a 15-Year-Old Permeable Reactive Barrier Treating Septic System Nitrate" [Robertson et al. 2008). Sediment cores were retrieved and reaction rates were measured in column tests and compared to rates measured in year one using the same reactive mixture. The rates after 15 years were within about 50 percent of the year one rates. Near the end of the year 15 column test, wood particles were removed from the reactive media, and nitrate removal subsequently declined by about 80 percent, indicating that the wood particles were principally responsible for denitrification. The authors concluded from this work that some denitrifying biological barriers can remain maintenance free and be adequately reactive for decades.

J2.4.3.3 Evaluation and Screening Rationale

In addition to consuming dissolved oxygen, bioreducing barriers have the potential to result in unwanted dissolved biodegradation by-products such as ferrous iron, manganese, and arsenic. As a consequence, they should not be placed too close to the river (or extraction wells), unless re-oxygenation systems (such as sparging wells) are installed downgradient of the biobarrier.

Effectiveness is deemed low to moderate. Given the highly oxic groundwater flowing at relatively high rates, amendment would likely need to be frequent to maintain reducing conditions. Maintaining reducing conditions is especially critical for uranium, which can re-oxidize if reducing conditions are not maintained. Furthermore, barriers do not support the cleanup of the entire plume. For these reasons, reactive biological barriers were not retained for further evaluation.

J2.4.4 Hydraulic Containment via Injection

Hydraulic containment via injection was not retained as a method of containing groundwater contaminated with uranium or other COCs.

J2.4.4.1 Description

Hydraulic containment via injection involves injecting water into a line of closely spaced injection wells or a trench installed close to and parallel to the river. A groundwater mound would be created under the injection points, which would result in an inward gradient and stop the migration of groundwater to the river. This injection would mimic the natural conditions encountered during periods of high river stage. Some extraction of groundwater upgradient of the barrier, with discharge into wells side gradient, would be required to maintain the water balance. Source of water for injection could be from existing permitted Columbia River supply and/or groundwater.

J2.4.4.2 Relevant Demonstration Projects

Fresh water injection systems used to prevent saltwater intrusion along coastlines are conceptually similar to injection of water to hydraulically contain COCs. Saltwater intrusion barriers consist of a line of injection wells paralleling the coast to inject water into a fresh water aquifer to create and maintain a "fresh water ridge," which produces an outward gradient to stop the migration of salt water into the aquifer (“Volume 20: Salt Water Intrusion Barrier Wells” [EPA/816-R-99-014t]). There are 315 saltwater intrusion barrier wells documented in the United States. Well clogging is a common issue with operating these injection wells. Maintaining high-quality waters and chlorination of injection water are methods employed to reduce the frequency of well clogging. However, even when using high-quality waters, clogging is inevitable. When clogging occurs and the injection head has increased above acceptable levels, redevelopment of the injection wells is necessary (approximately every three years when using high-quality injectate water). Injection wells also need to be supplied with pressure either individually or in small groups to prevent the complete collapse of the pressure ridge barrier in cases of system shutdowns.

J2.4.4.3 Evaluation and Screening Rationale

The primary disadvantage of hydraulic containment via injection is that the injection locations will need to be some distance from the river because of logistics issues. Therefore, the COCs that are currently downgradient of the injection points would be flushed into the river without control. Based on extensive experience with saltwater intrusion barriers, operational complexity associated injection well clogging rehabilitation would likely be encountered. For these reasons, hydraulic containment via injection was not retained for further evaluation.

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Appendix I

Alternatives for Evaluated Waste Sites

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Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300 RLWS	The 300 Area Radioactive Liquid Waste Sewer (RLWS) consists of a network of underground, double-encased, stainless-steel pipe (encased in reinforced-fiberglass or plastic pipe as secondary containment) that transfers radioactive liquid wastes from the generating facilities (324, 325, 325-A, 326, 327, and 329 Buildings) to the 340 Complex. The system was retired in 1998. Contaminants would include uranium, acids, bases, metals, solvents, and fission products. Contaminated soil and piping is estimated to be 8,000 m^3 (280,000 ft^3).	Post-ROD To-Go Site	Pipeline	6.43 acres	6.4 m (21 ft)	Uranium, radionuclides, metals, organics	1) Void fill or RTD 6.43 acres of pipeline to 6.4 m (21 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) Void fill or RTD 6.43 acres of pipeline to 6.4 m (21 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) Void fill or RTD 6.43 acres of pipeline to 6.4 m (21 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) Void fill or RTD 6.43 acres of pipeline to 6.4 m (21 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.
300 RRLWS	A network of single-walled, stainless-steel piping and carbon-steel fittings buried between 3 and 6 m (10 and 20 ft) below grade. Received radioactive wastes from various 300 Area facilities including the fuel fabrication and R&D laboratories. Wastes discharged to the sewer included water and small quantities of chemicals, decontamination solutions, aqueous fuel fabrication solutions, acids, and bases. Contaminants of potential concern would include uranium, mercury, acids, bases, fission products, metals, and solvents.	Post-ROD To-Go Site	Pipeline	20 cm (8 in) 457 m (1,500 ft)	6 m (20 ft)	Uranium, radionuclides, metals, organics	1) Void fill or RTD pipeline length of 457 m (1,500 ft) to 6 m (20 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) Void fill or RTD pipeline length of 457 m (1,500 ft) to 6 m (20 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) Void fill or RTD pipeline length of 457 m (1,500 ft) to 6 m (20 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) Void fill or RTD pipeline length of 457 m (1,500 ft) to 6 m (20 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.
300-11	The unmarked site is comprised of gasoline-impacted, subsurface soil from a gasoline UST. The release was discovered after leak test failure in 1992. The UST was removed. Contaminated remains unremediated.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	7.43 m2 (80 ft2)	Ranges from to 1.6 m to 6.25m (5.4 to 20.5 ft)	Petroleum hydrocarbons	1) RTD area of 7.43 m2 (80 ft2) to 6.25 m (20.5 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 7.43 m2 (80 ft2) to 6.25 m (20.5 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 7.43 m2 (80 ft2) to 6.25 m (20.5 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 7.43 m^2 (80 ft2) to 6.25 m (20.5 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-121	The site received condensate from the air receivers inside the 3621D Building. It may also have received spills that reached the floor drains. Petroleum and ethylene glycol contamination is possible.	Pre-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	9.29 m2 (100 ft2)	Soil beneath foundation removal to 4.6 m (15 ft)	Petroleum hydrocarbons, organics	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-123	The site is a French drain that received steam condensate from the 366 Building fuel oil bunker loading station. The French drain is a vertical, metal culvert covered with a 0.7-m (2.25-ft)-diameter, diamond plate, metal cover.	Pre-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Petroleum hydrocarbons	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-131	The site receives drainage from the fire sprinkler system at a rate of <4 L/min. (1 gal/min.). Fire sprinkler water is exempt from permitting. However, based on past practice activities at the 3706 Building and potential releases to soil, the disposal structure and soil should be surveyed to determine if radioactive contamination is present. The site falls within WIDS Site 300-46, which estimates the extent of extensive uranium, TRU, and chemical contamination of the 3706 Building and the surrounding area.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).

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Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300-132	The site has been described as a French drain that received steam condensate. When the site was active, the flow rate was <0.04 L/min. (0.01 gal/min.). During the November 1998 walk down, no engineered structure was visible. The site appears to be a rock- and cobble-filled depression next to the 3706 Building. The site falls within WIDS Site 300-46, which estimates the extent of extensive uranium, TRU, and chemical contamination of the 3706 Building and the surrounding area.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).
300-133	The site is a French drain that used to receive steam condensate. When the site was active, the flow rate was <0.04 L/min. (0.01 gal/min.) of steam condensate only. The site falls within WIDS Site 300-46, which estimates the extent of extensive uranium, TRU, and chemical contamination of the 3706 Building and the surrounding area.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).
300-134	The site is a French drain that received steam condensate. When the site was active, the flow rate was <0.04 L/min. (0.01 gal/min.) of steam condensate only. The site falls within WIDS Site 300-46, which estimates the extent of extensive uranium, TRU, and chemical contamination of the 3706 Building and the surrounding area.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).
300-135	The site is a French drain that received steam condensate. The drain is a clay pipe that abuts the north wall of the 3706 Building. When the site was active, the flow rate was <0.04 L/min. (0.01 gal/min.). The site falls within WIDS Site 300-46, which estimates the extent of extensive uranium, TRU, and chemical contamination of the 3706 Building and the surrounding area.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).
300-136	The site is a French drain that received steam condensate. The drain is a clay pipe and covered by a metal lid with some perforations. The site is surrounded by sand and gravel, some of which partially covers the lid. When the site was active, the flow rate was <0.04 L/min. (0.01 gal/min.). The site falls within WIDS Site 300-46, which estimates the extent of extensive uranium, TRU, and chemical contamination of the 3706 Building and the surrounding area.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).
300-137	The site has been described as a French drain that received steam condensate. No engineered structure was visible, during the November 1998 walkdown. It could not be ascertained if the condensate stream was active or not. When the site was active, the flow rate was <0.04 L/min. (0.01 gal/min.). The site falls within WIDS Site 300-46, which estimates the extent of extensive uranium, TRU, and chemical contamination of the 3706 Building and the surrounding area.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).
300-138	The site is a French drain that received steam condensate. When the site was active, the flow rate was <0.04 L/min. (0.01 gal/min.) of steam condensate only. The site falls within WIDS Site 300-46, which estimates the extent of extensive uranium, TRU, and chemical contamination of the 3706 Building and the surrounding area.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).
300-139	A French drain that received steam condensate. The drain is a clay pipe covered by a metal lid. When the site was active, the flow rate was <0.19 L/min. (0.05 gal/min.) of steam condensate only. The site falls within WIDS Site 300-46, which estimates the extent of extensive uranium, TRU, and chemical contamination of the 3706 Building and the surrounding area.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).

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300-140	The site is a French drain that received steam condensate. When the site was active, the flow rate was <0.19 L/min. (0.05 gal/min.). The site falls within WIDS Site 300-46, which estimates the extent of extensive uranium, TRU, and chemical contamination of the 3706 Building and the surrounding area.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).
300-141	The site is a French drain that received steam condensate. When the site was active, the flow rate was <0.04 L/min. (0.01 gal/min.) of steam condensate only. The site falls within WIDS Site 300-46, which estimates the extent of extensive uranium, TRU, and chemical contamination of the 3706 Building and the surrounding area.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).
300-142	The site is a French drain that received steam condensate. When the site was active, the flow rate was <0.04 L/min. (0.01 gal/min.). The site falls within WIDS Site 300-46, which estimates the extent of extensive uranium, TRU, and chemical contamination of the 3706 Building and the surrounding area.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).
300-143	The site is a French drain that received steam condensate. When the site was active, the flow rate was <0.04 L/min. (0.01 gal/min.). The site falls within WIDS Site 300-46, which estimates the extent of extensive uranium, TRU, and chemical contamination of the 3706 Building and the surrounding area.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).
300-144	The site is a French drain that received steam condensate. When the site was active, the flow rate was <0.19 L/min. (0.05 gal/min.) of steam condensate only. The site falls within WIDS Site 300-46, which estimates the extent of extensive uranium, TRU, and chemical contamination of the 3706 Building and the surrounding area.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).
300-145	The site is a French drain that received steam condensate. When the site was active, the flow rate was <0.038 L/min. (0.01 gal/min.). The site falls within WIDS Site 300-46, which estimates the extent of extensive uranium, TRU, and chemical contamination of the 3706 Building and the surrounding area.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).
300-146	The site is a French drain that receives stormwater runoff. According to DOE/RL-95-82c, the flow is <0.04 L/min (0.01 gal/min). The site falls within WIDS Site 300-46, which estimates the extent of extensive uranium, TRU, and chemical contamination of the 3706 Building and the surrounding area.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).
300-147	The site is a French drain that receives stormwater runoff. The drain is made of concrete and appears to be approximately 0.9 m (3 ft) deep. During the 11/11/1998 walk down, the drain appeared to be dry, its bottom covered by debris. According to DOE/RL-95-82c, the flow is <0.038 L/min. (0.01 gal/min.). The site falls within WIDS Site 300-46, which estimates the extent of extensive uranium, TRU, and chemical contamination of the 3706 Building and the surrounding area.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).
300-148	The site is described by DOE/RL-95-82c as a French drain that collects stormwater runoff at a flow <0.038 L/min. (0.01 gal/min.). The pipe appears to be filled with gravel and large rocks to within centimeters of its top. During the 10/26/1998 walk down, the site appeared to be a steam condensate site as opposed to a stormwater site. The site falls within WIDS Site 300-46, which estimates the extent of extensive uranium, TRU, and chemical contamination of the 3706 Building and the surrounding area.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300-149	The site is a French drain that received steam condensate. The French drain is a concrete pipe covered perforated metal lid. When the site was active, the flow rate was <0.04 L/min. (0.01 gal/min.) of steam condensate only. According to DOE/RL-95-82c, the site is inactive, source abandoned. The site falls within WIDS Site 300-46, which estimates the extent of extensive uranium, TRU, and chemical contamination of the 3706 Building and the surrounding area.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).
300-15	This underground, process sewer extends throughout the 300 Area. Transfers process wastes (potable water, cooling water, precipitation runoff, waste brine solution [NaCl with Mg salts], Cr, Cu, U, nitrate, sulfate, and fluoride ions with Pb, Ag, acetone, and cyanide. The sewer network includes the original system (20-cm [8-in.-]-diameter vitrified clay piping with acid-proof joints) which directed liquid waste eastward to the 316-1 and 316-2 Process Pond until 1975, then to the 300 Area Trenches from 1975 to 1994. Starting in 1994, the discharges utilized a new pipeline to the 300 Area TEDF for treatment and release to the Columbia River. Initially, the system received low-level liquid wastes from the 313 and 314 Buildings, and later from the 3706 and 321 Laboratories. The 321 Building connected to the main 20-cm (8-in.)-diameter lines through a combination of 8-cm (3-in)-diameter stainless-steel, 20-cm (8-in.)-diameter wrought iron, and 15-cm (6-in.)-diameter earthenware pipes, all of acid-proof construction. By 1994, more than 50 facilities were connected to the process sewer. As the system was updated and expanded, pipe materials included the original vitrified clay, and iron, steel, concrete, PVC, and stainless steel piping.	Post-ROD To-Go Site	Site exceeds groundwater protection criteria for total uranium isotopes and ecological risk criteria for Arochlor-1248. (Chapter 5 and 7). However, portions of the site remain unremediated (handled as a Post-ROD To Go Site).	Pipeline length of 14,645 m (48,048 ft)	variable	Metals, cyanide, organics	1) Void fill or RTD pipeline length of 14,645 m (48,048 ft) to variable depths (assume 4.6 m [15 ft] for cost estimate). Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) Void fill or RTD pipeline length of 14,645 m (48,048 ft) to variable depths (assume 4.6 m [15 ft] for cost estimate). Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) Void fill or RTD pipeline length of 14,645 m (48,048 ft) to variable depths (assume 4.6 m [15 ft] for cost estimate). Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipeline length of 14,645 m (48,048 ft) to variable depths (assume 4.6 m [15 ft] for cost estimate). Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.
300-150	The site is a French drain that is a clay pipe. When the site was active, it received <0.04 L/min. (0.01 gal/min.) of steam condensate only. According to DOE/RL-95-82c, the site is inactive, the source abandoned.	Consolidated Site	Consolidated Site	Encompassed with Site 300-46	Encompassed with Site 300-46	Radionuclides and metals suspected	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).	Site is a Consolidated Site and is evaluated as part of the parent site (300-46).
300-16	On three occurrences, radioactive contamination (yellow cake uranium) was discovered on the bottom ends of several utility poles that had been removed.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Uranium	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-16:1	The subsite consists of the buried remains of a telephone pole northwest of the 314 Building. Process Description: A routine radiation survey for electrical upgrades in the 300 Area revealed contamination on a telephone pole on May 17, 1994 (RSR 165951). The radiation survey report indicated that the contamination level was 7,000 counts per minute on the top of the pole. The contamination at the bottom of the pole was measured at 3,500 counts per minute. Location Description: The site was located northwest of the 314 Building just south of 305-B Storage Facility.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Radionuclides, metals, PCBs	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300-16:2	The site consists of the buried remains of a telephone pole east of the 314 Building. Process Description: On September 22, 1995 a telephone pole located on the east side of the 314 Building was removed. The lower four feet was found to be contaminated (RSR 194873). The radiation survey report indicated that the contamination level was 8,000 counts per minute on the base of the pole. Location Description: The site was located east of the 314 Building. Associated Structures: These incidents are associated with the contamination found along Ginko Street, recorded in waste sites 300-28 and 300-24.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Radionuclides, metals, PCBs	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-16:3	The site consists of the buried remains of a telephone pole south of the 314 Building. Process Description: On March 6, 1992 a 5 ft (1.5 m) telephone pole located south of the 314 Building was removed. The pole was found to be contaminated (RSR 37049). The radiation survey report indicated that the contamination level was 3,000 counts per minute. The 300-FF-2 Operable Unit Technical Baseline Report (BHI-00012) identified this pole in Figure 3-65. Location Description: The site was located south of the 314 Building between the 303-A and 3722 buildings. Associated Structures: These incidents are associated with the contamination found along Ginko Street, recorded in waste sites 300-28 and 300-24.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Radionuclides, metals, PCBs	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-175	The site is a concrete French drain, with a metal lid, that received non-dangerous/ nonradioactive steam condensate. The operational flow rate was <0.04 L/min (0.01 gal/min).	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	9.29 m2 (100 ft2)	soil beneath foundation removal to 4.6 m (15 ft)	Non-radionuclides	1) RTD area of 9.29 m2 (100 ft2) to 4.6 m (15 ft) after demolition of structure. Remediate after 2027 with building 325. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 9.29 m2 (100 ft2) to 4.6 m (15 ft) after demolition of structure. Remediate after 2027 with building 325. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 9.29 m2 (100 ft2) to 4.6 m (15 ft) after demolition of structure. Remediate after 2027 with building 325. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 9.29 m2 (100 ft2) to 4.6 m (15 ft) after demolition of structure. Remediate after 2027 with building 325. 2) Disposal at ERDF or other approved disposal facility.
300-2	About 189,250 L (50,000 gal) of secondary cooling water and other contaminated water containing 33 mCi of I-133 and 12 mCi of I-131 were discharged to the ground. About 10 µCi of alpha emitters (calculated as Pu-239) and about 40 mCi of non-volatile beta emitters, plus rutheniums, were transferred to the trench during the first 36 hours of the incident. A small number of short pumpings were made after that. However, the total volume and radioisotopic inventory are insignificant in comparison to those during the first 36 hours.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	18 m2 (194 ft2)	4.6 m (15 ft)	Radionuclides	1) RTD area of 18 m2 (194 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 18 m2 (194 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 18 m2 (194 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 18 m2 (194 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300-214	The site is a subsurface, carbon-steel and PVC pipeline that transfers liquid waste from the 308, 324, 325, 326, 327, and 329 Buildings to the 307 Retention Basins. The waste discharged to the RPS is nonhazardous, potentially radioactive waste (not to exceed 5,000 pCi/L). In FY 1998, approximately 12 million L (3 million gal) flowed through the RPS to the 307 Retention Basins.	Post-ROD To-Go Site	Pipeline	1,344 m (4,409 ft) in length	4.6 m (15 ft)	Radionuclides	1) RTD pipeline length of 1344 m (4409 ft) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipeline length of 1344 m (4409 ft) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipeline length of 1344 m (4409 ft) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipeline length of 1344 m (4409 ft) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-218	This building is one of the original World War II-era 300 Area, Manhattan Engineering District/ DuPont structures. Exterior walls and partitions are concrete block. The floor is reinforced-concrete with test pits and a basement room at the west end. A small second floor or mezzanine exists at the west end of the building.	Pre-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Radionuclides	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-219	Includes transfer lines connecting components of the 300 Area Waste Acid Treatment System (WATS) and the Uranium Recovery Operations (URO). Piping, located in Pipe Trench 300-224, includes: 1) 333 N Fuels process transfer lines to process acid waste solution storage tanks in 333 and 334-A Facilities; 2) waste transfer lines to waste treatment facilities in 313 Uranium Recovery/WATS Neutralization Room; 3) transfer lines to/from 313 Building to neutralized acid waste storage tanks in 311 Tank Farm, 4) ethylene glycol supply and return lines in Pipe Trench between 333 and 313 Buildings used to heat this portion of Pipe Trench; 5) fresh nitric and sulfuric acid lines from 334 Tank Farm to 333 Building; and 6) caustic lines from Tank Farm to 313 WATS/URO Room. As of 11/1/1998, all process and waste piping inside associated facilities had been disconnected from the Pipe Trench. Only piping inside the Pipe Trench or outside the facilities (e.g., tank farm piping) remains for pipes associated with the 300 Area WATS/URO Acid Treatment System.	Pre-ROD To-Go Site	Pipeline with Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Radionuclides, metals, organics	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-22	The site is a UPR from a parted hose coupling that contaminated the ground outside the emergency airlock of the 309 Building on 9/20/1962. The site is covered with new asphalt. The asphalt area is roped off and trucks are not allowed on the asphalt. The rupture loop annex is present below ground at the site.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	15 m2 (162 ft2)	4.6 m (15 ft)	Radionuclides	1) RTD area of 15 m2 (162 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 15 m2 (162 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 15 m2 (162 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 15 m2 (162 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-224	The site is a subsurface, concrete pipe trench with concrete block and metal plate covers. The pipe trench has several sections that allow piping connections to be made between process operations in the 313 Building, the 303 -F Building, the 311 Tank Farm, the 333 Building, the 334-A Building, and the 334 Tank Farm. The pipe trench and subsurface soil have become contaminated due to multiple releases into the trench. Releases included acids, bases, and solvents. Some of released acids contained dissolved uranium.	Pre-ROD To-Go Site	Pipeline with Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Uranium, metals, organics	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-24	This site is contaminated soil near the 314 Building. Mostly uranium and a trace of Cs-137 were detected in soil samples from the trench near the 314 Building at a gross alpha count of 896 pCi/g.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Uranium, Cesium-137	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300-249	This site is the residual, radioactive contamination, remaining from former operations at the 304 Building, that was not closed out as part of 304 Uranium Concretion Facility closure.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Radionuclides	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-25	The 324 Building is a substantial concrete and steel structure. The remaining slab has a number of penetrations into the subsurface, including piping trenches, sumps, and pits. Portions of the building are covered under a RCRA Closure Plan with ongoing closure activities in progress.	Pre-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Radionuclides	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-251	Uranium contaminated soil around and under the 303-K Building (aka, the 303-K CWS). The 303-K Building was removed and clean closed on 7/22/2002.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Uranium	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-255	Soil contamination exists inside the 309 Building Tank Farm fenced area. The source of the contamination was probably the piping related to tanks 309-TW-1, -2 and -3. Potential radioactive contaminants are Cs-137, Co-60, and Am-241. Potential hazardous contaminants are Ba, Cd, Cr, Pb, and Se.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	528 m2 (5,683 ft2)	4.6 m (15 ft)	Radionuclides and metals	1) RTD area of 528 m2 (5,683 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 528 m2 (5,683 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 528 m2 (5,683 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 528 m2 (5,683 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.
300-257	The site is process sewer piping that originally discharged radioactive, liquid waste from the 309 Building's Rupture Loop Holding Tank to the Columbia River. The waste is the process sewer piping. The tank was removed in the late 1970s. Concurrently, the Rupture Loop Holding Tank was removed to a 200 Area burial ground, and the RLWS connections were severed and plugged. The former Rupture Loop Holding Tank area is not a parking lot.	Post-ROD To-Go Site	Pipeline with Human Health Direct Contact and/or Ecological risk likely in shallow soil	0.9 m (2.95 ft) diameter, 451 m (1,480 ft)	5.9 m (19.3 ft)	Radionuclides	1) RTD length of 451 m (1,480 ft) to 5.9 m (19.3 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD length of 451 m (1,480 ft) to 5.9 m (19.3 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD length of 451 m (1,480 ft) to 5.9 m (19.3 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD length of 451 m (1,480 ft) to 5.9 m (19.3 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-258	The site is an abandoned, subsurface, concrete, pipe trench that housed acid transfer piping from the 334 Tank Farm to the 306E Building chemical processing bay in the facility's northeastern corner. From about 1972 to1975, waste etch solution may have been transferred from the 306E Building chemical bay to the 333/334 WATS.	Pre-ROD To-Go Site	Pipeline with Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Radionuclides, metals	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300-263	The site is an inactive, unused catch tank. Hazardous or radioactive waste was never transferred from the 324 Building to the tank, which is isolated, and the pipelines are capped. Sample results indicated Cs-137 to be 509 pCi/L. Gross beta was 1,700 pCi/L. During sampling, 15.2 cm (6 in.) of rainwater had accumulated in the sample area. The water is believed to have come from intrusion because many of the flange bolts were missing. The contamination may have been from surface contamination.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	38 m2 (409 ft2)	4.6 m (15 ft)	Cesium-137	1) RTD area of 38 m2 (409 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 38 m2 (409 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 38 m2 (409 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 38 m2 (409 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-264	The 327 Building (Postirradiation Testing Laboratory) is in a stabilization and deactivation phase, where radioactive material and contamination are being removed and cleaned for future D&D activities. Post-irradiation testing has been terminated, and stabilization and deactivation work is in progress. A 1995, assessment showed most gamma activity was from to Cs-137, Cs-134, Eu-154, and Co-60. Approximately 170 g (maximum) of plutonium are estimated to be in the ducts, piping, and other building locations, with an additional 314 g estimated to be in the cells.	Pre-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Radionuclides	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-265	The transfer line carried liquid High-Level Waste from spent nuclear fuel processing.	Post-ROD To-Go Site	Pipeline	The pipes are 3/8 and 3/4" and are encased within a 2" which is encased in a 4" pipe. There are 2 pipelines laid in parallel that would be excavated with 1 trench or 328 m (1076 ft).	2.29 m (7.5 ft)	Radionuclides	1) RTD 328 m (1076 ft) length to 2.29 m (7.5 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD 328 m (1076 ft) length to 2.29 m (7.5 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD 328 m (1076 ft) length to 2.29 m (7.5 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD 328 m (1076 ft) length to 2.29 m (7.5 ft) bgs. Remediate after 2027. 2) Disposal at ERDF or other approved disposal facility.
300-268	The contamination related to this building were a result of passive dust from machining irradiated uranium, graphite, and other metallic samples from the 305 Test Pile. The contamination, if remaining, would be associated with any remaining concrete foundation.	Pre-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Uranium, metals	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-269	The site is a rectangular concrete building foundation. The 331-A Building was used for biological research and demolished in 2000. Residual contamination may be on the pad from past releases at the building.	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	465 m^2 (5,005 ft^2)	Soil beneath foundation removal to 4.6 m (15 ft)	Radionuclides	1) RTD area of 465 m2 (5,005 ft2) to 4.6 m (15 ft) bgs, after demolition of structure	1) RTD area of 465 m2 (5,005 ft2) to 4.6 m (15 ft) bgs, after demolition of structure	1) RTD area of 465 m2 (5,005 ft2) to 4.6 m (15 ft) bgs, after demolition of structure	1) RTD area of 465 m2 (5,005 ft2) to 4.6 m (15 ft) bgs, after demolition of structure

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300-270	The UPR is a milky-white flow of water discharged from a pipe located below the loading dock on the east side of the 313 Building. The dock is used by Richland Specialty Extrusions to store metal (e.g., aluminum) cylinders. The pipe drains stormwater from the 313 Building roof. The release was to the compacted gravel and soil ground surface. The stormwater is non-dangerous and nonradioactive. Soil collected from the area near the pipe showed elevated Pb levels. The contaminated soil was not caused by the milky-white liquid. The Pb source was not documented.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Lead	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-273	The encased pipeline contains two, 7.6-cm (3-in.)-diameter stainless-steel lines. The underground pipeline transferred fuel oil from the 366 Fuel Oil Bunkers (300-6) to the underground Fuel Oil Day Tanks (300-223) to run the 384 Powerhouse.	Pre-ROD To-Go Site	Pipeline	0	0	Petroleum hydrocarbons	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-274	Transite pipe, treated wood, insulation, and various forms of transite were identified during the OU walk down. The debris was potential asbestos-containing material.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Asbestos, metals, PCBs	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-276	The site includes the surface and subsurface sewer system. The original 300 Area Sanitary Sewer System serviced all existing 300 Area Buildings and a process line from the 313 Building with vitrified clay sanitary sewer pipes. The 1943 system fed into a large septic tank with a connection to a tile drainage field. In 1947, a new tile field, overflow ditch, and connecting ditch were added to increase capacity. During that construction, uranium contamination was discovered in the sanitary sewer sludge and water. The system was expanded again in 1951, to cope with the increasing number of 300 Area facilities by adding two more septic tanks and north and south leaching trenches to replace the old tile field. The system continued to be used until 1996, when the 300 Area SSS was connected to the City of Richland's municipal water treatment system. The SSS potentially contains radioactive and chemical contaminants.	Pre-ROD To-Go Site	Pipeline with Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Uranium, metals, organics	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-277	Unplanned Release. Truck being screened with instruments in the que leaving the IRA area for ERDF.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	16,248 m2 (174,892 ft2)	1 m (3 ft)	Radionuclides suspected	1) RTD area of 16,248 m2 (174,892 ft2) to 1 m (3 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 16,248 m2 (174,892 ft2) to 1 m (3 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 16,248 m2 (174,892 ft2) to 1 m (3 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 16,248 m2 (174,892 ft2) to 1 m (3 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-279	This feature consists of the historical location of underground diesel and gasoline storage tanks that were located to the north of the original 313 Bldg. (M-2885 sheet 1 rev 0), and east of the original 3716 Automotive Repair Bldg. location. The northern expansion of the 313 Bldg. was over this area where the tanks were located.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	37 m2 (398 ft2)	4.6 m (15 ft)	Petroleum hydrocarbons	1) RTD area of 37 m2 (398 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 37 m2 (398 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 37 m2 (398 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 37 m2 (398 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.

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Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300-28	The site is contaminated asphalt and soil beneath Gingko Street. New asphalt patches are visible where utility trenches were excavated. The oxide burner operations caused contamination to spread around the 314 Building area. Uranium metal dust from the fuel fabrication activities provided a pathway for heavy metal dust to become airborne and accumulate in soil throughout the northern portion of the 300 Area.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Uranium, metals	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-280	The construction debris disposal pit was a rectangular 13 m by 38 m (42 ft by 124 ft) pit aligned northwest to southeast with a 6 m (20 ft) wide gravel road ramping into the northwest end of the pit (M-3904, sheet 16, rev 1).	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	491 m2 (5,285 ft2)	4.6 m (15 ft)	Radionuclides and metals suspected	1) RTD area of 491 m2 (5,285 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 491 m2 (5,285 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 491 m2 (5,285 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 491 m2 (5,285 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-281	This is the suspected site of a septic tank that was shown on a drawing (H-3-45154). The drawing calls for removal of the septic tank. However, the entire drawing was placed on hold for future construction and it is unclear if the septic tank was ever removed. The drawing was for a facility that was never built.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	7.1 m2 (76.4 ft2)	4.6 m (15 ft)	Radionuclides suspected	1) RTD area of 7.1 m2 (76.4 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 7.1 m2 (76.4 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 7.1 m2 (76.4 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 7.1 m2 (76.4 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.
300-282	This feature consists of the historical location of temporary experimental autoclaves with a settling tank that was connected to a wooden French drain. (DDTS-Generated-3822).	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	Assumed 0.5-acres for cost estimating purposes.	4.6 m (15 ft)	Radionuclides and metals suspected	1) Institutional Controls 2) RTD area of 0.5-acres to 4.6 m (15 ft) bgs. 3) Disposal at ERDF or other approved disposal facility.	1) Institutional Controls 2) RTD area of 0.5-acres to 4.6 m (15 ft) bgs. 3) Disposal at ERDF or other approved disposal facility.	1) Institutional Controls 2) RTD area of 0.5-acres to 4.6 m (15 ft) bgs. 3) Disposal at ERDF or other approved disposal facility.	1) Institutional Controls 2) RTD area of 0.5-acres to 4.6 m (15 ft) bgs. 3) Disposal at ERDF or other approved disposal facility.
300-283	The site is a suspected release to soil. The site is currently used as an entry road/parking lot for 300 Area D4 activities.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	68 m2 (729 ft2)	4.6 m (15 ft)	Radionuclides suspected	1) RTD area of 68 m2 (729 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 68 m2 (729 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 68 m2 (729 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 68 m2 (729 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-284	This feature is the historical location of the sand blasting area associated with the former 3221 building location.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	229 m2 (2,465 ft2)	0.6 m (2 ft)	Radionuclides and metals suspected	1) RTD area of 229 m2 (2,465 ft2) to 0.6 m (2 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 229 m2 (2,465 ft2) to 0.6 m (2 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 229 m2 (2,465 ft2) to 0.6 m (2 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 229 m2 (2,465 ft2) to 0.6 m (2 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.

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Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300-286	This site consists of three discrete locations and the underlying soil of a potentially contaminated French drain and drywells and their associated below grade piping components. A drywell and a French drain were discovered during the Orphan Site Evaluation (OSE) historical review, and the remaining drywell was discovered during a field walkdown of the area under investigation. Each of the facilities that the French drains and drywells are associated with, were identified and process or function of the facilities determined. Details of inlet pipes, French drains, drywells and source facilities are provided when available. Drain number 1 (FD-1) (Orphan site feature 300-FF2-019) is a 61 cm (24 in) diameter drywell constructed in accordance with Hanford standard AC-4-30 (H-3-14950 & H-3-14947). The drain received liquids from two 0.3 m x 0.3 m x 0.3 m (1 ft x 1 ft x 1ft) sumps located in the 309 Building exhaust filter pit. A 2.5 cm (1 in) schedule 40 steel drain line from each sump joined a (2 in) schedule 40 steel line that drained to the French drain. Thee is a locked metal cover over the drywell. Drain number 2 (FD-28) is a stormwater catch basin and 4-inch slotted drain pipe (corrugated polyethylene with a smooth interior). It is not visible in the field. Drain number 3 (FD-33) is a French drain with a 15.2-cm (6-inch) pipe that empties into it. The pipe was traced 11 meters due west using geophysics. The traced end of the pipe is 3 meters (10 feet) east of FD-21 (NFE), which was associated with the 3701-N guardhouse.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	9.29 m2 (100 ft2)	4.6 m (15 ft)	Radionuclides, metals, organics suspected	1) RTD area of 9.29 m2 (100 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 9.29 m2 (100 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 9.29 m2 (100 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 9.29 m2 (100 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-287	This feature consists of broken corrugated transite in a pile approximately 0.5 meters by 1.5 meters.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	2 m2 (21.5 ft2)	4.6 m (15 ft)	Asbestos	1) RTD area of 2 m2 (21.5 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 2 m2 (21.5 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 2 m2 (21.5 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 2 m2 (21.5 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-288	This feature consists of two piles of garnet sand within a 5 m (16.4 ft) diameter area. The total volume is approximately 15 cubic meters (20 cubic yards), and each pile is estimated to be 5% garnet sand and 95% soil.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	34 m2 (368 ft2)	4.6 m (15 ft)	Radionuclides and metals suspected	1) RTD area of 34 m2 (368 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 34 m2 (368 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 34 m2 (368 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 34 m2 (368 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-289	This feature consists of bare ground, with crusting and two drum bung plugs.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	22 m2 (240 ft2)	4.6 m (15 ft)	Radionuclides, metals, organics suspected	1) RTD area of 22 m2 (240 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 22 m2 (240 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 22 m2 (240 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 22 m2 (240 ft2) to 4.6 m (15 ft) bgs.2) Disposal at ERDF or other approved disposal facility.
300-290	The site is a posted RMA (Radiological Materials Area) approximately 64 square meters. The material in the RMA consisted mostly of rusted metal automotive parts, scraps of crumpled sheet metal, electrical wire debris and engine gaskets.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	58 m2 (624 ft2)	4.6 m (15 ft)	Radionuclides, metals, organics suspected	1) RTD area of 58 m2 (624 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 58 m2 (624 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 58 m2 (624 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 58 m2 (624 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-291	This feature consists of garnet sand on a gravel road bed.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	270 m2 (2,906 ft2)	1.2 m (4 ft)	Radionuclides and metals suspected	1) RTD area of 270 m^2 (2,906 ft^2) to 1.2 m (4 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 270 m^2 (2,906 ft^2) to 1.2 m (4 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 270 m^2 (2,906 ft^2) to 1.2 m (4 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 270 m^2 (2,906 ft^2) to 1.2 m (4 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.

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Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300-292	This site includes ten (10) abandoned nonhazardous waste pipeline segments associated with the process sewers from the 315 Water Filter Plant (filter backwash) in the 300 Area (Other04102010). The site includes pipeline segments identified during the 300-FF-1 Orphan Site Evaluation for disposition with the 300-FF-2 Operable Unit evaluations (038509) and additional undocumented pipeline segments, manholes, sumps and diversion boxes discovered during the 300-FF-2 Orphan Site Evaluation (OSE). The OSE reference number for these segments is 300FF2-266.The site consists of abandoned pipeline segments and associated features (manholes, junction boxes, sumps, etc.) that transported filter backwash waste solutions from the 315 Water Filter Plant. These waste solutions were routed to Filter Backwash Ponds (e.g. 300 RFBP, 300 FBP:1, 300 FBP:2).The original 315 Water Filter Plant process sewer ran east from the 315 Building process sewer sump (315-22) to an outfall into the Columbia River. In 1975, the 315 process sewer pipeline to the river outfall was isolated and sealed at a diversion box (315-23) installed to redirect the 315 Building process sewer flow north to discharge into on-site sedimentation ponds (see attached map and tables). The east branch of the 315 Water Filter Plant process sewer from the diversion box (315-23) was accepted as WIDS Waste Site 300-261; it was later closed out ("rejected") with Waste Site Reclassification Form 99-044.The most recent waste site associated with these pipeline segments was the lined 300 FBP:2 Filter Backwash Pond (aka 315-C Sedimentation Pond) that was shutdown in 1998 (2000-116). During the last period of operation, any filter backwash waste solutions were to be settled in the pond and the pond overflow was to drain into a lift station for discharge to the 300 Area Process Sewer (300-15).	Post-ROD To-Go Site	Pipeline	20 cm (8 in) diameter 1000 m (1,480 ft) length	assume to 4.6 m (15 ft)	Radionuclides, metals, organics suspected	1) RTD 1000 m (1,480 ft) pipeline length to 4.6 m (15 ft) bgs after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD 1000 m (1,480 ft) pipeline length to 4.6 m (15 ft) bgs after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD 1000 m (1,480 ft) pipeline length to 4.6 m (15 ft) bgs after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD 1000 m (1,480 ft) pipeline length to 4.6 m (15 ft) bgs after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.
300-293	The subsite consists of underground utility lines (UGL) in the 300 Area that has been identified as being greater than 2.5 feet below the ground surface (bgs). The UGLs without an approximate depth were also assigned to this subsite.	Post-ROD To-Go Site	Pipeline	1,794.7 m (5,888 ft)	0.75 m (2.5 ft)	Radionuclides, metals, organics suspected	1) RTD pipe length of 1,794.7 m (5,888 ft) to 0.75 m (2.5 ft) after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipe length of 1,794.7 m (5,888 ft) to 0.75 m (2.5 ft) after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipe length of 1,794.7 m (5,888 ft) to 0.75 m (2.5 ft) after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipe length of 1,794.7 m (5,888 ft) to 0.75 m (2.5 ft) after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.
300-294	This feature consists of garnet sand on a gravel road bed.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	270 m2 (2,906 ft2)	1.2 m (4 ft)	Radionuclides and metals suspected	1) RTD area of 270 m2 (2,906 ft2) to 1.2 m (4 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 270 m2 (2,906 ft2) to 1.2 m (4 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 270 m2 (2,906 ft2) to 1.2 m (4 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 270 m2 (2,906 ft2) to 1.2 m (4 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300-295	This site includes four (4) abandoned nonhazardous waste pipeline segments and associated features (diversion valve box, manholes, etc.) that serviced the 384 Power House coal ash waste disposal by sluicing to the 300 Ash Pits and/or to the 315-C Sedimentation Pond (Other11092009). The site includes pipeline segments identified during the 300-FF-1 Orphan Site Evaluation for disposition with the 300-FF-2 Operable Unit evaluations (038509) and additional undocumented pipeline segments discovered during the 300-FF-2 Orphan Site Evaluation (OSE).The coal ash waste site (300 Ash Pit) associated with these pipeline segments was reclassified to a status of "No Action" (98-004, Control Number 115) based on the past practice knowledge (DOE/RL-94-49) that the waste streams were nonhazardous and based on post-remediation characterization results for the 300-FF-1 Operable Unit waste sites (CVP 2003-02, DOE/RL-2004-74).The most recent waste site associated with these pipeline segments was the lined 300 FBP:2 Filter Backwash Pond (aka 315-C Sedimentation Pond) that was shutdown in 1998 (2000-116). No coal ash slurries were routed to the 315 C Filter Backwash Sedimentation Pond (300 FPB:2) via Segment 14, the most recent coal ash sluicing pipeline (see Site Comments). This site is listed as 300FF2-269 in the Orphan Sites Evaluation Report (OSR-2010-0002).	Post-ROD To-Go Site	Pipeline	450 m (1,480 ft) of pipe.	4.6 m (15 ft)	Radionuclides, metals, organics suspected	1) RTD pipe length of 450 m (1,480 ft) to 4.6 m (15 ft). 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipe length of 450 m (1,480 ft) to 4.6 m (15 ft). 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipe length of 450 m (1,480 ft) to 4.6 m (15 ft). 2) Disposal at ERDF or other approved disposal facility.	1) RTD pipe length of 450 m (1,480 ft) to 4.6 m (15 ft). 2) Disposal at ERDF or other approved disposal facility.
300-296	Unplanned Release. Soil below building 324 B Cell. Very high contamination with rads (14K rad per hour). 9000 rad per hour in soil under building. Assume building 324 D&D'ed.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	501 m2 (5,393 ft2)	assume to 4.6 m (15 ft)	Radionuclides and metals suspected	Internal Government Cost Estimate (IGCE) used for cost estimate	IGCE used for cost estimate	IGCE used for cost estimate	IGCE used for cost estimate
300-32	The site is the remaining contaminated components of the former 333 Building, including the concrete pad, any subgrade soils and piping. Chemical wastes included nitric, sulfuric, hydrofluoric, chromic-nitric-sulfuric, and other acids, along with degreasers TCE in the 1960s and early 1970s, and PCE and 111-TCA in the 1970s and 1980s. Heat treatment salts included sodium nitrate, sodium and potassium nitrite, and sodium and potassium chloride. Additionally, many alcohol and acetone cleansers were used throughout the building's history.	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	3,655 m2 (39,342 ft2)	soil beneath foundation removal to 4.6 m (15 ft)	Metals, organics	1) RTD area of 3,655 m2 (39,342 ft2) to 4.6 m (15 ft) bgs, after demolition of structure 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 3,655 m2 (39,342 ft2) to 4.6 m (15 ft) bgs, after demolition of structure 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 3,655 m2 (39,342 ft2) to 4.6 m (15 ft) bgs, after demolition of structure 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 3,655 m2 (39,342 ft2) to 4.6 m (15 ft) bgs, after demolition of structure 2) Disposal at ERDF or other approved disposal facility.
300-34	An unplanned release to soil was discovered during excavation to install a new manhole (PS-87). Radioactive-contaminated soil was found at ~3.65 m (12 ft) below ground surface. Maximum contamination levels were beta/gamma 10,000 dpm. Soil samples emitted 525 pCi/g total beta and 91 pCi/g total alpha.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	9.3 m2 (100 ft2)	3.7 m (12 ft)	Radionuclides	Included with 300-15	Included with 300-15	Included with 300-15	Included with 300-15
300-39	The waste is radioactively contaminated equipment and structures.	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	72 m2 (775 ft2)	soil beneath foundation removal to 4.6 m (15 ft)	Radionuclides	1) RTD area of 72 m2 (775 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 72 m2 (775 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 72 m2 (775 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 72 m2 (775 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.
300-4	The site consists of uranium-contaminated soil inside the southwest corner of the fenced (active) electrical substation. A potential exists for PCB impact to soil from substation equipment, based on soil samples that contained PCBs at concentrations from 1 to 3 mg/kg. EPA (2001) also lists solvents as a potential contaminant at this site.	Post-ROD To-Go Site	Adjacent to long-term facility Human Health Direct Contact and/or Ecological risk likely in shallow soil	420 m2 (4,521 ft2)	4.6 m (15 ft)	Uranium, PCBs	1) Temporary Surface Barrier until 2027. 2) RTD area of 420 m2 (4,521 ft2) to 4.6 m (15 ft) bgs [after 2027]. 3) Disposal at ERDF or other approved disposal facility.	1) Temporary Surface Barrier until 2027. 2) RTD area of 420 m2 (4,521 ft2) to 4.6 m (15 ft) bgs [after 2027]. 3) Disposal at ERDF or other approved disposal facility.	1) Temporary Surface Barrier until 2027. 2) RTD area of 420 m2 (4,521 ft2) to 4.6 m (15 ft) bgs [after 2027]. 3) Disposal at ERDF or other approved disposal facility.	1) Temporary Surface Barrier until 2027. 2) RTD area of 420 m2 (4,521 ft2) to 4.6 m (15 ft) bgs [after 2027]. 3) Disposal at ERDF or other approved disposal facility.

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300-40	This section of piping that was isolated from the rest of the 300 Area process sewer collected rainwater drainage from the 311 Tank Farm and the 303-F Floor Drains. The piping also collected effluent from the 311 Stillhouse. Potential wastes received in this piping system would consist of chemicals (These include nitric acid, NaOH, alcohol, TCE, phosphoric acid, Duponol-M-3, hydrofluorosilicic acid, thorium, uranium, and cutting oils) used in the 313 Building fuels manufacturing process.	Pre-ROD To-Go Site	Pipeline	0	0	Radionuclides, metals, organics	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-43	The waste is uranium-contaminated soil remaining after washdown activities inside the 304 CF and 304 SA facilities had leaked through building wall cracks to the outdoor periphery. Sampling and analysis during TSD closure activities for the 304 CF and 304 SA showed uranium contamination at levels up to 256 µg/g for shallow soils at the exterior storage pad.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Uranium	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-46	Contamination of the area surrounding the 3706 Building may have been caused by operations, and associated spills and releases. Subsurface contamination is suspected, although radiological surveys near and around the 3706 Building have not detected radiologically contaminated soil.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Radionuclides and metals suspected	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-48	The handling of thorium powder targets spread fine and particulate contamination throughout the 3732 Building. Decontamination practices included hosing down the facility floors and walls, allowing contaminated liquid to be released to the surrounding soil.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Radionuclides	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-5	The site was two underground fuel tanks, the pump island, ancillary piping, and contaminated soil. An unknown quantity of contaminated soil, under the fuel dispensing island at the 3709-A Building (300 Area Fire Station) was discovered on 4/10/1992. These tanks were removed on 4/14/1992.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	58.3 m2 (628 ft2)	4.6 m (15 ft)	Petroleum hydrocarbons	1) RTD area of 58.3 m2 (628 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 58.3 m2 (628 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 58.3 m2 (628 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 58.3 m2 (628 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
300-6	In summer 2001, four concrete bunkers (USTs) were removed. In September 2001, excavated, sidewall soil was segregated and stockpiled at the site, based on visible evidence of petroleum contamination. The stockpiled soil awaits characterization and disposition.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Petroleum hydrocarbons	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
300-7	The vegetated site contains solid construction debris (concrete, metallic waste, asbestos, and uranium contamination). Surface debris piles are visible. Subsurface disturbances have been identified with GPR.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	6,225 m2 (67,005 ft2)	4.6 m (15 ft)	Uranium, metals, asbestos	At DOEs request, WCHs costs have been applied for cost estimating purposes	At DOEs request, WCHs costs have been applied for cost estimating purposes	At DOEs request, WCHs costs have been applied for cost estimating purposes	At DOEs request, WCHs costs have been applied for cost estimating purposes
300-80	The site is a square concrete structure adjacent to the 314 Building and next to a fenced stairway leading down. The site is covered by a steel plate marked with a sign "Radioactive material, internally contaminated." The purpose of this structure in not clear. The site appears to have become contaminated.	Pre-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Radionuclides	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
300-81	The drain is a concrete structure with a metal cover. The building source pipe is connected to the drain through the cover. There were no known hazardous or radioactive releases from the steam condensate discharge, which was eliminated in 1996. Lines have not been capped. The source is out-of-service, but the disposal site has not been permanently abandoned.	Consolidated Site	Consolidated Site	Encompassed with Site UPR 300-4.	Encompassed with Site UPR 300-4.	Radionuclides suspected	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).
300-82	The site is a French drain with a metal cover. The source piping has been removed. The stream was eliminated in 1996. The source is out-of-service. The source has been eliminated but the lines have not been capped/permanently abandoned.	Consolidated Site	Consolidated Site	Encompassed with Site UPR 300-4.	Encompassed with Site UPR 300-4.	Radionuclides suspected	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).
300-83	The site is a square concrete structure with a metal cover and labeled F.D. #35. There were no known hazardous or radioactive releases from this steam condensate discharge. The source was eliminated in 1996, but the lines have not been capped/permanently abandoned.	Consolidated Site	Consolidated Site	Encompassed with Site UPR 300-4.	Encompassed with Site UPR 300-4.	Radionuclides suspected	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).
300-84	The site is a semicircular, steel caisson. There were no known hazardous or radioactive releases from this water discharge. The source is permanently abandoned. The source has been eliminated and lines capped, but the disposal site has not been permanently abandoned. The source was eliminated in 1996.	Consolidated Site	Consolidated Site	Encompassed with Site UPR 300-4.	Encompassed with Site UPR 300-4.	Radionuclides suspected	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).
300-9	This "Early Burial Ground" and its burial inventory are not well documented. Uranium-contaminated aluminum shavings are scattered on the ground surface. Other surface contaminants may include aluminum-silicon alloy and beryllium-contaminated aluminum. Process knowledge suggests the waste would consist of the uranium-contaminated waste from very early 300 Area experimental processes.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	462 m2 (4,973 ft2)	4.6 m (15 ft)	Uranium, metals	At DOEs request, WCHs costs have been applied for cost estimating purposes	At DOEs request, WCHs costs have been applied for cost estimating purposes	At DOEs request, WCHs costs have been applied for cost estimating purposes	At DOEs request, WCHs costs have been applied for cost estimating purposes
300-92	The site is designed to receive stormwater runoff from 321 Building. Stormwater disposal to engineered structures will be managed under a permit issued by Ecology in 1999.	Consolidated Site	Consolidated Site	Encompassed with Site UPR 300-4.	Encompassed with Site UPR 300-4.	Radionuclides suspected	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).	Site is a Consolidated Site and is evaluated as part of the parent site (UPR 300-4).
307 RB	The RPS line and the 307 RB systems collect potentially contaminated liquids from sinks, drains, and sumps of laboratory facilities. During FY1998, 12 Million L (3 Million gal) of liquid were received by the retention basins. Liquid effluents that met process sewer discharge criteria were released to the process sewer. Waste that exceeded discharge limits was held until it could be transported to the 200 Area double-shell tanks. Before October 1998, waste at contaminant concentrations above discharge limits was diverted to the 340 Complex holding tanks.	Pre-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Radionuclides, metals, organics suspected	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
309-TW-1	The unit received aqueous nonhazardous radioactive wastes from the operation of the PRTR. Residual contamination may be present in the empty tanks.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	5.46 m2 (58.8 ft2)	assume to 4.6 m (15 ft)	Radionuclides, metals, organics suspected	Included with 300-39	Included with 300-39	Included with 300-39	Included with 300-39
309-TW-2	The unit received aqueous nonhazardous radioactive wastes from the operation of the PRTR. Residual contamination may be present in the tanks.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	414 m2 (4,456 ft2)	assume to 4.6 m (15 ft)	Radionuclides, metals, organics suspected	Included with 300-39	Included with 300-39	Included with 300-39	Included with 300-39
309-TW-3	The unit received aqueous nonhazardous radioactive wastes from the operation of the PRTR. Residual contamination may be present in the tank.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	414 m2 (4,456 ft2)	assume to 4.6 m (15 ft)	Radionuclides, metals, organics suspected	Included with 300-39	Included with 300-39	Included with 300-39	Included with 300-39
309-WS-1	The site is a plutonium recycle test reactor ion exchanger vault. Following deactivation activities, residual radiological contamination and chemical contamination from the ion exchange resin may be present on surfaces in the vault. Contaminants of potential concern are Cs-137 and Sr-90. The rainwater (in the lower vault) and ion exchange columns were removed in 1995.	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	Approximately 40 m3 (1,412 ft3) of concrete removal; Approximately 20 m3 (706 ft3) of soil removal	soil beneath foundation removal to 4.6 m (15 ft)	Cesium and Strontium	Included with 300-39	Included with 300-39	Included with 300-39	Included with 300-39
309-WS-2	Stabilized radiological contamination is present on vault surfaces. Contaminants of potential concern are TRU, Cs-137, and Co-60. Before stabilization, survey reports indicate radiological contamination levels were as high as 70,000 dpm cm^2 beta/gamma and 28,000 dpm cm^2 alpha, with contact dose rates up to 2.5 rem/hr. After cleanout and stabilization, contamination levels were <1,000 dpm/cm^2 beta/gamma, <background (3 counts/min) alpha, and a dose rate of <0.5 millirem/hr.	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	Approximately 18 m3 (636 ft3) of concrete removal; Approximately 23 m3 (812 ft3) of soil removal	soil beneath foundation removal to 4.6 m (15 ft)	Radionuclides, TRU	Included with 300-39	Included with 300-39	Included with 300-39	Included with 300-39
309-WS-3	The brine tank stored brine salt to be used by the process water/brine tanks within the basement of the 309 Building.	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	36 m2 (388 ft2)	soil beneath foundation removal to 4.6 m (15 ft)	Metals suspected	Included with 300-39	Included with 300-39	Included with 300-39	Included with 300-39
313 ESSP	The area was used to stage mixed waste including byproduct waste materials from the fuels fabrication process and neutralized solids from the 313 Recovery Operations process.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Radionuclides, metals	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
316-1	The original unlined percolation pond surface area was 45,522 m^2 (490,000 ft^2), at 1.5 m (5 ft) deep, and was separated into five sections. It originally received cooling water and low-level liquid wastes from fuel fabrication facilities and early laboratories (313, 314, 3706, and 321 Buildings). Facilities contaminants included U, Cu, Co, and small amounts of Pu. Combined process wastes discharged from the fuel fabrication facilities to the South and North Process Ponds ranged from 1.5 to 11.4 Million L/day (400,000 to 3 Million gal/day). In August 1945, the pond overflowed easterward toward the Columbia River. A crushed-rock and earten dike was built in September 1945. Accumulation of aluminum/uranium hydroxide precipitate had affected the infiltration rate. In October 1948, the SPP dike breached on the northwest side, releasing the bulk of the pond's contents including 5.4 to 27.7 kg (12 to 61 lb) or uranium into the Columbia River. The breach was attributed aluminum/uranium hydroxide precipitate accumulated on the pond bottom. The 316-2 Nort Process Pond was built as a substitute for the SPP, while repairs were made, and the bottom was dredged. Afterward, the ponds were regularly maintained by dredging. Dredge sediments were deposited on the surrounding dikes and on the scrapings disposal area. The site was Closed Out under EPA/ROD/R10-96/143. Approximately 234,000 metric tons (257,000 US tons) of material were removed from the site.	Residual source mass causing uranium groundwater plume	Residual source mass causing uranium groundwater plume	56,950 m2 (613,000 ft2)	12 m (40 ft) bgs	Uranium	No Action	Phased uranium sequestration via phosphate infiltration over 56,950 m2 (613,000 ft2) and phosphate PRZ injection over 10,540 m2 (113,450 ft2)	1) Focused deep RTD area of 10,540 m2 (113,450 ft2) to 12 m (40 ft) bgs. 2) Uranium sequestration via phosphate infiltration and injection over 46,410 m2 (499,550 ft2)	Expanded deep RTD area of 56,950 m2 (613,000 ft2) to 12 m (40 ft) bgs.
316-2	Seven sections separated by 3.7-m (12-ft-) wide dikes, with the entire 40,000 m^2 (10-acre) area surrounded by a dike 4.6 m (15 ft) wide and ~3 m (10 ft) high. It was built to receive waste in 1948, after a dike failure at the SPP. The site originally received cooling water and low-level liquid process wastes from the fuel fabrication facilities and the early laboratories (313, 314, 3706, and 321 Buildings). In 1955, the 316-2 North Process Pond was taken out of service for 14 months to manage accumulated uranium-bearing. Dredging recovered 4,672 kg (10,300 lb) of uranium from deposits up to 22.9 cm (9-in.) thick in two locations in the southwest region of the pond. Pre-1954, ~21,955 L (5,800 gal) per month of sodium aluminate containing 22.7 kg (50 lb) of uranium, was released to the 316-1 adn 316-2 ponds, resulting in 2,722 kg (6,000 lb) of uranium. An estimated 8,684 kg (19,145 lb) of mostly depleted U-235 was discharged to the ponds from the 321 Building. By 1956, sodium aluminate was included in the 313 Building waste stream instead of being discharged to the ponds. The South and North Process Ponds were phased out in 1974 and 1975. The North Process Pond was Closed Out under EPA/ROD/R10-96/143.	Residual source mass causing uranium groundwater plume	Residual source mass causing uranium groundwater plume	59,940 m2 (645,190 ft2)	12 m (40 ft) bgs		No Action	Phased uranium sequestration via phosphate infiltration over 59,940 m2 (645,190 ft2) and phosphate PRZ injection over 12,880 m2 (138,640 ft2)	1) Focused deep RTD area of 12,880 m2 (138,640 ft2) to 12 m (40 ft) bgs. 2) Uranium sequestration via phosphate infiltration and injection over 47,060 m2 (506,550 ft2)	Expanded deep RTD area of 59,940 m2 (645,190 ft2) to 12 m (40 ft) bgs.

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
316-5	Served as the discharge site for the 300 Area Process Sewer System. The 468-m (1,535-ft) long, 3-m (10-ft) wide ponds, spaced 15 m (50 ft) apart were constructed to receive the low-level waste that had previously gone to the South and North Process Ponds (316-1 and 316-2). The two trenches operated alternately with one being filled to a predetermined level before switching to the other one, usually every 2 to 6 months. The site received approximately 9.8 million L/day (2.6 million gal/day) of water. This water was chlorinated by the water filter plant for the 300 Area and contained minerals added to the water during use. Water discharged to the process sewer was used primarily for cooling and was not modified. Other discharge sources included steam condensates, floor washing/waxing janitorial solutions, water treatment (primarily salt), laboratories, process water from fuel fabrication, and other aqueous solutions not designated as dangerous wastes (WAC 173-303). In 1991, an Expedited Response Action removed contaminated soil and sludge from the trenches sides and bottoms. Excavated sediments were used to fill the north end of the trenches and were immobilized in the Process Trench Spoils Area. Excavation activities removing lifts of 0.3 m (1 ft) of contaminated soil from the sides and 1.3 m (4 ft) from the bottom of each trench. The 300 Area Process Trenches Waste Site was closed out under EPA/ROD/R10-96/143.	Residual source mass causing uranium groundwater plume	Residual source mass causing uranium groundwater plume	29,970 m2 (322,590 ft2)	12 m (40 ft) bgs	Uranium	No Action	Phased uranium sequestration via phosphate infiltration over 29,970 m2 (322,593 ft2) and phosphate PRZ injection over 12,880 m2 (138,640 ft2)	1) Focused deep RTD area of 12,880 m2 (138,640 ft2) to 12 m (40 ft) bgs. 2) Uranium sequestration via phosphate infiltration and injection over 17,090 m2 (183,954 ft2)	Expanded deep RTD area of 29,970 m2 (322,590 ft2) to 12 m (40 ft) bgs.
316-3	The site received wastes from the 300 Area Laboratory expansion facilities (329 Biophysics Laboratory, 327 Radiometallurgy Building, 324 Radiochemistry Building, 326 Pile Technology Building, and 329 Mechanical Development Building). The wastes first went through the 307 Retention Basins. Retention Basin waste below discharge limits was released to the trenches.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil Groundwater/surface water protection risk likely for uranium and other COCs.	555 m2 (5,974 ft2)	12 m (40 ft) bgs	Uranium, radionuclides, metals, organics	1) RTD area of 555 m2 (5,974 ft2) to 4.6 m (15 ft) bgs 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 555 m2 (5,974 ft2) to 4.6 m (15 ft) bgs 2) Phased uranium sequestration via phosphate infiltration over 28,480 m2 (306,560 ft2) and phosphate PRZ injection over 3,360 m2 (36,170 ft2)	1) Focused deep RTD area 3,360 m2 (36,170 ft2) to 4.6 m (15 ft) bgs. 2) Uranium sequestration via phosphate infiltration and injection over 25,120 m2 (270,390 ft2)	Expanded deep RTD area of 28,480 m2 (306,560 ft2) to 12 m (40 ft) bgs.
316-4	The site received hexone-bearing uranium waste and limited amounts of other uranium-bearing waste from the 321 Building. Calculations through July 1955, indicate liquid wastes containing 550 kg (1,230 lb) of uranium were discharged to this site. In 1962, 12,040 L (3,182 gal) of liquid, organic waste was transported to the 300 North Cribs. The crib tanks were removed in 2004.	Pre-ROD To-Go Site	Groundwater/Surface water protection risk likely for Uranium	0	0	Uranium, organics	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
323 TANK 1	The tank received neutralized uranium-contaminated water and/or basic aluminum cladding waste solutions from reprocessing R&D activities in the 321 Building and the 3706 Building (via the hot sink drains in the 321 Building laboratories), including those related to bismuth phosphate chemical separations, REDOX, Uranium Metal Recovery, PUREX, RECUPLEX, the Thorex program, and medical isotope extraction. The tank was emptied in 1952 or 1953.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	2,323 m2 (25,000 ft2)	assume to 4.6 m (15 ft)	Uranium, metals	1) RTD area of 2,323 m2 (25,000 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 2,323 m2 (25,000 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 2,323 m2 (25,000 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 2,323 m2 (25,000 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
323 TANK 2	The tank received neutralized uranium-contaminated water and/or basic aluminum cladding waste solutions from reprocessing R&D activities in the 321 Building and the 3706 Building (via the hot sink drains in the 321 Building laboratories), including those related to bismuth phosphate chemical separations, REDOX, Uranium Metal Recovery, PUREX, RECUPLEX, the Thorex program, and medical isotope extraction. The tank was emptied in 1952 or 1953.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	2,323 m2 (25,000 ft2)	assume to 4.6 m (15 ft)	Uranium, metals	Encompassed in same concrete encasement as 323 TANK 1.	Encompassed in same concrete encasement as 323 TANK 1.	Encompassed in same concrete encasement as 323 TANK 1.	Encompassed in same concrete encasement as 323 TANK 1.
323 TANK 3	The tank received neutralized uranium-contaminated water and/or basic aluminum cladding waste solutions from reprocessing R&D activities in the 321 Building and the 3706 Building (via the hot sink drains in the 321 Building laboratories), including those related to bismuth phosphate chemical separations, REDOX, Uranium Metal Recovery, PUREX, RECUPLEX, the Thorex program, and medical isotope extraction. The tank was emptied in 1952 or 1953.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	2,323 m2 (25,000 ft2)	assume to 4.6 m (15 ft)	Uranium, metals	Encompassed in same concrete encasement as 323 TANK 1.	Encompassed in same concrete encasement as 323 TANK 1.	Encompassed in same concrete encasement as 323 TANK 1.	Encompassed in same concrete encasement as 323 TANK 1.
323 TANK 4	The tank received neutralized uranium-contaminated water and/or basic aluminum cladding waste solutions from reprocessing R&D activities in the 321 Building and the 3706 Building (via the hot sink drains in the 321 Building laboratories), including those related to bismuth phosphate chemical separations, REDOX, Uranium Metal Recovery, PUREX, RECUPLEX, the Thorex program, and medical isotope extraction. The tank was emptied in 1952 or 1953. Between 1968 and 1987, the tank received waste from the 323 Building, including the hot cell drain, the cleanup box drain, and overflow from the process water sump. The tank has not received waste since 1987, when it contained liquid and sludge. Significant uranium and aluminum were detected, but no thorium in either the liquid or the sludge. The uranium and aluminum contamination would have entered the tank before 1967.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	2,323 m2 (25,000 ft2)	assume to 4.6 m (15 ft)	Uranium, metals	Encompassed in same concrete encasement as 323 TANK 1.	Encompassed in same concrete encasement as 323 TANK 1.	Encompassed in same concrete encasement as 323 TANK 1.	Encompassed in same concrete encasement as 323 TANK 1.
325 WTF	The waste treatment facilities treated radioactive-mixed wastes generated in R&D activities. The 325 Waste Treatment Facility also served to test and evaluate the effectiveness of various waste treatment technologies.	Post-ROD To-Go Site	Underneath long-term facility (no temporary barrier needed) Human Health Direct Contact and/or Ecological risk likely in shallow soil	1250 m2 (13,456 ft2)	soil beneath foundation removal to 4.6 m (15 ft)	Radionuclides	1) RTD area of 1250 m2 (13,456 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 1250 m2 (13,456 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 1250 m2 (13,456 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 1250 m2 (13,456 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.
331 LSLT1	The Life Sciences Laboratory Trench received sanitary wastewater and animal waste from the animal waste pit. Since most of the animal studies involved the use of radio isotopes, animal waste was segregated by activity. Solid animal waste, exceeding 200 pCi/g specific activity, was transported to 100-F trenches regularly. All other solid animal waste (<200 pCi/g specific activity) was flushed into the 331 Waste System. Specific contamination cases occurred at the 331 Complex.	Post-ROD To-Go Site	Underneath long-term facility (no temporary barrier needed) Human Health Direct Contact and/or Ecological risk likely in shallow soil	4.41 m2 (47.5 ft2)	4.6 m (15 ft)	Radionuclides	1) RTD area of 4.41 m2 (47.5 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 4.41 m2 (47.5 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 4.41 m2 (47.5 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 4.41 m2 (47.5 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
331 LSLT2	The Life Sciences Laboratory Trench received liquid animal waste from the animal waste pit. Animal wastes were the most prominent wastes, in terms of volume, generated by the 331 Complex. Originally, liquid animal wastes from the complex including wash downs from the "hog and dog runs", were disposed to a large, unlined pit, east of the 331-D Building. Sewers carrying animal waste from the 331 Complex were also connected to this pit.	Post-ROD To-Go Site	Underneath long-term facility (no temporary barrier needed) Human Health Direct Contact and/or Ecological risk likely in shallow soil	4.41 m2 (47.5 ft2)	4.6 m (15 ft)	Radionuclides	1) RTD area of 4.41 m2 (47.5 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 4.41 m2 (47.5 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 4.41 m2 (47.5 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 4.41 m2 (47.5 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.
333 ESHTSSA	This area is no longer used for storing HW. In the past, it stored containers of solidified waste heat treat salts from the Fuels Fabrication Facility. The waste consisted of sodium chloride, potassium chloride, sodium nitrate, and potassium nitrate. Approximately, 30 to 50 208-L (55-gal) drums accumulated each year.	Consolidated Site	Consolidated Site	Encompassed by parent site 618-1.	Encompassed by parent site 618-1.	Uranium suspected	Site is a Consolidated Site and is evaluated as part of the parent site 618-1.	Site is a Consolidated Site and is evaluated as part of the parent site 618-1.	Site is a Consolidated Site and is evaluated as part of the parent site 618-1.	Site is a Consolidated Site and is evaluated as part of the parent site 618-1.
333 WSTF	The White Sands Test Facility tank stored used, non-PCB oil from the extrusion press sump. The oil was not ignitable before removal. No known releases were documented. The Uranium Bearing Acid tanks stored spent-acid-containing uranium. The uranium was a recoverable asset for recycling.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Petroleum hydrocarbons, uranium	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
340 Complex	The 340 Complex consists of Buildings 340, 340-A, 340-B, 3707-F, office trailers, 307 Retention Basins, two vaulted underground tanks, six 340A tanks, underground transfer pipes, load-out and decontamination equipment, instrumentation, and before 1963, the 316-3 Trenches, which disposed of retention process waste that met release criteria. The site supported the 325, 326, 237, and 329 Buildings, relieved stress on the 316-1 and 316-2 Process Ponds, and received potentially contaminated "retention" waste liquids. Waste liquids passed through the RPS line to the 307 Retention Basins to reduce radioactivity to less than threshold values before transfer to the 307 Trenches. Threshold-exceeding liquid was transferred to 56,780-L (15,000-gal) capacity collection tanks in the 340 Building before disposal at the 200 Area. Discharge to the basins was 4 g/L gross beta and 0.5 g/L plutonium, later changed to 50,000 pCi/L. The RLWS collected liquid process waste from the laboratories and the 308, 309, and 324 Buildings, and transferred the wastes to the 340 Building tanks. The 307 Trenches received 1 Million L (264,172 gal) of uncontaminated low-level radioactive waste liquid from the 307 Retention Basins once the waste streams were less than discharge limits. After 1963 removal from service, the 307 Trenches waste liquids were transferred to the process sewer for disposal in the Process Ponds. The 307 Trenches were excavated, and contaminated soil was transported to the 618-10 Burial Ground. In 1965, the trenches were backfilled with 7,645 m^3 (25,082 ft^3) of uranium-contaminated sediment from the SPP and fly ash. A leak test in 1976, of the single-walled RLWS network showed widespread system leaks. The system was replaced in 1978 to 1979, with double-walled, stainless steel pipes and a leak detection system. During replacement, contaminated soil was removed, but the RLWS piping and low radioactive level soil remains.	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	6,403 m2 (68,921 ft2)	soil beneath foundation removal to 4.6 m (15 ft)	Radionuclides	1) RTD area of 6,403 m2 (68,921 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 6,403 m2 (68,921 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 6,403 m2 (68,921 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 6,403 m2 (68,921 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
3712 USSA	The 3712 Uranium Scrap Storage Area (USSA) Building stores uranium fuel elements, fuel fabrication components, and uranium scraps from 313 and 333 fuel fabrication activities.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Uranium	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
400 PPSS	This site is the 400 Area Secondary Cooling Water (400 Area Process Pond and Sewer System). The unit consists of underground piping, a control structure, and the 4608B and 4608C percolation ponds. The process sewer, which empties into the process ponds, is for discharging water from cooling systems, and non-sanitary drains and sumps in the 400 Area facilities, including the FFTF. Water from the FFTF and FMEF cooling towers contains non-regulated quantities of algaecides and other treatment chemicals, including a biocide (Dearcide 702), microbiocide (sodium hypochlorite), and softening agent (Dearborn 878). Chemicals used for secondary cooling water testing (Dearborn Code 550, 562, 595, 899, 904) are present in unregulated quantities.	Post-ROD To-Go Site	Pipeline with Human Health Direct Contact and/or Ecological risk likely in shallow soil	3,006 m2 (32,356 ft2)	4.6 m (15 ft)	Metals, organics suspected	1) RTD area of 3,006 m2 (32,356 ft2) to 4.6 m (15 ft) bgs, after demolition of structure in 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 3,006 m2 (32,356 ft2) to 4.6 m (15 ft) bgs, after demolition of structure in 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 3,006 m2 (32,356 ft2) to 4.6 m (15 ft) bgs, after demolition of structure in 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 3,006 m2 (32,356 ft2) to 4.6 m (15 ft) bgs, after demolition of structure in 2027. 2) Disposal at ERDF or other approved disposal facility.
400-37	The site is an underground fuel oil tank. No visual evidence of the tank exists on the surface. The tank supplied diesel fuel to a standby electric generator. Drawing H-4-152061 has a written notation that the fuel oil tank was abandoned in place and that the exact location of the fuel line is unknown. It is believed to have been filled with sand.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	51.83 m2 (557.9 ft2)	4.6 m (15 ft)	Petroleum hydrocarbons	1) RTD area of 51.83 m2 (557.9 ft2) to 4.6 m (15 ft) bgs. Remediation to start in 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 51.83 m2 (557.9 ft2) to 4.6 m (15 ft) bgs. Remediation to start in 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 51.83 m2 (557.9 ft2) to 4.6 m (15 ft) bgs. Remediation to start in 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 51.83 m2 (557.9 ft2) to 4.6 m (15 ft) bgs. Remediation to start in 2027. 2) Disposal at ERDF or other approved disposal facility.
400-38	The site is an underground fuel tank that supported 4722A. There is no visual evidence of the tank on the surface. Drawing H-4-152061 has a notation reading "buried fuel tank." It is possible the tank has been filled with sand, but documentation has not been found.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	21 m2 (225 ft2)	4.6 m (15 ft)	Petroleum hydrocarbons	1) RTD area of 21 m2 (225 ft2) to 4.6 m (15 ft) bgs. Remediation to start in 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 21 m2 (225 ft2) to 4.6 m (15 ft) bgs. Remediation to start in 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 21 m2 (225 ft2) to 4.6 m (15 ft) bgs. Remediation to start in 2027. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 21 m2 (225 ft2) to 4.6 m (15 ft) bgs. Remediation to start in 2027. 2) Disposal at ERDF or other approved disposal facility.
600-117	The site treats and disposes of process sewer effluent from the 300 Area. Treatment includes chemical precipitation, selective ion exchange, and UV/peroxide oxidation to destroy organics and cyanide.	Pre-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Organics, cyanide, metals	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
600-290	The site was a contaminated pad and loading dock near the 618-13 soil mound that was used for loading waste drums. Rust-colored drum ring patterns on the concrete suggest temporary storage of 208-L (55-gal) drums.	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	110 m2 (1184 ft2); 110 m3 (35 ft3) of concrete	soil beneath foundation removal to 4.6 m (15 ft)	Metals, organics suspected	No Alternative; addressed with sub-sets (600-290:1 and -290:2)	No Alternative; addressed with sub-sets (600-290:1 and -290:2)	No Alternative; addressed with sub-sets (600-290:1 and -290:2)	No Alternative; addressed with sub-sets (600-290:1 and -290:2)

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
600-290:2	The subsite includes the remaining area covered by the WIDS boundary. The majority of the area was enclosed by a fence and was used for storage of contaminated equipment. A portion of the site extends north of the fence where anomalies were visible in an old aerial photograph.	Post-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	7,882 m2 (84,812 ft2)	soil beneath foundation removal to 4.6 m (15 ft)	Radionuclides, metals, organics suspected	1) RTD area of 7,882 m2 (84,812 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 7,882 m2 (84,812 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 7,882 m2 (84,812 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 7,882 m2 (84,812 ft2) to 4.6 m (15 ft) bgs, after demolition of structure. 2) Disposal at ERDF or other approved disposal facility.
600-367	The site is a large, open field with a high soil mound in the center. Several pipes extend vertically through the soil surface in some areas. A small pallet containing damaged bags of bentonite is located in the southeast corner of the area adjacent to some vertical pipes. Two steel-hinged plates cover access holes to underground culverts used as monitoring stations for buried waste tests. Only simulated buried waste was placed at this test site.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	35,000 m2 (376,736 ft2)	4.6 m (15 ft)	Metals, organics suspected	1) RTD area of 35,000 m2 (376,736 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 35,000 m2 (376,736 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 35,000 m2 (376,736 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 35,000 m2 (376,736 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
600-63	The site includes potentially contaminated soil and equipment, and is enclosed within barbed, chain-link fencing with a locking gate. A considerable amount of surface debris is observed outside the fenced area. A trace amount of Co-60 was mixed in 1 cm (0.4 in.) of soil and placed 60 cm (24 in.) below the surface of two of the drainage lysimeters. Trace amounts of tritium were placed in two other lysimeters. Contaminant migration was monitored. Buried equipment, including caissons, lysimeters, associated instrumentation, and solar panels are noted, and may be contaminated with Co-60 and tritium.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	1,600 m2 (17,222 ft2)	4.6 m (15 ft)	Cobalt-60 and tritium	BPA lease site. Site will be remediated after ROD, but costs are not included in FS.	BPA lease site. Site will be remediated after ROD, but costs are not included in FS.	BPA lease site. Site will be remediated after ROD, but costs are not included in FS.	BPA lease site. Site will be remediated after ROD, but costs are not included in FS.
618-1	Two trenches received waste from early 300 Area facility operations, including the 305 Reactor, 3706 Laboratory, and 3741 Building. The site contains large quantities (14,500 kg [~16 tons]) of uranium from fuel fabrication activities, and small quantities of plutonium and fission products from laboratory operations. Radiological readings indicated 6,000 dpm alpha and 15 mr/hr beta/gamma. An August 1946, monthly report mentions burial of a bronze crucible that read 170 mR/hr (179 mrads/hr) and 5.5 mR/hr (5.5 mrads/hr) at 10.2 cm (4 in.).	Risk Exceedance	Groundwater Protection risk for Total Uranium Isotopes in deep soil	5,000 m2 (53,820 ft2)	20 m (32.8 ft)	Uranium	No Action	1) Institutional Controls 2) Phosphate Sequestration	1) Institutional Controls 2) Phosphate Sequestration	1) RTD area of 5,000 m2 (53,820 ft2) to 20 m (32.8 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
618-10	The site consists of 12 trenches and 94 vertical pipe units (VPUs). The site contains a broad spectrum of low- to high-level dry wastes, primarily fission products and some TRU from the 300 Area. Low-level wastes are buried in trenches, and medium- to high-level beta/gamma wastes are mostly in the vertical pipe units. Some higher activity wastes were placed in concrete-shielded drums and disposed in the trenches. The site was surface stabilized with clean backfill material in 1983. This burial ground is currently undergoing remediation.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Radionuclides and TRU	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
618-11	The site consists of three V-shaped trenches, two large-diameter caissons, and 50 VPUs. The burial ground received a variety of waste from the 300 Area operations. Low-level activity waste and large items were placed into the burial trenches. Some high-activity liquid waste or plutonium contaminated liquid was placed inside barrels and sealed with concrete. The burial ground was surface stabilized with additional clean soil and planted with wheat grass in 1983.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	34,770 m2 (374,261 ft2) [fenced] 4,111 m2 (42,250 ft2) [trenches]	variable	Radionuclides	1) RTD area of 62,012 m2 (667,489 ft2) to variable depths (assume 4.6 m [15 ft] for cost estimate). 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 62,012 m2 (667,489 ft2) to variable depths (assume 4.6 m [15 ft] for cost estimate). 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 62,012 m2 (667,489 ft2) to variable depths (assume 4.6 m [15 ft] for cost estimate). 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 62,012 m2 (667,489 ft2) to variable depths (assume 4.6 m [15 ft] for cost estimate). 2) Disposal at ERDF or other approved disposal facility.

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
618-2	The waste site consisted of three east-west trenches. In 1995, GPR identified three distinct trenches. Historical documents stated that there were either three or four trenches. The discrepancy of whether there are three or four trenches could be because the geometry of the middle trench is broken into two pieces at the east end. The unit was used for disposal of uranium-contaminated equipment and materials, plutonium, and fission products. The uranium waste was typically solid metallic uranium oxides in the form of metal cuttings from Reactor Fuel Fabrication facilities in the 300 Area. Plutonium and fission products came from 300 Area laboratory facilities that began to operate in 1953. The burial ground may also contain tin from the triple dip canning process and lead from the lead dip process. In December 2004, during remedial excavation, bottles with liquid were found in a combination lock safe.	Risk Exceedance	Groundwater Protection risk for Total Uranium Isotopes in deep soil	441 m2 (4,747 ft2) [north]; 810 m2 (8,719 ft2) [middle]; 825 m2 (8,800 ft2) [south]	20 m (32.8 ft)	Uranium	No Action	1) Institutional Controls 2) Phosphate Sequestration over 2,076 m2 (22,346 ft2)	1) Institutional Controls 2) Phosphate Sequestration over 2,076 m2 (22,346 ft2)	1) RTD area of 2,076 m2 (22,346 ft2) to 20 m (32.8 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
618-3	The site consists of uranium-contaminated waste, primarily building materials from the remodeling of the 313 Building. It may also contain waste from the 303-J and K upgrades. In 1986, the volume of contaminated soil was estimated to be 12,549 m^3 (443,160 ft^3), with 12,643 m^3 (446,480 ft^3) of overburden.	Risk Exceedance	Human Health Direct Contact and Groundwater Protection risk for Uranium in shallow soil	6,222 m2 (66,973 ft2)	4 m (13 ft) bgs	Uranium	No Action	1) Institutional Controls 2) Phosphate Sequestration over 6,222 m2 (66,973 ft2)	1) Institutional Controls 2) Phosphate Sequestration over 6,222 m2 (66,973 ft2)	1) RTD area of 6,222 m2 (66,973 ft2) to 4 m (13 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
UPR-300-1	The site was a release to soil between the 307 Retention Basins and the 340 Building. The discharged waste consisted of process effluent contaminated by TRU fission products including 900 Ci of short-lived radionuclides (mainly promethium-147) and 10 Ci each of Sr-90 and Cs-137. The top 0.61 m (2 ft) of the contaminated drummed and transported to a 200 Area burial ground. Further removal of contaminated soil was considered a threat to adjacent structures. There is no readily apparent sign of subsurface contamination beneath the gravel-covered area. More than 90% of the contamination is confined to an area 3.7 m (12 ft) in diameter and 7.6 m (25 ft) deep.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Radionuclides and TRU	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
UPR-300-10	The site was a UPR to the soil beneath the northwest corner of the 325 Building. UPR-300-10 occurred in the radioactive waste sewer line that served the 325-B Hot Cells, between the 325 Building's west basement wall of Room 32 and the north foundation wall of Room 202. The release included waste from dissolution of highly radioactive samples including irradiated reactor fuels.	Post-ROD To-Go Site	Underneath long-term facility (no temporary barrier needed) Human Health Direct Contact and/or Ecological risk likely in shallow soil	232 m2 (2,497 ft2)	4.6 m (15 ft)	Radionuclides	1) RTD area of 232 m2 (2,497 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 232 m2 (2,497 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 232 m2 (2,497 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 232 m2 (2,497 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.
UPR-300-11	The site was a release to the soil that involved a 1.2-m (4-ft)-diameter column of gravel-covered soil in the 340 Complex yard. The release occurred around and below a leaking, flanged tee that connected the RRLWS to the 340 Vault. Soil samples from near the broken pipe yielded detectable concentrations of Sr-90, Eu-155, Ce-144, Pu-239/240, Am-241, and Pu-238 . Approximately 1 Ci of contamination was left in place.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Radionuclides	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs.If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
UPR-300-12	UPR-300-12 occurred in the basement floor of the 325-A Building. The waste migrated through cracks in the floor to the soil beneath the building. The site received radioactive rinse water overflow containing nitrate ions, Pm-147, fission products, and TRU nuclides. Total rinse water activity was estimated at 70 Ci (95% Pm-147). The rinse water contained nitrate ions, Pm-147, fission products, and TRU radionuclides. Nitrate ions, but no radionuclides, were detected in samples from a nearby groundwater monitoring well. PNNL sampled the underlying soil in January 1979. Decontamination efforts on Room 50-A were completed. Removal of the contaminated soil under the building was considered a threat to the integrity of the 325 Building.	Post-ROD To-Go Site	Underneath long-term facility (no temporary barrier needed) Human Health Direct Contact and/or Ecological risk likely in shallow soil	3.6 m2 (38.75 ft2)	4.6 m (15 ft)	Radionuclides and TRU	Shallow soil contamination under building will be removed during 325-A Building demolition. Costs are not included in FS.	Shallow soil contamination under building will be removed during 325-A Building demolition. Costs are not included in FS.	Shallow soil contamination under building will be removed during 325-A Building demolition. Costs are not included in FS.	Shallow soil contamination under building will be removed during 325-A Building demolition. Costs are not included in FS.
UPR-300-2	Multiple releases occurred from ongoing decontamination and waste handling activities starting in January 1954. It is unknown if this was related to a single event or all events over the period (1954 to date). An estimated 10 mCi of Cs-137 may have been released.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	241 m2 (2,594 ft2)	4.6 m (15 ft)	Cesium-137, radionuclides	1) RTD area of 241 m2 (2,594 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 241 m2 (2,594 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 241 m2 (2,594 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 241 m2 (2,594 ft2) to 4.6 m (15 ft) bgs. 2) Disposal at ERDF or other approved disposal facility.
UPR-300-38	The site is the contaminated, concrete foundation and underlying soil beneath the 313 Building from multiple UPR events. The full contamination extent is pending 313 Building foundation removal. Materials released to soil beneath the building may have included uranium-bearing acid (nitric and sulfuric acid with uranium in solution), neutralized acid waste (typically sodium fluoride, sodium nitrate, sodium dichromate, and sodium sulfate in solution with precipitates of uranium, chromium, copper, and zirconium), etch acids (nitric, hydrofluoric, sulfuric, and chromic acids), TCE, PCE, sodium hydroxide solutions, and contaminated water.	Pre-ROD To-Go Site	Structure with Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Uranium, metals, organics	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
UPR-300-39	The release site was to the soil adjacent to the caustic storage tanks in the 311 Tank Farm. The waste consisted of caustic solution containing 50% sodium hydroxide solution. If the sodium hydroxide were exposed to uranium contamination (likely the case), the resultant contamination would be sodium diuranate ("yellow cake"). In February 2006, the 311 Tank Farm and concrete containment were demolished. Before demolition, the two, sodium hydroxide tanks were labeled "Empty."	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Uranium	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
UPR-300-4	The site is the soil beneath and south of the 321 Building. The site represents a number of releases that occurred from 1945 to 1988. Complete contaminated soil removal was not attempted because of possible threat to the integrity of the 321 Building. No specific occurrence reports have been documented. The contaminated soil extent is not documented.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Radionuclides suspected	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
UPR-300-40	The release site was to the soil between the 311 Tank Farm and the 303-F Building. Piping connections were repaired, but contaminated soil was not removed. The waste consisted of uranium-bearing acid waste containing nitric and sulfuric acid with uranium in solution and chromic acids with copper and zinc in solution. A comparison of WIDS Sites UPR-300-31 and UPR-300-40 and their reference documents was performed, and the conclusion was that they both represented the same event. It was decided to join them under WIDS Site UPR-300-40.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Uranium, metals	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
UPR-300-42	The release was an overflow of 750-1,135 L (200-300 gal) No. 6 fuel oil onto the ground adjacent to the #2 Day Tank, a UST. The adjacent day tanks (300-223) have been remediated, but this release was not removed because of concerns regarding the foundation of the 384 Powerhouse. The surface area around the day tanks was paved with asphalt. This release is not visible.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Petroleum hydrocarbons	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
333 LHWSA	This radioactive materials storage area is fixed (concrete and asphalt) over the 618-1 Burial Ground.	Consolidated Site	Consolidated Site	Encompassed by parent site 618-1.	Encompassed by parent site 618-1.	Uranium suspected	Site is a Consolidated Site and is evaluated as part of the parent site 618-1.	Site is a Consolidated Site and is evaluated as part of the parent site 618-1.	Site is a Consolidated Site and is evaluated as part of the parent site 618-1.	Site is a Consolidated Site and is evaluated as part of the parent site 618-1.
UPR-300-13	The release site was soil adjacent to the underground spent acid receiver tank that east of 333 Building and adjacent to the 618-1 Burial Ground. The waste contained process acid that included 2,012 kg (4,432 lb) of nitrate, 202.9 kg (447 lb) of Cu, and 1.4 kg (3 lb) of U. Some contaminated soil may have been removed during tank removal and excavation for the 334-A Building foundation. Site remediation will addressed with the 618-1 Burial Ground.	Consolidated Site	Consolidated Site	Encompassed by parent site 618-1.	Encompassed by parent site 618-1.	Uranium suspected	Site is a Consolidated Site and is evaluated as part of the parent site 618-1.	Site is a Consolidated Site and is evaluated as part of the parent site 618-1.	Site is a Consolidated Site and is evaluated as part of the parent site 618-1.	Site is a Consolidated Site and is evaluated as part of the parent site 618-1.
UPR-300-14	The release site was to a limestone pit designed to neutralize spilled acid before the acid was released to the underlying ground. The release consisted of 93% sulfuric acid. Residual contamination from the spill to the open-bottomed, limestone neutralization pit and soil in the 618-1 Burial Ground will be addressed during 618-1 Burial Ground remediation.	Consolidated Site	Consolidated Site	Encompassed by parent site 618-1.	Encompassed by parent site 618-1.	Uranium suspected	Site is a Consolidated Site and is evaluated as part of the parent site 618-1.	Site is a Consolidated Site and is evaluated as part of the parent site 618-1.	Site is a Consolidated Site and is evaluated as part of the parent site 618-1.	Site is a Consolidated Site and is evaluated as part of the parent site 618-1.
UPR-300-44	The release consisted of wastewater and possibly uranium-bearing acid (nitric and sulfuric acid with uranium in solution) or waste-etch acid (nitric, hydrofluoric, and chromic acids with U, Cu, and Zr metals in solution) to soil around a section of process sewer line. This site has been incorporated into WIDS Site UPR-300-38.	Consolidated Site	Consolidated Site	Encompassed by parent site UPR-300-38.	Encompassed by parent site UPR-300-38.	Uranium, metals, organics	Site is a Consolidated Site and is evaluated as part of the parent site UPR-300-38.	Site is a Consolidated Site and is evaluated as part of the parent site UPR-300-38.	Site is a Consolidated Site and is evaluated as part of the parent site UPR-300-38.	Site is a Consolidated Site and is evaluated as part of the parent site UPR-300-38.
UPR-300-45	The release site was to the soil beneath the transfer piping, adjacent to the 303-F Building. The leak contained uranium-bearing waste acid identified as nitric and sulfuric with uranium in solution. Analysis showed the solution to contain 3,480, 6,960, and 920 ppm of nitrate, sulfate, and uranium, respectively. Some soil from the release site was exhumed, packaged, and sent to the Low-Level Burial Grounds for disposal. Cleanup effectiveness is not documented. The remaining soil beneath the pipe trench and around the processing facilities is expected to be addressed separately after the RCRA closure plan activities are completed.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Uranium, metals	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
UPR-300-48	The site received radioactive liquid from a leak in the process sewer drainpipe. The site was discovered during dye testing of drains during development of the Facility Effluent Monitoring Plan development for the 325 Building. The contamination may have resulted from routine releases and accumulated in the soil under the crack. Radioactivity up to 1,700 dpm alpha was detected. The TCLP results were below regulatory limits. Radioactivity levels were sufficiently low to permit fixing the contamination in place. This activity was reported as an off normal occurrence in October 1991 (RL-PNL-325-1991-1023).	Post-ROD To-Go Site	Underneath long-term facility (no temporary barrier needed) Human Health Direct Contact and/or Ecological risk likely in shallow soil	37.3 m2 (400 ft2)	4.6 m (15 ft)	Radionuclides	1) RTD area of 37.3 m2 (400 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 37.3 m2 (400 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 37.3 m2 (400 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.	1) RTD area of 37.3 m2 (400 ft2) to 4.6 m (15 ft) bgs [after 2027]. 2) Disposal at ERDF or other approved disposal facility.

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
UPR-300-5	The site was a release that contaminated the storage basin area, the filter vault, the stack base, the truck stall, and the truck ramp outside the 309 Building. The waste was low-level radioactive water. The primary isotope was Cs-137.	Post-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	7.32 m2 (78.8 ft2)	4.6 m (15 ft)	Cesium-137, radionuclides	Shallow soil contamination under building will be removed during 309 Building demolition. Costs are not included in FS.	Shallow soil contamination under building will be removed during 309 Building demolition. Costs are not included in FS.	Shallow soil contamination under building will be removed during 309 Building demolition. Costs are not included in FS.	Shallow soil contamination under building will be removed during 309 Building demolition. Costs are not included in FS.
UPR-600-1	The release originated as a fire in the 618-10 Burial Ground that spread radioactive particulates 274 m (300 yd) out from the burial ground fence. The waste consisted of burned CW filters, about 200 boxes of contaminated materials, and an unknown amount of other materials.	Consolidated Site	Consolidated Site	Encompassed by parent site 618-10.	Encompassed by parent site 618-10.	Radionuclides	Site is a Consolidated Site and is evaluated as part of the parent site 618-10.	Site is a Consolidated Site and is evaluated as part of the parent site 618-10.	Site is a Consolidated Site and is evaluated as part of the parent site 618-10.	Site is a Consolidated Site and is evaluated as part of the parent site 618-10.
UPR-600-10	Loose surface contmination on a container became airborne, impacting surface soil in the 618-11 Burial Ground around Barrel 327-2. The release consisted of high-level beta and gamma activity with readings up to 1.4 rads/hr at 7.6 cm (3 in.). The 618-11 Burial Ground was surface stabilized in 1983.	Consolidated Site	Consolidated Site	Encompassed by parent site 618-11.	Encompassed by parent site 618-11.	Radionuclides	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.
UPR-600-2	Contamination from this incident was identified around the burial receptacle in the 618-10 Burial Ground, an area in front of the burial ground access gate, and a spot in front of the 300 Area Powerhouse. Contamination detected at the time of the release ranged from 60,000 to 80,000 counts/min around the barrel in the 618-10 Burial Ground, 40,000 counts/min in front of the 300 Area Powerhouse, and 80,000 counts/min in front of the burial ground access gate.	Consolidated Site	Consolidated Site	Encompassed by parent site 618-10.	Encompassed by parent site 618-10.	Radionuclides	Site is a Consolidated Site and is evaluated as part of the parent site 618-10.	Site is a Consolidated Site and is evaluated as part of the parent site 618-10.	Site is a Consolidated Site and is evaluated as part of the parent site 618-10.	Site is a Consolidated Site and is evaluated as part of the parent site 618-10.
UPR-600-22	The site consists of a series of small, parallel berms. Before 1972, the area was contaminated with particulate fallout (windblown) from burial activities in the 618-11 Burial Grounds. The contaminated area was covered by scraping the affected ground into windrows. The windrows were cut by backhoe on 10/24/1972. Radiological surveys were made of all removed soil and the walls of each cut. No beta, gamma, or alpha radioactivity was detected above the normal background of 100 counts/min.	Pre-ROD To-Go Site	Human Health Direct Contact and/or Ecological risk likely in shallow soil	0	0	Radionuclides, metals suspected	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).	Not evaluated. Site assumed to pass PRGs. If site fails PRGs, alternative evaluation will follow Post-ROD To-Go decision process (see Chapter 9).
UPR-600-3	During VPU disposal, the lid of an improperly sealed container came off, and radioactive dust contaminated soil around the VPU. The surface was stabilized with the rest of the burial ground in 1983. The burial ground is fenced and posed as an URMA.	Consolidated Site	Consolidated Site	Encompassed by parent site 618-10.	Encompassed by parent site 618-10.	Radionuclides	Site is a Consolidated Site and is evaluated as part of the parent site 618-10.	Site is a Consolidated Site and is evaluated as part of the parent site 618-10.	Site is a Consolidated Site and is evaluated as part of the parent site 618-10.	Site is a Consolidated Site and is evaluated as part of the parent site 618-10.
UPR-600-4	The release originated as radioactive waste from the High-Level Radiochemistry Facility. Radioactive blow back occurred that during cask waste release to a VPU at the 618-11 Burial Ground. The release consisted of a 1,000 ft^2 area of contaminated soil in the 618-11 Burial Ground, with readings up to 10,000 counts/min. The release site was surface stabilized with the rest of the burial ground in 1983.	Consolidated Site	Consolidated Site	Encompassed by parent site 618-11.	Encompassed by parent site 618-11.	Radionuclides	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.
UPR-600-5	The release site consisted of surface soil in the 618-11 Burial Ground. Ggross fission products with beta and gamma contamination were generated in the Radio Chemistry Building (325 Building). The release occurred as a fine, white powder that escaped a truck chute during routine VPU burial operations, impacting soil surrounding the VPU. Windy conditions spread the contaminated soil. The impacted surface soil was covered with a layer of clean material immediately after the release. The burial ground was surface stabilized in 1983.	Consolidated Site	Consolidated Site	Encompassed by parent site 618-11.	Encompassed by parent site 618-11.	Radionuclides	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.

Table I-1. Alternatives for Evaluated Waste Sites

Waste Site	Site History	Rationale for Inclusion in Feasibility Study	Type of Exceedances (assumed for Post ROD To Go Sites)	Assumed Areal Footprint Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS	Alternative 2	Alternative 3	Alternative 4	Alternative 5
UPR-600-6	Soil was impacted by ruthenium-103 and zirconium-niobium-95 (with readings from 100 counts/min to 200 mrads/hr), as a result of high winds that blew contaminated materials from a truck during burial operations at the 618-11 Burial Ground. The contaminated area was 1,400 ft^2. The 618-11 Burial Ground was surface stabilized in 1983.	Consolidated Site	Consolidated Site	Encompassed by parent site 618-11.	Encompassed by parent site 618-11.	Radionuclides	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.
UPR-600-7	A release occurred, when an employee dumped a wooden box, containing a highly contaminated filter from the High-Level Radiochemistry Facility (327 Building), from the back of a truck to to the ground surface at the 618-11 Burial Ground. The box released a "cloud of dust" that affected surface soil. The 618-11 Burial Ground was surface stabilized in 1983.	Consolidated Site	Consolidated Site	Encompassed by parent site 618-11.	Encompassed by parent site 618-11.	Radionuclides	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.
UPR-600-8	This release resulted in the contamination of 30 ft^2 of surface soil with activity readings up to 100,000 counts/min in the in the 618-11 Burial Ground, from loose contamination blown from the release gate of a cask during routine burial operations. The waste included aluminum rupture cans that had been inspected in the High-Level Radiochemistry Facility (327 Building). Following the release, the area was covered with a layer of clean gravel. The 618-11 Burial Ground was surface stabilized in 1983.	Consolidated Site	Consolidated Site	Encompassed by parent site 618-11.	Encompassed by parent site 618-11.	Radionuclides	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.
UPR-600-9	Waste materials beame wedged in a truck chute and caused an airborne release during burial operations in the 618-11 Burial Ground. Wastes consisted of corroded aluminum rupture cans and pieces of an N-Reactor safety rod from the 327 Building. Waste material readings at the VPU chute were up to 450 mR/h at 1 ft from the release. Contamination within the burial ground fencing was covered with a 3-to 6-inch lift of gravel. Contaminated soil outside the fence was tilled under to bury contamination and release the area from radiation zone status. The 618-11 burial ground was surface stabilized in 1983.	Consolidated Site	Consolidated Site	Encompassed by parent site 618-11.	Encompassed by parent site 618-11.	Radionuclides	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.	Site is a Consolidated Site and is evaluated as part of the parent site 618-11.

a. The actions assumed in Appendix I were developed for cost estimating purposes for this FS. Additional information on components of the alternatives is presented in Chapter 9.

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Appendix H

Ecological Risk Assessment Calculation Brief

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Table H-1. Avian Toxicity Reference Values for SSL Calculation

Group	Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Avian NOAEL TRV (mg/kg/d)	Selected Avian LOAEL TRV (mg/kg/d)
Metals	Aluminum	aluminum sulfate	Carriere et al. 1986	ringed dove	0.155	4 month	oral in diet	reproduction				109.7	---	ES/ER/TM 86/R3		**109.7**	**---**
	Antimony															**---**	**---**
	Arsenic	arsenic oxide	Holcman and Stibilj 1997*	chicken	1.6	19 days during reproduction	oral in diet	reproduction	progeny count			2.24	---	OSWER Directive 9285.7-62		**---**	**---**
	Arsenic	sodium arsenate	Stanley et al. 1994	mallard	1	>10 weeks	oral in diet	reproduction				9.3	40.3			**9.3**	**40.3**
	Barium	barium hydroxide	Johnson et al. 1960	1-day old chicks	0.121	4 weeks	oral in diet	mortality		0.1	subchronic-chronic	20.8	41.7	ES/ER/TM 86/R3		**20.8**	**41.7**
	Beryllium															**---**	**---**
	Bismuth															**---**	**---**
	Boron	boric acid	Smith and Anders 1989	mallard	1	3 weeks pre-, during, and 3 weeks post-reproduction	oral in diet	reproduction	egg fertility, duckling growth, embry and duckling mortality			28.8	100	ES/ER/TM 86/R3		**28.8**	**100**
	Cadmium	multiple forms	multiple studies*	multiple species								1.47	---	OSWER Directive 9285.7-65	Geometric mean of NOAELs for reproduction and growth	**1.47**	**---**
	Cadmium	cadmium sulfate	Leach et al. 1979*	chicken	1.6	12 weeks during egg laying	oral in diet	reproduction	egg production, progeny count			0.593	2.37	OSWER Directive 9285.7-65	lowest bounded reproductive LOAEL above the geometric mean NOAEL from EcoSSL	**---**	**2.37**
	Chromium (3+)	multiple forms	multiple studies*	chicken				reproduction and growth				2.66	---	OSWER Directive 9285.7-66	Geometric mean of NOAELs for reproduction and growth	**2.66**	**---**
	Chromium (3+)	chrome alum doceahydrate	Haseltine et al. unpublished*	black duck	1.17	180-190 days	oral in diet	reproduction	reproductive success			0.569	2.78	OSWER Directive 9285.7-66	lowest bounded reproductive LOAEL above the geometric mean NOAEL from EcoSSL	**---**	**2.78**
	Cobalt	multiple forms	multiple studies*	multiple species				growth	body weight			7.61		OSWER Directive 9285.7-67	Geometric mean of NOAELs for reproduction and growth	**7.61**	
	Cobalt	cobalt chloride	Hill 1979*	chicken	0.328	5 weeks	oral in diet	growth	body weight			3.89	7.8	OSWER Directive 9285.7-67	lowest bounded reproductive LOAEL above the geometric mean NOAEL from EcoSSL	**---**	**7.8**
	Copper	copper	al Ankari et al. 1998*	chicken	1.5161	84 days during egg laying	oral in diet	reproduction	eggs per nest			4.05	12.1	OSWER Directive 9285.7-68	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**4.05**	**12.1**
	Lead	lead acetate	Edens and Garlich 1983*	chicken	1.81	4 weeks during egg laying	oral in diet	reproduction	progeny count			1.63	3.26	OSWER Directive 9285.7-70	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**1.63**	**3.26**
	Lithium															**---**	**---**
	Manganese	multiple forms	multiple studies*	multiple species				reproduction and growth				179	---	OSWER Directive 9285.7-71	Geometric mean of NOAELs for reproduction and growth	**179**	**---**
	Manganese	manganese chloride tetrahydrate	Southern and Baker 1983*	chicken	0.316	14 days	oral in diet	growth	body weight			261	348	OSWER Directive 9285.7-71	lowest bounded growth or reproductive LOAEL above the geometric mean NOAEL from EcoSSL	**---**	**348**
	Mercury	methyl mercury	Heinz and Hoffman 1998; Heinz 1979	mallard	1	2.5 months to two generations	oral in diet	reproduction				0.068	0.37			**0.068**	**0.37**
	Molybdenum	Sodium molybdate	Lepore and Miller 1965	chicken	1.5	21 days through reproduction	oral in diet	reproduction	embryonic viability	0.1	LOAEL-NOAEL	3.53	35.3	ES/ER/TM 86/R3		**3.53**	**35.3**
	Nickel	multiple forms	multiple studies*	multiple species				reproduction and growth				6.71	---	OSWER Directive 9285.7-76	Geometric mean of reproduction and growth studies	**6.71**	**---**
	Nickel	nickel chloride hexahydrate	Martinez and Diaz 1996*	chicken	1.8901	42 days	oral in diet	growth	body weight			5.76	11.5	OSWER Directive 9285.7-76	lowest bounded growth or reproductive LOAEL above the geometric mean NOAEL from EcoSSL	**---**	**11.5**

Table H-1. Avian Toxicity Reference Values for SSL Calculation

Group	Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Avian NOAEL TRV (mg/kg/d)	Selected Avian LOAEL TRV (mg/kg/d)
	Selenium	sodium selenite	El-Begearmi and Combs 1982*	chicken	0.328	2 weeks	oral in diet	survival	mortality			0.29	0.579	OSWER Directive 9285.7-72	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**0.29**	**0.579**
	Silver	silver acetate	Jensen et al. 1974*	turkey	0.662	5 weeks	oral in diet		growth	0.1	LOAEL-NOAEL	2.02	20.2	OSWER Directive 9285.7-77	lowest growth, reproduction, or survival LOAEL, with NOAEL estimated by application of UF	**2.02**	**20.2**
	Strontium															---	---
	Thallium											---	---			---	---
	Tin	bis(Tributyltin) oxide (TBTO)	Schlatterer et al. 1993	Japanese quail	0.15	6 weeks during reproduction	oral in diet	reproduction	egg weight and hatchability			6.8	16.9	ES/ER/TM 86/R3		**6.8**	**16.9**
	Uranium	depleted metallic	Haseltine and Sileo 1983	black duck	1.25	6 weeks	oral in diet	growth, mortality, organ pathology	mortality, body weight, blood chemistry, liver or kidney effects	0.1	subchronic-chronic	16	---	ES/ER/TM 86/R3		**16**	---
	Vanadium	sodium metavanadate	Hill 1979*	chicken	1.042	5 weeks	oral in diet	growth	body weight			0.344	0.688	OSWER Directive 9285.7-75	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**0.344**	**0.688**
	Zinc	multiple forms	multiple studies*	multiple species				reproduction and growth				66.1	---	OSWER Directive 9285.7-73	Geometric mean of reproduction and growth studies	**66.1**	---
	Zinc	zinc acetate	Gibson et al. 1986*	chicken	2	10 weeks	oral in diet	reproduction	progeny count			57.3	66.5	OSWER Directive 9285.7-73	lowest bounded growth or reproductive LOAEL above the geometric mean NOAEL from EcoSSL	---	**66.5**
General Inorganics	Ammonia/Ammonium															---	---
	Chloride															---	---
	Cyanide															---	---
	Fluoride		Pattee et al. 1988	screech owl	0.18	1 mo	oral in diet	reproduction	hatching success			7.8	32	ES/ER/TM 86/R3		7.8	32
	Iodine															---	---
	Nitrate/Nitrite															---	---
	Phosphate															---	---
	Sulfate/Sulfite															---	---
	Total Organic Carbon															---	---
Volatile Organics	1,1-dichloroethane	1,2-dichloroethane (DCA)	Alumot et al. 1976b	chicken	1.6	2 yr	oral in diet	reproduction	reduced egg production			17.2	34.4	ES/ER/TM 86/R3		**17.2**	**34.4**
	1,1-dichloroethene	1,2-dichloroethane (DCA)	Alumot et al. 1976b	chicken	1.6	2 yr	oral in diet	reproduction	reduced egg production			17.2	34.4	ES/ER/TM 86/R3		**17.2**	**34.4**
	1,1,1-trichloroethane	1,2-dichloroethane (DCA)	Alumot et al. 1976b	chicken	1.6	2 yr	oral in diet	reproduction	reduced egg production			17.2	34.4	ES/ER/TM 86/R3		**17.2**	**34.4**
	1,1,2-trichloroethane	1,2-dichloroethane (DCA)	Alumot et al. 1976b	chicken	1.6	2 yr	oral in diet	reproduction	reduced egg production			17.2	34.4	ES/ER/TM 86/R3		**17.2**	**34.4**
	1,1,2,2-tetrachloroethane	1,2-dichloroethane (DCA)	Alumot et al. 1976b	chicken	1.6	2 yr	oral in diet	reproduction	reduced egg production			17.2	34.4	ES/ER/TM 86/R3		**17.2**	**34.4**
	1,2-dichlorobenzene	1,2-dichloroethane (DCA)	Alumot et al. 1976b	chicken	1.6	2 yr	oral in diet	reproduction	reduced egg production			17.2	34.4	ES/ER/TM 86/R3		**17.2**	**34.4**
	1,2-dichloroethane (DCA)	NA	Alumot et al. 1976b	chicken	1.6	2 yr	oral in diet	reproduction	reduced egg production			17.2	34.4	ES/ER/TM 86/R3		**17.2**	**34.4**
	1,3-dichlorobenzene	1,2-dichloroethane (DCA)	Alumot et al. 1976b	chicken	1.6	2 yr	oral in diet	reproduction	reduced egg production			17.2	34.4	ES/ER/TM 86/R3		**17.2**	**34.4**
	2-butanone (Methyl Ethyl Ketone/MEK)	2-hexanone	Abou-Donia et al. 1982	chicken	1.7	90 days	oral gavage	survival, pathology, neurotoxicity	weight loss and ataxia	0.1	LOAEL-NOAEL	10	100			**10**	**100**

Table H-1. Avian Toxicity Reference Values for SSL Calculation

Group	Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Avian NOAEL TRV (mg/kg/d)	Selected Avian LOAEL TRV (mg/kg/d)
	2-hexanone	NA	Abou-Donia et al. 1982	chicken	1.7	90 days	oral gavage	survival, pathology, neurotoxicity	weight loss and ataxia	0.1	LOAEL-NOAEL	10	100			**10**	**100**
	Benzene	xylene	Hill and Camardese 1986	Japanese quail		5 days	oral in diet	growth and mortality		0.01	subacute-chronic	40.7	---		5 day dietary exposure to 4066 mg/kg/d had no effect	**40.7**	**---**
	Butanol															**---**	**---**
	Carbon Tetrachloride	1,2-dichloroethane (DCA)	Alumot et al. 1976b	chicken	1.6	2 yr	oral in diet	reproduction	reduced egg production			17.2	34.4	ES/ER/TM 86/R3		**17.2**	**34.4**
	Chlorobenzene	1,2-dichloroethane (DCA)	Alumot et al. 1976b	chicken	1.6	2 yr	oral in diet	reproduction	reduced egg production			17.2	34.4	ES/ER/TM 86/R3		**17.2**	**34.4**
	Chloroform	1,2-dichloroethane (DCA)	Alumot et al. 1976b	chicken	1.6	2 yr	oral in diet	reproduction	reduced egg production			17.2	34.4	ES/ER/TM 86/R3		**17.2**	**34.4**
	Cis-1,2-dichloroethylene	1,2-dichloroethane (DCA)	Alumot et al. 1976b	chicken	1.6	2 yr	oral in diet	reproduction	reduced egg production			17.2	34.4	ES/ER/TM 86/R3		**17.2**	**34.4**
	Dichloromethane (Methylene Chloride)	1,2-dichloroethane (DCA)	Alumot et al. 1976b	chicken	1.6	2 yr	oral in diet	reproduction	reduced egg production			17.2	34.4	ES/ER/TM 86/R3		**17.2**	**34.4**
	Ethyl Benzene	xylene	Hill and Camardese 1986	Japanese quail		5 days	oral in diet	growth and mortality		0.01	subacute-chronic	40.7	---		5 day dietary exposure to 4066 mg/kg/d had no effect	**40.7**	**---**
	Methyl Isobutyl Ketone	2-hexanone	Abou-Donia et al. 1982	chicken	1.7	90 days	oral gavage	survival, pathology, neurotoxicity	weight loss and ataxia	0.1	LOAEL-NOAEL	10	100			**10**	**100**
	n-butyl Benzene	xylene	Hill and Camardese 1986	Japanese quail		5 days	oral in diet	growth and mortality		0.01	subacute-chronic	40.7	---		5 day dietary exposure to 4066 mg/kg/d had no effect	**40.7**	**---**
	Tetrachloroethylene	1,2-dichloroethane (DCA)	Alumot et al. 1976b	chicken	1.6	2 yr	oral in diet	reproduction	reduced egg production			17.2	34.4	ES/ER/TM 86/R3		**17.2**	**34.4**
	Toluene	xylene	Hill and Camardese 1986	Japanese quail		5 days	oral in diet	growth and mortality		0.01	subacute-chronic	33.3	---		5 day dietary exposure to 4066 mg/kg/d had no effect	**40.7**	**---**
	Trans-1,2-dichloroethylene	1,2-dichloroethane (DCA)	Alumot et al. 1976b	chicken	1.6	2 yr	oral in diet	reproduction	reduced egg production			17.2	34.4	ES/ER/TM 86/R3		**17.2**	**34.4**
	Trichloroethylene (TCE)	1,2-dichloroethane (DCA)	Alumot et al. 1976b	chicken	1.6	2 yr	oral in diet	reproduction	reduced egg production			17.2	34.4	ES/ER/TM 86/R3		**17.2**	**34.4**
	Xylene	NA	Hill and Camardese 1986	Japanese quail		5 days	oral in diet	growth and mortality		0.01	subacute-chronic	40.7	---		5 day dietary exposure to 4066 mg/kg/d had no effect	**40.7**	**---**
Polycyclic Aromatic Hydrocarbons	Acenaphthene	aromatic hydrocarbon mixture	Patton and Dieter 1980	mallard	1.23	7 mo	oral in diet	growth	liver weight			32.5	325		*Mixture of ethylbenzene, 1,2,3,4-tetrahydronaphthalene, dimethylnaphthalene, 2,3,3-trimethylindolenine, acenaphthene, acenaphthylene, phenanthrene, 2-methylbenzothiazole, dibenzothiophene, and 2,6-dimethylquinoline	**32.5**	**325**
	Acenaphthylene	aromatic hydrocarbon mixture	Patton and Dieter 1980	mallard	1.23	7 mo	oral in diet	growth	liver weight			32.5	325		* Mixture of ethylbenzene, 1,2,3,4-tetrahydronaphthalene, dimethylnaphthalene, 2,3,3-trimethylindolenine, acenaphthene, acenaphthylene, phenanthrene, 2-methylbenzothiazole, dibenzothiophene, and 2,6-dimethylquinoline	**32.5**	**325**
	Anthracene	aromatic hydrocarbon mixture	Patton and Dieter 1980	mallard	1.23	7 mo	oral in diet	growth	liver weight			32.5	325		* Mixture of ethylbenzene, 1,2,3,4-tetrahydronaphthalene, dimethylnaphthalene, 2,3,3-trimethylindolenine, acenaphthene, acenaphthylene, phenanthrene, 2-methylbenzothiazole, dibenzothiophene, and 2,6-dimethylquinoline	**32.5**	**325**
	Benzo(a)pyrene	benzo(a)anthracene	Beall 2007	bobwhite quail		60 d	oral in diet	growth				0.65	---		NOAEL based on mean exposure over 60-day duration of the study.	**0.65**	**---**

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Group	Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Avian NOAEL TRV (mg/kg/d)	Selected Avian LOAEL TRV (mg/kg/d)
	Benzo(a)anthracene	NA	Beall 2007	bobwhite quail		60 d	oral in diet	growth				0.65	---		NOAEL based on mean exposure over 60-day duration of the study.	**0.65**	**---**
	Benzo(b)fluoranthene	benzo(a)anthracene	Beall 2007	bobwhite quail		60 d	oral in diet	growth				0.65	---		NOAEL based on mean exposure over 60-day duration of the study.	**0.65**	**---**
	Benzo(ghi)perylene	benzo(a)anthracene	Beall 2007	bobwhite quail		60 d	oral in diet	growth				0.65	---		NOAEL based on mean exposure over 60-day duration of the study.	**0.65**	**---**
	Benzo(k)fluoranthene	benzo(a)anthracene	Beall 2007	bobwhite quail		60 d	oral in diet	growth				0.65	---		NOAEL based on mean exposure over 60-day duration of the study.	**0.65**	**---**
	Chrysene	benzo(a)anthracene	Beall 2007	bobwhite quail		60 d	oral in diet	growth				0.65	---		NOAEL based on mean exposure over 60-day duration of the study.	**0.65**	**---**
	Dibenz(ah)anthracene	benzo(a)anthracene	Beall 2007	bobwhite quail		60 d	oral in diet	growth				0.65	---		NOAEL based on mean exposure over 60-day duration of the study.	**0.65**	**---**
	Fluoranthene	benzo(a)anthracene	Beall 2007	bobwhite quail		60 d	oral in diet	growth				0.65	---		NOAEL based on mean exposure over 60-day duration of the study.	**0.65**	**---**
	Fluorene	aromatic hydrocarbon mixture	Patton and Dieter 1980	mallard	1.23	7 mo	oral in diet	growth	liver weight			32.5	325		* Mixture of ethylbenzene, 1,2,3,4-tetrahydronaphthalene, dimethylnaphthalene, 2,3,3-trimethylindolenine, acenaphthene, acenaphthylene, phenanthrene, 2-methylbenzothiazole, dibenzothiophene, and 2,6-dimethylquinoline	**32.5**	**325**
	Indeno[1,2,3-cd]pyrene	benzo(a)anthracene	Beall 2007	bobwhite quail		60 d	oral in diet	growth				0.65	---		NOAEL based on mean exposure over 60-day duration of the study.	**0.65**	**---**
	2-Methylnaphthalene	aromatic hydrocarbon mixture	Patton and Dieter 1980	mallard	1.23	7 mo	oral in diet	growth	liver weight			32.5	325		* Mixture of ethylbenzene, 1,2,3,4-tetrahydronaphthalene, dimethylnaphthalene, 2,3,3-trimethylindolenine, acenaphthene, acenaphthylene, phenanthrene, 2-methylbenzothiazole, dibenzothiophene, and 2,6-dimethylquinoline	**32.5**	**325**
	Naphthalene	aromatic hydrocarbon mixture	Patton and Dieter 1980	mallard	1.23	7 mo	oral in diet	growth	liver weight			32.5	325		* Mixture of ethylbenzene, 1,2,3,4-tetrahydronaphthalene, dimethylnaphthalene, 2,3,3-trimethylindolenine, acenaphthene, acenaphthylene, phenanthrene, 2-methylbenzothiazole, dibenzothiophene, and 2,6-dimethylquinoline	**32.5**	**325**
	Phenanthrene	aromatic hydrocarbon mixture	Patton and Dieter 1980	mallard	1.23	7 mo	oral in diet	growth	liver weight			32.5	325		* Mixture of ethylbenzene, 1,2,3,4-tetrahydronaphthalene, dimethylnaphthalene, 2,3,3-trimethylindolenine, acenaphthene, acenaphthylene, phenanthrene, 2-methylbenzothiazole, dibenzothiophene, and 2,6-dimethylquinoline	**32.5**	**325**
	Pyrene	Benzo(a)anthracene	Beall 2007	bobwhite quail		60 d	oral in diet	growth				0.65	---		NOAEL based on mean exposure over 60-day duration of the study.	**0.65**	**---**

Table H-1. Avian Toxicity Reference Values for SSL Calculation

Group	Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Avian NOAEL TRV (mg/kg/d)	Selected Avian LOAEL TRV (mg/kg/d)
	Low MW PAHs	aromatic hydrocarbon mixture	Patton and Dieter 1980	mallard	1.23	7 mo	oral in diet	growth	liver weight			32.5	325		* Mixture of ethylbenzene, 1,2,3,4-tetrahydronaphthalene, dimethylnaphthalene, 2,3,3-trimethylindolenine, acenaphthene, acenaphthylene, phenanthrene, 2-methylbenzothiazole, dibenzothiophene, and 2,6-dimethylquinoline	**32.5**	**325**
	High MW PAHs	benzo(a)anthracene	Beall 2007	bobwhite quail		60 d	oral in diet	growth				0.65	---		NOAEL based on mean exposure over 60-day duration of the study.	**0.65**	**---**
Petroleum	Gasoline Range Organics	No. 2 Fuel	Szaro et al. 1981	mallard	1	18 weeks	oral in diet	mortality and growth	reduced growth			500	5000			**500**	**5000**
	TPH - Diesel	No. 2 Fuel	Szaro et al. 1981	mallard	1	18 weeks	oral in diet	mortality and growth	reduced growth			500	5000			**500**	**5000**
	TPH - Kerosene	No. 2 Fuel	Szaro et al. 1981	mallard	1	18 weeks	oral in diet	mortality and growth	reduced growth			500	5000			**500**	**5000**
Semivolatile Organics	Normal paraffin hydrocarbons	aliphatic hydrocarbon mixture	Patton and Dieter 1980	mallard	1.23	7 mo	oral in diet	growth				813	---		* Mixture of n-paraffins (tridecane, pentadecane, hexadecane, heptadecane, octadecane, and nonadecane), iso-paraffins (2,2,4,6,6-pentamethylheptane, 2,2,4,4,6,8,8-heptamethylnonane, and 2,6,10,14-tetramethylpentadecane), and 2-ring cyclo-paraffins (decahydronaphthalene)	**813**	**---**
	Phenol															**---**	**---**
	2-methylphenol (ocresol)															**---**	**---**
	4-methylphenol (pcresol)															**---**	**---**
	2,4-dinitrotoluene	NA	Johnson et al. 2005	bobwhite quail		60 d	oral gavage	hematoxicity and mortality	hematoxicity and mortality	0.01(for NOAEL) 0.25 (for LOAEL)	subchronic-chronic, inter-species differences	0.01	1.3	39 EJ 1138 01D	study and value selected based on an extensive review of available literature - documented in USACHPPM	**0.01**	**1.3**
	Bis[2-ethylhexyl] phthalate	NA	Peakall 1974	ringed dove	0.155	4 wk (during reproduction)	oral in diet	reproduction		NA		1.1		ES/ER/TM 86/R3		**1.1**	**---**
	Total PCBs	aroclor 1254	Dahlgren et al. 1972	ring-necked pheasant	1	17 weeks during egg laying	oral via gelatin capsule	reproduction	reduced egg hatchability	0.1	LOAEL-NOAEL	0.18	1.8	ES/ER/TM 86/R3		**0.18**	**1.8**
	Aroclor 1016	aroclor 1254	Dahlgren et al. 1972	ring-necked pheasant	1	17 weeks during egg laying	oral via gelatin capsule	reproduction	reduced egg hatchability	0.1	LOAEL-NOAEL	0.18	1.8	ES/ER/TM 86/R3		**0.18**	**1.8**
	Aroclor 1221	aroclor 1254	Dahlgren et al. 1972	ring-necked pheasant	1	17 weeks during egg laying	oral via gelatin capsule	reproduction	reduced egg hatchability	0.1	LOAEL-NOAEL	0.18	1.8	ES/ER/TM 86/R3		**0.18**	**1.8**
	Aroclor 1232	aroclor 1254	Dahlgren et al. 1972	ring-necked pheasant	1	17 weeks during egg laying	oral via gelatin capsule	reproduction	reduced egg hatchability	0.1	LOAEL-NOAEL	0.18	1.8	ES/ER/TM 86/R3		**0.18**	**1.8**
	Aroclor 1242	aroclor 1254	Dahlgren et al. 1972	ring-necked pheasant	1	17 weeks during egg laying	oral via gelatin capsule	reproduction	reduced egg hatchability	0.1	LOAEL-NOAEL	0.18	1.8	ES/ER/TM 86/R3		**0.18**	**1.8**
	Aroclor 1248	aroclor 1254	Dahlgren et al. 1972	ring-necked pheasant	1	17 weeks during egg laying	oral via gelatin capsule	reproduction	reduced egg hatchability	0.1	LOAEL-NOAEL	0.18	1.8	ES/ER/TM 86/R3		**0.18**	**1.8**
	Aroclor 1254	aroclor 1254	Dahlgren et al. 1972	ring-necked pheasant	1	17 weeks during egg laying	oral via gelatin capsule	reproduction	reduced egg hatchability	0.1	LOAEL-NOAEL	0.18	1.8	ES/ER/TM 86/R3		**0.18**	**1.8**
	Aroclor 1260	aroclor 1254	Dahlgren et al. 1972	ring-necked pheasant	1	17 weeks during egg laying	oral via gelatin capsule	reproduction	reduced egg hatchability	0.1	LOAEL-NOAEL	0.18	1.8	ES/ER/TM 86/R3		**0.18**	**1.8**
	Aroclor 1262	aroclor 1254	Dahlgren et al. 1972	ring-necked pheasant	1	17 weeks during egg laying	oral via gelatin capsule	reproduction	reduced egg hatchability	0.1	LOAEL-NOAEL	0.18	1.8	ES/ER/TM 86/R3		**0.18**	**1.8**
Herbicide	Dichloroprop															**---**	**---**

Table H-1. Avian Toxicity Reference Values for SSL Calculation

Group	Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Avian NOAEL TRV (mg/kg/d)	Selected Avian LOAEL TRV (mg/kg/d)
Pesticide	Aldrin	NA	Hall et al. 1971	ring-necked pheasant		6 weeks	oral via gelatin capsule	growth		0.1(for NOAEL) 0.25 (for LOAEL)	subchronic-chronic	0.007	0.035	39 EJ 1138 01J	study and value selected based on an extensive review of available literature - documented in USACHPPM	**0.007**	**0.035**
	beta-1,2,3,4,5,6-Hexachlorocyclohexane	gamma hexachlorobenzene (lindane)	Chakravarty and Lahiri 1986; Chakravarty et al. 1986	mallard	1	8 wks	oral intubation	reproduction	eggshell thickness, egg number, etc.	0.1	for interspecies uncertainty	0.571	0.857	87 MA02T6 05C	study and value selected based on an extensive review of available literature - documented in USACHPPM	**0.571**	**0.857**
	alpha-Chlordane	chlordane	Stickel et al. 1983	red-winged blackbird	0.064	84 d	oral in diet	mortality				2.14	10.7	ES/ER/TM 86/R3		**2.14**	**10.7**
	gamma-Chlordane	chlordane	Stickel et al. 1983	red-winged blackbird	0.064	84 d	oral in diet	mortality				2.14	10.7	ES/ER/TM 86/R3		**2.14**	**10.7**
	Dichlorodiphenyldichloroethylene	DDT	Cecil et al. 1978	chicken		30 d	oral in diet	growth	body weight			0.227	2.27	OSWER Directive 9285.7 57	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**0.227**	**---**
	Dichlorodiphenyldichloroethylene	DDT	Heath et al. 1969	mallard		1 yr	oral in diet	reproduction	reproductive success			0.563	1.892	OSWER Directive 9285.7 57	value is lowest reproductive LOAEL above the NOAEL used for the EcoSSL; NOAEL is from same study	**---**	**1.892**
	Dichlorodiphenyltrichloroethane	NA	Cecil et al. 1978	chicken		30 d	oral in diet	growth	body weight			0.227	2.27	OSWER Directive 9285.7 57	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**0.227**	**---**
	Dichlorodiphenyltrichloroethane	NA	Heath et al. 1969	mallard		1 yr	oral in diet	reproduction	reproductive success			0.563	1.892	OSWER Directive 9285.7 57	value is lowest reproductive LOAEL above the NOAEL used for the EcoSSL; NOAEL is from same study	**---**	**1.892**
	Dieldrin	NA	Nebeker et al. 1992	mallard		24 d	oral in diet	growth	body weight			0.0709	3.78	OSWER Directive 9285.7 56	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**0.0709**	**---**
	Dieldrin	NA	Wiese et al. 1968	crowned guinea fowl		21 month	oral in diet	reproduction	number of progeny			0.0671	0.223	OSWER Directive 9285.7 56	value is lowest reproductive LOAEL above the NOAEL used for the EcoSSL; NOAEL is from same study	**---**	**0.223**
	Endosulfan I	endosulfan	Abiola 1992	gray partridge	0.4	4 wk (during reproduction)	oral in diet	reproduction				10	---	ES/ER/TM 86/R3		**10**	**---**
	Endosulfan II	endosulfan	Abiola 1992	gray partridge	0.4	4 wk (during reproduction)	oral in diet	reproduction				10	---	ES/ER/TM 86/R3		**10**	**---**
	Endosulfan sulfate	endosulfan	Abiola 1992	gray partridge	0.4	4 wk (during reproduction)	oral in diet	reproduction				10	---	ES/ER/TM 86/R3		**10**	**---**
	Endrin aldehyde	endrin	Spann et al. 1986	mallard	1.15	>200 d	oral in diet	reproduction				0.3	---	ES/ER/TM 86/R3		**0.3**	**---**
	Methoxychlor															**---**	**---**

Table H-1. Avian Toxicity Reference Values for SSL Calculation

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

Notes:

Uncertainty factors were used to adjust all measured effect concentrations to chronic NOAELS and chronic LOAELs as follows:

LOAEL to NOAEL = 0.1

Subchronic to chronic = 0.1

where:

chronic = >12 weeks or during critical lifestage

subchronic = 4 to 12 weeks

These uncertainty factors are consistent with methods used in development of the EcoSSLs (EPA, 2007a) and are more conservative than uncertainty factors recommended in EPA 540-R-97-006.

*Study information and calculated NOAELs and LOAELs for these sources were taken directly from the cited EcoSSL report developed by the EPA. All other primary sources were obtained, reviewed, and TRVs were extracted or developed from the study.

EcoSSL = Ecologicla Soil Screenign Level

EPA = United States Evironmental Protection Agency

LOAEL = lowest observable adverse effect level

NOAEL = no observable adverse effect level

mg/kg/d = milligram per kilogram per day

TRV = toxicity reference value

my Center for Health Promotion and Preventive Medicine

Bold = values selected as the avian TRVs

Table H-2. Mammalian Toxicity Reference Values for SSL Calculation

Group	Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
Metals	Aluminum	aluminum chloride	Ondreicka et al., 1966	mouse	0.03	3 generations	oral in water	reproduction	offspring growth	0.1	LOAEL-NOAEL	1.93	19.3	ES/ER/TM-86/R3	Note that soil pH must be <5.5 (EPA, 2003) for Al to be bioavailable.	**1.93**	**19.3**
	Antimony	antimony trichloride	*Rossi et al., 1987	rat	0.33	31 days	oral in water	reproduction	progeny body weight			0.059	0.59	OSWER Directive 9285.7-61	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**0.059**	**0.59**
	Arsenic	sodium arsenite	*Neiger and Osweiler, 1989	dog	10.1	8 weeks	oral in diet	growth	reduced body weight			1.04	1.66	OSWER Directive 9285.7-62	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**1.04**	**1.66**
	Barium	multiple forms	*multiple studies	multiple species								51.8		OSWER Directive 9285.7-63	geometric mean of NOAELs for reproduction and growth	**---**	**---**
	Barium	barium chloride	NTP, 1994	rat	0.35	105 weeks	oral in water	nephrotoxicity	increased kidney weight			45	75		study selected because NOAEL is similar to EcoSSL, study is of long duration, and a LOAEL was identified.	**45**	**75**
	Beryllium	beryllium sulfate	*Schroeder and Mitchener, 1975	rat	0.486	lifetime	oral in water	longevity				0.532		OSWER Directive 9285.7-64	Same study as ES/E/TM-86/R3, but used different body weight in calculation of NOAEL	**0.532**	**---**
	Bismuth															**---**	**---**
	Boron	boric acid or Borax	Weir and Fischer, 1972	rat	0.35	three generations	oral in diet	reproduction	sterility			28	93.6	ES/ER/TM-86/R3		**28**	**93.6**
	Cadmium	cadmium acetate	*Yuhas et al., 1979	rat	0.43	2 weeks	oral in water	growth	body weight			0.77	7.7	OSWER Directive 9285.7-65	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**---**	**---**
	Cadmium	cadmium chloride	Sutou et al., 1980a and 1980b	rat	0.303	6 weeks during reproduction	oral gavage	reproduction	reduced fetal survival			1	10	ES/ER/TM-86/R3	The ORNL TRV for cadmium was selected as it represents reproductive effects, is a longer study, and is comparable to the TRV used for EcoSSLs	**1**	**10**
	Chromium (6+)	multiple forms	*multiple studies	multiple species				reproduction and growth				9.24		OSWER Directive 9285.7-66	geometric mean of NOAELs for reproduction and growth	**9.24**	**---**
	Chromium (6+)	sodium dichromate	Chowdhury and Mitra, 1995	rat	0.3084	90 days	oral gavage	reproduction	testes weight			20	40	OSWER Directive 9285.7-66	lowest bounded reproductive LOAEL above the geometric mean NOAEL from EcoSSL	**---**	**40**
	Chromium (3+)	multiple forms	*multiple studies	multiple species				reproduction and growth				2.4		OSWER Directive 9285.7-66	geometric mean of NOAELs for reproduction and growth	**2.4**	**---**
	Chromium (3+)	chromium sulfate	*Zahid et al., 1990	mouse	0.0249	35 days	oral in diet	reproduction	sperm cell counts	0.1	LOAEL-NOAEL	0.962	9.62	OSWER Directive 9285.7-66	lowest reproductive LOAEL above the geometric mean NOAEL from EcoSSL	**---**	**9.62**
	Cobalt	multiple forms	*multiple studies	multiple species				reproduction and growth				7.33		OSWER Directive 9285.7-67	geometric mean of NOAELs for reproduction and growth	**7.33**	**---**
	Cobalt	cobalt chloride	*Domingo et al., 1985	rat	0.3	28 days	gavage	reproduction	progeny body weight			5.45	10.9	OSWER Directive 9285.7-67	lowest bounded reproductive LOAEL above the geometric mean NOAEL from EcoSSL	**---**	**10.9**
	Copper	copper sulfate pentahydrate	*Allcroft et al., 1961	pig	100	4 weeks	oral in diet	growth	body weight			5.6	9.34	OSWER Directive 9285.7-68	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**5.6**	**9.34**
	Lead	lead acetate	*Kimmel et al., 1980	rat	0.3	7 weeks during gestation	oral in water	growth	body weight			4.7	8.9	OSWER Directive 9285.7-68	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**4.7**	**8.9**
	Lithium	lithium carbonate	Marathe and Thomas, 1986	rat	0.35	days 6-15 of gestation	oral in diet	reproduction	reduced number of offspring			9.4	18.8	ES/ER/TM-86/R3		**9.4**	**18.8**
	Manganese	multiple forms	*multiple studies	multiple species				reproduction and growth				51.5		OSWER Directive 9285.7-71	geometric mean of NOAELs for reproduction and growth	**51.5**	**---**

Table H-2. Mammalian Toxicity Reference Values for SSL Calculation

Group	Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
	Manganese	manganese oxide	*Rehnberg et al., 1980	rat	0.0566	20 days	gavage	reproduction, growth	reproductive organ histology, body weight			21	71	OSWER Directive 9285.7-71	lowest bounded growth or reproductive LOAEL above the geometric mean NOAEL from EcoSSL	---	71
	Mercury	methylmercury chloride	Verschuuren et al., 1976a	rat	0.35	three generations	oral in diet	reproduction	pup viability			0.032	0.16	ES/ER/TM-86/R3		0.032	0.16
	Molybdenum	molybdate (MoO4)	Schroeder and Mitchener, 1971	mouse	0.03	three generations	oral in water	reproduction	reproductive success, number of runts	0.1	LOAEL-NOAEL	0.26	2.6	ES/ER/TM-86/R3		0.26	2.6
	Nickel	nickelous chloride	*Pandey and Srivastava, 2000	mouse	0.025	35 days	oral (other)	reproduction	sperm cell counts			1.7	3.4	OSWER Directive 9285.7-76	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	1.7	3.4
	Selenium	sodium selenite	*Mahan and Moxon, 1984	pig	17.8	37 days	oral in diet	growth	body weight			0.143	0.215	OSWER Directive 9285.7-72	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	0.143	0.215
	Silver	silver acetate	*Van Vleet, 1976	pig	8.86	40 days	oral in diet	growth	body weight	0.1	LOAEL-NOAEL	6.02	60.2	OSWER Directive 9285.7-77	lowest growth, reproduction, or survival LOAEL, with NOAEL estimated by application of UF	6.02	60.2
	Strontium	strontium chloride	Skoryna, 1981	rat	0.35	3 yrs	oral in water	growth	body weight			263		ES/ER/TM-86/R3		263	---
	Thallium	thallium sulfate	Formigli et al., 1986	rat	0.365	60 days	drinking water	reproduction	sperm motility	0.05 and 0.25	subchronic LOAEL-chronic NOAEL; subchronic LOAEL-chronic LOAEL	0.015	0.075	ES/ER/TM-86/R3; 37 EJ1138 01O	study and value selected based on an extensive review of available literature - documented in USACHPPM	0.015	0.075
	Tin	bis-tibutyltin-oxide (TBTO)	Davis et al., 1987	mouse	0.03	days 6-15 of gestation	oral intubation	reproduction	reduced fetal weight and fetal survival			23.4	35	ES/ER/TM-86/R3		23.4	35
	Uranium	uranyl acetate	Paternain et al., 1989	mouse	0.028	60 d prior to gestation, gestation, delivery, lactation	oral intubation	reproduction	pup survival and body weight			3.07	6.13	ES/ER/TM-86/R3	Note that the study selected by ES/ER/TM-86/R3, is one of the studies reviewed by Sheppard et al., 2005. The selected LOAEL approximates the mean of developmental values referenced in Sheppard et al., 2005	3.07	6.13
	Vanadium	sodium orthovanadate	*Sanchez et al., 1991	mouse	0.047	12 days during gestation	gavage	reproduction	ODVP			4.16	8.31	OSWER Directive 9285.7-75	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	4.16	8.31
	Zinc	various forms	*multiple studies	multiple species				reproduction and growth				75.4		OSWER Directive 9285.7-73	geometric mean of NOAELs for reproduction and growth	75.4	---
	Zinc	zinc sulfate	*Miller et al., 1989	cattle	580	14 weeks	oral in diet	reproduction	progeny body weight			37.9	75.9	OSWER Directive 9285.7-73	lowest bounded growth or reproductive LOAEL above the geometric mean NOAEL from EcoSSL	---	75.9
General Inorganics	Ammonia/Ammonium															---	---
	Chloride															---	---
	Cyanide	potassium cyanide	Tewe and Maner, 1981	rat	0.273	gestation and lactation	oral in diet	reproduction	juvenile growth			68.7	---	ES/ER/TM-86/R3		68.7	---
	Fluoride	sodium fluoride	Aulerich et al., 1987	mink	1	382 days	oral in diet	reproduction	kit survival			31.37	52.75	ES/ER/TM-86/R3		31.37	52.75
	Iodine	potassium iodide	Aulerich et al., 1978	mink	1	breeding through lactation	oral in diet	reproduction	kit survival			1.37	13.7			1.37	13.7
	Nitrate/Nitrite	potassium nitrate	Sleight and Atallah, 1968	guinea pig	0.86	143-204 days	oral in water	reproduction	number of live births			507	1130	ES/ER/TM-86/R3		507	1130
	Phosphate															---	---
	Sulfate/Sulfite															---	---
	Total Organic Carbon															---	---

Table H-2. Mammalian Toxicity Reference Values for SSL Calculation

Group	Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
Volatile Organics	1,1-dichloroethane	1,2-dichloroethane (DCA)	Lane et al., 1982	mouse	0.035	2 generations	oral in water	reproduction				50	---	ES/ER/TM-86/R3		**50**	**---**
	1,1-dichloroethene	NA	Quast et al., 1983	rat	0.35	2 years	oral in water	mortality, body weight				30	---	ES/ER/TM-86/R3		**30**	**---**
	1,1,1-trichloroethane	NA	Lane et al., 1982	mouse	0.035	2 generations	oral in water	reproduction				1000	---	ES/ER/TM-86/R3		**1000**	**---**
	1,1,2-trichloroethane	1,1,1-trichloroethane	Lane et al., 1982	mouse	0.035	2 generations	oral in water	reproduction				1000	---	ES/ER/TM-86/R3		**1000**	**---**
	1,1,2,2-tetrachloroethane	1,1,1,2-tetrachloroethane	NTP, 1983	rat		103 wks	oral gavage	nephrotoxicity		0.1	LOAEL-NOAEL	8.93	89.3	IRIS	Verified on IRIS (http://www.epa.gov/ncea/iris/subst/0265.htm) Dec 11, 2009	**8.93**	**89.3**
	1,2-dichlorobenzene	NA	NTP, 1985	rat		2 yrs	oral gavage	survival and pathology				85.7	---	IRIS	Verified on IRIS (http://www.epa.gov/ncea/iris/subst/0408.htm) Dec 11, 2009	**85.7**	**---**
	1,2-dichloroethane (DCA)	NA	Lane et al., 1982	mouse	0.035	2 generations	oral in water	reproduction				50	---	ES/ER/TM-86/R3		**50**	**---**
	1,3-dichlorobenzene	1,2-dichlorobenzene	NTP, 1985	rat		2 yrs	oral gavage	survival and pathology				85.7	---	IRIS	Verified on IRIS (http://www.epa.gov/ncea/iris/subst/0408.htm) Dec 11, 2009	**85.7**	**---**
	2-butanone (Methyl Ethyl Ketone/MEK)	NA	Cox et al., 1975	rat	0.35	2 generations	oral in water	reproduction	reduced litter size and pup survival			1771	4571	ES/ER/TM-86/R3		**1771**	**4571**
	2-hexanone	NA	O'Donoghue et al., 1978	rat		13 month	oral in water	neurotoxicity				5	36.1	IRIS	Verified on IRIS (http://www.epa.gov/ncea/iris/subst/1019.htm) Dec 11, 2009; NOAEL is BMDL10 value; LOAEL is BMD10 value	**5**	**36.1**
	Benzene	NA	Wolf et al., 1956	rat	0.175-0.250	187 days	oral gavage	survival and pathology	hemotoxicity			0.7	7			**0.7**	**7**
	Butanol	NA	EPA, 1986	rat		13 weeks	oral gavage	hypoactivity/ataxia				125	500	IRIS	Verified on IRIS (http://www.epa.gov/ncea/iris/subst/0140.htm) Dec 11, 2009	**125**	**500**
	Carbon Tetrachloride	NA	Alumot et al., 1976a	rat	0.35	2 yrs	oral in diet	reproduction				16	---	ES/ER/TM-86/R3		**16**	**---**
	Chlorobenzene	NA	Monsanto Co., 1967	dog		13 weeks	oral in capsules	liver pathology				19.5	38.7	IRIS	Verified on IRIS (http://www.epa.gov/ncea/iris/subst/0399.htm) Dec 11, 2009	**19.5**	**38.7**
	Chloroform	NA	Palmer et al., 1979	rat	0.35	13 wk	oral intubation	liver, kidney, gonad condition	gonadal atrophy	0.1	subchronic-chronic	15	41	ES/ER/TM-86/R3		**15**	**41**
	Cis-1,2-dichloroethylene	1,2-dichloroethylene	Palmer et al., 1979	mouse	0.03	90 days	oral in water	body and organ weights				45.2	---	ES/ER/TM-86/R3		**45.2**	**---**
	Dichloromethane (Methylene Chloride)	NA	NCA, 1982	rat	0.35	2 yrs	oral in water	liver histology				5.85	50	ES/ER/TM-86/R3		**5.85**	**50**
	Ethyl Benzene	NA	Wolf et al., 1956	rat	0.175-0.250	182 days	oral gavage	survival and pathology	liver and kidney histopathology			136	408			**97.1**	**291**
	Methyl Isobutyl Ketone	2-butanone (Methyl Ethyl Ketone/MEK)	Cox et al., 1975	rat	0.35	2 generations	oral in water	reproduction	reduced litter size and pup survival			1771	4571	ES/ER/TM-86/R3		**1771**	**4571**
	n-butyl Benzene	isopropyl benzene	Wolf et al., 1956	rat	0.175-0.250	194 days	oral gavage	survival and pathology	increased kidney weight			110	330			**110**	**330**
	Tetrachloroethylene	1,1,2,2-tetrachloroethylene	Buben and O'Flaherty, 1985	mouse	0.03	6 weeks	oral gavage	hepatotoxicity		0.1	LOAEL-NOAEL	1.4	7	ES/ER/TM-86/R3		**1.4**	**7**
	Toluene	NA	Gospe et al,. 1994	rat	0.2	gestation days 6-19	oral gavage	reproduction	maternal weight loss			52	520			**52**	**520**
	Trans-1,2-dichloroethylene	1,2-dichloroethylene	Palmer et al., 1979	mouse	0.03	90 days	oral in water	body and organ weights				45.2	---	ES/ER/TM-86/R3		**45.2**	**---**
	Trichloroethylene (TCE)	NA	Buben and O'Flaherty, 1985	mouse	0.03	6 weeks	oral gavage	hepatotoxicity		0.01	LOAEL-NOAEL subchronic-chronic	0.7	7	ES/ER/TM-86/R3		**0.7**	**7**
	Xylene	xylene mixture	NTP, 1986	rat		103 wks	oral gavage	behavior growth mortality				179	350			**179**	**350**

Table H-2. Mammalian Toxicity Reference Values for SSL Calculation

Group	Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
Polycyclic Aromatic Hydrocarbons	Acenaphthene	NA	EPA, 1989a	mouse	0.03	90 days	oral gavage	hepatotoxicity	liver weight changes and cellular hypertrophy			175	350	IRIS	Verified on IRIS (http://www.epa.gov/ncea/iris/subst/0442.htm) Dec 9, 2009	**175**	**350**
	Acenaphthylene	acenaphthene	EPA, 1989a	mouse	0.03	90 days	oral gavage	hepatotoxicity	liver weight changes and cellular hypertrophy			175	350	IRIS	Verified on IRIS (http://www.epa.gov/ncea/iris/subst/0442.htm) Dec 9, 2009	**175**	**350**
	Anthracene	NA	EPA, 1989b	mouse	0.03	90 days	oral gavage	survival and pathology	reduced body weight			1000	---	IRIS	Verified on IRIS (http://www.epa.gov/ncea/iris/subst/0434.htm) Dec 9, 2009	**1000**	**---**
	Benzo(a)pyrene	NA	Mackenzie and Angevine, 1981	mouse	0.03	gestation days 7-16	oral intubation	reproduction	reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/R3; 39 EJ 1138-01P	study and value selected based on an extensive review of available literature - documented in USACHPPM	**1**	**10**
	Benzo(a)anthracene	benzo(a)pyrene	Mackenzie and Angevine, 1981	mouse	0.03	gestation days 7-16	oral intubation	reproduction	reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/R3; 39 EJ 1138-01P	study and value selected based on an extensive review of available literature - documented in USACHPPM	**1**	**10**
	Benzo(b)fluoranthene	benzo(a)pyrene	Mackenzie and Angevine, 1981	mouse	0.03	gestation days 7-16	oral intubation	reproduction	reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/R3; 39 EJ 1138-01P	study and value selected based on an extensive review of available literature - documented in USACHPPM	**1**	**10**
	Benzo(ghi)perylene	benzo(a)pyrene	Mackenzie and Angevine, 1981	mouse	0.03	gestation days 7-16	oral intubation	reproduction	reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/R3; 39 EJ 1138-01P	study and value selected based on an extensive review of available literature - documented in USACHPPM	**1**	**10**
	Benzo(k)fluoranthene	benzo(a)pyrene	Mackenzie and Angevine, 1981	mouse	0.03	gestation days 7-16	oral intubation	reproduction	reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/R3; 39 EJ 1138-01P	study and value selected based on an extensive review of available literature - documented in USACHPPM	**1**	**10**
	Chrysene	benzo(a)pyrene	Mackenzie and Angevine, 1981	mouse	0.03	gestation days 7-16	oral intubation	reproduction	reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/R3; 39 EJ 1138-01P	study and value selected based on an extensive review of available literature - documented in USACHPPM	**1**	**10**
	Dibenz(ah)anthracene	benzo(a)pyrene	Mackenzie and Angevine, 1981	mouse	0.03	gestation days 7-16	oral intubation	reproduction	reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/R3; 39 EJ 1138-01P	study and value selected based on an extensive review of available literature - documented in USACHPPM	**1**	**10**
	Fluoranthene	NA	EPA, 1988b	mouse	0.03	13 weeks	oral gavage	nephropathy	increased liver wt and pathology			125	250	IRIS	Verified on IRIS (http://www.epa.gov/ncea/iris/subst/0444.htm) Dec 9, 2009	**125**	**250**
	Fluorene	NA	EPA, 1989c	mouse	0.03	13 weeks	oral gavage	hemotoxicity				125	250	IRIS	Verified on IRIS (http://www.epa.gov/ncea/iris/subst/0435.htm) Dec 9, 2009	**125**	**250**
	Indeno[1,2,3-cd]pyrene	benzo(a)pyrene	Mackenzie and Angevine, 1981	mouse	0.03	gestation days 7-16	oral intubation	reproduction	reduced pregnancy rate and fertility	0.1	LOAEL-NOAEL	1	10	ES/ER/TM-86/R3; 39 EJ 1138-01P	study and value selected based on an extensive review of available literature - documented in USACHPPM	**1**	**10**
	2-Methylnaphthalene	NA	Murata et al., 1997	mouse	0.0425	81 wks	oral in diet	survival and pathology	pulmonary pathology			50.3	113.8			**50.3**	**113.8**
	Naphthalene	NA	NTP, 1991	rat	0.24	days 6-15 of gestation	oral gavage	reproduction	maternal weight loss			50	150			**50**	**150**
	Phenanthrene	anthracene	EPA, 1989b	rat	0.03	90 days	oral gavage	survival and pathology	reduced body weight			1000	---	IRIS	Verified on IRIS (http://www.epa.gov/ncea/iris/subst/0434.htm) Dec 9, 2009	**1000**	**---**
	Pyrene	NA	EPA, 1989d	mouse	0.03	13 weeks	oral gavage	nephropathy				75	125	IRIS	Verified on IRIS (http://www.epa.gov/ncea/iris/subst/0445.htm) Dec 9, 2009	**75**	**125**
	Low MW PAHs	1-naphthaleneacetic acid	*Verschuuren et al., 1976b	rat	0.247	6 weeks	oral in diet	growth	reduced body weight			65.6	328	OSWER Directive 9285.7-78	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**65.6**	**328**

Table H-2. Mammalian Toxicity Reference Values for SSL Calculation

Group	Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
	High MW PAHs	benzo(a)pyrene	*Culp et al., 1998	mouse	0.038	55 weeks	oral in diet	survival	reduced survival			0.615	3.07	OSWER Directive 9285.7-78	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**0.615**	**3.07**
Petroleum	Gasoline Range Organics	JP-8 jet fuel	Cooper and Mattie, 1996	rat	0.35	gestation days 6-15	oral gavage	reproduction	adult and fetal weight; fetal mortality			1000	1500			**1000**	**1500**
	TPH - Diesel	JP-8 jet fuel	Cooper and Mattie, 1996	rat	0.35	gestation days 6-15	oral gavage	reproduction	adult and fetal weight; fetal mortality			1000	1500			**1000**	**1500**
	TPH - Kerosene	JP-8 jet fuel	Cooper and Mattie, 1996	rat	0.35	gestation days 6-15	oral gavage	reproduction	adult and fetal weight; fetal mortality			1000	1500			**1000**	**1500**
Semivolatile Organics	Normal paraffin hydrocarbons	JP-8 jet fuel	Cooper and Mattie, 1996	rat	0.35	gestation days 6-15	oral gavage	reproduction	adult and fetal weight; fetal mortality			1000	1500			**1000**	**1500**
	Phenol	NA	EPAOTS0573686	rat		gestation days 6-15	oral gavage	reproduction	reduced fetal weight	0.1	for interspecies uncertainty	12	36	87 MA02T6 05E	study and value selected based on an extensive review of available literature - documented in USACHPPM	**12**	**36**
	2-methylphenol (ocresol)	NA	Hornshaw et al., 1986	mink	0.958	6 month	oral in diet	reproduction				313	---	ES/ER/TM-86/R3	calculations have been updated to use body weight and ingestion data from primary source	**313**	**---**
	4-methylphenol (pcresol)	2-methylphenol (ocresol)	Hornshaw et al., 1986	mink	0.958	6 month	oral in diet	reproduction				313	---	ES/ER/TM-86/R3	calculations have been updated to use body weight and ingestion data from primary source	**313**	**---**
	2,4-dinitrotoluene	NA	Ellis et al., 1979	dog		24 months	oral in capsules	hemotoxicity and mortality	hemotoxicity and mortality			0.67	1.4	39 EJ 1138 01D	NOAEL and LOAEL are LED10 and ED10 values, respectively calcualted using EPA benchmark dose software. Study for benchmark calculation selected based on an extensive review of available literature - documented in USACHPPM	**0.67**	**1.4**
	Bis[2-ethylhexyl] phthalate	NA	Lamb et al., 1987	mouse	0.03	105 days (during reproduction)	oral in diet	reproduction				18.3	183	ES/ER/TM-86/R3		**18.3**	**183**
	Total PCBs	aroclor 1254	McCoy et al., 1995	Oldfield mouse	0.014	12 months	oral in diet	reproduction	reduced number of litters, pup body weight, and pup survival	0.1	LOAEL-NOAEL	0.068	0.68	ES/ER/TM-86/R3		**0.068**	**0.68**
	Aroclor 1016	aroclor 1016	EPA/600/3¬80/033	mink	1	18 months	oral in diet	reproduction	reduced kit growth			1.37	3.43	ES/ER/TM-86/R3		**1.37**	**3.43**
	Aroclor 1221	aroclor 1254	McCoy et al., 1995	Oldfield mouse	0.014	12 months	oral in diet	reproduction	reduced number of litters, pup body weight, and pup survival	0.1	LOAEL-NOAEL	0.068	0.68	ES/ER/TM-86/R3		**0.068**	**0.68**
	Aroclor 1232	aroclor 1254	McCoy et al., 1995	Oldfield mouse	0.014	12 months	oral in diet	reproduction	reduced number of litters, pup body weight, and pup survival	0.1	LOAEL-NOAEL	0.068	0.68	ES/ER/TM-86/R3		**0.068**	**0.68**
	Aroclor 1242	aroclor 1242	Bleavins et al., 1980	mink	1	7 months	oral in diet	reproduction	total reproductive failure	0.1	LOAEL-NOAEL	0.069	0.69	ES/ER/TM-86/R3		**0.069**	**0.69**
	Aroclor 1248	aroclor 1248	Barsotti et al., 1976	Rhesus monkey	5	14 months	oral in diet	reproduction	reduced pregnancy and live birth rates	0.1	LOAEL-NOAEL	0.0087	0.087	ES/ER/TM-86/R3	recalculated: study reports PCB consumption of 0.43 mg PCB/day	**0.0087**	**0.087**
	Aroclor 1254	aroclor 1254	McCoy et al., 1995	Oldfield mouse	0.014	12 months	oral in diet	reproduction	reduced number of litters, pup body weight, and pup survival	0.1	LOAEL-NOAEL	0.068	0.68	ES/ER/TM-86/R3		**0.068**	**0.68**

Table H-2. Mammalian Toxicity Reference Values for SSL Calculation

Group	Soil Constituent	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied	Uncertainty Factor type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source	Notes	Selected Mammalian NOAEL TRV (mg/kg/d)	Selected Mammalian LOAEL TRV (mg/kg/d)
	Aroclor 1260	aroclor 1254	McCoy et al., 1995	Oldfield mouse	0.014	12 months	oral in diet	reproduction	reduced number of litters, pup body weight, and pup survival	0.1	LOAEL-NOAEL	0.068	0.68	ES/ER/TM-86/R3		**0.068**	**0.68**
	Aroclor 1262	aroclor 1254	McCoy et al., 1995	Oldfield mouse	0.014	12 months	oral in diet	reproduction	reduced number of litters, pup body weight, and pup survival	0.1	LOAEL-NOAEL	0.068	0.68	ES/ER/TM-86/R3		**0.068**	**0.68**
Herbicide	Dichloroprop															**---**	**---**
Pesticide	Aldrin	NA	Treon and Cleveland, 1955	rat	0.35	3 generations	oral in diet	reproduction	number of litters and offspring mortality		---	0.2	1	ES/ER/TM-86/R3		**0.2**	**1**
	beta-1,2,3,4,5,6-Hexachlorocyclohexane	NA	Van Velsen et al., 1986	rat	0.35	13 weeks	oral in diet	growth, blood chemistry, organ histology	gonadal atrophy in male and female rats	0.1	chronic-subchronic	0.4	2	ES/ER/TM-86/R3		**0.4**	**2**
	alpha-Chlordane	chlordane	Narotsky and Kavlock, 1995	rat		GD-6-19	oral gavage	reproduction	post natal pup viability	0.1	LOAEL-NOAEL	2.1	21	87 MA02T6 05A	study and value selected based on an extensive review of available literature - documented in USACHPPM	**2.1**	**21**
	gamma-Chlordane	chlordane	Narotsky and Kavlock, 1995	rat		GD-6-19	oral gavage	reproduction	post natal pup viability	0.1	LOAEL-NOAEL	2.1	21	87 MA02T6 05A	study and value selected based on an extensive review of available literature - documented in USACHPPM	**2.1**	**21**
	Dichlorodiphenyldichloroethylene (DDE)	DDT	Wrenn et al., 1970	rat		15 days (during gestation)	oral gavage	reproduction				0.147	0.735	EPA, 2007a	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**0.147**	**0.735**
	Dichlorodiphenyltrichloroethane (DDT)	NA	Wrenn et al., 1970	rat		15 days (during gestation)	oral gavage	reproduction				0.147	0.735	EPA, 2007a	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**0.147**	**0.735**
	Dieldrin	NA	Harr et al., 1970	rat		750 days	oral in diet	reproduction			---	0.015	0.03	EPA, 2007b	value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study	**0.015**	**0.03**
	Endosulfan I	endosulfan	Dikshith et al., 1984	rat	0.35	30 days (not during reproduction)	oral intubation	reproduction and blood chemistry		0.1	chronic-subchronic	0.15	---	ES/ER/TM-86/R3	no effects observed at highest dose	**0.15**	**---**
	Endosulfan II	endosulfan	Dikshith et al., 1984	rat	0.35	30 days (not during reproduction)	oral intubation	reproduction and blood chemistry		0.1	chronic-subchronic	0.15	---	ES/ER/TM-86/R3	no effects observed at highest dose	**0.15**	**---**
	Endosulfan sulfate	endosulfan	Dikshith et al., 1984	rat	0.35	30 days (not during reproduction)	oral intubation	reproduction and blood chemistry		0.1	chronic-subchronic	0.15	---	ES/ER/TM-86/R3	no effects observed at highest dose	**0.15**	**---**
	Endrin aldehyde	endrin	Good and Ware, 1969	mouse	0.03	120 d (during reproduction)	oral in diet	reproduction	reduced parental survival, litter size, and number of young per day	0.1	LOAEL-NOAEL	0.092	0.92	ES/ER/TM-86/R3		**0.092**	**0.92**
	Methoxychlor	NA	Gray et al., 1988	rat	0.35	11 month (during reproduction)	oral in diet	reproduction	fertility and litter size reduced		---	4	8	ES/ER/TM-86/R3		**4**	**8**

Table H-2. Mammalian Toxicity Reference Values for SSL Calculation

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

Notes:

Uncertainty factors were used to adjust all measured effect concentrations to chronic NOAELS and chronic LOAELs as follows:

LOAEL to NOAEL = 0.1

Subchronic to chronic = 0.1

where:

chronic = >12 weeks or during critical lifestage

subchronic = 4 to 12 weeks

These uncertainty factors are consistent with methods used in development of the EcoSSLs (EPA, 2007a) and are more conservative than uncertainty factors recommended in EPA 540-R-97-006.

*Study information and calculated NOAELs and LOAELs for these sources were taken directly from the cited EcoSSL report developed by the EPA. All other primary sources were obtained, reviewed, and TRVs were extracted or developed from the study.

Bold = values selected as the mammalian TRVs

Acronyms:

BMD10 = Benchmark dose resulting in observed effects for 10 percent of test species

EcoSSl = ecological soil screening level

EPA = United States Environmental Protection Agency

IRIS = Integrated Risk Information System

LOAEL = lowest observable adverse effect level

NOAEL = no observable adverse effect level

mg/kg/d = milligram per kilogram per day

TRV = toxicity reference value

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Table H-3. Exposure Factors for Bird and Mammal Endpoint Species

Assessment Endpoint Functional Group	Endpoint Species	Body Weight (kg)	Notes	Source	Food Intake (kg/kg-bw/d, dw)	Notes	Source	Diet Composition						Soil Ingestion Site (kg/kg-(bw/d)[b]	Notes	Source
								% of Diet as Mammals/ Birds	% Diet as Invertebrates	% of Diet as Plants	Major Food Items	Source	% of Diet as Soil			
Granivorous bird	California Quail	0.18	Median from multiple studies	Robel, 1969 Roseberry and Klimstra, 1971 Guthery et al., 1988	0.078	Average of food ingestion rates over 4 seasons from exposure factors handbook for bobwhite (EPA, 1993). Rate based on diet of commercial game food with only 5 to 10 percent water content; therefore, assumed dry weight.	Koerth and Guthery, 1990	0	0	100	Primarily a granivore, but also ingests some animal matter (primarily snails) and green forage. It is assumed this species ingests 100 percent plants (seeds) for screening-level dose calculation purpose.		6.1	0.00476	Value for mourning dove assumed representative of California Quali. Median soil ingestion rate estimated for mourning dove in Table 3 of the EcoSSL guidance. The median was selected as the best measure of central tendency that is unbiased by outliners.	OSWER Directive 9285.7 55
Omnivorous bird	Meadowlark	0.0995	Median from multiple studies	Wiens and Rotenberry, 1980 Maher, 1979	0.12	Allometric estimation for 'omnivorous birds' normalized to kg/kg-bw/d using median body weights from multiple studies	Nagy, 2001[a]	0	63	37	Ground forager that consumes both plant material (primarily seeds) and invertebrates (primarily arthropods). Percentages represent averages for >1900 meadowlarks studied across North America.	Lanyon, 1994	2.08	0.0025	Data regarding soil ingestion of western meadowlarks are unavailable. For the purposes of this ERA, it was assumed that soil ingestion for meadowlarks is similar to that derived for the American robin.	Sample and Suter, 1994
Insectivorous bird	Killdeer	0.0756	Median from multiple studies	Purdue and Haines, 1977 Stegeman, 1955 Jackson and Jackson, 2000 Dunning, 1993	0.192	Allometric estimation for 'Charadriiformes' normalized to kg/kg-bw/d using median body weights from multiple studies	Nagy, 2001[a]	0	100	0	Primarily consume terrestrial invertebrates, especially earthworms, grasshoppers, beetles, and snails. Forages in terrestrial and aquatic habitats.	Jackson and Jackson, 2000	7.3	0.0140	Data regarding soil ingestion of killdeer are unavailable. For the purposes of this ERA, it was assumed that soil ingestion for killdeer is similar to that of the least sandpiper. However, it should be noted that this value is likely somewhat higher than the actual soil ingestion for killdeer because killdeer do not probe in the soil/sediment. Jackson and Jackson (2000) reported grit to be 4.5% by volume of the esophageal contents in 15 killdeer, which suggests that a value of 7.3% may be a conservative estimate.	Beyer et al., 1994
Carnivorous bird	Red-tailed Hawk	1.179	Median from multiple studies	Craighead and Craighead,1956 Steenhof,1983 Springer and Osborne,1983	0.035	High end estimate (estimate* 1.25) presented in Table 1 of the EcoSSL guidance (EPA, 2007i). Based on empirical ingestion data from Craighead and Craighead (1956)	EPA, 2007i	100	0	0	Primarily eat small mammals such as mice, shrews, voles, rabbits, and squirrels, but also eat birds, lizards, snakes, and large insects, depending on availability. Assumed 100 percent small mammal diet for screening-level dose calculation purposes.	EPA,1993	2.4	0.00085	Median soil ingestion rate estimated for red-tailed hawk in Table 3 of the EcoSSL guidance. The median was selected as the best measure of central tendency that is unbiased by outliners.	OSWER Directive 9285.7 55

Table H-3. Exposure Factors for Bird and Mammal Endpoint Species

Assessment Endpoint Functional Group	Endpoint Species	Body Weight (kg)	Notes	Source	Food Intake (kg/kg-bw/d, dw)	Notes	Source	Diet Composition						Soil Ingestion Site (kg/kg-(bw/d)[b]	Notes	Source
								% of Diet as Mammals/ Birds	% Diet as Invertebrates	% of Diet as Plants	Major Food Items	Source	% of Diet as Soil			
Granivorous mammal	Great Basin pocket mouse	0.0175	Median from multiple studies	Scheffer,1938 O'Farrell et al.,1975 Schreiber,1978	0.123	Allometric estimation for 'granivorous mammals' normalized to kg/kg-bw/d using mean weight as reported by Scheffer, 1938, O'Farrell et al., 1975, and Schreiber, 1978	Nagy, 2001[a]	0	0	100	Diet consists primarily of seeds; however, insects (e.g., insect larvae reported in pocket mice from eastern Washington; Kritzman, 1974) may be consumed in the spring before seeds become available. Diet assumed to be 100 percent plants (seeds) for screening-level dose calculation purpose.	Kritzman,1974	2	0.00246	Data regarding soil ingestion of granivorous mammals are unavailable. For the purposes of this ERA, it was assumed that soil ingestion for pocket mice is similar to that of the white-footed mouse.	Beyer et al., 1994
Omnivorous mammal	Deer Mouse	0.0194	Median from multiple studies	O'Farrell, et al., 1975 Silva and Downing, 1995	0.166	Allometric estimation for 'omnivorous mammals' normalized to kg/kg-bw/d using median body weights from multiple studies	Nagy, 2001[a]	0	50	50	Diet consists of plant material (primarily seeds) and terrestrial invertebrates (mainly insects). Approximation for diet of deer mice in Colorado over all seasons was 50 percent plants and 50 percent invertebrates.	EPA, 1993	2	0.0033	Assumed to be similar to the white-footed mouse because of similar dietary and foraging habits.	Beyer et al., 1994
Insectivorous mammal	Grasshopper mouse	0.0346	Median from multiple studies	Wied, Maximilian, Prinz zu., 1839 McKinney and Pasley, 1974 BHI-01757	0.098	Allometric estimation for 'insectivorous mammals' normalized to kg/kg-bw/d using median body weights from multiple studies	Nagy, 2001[a]	0	100	0	Animal material contributed 89 percent of the total food consumed and cultivated grains represented less than 5 percent of the total in the stomach contents of field-trapped grasshopper mice from 90 locations across 13 states. Diet assumed to be 100 percent invertebrates for screening-level dose calculation purposes.	Bailey and Sperry, 1929	0.9	0.00088	Assumed to be similar to the short-tailed shrew because of similar dietary and foraging habits. Median soil ingestion rate estimated for short-tailed shrew in Table 3 of the EcoSSL guidance. The median was selected as the best measure of central tendency that is unbiased by outliners.	OSWER Directive 9285.7 55
Carnivorous mammal	Badger	7.6	Median from multiple studies	Messick and Hornocker, 1981 Silva and Downing, 1995	0.0347	Allometric estimation for 'carnivorous mammals' normalized to kg/kg-bw/d using median body weights from multiple studies	Nagy, 2001[a]	100	0	0	Carnivores that primarily eat small rodents (rats, mice, ground squirrels, pocket gophers), thought some reptiles, insects, birds, and carrion are consumed. Assumed 100 percent small mammal diet for screening-level dose calculation purposes.	Long, 1973	5.2	0.00181	Data regarding soil ingestion of badgers are unavailable. Because the badger is a burrowing mammal, soil ingestion may be similar to that of the prairie dog. It was assumed that the median soil ingestion of the two prairie dog species with available data (2.7 and 7.7 percent) would be representative of the badger.	Beyer et al., 1994

Table H-3. Exposure Factors for Bird and Mammal Endpoint Species

Assessment Endpoint Functional Group	Endpoint Species	Body Weight (kg)	Notes	Source	Food Intake (kg/kg-bw/d, dw)	Notes	Source	Diet Composition						Soil Ingestion Site (kg/kg-(bw/d)[b]	Notes	Source
								% of Diet as Mammals/ Birds	% Diet as Invertebrates	% of Diet as Plants	Major Food Items	Source	% of Diet as Soil			

Notes:

Bold and underlined text indicates life-history parameters that were used in the initial screening exposure calculations.

a. Nagy (2001) regression equation format --> dry matter g/day/g body weight = *a* (grams body weight)^{b} /g body weight

b. Soil ingestion is equal to the percent soil in diet multiplied by the food ingestion rate as follows: soil ingestion = (percent soil/100* food ingestion rate)

BW = body weight

DW = dry weight

EPA = United States Environmental Protection Agency

Group	*a*	*b*
Birds		
omnivorous birds	0.670	0.627
Galliformes	0.088	0.891
Charadriiformes	0.522	0.769
Mammals		
carnivorous mammals	0.153	0.834
granivorous mammals	0.659	0.413
insectivorous mammals	0.373	0.622

Table H-4. Biotransfer Factors and Regression Models Used for Refined SSL Calculations

Group	Analyte	Regression Models[a]				Bioaccumulation Factors		
		B0	B1	Source	Notes[b]	BAF	Source	Notes[b]
Soil to Plants								
Radionuclides	Americium-241					**0.00496**	Beresford et al., 2008	CR review
	Antimony-125					**0.025**	Beresford et al., 2008	From Coughtrey et al. (1983) suggested value for natural vegetation (A.A. Balkema Vol. 3); Note one CR review value of CR=41
	Carbon-14					**890**	Beresford et al., 2008	Specific activity model; FASSET
	Cesium-134					**0.693425575**	Beresford et al., 2008	CR review
	Cesium 137					**0.693425575**	Beresford et al., 2008	CR review
	Cobalt-60					**0.0135**	Beresford et al., 2008	IAEA TRS364 value for grass
	Curium-244					**0.000275**	Beresford et al., 2008	IAEA TRS364 value for grass
	Europium-152					**0.00519802**	Beresford et al., 2008	Estimated from stable concentrations. in soils & angiosperms values presented Coughtrey and Thorne (1983; A.A. Balkema Vol. 1)
	Europium-154					**0.00519802**	Beresford et al., 2008	Estimated from stable concentrations. in soils & angiosperms values presented Coughtrey and Thorne (1983; A.A. Balkema Vol. 1)
	Europium-155					**0.00519802**	Beresford et al., 2008	Estimated from stable concentrations. in soils & angiosperms values presented Coughtrey and Thorne (1983; A.A. Balkema Vol. 1)
	Hydrogen-3 (tritium)					**150**	Beresford et al., 2008	Specific activity model; FASSET
	Neptunium-237					**0.01725**	Beresford et al., 2008	IAEA TRS363 value for grass
	Nickel-63					**0.1875**	Beresford et al., 2008	CR review
	Plutonium-238					**0.014425378**	Beresford et al., 2008	CR review; note some reviews report values in range 10-2 - 10-8 but present data in manner which cannot be used. Primary source here is Sheppard review of IUR data
	Plutonium-239/240					**0.014425378**	Beresford et al., 2008	CR review; note some reviews report values in range 10-2 - 10-8 but present data in manner which cannot be used. Primary source here is Sheppard review of IUR data
	Radium-226					**0.039440524**	Beresford et al., 2008	CR review
	Radium-228					**0.039440524**	Beresford et al., 2008	CR review
	Strontium 90					**0.206811821**	Beresford et al., 2008	CR review
	Technetium-99					**20.00829611**	Beresford et al., 2008	CR review
	Thorium-232					**0.043740981**	Beresford et al., 2008	CR review
	Uranium-234					**0.0145507**	Beresford et al., 2008	CR review
	Uranium-235					**0.0145507**	Beresford et al., 2008	CR review
	Uranium-238					**0.0145507**	Beresford et al., 2008	CR review
Metals	Aluminum					**0.00287**	BJC/OR-133	Median - Table D-1 validation data
	Antimony	**-3.233**	**0.938**	OSWER Directive 9285.7 55	Derived from measured data in Appendix A	0.0102	BJC/OR-133	Median - Table D-1 validation data
	Arsenic, Total all valence states	**-1.992**	**0.564**	BJC/OR-133	Single variable regression; EcoSSLs used BAF	0.0375	BJC/OR-133	Median - Table 6; cited in OSWER Directive 9285.7 55
	Arsenic (III)	**-1.992**	**0.564**	BJC/OR-133	Single variable regression; EcoSSLs used BAF	0.0375	BJC/OR-133	Median - Table 6; cited in OSWER Directive 9285.7 55
	Arsenic (V)	**-1.992**	**0.564**	BJC/OR-133	Single variable regression; EcoSSLs used BAF	0.0375	BJC/OR-133	Median - Table 6; cited in OSWER Directive 9285.7 55
	Barium					**0.156**	BJC/OR-133	Median - Table D-1 validation data; cited in OSWER Directive 9285.7 55
	Beryllium	**-0.5361**	**0.7345**	OSWER Directive 9285.7 55	Derived from measured data in Appendix A			
	Bismuth					**0.005**	ORNL-5786	Figure 2.2
	Boron					**5.714**	USACHPPM, 2004	Median - Table 4-6 leaf tissue
	Cadmium	**-0.476**	**0.546**	BJC/OR-133	Cited in OSWER Directive 9285.7 55 (Table 4a)	0.586	BJC/OR-133	Median - Table 6
	Chromium (total)					**0.041**	BJC/OR-133	Median - Table D-1 validation data; cited in OSWER Directive 9285.7 55
	Chromium (+3)					**0.041**	BJC/OR-133	Median - Table D-1 validation data; cited in OSWER Directive 9285.7 55
	Chromium (+6)					**0.041**	BJC/OR-133	Median - Table D-1 validation data; cited in OSWER Directive 9285.7 55
	Cobalt					**0.00745**	BJC/OR-133	Median - Table D-1 validation data; cited in OSWER Directive 9285.7 55
	Copper	**0.669**	**0.394**	BJC/OR-133	Cited in OSWER Directive 9285.7 55 (Table 4a)	0.124	BJC/OR-133	Median - Table 6
	Lead	**-1.328**	**0.561**		Cited in OSWER Directive 9285.7 55 (Table 4a)	0.0389	BJC/OR-133	Median - Table 6
	Lithium					**0.004**	ORNL-5786	Figure 2.2
	Manganese					**0.0792**	BJC/OR-133	Median - Table D-1 validation data; cited in OSWER Directive 9285.7 55
	Mercury	**-0.996**	**0.544**	BJC/OR-133	Single variable regression	0.0652	BJC/OR-133	Median - Table 6
	Molybdenum					**1.2504**	USACHPPM, 2004	Median - Table 4-6 leaf tissue
	Nickel	**-2.224**	**0.748**	BJC/OR-133	Cited in OSWER Directive 9285.7 55 (Table 4a)	0.018	USACHPPM, 2004	Median - Table 6

Table H-4. Biotransfer Factors and Regression Models Used for Refined SSL Calculations

Group	Analyte	Regression Models[a]				Bioaccumulation Factors		
		B0	B1	Source	Notes[b]	BAF	Source	Notes[b]
	Selenium	**-0.678**	**1.104**	BJC/OR-133	Cited in OSWER Directive 9285.7 55 (Table 4a)	0.672	USACHPPM, 2004	Median - Table 6
	Silver					**0.014**	BJC/OR-133	Median - Table D-1 validation data
	Strontium					**0.207**	Beresford et al., 2008	CR review
	Thallium					**0.004**	ORNL-5786	Figure 2.2
	Tin					**1**	Default	
	Uranium					**0.021**	USACHPPM, 2004	Median - Table 4-6 leaf tissue
	Vanadium					**0.00485**	BJC/OR-133	Median - Table D-1 validation data
	Zinc	**1.575**	**0.555**	BJC/OR-133	Cited in OSWER Directive 9285.7 55 (Table 4a)	0.366	BJC/OR-133	Median - Table 6
General Inorganics	Ammonia/Ammonium							
	Chloride							
	Cyanide							
	Fluoride					**0.006**	ORNL-5786	Figure 2.2
	Iodine					**0.05**	ORNL-5786	Figure 2.2
	Nitrate/Nitrite							
	Phosphate							
	Sulfate/Sulfite							
	Total Organic Carbon							
Volatile Organics	1,1-dichloroethane						OSWER Directive 9285.7-55	Kow (1.79) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	1,1-dichloroethene						OSWER Directive 9285.7-55	Kow (2.13) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	1,1,1-trichloroethane						OSWER Directive 9285.7-55	Kow (2.48) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	1,1,2-trichloroethane						OSWER Directive 9285.7-55	Kow (2.05) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	1,1,2,2-tetrachloroethane						OSWER Directive 9285.7-55	Kow (2.39) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	1,2-dichlorobenzene					**2.45**	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 3.43 (EPA, 1995)
	1,2-dichloroethane (DCA)						OSWER Directive 9285.7-55	Kow (1.47) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	1,3-dichlorobenzene					**2.23**	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 3.53 (EPA, 2010)c
	2-butanone (Methyl Ethyl Ketone/MEK)						OSWER Directive 9285.7-55	Kow (0.29) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	2-hexanone						OSWER Directive 9285.7-55	Kow (1.38) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	Benzene						OSWER Directive 9285.7-55	Kow (2.13) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	Butanol						OSWER Directive 9285.7-55	Kow (0.8) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	Carbon Tetrachloride						OSWER Directive 9285.7-55	Kow (2.73) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	Chlorobenzene						OSWER Directive 9285.7-55	Kow (2.86) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	Chloroform						OSWER Directive 9285.7-55	Kow (1.92) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	Cis-1,2-dichloroethylene						OSWER Directive 9285.7-55	Kow (1.86) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	Dichloromethane (Methylene Chloride)						OSWER Directive 9285.7-55	Kow (1.25) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	Ethyl Benzene					**3.21**	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 3.14 (EPA, 1995)

Table H-4. Biotransfer Factors and Regression Models Used for Refined SSL Calculations

Group	Analyte	Regression Models[a]				Bioaccumulation Factors		
		B0	B1	Source	Notes[b]	BAF	Source	Notes[b]
	Methyl Isobutyl Ketone						OSWER Directive 9285.7-55	Kow (1.19) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	n-butyl Benzene					**1.67**	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 3.84 (EPA, 2010)c
	Tetrachloroethylene						OSWER Directive 9285.7-55	Kow (2.67) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	Toluene						OSWER Directive 9285.7-55	Kow (2.75) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	Trans-1,2-dichloroethylene						OSWER Directive 9285.7-55	Kow (2.07) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	Trichloroethylene (TCE)						OSWER Directive 9285.7-55	Kow (2.71) outside of range of Kow-based models for plants (OSWER Directive 9285.7-55); BAF is undefined.
	Xylene					**3.43**	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 3.07 (EPA, 1995)
Polycyclic Aromatic Hydrocarbons	Acenaphthene	**-5.562**	**-0.8556**	OSWER Directive 9285.7-55	Derived from measured data in Appendix C or Figure 4			
	Acenaphthylene	**-1.144**	**0.791**	OSWER Directive 9285.7-55	Modeled using the rinsed PAH-specific equation			
	Anthracene	**-0.9887**	**0.7784**	OSWER Directive 9285.7-55	Derived from measured data in Appendix C or Figure 4			
	Benzo(a)pyrene	**-2.0615**	**0.975**	OSWER Directive 9285.7-55	Derived from measured data in Appendix C or Figure 4			
	Benzo(a)anthracene	**-2.7078**	**0.5944**	OSWER Directive 9285.7-55	Derived from measured data in Appendix C or Figure 4			
	Benzo(b)fluoranthene					**0.31**	OSWER Directive 9285.7-55	Median BAF calculated from measured data in Appendix C
	Benzo(ghi)perylene	**-0.9313**	**1.1829**	OSWER Directive 9285.7-55	Derived from measured data in Appendix C or Figure 4			
	Benzo[k]fluoranthene	**-4.6482**	**0.1668**	OSWER Directive 9285.7-55	Derived from measured data in Appendix C or Figure 4			
	Chrysene	**-2.7078**	**0.5944**	OSWER Directive 9285.7-55	Derived from measured data in Appendix C or Figure 4			
	Dibenz(ah)anthracene					**0.13**	OSWER Directive 9285.7-55	Median BAF calculated from measured data in Appendix C
	Fluoranthene					**0.5**	OSWER Directive 9285.7-55	Median BAF calculated from measured data in Appendix C
	Fluorene	**-5.562**	**-0.8556**	OSWER Directive 9285.7-55	Derived from measured data in Appendix C or Figure 4			
	Indeno[1,2,3-cd]pyrene					**0.11**	OSWER Directive 9285.7-55	Median BAF calculated from measured data in Appendix C
	2-Methylnaphthalene	**-1.3205**	**4.544**	OSWER Directive 9285.7-55	Based on LMW PAH rinsed model in Figure 4			
	Naphthalene					**12.2**	OSWER Directive 9285.7-55	Median BAF calculated from measured data in Appendix C
	Phenanthrene	**-0.1665**	**0.6203**	OSWER Directive 9285.7-55	Derived from measured data in Appendix C or Figure 4			
	Pyrene					**0.72**	OSWER Directive 9285.7-55	Median BAF calculated from measured data in Appendix C
	Total PAHs	**0.083**	**0.3015**	OSWER Directive 9285.7-55	Derived from measured data in Appendix C or Figure 4			
	Low MW PAHs	**-1.3205**	**0.4544**	OSWER Directive 9285.7-55	Derived from measured data in Appendix C or Figure 4			
	High MW PAHs	**-1.7026**	**0.9469**	OSWER Directive 9285.7-55	Derived from measured data in Appendix C or Figure 4			
	TPH - Diesel							
	TPH - Kerosene							
	Normal paraffin hydrocarbons							
	Phenol						OSWER Directive 9285.7-55	Kow (1.48) outside of range of Kow-based models for plants (OSWER Directive 9285.7 55); BAF is undefined.
Semivolatile Organics	2-methylphenol (ocresol)						OSWER Directive 9285.7-55	Kow (1.99) outside of range of Kow-based models for plants (OSWER Directive 9285.7 55); BAF is undefined.
	4-methylphenol (pcresol)						OSWER Directive 9285.7-55	Kow (1.95) outside of range of Kow-based models for plants (OSWER Directive 9285.7 55); BAF is undefined.
	2,4-dinitrotoluene	1.873	-0.3768	Tsao and Sample, 2005		**0.376**	Tsao and Sample, 2005	Median BAF for foliage, all plants, from Table 3.3-1
	Bis[2-ethylhexyl] phthalate					**0.07**	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 7.30 (EPA, 1995)[c]
	Total PCBs					**0.17**	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 6.29 (EPA, 2010)c
	Aroclor 1016					**0.30**	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 5.69 (ChemIDPlus Lite) [c]
	Aroclor 1221					**0.78**	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 4.65 (ChemIDPlus Lite) [c]
	Aroclor 1232					**0.99**	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 4.4 (ChemIDPlus Lite) [c]
	Aroclor 1242					**0.16**	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 6.34 (ChemIDPlus Lite) [c]

Table H-4. Biotransfer Factors and Regression Models Used for Refined SSL Calculations

Group	Analyte	Regression Models[a]				Bioaccumulation Factors		
		B0	B1	Source	Notes[b]	BAF	Source	Notes[b]
	Aroclor 1248					0.18	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 6.2 (ChemIDPlus Lite) [c]
	Aroclor 1254					0.14	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 6.5 (ChemIDPlus Lite) [c]
	Aroclor 1260					0.05	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 7.55 (ChemIDPlus Lite) [c]
	Aroclor-1262							
Pesticides	Dichloroprop							
	Aldrin					0.14	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 6.50 (EPA, 1995)[c]
	beta-1,2,3,4,5,6-Hexachlorocyclohexane					1.72	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 3.81 (EPA, 1995)[c]
	alpha-Chlordane					0.16	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 6.32 (EPA, 1995)[c]
	gamma-Chlordane					0.16	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 6.32 (EPA, 1995)[c]
	Dichlorodiphenyldichloroethylene	-2.5119	0.7524	OSWER Directive 9285.7-55	Regression model for total DDTs from Table 4b			
	Dichlorodiphenyltrichloroethane	-2.5119	0.7524	OSWER Directive 9285.7-55	Regression model for total DDTs from Table 4b			
	Dieldrin					0.41	OSWER Directive 9285.7-55	Empirical BAF from Table 4b
	Endosulfan I					1.31	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 4.10 (EPA, 1995) [c]
	Endosulfan II					1.31	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 4.10 (EPA, 1995)[c]
	Endosulfan sulfate					1.98	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 4.10 (EPA, 2010)c
	Endrin aldehyde					1.44	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 4 (EPA, 1995)[c]
	Methoxychlor					0.52	OSWER Directive 9285.7-55	Log Kow model for nonionic organics (rinsed plants); log Kow = 5.08 (EPA, 1995)[c]
Soil to Terrestrial Invertebrates								
Radionuclides	Americium-241					0.1006	Beresford et al., 2008	CR review
	Antimony-125					0.2525	Beresford et al., 2008b	Same as gastropod (most conservative invertebrate CR)
	Carbon-14					430	Beresford et al., 2008	Assume same as worm
	Cesium-134					0.1341	Beresford et al., 2008	CR review
	Cesium 137					0.1341	Beresford et al., 2008	CR review
	Cobalt-60					0.0035	Beresford et al., 2008	CR review
	Curium-244					0.1374	Beresford et al., 2008	CR review
	Europium-152					0.0008	Beresford et al., 2008	Same as soil invertebrate
	Europium-154					0.0008	Beresford et al., 2008	Same as soil invertebrate
	Europium-155					0.0008	Beresford et al., 2008	Same as soil invertebrate
	Hydrogen-3 (tritium)					150	Beresford et al., 2008	Assume same as worm
	Neptunium-237					0.1006	Beresford et al., 2008	Same as Am gastropod
	Nickel-63					0.0086	Beresford et al., 2008	CR review
	Plutonium-238					0.0388	Beresford et al., 2008	CR review
	Plutonium-239/240					0.0388	Beresford et al., 2008	CR review
	Radium-226					0.0900	Beresford et al., 2008	CR review
	Radium-228					0.0900	Beresford et al., 2008	CR review
	Strontium 90					0.4066	Beresford et al., 2008	CR review
	Technetium-99					0.3700	Beresford et al., 2008	Assume maximum available value in lack of data
	Thorium-232					0.0088	Beresford et al., 2008	Assume U Soil invertebrate
	Uranium-234					0.0088	Beresford et al., 2008	Same as soil invertebrate
	Uranium-235					0.0088	Beresford et al., 2008	Same as soil invertebrate
	Uranium-238					0.0088	Beresford et al., 2008	Same as soil invertebrate

Table H-4. Biotransfer Factors and Regression Models Used for Refined SSL Calculations

Group	Analyte	Regression Models[a]				Bioaccumulation Factors		
		B0	B1	Source	Notes[b]	BAF	Source	Notes[b]
Metals	Aluminum					**0.043**	ES/ER/TM-220	Median - Table C.1
	Antimony					**1**	ORNL-5786 cited in EPA 2007i	Assumed earthworm concentration = soil concentration according to (Table 4a)
	Arsenic	**-1.421**	**0.706**	ES/ER/TM-220	Sample et al., 1999 cited in OSWER Directive 9285.7-55 (Table 4a)	0.224	ES/ER/TM-220	Median - Table 11
	Arsenic (III)	**-1.421**	**0.706**	ES/ER/TM-220	Sample et al., 1999 cited in OSWER Directive 9285.7-55 (Table 4a)	0.224	ES/ER/TM-220	Median - Table 11
	Arsenic (V)	**-1.421**	**0.706**	ES/ER/TM-220	Sample et al., 1999 cited in OSWER Directive 9285.7-55 (Table 4a)	0.224	ES/ER/TM-220	Median - Table 11
	Barium					**0.091**	ES/ER/TM-220	Median - Table 11; cited in OSWER Directive 9285.7 55
	Beryllium					**0.045**	ES/ER/TM-220	Median - Table C.1; cited in OSWER Directive 9285.7 55
	Bismuth					**1**	Default	
	Boron					**1**	Default	
	Cadmium	**2.114**	**0.795**	ES/ER/TM-220	Sample et al., 1999 cited in OSWER Directive 9285.7-55 (Table 4a)	7.708	ES/ER/TM-220	Median - Table 11
	Chromium					**0.306**	ES/ER/TM-220	Median - Table 11; cited in OSWER Directive 9285.7 55
	Chromium (+3)					**0.306**	ES/ER/TM-220	Median - Table 11; cited in OSWER Directive 9285.7 55
	Chromium (+6)					**0.306**	ES/ER/TM-220	Median - Table 11; cited in OSWER Directive 9285.7 55
	Cobalt					**0.291**	ES/ER/TM-220	Median - Table 11; cited in OSWER Directive 9285.7 55
	Copper	1.675	0.264	ES/ER/TM-220	General regression - low r^2	**0.515**	ES/ER/TM-220	Median - Table 11; cited in OSWER Directive 9285.7 55
	Lead	**-0.218**	**0.807**	ES/ER/TM-220	Sample et al., 1999 cited in OSWER Directive 9285.7 55 (Table 4a)	0.266	ES/ER/TM-220	Median - Table 11
	Lithium					**0.046**	ES/ER/TM-220	Median - Table C.1
	Manganese	**-0.809**	**0.682**	ES/ER/TM-220	Sample et al., 1999 cited in OSWER Directive 9285.7 55 (Table 4a)	0.054	ES/ER/TM-220	Median - Table 11
	Mercury	**0.0781**	**0.3369**	ES/ER/TM-220	General regression, not including validation data	1.693	ES/ER/TM-220	Median - Table 11
	Molybdenum					**0.953**	ES/ER/TM-220	Median - Table C.1
	Nickel	3.677	-0.26	ES/ER/TM-220	regression not significant	**1.059**	ES/ER/TM-220	Median - Table 11
	Selenium	**-0.075**	**0.733**	ES/ER/TM-220	Sample et al., 1999 cited in OSWER Directive 9285.7 55 (Table 4a)	0.985	ES/ER/TM-220	Median - Table 11
	Silver					**2.045**	ES/ER/TM-220	Median - Table C.1; cited in OSWER Directive 9285.7 55
	Strontium					**0.4066**	Beresford et al., 2008	CR review
	Thallium					**0.0541**	USACHPPM, 2004	Median - Table 4-5 (Insecta)
	Tin					**0.08**	ORNL-5786	No data available for invertebrates; assumed to be similar to uptake to small mammals (from Figure 2.25)
	Uranium					**0.033**	ES/ER/TM-220	Median - Table C.1
	Vanadium					**0.042**	ES/ER/TM-220	Median - Table C.1; cited in OSWER Directive 9285.7 55
	Zinc	**4.449**	**0.328**	ES/ER/TM-220	Sample et al., 1999 cited in OSWER Directive 9285.7 55 (Table 4a)			
General Inorganics	Ammonia/Ammonium							
	Chloride							
	Cyanide							
	Fluoride							
	Iodine							
	Nitrate/Nitrite							
	Phosphate							
	Sulfate/Sulfite							
	Total Organic Carbon							

Table H-4. Biotransfer Factors and Regression Models Used for Refined SSL Calculations

Group	Analyte	Regression Models[a]				Bioaccumulation Factors		
		B0	B1	Source	Notes[b]	BAF	Source	Notes[b]
Volatile Organics	1,1-dichloroethane					1.010	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	1,1-dichloroethene					1.011	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	1,1,1-trichloroethane					1.013	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	1,1,2-trichloroethane					1.010	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	1,1,2,2-tetrachloroethane					1.013	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	1,2-dichlorobenzene					1.018	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	1,2-dichloroethane (DCA)					0.988	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	1,3-dichlorobenzene					1.018	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	2-butanone (Methyl Ethyl Ketone/MEK)					0.094	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	2-hexanone					0.207	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	Benzene					1.011	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	Butanol					0.478	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	Carbon Tetrachloride					1.015	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	Chlorobenzene					1.015	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	Chloroform					1.011	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	Cis-1,2-dichloroethylene					1.011	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	Dichloromethane (Methylene Chloride)					1.007	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	Ethyl Benzene					1.016	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	Methyl Isobutyl Ketone					0.197	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	n-butyl Benzene					1.022	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	Tetrachloroethylene					1.018	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	Toluene					1.014	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	Trans-1,2-dichloroethylene					1.011	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	Trichloroethylene (TCE)					1.012	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	Xylene					1.016	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
Polycyclic Aromatic Hydrocarbons	Acenaphthene					1.470	OSWER Directive 9285.7-55	Modeled from Kow based on Jager (1998) [Table 5]
	Acenaphthylene					22.9	OSWER Directive 9285.7-55	Modeled from Kow based on Jager (1998) [Table 5]
	Anthracene					2.42	OSWER Directive 9285.7-55	Modeled from Kow based on Jager (1998) [Table 5]
	Benzo(a)pyrene					1.33	OSWER Directive 9285.7-55	Modeled from Kow based on Jager (1998) [Table 5]
	Benzo(a)anthracene					1.59	OSWER Directive 9285.7-55	Modeled from Kow based on Jager (1998) [Table 5]
	Benzo(b)fluoranthene					2.6	OSWER Directive 9285.7-55	Modeled from Kow based on Jager (1998) [Table 5]
	Benzo(ghi)perylene					2.94	OSWER Directive 9285.7-55	Modeled from Kow based on Jager (1998) [Table 5]
	Benzo[k]fluoranthene					2.6	OSWER Directive 9285.7-55	Modeled from Kow based on Jager (1998) [Table 5]
	Chrysene					2.29	OSWER Directive 9285.7-55	Modeled from Kow based on Jager (1998) [Table 5]
	Dibenz(ah)anthracene					2.31	OSWER Directive 9285.7-55	Modeled from Kow based on Jager (1998) [Table 5]
	Fluoranthene					3.04	OSWER Directive 9285.7-55	Modeled from Kow based on Jager (1998) [Table 5]
	Fluorene					9.57	OSWER Directive 9285.7-55	Modeled from Kow based on Jager (1998) [Table 5]
	Indeno[1,2,3-cd]pyrene					2.86	OSWER Directive 9285.7-55	Modeled from Kow based on Jager (1998) [Table 5]
	2-Methylnaphthalene					1.020	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	Naphthalene					4.4	OSWER Directive 9285.7-55	Modeled from Kow based on Jager (1998) [Table 5]
	Phenanthrene					1.72	OSWER Directive 9285.7-55	Modeled from Kow based on Jager (1998) [Table 5]
	Pyrene					1.75	OSWER Directive 9285.7-55	Modeled from Kow based on Jager (1998) [Table 5]
	Total PAHs							
	Low MW PAHs							
	High MW PAHs							
	TPH - Diesel							
	TPH - Kerosene							
	Normal paraffin hydrocarbons							
	Phenol					0.235	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e

Table H-4. Biotransfer Factors and Regression Models Used for Refined SSL Calculations

Group	Analyte	Regression Models[a]				Bioaccumulation Factors		
		B0	B1	Source	Notes[b]	BAF	Source	Notes[b]
Semivolatile Organics	2-methylphenol (ocresol)					0.336	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	4-methylphenol (pcresol)					0.333	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	2,4-dinitrotoluene					0.184	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	Bis[2-ethylhexyl] phthalate					41.144	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7-55 and log Koc and Kow from EPA, 2010e
	Total PCBs	1.41	1.36	Sample et al., 1999	Combined model and validation data sets, Table 3	6.67	Sample et al., 1999	Median, combined model and validation datasets, Table 2
	Aroclor 1016	1.41	1.36	Sample et al., 1999	Combined model and validation data sets, Table 3	6.67	Sample et al., 1999	Median, combined model and validation datasets, Table 2
	Aroclor 1221	1.41	1.36	Sample et al., 1999	Combined model and validation data sets, Table 3	6.67	Sample et al., 1999	Median, combined model and validation datasets, Table 2
	Aroclor 1232	1.41	1.36	Sample et al., 1999	Combined model and validation data sets, Table 3	6.67	Sample et al., 1999	Median, combined model and validation datasets, Table 2
	Aroclor 1242	1.41	1.36	Sample et al., 1999	Combined model and validation data sets, Table 3	6.67	Sample et al., 1999	Median, combined model and validation datasets, Table 2
	Aroclor 1248	1.41	1.36	Sample et al., 1999	Combined model and validation data sets, Table 3	6.67	Sample et al., 1999	Median, combined model and validation datasets, Table 2
	Aroclor 1254	1.41	1.36	Sample et al., 1999	Combined model and validation data sets, Table 3	6.67	Sample et al., 1999	Median, combined model and validation datasets, Table 2
	Aroclor 1260	1.41	1.36	Sample et al., 1999	Combined model and validation data sets, Table 3	6.67	Sample et al., 1999	Median, combined model and validation datasets, Table 2
	Aroclor-1262							
Pesticides	Dichloroprop							
	Aldrin					1.033	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7 55 and log Koc and Kow from EPA, 2010e
	beta-1,2,3,4,5,6-Hexachlorocyclohexane					1.021	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7 55 and log Koc and Kow from EPA, 2010e
	alpha-Chlordane					1.031	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7 55 and log Koc and Kow from EPA, 2010e
	gamma-Chlordane					1.036	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7 55 and log Koc and Kow from EPA, 2010e
	Dichlorodiphenyldichloroethylene	2.4771	0.8804	OSWER Directive 9285.7-55	Regression derived from measured data			
	Dichlorodiphenyltrichloroethane	2.1247	0.8689	OSWER Directive 9285.7-55	Regression derived from measured data			
	Dieldrin					14.70	OSWER Directive 9285.7-55	Median BAF
	Endosulfan I					1.184	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7 55 and log Koc and Kow from EPA, 2010e
	Endosulfan II					1.184	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7 55 and log Koc and Kow from EPA, 2010e
	Endosulfan sulfate					1.184	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7 55 and log Koc and Kow from EPA, 2010e
	Endrin aldehyde					6.686	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7 55 and log Koc and Kow from EPA, 2010e
	Methoxychlor					3.739	OSWER Directive 9285.7-55	Calculated using model from OSWER Directive 9285.7 55 and log Koc and Kow from EPA, 2010e
Soil to Small Mammal								
Radionuclides	Americium-241					0.041	Beresford et al., 2008	CR review
	Antimony-125					2.1465E-06	Beresford et al., 2008	Constant dietary CR [assume shrub diet] Beresford et al., 2004
	Carbon-14					1340	Beresford et al., 2008	Specific activity model; FASSET
	Cesium-134					2.87	Beresford et al., 2008	CR review - reindeer data not included
	Cesium 137					2.87	Beresford et al., 2008	CR review - reindeer data not included
	Cobalt-60					0.30	Beresford et al., 2008	CR review
	Curium-244					0.041	Beresford et al., 2008	Assume Am mammal
	Europium-152					0.002	Beresford et al., 2008	Allometric prediction using DOE (EPIC vole parameters, grass CR of 1E-2)
	Europium-154					0.002	Beresford et al., 2008	Allometric prediction using DOE (EPIC vole parameters, grass CR of 1E-2)
	Europium-155					0.002	Beresford et al., 2008	Allometric prediction using DOE (EPIC vole parameters, grass CR of 1E-2)
	Hydrogen-3 (tritium)					150	Beresford et al., 2008	Specific activity model; FASSET
	Neptunium-237					0.041	Beresford et al., 2008	Same as Am mammal
	Nickel-63					0.072	Beresford et al., 2008	CR review but based on stable Ni concentrations in mammalian tissues and 'general' soil concentrations FWCR = 3.87e-3 (in: Coughtrey and Thorne, 1983, A.A. Balkema, Vol. 2). Note 1 study gives high conc. in bone which may increase CR circa 10x)
	Plutonium-238					0.023	Beresford et al., 2008	CR review
	Plutonium-239/240					0.023	Beresford et al., 2008	CR review
	Radium-226					0.027	Beresford et al., 2008	CR review - reindeer data not included
	Radium-228					0.027	Beresford et al., 2008	CR review - reindeer data not included
	Strontium 90					1.74	Beresford et al., 2008	CR review - reindeer data not included
	Technetium-99					0.37	Beresford et al., 2008	FASTer prediction
	Thorium-232					0.00012	Beresford et al., 2008	CR review
	Uranium-234					0.00011	Beresford et al., 2008	CR review
	Uranium-235					0.00011	Beresford et al., 2008	CR review

Table H-4. Biotransfer Factors and Regression Models Used for Refined SSL Calculations

Group	Analyte	Regression Models[a]				Bioaccumulation Factors		
		B0	B1	Source	Notes[b]	BAF	Source	Notes[b]
	Uranium-238					**0.00011**	Beresford et al., 2008	CR review
Metals	Aluminum					**0.0263**	ES/ER/TM-219	Median - Table C.1 (general)
	Antimony						ORNL-5786 cited in OSWER Directive 9285.7-55	**0.001* 50 * Cdiet (from Table 4a)**
	Arsenic	**-4.8471**	**0.8188**	ES/ER/TM-219	cited in OSWER Directive 9285.7-55 (Table 4a) - general	0.0038	ES/ER/TM-219	Median - Table 2 (general)
	Arsenic (III)	**-4.8471**	**0.8188**	ES/ER/TM-219	cited in OSWER Directive 9285.7-55 (Table 4a) - general	0.0038	ES/ER/TM-219	Median - Table 2 (general)
	Arsenic (V)	**-4.8471**	**0.8188**	ES/ER/TM-219	cited in OSWER Directive 9285.7-55 (Table 4a) - general	0.0038	ES/ER/TM-219	Median - Table 2 (general)
	Barium					**0.0168**	ES/ER/TM-219	Median - Table 2 (general); cited in OSWER Directive 9285.7 55
	Beryllium						ORNL-5786 cited in OSWER Directive 9285.7-55 (table 4a)	**0.001 * 50 * Cdiet (from Table 4a)**
	Bismuth					**1**	Default value	Default Value
	Boron					**1**	Default value	Default Value
	Cadmium	**-1.2571**	**0.4723**	ES/ER/TM-219	cited in OSWER Directive 9285.7-55 (Table 4a) - herbivore	0.7568		
	Chromium	**-1.4599**	**0.7338**	ES/ER/TM-219	cited in OSWER Directive 9285.7-55 (Table 4a) - general	0.0605	ES/ER/TM-219	Median - Table 2 (general)
	Chromium (+3)	**-1.4599**	**0.7338**	ES/ER/TM-219	cited in OSWER Directive 9285.7-55 (Table 4a) - general	0.0605	ES/ER/TM-219	Median - Table 2 (general)
	Chromium (+6)	**-1.4599**	**0.7338**	ES/ER/TM-219	cited in OSWER Directive 9285.7-55 (Table 4a) - general	0.0605	ES/ER/TM-219	Median - Table 2 (general)
	Cobalt	**-4.4669**	**1.307**	ES/ER/TM-219	cited in OSWER Directive 9285.7-55 (Table 4a) - general	0.1000	ES/ER/TM-219	Median - Table 2 (general)
	Copper	**2.042**	**0.1444**	ES/ER/TM-219	cited in OSWER Directive 9285.7-55 (Table 4a) - general	0.5999	ES/ER/TM-219	Median - Table 2 (general)
	Lead	**0.0761**	**0.4422**	ES/ER/TM-219	cited in OSWER Directive 9285.7-55 (Table 4a) - general	0.1233	ES/ER/TM-219	Median - Table 2 (general)
	Lithium					**1**	Default value	Default Value
	Manganese					**0.0205**	ES/ER/TM-219	Median - Table C.1 (general)
	Mercury					**0.054**	ES/ER/TM-219	Median - Table 2 (general)
	Molybdenum					**1**	Default value	
	Nickel	**-0.2462**	**0.4658**	ES/ER/TM-219	cited in OSWER Directive 9285.7-55 (Table 4a) - general	0.3524	ES/ER/TM-219	Median - Table 2 (general)
	Selenium	**-0.4158**	**0.3764**	ES/ER/TM-219	cited in OSWER Directive 9285.7-55 (Table 4a) - general	0.2107	ES/ER/TM-219	Median - Table 2 (general)
	Silver					**0.0040**	ES/ER/TM-219	Median - Table C.1 (general)
	Strontium					**1.74**	Beresford et al., 2008	CR review - reindeer data not included
	Thallium					**0.1124**	ES/ER/TM-219	Median - Table 2 (general)
	Tin					**0.08**	ORNL-5786	Figure 2.25
	Uranium					**0.0002**	ORNL-5786	Figure 2.25
	Vanadium					**0.0123**	ES/ER/TM-219	Median - Table C.1 (general)
	Zinc	**4.3632**	**0.0706**	ES/ER/TM-219	cited in OSWER Directive 9285.7-55 (Table 4a) - herbivore	0.8984	ES/ER/TM-219	Median - Table 2 (general)
General Inorganics	Ammonia/Ammonium							
	Chloride							
	Cyanide							
	Fluoride							
	Iodine							
	Nitrate/Nitrite							
	Phosphate							
	Sulfate/Sulfite							
	Total Organic Carbon							

Table H-4. Biotransfer Factors and Regression Models Used for Refined SSL Calculations

Group	Analyte	Regression Models[a]				Bioaccumulation Factors		
		B0	B1	Source	Notes[b]	BAF	Source	Notes[b]
Volatile Organics	1,1-dichloroethane					**0.0109**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 1.79 (EPA, 1995) [d]
	1,1-dichloroethene					**0.0186**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 2.13 (EPA, 1995) [d]
	1,1,1-trichloroethane					**0.0305**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 2.48 (EPA, 1995) [d]
	1,1,2-trichloroethane					**0.0165**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 2.05 (EPA, 1995) [d]
	1,1,2,2-tetrachloroethane					**0.0270**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 2.39 (EPA, 1995) [d]
	1,2-dichlorobenzene					**0.0882**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 3.43 (EPA, 1995) [d]
	1,2-dichloroethane (DCA)					**0.0063**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 1.47 (EPA, 1995) [d]
	1,3-dichlorobenzene					**0.0963**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 3.53 (EPA, 2010)d
	2-butanone (Methyl Ethyl Ketone/MEK)					**0.0006**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 0.29 (EPA, 2010)d
	2-hexanone					**0.0053**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 1.38 (EPA, 2010)d
	Benzene					**0.0186**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 2.13 (EPA, 1995) [d]
	Butanol					**0.0017**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 0.8 (EPA, 1995) [d]
	Carbon Tetrachloride					**0.0420**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 2.73 (EPA, 1995) [d]
	Chlorobenzene					**0.0490**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 2.86 (EPA, 1995) [d]
	Chloroform					**0.0135**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 1.92 (EPA, 1995) [d]
	Cis-1,2-dichloroethylene					**0.0122**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 1.86 (EPA, 1995) [d]
	Dichloromethane (Methylene Chloride)					**0.0042**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 1.25 (EPA, 1995) [d]
	Ethyl Benzene					**0.0666**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 3.14 (EPA, 1995) [d]
	Methyl Isobutyl Ketone					**0.0037**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 1.19 (EPA, 1995) [d]
	n-butyl Benzene					**0.1227**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 3.84 (EPA, 2010)d
	Tetrachloroethylene					**0.0390**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 1.79 (EPA, 1995) [d]
	Toluene					**0.0430**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 1.79 (EPA, 1995) [d]
	Trans-1,2-dichloroethylene					**0.0170**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 1.79 (EPA, 1995) [d]
	Trichloroethylene (TCE)					**0.0410**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 1.79 (EPA, 1995) [d]
	Xylene					**0.0619**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 1.79 (EPA, 1995) [d]
Polycyclic Aromatic Hydrocarbons	Acenaphthene					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	Acenaphthylene					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	Anthracene					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	Benzo(a)pyrene					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	Benzo(a)anthracene					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	Benzo(b)fluoranthene					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	Benzo(ghi)perylene					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	Benzo[k]fluoranthene					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	Chrysene					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	Dibenz(ah)anthracene					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	Fluoranthene					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	Fluorene					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	Indeno[1,2,3-cd]pyrene					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	2-Methylnaphthalene					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	Naphthalene					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	Phenanthrene					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	Pyrene					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	Total PAHs					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	Low MW PAHs					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	High MW PAHs					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	TPH - Diesel					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	TPH - Kerosene					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	Normal paraffin hydrocarbons					**0**	OSWER Directive 9285.7-55	Assumed to be negligible
	Phenol					**0.0064**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 1.48 (EPA, 1995) [d]

Table H-4. Biotransfer Factors and Regression Models Used for Refined SSL Calculations

Group	Analyte	Regression Models[a]				Bioaccumulation Factors		
		B0	B1	Source	Notes[b]	BAF	Source	Notes[b]
Semivolatile Organics	2-methylphenol (ocresol)					**0.0150**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 1.99 (EPA, 1995) [d]
	4-methylphenol (pcresol)					**0.0141**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 1.95 (EPA, 1995) [d]
	2,4-dinitrotoluene					**0.0155**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 2.01 (EPA, 1995) [d]
	Bis[2-ethylhexyl] phthalate					**0.0945**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 7.3 (EPA, 1995) [d]
	Total PCBs					**0.1792**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 6.29 (EPA, 2010)d
	Aroclor 1016					**0.2104**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 5.69 (ChemIDPlus Lite) [d]
	Aroclor 1221					**0.1883**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 4.65 (ChemIDPlus Lite) [d]
	Aroclor 1232					**0.1704**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 4.4 (ChemIDPlus Lite) [d]
	Aroclor 1242					**0.1756**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 6.34 (ChemIDPlus Lite) [d]
	Aroclor 1248					**0.1855**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 6.2 (ChemIDPlus Lite) [d]
	Aroclor 1254					**0.1630**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 6.5 (ChemIDPlus Lite) [d]
	Aroclor 1260					**0.0750**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 7.55 (ChemIDPlus Lite) [d]
	Aroclor-1262							
Pesticides	Dichloroprop							
	Aldrin					**0.1630**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 6.5 (EPA, 1995) [d]
	beta-1,2,3,4,5,6-Hexachlorocyclohexane					**0.1201**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 3.81 (EPA, 1995) [d]
	alpha-Chlordane					**0.1771**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 6.32 (EPA, 1995) [d]
	gamma-Chlordane					**0.1771**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 6.32 (EPA, 1995) [d]
	Dichlorodiphenyldichloroethylene	**3.6401**	**0.641**	OSWER Directive 9285.7-55	Regression derived from measured data [Appendix D]	0.1410	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 6.76 (EPA, 1995) [d]
	Dichlorodiphenyltrichloroethane	**1.1788**	**0.7254**	OSWER Directive 9285.7-55	Regression derived from measured data [Appendix D]	0.1606	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 6.53 (EPA, 1995) [d]
	Dieldrin					**1.20**	OSWER Directive 9285.7-55	Median BAF
	Endosulfan I					**0.1455**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 4.1 (EPA, 1995) [d]
	Endosulfan II					**0.1455**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 4.1 (EPA, 1995) [d]
	Endosulfan sulfate					**0.1072**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 3.66 (EPA, 2010) [d]
	Endrin aldehyde					**0.1368**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 4 (EPA, 1995) [d]
	Methoxychlor					**0.2093**	RTI, 2005	logKow model for organics with logKow between -0.67 and 8.2; log Kow = 5.08 (EPA, 1995) [d]

a. Regression models are in the form of LN(plant, invertebrate, or small mammal concentration) = B0 + B1(LN (soil concentration).

b. Notes refer to tables and appendices in the cited references, not tables or appendices of this report.

c. BAFs for uptake of organics with log Kows between 3 and 8 to plants were derived using log BAF = -0.4057*(logKow)+1.781 (rinsed plants, OSWER Directive 9285.7 55).

d. BAFs for uptake of organics to small mammals were derived using log BAF = -0.099(logKow)^2 + 1.07(logKow) - 3.56; this regression is for uptake to fat and represents the lipid concentration rather than whole body.

e. BAFs for uptake of organics to invertebrates were derived using BAF = (0.87*(logKow)/(Koc*foc) (OSWER Directive 9285.7 55), where foc = 0.01.

BAF = Bioaccumulation Factor

Cdiet = concentration in small mammal diet (assumed to be 50 percent plants and 50 percent invertebrates)

EPA = United States Environmental Protection Agency

IAEA = International Atomic Energy Association

PCBs = polychlorinated biphenyls

TPH = total petroleum hydrocarbons

USACHPPM = United States Army Center for Health Promotion and Preventive Medicine

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Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
300 ASH PITS_Shallow	non-Rad	Aroclor-1248	12672-29-6	µg/kg	5.20E+01	4.00E+04	1.30E-03	3.25E+02	1.60E-01
300 ASH PITS_Shallow	non-Rad	Arsenic	7440-38-2	µg/kg	6.08E+03	1.00E+04	6.08E-01	1.90E+05	3.20E-02
300 ASH PITS_Shallow	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	µg/kg	9.60E+01	1.00E+05	9.60E-04	4.54E+04	2.11E-03
300 ASH PITS_Shallow	non-Rad	Butylbenzylphthalate	85-68-7	µg/kg	76	No Value	--	No Value	--
300 ASH PITS_Shallow	Rad	RADs SOF	--	pCi/g	--	--	5.38E-05	--	1.69E-04
300 ASH PITS_Shallow	Rad	Uranium-235	15117-96-1	pCi/g	3.88E-02	2.74E+04	1.42E-06	4.36E+03	8.89E-06
300 ASH PITS_Shallow	Rad	Uranium-238	U-238	pCi/g	8.23E-01	1.57E+04	5.24E-05	5.15E+03	1.60E-04
300 ASH PITS_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	2.45E+03	5.00E+03	4.90E-01	7.86E+05	3.12E-03
300 VTS_Shallow	Rad	Cesium-137	10045-97-3	pCi/g	2.90E-02	2.21E+03	1.31E-05	9.24E+02	3.14E-05
300-10_Shallow_Focused	non-Rad	Arsenic	7440-38-2	µg/kg	13500	1.00E+04	**1.35E+00**	1.90E+05	7.11E-02
300-10_Shallow_Focused	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	µg/kg	2.00E+02	1.00E+05	2.00E-03	4.54E+04	4.41E-03
300-10_Shallow_Focused	non-Rad	Butylbenzylphthalate	85-68-7	µg/kg	230	No Value	--	No Value	--
300-10_Shallow_Focused	Rad	Cesium-137	10045-97-3	pCi/g	1.55E-01	2.21E+03	7.01E-05	9.24E+02	1.68E-04
300-10_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	1.59E-04	--	4.43E-04
300-10_Shallow_Focused	Rad	Uranium-235	15117-96-1	pCi/g	4.06E-02	2.74E+04	1.48E-06	4.36E+03	9.31E-06
300-10_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	1.37E+00	1.57E+04	8.73E-05	5.15E+03	2.66E-04
300-10_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	4.08E+03	5.00E+03	8.16E-01	7.86E+05	5.19E-03
300-109_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	µg/kg	1.22E+02	4.00E+04	3.05E-03	1.47E+03	8.30E-02
300-109_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	µg/kg	3.97E+01	4.00E+04	9.93E-04	1.47E+03	2.70E-02
300-109_Shallow_Focused	non-Rad	Aroclors HI	--	µg/kg	--	--	4.04E-03	--	1.10E-01
300-109_Shallow_Focused	non-Rad	Arsenic	7440-38-2	µg/kg	2.42E+03	1.00E+04	2.42E-01	1.90E+05	1.27E-02
300-109_Shallow_Focused	non-Rad	Barium	7440-39-3	µg/kg	6.33E+04	3.30E+05	1.92E-01	1.32E+06	4.80E-02
300-109_Shallow_Focused	non-Rad	Benzo(a)pyrene	50-32-8	µg/kg	1.24E+00	1.80E+04	6.89E-05	7.64E+04	1.62E-05
300-109_Shallow_Focused	non-Rad	Benzo(b)fluoranthene	205-99-2	µg/kg	2.30E+00	1.80E+04	1.28E-04	3.92E+04	5.87E-05
300-109_Shallow_Focused	non-Rad	Beryllium	7440-41-7	µg/kg	1.80E+02	1.00E+04	1.80E-02	1.39E+04	1.29E-02
300-109_Shallow_Focused	non-Rad	Boron	7440-42-8	µg/kg	632	5.00E+02	**1.26E+00**	1.33E+05	4.75E-03
300-109_Shallow_Focused	non-Rad	Cadmium	7440-43-9	µg/kg	5.90E+01	4.00E+03	1.48E-02	1.63E+03	3.62E-02
300-109_Shallow_Focused	non-Rad	Chromium	7440-47-3	µg/kg	6950	4.00E+02	**1.74E+01**	3.82E+04	1.82E-01
300-109_Shallow_Focused	non-Rad	Chrysene	218-01-9	µg/kg	1.77E+00	1.80E+04	9.83E-05	4.45E+04	3.98E-05
300-109_Shallow_Focused	non-Rad	Cobalt	7440-48-4	µg/kg	6.42E+03	1.30E+04	4.94E-01	1.11E+05	5.78E-02
300-109_Shallow_Focused	non-Rad	Copper	7440-50-8	µg/kg	1.08E+04	5.00E+04	2.16E-01	1.07E+05	1.01E-01
300-109_Shallow_Focused	non-Rad	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	1.40E+01	1.80E+04	7.78E-04	3.57E+04	3.92E-04
300-109_Shallow_Focused	non-Rad	Lead	7439-92-1	µg/kg	2.89E+03	5.00E+04	5.78E-02	3.56E+04	8.12E-02
300-109_Shallow_Focused	non-Rad	Manganese	7439-96-5	µg/kg	278000	2.20E+05	**1.26E+00**	5.80E+06	4.79E-02
300-109_Shallow_Focused	non-Rad	Mercury	7439-97-6	µg/kg	2.20E+01	1.00E+02	2.20E-01	1.87E+03	1.18E-02
300-109_Shallow_Focused	non-Rad	Molybdenum	7439-98-7	µg/kg	3.41E+02	2.00E+03	1.71E-01	1.40E+04	2.44E-02
300-109_Shallow_Focused	non-Rad	Nickel	7440-02-0	µg/kg	8.49E+03	3.00E+04	2.83E-01	3.26E+04	2.60E-01
300-109_Shallow_Focused	non-Rad	Pyrene	129-00-0	µg/kg	1.56E+00	1.80E+04	8.67E-05	6.00E+05	2.60E-06
300-109_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	1.15E-04	--	4.88E-04
300-109_Shallow_Focused	Rad	Uranium-233/234	U-233/234	pCi/g	1.40E+00	5.16E+04	2.71E-05	6.37E+03	2.20E-04
300-109_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	1.38E+00	1.57E+04	8.79E-05	5.15E+03	2.68E-04
300-109_Shallow_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	47600	2.00E+03	**2.38E+01**	3.11E+04	**1.53E+00**
300-109_Shallow_Focused	non-Rad	Zinc	7440-66-6	µg/kg	3.47E+04	5.00E+04	6.94E-01	6.78E+04	5.12E-01
300-109_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	4.11E+03	5.00E+03	8.22E-01	7.86E+05	5.23E-03

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
300-109_Staging Pile Area_Focused	non-Rad	Aroclor-1254	11097-69-1	µg/kg	3.68E+01	4.00E+04	9.20E-04	1.47E+03	2.50E-02
300-109_Staging Pile Area_Focused	non-Rad	Aroclor-1260	11096-82-5	µg/kg	1.94E+01	4.00E+04	4.85E-04	1.47E+03	1.32E-02
300-109_Staging Pile Area_Focused	non-Rad	Aroclors HI	--	µg/kg	--	--	1.41E-03	--	3.82E-02
300-109_Staging Pile Area_Focused	non-Rad	Arsenic	7440-38-2	µg/kg	2.58E+03	1.00E+04	2.58E-01	1.90E+05	1.36E-02
300-109_Staging Pile Area_Focused	non-Rad	Barium	7440-39-3	µg/kg	7.27E+04	3.30E+05	2.20E-01	1.32E+06	5.51E-02
300-109_Staging Pile Area_Focused	non-Rad	Benzo(a)anthracene	56-55-3	µg/kg	2.08E+00	1.80E+04	1.16E-04	6.40E+04	3.25E-05
300-109_Staging Pile Area_Focused	non-Rad	Benzo(a)pyrene	50-32-8	µg/kg	3.30E+00	1.80E+04	1.83E-04	7.64E+04	4.32E-05
300-109_Staging Pile Area_Focused	non-Rad	Benzo(b)fluoranthene	205-99-2	µg/kg	1.31E+00	1.80E+04	7.28E-05	3.92E+04	3.34E-05
300-109_Staging Pile Area_Focused	non-Rad	Beryllium	7440-41-7	µg/kg	2.03E+02	1.00E+04	2.03E-02	1.39E+04	1.46E-02
300-109_Staging Pile Area_Focused	non-Rad	Boron	7440-42-8	µg/kg	1060	5.00E+02	**2.12E+00**	1.33E+05	7.97E-03
300-109_Staging Pile Area_Focused	non-Rad	Cadmium	7440-43-9	µg/kg	6.60E+01	4.00E+03	1.65E-02	1.63E+03	4.05E-02
300-109_Staging Pile Area_Focused	non-Rad	Chromium	7440-47-3	µg/kg	8170	4.00E+02	**2.04E+01**	3.82E+04	2.14E-01
300-109_Staging Pile Area_Focused	non-Rad	Cobalt	7440-48-4	µg/kg	5.95E+03	1.30E+04	4.58E-01	1.11E+05	5.36E-02
300-109_Staging Pile Area_Focused	non-Rad	Copper	7440-50-8	µg/kg	1.16E+04	5.00E+04	2.32E-01	1.07E+05	1.08E-01
300-109_Staging Pile Area_Focused	non-Rad	Fluoranthene	206-44-0	µg/kg	5.14E+00	1.80E+04	2.86E-04	8.39E+05	6.13E-06
300-109_Staging Pile Area_Focused	non-Rad	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	2.92E+01	1.80E+04	1.62E-03	3.57E+04	8.18E-04
300-109_Staging Pile Area_Focused	non-Rad	Lead	7439-92-1	µg/kg	5.03E+03	5.00E+04	1.01E-01	3.56E+04	1.41E-01
300-109_Staging Pile Area_Focused	non-Rad	Manganese	7439-96-5	µg/kg	286000	2.20E+05	**1.30E+00**	5.80E+06	4.93E-02
300-109_Staging Pile Area_Focused	non-Rad	Molybdenum	7439-98-7	µg/kg	4.08E+02	2.00E+03	2.04E-01	1.40E+04	2.91E-02
300-109_Staging Pile Area_Focused	non-Rad	Nickel	7440-02-0	µg/kg	8.57E+03	3.00E+04	2.86E-01	3.26E+04	2.63E-01
300-109_Staging Pile Area_Focused	non-Rad	Pyrene	129-00-0	µg/kg	6.96E+00	1.80E+04	3.87E-04	6.00E+05	1.16E-05
300-109_Staging Pile Area_Focused	Rad	RADs SOF	--	pCi/g	--	--	1.96E-04	--	8.48E-04
300-109_Staging Pile Area_Focused	non-Rad	Tin	7440-31-5	µg/kg	1.45E+03	5.00E+04	2.90E-02	2.04E+05	7.11E-03
300-109_Staging Pile Area_Focused	Rad	Uranium-233/234	U-233/234	pCi/g	2.54E+00	5.16E+04	4.92E-05	6.37E+03	3.99E-04
300-109_Staging Pile Area_Focused	Rad	Uranium-238	U-238	pCi/g	2.31E+00	1.57E+04	1.47E-04	5.15E+03	4.49E-04
300-109_Staging Pile Area_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	45100	2.00E+03	**2.26E+01**	3.11E+04	**1.45E+00**
300-109_Staging Pile Area_Focused	non-Rad	Zinc	7440-66-6	µg/kg	4.88E+04	5.00E+04	9.76E-01	6.78E+04	7.20E-01
300-109_Staging Pile Area_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	6877	5.00E+03	**1.38E+00**	7.86E+05	8.75E-03
300-18_Shallow	non-Rad	Arsenic	7440-38-2	µg/kg	2.20E+03	1.00E+04	2.20E-01	1.90E+05	1.16E-02
300-18_Shallow	non-Rad	Barium	7440-39-3	µg/kg	6.34E+04	3.30E+05	1.92E-01	1.32E+06	4.80E-02
300-18_Shallow	non-Rad	Beryllium	7440-41-7	µg/kg	6.50E+02	1.00E+04	6.50E-02	1.39E+04	4.68E-02
300-18_Shallow	non-Rad	Cadmium	7440-43-9	µg/kg	4.00E+01	4.00E+03	1.00E-02	1.63E+03	2.45E-02
300-18_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	6900	4.00E+02	**1.73E+01**	3.82E+04	1.81E-01
300-18_Shallow	non-Rad	Lead	7439-92-1	µg/kg	3.60E+03	5.00E+04	7.20E-02	3.56E+04	1.01E-01
300-18_Shallow	Rad	RADs SOF	--	pCi/g	--	--	3.88E-05	--	1.82E-04
300-18_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	6.49E-01	5.16E+04	1.26E-05	6.37E+03	1.02E-04
300-18_Shallow	Rad	Uranium-238	U-238	pCi/g	4.11E-01	1.57E+04	2.62E-05	5.15E+03	7.98E-05
300-18_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	1.14E+03	5.00E+03	2.27E-01	7.86E+05	1.45E-03
300-223_Shallow_Focused	non-Rad	Total petroleum hydrocarbons - diesel range	TPHDIESEL	µg/kg	1.20E+05	2.00E+05	6.00E-01	3.56E+08	3.37E-04
300-223_Shallow_Focused	non-Rad	Total petroleum hydrocarbons - motor oil (high boiling)	TPH/OILH	µg/kg	230000	No Value	**--**	No Value	**--**
300-23_Shallow_Focused	non-Rad	Total petroleum hydrocarbons - motor oil (high boiling)	TPH/OILH	µg/kg	52000	No Value	**--**	No Value	**--**
300-259_Shallow	non-Rad	Antimony	7440-36-0	µg/kg	3.22E+02	5.00E+03	6.45E-02	5.98E+03	5.39E-02
300-259_Shallow	non-Rad	Arsenic	7440-38-2	µg/kg	2.10E+03	1.00E+04	2.10E-01	1.90E+05	1.10E-02
300-259_Shallow	non-Rad	Barium	7440-39-3	µg/kg	7.52E+04	3.30E+05	2.28E-01	1.32E+06	5.70E-02

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
300-259_Shallow	non-Rad	Beryllium	7440-41-7	µg/kg	2.26E+02	1.00E+04	2.26E-02	1.39E+04	1.62E-02
300-259_Shallow	non-Rad	Boron	7440-42-8	µg/kg	1302.923	5.00E+02	**2.61E+00**	1.33E+05	9.80E-03
300-259_Shallow	non-Rad	Cadmium	7440-43-9	µg/kg	2.52E+02	4.00E+03	6.29E-02	1.63E+03	1.54E-01
300-259_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	7901.1621	4.00E+02	**1.98E+01**	3.82E+04	2.07E-01
300-259_Shallow	non-Rad	Cobalt	7440-48-4	µg/kg	5.83E+03	1.30E+04	4.49E-01	1.11E+05	5.25E-02
300-259_Shallow	non-Rad	Copper	7440-50-8	µg/kg	1.07E+04	5.00E+04	2.14E-01	1.07E+05	9.99E-02
300-259_Shallow	non-Rad	Lead	7439-92-1	µg/kg	4.62E+03	5.00E+04	9.25E-02	3.56E+04	1.30E-01
300-259_Shallow	non-Rad	Manganese	7439-96-5	µg/kg	318873.58	2.20E+05	**1.45E+00**	5.80E+06	5.50E-02
300-259_Shallow	non-Rad	Mercury	7439-97-6	µg/kg	1.00E+01	1.00E+02	1.00E-01	1.87E+03	5.35E-03
300-259_Shallow	non-Rad	Molybdenum	7439-98-7	µg/kg	3.03E+02	2.00E+03	1.51E-01	1.40E+04	2.16E-02
300-259_Shallow	non-Rad	Nickel	7440-02-0	µg/kg	8.75E+03	3.00E+04	2.92E-01	3.26E+04	2.68E-01
300-259_Shallow	Rad	RADs SOF	--	pCi/g	--	--	1.17E-04	--	5.12E-04
300-259_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	1.59E+00	5.16E+04	3.09E-05	6.37E+03	2.50E-04
300-259_Shallow	Rad	Uranium-238	U-238	pCi/g	1.35E+00	1.57E+04	8.58E-05	5.15E+03	2.62E-04
300-259_Shallow	non-Rad	Vanadium	7440-62-2	µg/kg	42625.614	2.00E+03	**2.13E+01**	3.11E+04	**1.37E+00**
300-259_Shallow	non-Rad	Zinc	7440-66-6	µg/kg	479584.29	5.00E+04	**9.59E+00**	6.78E+04	**7.07E+00**
300-259_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	3.88E+03	5.00E+03	7.75E-01	7.86E+05	4.93E-03
300-260_Shallow_Focused	non-Rad	Antimony	7440-36-0	µg/kg	9.22E+02	5.00E+03	1.84E-01	5.98E+03	1.54E-01
300-260_Shallow_Focused	non-Rad	Arsenic	7440-38-2	µg/kg	3.16E+03	1.00E+04	3.16E-01	1.90E+05	1.66E-02
300-260_Shallow_Focused	non-Rad	Barium	7440-39-3	µg/kg	1.22E+05	3.30E+05	3.70E-01	1.32E+06	9.24E-02
300-260_Shallow_Focused	non-Rad	Beryllium	7440-41-7	µg/kg	2.39E+02	1.00E+04	2.39E-02	1.39E+04	1.72E-02
300-260_Shallow_Focused	non-Rad	Boron	7440-42-8	µg/kg	8360	5.00E+02	**1.67E+01**	1.33E+05	6.29E-02
300-260_Shallow_Focused	non-Rad	Cadmium	7440-43-9	µg/kg	1.10E+02	4.00E+03	2.75E-02	1.63E+03	6.75E-02
300-260_Shallow_Focused	non-Rad	Chromium	7440-47-3	µg/kg	9890	4.00E+02	**2.47E+01**	3.82E+04	2.59E-01
300-260_Shallow_Focused	non-Rad	Cobalt	7440-48-4	µg/kg	7.43E+03	1.30E+04	5.72E-01	1.11E+05	6.69E-02
300-260_Shallow_Focused	non-Rad	Copper	7440-50-8	µg/kg	73300	5.00E+04	**1.47E+00**	1.07E+05	6.85E-01
300-260_Shallow_Focused	non-Rad	Lead	7439-92-1	µg/kg	1.83E+04	5.00E+04	3.66E-01	3.56E+04	5.14E-01
300-260_Shallow_Focused	non-Rad	Manganese	7439-96-5	µg/kg	328000	2.20E+05	**1.49E+00**	5.80E+06	5.66E-02
300-260_Shallow_Focused	non-Rad	Mercury	7439-97-6	µg/kg	1.20E+01	1.00E+02	1.20E-01	1.87E+03	6.42E-03
300-260_Shallow_Focused	non-Rad	Molybdenum	7439-98-7	µg/kg	5.37E+02	2.00E+03	2.69E-01	1.40E+04	3.84E-02
300-260_Shallow_Focused	non-Rad	Nickel	7440-02-0	µg/kg	1.02E+04	3.00E+04	3.40E-01	3.26E+04	3.13E-01
300-260_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	2.83E-04	--	8.93E-04
300-260_Shallow_Focused	non-Rad	Silver	7440-22-4	µg/kg	2.06E+02	2.00E+03	1.03E-01	4.96E+04	4.15E-03
300-260_Shallow_Focused	Rad	Uranium-235	15117-96-1	pCi/g	2.51E-01	2.74E+04	9.16E-06	4.36E+03	5.76E-05
300-260_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	4.30E+00	1.57E+04	2.74E-04	5.15E+03	8.35E-04
300-260_Shallow_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	59000	2.00E+03	**2.95E+01**	3.11E+04	**1.90E+00**
300-260_Shallow_Focused	non-Rad	Zinc	7440-66-6	µg/kg	77400	5.00E+04	**1.55E+00**	6.78E+04	**1.14E+00**
300-260_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	12800	5.00E+03	**2.56E+00**	7.86E+05	1.63E-02
300-272_Overburden_Focused	non-Rad	Total petroleum hydrocarbons - diesel range	TPHDIESEL	µg/kg	1.31E+04	2.00E+05	6.55E-02	3.56E+08	3.68E-05
300-272_Shallow_Focused	non-Rad	Total petroleum hydrocarbons - diesel range	TPHDIESEL	µg/kg	4.31E+04	2.00E+05	2.16E-01	3.56E+08	1.21E-04
300-275_Shallow_1	non-Rad	Acenaphthene	83-32-9	µg/kg	9.60E+02	2.00E+04	4.80E-02	1.10E+06	8.73E-04
300-275_Shallow_1	non-Rad	Antimony	7440-36-0	µg/kg	2.60E+02	5.00E+03	5.20E-02	5.98E+03	4.35E-02
300-275_Shallow_1	non-Rad	Arsenic	7440-38-2	µg/kg	2.21E+03	1.00E+04	2.21E-01	1.90E+05	1.16E-02
300-275_Shallow_1	non-Rad	Barium	7440-39-3	µg/kg	7.53E+04	3.30E+05	2.28E-01	1.32E+06	5.70E-02

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
300-275_Shallow_1	non-Rad	Benzo(a)pyrene	50-32-8	µg/kg	1.30E+00	1.80E+04	7.22E-05	7.64E+04	1.70E-05
300-275_Shallow_1	non-Rad	Benzo(b)fluoranthene	205-99-2	µg/kg	1.86E+00	1.80E+04	1.03E-04	3.92E+04	4.73E-05
300-275_Shallow_1	non-Rad	Beryllium	7440-41-7	µg/kg	4.52E+02	1.00E+04	4.52E-02	1.39E+04	3.25E-02
300-275_Shallow_1	non-Rad	Boron	7440-42-8	µg/kg	1466.2284	5.00E+02	**2.93E+00**	1.33E+05	1.10E-02
300-275_Shallow_1	non-Rad	Cadmium	7440-43-9	µg/kg	8.33E+01	4.00E+03	2.08E-02	1.63E+03	5.11E-02
300-275_Shallow_1	Rad	Cesium-137	10045-97-3	pCi/g	8.20E-02	2.21E+03	3.71E-05	9.24E+02	8.87E-05
300-275_Shallow_1	non-Rad	Chromium	7440-47-3	µg/kg	8021.7632	4.00E+02	**2.01E+01**	3.82E+04	2.10E-01
300-275_Shallow_1	non-Rad	Chrysene	218-01-9	µg/kg	2.20E+00	1.80E+04	1.22E-04	4.45E+04	4.94E-05
300-275_Shallow_1	non-Rad	Cobalt	7440-48-4	µg/kg	5.85E+03	1.30E+04	4.50E-01	1.11E+05	5.27E-02
300-275_Shallow_1	non-Rad	Copper	7440-50-8	µg/kg	4.29E+04	5.00E+04	8.58E-01	1.07E+05	4.01E-01
300-275_Shallow_1	non-Rad	Fluoranthene	206-44-0	µg/kg	2.30E+03	1.80E+04	1.28E-01	8.39E+05	2.74E-03
300-275_Shallow_1	non-Rad	Fluorene	86-73-7	µg/kg	8.11E+01	2.90E+04	2.80E-03	1.75E+05	4.64E-04
300-275_Shallow_1	non-Rad	Lead	7439-92-1	µg/kg	7.19E+03	5.00E+04	1.44E-01	3.56E+04	2.02E-01
300-275_Shallow_1	non-Rad	Lithium	7439-93-2	µg/kg	6686.355	2.00E+03	**3.34E+00**	5.15E+05	1.30E-02
300-275_Shallow_1	non-Rad	Manganese	7439-96-5	µg/kg	276815.49	2.20E+05	**1.26E+00**	5.80E+06	4.77E-02
300-275_Shallow_1	non-Rad	Mercury	7439-97-6	µg/kg	1.67E+01	1.00E+02	1.67E-01	1.87E+03	8.91E-03
300-275_Shallow_1	non-Rad	Molybdenum	7439-98-7	µg/kg	3.78E+02	2.00E+03	1.89E-01	1.40E+04	2.70E-02
300-275_Shallow_1	non-Rad	Nickel	7440-02-0	µg/kg	9.46E+03	3.00E+04	3.15E-01	3.26E+04	2.90E-01
300-275_Shallow_1	Rad	RADs SOF	--	pCi/g	--	--	6.96E-04	--	2.97E-03
300-275_Shallow_1	non-Rad	Silver	7440-22-4	µg/kg	1.21E+02	2.00E+03	6.04E-02	4.96E+04	2.44E-03
300-275_Shallow_1	non-Rad	Strontium	7440-24-6	µg/kg	20195.541	No Value	**--**	4.23E+06	4.77E-03
300-275_Shallow_1	non-Rad	Tin	7440-31-5	µg/kg	1.47E+03	5.00E+04	2.93E-02	2.04E+05	7.18E-03
300-275_Shallow_1	non-Rad	Uranium	7440-61-1	µg/kg	2.50E+03	5.00E+03	5.00E-01	7.86E+05	3.18E-03
300-275_Shallow_1	Rad	Uranium-233/234	U-233/234	pCi/g	7.72E+00	5.16E+04	1.50E-04	6.37E+03	1.21E-03
300-275_Shallow_1	Rad	Uranium-235	15117-96-1	pCi/g	1.00E+00	2.74E+04	3.65E-05	4.36E+03	2.29E-04
300-275_Shallow_1	Rad	Uranium-238	U-238	pCi/g	7.41E+00	1.57E+04	4.72E-04	5.15E+03	1.44E-03
300-275_Shallow_1	non-Rad	Vanadium	7440-62-2	µg/kg	45127.74	2.00E+03	**2.26E+01**	3.11E+04	**1.45E+00**
300-275_Shallow_1	non-Rad	Zinc	7440-66-6	µg/kg	4.10E+04	5.00E+04	8.20E-01	6.78E+04	6.05E-01
300-275_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	22251	5.00E+03	**4.45E+00**	7.86E+05	2.83E-02
300-275_Shallow_2	non-Rad	Acenaphthene	83-32-9	µg/kg	3.60E+00	2.00E+04	1.80E-04	1.10E+06	3.27E-06
300-275_Shallow_2	non-Rad	Arsenic	7440-38-2	µg/kg	2.76E+03	1.00E+04	2.76E-01	1.90E+05	1.45E-02
300-275_Shallow_2	non-Rad	Barium	7440-39-3	µg/kg	6.86E+04	3.30E+05	2.08E-01	1.32E+06	5.20E-02
300-275_Shallow_2	non-Rad	Beryllium	7440-41-7	µg/kg	2.54E+02	1.00E+04	2.54E-02	1.39E+04	1.83E-02
300-275_Shallow_2	non-Rad	Boron	7440-42-8	µg/kg	1146.5781	5.00E+02	**2.29E+00**	1.33E+05	8.62E-03
300-275_Shallow_2	non-Rad	Cadmium	7440-43-9	µg/kg	1.44E+02	4.00E+03	3.60E-02	1.63E+03	8.83E-02
300-275_Shallow_2	non-Rad	Chromium	7440-47-3	µg/kg	8993.6377	4.00E+02	**2.25E+01**	3.82E+04	2.35E-01
300-275_Shallow_2	non-Rad	Cobalt	7440-48-4	µg/kg	5.98E+03	1.30E+04	4.60E-01	1.11E+05	5.38E-02
300-275_Shallow_2	non-Rad	Copper	7440-50-8	µg/kg	1.16E+04	5.00E+04	2.32E-01	1.07E+05	1.08E-01
300-275_Shallow_2	non-Rad	Fluoranthene	206-44-0	µg/kg	5.60E+01	1.80E+04	3.11E-03	8.39E+05	6.67E-05
300-275_Shallow_2	non-Rad	Fluorene	86-73-7	µg/kg	2.60E+00	2.90E+04	8.97E-05	1.75E+05	1.49E-05
300-275_Shallow_2	non-Rad	Lead	7439-92-1	µg/kg	4.10E+03	5.00E+04	8.20E-02	3.56E+04	1.15E-01
300-275_Shallow_2	non-Rad	Lithium	7439-93-2	µg/kg	7066.6688	2.00E+03	**3.53E+00**	5.15E+05	1.37E-02
300-275_Shallow_2	non-Rad	Manganese	7439-96-5	µg/kg	292731.34	2.20E+05	**1.33E+00**	5.80E+06	5.05E-02
300-275_Shallow_2	non-Rad	Mercury	7439-97-6	µg/kg	2.73E+01	1.00E+02	2.73E-01	1.87E+03	1.46E-02

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
300-275_Shallow_2	non-Rad	Molybdenum	7439-98-7	µg/kg	4.04E+02	2.00E+03	2.02E-01	1.40E+04	2.88E-02
300-275_Shallow_2	non-Rad	Nickel	7440-02-0	µg/kg	9.59E+03	3.00E+04	3.20E-01	3.26E+04	2.94E-01
300-275_Shallow_2	Rad	RADs SOF	--	pCi/g	--	--	1.13E-04	--	5.01E-04
300-275_Shallow_2	non-Rad	Strontium	7440-24-6	µg/kg	27080.652	No Value	**--**	4.23E+06	6.40E-03
300-275_Shallow_2	non-Rad	Tin	7440-31-5	µg/kg	1.15E+03	5.00E+04	2.30E-02	2.04E+05	5.63E-03
300-275_Shallow_2	Rad	Uranium-233/234	U-233/234	pCi/g	1.31E+00	5.16E+04	2.53E-05	6.37E+03	2.05E-04
300-275_Shallow_2	Rad	Uranium-235	15117-96-1	pCi/g	2.37E-01	2.74E+04	8.65E-06	4.36E+03	5.44E-05
300-275_Shallow_2	Rad	Uranium-238	U-238	pCi/g	1.24E+00	1.57E+04	7.93E-05	5.15E+03	2.42E-04
300-275_Shallow_2	non-Rad	Vanadium	7440-62-2	µg/kg	51631.53	2.00E+03	**2.58E+01**	3.11E+04	**1.66E+00**
300-275_Shallow_2	non-Rad	Zinc	7440-66-6	µg/kg	4.12E+04	5.00E+04	8.25E-01	6.78E+04	6.08E-01
300-275_Shallow_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	3.73E+03	5.00E+03	7.45E-01	7.86E+05	4.74E-03
300-33, 300-41, 300-256_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	5349	5.00E+03	**1.07E+00**	7.86E+05	6.81E-03
300-33, 300-41, 300-256_Shallow	non-Rad	Aroclor-1016	12674-11-2	µg/kg	1.03E+01	4.00E+04	2.58E-04	1.82E+03	5.66E-03
300-33, 300-41, 300-256_Shallow	non-Rad	Aroclor-1242	53469-21-9	µg/kg	1.64E+01	4.00E+04	4.10E-04	1.49E+03	1.10E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Aroclor-1248	12672-29-6	µg/kg	1.90E+02	4.00E+04	4.75E-03	3.25E+02	5.85E-01
300-33, 300-41, 300-256_Shallow	non-Rad	Aroclor-1254	11097-69-1	µg/kg	8.49E+01	4.00E+04	2.12E-03	1.47E+03	5.78E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Aroclor-1260	11096-82-5	µg/kg	1.75E+01	4.00E+04	4.36E-04	1.47E+03	1.19E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Aroclors HI	--	µg/kg	--	--	7.97E-03	--	6.71E-01
300-33, 300-41, 300-256_Shallow	non-Rad	Arsenic	7440-38-2	µg/kg	2.64E+03	1.00E+04	2.64E-01	1.90E+05	1.39E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Barium	7440-39-3	µg/kg	7.24E+04	3.30E+05	2.19E-01	1.32E+06	5.49E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Beryllium	7440-41-7	µg/kg	2.56E+02	1.00E+04	2.56E-02	1.39E+04	1.84E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Boron	7440-42-8	µg/kg	1483.9168	5.00E+02	**2.97E+00**	1.33E+05	1.12E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Butylbenzylphthalate	85-68-7	µg/kg	228	No Value	**--**	No Value	**--**
300-33, 300-41, 300-256_Shallow	non-Rad	Cadmium	7440-43-9	µg/kg	9.37E+01	4.00E+03	2.34E-02	1.63E+03	5.75E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	8781.1801	4.00E+02	**2.20E+01**	3.82E+04	2.30E-01
300-33, 300-41, 300-256_Shallow	non-Rad	Cobalt	7440-48-4	µg/kg	6.27E+03	1.30E+04	4.83E-01	1.11E+05	5.65E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Copper	7440-50-8	µg/kg	1.37E+04	5.00E+04	2.73E-01	1.07E+05	1.28E-01
300-33, 300-41, 300-256_Shallow	non-Rad	Fluoride	16984-48-8	µg/kg	1651.3546	No Value	**--**	2.28E+06	7.24E-04
300-33, 300-41, 300-256_Shallow	non-Rad	Lead	7439-92-1	µg/kg	4.27E+03	5.00E+04	8.54E-02	3.56E+04	1.20E-01
300-33, 300-41, 300-256_Shallow	non-Rad	Lithium	7439-93-2	µg/kg	5495.0169	2.00E+03	**2.75E+00**	5.15E+05	1.07E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Manganese	7439-96-5	µg/kg	314762.37	2.20E+05	**1.43E+00**	5.80E+06	5.43E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Mercury	7439-97-6	µg/kg	1.60E+01	1.00E+02	1.60E-01	1.87E+03	8.56E-03
300-33, 300-41, 300-256_Shallow	non-Rad	Methylene chloride	75-09-2	µg/kg	2.913436	No Value	**--**	1.66E+05	1.76E-05
300-33, 300-41, 300-256_Shallow	non-Rad	Molybdenum	7439-98-7	µg/kg	4.86E+02	2.00E+03	2.43E-01	1.40E+04	3.47E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Nickel	7440-02-0	µg/kg	8.88E+03	3.00E+04	2.96E-01	3.26E+04	2.72E-01
300-33, 300-41, 300-256_Shallow	non-Rad	Nitrate	14797-55-8	µg/kg	8866.6667	No Value	**--**	3.40E+08	2.61E-05
300-33, 300-41, 300-256_Shallow	Rad	RADs SOF	--	pCi/g	--	--	1.85E-04	--	8.14E-04
300-33, 300-41, 300-256_Shallow	non-Rad	Silver	7440-22-4	µg/kg	7.82E+02	2.00E+03	3.91E-01	4.96E+04	1.58E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Uranium	7440-61-1	µg/kg	7260	5.00E+03	**1.45E+00**	7.86E+05	9.24E-03
300-33, 300-41, 300-256_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	2.14E+00	5.16E+04	4.14E-05	6.37E+03	3.36E-04
300-33, 300-41, 300-256_Shallow	Rad	Uranium-235	15117-96-1	pCi/g	3.38E-01	2.74E+04	1.23E-05	4.36E+03	7.75E-05
300-33, 300-41, 300-256_Shallow	Rad	Uranium-238	U-238	pCi/g	2.06E+00	1.57E+04	1.31E-04	5.15E+03	4.00E-04
300-33, 300-41, 300-256_Shallow	non-Rad	Vanadium	7440-62-2	µg/kg	52694.189	2.00E+03	**2.63E+01**	3.11E+04	**1.69E+00**
300-33, 300-41, 300-256_Shallow	non-Rad	Zinc	7440-66-6	µg/kg	4.15E+04	5.00E+04	8.29E-01	6.78E+04	6.12E-01

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	µg/kg	3.30E+02	4.00E+04	8.25E-03	3.25E+02	**1.02E+00**
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	µg/kg	3.85E+02	4.00E+04	9.63E-03	1.47E+03	2.62E-01
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	µg/kg	5.20E+01	4.00E+04	1.30E-03	1.47E+03	3.54E-02
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aroclors HI	--	µg/kg	--	--	1.92E-02	--	**1.32E+00**
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Arsenic	7440-38-2	µg/kg	3.24E+03	1.00E+04	3.24E-01	1.90E+05	1.71E-02
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Barium	7440-39-3	µg/kg	6.46E+04	3.30E+05	1.96E-01	1.32E+06	4.89E-02
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Beryllium	7440-41-7	µg/kg	1.69E+02	1.00E+04	1.69E-02	1.39E+04	1.22E-02
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Boron	7440-42-8	µg/kg	1030	5.00E+02	**2.06E+00**	1.33E+05	7.74E-03
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Cadmium	7440-43-9	µg/kg	1.00E+02	4.00E+03	2.50E-02	1.63E+03	6.13E-02
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Chromium	7440-47-3	µg/kg	8080	4.00E+02	**2.02E+01**	3.82E+04	2.12E-01
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Cobalt	7440-48-4	µg/kg	5.64E+03	1.30E+04	4.34E-01	1.11E+05	5.08E-02
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Copper	7440-50-8	µg/kg	1.04E+04	5.00E+04	2.08E-01	1.07E+05	9.72E-02
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Fluoride	16984-48-8	µg/kg	1300	No Value	**--**	2.28E+06	5.70E-04
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Lead	7439-92-1	µg/kg	3.16E+03	5.00E+04	6.32E-02	3.56E+04	8.88E-02
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Lithium	7439-93-2	µg/kg	6580	2.00E+03	**3.29E+00**	5.15E+05	1.28E-02
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Manganese	7439-96-5	µg/kg	259000	2.20E+05	**1.18E+00**	5.80E+06	4.47E-02
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Methylene chloride	75-09-2	µg/kg	2.21	No Value	**--**	1.66E+05	1.33E-05
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Molybdenum	7439-98-7	µg/kg	2.75E+02	2.00E+03	1.38E-01	1.40E+04	1.96E-02
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Nickel	7440-02-0	µg/kg	8.04E+03	3.00E+04	2.68E-01	3.26E+04	2.47E-01
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Nitrate	14797-55-8	µg/kg	17900	No Value	**--**	3.40E+08	5.26E-05
300-33, 300-41, 300-256_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	1.97E-04	--	8.95E-04
300-33, 300-41, 300-256_Shallow_Focused	Rad	Uranium-233/234	U-233/234	pCi/g	3.02E+00	5.16E+04	5.85E-05	6.37E+03	4.74E-04
300-33, 300-41, 300-256_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	2.17E+00	1.57E+04	1.38E-04	5.15E+03	4.21E-04
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	51400	2.00E+03	**2.57E+01**	3.11E+04	**1.65E+00**
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Zinc	7440-66-6	µg/kg	3.89E+04	5.00E+04	7.78E-01	6.78E+04	5.74E-01
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	6460	5.00E+03	**1.29E+00**	7.86E+05	8.22E-03
300-37_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	µg/kg	1.00E+02	4.00E+04	2.50E-03	1.47E+03	6.80E-02
300-37_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	µg/kg	3.20E+03	4.00E+04	8.00E-02	1.47E+03	**2.18E+00**
300-37_Shallow_Focused	non-Rad	Aroclors HI	--	µg/kg	--	--	8.25E-02	--	**2.25E+00**
300-44_Overburden_Focused	non-Rad	Arsenic	7440-38-2	µg/kg	9.10E+03	1.00E+04	9.10E-01	1.90E+05	4.79E-02
300-44_Overburden_Focused	Rad	Uranium-238	U-238	pCi/g	3.45E-01	1.57E+04	2.20E-05	5.15E+03	6.70E-05
300-44_Overburden_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	1.03E+03	5.00E+03	2.05E-01	7.86E+05	1.31E-03
300-44_Shallow_Focused	non-Rad	Antimony	7440-36-0	µg/kg	4.10E+03	5.00E+03	8.20E-01	5.98E+03	6.86E-01
300-44_Shallow_Focused	non-Rad	Arsenic	7440-38-2	µg/kg	16900	1.00E+04	**1.69E+00**	1.90E+05	8.89E-02
300-44_Shallow_Focused	non-Rad	Barium	7440-39-3	µg/kg	7.52E+04	3.30E+05	2.28E-01	1.32E+06	5.70E-02
300-44_Shallow_Focused	non-Rad	Beryllium	7440-41-7	µg/kg	4.80E+02	1.00E+04	4.80E-02	1.39E+04	3.45E-02
300-44_Shallow_Focused	non-Rad	Chromium	7440-47-3	µg/kg	9300	4.00E+02	**2.33E+01**	3.82E+04	2.43E-01
300-44_Shallow_Focused	non-Rad	Cobalt	7440-48-4	µg/kg	8.20E+03	1.30E+04	6.31E-01	1.11E+05	7.39E-02
300-44_Shallow_Focused	non-Rad	Copper	7440-50-8	µg/kg	7.80E+03	5.00E+04	1.56E-01	1.07E+05	7.29E-02
300-44_Shallow_Focused	non-Rad	Manganese	7439-96-5	µg/kg	303000	2.20E+05	**1.38E+00**	5.80E+06	5.22E-02
300-44_Shallow_Focused	non-Rad	Nickel	7440-02-0	µg/kg	8.60E+03	3.00E+04	2.87E-01	3.26E+04	2.64E-01
300-44_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	2.93E-01	1.57E+04	1.87E-05	5.15E+03	5.69E-05
300-44_Shallow_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	43200	2.00E+03	**2.16E+01**	3.11E+04	**1.39E+00**
300-44_Shallow_Focused	non-Rad	Zinc	7440-66-6	µg/kg	3.78E+04	5.00E+04	7.56E-01	6.78E+04	5.58E-01

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
300-44_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	8.72E+02	5.00E+03	1.74E-01	7.86E+05	1.11E-03
300-45_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	µg/kg	8.60E+01	4.00E+04	2.15E-03	1.47E+03	5.85E-02
300-45_Shallow_Focused	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	µg/kg	2.90E+02	1.00E+05	2.90E-03	4.54E+04	6.39E-03
300-45_Shallow_Focused	Rad	Cesium-137	10045-97-3	pCi/g	2.28E-02	2.21E+03	1.03E-05	9.24E+02	2.47E-05
300-45_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	8.89E-05	--	2.72E-04
300-45_Shallow_Focused	Rad	Uranium-235	15117-96-1	pCi/g	6.06E-02	2.74E+04	2.21E-06	4.36E+03	1.39E-05
300-45_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	1.20E+00	1.57E+04	7.64E-05	5.15E+03	2.33E-04
300-45_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	3.60E+03	5.00E+03	7.20E-01	7.86E+05	4.58E-03
300-49_Overburden	non-Rad	1,2,4-Trichlorobenzene	120-82-1	µg/kg	30.521	No Value	--	No Value	--
300-49_Overburden	non-Rad	1,4-Dichlorobenzene	106-46-7	µg/kg	28.761	No Value	--	No Value	--
300-49_Overburden	non-Rad	2,4-Dinitrotoluene	121-14-2	µg/kg	18.933	No Value	--	2.64E+04	7.17E-04
300-49_Overburden	non-Rad	2-Chlorophenol	95-57-8	µg/kg	51.333	No Value	--	No Value	--
300-49_Overburden	non-Rad	4-Chloro-3-methylphenol	59-50-7	µg/kg	45.95	No Value	--	No Value	--
300-49_Overburden	non-Rad	Acenaphthene	83-32-9	µg/kg	3.07E+01	2.00E+04	1.54E-03	1.10E+06	2.79E-05
300-49_Overburden	non-Rad	Antimony	7440-36-0	µg/kg	2.32E+02	5.00E+03	4.64E-02	5.98E+03	3.88E-02
300-49_Overburden	non-Rad	Aroclor-1254	11097-69-1	µg/kg	3.01E+03	4.00E+04	7.52E-02	1.47E+03	**2.05E+00**
300-49_Overburden	non-Rad	Arsenic	7440-38-2	µg/kg	3.29E+03	1.00E+04	3.29E-01	1.90E+05	1.73E-02
300-49_Overburden	non-Rad	Barium	7440-39-3	µg/kg	7.61E+04	3.30E+05	2.31E-01	1.32E+06	5.76E-02
300-49_Overburden	non-Rad	Beryllium	7440-41-7	µg/kg	2.01E+02	1.00E+04	2.01E-02	1.39E+04	1.45E-02
300-49_Overburden	non-Rad	Cadmium	7440-43-9	µg/kg	1.74E+02	4.00E+03	4.36E-02	1.63E+03	1.07E-01
300-49_Overburden	non-Rad	Chromium	7440-47-3	µg/kg	18105.752	4.00E+02	**4.53E+01**	3.82E+04	4.74E-01
300-49_Overburden	non-Rad	Cobalt	7440-48-4	µg/kg	7.13E+03	1.30E+04	5.48E-01	1.11E+05	6.42E-02
300-49_Overburden	non-Rad	Copper	7440-50-8	µg/kg	536000	5.00E+04	**1.07E+01**	1.07E+05	**5.01E+00**
300-49_Overburden	non-Rad	Di-n-butylphthalate	84-74-2	µg/kg	51.612	No Value	--	No Value	--
300-49_Overburden	non-Rad	Lead	7439-92-1	µg/kg	3.70E+04	5.00E+04	7.39E-01	3.56E+04	**1.04E+00**
300-49_Overburden	non-Rad	Manganese	7439-96-5	µg/kg	316668.7	2.20E+05	**1.44E+00**	5.80E+06	5.46E-02
300-49_Overburden	non-Rad	Nickel	7440-02-0	µg/kg	1.30E+04	3.00E+04	4.35E-01	3.26E+04	4.00E-01
300-49_Overburden	non-Rad	n-Nitrosodi-n-dipropylamine	621-64-7	µg/kg	39.728	No Value	--	No Value	--
300-49_Overburden	non-Rad	Pentachlorophenol	87-86-5	µg/kg	49.824	No Value	--	No Value	--
300-49_Overburden	non-Rad	Phenol	108-95-2	µg/kg	5.00E+01	3.00E+04	1.67E-03	1.51E+06	3.31E-05
300-49_Overburden	non-Rad	Pyrene	129-00-0	µg/kg	4.01E+01	1.80E+04	2.23E-03	6.00E+05	6.69E-05
300-49_Overburden	Rad	RADs SOF	--	pCi/g	--	--	8.70E-05	--	3.70E-04
300-49_Overburden	non-Rad	Silver	7440-22-4	µg/kg	7.03E+02	2.00E+03	3.51E-01	4.96E+04	1.42E-02
300-49_Overburden	Rad	Uranium-233/234	U-233/234	pCi/g	1.01E+00	5.16E+04	1.95E-05	6.37E+03	1.58E-04
300-49_Overburden	Rad	Uranium-235	15117-96-1	pCi/g	5.70E-02	2.74E+04	2.08E-06	4.36E+03	1.31E-05
300-49_Overburden	Rad	Uranium-238	U-238	pCi/g	1.03E+00	1.57E+04	6.54E-05	5.15E+03	1.99E-04
300-49_Overburden	non-Rad	Vanadium	7440-62-2	µg/kg	50379.9	2.00E+03	**2.52E+01**	3.11E+04	**1.62E+00**
300-49_Overburden	non-Rad	Zinc	7440-66-6	µg/kg	141984.11	5.00E+04	**2.84E+00**	6.78E+04	**2.09E+00**
300-49_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	3.07E+03	5.00E+03	6.13E-01	7.86E+05	3.90E-03
300-49_Shallow	non-Rad	Antimony	7440-36-0	µg/kg	1.76E+02	5.00E+03	3.52E-02	5.98E+03	2.94E-02
300-49_Shallow	non-Rad	Arsenic	7440-38-2	µg/kg	4.43E+03	1.00E+04	4.43E-01	1.90E+05	2.33E-02
300-49_Shallow	non-Rad	Barium	7440-39-3	µg/kg	8.99E+04	3.30E+05	2.72E-01	1.32E+06	6.81E-02
300-49_Shallow	non-Rad	Beryllium	7440-41-7	µg/kg	3.03E+02	1.00E+04	3.03E-02	1.39E+04	2.18E-02
300-49_Shallow	Rad	Cesium-137	10045-97-3	pCi/g	1.51E-01	2.21E+03	6.83E-05	9.24E+02	1.63E-04

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
300-49_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	9170.4553	4.00E+02	**2.29E+01**	3.82E+04	2.40E-01
300-49_Shallow	non-Rad	Cobalt	7440-48-4	µg/kg	9.32E+03	1.30E+04	7.17E-01	1.11E+05	8.40E-02
300-49_Shallow	non-Rad	Copper	7440-50-8	µg/kg	1.49E+04	5.00E+04	2.97E-01	1.07E+05	1.39E-01
300-49_Shallow	non-Rad	Lead	7439-92-1	µg/kg	6.63E+03	5.00E+04	1.33E-01	3.56E+04	1.86E-01
300-49_Shallow	non-Rad	Manganese	7439-96-5	µg/kg	361805.31	2.20E+05	**1.64E+00**	5.80E+06	6.24E-02
300-49_Shallow	non-Rad	Nickel	7440-02-0	µg/kg	1.07E+04	3.00E+04	3.55E-01	3.26E+04	3.27E-01
300-49_Shallow	Rad	RADs SOF	--	pCi/g	--	--	1.70E-04	--	6.32E-04
300-49_Shallow	non-Rad	Silver	7440-22-4	µg/kg	3.82E+02	2.00E+03	1.91E-01	4.96E+04	7.71E-03
300-49_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	1.32E+00	5.16E+04	2.55E-05	6.37E+03	2.07E-04
300-49_Shallow	Rad	Uranium-235	15117-96-1	pCi/g	2.40E-01	2.74E+04	8.76E-06	4.36E+03	5.50E-05
300-49_Shallow	Rad	Uranium-238	U-238	pCi/g	1.06E+00	1.57E+04	6.78E-05	5.15E+03	2.07E-04
300-49_Shallow	non-Rad	Vanadium	7440-62-2	µg/kg	58672.352	2.00E+03	**2.93E+01**	3.11E+04	**1.89E+00**
300-49_Shallow	non-Rad	Zinc	7440-66-6	µg/kg	54650.548	5.00E+04	**1.09E+00**	6.78E+04	8.06E-01
300-49_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	2.98E+03	5.00E+03	5.97E-01	7.86E+05	3.80E-03
300-50_Overburden	non-Rad	Aroclor-1254	11097-69-1	µg/kg	3.34E+01	4.00E+04	8.36E-04	1.47E+03	2.28E-02
300-50_Overburden	non-Rad	Aroclor-1260	11096-82-5	µg/kg	2.29E+02	4.00E+04	5.73E-03	1.47E+03	1.56E-01
300-50_Overburden	non-Rad	Aroclors HI	--	µg/kg	--	--	6.57E-03	--	1.79E-01
300-50_Overburden	non-Rad	Arsenic	7440-38-2	µg/kg	6.90E+03	1.00E+04	6.90E-01	1.90E+05	3.63E-02
300-50_Overburden	non-Rad	Barium	7440-39-3	µg/kg	1.18E+05	3.30E+05	3.57E-01	1.32E+06	8.92E-02
300-50_Overburden	non-Rad	Beryllium	7440-41-7	µg/kg	3.25E+02	1.00E+04	3.25E-02	1.39E+04	2.34E-02
300-50_Overburden	non-Rad	Cadmium	7440-43-9	µg/kg	5.63E+02	4.00E+03	1.41E-01	1.63E+03	3.45E-01
300-50_Overburden	Rad	Cesium-137	10045-97-3	pCi/g	5.60E-02	2.21E+03	2.53E-05	9.24E+02	6.06E-05
300-50_Overburden	non-Rad	Chromium	7440-47-3	µg/kg	12197.473	4.00E+02	**3.05E+01**	3.82E+04	3.19E-01
300-50_Overburden	non-Rad	Cobalt	7440-48-4	µg/kg	9.39E+03	1.30E+04	7.22E-01	1.11E+05	8.46E-02
300-50_Overburden	non-Rad	Copper	7440-50-8	µg/kg	64526.564	5.00E+04	**1.29E+00**	1.07E+05	6.03E-01
300-50_Overburden	non-Rad	Lead	7439-92-1	µg/kg	5.90E+03	5.00E+04	1.18E-01	3.56E+04	1.66E-01
300-50_Overburden	non-Rad	Manganese	7439-96-5	µg/kg	314270.52	2.20E+05	**1.43E+00**	5.80E+06	5.42E-02
300-50_Overburden	non-Rad	Nickel	7440-02-0	µg/kg	1.52E+04	3.00E+04	5.08E-01	3.26E+04	4.67E-01
300-50_Overburden	Rad	RADs SOF	--	pCi/g	--	--	5.38E-04	--	2.27E-03
300-50_Overburden	non-Rad	Silver	7440-22-4	µg/kg	1.20E+03	2.00E+03	6.01E-01	4.96E+04	2.42E-02
300-50_Overburden	Rad	Uranium-233/234	U-233/234	pCi/g	6.03E+00	5.16E+04	1.17E-04	6.37E+03	9.46E-04
300-50_Overburden	Rad	Uranium-235	15117-96-1	pCi/g	4.49E-01	2.74E+04	1.64E-05	4.36E+03	1.03E-04
300-50_Overburden	Rad	Uranium-238	U-238	pCi/g	5.95E+00	1.57E+04	3.79E-04	5.15E+03	1.16E-03
300-50_Overburden	non-Rad	Vanadium	7440-62-2	µg/kg	45242.833	2.00E+03	**2.26E+01**	3.11E+04	**1.45E+00**
300-50_Overburden	non-Rad	Zinc	7440-66-6	µg/kg	4.59E+04	5.00E+04	9.18E-01	6.78E+04	6.77E-01
300-50_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	17919	5.00E+03	**3.58E+00**	7.86E+05	2.28E-02
300-50_Shallow	non-Rad	Antimony	7440-36-0	µg/kg	3.00E+03	5.00E+03	6.00E-01	5.98E+03	5.02E-01
300-50_Shallow	non-Rad	Aroclor-1254	11097-69-1	µg/kg	1.26E+02	4.00E+04	3.16E-03	1.47E+03	8.59E-02
300-50_Shallow	non-Rad	Arsenic	7440-38-2	µg/kg	6.40E+03	1.00E+04	6.40E-01	1.90E+05	3.37E-02
300-50_Shallow	non-Rad	Barium	7440-39-3	µg/kg	1.03E+05	3.30E+05	3.12E-01	1.32E+06	7.81E-02
300-50_Shallow	non-Rad	Beryllium	7440-41-7	µg/kg	2.82E+02	1.00E+04	2.82E-02	1.39E+04	2.03E-02
300-50_Shallow	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	µg/kg	1.93E+01	1.00E+05	1.93E-04	4.54E+04	4.25E-04
300-50_Shallow	non-Rad	Cadmium	7440-43-9	µg/kg	4.63E+02	4.00E+03	1.16E-01	1.63E+03	2.84E-01
300-50_Shallow	Rad	Cesium-137	10045-97-3	pCi/g	5.60E-02	2.21E+03	2.53E-05	9.24E+02	6.06E-05

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
300-50_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	16841.216	4.00E+02	**4.21E+01**	3.82E+04	4.41E-01
300-50_Shallow	non-Rad	Cobalt	7440-48-4	µg/kg	9.11E+03	1.30E+04	7.01E-01	1.11E+05	8.21E-02
300-50_Shallow	non-Rad	Copper	7440-50-8	µg/kg	1.68E+04	5.00E+04	3.36E-01	1.07E+05	1.57E-01
300-50_Shallow	non-Rad	Lead	7439-92-1	µg/kg	6.38E+03	5.00E+04	1.28E-01	3.56E+04	1.79E-01
300-50_Shallow	non-Rad	Manganese	7439-96-5	µg/kg	318119.94	2.20E+05	**1.45E+00**	5.80E+06	5.48E-02
300-50_Shallow	non-Rad	Nickel	7440-02-0	µg/kg	1.24E+04	3.00E+04	4.14E-01	3.26E+04	3.81E-01
300-50_Shallow	Rad	RADs SOF	--	pCi/g	--	--	7.39E-04	--	3.08E-03
300-50_Shallow	non-Rad	Silver	7440-22-4	µg/kg	2991.6221	2.00E+03	**1.50E+00**	4.96E+04	6.03E-02
300-50_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	7.89E+00	5.16E+04	1.53E-04	6.37E+03	1.24E-03
300-50_Shallow	Rad	Uranium-235	15117-96-1	pCi/g	6.64E-01	2.74E+04	2.42E-05	4.36E+03	1.52E-04
300-50_Shallow	Rad	Uranium-238	U-238	pCi/g	8.41E+00	1.57E+04	5.36E-04	5.15E+03	1.63E-03
300-50_Shallow	non-Rad	Vanadium	7440-62-2	µg/kg	46964.326	2.00E+03	**2.35E+01**	3.11E+04	**1.51E+00**
300-50_Shallow	non-Rad	Zinc	7440-66-6	µg/kg	4.13E+04	5.00E+04	8.27E-01	6.78E+04	6.10E-01
300-50_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	22938	5.00E+03	**4.59E+00**	7.86E+05	2.92E-02
300-8_Shallow	non-Rad	Beryllium	7440-41-7	µg/kg	5.74E+02	1.00E+04	5.74E-02	1.39E+04	4.13E-02
300-8_Shallow	Rad	RADs SOF	--	pCi/g	--	--	6.75E-05	--	2.83E-04
300-8_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	7.86E-01	5.16E+04	1.52E-05	6.37E+03	1.23E-04
300-8_Shallow	Rad	Uranium-238	U-238	pCi/g	8.21E-01	1.57E+04	5.23E-05	5.15E+03	1.60E-04
300-8_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	2.37E+03	5.00E+03	4.75E-01	7.86E+05	3.02E-03
316-1_Overburden	Rad	Cesium-137	10045-97-3	pCi/g	1.01E-01	2.21E+03	4.57E-05	9.24E+02	1.09E-04
316-1_Overburden	Rad	Cobalt-60	10198-40-0	pCi/g	3.18E-01	6.13E+03	5.19E-05	8.05E+02	3.95E-04
316-1_Overburden	Rad	RADs SOF	--	pCi/g	--	--	1.25E-03	--	5.39E-03
316-1_Overburden	Rad	Uranium-233/234	U-233/234	pCi/g	1.30E+01	5.16E+04	2.51E-04	6.37E+03	2.03E-03
316-1_Overburden	Rad	Uranium-235	15117-96-1	pCi/g	1.08E+00	2.74E+04	3.94E-05	4.36E+03	2.48E-04
316-1_Overburden	Rad	Uranium-238	U-238	pCi/g	1.35E+01	1.57E+04	8.57E-04	5.15E+03	2.61E-03
316-1_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	40572	5.00E+03	**8.11E+00**	7.86E+05	5.16E-02
316-1_Shallow_1	non-Rad	Aroclor-1248	12672-29-6	µg/kg	3.00E+03	4.00E+04	7.50E-02	3.25E+02	**9.23E+00**
316-1_Shallow_1	non-Rad	Arsenic	7440-38-2	µg/kg	19014.394	1.00E+04	**1.90E+00**	1.90E+05	1.00E-01
316-1_Shallow_1	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	µg/kg	6.86E+01	1.00E+05	6.86E-04	4.54E+04	1.51E-03
316-1_Shallow_1	non-Rad	Butylbenzylphthalate	85-68-7	µg/kg	97.692869	No Value	**--**	No Value	**--**
316-1_Shallow_1	Rad	Cesium-137	10045-97-3	pCi/g	3.18E-02	2.21E+03	1.44E-05	9.24E+02	3.44E-05
316-1_Shallow_1	Rad	RADs SOF	--	pCi/g	--	--	1.82E-03	--	5.69E-03
316-1_Shallow_1	Rad	Uranium-235	15117-96-1	pCi/g	1.21E+00	2.74E+04	4.43E-05	4.36E+03	2.78E-04
316-1_Shallow_1	Rad	Uranium-238	U-238	pCi/g	2.77E+01	1.57E+04	1.76E-03	5.15E+03	5.38E-03
316-1_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	83027	5.00E+03	**1.66E+01**	7.86E+05	1.06E-01
316-1_Shallow_3	non-Rad	Antimony	7440-36-0	µg/kg	4.90E+02	5.00E+03	9.80E-02	5.98E+03	8.19E-02
316-1_Shallow_3	non-Rad	Aroclor-1254	11097-69-1	µg/kg	9.99E+01	4.00E+04	2.50E-03	1.47E+03	6.79E-02
316-1_Shallow_3	non-Rad	Arsenic	7440-38-2	µg/kg	5.14E+03	1.00E+04	5.14E-01	1.90E+05	2.70E-02
316-1_Shallow_3	non-Rad	Barium	7440-39-3	µg/kg	1.29E+05	3.30E+05	3.91E-01	1.32E+06	9.78E-02
316-1_Shallow_3	non-Rad	Beryllium	7440-41-7	µg/kg	4.16E+02	1.00E+04	4.16E-02	1.39E+04	2.99E-02
316-1_Shallow_3	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	µg/kg	3.42E+02	1.00E+05	3.42E-03	4.54E+04	7.54E-03
316-1_Shallow_3	non-Rad	Cadmium	7440-43-9	µg/kg	4.70E+02	4.00E+03	1.18E-01	1.63E+03	2.88E-01
316-1_Shallow_3	Rad	Cesium-137	10045-97-3	pCi/g	3.77E-01	2.21E+03	1.71E-04	9.24E+02	4.08E-04
316-1_Shallow_3	non-Rad	Chromium	7440-47-3	µg/kg	50455.279	4.00E+02	**1.26E+02**	3.82E+04	**1.32E+00**

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
316-1_Shallow_3	non-Rad	Cobalt	7440-48-4	µg/kg	9.70E+03	1.30E+04	7.46E-01	1.11E+05	8.74E-02
316-1_Shallow_3	Rad	Cobalt-60	10198-40-0	pCi/g	2.28E+00	6.13E+03	3.72E-04	8.05E+02	2.83E-03
316-1_Shallow_3	non-Rad	Copper	7440-50-8	µg/kg	1366370.3	5.00E+04	**2.73E+01**	1.07E+05	**1.28E+01**
316-1_Shallow_3	non-Rad	Heptachlor epoxide	1024-57-3	µg/kg	2.6479397	No Value	--	No Value	--
316-1_Shallow_3	non-Rad	Lead	7439-92-1	µg/kg	1.44E+04	5.00E+04	2.88E-01	3.56E+04	4.05E-01
316-1_Shallow_3	non-Rad	Manganese	7439-96-5	µg/kg	392825.12	2.20E+05	**1.79E+00**	5.80E+06	6.77E-02
316-1_Shallow_3	non-Rad	Mercury	7439-97-6	µg/kg	1105.3045	1.00E+02	**1.11E+01**	1.87E+03	5.91E-01
316-1_Shallow_3	non-Rad	Nickel	7440-02-0	µg/kg	94655.889	3.00E+04	**3.16E+00**	3.26E+04	**2.90E+00**
316-1_Shallow_3	non-Rad	Phenol	108-95-2	µg/kg	2.80E+01	3.00E+04	9.33E-04	1.51E+06	1.85E-05
316-1_Shallow_3	Rad	RADs SOF	--	pCi/g	--	--	2.41E-03	--	1.14E-02
316-1_Shallow_3	non-Rad	Selenium	7782-49-2	µg/kg	1444.348	5.20E+02	**2.78E+00**	1.90E+03	7.60E-01
316-1_Shallow_3	non-Rad	Silver	7440-22-4	µg/kg	13195.532	2.00E+03	**6.60E+00**	4.96E+04	2.66E-01
316-1_Shallow_3	Rad	Uranium-233/234	U-233/234	pCi/g	2.27E+01	5.16E+04	4.40E-04	6.37E+03	3.57E-03
316-1_Shallow_3	Rad	Uranium-235	15117-96-1	pCi/g	2.55E+00	2.74E+04	9.30E-05	4.36E+03	5.84E-04
316-1_Shallow_3	Rad	Uranium-238	U-238	pCi/g	2.08E+01	1.57E+04	1.33E-03	5.15E+03	4.04E-03
316-1_Shallow_3	non-Rad	Vanadium	7440-62-2	µg/kg	56706.602	2.00E+03	**2.84E+01**	3.11E+04	**1.82E+00**
316-1_Shallow_3	non-Rad	Zinc	7440-66-6	µg/kg	82015.898	5.00E+04	**1.64E+00**	6.78E+04	**1.21E+00**
316-1_Shallow_3	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	63074	5.00E+03	**1.26E+01**	7.86E+05	8.02E-02
316-1_Shallow_4	non-Rad	Aroclor-1254	11097-69-1	µg/kg	6.20E+01	4.00E+04	1.55E-03	1.47E+03	4.22E-02
316-1_Shallow_4	Rad	Cobalt-60	10198-40-0	pCi/g	1.20E-01	6.13E+03	1.96E-05	8.05E+02	1.49E-04
316-1_Shallow_4	Rad	RADs SOF	--	pCi/g	--	--	1.28E-03	--	5.69E-03
316-1_Shallow_4	Rad	Uranium-233/234	U-233/234	pCi/g	1.61E+01	5.16E+04	3.13E-04	6.37E+03	2.53E-03
316-1_Shallow_4	Rad	Uranium-235	15117-96-1	pCi/g	1.07E+00	2.74E+04	3.90E-05	4.36E+03	2.45E-04
316-1_Shallow_4	Rad	Uranium-238	U-238	pCi/g	1.43E+01	1.57E+04	9.09E-04	5.15E+03	2.77E-03
316-1_Shallow_4	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	42963	5.00E+03	**8.59E+00**	7.86E+05	5.47E-02
316-2_Shallow_1	Rad	Cesium-137	10045-97-3	pCi/g	3.10E-02	2.21E+03	1.40E-05	9.24E+02	3.35E-05
316-2_Shallow_1	Rad	Cobalt-60	10198-40-0	pCi/g	9.22E-02	6.13E+03	1.50E-05	8.05E+02	1.14E-04
316-2_Shallow_1	Rad	RADs SOF	--	pCi/g	--	--	6.53E-03	--	2.99E-02
316-2_Shallow_1	Rad	Uranium-233/234	U-233/234	pCi/g	8.64E+01	5.16E+04	1.67E-03	6.37E+03	1.36E-02
316-2_Shallow_1	Rad	Uranium-235	15117-96-1	pCi/g	1.22E+01	2.74E+04	4.45E-04	4.36E+03	2.80E-03
316-2_Shallow_1	Rad	Uranium-238	U-238	pCi/g	6.88E+01	1.57E+04	4.39E-03	5.15E+03	1.34E-02
316-2_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	210452	5.00E+03	**4.21E+01**	7.86E+05	2.68E-01
316-2_Shallow_2	non-Rad	Aroclor-1248	12672-29-6	µg/kg	6.97E+02	4.00E+04	1.74E-02	3.25E+02	**2.14E+00**
316-2_Shallow_2	non-Rad	Aroclor-1254	11097-69-1	µg/kg	4.20E+01	4.00E+04	1.05E-03	1.47E+03	2.86E-02
316-2_Shallow_2	non-Rad	Aroclor-1260	11096-82-5	µg/kg	1.10E+02	4.00E+04	2.75E-03	1.47E+03	7.48E-02
316-2_Shallow_2	non-Rad	Aroclors HI	--	µg/kg	--	--	2.12E-02	--	**2.24E+00**
316-2_Shallow_2	Rad	Cesium-137	10045-97-3	pCi/g	4.48E-01	2.21E+03	2.03E-04	9.24E+02	4.85E-04
316-2_Shallow_2	Rad	Cobalt-60	10198-40-0	pCi/g	4.53E-01	6.13E+03	7.38E-05	8.05E+02	5.62E-04
316-2_Shallow_2	Rad	RADs SOF	--	pCi/g	--	--	9.03E-03	--	4.03E-02
316-2_Shallow_2	Rad	Uranium-233/234	U-233/234	pCi/g	1.15E+02	5.16E+04	2.22E-03	6.37E+03	1.80E-02
316-2_Shallow_2	Rad	Uranium-235	15117-96-1	pCi/g	1.11E+01	2.74E+04	4.05E-04	4.36E+03	2.55E-03
316-2_Shallow_2	Rad	Uranium-238	U-238	pCi/g	9.62E+01	1.57E+04	6.13E-03	5.15E+03	1.87E-02
316-2_Shallow_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	291369	5.00E+03	**5.83E+01**	7.86E+05	3.71E-01
316-2_Shallow_3	non-Rad	Arsenic	7440-38-2	µg/kg	8.00E+03	1.00E+04	8.00E-01	1.90E+05	4.21E-02

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
316-2_Shallow_3	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	µg/kg	2.60E+02	1.00E+05	2.60E-03	4.54E+04	5.73E-03
316-2_Shallow_3	non-Rad	Butylbenzylphthalate	85-68-7	µg/kg	180	No Value	--	No Value	--
316-2_Shallow_3	Rad	RADs SOF	--	pCi/g	--	--	1.59E-03	--	4.96E-03
316-2_Shallow_3	Rad	Uranium-235	15117-96-1	pCi/g	9.09E-01	2.74E+04	3.32E-05	4.36E+03	2.08E-04
316-2_Shallow_3	Rad	Uranium-238	U-238	pCi/g	2.44E+01	1.57E+04	1.56E-03	5.15E+03	4.75E-03
316-2_Shallow_3	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	73174	5.00E+03	**1.46E+01**	7.86E+05	9.31E-02
316-5_Shallow_1	Rad	Americium-241	14596-10-2	pCi/g	4.79E-01	2.15E+04	2.23E-05	4.84E+03	9.90E-05
316-5_Shallow_1	non-Rad	Arsenic	7440-38-2	µg/kg	3.07E+03	1.00E+04	3.07E-01	1.90E+05	1.62E-02
316-5_Shallow_1	non-Rad	Benzo(a)anthracene	56-55-3	µg/kg	3.80E+01	1.80E+04	2.11E-03	6.40E+04	5.94E-04
316-5_Shallow_1	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	µg/kg	1.46E+02	1.00E+05	1.46E-03	4.54E+04	3.21E-03
316-5_Shallow_1	non-Rad	Butylbenzylphthalate	85-68-7	µg/kg	100	No Value	--	No Value	--
316-5_Shallow_1	Rad	Cesium-137	10045-97-3	pCi/g	2.29E+00	2.21E+03	1.04E-03	9.24E+02	2.48E-03
316-5_Shallow_1	Rad	RADs SOF	--	pCi/g	--	--	7.42E-03	--	2.41E-02
316-5_Shallow_1	Rad	Uranium-235	15117-96-1	pCi/g	1.86E+01	2.74E+04	6.79E-04	4.36E+03	4.27E-03
316-5_Shallow_1	Rad	Uranium-238	U-238	pCi/g	8.92E+01	1.57E+04	5.68E-03	5.15E+03	1.73E-02
316-5_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	271835	5.00E+03	**5.44E+01**	7.86E+05	3.46E-01
316-5_Shallow_2	non-Rad	1,1,2,2-Tetrachloroethane	79-34-5	µg/kg	140	No Value	--	1.65E+05	8.48E-04
316-5_Shallow_2	non-Rad	2-Butoxyethanol	111-76-2	µg/kg	240	No Value	--	No Value	--
316-5_Shallow_2	Rad	Americium-241	14596-10-2	pCi/g	1.24E-01	2.15E+04	5.77E-06	4.84E+03	2.56E-05
316-5_Shallow_2	non-Rad	Arsenic	7440-38-2	µg/kg	3.18E+03	1.00E+04	3.18E-01	1.90E+05	1.67E-02
316-5_Shallow_2	non-Rad	Barium	7440-39-3	µg/kg	7.67E+04	3.30E+05	2.32E-01	1.32E+06	5.81E-02
316-5_Shallow_2	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	µg/kg	1.80E+02	1.00E+05	1.80E-03	4.54E+04	3.97E-03
316-5_Shallow_2	non-Rad	Butylbenzylphthalate	85-68-7	µg/kg	110	No Value	--	No Value	--
316-5_Shallow_2	Rad	Cesium-137	10045-97-3	pCi/g	1.71E+00	2.21E+03	7.76E-04	9.24E+02	1.85E-03
316-5_Shallow_2	non-Rad	Chromium	7440-47-3	µg/kg	6900	4.00E+02	**1.73E+01**	3.82E+04	1.81E-01
316-5_Shallow_2	non-Rad	Chrysene	218-01-9	µg/kg	3.80E+01	1.80E+04	2.11E-03	4.45E+04	8.54E-04
316-5_Shallow_2	Rad	Cobalt-60	10198-40-0	pCi/g	1.18E-01	6.13E+03	1.92E-05	8.05E+02	1.47E-04
316-5_Shallow_2	non-Rad	Di-n-butylphthalate	84-74-2	µg/kg	146.4259	No Value	--	No Value	--
316-5_Shallow_2	non-Rad	Lead	7439-92-1	µg/kg	3.20E+03	5.00E+04	6.40E-02	3.56E+04	8.99E-02
316-5_Shallow_2	Rad	RADs SOF	--	pCi/g	--	--	5.43E-03	--	1.72E-02
316-5_Shallow_2	non-Rad	Selenium	7782-49-2	µg/kg	4.90E+02	5.20E+02	9.42E-01	1.90E+03	2.58E-01
316-5_Shallow_2	non-Rad	Silver	7440-22-4	µg/kg	3600	2.00E+03	**1.80E+00**	4.96E+04	7.26E-02
316-5_Shallow_2	Rad	Uranium-235	15117-96-1	pCi/g	9.04E+00	2.74E+04	3.30E-04	4.36E+03	2.07E-03
316-5_Shallow_2	Rad	Uranium-238	U-238	pCi/g	6.75E+01	1.57E+04	4.30E-03	5.15E+03	1.31E-02
316-5_Shallow_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	204701	5.00E+03	**4.09E+01**	7.86E+05	2.60E-01
316-5_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	µg/kg	5.70E+01	4.00E+04	1.43E-03	3.25E+02	1.75E-01
316-5_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	µg/kg	7.00E+01	4.00E+04	1.75E-03	1.47E+03	4.76E-02
316-5_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	µg/kg	5.20E+01	4.00E+04	1.30E-03	1.47E+03	3.54E-02
316-5_Shallow_Focused	non-Rad	Aroclors HI	--	µg/kg	--	--	4.48E-03	--	2.58E-01
316-5_Shallow_Focused	non-Rad	Arsenic	7440-38-2	µg/kg	4.30E+03	1.00E+04	4.30E-01	1.90E+05	2.26E-02
316-5_Shallow_Focused	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	µg/kg	1.90E+02	1.00E+05	1.90E-03	4.54E+04	4.19E-03
316-5_Shallow_Focused	Rad	Cesium-137	10045-97-3	pCi/g	1.83E+00	2.21E+03	8.28E-04	9.24E+02	1.98E-03
316-5_Shallow_Focused	non-Rad	Di-n-butylphthalate	84-74-2	µg/kg	1500	No Value	--	No Value	--
316-5_Shallow_Focused	Rad	Europium-155	14391-16-3	pCi/g	7.19E-02	1.53E+05	4.70E-07	3.34E+04	2.15E-06

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
316-5_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	3.99E-03	--	1.25E-02
316-5_Shallow_Focused	Rad	Uranium-235	15117-96-1	pCi/g	7.67E+00	2.74E+04	2.80E-04	4.36E+03	1.76E-03
316-5_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	4.52E+01	1.57E+04	2.88E-03	5.15E+03	8.78E-03
316-5_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	138095	5.00E+03	**2.76E+01**	7.86E+05	1.76E-01
331 LSLDF_Shallow_Focused	non-Rad	4,4'-DDE (Dichlorodiphenyldichloroethylene)	72-55-9	µg/kg	25	No Value	--	4.00E+02	6.25E-02
331 LSLDF_Shallow_Focused	non-Rad	Acetone	67-64-1	µg/kg	590	No Value	--	No Value	--
331 LSLDF_Shallow_Focused	non-Rad	Aldrin	309-00-2	µg/kg	0.56	No Value	--	1.65E+02	3.39E-03
331 LSLDF_Shallow_Focused	non-Rad	Alpha-BHC	319-84-6	µg/kg	0.39	No Value	--	No Value	--
331 LSLDF_Shallow_Focused	non-Rad	Antimony	7440-36-0	µg/kg	3.60E+02	5.00E+03	7.20E-02	5.98E+03	6.02E-02
331 LSLDF_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	µg/kg	8.50E+02	4.00E+04	2.13E-02	1.47E+03	5.78E-01
331 LSLDF_Shallow_Focused	non-Rad	Arsenic	7440-38-2	µg/kg	2.40E+03	1.00E+04	2.40E-01	1.90E+05	1.26E-02
331 LSLDF_Shallow_Focused	non-Rad	Barium	7440-39-3	µg/kg	7.86E+04	3.30E+05	2.38E-01	1.32E+06	5.95E-02
331 LSLDF_Shallow_Focused	non-Rad	Beryllium	7440-41-7	µg/kg	5.70E+02	1.00E+04	5.70E-02	1.39E+04	4.10E-02
331 LSLDF_Shallow_Focused	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	µg/kg	9.10E+02	1.00E+05	9.10E-03	4.54E+04	2.00E-02
331 LSLDF_Shallow_Focused	non-Rad	Boron	7440-42-8	µg/kg	1700	5.00E+02	**3.40E+00**	1.33E+05	1.28E-02
331 LSLDF_Shallow_Focused	non-Rad	Butylbenzylphthalate	85-68-7	µg/kg	340	No Value	--	No Value	--
331 LSLDF_Shallow_Focused	non-Rad	Cadmium	7440-43-9	µg/kg	1.40E+02	4.00E+03	3.50E-02	1.63E+03	8.59E-02
331 LSLDF_Shallow_Focused	non-Rad	Chromium	7440-47-3	µg/kg	10300	4.00E+02	**2.58E+01**	3.82E+04	2.70E-01
331 LSLDF_Shallow_Focused	non-Rad	Cobalt	7440-48-4	µg/kg	8.60E+03	1.30E+04	6.62E-01	1.11E+05	7.75E-02
331 LSLDF_Shallow_Focused	non-Rad	Copper	7440-50-8	µg/kg	1.54E+04	5.00E+04	3.08E-01	1.07E+05	1.44E-01
331 LSLDF_Shallow_Focused	non-Rad	Dieldrin	60-57-1	µg/kg	13	No Value	--	2.09E+01	6.22E-01
331 LSLDF_Shallow_Focused	non-Rad	Di-n-butylphthalate	84-74-2	µg/kg	98	No Value	--	No Value	--
331 LSLDF_Shallow_Focused	non-Rad	Endosulfan I	959-98-8	µg/kg	1.9	No Value	--	7.10E+02	2.68E-03
331 LSLDF_Shallow_Focused	non-Rad	Endosulfan II	33213-65-9	µg/kg	3.1	No Value	--	7.10E+02	4.37E-03
331 LSLDF_Shallow_Focused	non-Rad	Lead	7439-92-1	µg/kg	9.00E+03	5.00E+04	1.80E-01	3.56E+04	2.53E-01
331 LSLDF_Shallow_Focused	non-Rad	Manganese	7439-96-5	µg/kg	349000	2.20E+05	**1.59E+00**	5.80E+06	6.02E-02
331 LSLDF_Shallow_Focused	non-Rad	Mercury	7439-97-6	µg/kg	110	1.00E+02	**1.10E+00**	1.87E+03	5.88E-02
331 LSLDF_Shallow_Focused	non-Rad	Methoxychlor	72-43-5	µg/kg	3.3	No Value	--	2.18E+04	1.51E-04
331 LSLDF_Shallow_Focused	non-Rad	Methylene chloride	75-09-2	µg/kg	11	No Value	--	1.66E+05	6.63E-05
331 LSLDF_Shallow_Focused	non-Rad	Molybdenum	7439-98-7	µg/kg	5.90E+02	2.00E+03	2.95E-01	1.40E+04	4.21E-02
331 LSLDF_Shallow_Focused	non-Rad	Nickel	7440-02-0	µg/kg	1.00E+04	3.00E+04	3.33E-01	3.26E+04	3.07E-01
331 LSLDF_Shallow_Focused	non-Rad	Nitrate	14797-55-8	µg/kg	41700	No Value	--	3.40E+08	1.23E-04
331 LSLDF_Shallow_Focused	non-Rad	Nitrogen in Nitrite and Nitrate	NO2+NO3-N	µg/kg	9500	No Value	--	No Value	--
331 LSLDF_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	4.05E-05	--	1.76E-04
331 LSLDF_Shallow_Focused	non-Rad	Silver	7440-22-4	µg/kg	1.10E+03	2.00E+03	5.50E-01	4.96E+04	2.22E-02
331 LSLDF_Shallow_Focused	non-Rad	Uranium	7440-61-1	µg/kg	2.30E+03	5.00E+03	4.60E-01	7.86E+05	2.93E-03
331 LSLDF_Shallow_Focused	Rad	Uranium-233/234	U-233/234	pCi/g	5.40E-01	5.16E+04	1.05E-05	6.37E+03	8.48E-05
331 LSLDF_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	4.71E-01	1.57E+04	3.00E-05	5.15E+03	9.15E-05
331 LSLDF_Shallow_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	53100	2.00E+03	**2.66E+01**	3.11E+04	**1.71E+00**
331 LSLDF_Shallow_Focused	non-Rad	Zinc	7440-66-6	µg/kg	137000	5.00E+04	**2.74E+00**	6.78E+04	**2.02E+00**
331 LSLDF_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	1.40E+03	5.00E+03	2.80E-01	7.86E+05	1.78E-03
600-243_Shallow	non-Rad	2-Methylnaphthalene	91-57-6	µg/kg	2.79E+02	2.90E+04	9.61E-03	6.01E+03	4.64E-02
600-243_Shallow	non-Rad	Anthracene	120-12-7	µg/kg	3.13E+01	2.90E+04	1.08E-03	6.78E+05	4.61E-05
600-243_Shallow	non-Rad	Antimony	7440-36-0	µg/kg	1.30E+03	5.00E+03	2.60E-01	5.98E+03	2.17E-01

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
600-243_Shallow	non-Rad	Aroclor-1254	11097-69-1	µg/kg	2.70E+01	4.00E+04	6.75E-04	1.47E+03	1.84E-02
600-243_Shallow	non-Rad	Aroclor-1260	11096-82-5	µg/kg	1.85E+01	4.00E+04	4.63E-04	1.47E+03	1.26E-02
600-243_Shallow	non-Rad	Aroclors HI	--	µg/kg	--	--	1.14E-03	--	3.10E-02
600-243_Shallow	non-Rad	Arsenic	7440-38-2	µg/kg	6.16E+03	1.00E+04	6.16E-01	1.90E+05	3.24E-02
600-243_Shallow	non-Rad	Barium	7440-39-3	µg/kg	2.92E+05	3.30E+05	8.85E-01	1.32E+06	2.21E-01
600-243_Shallow	non-Rad	Benzo(a)anthracene	56-55-3	µg/kg	4.33E+01	1.80E+04	2.40E-03	6.40E+04	6.76E-04
600-243_Shallow	non-Rad	Benzo(a)pyrene	50-32-8	µg/kg	4.27E+01	1.80E+04	2.37E-03	7.64E+04	5.59E-04
600-243_Shallow	non-Rad	Benzo(b)fluoranthene	205-99-2	µg/kg	4.63E+01	1.80E+04	2.57E-03	3.92E+04	1.18E-03
600-243_Shallow	non-Rad	Benzo(k)fluoranthene	207-08-9	µg/kg	3.18E+01	1.80E+04	1.76E-03	3.92E+04	8.10E-04
600-243_Shallow	non-Rad	Beryllium	7440-41-7	µg/kg	2.08E+03	1.00E+04	2.08E-01	1.39E+04	1.50E-01
600-243_Shallow	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	µg/kg	4.32E+02	1.00E+05	4.32E-03	4.54E+04	9.52E-03
600-243_Shallow	non-Rad	Boron	7440-42-8	µg/kg	294462.62	5.00E+02	**5.89E+02**	1.33E+05	**2.21E+00**
600-243_Shallow	non-Rad	Cadmium	7440-43-9	µg/kg	7.96E+02	4.00E+03	1.99E-01	1.63E+03	4.88E-01
600-243_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	18006.452	4.00E+02	**4.50E+01**	3.82E+04	4.71E-01
600-243_Shallow	non-Rad	Chrysene	218-01-9	µg/kg	6.26E+01	1.80E+04	3.48E-03	4.45E+04	1.41E-03
600-243_Shallow	non-Rad	Cobalt	7440-48-4	µg/kg	6.21E+03	1.30E+04	4.77E-01	1.11E+05	5.59E-02
600-243_Shallow	non-Rad	Copper	7440-50-8	µg/kg	53981.061	5.00E+04	**1.08E+00**	1.07E+05	5.04E-01
600-243_Shallow	non-Rad	Dibenzofuran	132-64-9	µg/kg	78.499839	No Value	**--**	No Value	**--**
600-243_Shallow	non-Rad	Di-n-butylphthalate	84-74-2	µg/kg	37.233317	No Value	**--**	No Value	**--**
600-243_Shallow	non-Rad	Fluoranthene	206-44-0	µg/kg	7.91E+01	1.80E+04	4.39E-03	8.39E+05	9.43E-05
600-243_Shallow	non-Rad	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	2.80E+01	1.80E+04	1.56E-03	3.57E+04	7.84E-04
600-243_Shallow	non-Rad	Lead	7439-92-1	µg/kg	4.01E+04	5.00E+04	8.03E-01	3.56E+04	**1.13E+00**
600-243_Shallow	non-Rad	Manganese	7439-96-5	µg/kg	2.08E+05	2.20E+05	9.47E-01	5.80E+06	3.59E-02
600-243_Shallow	non-Rad	Molybdenum	7439-98-7	µg/kg	1.87E+03	2.00E+03	9.35E-01	1.40E+04	1.34E-01
600-243_Shallow	non-Rad	Naphthalene	91-20-3	µg/kg	2.04E+02	2.90E+04	7.02E-03	1.00E+05	2.04E-03
600-243_Shallow	non-Rad	Nickel	7440-02-0	µg/kg	2.14E+04	3.00E+04	7.13E-01	3.26E+04	6.56E-01
600-243_Shallow	non-Rad	Pyrene	129-00-0	µg/kg	7.00E+01	1.80E+04	3.89E-03	6.00E+05	1.17E-04
600-243_Shallow	non-Rad	Selenium	7782-49-2	µg/kg	5708.5512	5.20E+02	**1.10E+01**	1.90E+03	**3.00E+00**
600-243_Shallow	non-Rad	Silver	7440-22-4	µg/kg	5.00E+02	2.00E+03	2.50E-01	4.96E+04	1.01E-02
600-243_Shallow	non-Rad	Total petroleum hydrocarbons - diesel range	TPHDIESEL	µg/kg	9.53E+04	2.00E+05	4.77E-01	3.56E+08	2.68E-04
600-243_Shallow	non-Rad	Total petroleum hydrocarbons - motor oil (high boiling)	TPH/OILH	µg/kg	334524.06	No Value	**--**	No Value	**--**
600-243_Shallow	non-Rad	Vanadium	7440-62-2	µg/kg	46986.305	2.00E+03	**2.35E+01**	3.11E+04	**1.51E+00**
600-243_Shallow	non-Rad	Zinc	7440-66-6	µg/kg	84099.429	5.00E+04	**1.68E+00**	6.78E+04	**1.24E+00**
600-259_Overburden	Rad	Cesium-137	10045-97-3	pCi/g	3.40E-02	2.21E+03	1.54E-05	9.24E+02	3.68E-05
600-259_Shallow	Rad	Cesium-137	10045-97-3	pCi/g	6.80E-02	2.21E+03	3.08E-05	9.24E+02	7.36E-05
600-259_Shallow_Focused	Rad	Cesium-137	10045-97-3	pCi/g	3.80E-02	2.21E+03	1.72E-05	9.24E+02	4.11E-05
600-47_Shallow	non-Rad	Arsenic	7440-38-2	µg/kg	2.30E+03	1.00E+04	2.30E-01	1.90E+05	1.21E-02
600-47_Shallow	non-Rad	Barium	7440-39-3	µg/kg	6.70E+04	3.30E+05	2.03E-01	1.32E+06	5.08E-02
600-47_Shallow	non-Rad	Beryllium	7440-41-7	µg/kg	5.00E+02	1.00E+04	5.00E-02	1.39E+04	3.60E-02
600-47_Shallow	non-Rad	Cadmium	7440-43-9	µg/kg	9.00E+01	4.00E+03	2.25E-02	1.63E+03	5.52E-02
600-47_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	5500	4.00E+02	**1.38E+01**	3.82E+04	1.44E-01
600-47_Shallow	non-Rad	Lead	7439-92-1	µg/kg	3.50E+03	5.00E+04	7.00E-02	3.56E+04	9.83E-02
600-47_Shallow	Rad	RADs SOF	--	pCi/g	--	--	1.27E-04	--	5.21E-04
600-47_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	1.36E+00	5.16E+04	2.64E-05	6.37E+03	2.14E-04

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
600-47_Shallow	Rad	Uranium-238	U-238	pCi/g	1.58E+00	1.57E+04	1.01E-04	5.15E+03	3.07E-04
600-47_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	4.30E+03	5.00E+03	8.61E-01	7.86E+05	5.47E-03
618-1_Shallow	non-Rad	Aroclor-1254	11097-69-1	µg/kg	2.64E+02	4.00E+04	6.60E-03	1.47E+03	1.80E-01
618-1_Shallow	non-Rad	Aroclor-1260	11096-82-5	µg/kg	5.35E+01	4.00E+04	1.34E-03	1.47E+03	3.64E-02
618-1_Shallow	non-Rad	Aroclors HI	--	µg/kg	--	--	7.94E-03	--	2.16E-01
618-1_Shallow	non-Rad	Arsenic	7440-38-2	µg/kg	2.28E+03	1.00E+04	2.28E-01	1.90E+05	1.20E-02
618-1_Shallow	non-Rad	Barium	7440-39-3	µg/kg	9.72E+04	3.30E+05	2.95E-01	1.32E+06	7.36E-02
618-1_Shallow	non-Rad	Beryllium	7440-41-7	µg/kg	1.88E+02	1.00E+04	1.88E-02	1.39E+04	1.35E-02
618-1_Shallow	non-Rad	Boron	7440-42-8	µg/kg	1190	5.00E+02	**2.38E+00**	1.33E+05	8.95E-03
618-1_Shallow	non-Rad	Cadmium	7440-43-9	µg/kg	6.80E+01	4.00E+03	1.70E-02	1.63E+03	4.17E-02
618-1_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	7930	4.00E+02	**1.98E+01**	3.82E+04	2.08E-01
618-1_Shallow	non-Rad	Cobalt	7440-48-4	µg/kg	6.36E+03	1.30E+04	4.89E-01	1.11E+05	5.73E-02
618-1_Shallow	non-Rad	Copper	7440-50-8	µg/kg	1.14E+04	5.00E+04	2.28E-01	1.07E+05	1.07E-01
618-1_Shallow	non-Rad	Fluoride	16984-48-8	µg/kg	400	No Value	**--**	2.28E+06	1.75E-04
618-1_Shallow	non-Rad	Lead	7439-92-1	µg/kg	3.10E+03	5.00E+04	6.20E-02	3.56E+04	8.71E-02
618-1_Shallow	non-Rad	Lithium	7439-93-2	µg/kg	6380	2.00E+03	**3.19E+00**	5.15E+05	1.24E-02
618-1_Shallow	non-Rad	Manganese	7439-96-5	µg/kg	300000	2.20E+05	**1.36E+00**	5.80E+06	5.17E-02
618-1_Shallow	non-Rad	Mercury	7439-97-6	µg/kg	3.10E+01	1.00E+02	3.10E-01	1.87E+03	1.66E-02
618-1_Shallow	non-Rad	Molybdenum	7439-98-7	µg/kg	3.36E+02	2.00E+03	1.68E-01	1.40E+04	2.40E-02
618-1_Shallow	non-Rad	Nickel	7440-02-0	µg/kg	8.15E+03	3.00E+04	2.72E-01	3.26E+04	2.50E-01
618-1_Shallow	non-Rad	Nitrate	14797-55-8	µg/kg	1600	No Value	**--**	3.40E+08	4.71E-06
618-1_Shallow	non-Rad	Nitrogen in Nitrite and Nitrate	NO2+NO3-N	µg/kg	300	No Value	**--**	No Value	**--**
618-1_Shallow	Rad	RADs SOF	--	pCi/g	--	--	2.67E-04	--	1.19E-03
618-1_Shallow	Rad	RADs SOF	--	pCi/g	--	--	1.34E-04	--	5.96E-04
618-1_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	1.93E+00	5.16E+04	3.74E-05	6.37E+03	3.03E-04
618-1_Shallow	Rad	Uranium-238	U-238	pCi/g	1.51E+00	1.57E+04	9.62E-05	5.15E+03	2.93E-04
618-1_Shallow	non-Rad	Vanadium	7440-62-2	µg/kg	56300	2.00E+03	**2.82E+01**	3.11E+04	**1.81E+00**
618-1_Shallow	non-Rad	Zinc	7440-66-6	µg/kg	4.21E+04	5.00E+04	8.42E-01	6.78E+04	6.21E-01
618-1_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	4.22E+03	5.00E+03	8.45E-01	7.86E+05	5.37E-03
618-1_Shallow_Focused	non-Rad	Antimony	7440-36-0	µg/kg	4.55E+02	5.00E+03	9.10E-02	5.98E+03	7.61E-02
618-1_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	µg/kg	3.51E+01	4.00E+04	8.78E-04	3.25E+02	1.08E-01
618-1_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	µg/kg	9.81E+02	4.00E+04	2.45E-02	1.47E+03	6.67E-01
618-1_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	µg/kg	5.60E+01	4.00E+04	1.40E-03	1.47E+03	3.81E-02
618-1_Shallow_Focused	non-Rad	Aroclors HI	--	µg/kg	--	--	2.68E-02	--	8.13E-01
618-1_Shallow_Focused	non-Rad	Arsenic	7440-38-2	µg/kg	6.09E+03	1.00E+04	6.09E-01	1.90E+05	3.21E-02
618-1_Shallow_Focused	non-Rad	Barium	7440-39-3	µg/kg	1.02E+05	3.30E+05	3.09E-01	1.32E+06	7.73E-02
618-1_Shallow_Focused	non-Rad	Beryllium	7440-41-7	µg/kg	3.71E+02	1.00E+04	3.71E-02	1.39E+04	2.67E-02
618-1_Shallow_Focused	non-Rad	Boron	7440-42-8	µg/kg	3740	5.00E+02	**7.48E+00**	1.33E+05	2.81E-02
618-1_Shallow_Focused	non-Rad	Cadmium	7440-43-9	µg/kg	2.66E+02	4.00E+03	6.65E-02	1.63E+03	1.63E-01
618-1_Shallow_Focused	non-Rad	Chromium	7440-47-3	µg/kg	19500	4.00E+02	**4.88E+01**	3.82E+04	5.10E-01
618-1_Shallow_Focused	non-Rad	Cobalt	7440-48-4	µg/kg	8.60E+03	1.30E+04	6.62E-01	1.11E+05	7.75E-02
618-1_Shallow_Focused	non-Rad	Copper	7440-50-8	µg/kg	2.38E+04	5.00E+04	4.76E-01	1.07E+05	2.22E-01
618-1_Shallow_Focused	non-Rad	Fluoride	16984-48-8	µg/kg	900	No Value	**--**	2.28E+06	3.95E-04
618-1_Shallow_Focused	non-Rad	Lead	7439-92-1	µg/kg	6.21E+03	5.00E+04	1.24E-01	3.56E+04	1.74E-01

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
618-1_Shallow_Focused	non-Rad	Lithium	7439-93-2	µg/kg	13300	2.00E+03	**6.65E+00**	5.15E+05	2.58E-02
618-1_Shallow_Focused	non-Rad	Manganese	7439-96-5	µg/kg	403000	2.20E+05	**1.83E+00**	5.80E+06	6.95E-02
618-1_Shallow_Focused	non-Rad	Mercury	7439-97-6	µg/kg	198	1.00E+02	**1.98E+00**	1.87E+03	1.06E-01
618-1_Shallow_Focused	non-Rad	Molybdenum	7439-98-7	µg/kg	3.56E+02	2.00E+03	1.78E-01	1.40E+04	2.54E-02
618-1_Shallow_Focused	non-Rad	Nickel	7440-02-0	µg/kg	1.68E+04	3.00E+04	5.60E-01	3.26E+04	5.15E-01
618-1_Shallow_Focused	non-Rad	Nitrate	14797-55-8	µg/kg	3800	No Value	--	3.40E+08	1.12E-05
618-1_Shallow_Focused	non-Rad	Nitrogen in Nitrite and Nitrate	NO2+NO3-N	µg/kg	260	No Value	--	No Value	--
618-1_Shallow_Focused	non-Rad	Silver	7440-22-4	µg/kg	1.12E+03	2.00E+03	5.60E-01	4.96E+04	2.26E-02
618-1_Shallow_Focused	non-Rad	Uranium	7440-61-1	µg/kg	7080	5.00E+03	**1.42E+00**	7.86E+05	9.01E-03
618-1_Shallow_Focused	Rad	Uranium-233/234	U-233/234	pCi/g	1.13E+01	5.16E+04	2.19E-04	6.37E+03	1.77E-03
618-1_Shallow_Focused	Rad	Uranium-235	15117-96-1	pCi/g	9.87E-01	2.74E+04	3.60E-05	4.36E+03	2.26E-04
618-1_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	8.23E+00	1.57E+04	5.24E-04	5.15E+03	1.60E-03
618-1_Shallow_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	64700	2.00E+03	**3.24E+01**	3.11E+04	**2.08E+00**
618-1_Shallow_Focused	non-Rad	Zinc	7440-66-6	µg/kg	68100	5.00E+04	**1.36E+00**	6.78E+04	**1.00E+00**
618-1_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	24957	5.00E+03	**4.99E+00**	7.86E+05	3.18E-02
618-12_Shallow	non-Rad	Arsenic	7440-38-2	µg/kg	8.52E+03	1.00E+04	8.52E-01	1.90E+05	4.49E-02
618-12_Shallow	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	µg/kg	6.30E+01	1.00E+05	6.30E-04	4.54E+04	1.39E-03
618-12_Shallow	non-Rad	Butylbenzylphthalate	85-68-7	µg/kg	60	No Value	--	No Value	--
618-12_Shallow	Rad	RADs SOF	--	pCi/g	--	--	6.99E-04	--	2.19E-03
618-12_Shallow	Rad	Uranium-235	15117-96-1	pCi/g	4.71E-01	2.74E+04	1.72E-05	4.36E+03	1.08E-04
618-12_Shallow	Rad	Uranium-238	U-238	pCi/g	1.07E+01	1.57E+04	6.82E-04	5.15E+03	2.08E-03
618-12_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	32092	5.00E+03	**6.42E+00**	7.86E+05	4.08E-02
618-13_Shallow	non-Rad	Acetone	67-64-1	µg/kg	8.64	No Value	--	No Value	--
618-13_Shallow	non-Rad	Antimony	7440-36-0	µg/kg	3.12E+02	5.00E+03	6.24E-02	5.98E+03	5.22E-02
618-13_Shallow	non-Rad	Arsenic	7440-38-2	µg/kg	3.50E+03	1.00E+04	3.50E-01	1.90E+05	1.84E-02
618-13_Shallow	non-Rad	Barium	7440-39-3	µg/kg	7.40E+04	3.30E+05	2.24E-01	1.32E+06	5.61E-02
618-13_Shallow	non-Rad	Beryllium	7440-41-7	µg/kg	2.12E+02	1.00E+04	2.12E-02	1.39E+04	1.53E-02
618-13_Shallow	non-Rad	Boron	7440-42-8	µg/kg	1050	5.00E+02	**2.10E+00**	1.33E+05	7.89E-03
618-13_Shallow	non-Rad	Cadmium	7440-43-9	µg/kg	6.30E+01	4.00E+03	1.58E-02	1.63E+03	3.87E-02
618-13_Shallow	Rad	Cesium-137	10045-97-3	pCi/g	3.80E-02	2.21E+03	1.72E-05	9.24E+02	4.11E-05
618-13_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	10700	4.00E+02	**2.68E+01**	3.82E+04	2.80E-01
618-13_Shallow	non-Rad	Cobalt	7440-48-4	µg/kg	6.29E+03	1.30E+04	4.84E-01	1.11E+05	5.67E-02
618-13_Shallow	non-Rad	Copper	7440-50-8	µg/kg	1.15E+04	5.00E+04	2.30E-01	1.07E+05	1.07E-01
618-13_Shallow	non-Rad	Lead	7439-92-1	µg/kg	3.62E+03	5.00E+04	7.24E-02	3.56E+04	1.02E-01
618-13_Shallow	non-Rad	Manganese	7439-96-5	µg/kg	344000	2.20E+05	**1.56E+00**	5.80E+06	5.93E-02
618-13_Shallow	non-Rad	Methylene chloride	75-09-2	µg/kg	5.12	No Value	--	1.66E+05	3.08E-05
618-13_Shallow	non-Rad	Molybdenum	7439-98-7	µg/kg	4.20E+02	2.00E+03	2.10E-01	1.40E+04	3.00E-02
618-13_Shallow	non-Rad	Nickel	7440-02-0	µg/kg	1.24E+04	3.00E+04	4.13E-01	3.26E+04	3.80E-01
618-13_Shallow	Rad	RADs SOF	--	pCi/g	--	--	1.62E-04	--	6.72E-04
618-13_Shallow	non-Rad	Tin	7440-31-5	µg/kg	1.05E+03	5.00E+04	2.10E-02	2.04E+05	5.15E-03
618-13_Shallow	non-Rad	Uranium	7440-61-1	µg/kg	1.75E+03	5.00E+03	3.50E-01	7.86E+05	2.23E-03
618-13_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	1.92E+00	5.16E+04	3.72E-05	6.37E+03	3.01E-04
618-13_Shallow	Rad	Uranium-238	U-238	pCi/g	1.70E+00	1.57E+04	1.08E-04	5.15E+03	3.30E-04
618-13_Shallow	non-Rad	Vanadium	7440-62-2	µg/kg	55800	2.00E+03	**2.79E+01**	3.11E+04	**1.79E+00**

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
618-13_Shallow	non-Rad	Zinc	7440-66-6	µg/kg	4.14E+04	5.00E+04	8.28E-01	6.78E+04	6.11E-01
618-13_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	5061	5.00E+03	**1.01E+00**	7.86E+05	6.44E-03
618-13_Shallow_Focused	non-Rad	Acetone	67-64-1	µg/kg	5.9	No Value	--	No Value	--
618-13_Shallow_Focused	non-Rad	Antimony	7440-36-0	µg/kg	2.33E+02	5.00E+03	4.66E-02	5.98E+03	3.90E-02
618-13_Shallow_Focused	non-Rad	Arsenic	7440-38-2	µg/kg	3.39E+03	1.00E+04	3.39E-01	1.90E+05	1.78E-02
618-13_Shallow_Focused	non-Rad	Barium	7440-39-3	µg/kg	5.77E+04	3.30E+05	1.75E-01	1.32E+06	4.37E-02
618-13_Shallow_Focused	non-Rad	Beryllium	7440-41-7	µg/kg	1.84E+02	1.00E+04	1.84E-02	1.39E+04	1.32E-02
618-13_Shallow_Focused	non-Rad	Boron	7440-42-8	µg/kg	960	5.00E+02	**1.92E+00**	1.33E+05	7.22E-03
618-13_Shallow_Focused	non-Rad	Cadmium	7440-43-9	µg/kg	4.70E+01	4.00E+03	1.18E-02	1.63E+03	2.88E-02
618-13_Shallow_Focused	non-Rad	Chromium	7440-47-3	µg/kg	8740	4.00E+02	**2.19E+01**	3.82E+04	2.29E-01
618-13_Shallow_Focused	non-Rad	Cobalt	7440-48-4	µg/kg	5.71E+03	1.30E+04	4.39E-01	1.11E+05	5.14E-02
618-13_Shallow_Focused	non-Rad	Copper	7440-50-8	µg/kg	1.01E+04	5.00E+04	2.02E-01	1.07E+05	9.44E-02
618-13_Shallow_Focused	non-Rad	Hexavalent Chromium	18540-29-9	µg/kg	150	No Value	--	1.25E+06	1.20E-04
618-13_Shallow_Focused	non-Rad	Lead	7439-92-1	µg/kg	4.94E+03	5.00E+04	9.88E-02	3.56E+04	1.39E-01
618-13_Shallow_Focused	non-Rad	Manganese	7439-96-5	µg/kg	268000	2.20E+05	**1.22E+00**	5.80E+06	4.62E-02
618-13_Shallow_Focused	non-Rad	Methylene chloride	75-09-2	µg/kg	5.03	No Value	--	1.66E+05	3.03E-05
618-13_Shallow_Focused	non-Rad	Molybdenum	7439-98-7	µg/kg	2.97E+02	2.00E+03	1.49E-01	1.40E+04	2.12E-02
618-13_Shallow_Focused	non-Rad	Nickel	7440-02-0	µg/kg	1.00E+04	3.00E+04	3.33E-01	3.26E+04	3.07E-01
618-13_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	8.32E-05	--	3.65E-04
618-13_Shallow_Focused	non-Rad	Tin	7440-31-5	µg/kg	7.45E+02	5.00E+04	1.49E-02	2.04E+05	3.65E-03
618-13_Shallow_Focused	non-Rad	Uranium	7440-61-1	µg/kg	1.50E+03	5.00E+03	3.00E-01	7.86E+05	1.91E-03
618-13_Shallow_Focused	Rad	Uranium-233/234	U-233/234	pCi/g	1.14E+00	5.16E+04	2.21E-05	6.37E+03	1.79E-04
618-13_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	9.59E-01	1.57E+04	6.11E-05	5.15E+03	1.86E-04
618-13_Shallow_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	48600	2.00E+03	**2.43E+01**	3.11E+04	**1.56E+00**
618-13_Shallow_Focused	non-Rad	Zinc	7440-66-6	µg/kg	3.71E+04	5.00E+04	7.42E-01	6.78E+04	5.47E-01
618-13_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	2.85E+03	5.00E+03	5.71E-01	7.86E+05	3.63E-03
618-2_Overburden	non-Rad	Arsenic	7440-38-2	µg/kg	2.70E+03	1.00E+04	2.70E-01	1.90E+05	1.42E-02
618-2_Overburden	non-Rad	Barium	7440-39-3	µg/kg	7.47E+04	3.30E+05	2.26E-01	1.32E+06	5.66E-02
618-2_Overburden	Rad	Cesium-137	10045-97-3	pCi/g	5.80E-02	2.21E+03	2.62E-05	9.24E+02	6.28E-05
618-2_Overburden	non-Rad	Chromium	7440-47-3	µg/kg	6600	4.00E+02	**1.65E+01**	3.82E+04	1.73E-01
618-2_Overburden	non-Rad	Lead	7439-92-1	µg/kg	4.30E+03	5.00E+04	8.60E-02	3.56E+04	1.21E-01
618-2_Overburden	Rad	RADs SOF	--	pCi/g	--	--	7.63E-05	--	2.79E-04
618-2_Overburden	non-Rad	Selenium	7782-49-2	µg/kg	1000	5.20E+02	**1.92E+00**	1.90E+03	5.26E-01
618-2_Overburden	non-Rad	Tin	7440-31-5	µg/kg	2.70E+03	5.00E+04	5.40E-02	2.04E+05	1.32E-02
618-2_Overburden	non-Rad	Uranium	7440-61-1	µg/kg	1.14E+00	5.00E+03	2.28E-04	7.86E+05	1.45E-06
618-2_Overburden	Rad	Uranium-233/234	U-233/234	pCi/g	6.44E-01	5.16E+04	1.25E-05	6.37E+03	1.01E-04
618-2_Overburden	Rad	Uranium-238	U-238	pCi/g	5.91E-01	1.57E+04	3.76E-05	5.15E+03	1.15E-04
618-2_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	1.75E+03	5.00E+03	3.50E-01	7.86E+05	2.23E-03
618-2_Shallow	Rad	Americium-241	14596-10-2	pCi/g	8.13E-01	2.15E+04	3.78E-05	4.84E+03	1.68E-04
618-2_Shallow	non-Rad	Arsenic	7440-38-2	µg/kg	1.90E+03	1.00E+04	1.90E-01	1.90E+05	1.00E-02
618-2_Shallow	non-Rad	Barium	7440-39-3	µg/kg	7.91E+04	3.30E+05	2.40E-01	1.32E+06	5.99E-02
618-2_Shallow	Rad	Cesium-137	10045-97-3	pCi/g	2.24E+00	2.21E+03	1.01E-03	9.24E+02	2.42E-03
618-2_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	7100	4.00E+02	**1.78E+01**	3.82E+04	1.86E-01
618-2_Shallow	non-Rad	Lead	7439-92-1	µg/kg	5.60E+03	5.00E+04	1.12E-01	3.56E+04	1.57E-01

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
618-2_Shallow	Rad	Plutonium-239/240	PU-239/240	pCi/g	7.67E+00	1.27E+04	6.04E-04	6.27E+03	1.22E-03
618-2_Shallow	Rad	RADs SOF	--	pCi/g	--	--	1.84E-03	--	4.63E-03
618-2_Shallow	non-Rad	Selenium	7782-49-2	µg/kg	760	5.20E+02	**1.46E+00**	1.90E+03	4.00E-01
618-2_Shallow	non-Rad	Tin	7440-31-5	µg/kg	2.40E+03	5.00E+04	4.80E-02	2.04E+05	1.18E-02
618-2_Shallow	non-Rad	Uranium	7440-61-1	µg/kg	4.53E+03	5.00E+03	9.06E-01	7.86E+05	5.76E-03
618-2_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	2.20E+00	5.16E+04	4.26E-05	6.37E+03	3.45E-04
618-2_Shallow	Rad	Uranium-235	15117-96-1	pCi/g	2.14E-01	2.74E+04	7.81E-06	4.36E+03	4.91E-05
618-2_Shallow	Rad	Uranium-238	U-238	pCi/g	2.20E+00	1.57E+04	1.40E-04	5.15E+03	4.27E-04
618-2_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	5852	5.00E+03	**1.17E+00**	7.86E+05	7.45E-03
618-2_Staging Pile	Rad	Americium-241	14596-10-2	pCi/g	8.18E-01	2.15E+04	3.80E-05	4.84E+03	1.69E-04
618-2_Staging Pile	non-Rad	Arsenic	7440-38-2	µg/kg	3.06E+03	1.00E+04	3.06E-01	1.90E+05	1.61E-02
618-2_Staging Pile	non-Rad	Barium	7440-39-3	µg/kg	6.77E+04	3.30E+05	2.05E-01	1.32E+06	5.13E-02
618-2_Staging Pile	Rad	Cesium-137	10045-97-3	pCi/g	9.50E-02	2.21E+03	4.30E-05	9.24E+02	1.03E-04
618-2_Staging Pile	non-Rad	Chromium	7440-47-3	µg/kg	6424.1864	4.00E+02	**1.61E+01**	3.82E+04	1.68E-01
618-2_Staging Pile	non-Rad	Lead	7439-92-1	µg/kg	4.01E+03	5.00E+04	8.02E-02	3.56E+04	1.13E-01
618-2_Staging Pile	Rad	Plutonium-239/240	PU-239/240	pCi/g	1.00E+01	1.27E+04	7.87E-04	6.27E+03	1.59E-03
618-2_Staging Pile	Rad	RADs SOF	--	pCi/g	--	--	1.04E-03	--	8.14E-03
618-2_Staging Pile	Rad	Tritium	10028-17-8	pCi/g	2.33E+00	1.68E+06	1.39E-06	4.20E+02	5.55E-03
618-2_Staging Pile	non-Rad	Uranium	7440-61-1	µg/kg	5022	5.00E+03	**1.00E+00**	7.86E+05	6.39E-03
618-2_Staging Pile	Rad	Uranium-233/234	U-233/234	pCi/g	2.04E+00	5.16E+04	3.95E-05	6.37E+03	3.20E-04
618-2_Staging Pile	Rad	Uranium-235	15117-96-1	pCi/g	1.23E-01	2.74E+04	4.50E-06	4.36E+03	2.83E-05
618-2_Staging Pile	Rad	Uranium-238	U-238	pCi/g	1.97E+00	1.57E+04	1.26E-04	5.15E+03	3.83E-04
618-2_Staging Pile	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	9201	5.00E+03	**1.84E+00**	7.86E+05	1.17E-02
618-3_Shallow	non-Rad	Arsenic	7440-38-2	µg/kg	2.80E+03	1.00E+04	2.80E-01	1.90E+05	1.47E-02
618-3_Shallow	non-Rad	Barium	7440-39-3	µg/kg	7.65E+04	3.30E+05	2.32E-01	1.32E+06	5.80E-02
618-3_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	9700	4.00E+02	**2.43E+01**	3.82E+04	2.54E-01
618-3_Shallow	non-Rad	Lead	7439-92-1	µg/kg	3.90E+03	5.00E+04	7.80E-02	3.56E+04	1.10E-01
618-3_Shallow	Rad	RADs SOF	--	pCi/g	--	--	6.07E-05	--	2.51E-04
618-3_Shallow	non-Rad	Selenium	7782-49-2	µg/kg	659	5.20E+02	**1.27E+00**	1.90E+03	3.47E-01
618-3_Shallow	non-Rad	Uranium	7440-61-1	µg/kg	1.61E+03	5.00E+03	3.22E-01	7.86E+05	2.05E-03
618-3_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	6.77E-01	5.16E+04	1.31E-05	6.37E+03	1.06E-04
618-3_Shallow	Rad	Uranium-238	U-238	pCi/g	7.47E-01	1.57E+04	4.76E-05	5.15E+03	1.45E-04
618-3_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	2.22E+03	5.00E+03	4.45E-01	7.86E+05	2.83E-03
618-3_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	6.78E-03	--	2.90E-02
618-3_Shallow_Focused	Rad	Uranium-233/234	U-233/234	pCi/g	7.96E+01	5.16E+04	1.54E-03	6.37E+03	1.25E-02
618-3_Shallow_Focused	Rad	Uranium-235	15117-96-1	pCi/g	4.79E+00	2.74E+04	1.75E-04	4.36E+03	1.10E-03
618-3_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	7.94E+01	1.57E+04	5.06E-03	5.15E+03	1.54E-02
618-3_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	238577	5.00E+03	**4.77E+01**	7.86E+05	3.04E-01
618-4_Overburden_2	non-Rad	Arsenic	7440-38-2	µg/kg	2.50E+03	1.00E+04	2.50E-01	1.90E+05	1.32E-02
618-4_Overburden_2	non-Rad	Lead	7439-92-1	µg/kg	4.70E+03	5.00E+04	9.40E-02	3.56E+04	1.32E-01
618-4_Overburden_2	Rad	RADs SOF	--	pCi/g	--	--	1.15E-04	--	4.78E-04
618-4_Overburden_2	Rad	Uranium-233/234	U-233/234	pCi/g	1.30E+00	5.16E+04	2.52E-05	6.37E+03	2.04E-04
618-4_Overburden_2	Rad	Uranium-238	U-238	pCi/g	1.41E+00	1.57E+04	8.98E-05	5.15E+03	2.74E-04
618-4_Overburden_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	4.20E+03	5.00E+03	8.39E-01	7.86E+05	5.34E-03

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
618-4_Overburden_3	non-Rad	Lead	7439-92-1	µg/kg	5.00E+03	5.00E+04	1.00E-01	3.56E+04	1.40E-01
618-4_Overburden_3	Rad	RADs SOF	--	pCi/g	--	--	3.73E-05	--	1.59E-04
618-4_Overburden_3	Rad	Uranium-233/234	U-233/234	pCi/g	4.24E-01	5.16E+04	8.22E-06	6.37E+03	6.66E-05
618-4_Overburden_3	Rad	Uranium-235	15117-96-1	pCi/g	3.20E-02	2.74E+04	1.17E-06	4.36E+03	7.34E-06
618-4_Overburden_3	Rad	Uranium-238	U-238	pCi/g	4.38E-01	1.57E+04	2.79E-05	5.15E+03	8.50E-05
618-4_Overburden_3	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	1.17E+03	5.00E+03	2.34E-01	7.86E+05	1.49E-03
618-4_Overburden_4	non-Rad	Lead	7439-92-1	µg/kg	4.80E+03	5.00E+04	9.60E-02	3.56E+04	1.35E-01
618-4_Overburden_4	Rad	RADs SOF	--	pCi/g	--	--	7.83E-05	--	3.31E-04
618-4_Overburden_4	Rad	Uranium-233/234	U-233/234	pCi/g	9.42E-01	5.16E+04	1.83E-05	6.37E+03	1.48E-04
618-4_Overburden_4	Rad	Uranium-238	U-238	pCi/g	9.42E-01	1.57E+04	6.00E-05	5.15E+03	1.83E-04
618-4_Overburden_4	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	2.32E+03	5.00E+03	4.65E-01	7.86E+05	2.96E-03
618-4_Shallow	non-Rad	Arsenic	7440-38-2	µg/kg	3.20E+03	1.00E+04	3.20E-01	1.90E+05	1.68E-02
618-4_Shallow	non-Rad	Lead	7439-92-1	µg/kg	4.90E+04	5.00E+04	9.80E-01	3.56E+04	**1.38E+00**
618-4_Shallow	Rad	RADs SOF	--	pCi/g	--	--	2.58E-04	--	1.10E-03
618-4_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	3.22E+00	5.16E+04	6.24E-05	6.37E+03	5.05E-04
618-4_Shallow	Rad	Uranium-238	U-238	pCi/g	3.07E+00	1.57E+04	1.96E-04	5.15E+03	5.96E-04
618-4_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	7456	5.00E+03	**1.49E+00**	7.86E+05	9.49E-03
618-5_Overburden	non-Rad	Arsenic	7440-38-2	µg/kg	3.40E+03	1.00E+04	3.40E-01	1.90E+05	1.79E-02
618-5_Overburden	non-Rad	Cadmium	7440-43-9	µg/kg	1.70E+02	4.00E+03	4.25E-02	1.63E+03	1.04E-01
618-5_Overburden	non-Rad	Chromium	7440-47-3	µg/kg	9700	4.00E+02	**2.43E+01**	3.82E+04	2.54E-01
618-5_Overburden	non-Rad	Lead	7439-92-1	µg/kg	7.50E+03	5.00E+04	1.50E-01	3.56E+04	2.11E-01
618-5_Overburden	Rad	RADs SOF	--	pCi/g	--	--	3.70E-04	--	1.54E-03
618-5_Overburden	Rad	Uranium-233/234	U-233/234	pCi/g	4.14E+00	5.16E+04	8.02E-05	6.37E+03	6.50E-04
618-5_Overburden	Rad	Uranium-238	U-238	pCi/g	4.56E+00	1.57E+04	2.90E-04	5.15E+03	8.85E-04
618-5_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	9773	5.00E+03	**1.95E+00**	7.86E+05	1.24E-02
618-5_Shallow	non-Rad	Arsenic	7440-38-2	µg/kg	4.30E+03	1.00E+04	4.30E-01	1.90E+05	2.26E-02
618-5_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	11300	4.00E+02	**2.83E+01**	3.82E+04	2.96E-01
618-5_Shallow	non-Rad	Lead	7439-92-1	µg/kg	6.10E+03	5.00E+04	1.22E-01	3.56E+04	1.71E-01
618-5_Shallow	Rad	RADs SOF	--	pCi/g	--	--	8.51E-05	--	3.51E-04
618-5_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	9.38E-01	5.16E+04	1.82E-05	6.37E+03	1.47E-04
618-5_Shallow	Rad	Uranium-238	U-238	pCi/g	1.05E+00	1.57E+04	6.69E-05	5.15E+03	2.04E-04
618-5_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	2.85E+03	5.00E+03	5.70E-01	7.86E+05	3.62E-03
618-5_Staging Pile_4	non-Rad	Arsenic	7440-38-2	µg/kg	3.30E+03	1.00E+04	3.30E-01	1.90E+05	1.74E-02
618-5_Staging Pile_4	non-Rad	Cadmium	7440-43-9	µg/kg	5.00E+01	4.00E+03	1.25E-02	1.63E+03	3.07E-02
618-5_Staging Pile_4	non-Rad	Chromium	7440-47-3	µg/kg	11800	4.00E+02	**2.95E+01**	3.82E+04	3.09E-01
618-5_Staging Pile_4	non-Rad	Lead	7439-92-1	µg/kg	5.30E+03	5.00E+04	1.06E-01	3.56E+04	1.49E-01
618-5_Staging Pile_4	Rad	RADs SOF	--	pCi/g	--	--	9.43E-05	--	4.00E-04
618-5_Staging Pile_4	Rad	Uranium-233/234	U-233/234	pCi/g	1.15E+00	5.16E+04	2.23E-05	6.37E+03	1.81E-04
618-5_Staging Pile_4	Rad	Uranium-238	U-238	pCi/g	1.13E+00	1.57E+04	7.20E-05	5.15E+03	2.19E-04
618-5_Staging Pile_4	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	3.36E+03	5.00E+03	6.73E-01	7.86E+05	4.28E-03
618-5_Staging Pile_5	non-Rad	Arsenic	7440-38-2	µg/kg	2.70E+03	1.00E+04	2.70E-01	1.90E+05	1.42E-02
618-5_Staging Pile_5	non-Rad	Chromium	7440-47-3	µg/kg	10300	4.00E+02	**2.58E+01**	3.82E+04	2.70E-01
618-5_Staging Pile_5	non-Rad	Lead	7439-92-1	µg/kg	3.90E+03	5.00E+04	7.80E-02	3.56E+04	1.10E-01
618-5_Staging Pile_5	Rad	RADs SOF	--	pCi/g	--	--	1.45E-04	--	6.10E-04

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
618-5_Staging Pile_5	Rad	Uranium-233/234	U-233/234	pCi/g	1.52E+00	5.16E+04	2.95E-05	6.37E+03	2.39E-04
618-5_Staging Pile_5	Rad	Uranium-235	15117-96-1	pCi/g	1.68E-01	2.74E+04	6.13E-06	4.36E+03	3.85E-05
618-5_Staging Pile_5	Rad	Uranium-238	U-238	pCi/g	1.71E+00	1.57E+04	1.09E-04	5.15E+03	3.32E-04
618-5_Staging Pile_5	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	4.33E+03	5.00E+03	8.65E-01	7.86E+05	5.50E-03
618-7_Shallow_1	non-Rad	Antimony	7440-36-0	µg/kg	5.59E+02	5.00E+03	1.12E-01	5.98E+03	9.34E-02
618-7_Shallow_1	non-Rad	Arsenic	7440-38-2	µg/kg	1.89E+03	1.00E+04	1.89E-01	1.90E+05	9.95E-03
618-7_Shallow_1	non-Rad	Barium	7440-39-3	µg/kg	6.89E+04	3.30E+05	2.09E-01	1.32E+06	5.22E-02
618-7_Shallow_1	non-Rad	Beryllium	7440-41-7	µg/kg	2.77E+02	1.00E+04	2.77E-02	1.39E+04	1.99E-02
618-7_Shallow_1	non-Rad	Cadmium	7440-43-9	µg/kg	6.54E+01	4.00E+03	1.63E-02	1.63E+03	4.01E-02
618-7_Shallow_1	Rad	Cesium-137	10045-97-3	pCi/g	8.20E-02	2.21E+03	3.71E-05	9.24E+02	8.87E-05
618-7_Shallow_1	non-Rad	Chromium	7440-47-3	µg/kg	10227.486	4.00E+02	**2.56E+01**	3.82E+04	2.68E-01
618-7_Shallow_1	non-Rad	Cobalt	7440-48-4	µg/kg	9.15E+03	1.30E+04	7.04E-01	1.11E+05	8.25E-02
618-7_Shallow_1	non-Rad	Copper	7440-50-8	µg/kg	1.61E+04	5.00E+04	3.22E-01	1.07E+05	1.51E-01
618-7_Shallow_1	non-Rad	Lead	7439-92-1	µg/kg	1.46E+04	5.00E+04	2.91E-01	3.56E+04	4.09E-01
618-7_Shallow_1	non-Rad	Manganese	7439-96-5	µg/kg	326067.08	2.20E+05	**1.48E+00**	5.80E+06	5.62E-02
618-7_Shallow_1	non-Rad	Mercury	7439-97-6	µg/kg	4.43E+01	1.00E+02	4.43E-01	1.87E+03	2.37E-02
618-7_Shallow_1	non-Rad	Nickel	7440-02-0	µg/kg	2.10E+04	3.00E+04	6.99E-01	3.26E+04	6.43E-01
618-7_Shallow_1	Rad	RADs SOF	--	pCi/g	--	--	3.49E-04	--	1.43E-03
618-7_Shallow_1	non-Rad	Tin	7440-31-5	µg/kg	1.55E+03	5.00E+04	3.09E-02	2.04E+05	7.58E-03
618-7_Shallow_1	Rad	Uranium-233/234	U-233/234	pCi/g	3.61E+00	5.16E+04	7.01E-05	6.37E+03	5.67E-04
618-7_Shallow_1	Rad	Uranium-235	15117-96-1	pCi/g	3.64E-01	2.74E+04	1.33E-05	4.36E+03	8.34E-05
618-7_Shallow_1	Rad	Uranium-238	U-238	pCi/g	3.57E+00	1.57E+04	2.28E-04	5.15E+03	6.94E-04
618-7_Shallow_1	non-Rad	Vanadium	7440-62-2	µg/kg	74575.766	2.00E+03	**3.73E+01**	3.11E+04	**2.40E+00**
618-7_Shallow_1	non-Rad	Zinc	7440-66-6	µg/kg	4.92E+04	5.00E+04	9.84E-01	6.78E+04	7.25E-01
618-7_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	10814	5.00E+03	**2.16E+00**	7.86E+05	1.38E-02
618-7_Shallow_2	non-Rad	Antimony	7440-36-0	µg/kg	6.60E+02	5.00E+03	1.32E-01	5.98E+03	1.10E-01
618-7_Shallow_2	non-Rad	Arsenic	7440-38-2	µg/kg	2.50E+03	1.00E+04	2.50E-01	1.90E+05	1.32E-02
618-7_Shallow_2	non-Rad	Barium	7440-39-3	µg/kg	7.38E+04	3.30E+05	2.24E-01	1.32E+06	5.59E-02
618-7_Shallow_2	non-Rad	Beryllium	7440-41-7	µg/kg	4.40E+02	1.00E+04	4.40E-02	1.39E+04	3.17E-02
618-7_Shallow_2	non-Rad	Chromium	7440-47-3	µg/kg	6800	4.00E+02	**1.70E+01**	3.82E+04	1.78E-01
618-7_Shallow_2	non-Rad	Cobalt	7440-48-4	µg/kg	9.30E+03	1.30E+04	7.15E-01	1.11E+05	8.38E-02
618-7_Shallow_2	non-Rad	Copper	7440-50-8	µg/kg	1.36E+04	5.00E+04	2.72E-01	1.07E+05	1.27E-01
618-7_Shallow_2	non-Rad	Lead	7439-92-1	µg/kg	2.80E+03	5.00E+04	5.60E-02	3.56E+04	7.87E-02
618-7_Shallow_2	non-Rad	Manganese	7439-96-5	µg/kg	364000	2.20E+05	**1.65E+00**	5.80E+06	6.28E-02
618-7_Shallow_2	non-Rad	Mercury	7439-97-6	µg/kg	2.00E+01	1.00E+02	2.00E-01	1.87E+03	1.07E-02
618-7_Shallow_2	non-Rad	Nickel	7440-02-0	µg/kg	9.70E+03	3.00E+04	3.23E-01	3.26E+04	2.98E-01
618-7_Shallow_2	Rad	RADs SOF	--	pCi/g	--	--	4.50E-05	--	1.93E-04
618-7_Shallow_2	non-Rad	Tin	7440-31-5	µg/kg	1.50E+03	5.00E+04	3.00E-02	2.04E+05	7.35E-03
618-7_Shallow_2	Rad	Uranium-233/234	U-233/234	pCi/g	5.66E-01	5.16E+04	1.10E-05	6.37E+03	8.89E-05
618-7_Shallow_2	Rad	Uranium-238	U-238	pCi/g	5.34E-01	1.57E+04	3.40E-05	5.15E+03	1.04E-04
618-7_Shallow_2	non-Rad	Vanadium	7440-62-2	µg/kg	74700	2.00E+03	**3.74E+01**	3.11E+04	**2.40E+00**
618-7_Shallow_2	non-Rad	Zinc	7440-66-6	µg/kg	4.62E+04	5.00E+04	9.24E-01	6.78E+04	6.81E-01
618-7_Shallow_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	1.57E+03	5.00E+03	3.15E-01	7.86E+05	2.00E-03
618-7_Shallow_3	non-Rad	Antimony	7440-36-0	µg/kg	4.50E+02	5.00E+03	9.00E-02	5.98E+03	7.53E-02

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
618-7_Shallow_3	non-Rad	Arsenic	7440-38-2	µg/kg	2.80E+03	1.00E+04	2.80E-01	1.90E+05	1.47E-02
618-7_Shallow_3	non-Rad	Barium	7440-39-3	µg/kg	8.25E+04	3.30E+05	2.50E-01	1.32E+06	6.25E-02
618-7_Shallow_3	non-Rad	Beryllium	7440-41-7	µg/kg	3.10E+02	1.00E+04	3.10E-02	1.39E+04	2.23E-02
618-7_Shallow_3	non-Rad	Cadmium	7440-43-9	µg/kg	1.90E+02	4.00E+03	4.75E-02	1.63E+03	1.17E-01
618-7_Shallow_3	non-Rad	Chromium	7440-47-3	µg/kg	10100	4.00E+02	**2.53E+01**	3.82E+04	2.64E-01
618-7_Shallow_3	non-Rad	Cobalt	7440-48-4	µg/kg	8.60E+03	1.30E+04	6.62E-01	1.11E+05	7.75E-02
618-7_Shallow_3	non-Rad	Copper	7440-50-8	µg/kg	1.36E+04	5.00E+04	2.72E-01	1.07E+05	1.27E-01
618-7_Shallow_3	non-Rad	Lead	7439-92-1	µg/kg	4.30E+03	5.00E+04	8.60E-02	3.56E+04	1.21E-01
618-7_Shallow_3	non-Rad	Manganese	7439-96-5	µg/kg	357000	2.20E+05	**1.62E+00**	5.80E+06	6.16E-02
618-7_Shallow_3	non-Rad	Mercury	7439-97-6	µg/kg	2.00E+01	1.00E+02	2.00E-01	1.87E+03	1.07E-02
618-7_Shallow_3	non-Rad	Nickel	7440-02-0	µg/kg	1.01E+04	3.00E+04	3.37E-01	3.26E+04	3.10E-01
618-7_Shallow_3	Rad	RADs SOF	--	pCi/g	--	--	8.40E-05	--	3.71E-04
618-7_Shallow_3	non-Rad	Tin	7440-31-5	µg/kg	1.80E+03	5.00E+04	3.60E-02	2.04E+05	8.82E-03
618-7_Shallow_3	Rad	Uranium-233/234	U-233/234	pCi/g	1.07E+00	5.16E+04	2.07E-05	6.37E+03	1.68E-04
618-7_Shallow_3	Rad	Uranium-235	15117-96-1	pCi/g	8.50E-02	2.74E+04	3.10E-06	4.36E+03	1.95E-05
618-7_Shallow_3	Rad	Uranium-238	U-238	pCi/g	9.45E-01	1.57E+04	6.02E-05	5.15E+03	1.83E-04
618-7_Shallow_3	non-Rad	Vanadium	7440-62-2	µg/kg	68200	2.00E+03	**3.41E+01**	3.11E+04	**2.19E+00**
618-7_Shallow_3	non-Rad	Zinc	7440-66-6	µg/kg	4.45E+04	5.00E+04	8.90E-01	6.78E+04	6.56E-01
618-7_Shallow_3	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	2.85E+03	5.00E+03	5.70E-01	7.86E+05	3.63E-03
618-7_Shallow_4	non-Rad	Antimony	7440-36-0	µg/kg	2.50E+02	5.00E+03	5.00E-02	5.98E+03	4.18E-02
618-7_Shallow_4	non-Rad	Arsenic	7440-38-2	µg/kg	5.20E+03	1.00E+04	5.20E-01	1.90E+05	2.74E-02
618-7_Shallow_4	non-Rad	Barium	7440-39-3	µg/kg	5.79E+04	3.30E+05	1.75E-01	1.32E+06	4.39E-02
618-7_Shallow_4	non-Rad	Beryllium	7440-41-7	µg/kg	2.20E+02	1.00E+04	2.20E-02	1.39E+04	1.58E-02
618-7_Shallow_4	non-Rad	Cadmium	7440-43-9	µg/kg	9.00E+01	4.00E+03	2.25E-02	1.63E+03	5.52E-02
618-7_Shallow_4	non-Rad	Chromium	7440-47-3	µg/kg	11400	4.00E+02	**2.85E+01**	3.82E+04	2.98E-01
618-7_Shallow_4	non-Rad	Cobalt	7440-48-4	µg/kg	6.70E+03	1.30E+04	5.15E-01	1.11E+05	6.04E-02
618-7_Shallow_4	non-Rad	Copper	7440-50-8	µg/kg	1.32E+04	5.00E+04	2.64E-01	1.07E+05	1.23E-01
618-7_Shallow_4	non-Rad	Lead	7439-92-1	µg/kg	3.00E+03	5.00E+04	6.00E-02	3.56E+04	8.43E-02
618-7_Shallow_4	non-Rad	Manganese	7439-96-5	µg/kg	285000	2.20E+05	**1.30E+00**	5.80E+06	4.91E-02
618-7_Shallow_4	non-Rad	Nickel	7440-02-0	µg/kg	1.29E+04	3.00E+04	4.30E-01	3.26E+04	3.96E-01
618-7_Shallow_4	Rad	RADs SOF	--	pCi/g	--	--	6.20E-05	--	2.56E-04
618-7_Shallow_4	non-Rad	Tin	7440-31-5	µg/kg	7.10E+02	5.00E+04	1.42E-02	2.04E+05	3.48E-03
618-7_Shallow_4	Rad	Uranium-233/234	U-233/234	pCi/g	6.89E-01	5.16E+04	1.34E-05	6.37E+03	1.08E-04
618-7_Shallow_4	Rad	Uranium-238	U-238	pCi/g	7.63E-01	1.57E+04	4.86E-05	5.15E+03	1.48E-04
618-7_Shallow_4	non-Rad	Vanadium	7440-62-2	µg/kg	54800	2.00E+03	**2.74E+01**	3.11E+04	**1.76E+00**
618-7_Shallow_4	non-Rad	Zinc	7440-66-6	µg/kg	3.70E+04	5.00E+04	7.40E-01	6.78E+04	5.46E-01
618-7_Shallow_4	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	2.06E+03	5.00E+03	4.13E-01	7.86E+05	2.63E-03
618-7_Shallow_Focused	non-Rad	Acenaphthene	83-32-9	µg/kg	1.50E+02	2.00E+04	7.50E-03	1.10E+06	1.36E-04
618-7_Shallow_Focused	non-Rad	Antimony	7440-36-0	µg/kg	9.80E+02	5.00E+03	1.96E-01	5.98E+03	1.64E-01
618-7_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	µg/kg	6.70E+00	4.00E+04	1.68E-04	3.25E+02	2.06E-02
618-7_Shallow_Focused	non-Rad	Arsenic	7440-38-2	µg/kg	4.20E+03	1.00E+04	4.20E-01	1.90E+05	2.21E-02
618-7_Shallow_Focused	non-Rad	Barium	7440-39-3	µg/kg	9.28E+04	3.30E+05	2.81E-01	1.32E+06	7.03E-02
618-7_Shallow_Focused	non-Rad	Benzo(a)anthracene	56-55-3	µg/kg	8.80E+01	1.80E+04	4.89E-03	6.40E+04	1.38E-03
618-7_Shallow_Focused	non-Rad	Benzo(a)pyrene	50-32-8	µg/kg	6.60E+01	1.80E+04	3.67E-03	7.64E+04	8.64E-04

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
618-7_Shallow_Focused	non-Rad	Benzo(b)fluoranthene	205-99-2	µg/kg	5.20E+01	1.80E+04	2.89E-03	3.92E+04	1.33E-03
618-7_Shallow_Focused	non-Rad	Benzo(k)fluoranthene	207-08-9	µg/kg	1.10E+01	1.80E+04	6.11E-04	3.92E+04	2.81E-04
618-7_Shallow_Focused	non-Rad	Beryllium	7440-41-7	µg/kg	3.70E+02	1.00E+04	3.70E-02	1.39E+04	2.66E-02
618-7_Shallow_Focused	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	µg/kg	4.70E+02	1.00E+05	4.70E-03	4.54E+04	1.04E-02
618-7_Shallow_Focused	non-Rad	Cadmium	7440-43-9	µg/kg	6200	4.00E+03	**1.55E+00**	1.63E+03	**3.80E+00**
618-7_Shallow_Focused	Rad	Cesium-137	10045-97-3	pCi/g	1.00E-02	2.21E+03	4.52E-06	9.24E+02	1.08E-05
618-7_Shallow_Focused	non-Rad	Chromium	7440-47-3	µg/kg	65900	4.00E+02	**1.65E+02**	3.82E+04	**1.73E+00**
618-7_Shallow_Focused	non-Rad	Chrysene	218-01-9	µg/kg	6.90E+01	1.80E+04	3.83E-03	4.45E+04	1.55E-03
618-7_Shallow_Focused	non-Rad	Cobalt	7440-48-4	µg/kg	1.10E+04	1.30E+04	8.46E-01	1.11E+05	9.91E-02
618-7_Shallow_Focused	non-Rad	Copper	7440-50-8	µg/kg	2.50E+04	5.00E+04	5.00E-01	1.07E+05	2.34E-01
618-7_Shallow_Focused	non-Rad	Dibenz[a,h]anthracene	53-70-3	µg/kg	4.50E+01	1.80E+04	2.50E-03	4.41E+04	1.02E-03
618-7_Shallow_Focused	non-Rad	Di-n-butylphthalate	84-74-2	µg/kg	33	No Value	--	No Value	--
618-7_Shallow_Focused	non-Rad	Fluoranthene	206-44-0	µg/kg	4.80E+01	1.80E+04	2.67E-03	8.39E+05	5.72E-05
618-7_Shallow_Focused	non-Rad	Lead	7439-92-1	µg/kg	6.50E+03	5.00E+04	1.30E-01	3.56E+04	1.83E-01
618-7_Shallow_Focused	non-Rad	Manganese	7439-96-5	µg/kg	425000	2.20E+05	**1.93E+00**	5.80E+06	7.33E-02
618-7_Shallow_Focused	non-Rad	Mercury	7439-97-6	µg/kg	2.00E+01	1.00E+02	2.00E-01	1.87E+03	1.07E-02
618-7_Shallow_Focused	non-Rad	Nickel	7440-02-0	µg/kg	1.72E+04	3.00E+04	5.73E-01	3.26E+04	5.28E-01
618-7_Shallow_Focused	non-Rad	Pyrene	129-00-0	µg/kg	4.10E+02	1.80E+04	2.28E-02	6.00E+05	6.83E-04
618-7_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	6.60E-04	--	3.19E-03
618-7_Shallow_Focused	non-Rad	Tin	7440-31-5	µg/kg	1.20E+03	5.00E+04	2.40E-02	2.04E+05	5.88E-03
618-7_Shallow_Focused	non-Rad	Total petroleum hydrocarbons - motor oil (high boiling)	TPH/OILH	µg/kg	680000	No Value	--	No Value	--
618-7_Shallow_Focused	Rad	Uranium-233/234	U-233/234	pCi/g	1.09E+01	5.16E+04	2.11E-04	6.37E+03	1.71E-03
618-7_Shallow_Focused	Rad	Uranium-235	15117-96-1	pCi/g	9.74E-01	2.74E+04	3.55E-05	4.36E+03	2.23E-04
618-7_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	6.42E+00	1.57E+04	4.09E-04	5.15E+03	1.25E-03
618-7_Shallow_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	80500	2.00E+03	**4.03E+01**	3.11E+04	**2.59E+00**
618-7_Shallow_Focused	non-Rad	Zinc	7440-66-6	µg/kg	52400	5.00E+04	**1.05E+00**	6.78E+04	7.73E-01
618-7_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	19563	5.00E+03	**3.91E+00**	7.86E+05	2.49E-02
618-8_Shallow	non-Rad	Arsenic	7440-38-2	µg/kg	4.10E+03	1.00E+04	4.10E-01	1.90E+05	2.16E-02
618-8_Shallow	non-Rad	Barium	7440-39-3	µg/kg	9.76E+04	3.30E+05	2.96E-01	1.32E+06	7.39E-02
618-8_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	12400	4.00E+02	**3.10E+01**	3.82E+04	3.25E-01
618-8_Shallow	non-Rad	Lead	7439-92-1	µg/kg	5.10E+03	5.00E+04	1.02E-01	3.56E+04	1.43E-01
618-8_Shallow	Rad	RADs SOF	--	pCi/g	--	--	6.99E-05	--	3.30E-04
618-8_Shallow	non-Rad	Selenium	7782-49-2	µg/kg	846	5.20E+02	**1.63E+00**	1.90E+03	4.45E-01
618-8_Shallow	non-Rad	Uranium	7440-61-1	µg/kg	1.72E+03	5.00E+03	3.44E-01	7.86E+05	2.19E-03
618-8_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	1.19E+00	5.16E+04	2.31E-05	6.37E+03	1.87E-04
618-8_Shallow	Rad	Uranium-238	U-238	pCi/g	7.34E-01	1.57E+04	4.68E-05	5.15E+03	1.43E-04
618-8_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	1.94E+03	5.00E+03	3.87E-01	7.86E+05	2.46E-03
618-9_Shallow_Focused	non-Rad	1,1,2,2-Tetrachloroethane	79-34-5	µg/kg	110	No Value	--	1.65E+05	6.67E-04
618-9_Shallow_Focused	non-Rad	Acetone	67-64-1	µg/kg	680	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Aldrin	309-00-2	µg/kg	390	No Value	--	1.65E+02	**2.36E+00**
618-9_Shallow_Focused	non-Rad	Aroclor-1016	12674-11-2	µg/kg	1.90E+03	4.00E+04	4.75E-02	1.82E+03	**1.04E+00**
618-9_Shallow_Focused	non-Rad	Aroclor-1221	11104-28-2	µg/kg	1.90E+03	4.00E+04	4.75E-02	1.47E+03	**1.29E+00**
618-9_Shallow_Focused	non-Rad	Aroclor-1232	11141-16-5	µg/kg	1.90E+03	4.00E+04	4.75E-02	1.44E+03	**1.32E+00**
618-9_Shallow_Focused	non-Rad	Aroclor-1242	53469-21-9	µg/kg	1.90E+03	4.00E+04	4.75E-02	1.49E+03	**1.28E+00**

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
618-9_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	µg/kg	1.90E+03	4.00E+04	4.75E-02	3.25E+02	**5.85E+00**
618-9_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	µg/kg	3.90E+03	4.00E+04	9.75E-02	1.47E+03	**2.65E+00**
618-9_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	µg/kg	3.90E+03	4.00E+04	9.75E-02	1.47E+03	**2.65E+00**
618-9_Shallow_Focused	non-Rad	Aroclors HI	--	µg/kg	--	--	4.33E-01	--	**1.61E+01**
618-9_Shallow_Focused	non-Rad	Arsenic	7440-38-2	µg/kg	11600	1.00E+04	**1.16E+00**	1.90E+05	6.11E-02
618-9_Shallow_Focused	non-Rad	Barium	7440-39-3	µg/kg	9.02E+04	3.30E+05	2.73E-01	1.32E+06	6.83E-02
618-9_Shallow_Focused	non-Rad	Beryllium	7440-41-7	µg/kg	3.30E+02	1.00E+04	3.30E-02	1.39E+04	2.37E-02
618-9_Shallow_Focused	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	µg/kg	5.20E+03	1.00E+05	5.20E-02	4.54E+04	1.15E-01
618-9_Shallow_Focused	non-Rad	Butylbenzylphthalate	85-68-7	µg/kg	2700	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Chlordane	57-74-9	µg/kg	6.90E+01	1.00E+03	6.90E-02	5.04E+04	1.37E-03
618-9_Shallow_Focused	non-Rad	Chloroform	67-66-3	µg/kg	9	No Value	--	1.65E+05	5.45E-05
618-9_Shallow_Focused	non-Rad	Chromium	7440-47-3	µg/kg	9700	4.00E+02	**2.43E+01**	3.82E+04	2.54E-01
618-9_Shallow_Focused	non-Rad	Cobalt	7440-48-4	µg/kg	1.14E+04	1.30E+04	8.77E-01	1.11E+05	1.03E-01
618-9_Shallow_Focused	non-Rad	Copper	7440-50-8	µg/kg	1.67E+04	5.00E+04	3.34E-01	1.07E+05	1.56E-01
618-9_Shallow_Focused	non-Rad	Di-n-butylphthalate	84-74-2	µg/kg	7200	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Heptachlor epoxide	1024-57-3	µg/kg	44	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Hexachlorobutadiene	87-68-3	µg/kg	760	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Hexachloroethane	67-72-1	µg/kg	17000	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Lead	7439-92-1	µg/kg	7.70E+03	5.00E+04	1.54E-01	3.56E+04	2.16E-01
618-9_Shallow_Focused	non-Rad	Manganese	7439-96-5	µg/kg	359000	2.20E+05	**1.63E+00**	5.80E+06	6.19E-02
618-9_Shallow_Focused	non-Rad	Mercury	7439-97-6	µg/kg	330	1.00E+02	**3.30E+00**	1.87E+03	1.76E-01
618-9_Shallow_Focused	non-Rad	Methylene chloride	75-09-2	µg/kg	2300	No Value	--	1.66E+05	1.39E-02
618-9_Shallow_Focused	non-Rad	Nickel	7440-02-0	µg/kg	1.06E+04	3.00E+04	3.53E-01	3.26E+04	3.25E-01
618-9_Shallow_Focused	non-Rad	Nitrate	14797-55-8	µg/kg	1670000	No Value	--	3.40E+08	4.91E-03
618-9_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	1.94E-04	--	5.99E-04
618-9_Shallow_Focused	non-Rad	Tetrachloroethene	127-18-4	µg/kg	920	No Value	--	6.98E+04	1.32E-02
618-9_Shallow_Focused	non-Rad	Toluene	108-88-3	µg/kg	9.00E+00	2.00E+05	4.50E-05	5.20E+06	1.73E-06
618-9_Shallow_Focused	non-Rad	Trichloroethene	79-01-6	µg/kg	2	No Value	--	7.01E+04	2.85E-05
618-9_Shallow_Focused	non-Rad	Uranium	7440-61-1	µg/kg	3.10E+03	5.00E+03	6.20E-01	7.86E+05	3.94E-03
618-9_Shallow_Focused	Rad	Uranium-235	15117-96-1	pCi/g	7.10E-02	2.74E+04	2.59E-06	4.36E+03	1.63E-05
618-9_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	3.00E+00	1.57E+04	1.91E-04	5.15E+03	5.83E-04
618-9_Shallow_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	59300	2.00E+03	**2.97E+01**	3.11E+04	**1.91E+00**
618-9_Shallow_Focused	non-Rad	Zinc	7440-66-6	µg/kg	52300	5.00E+04	**1.05E+00**	6.78E+04	7.71E-01
618-9_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	8963	5.00E+03	**1.79E+00**	7.86E+05	1.14E-02
628-4_Overburden	non-Rad	Arsenic	7440-38-2	µg/kg	3.37E+03	1.00E+04	3.37E-01	1.90E+05	1.78E-02
628-4_Overburden	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	µg/kg	6.09E+01	1.00E+05	6.09E-04	4.54E+04	1.34E-03
628-4_Overburden	Rad	Cesium-137	10045-97-3	pCi/g	3.30E-02	2.21E+03	1.49E-05	9.24E+02	3.57E-05
628-4_Overburden	non-Rad	Lead	7439-92-1	µg/kg	7.28E+03	5.00E+04	1.46E-01	3.56E+04	2.05E-01
628-4_Overburden	Rad	RADs SOF	--	pCi/g	--	--	8.12E-05	--	3.24E-04
628-4_Overburden	Rad	Uranium-233/234	U-233/234	pCi/g	8.70E-01	5.16E+04	1.69E-05	6.37E+03	1.37E-04
628-4_Overburden	Rad	Uranium-238	U-238	pCi/g	7.75E-01	1.57E+04	4.94E-05	5.15E+03	1.51E-04
628-4_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	2.31E+03	5.00E+03	4.62E-01	7.86E+05	2.94E-03
628-4_Shallow	non-Rad	Aroclor-1242	53469-21-9	µg/kg	4.24E+01	4.00E+04	1.06E-03	1.49E+03	2.84E-02
628-4_Shallow	non-Rad	Aroclor-1248	12672-29-6	µg/kg	1.12E+03	4.00E+04	2.79E-02	3.25E+02	**3.43E+00**

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
628-4_Shallow	non-Rad	Aroclor-1254	11097-69-1	µg/kg	4.05E+02	4.00E+04	1.01E-02	1.47E+03	2.75E-01
628-4_Shallow	non-Rad	Aroclor-1260	11096-82-5	µg/kg	3.78E+01	4.00E+04	9.44E-04	1.47E+03	2.57E-02
628-4_Shallow	non-Rad	Aroclors HI	--	µg/kg	--	--	4.00E-02	--	**3.76E+00**
628-4_Shallow	non-Rad	Arsenic	7440-38-2	µg/kg	3.86E+03	1.00E+04	3.86E-01	1.90E+05	2.03E-02
628-4_Shallow	non-Rad	Lead	7439-92-1	µg/kg	99167.457	5.00E+04	**1.98E+00**	3.56E+04	**2.79E+00**
628-4_Shallow	Rad	RADs SOF	--	pCi/g	--	--	9.28E-05	--	4.07E-04
628-4_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	1.13E+00	5.16E+04	2.19E-05	6.37E+03	1.77E-04
628-4_Shallow	Rad	Uranium-235	15117-96-1	pCi/g	1.12E-01	2.74E+04	4.08E-06	4.36E+03	2.57E-05
628-4_Shallow	Rad	Uranium-238	U-238	pCi/g	1.05E+00	1.57E+04	6.68E-05	5.15E+03	2.04E-04
628-4_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	3.16E+03	5.00E+03	6.33E-01	7.86E+05	4.02E-03
UPR-300-17_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	12420	5.00E+03	**2.48E+00**	7.86E+05	1.58E-02
UPR-300-17_Shallow	non-Rad	Acenaphthene	83-32-9	µg/kg	1.17E+02	2.00E+04	5.85E-03	1.10E+06	1.06E-04
UPR-300-17_Shallow	non-Rad	Anthracene	120-12-7	µg/kg	7.01E+00	2.90E+04	2.42E-04	6.78E+05	1.03E-05
UPR-300-17_Shallow	non-Rad	Antimony	7440-36-0	µg/kg	3.59E+02	5.00E+03	7.17E-02	5.98E+03	6.00E-02
UPR-300-17_Shallow	non-Rad	Aroclor-1248	12672-29-6	µg/kg	1.97E+03	4.00E+04	4.93E-02	3.25E+02	**6.06E+00**
UPR-300-17_Shallow	non-Rad	Aroclor-1254	11097-69-1	µg/kg	4.50E+02	4.00E+04	1.13E-02	1.47E+03	3.06E-01
UPR-300-17_Shallow	non-Rad	Aroclor-1260	11096-82-5	µg/kg	1.13E+02	4.00E+04	2.83E-03	1.47E+03	7.71E-02
UPR-300-17_Shallow	non-Rad	Aroclors HI	--	µg/kg	--	--	6.34E-02	--	**6.44E+00**
UPR-300-17_Shallow	non-Rad	Arsenic	7440-38-2	µg/kg	2.57E+03	1.00E+04	2.57E-01	1.90E+05	1.35E-02
UPR-300-17_Shallow	non-Rad	Barium	7440-39-3	µg/kg	8.10E+04	3.30E+05	2.45E-01	1.32E+06	6.14E-02
UPR-300-17_Shallow	non-Rad	Benzo(a)anthracene	56-55-3	µg/kg	5.92E+01	1.80E+04	3.29E-03	6.40E+04	9.26E-04
UPR-300-17_Shallow	non-Rad	Benzo(a)pyrene	50-32-8	µg/kg	4.38E+01	1.80E+04	2.43E-03	7.64E+04	5.73E-04
UPR-300-17_Shallow	non-Rad	Benzo(b)fluoranthene	205-99-2	µg/kg	3.27E+01	1.80E+04	1.82E-03	3.92E+04	8.34E-04
UPR-300-17_Shallow	non-Rad	Benzo(k)fluoranthene	207-08-9	µg/kg	1.00E+01	1.80E+04	5.57E-04	3.92E+04	2.56E-04
UPR-300-17_Shallow	non-Rad	Beryllium	7440-41-7	µg/kg	2.40E+02	1.00E+04	2.40E-02	1.39E+04	1.73E-02
UPR-300-17_Shallow	non-Rad	Boron	7440-42-8	µg/kg	3902.7336	5.00E+02	**7.81E+00**	1.33E+05	2.93E-02
UPR-300-17_Shallow	non-Rad	Cadmium	7440-43-9	µg/kg	1.73E+02	4.00E+03	4.31E-02	1.63E+03	1.06E-01
UPR-300-17_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	13794.625	4.00E+02	**3.45E+01**	3.82E+04	3.61E-01
UPR-300-17_Shallow	non-Rad	Chrysene	218-01-9	µg/kg	3.93E+01	1.80E+04	2.18E-03	4.45E+04	8.82E-04
UPR-300-17_Shallow	non-Rad	Cobalt	7440-48-4	µg/kg	6.69E+03	1.30E+04	5.14E-01	1.11E+05	6.02E-02
UPR-300-17_Shallow	non-Rad	Copper	7440-50-8	µg/kg	1.51E+04	5.00E+04	3.03E-01	1.07E+05	1.41E-01
UPR-300-17_Shallow	non-Rad	Fluoranthene	206-44-0	µg/kg	3.53E+01	1.80E+04	1.96E-03	8.39E+05	4.21E-05
UPR-300-17_Shallow	non-Rad	Fluorene	86-73-7	µg/kg	2.93E+00	2.90E+04	1.01E-04	1.75E+05	1.67E-05
UPR-300-17_Shallow	non-Rad	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	5.85E+00	1.80E+04	3.25E-04	3.57E+04	1.64E-04
UPR-300-17_Shallow	non-Rad	Lead	7439-92-1	µg/kg	1.12E+04	5.00E+04	2.25E-01	3.56E+04	3.16E-01
UPR-300-17_Shallow	non-Rad	Manganese	7439-96-5	µg/kg	285159.32	2.20E+05	**1.30E+00**	5.80E+06	4.92E-02
UPR-300-17_Shallow	non-Rad	Mercury	7439-97-6	µg/kg	6.90E+01	1.00E+02	6.90E-01	1.87E+03	3.69E-02
UPR-300-17_Shallow	non-Rad	Molybdenum	7439-98-7	µg/kg	4.12E+02	2.00E+03	2.06E-01	1.40E+04	2.95E-02
UPR-300-17_Shallow	non-Rad	Naphthalene	91-20-3	µg/kg	4.79E+01	2.90E+04	1.65E-03	1.00E+05	4.79E-04
UPR-300-17_Shallow	non-Rad	Nickel	7440-02-0	µg/kg	563653.88	3.00E+04	**1.88E+01**	3.26E+04	**1.73E+01**
UPR-300-17_Shallow	non-Rad	Pyrene	129-00-0	µg/kg	3.41E+01	1.80E+04	1.90E-03	6.00E+05	5.69E-05
UPR-300-17_Shallow	Rad	RADs SOF	--	pCi/g	--	--	4.09E-04	--	1.96E-03
UPR-300-17_Shallow	non-Rad	Silver	7440-22-4	µg/kg	3.40E+02	2.00E+03	1.70E-01	4.96E+04	6.85E-03
UPR-300-17_Shallow	non-Rad	Total petroleum hydrocarbons - diesel range	TPHDIESEL	µg/kg	2.95E+03	2.00E+05	1.48E-02	3.56E+08	8.29E-06

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
UPR-300-17_Shallow	non-Rad	Total petroleum hydrocarbons - motor oil (high boiling)	TPH/OILH	µg/kg	210419.68	No Value	--	No Value	--
UPR-300-17_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	6.15E+00	5.16E+04	1.19E-04	6.37E+03	9.65E-04
UPR-300-17_Shallow	Rad	Uranium-235	15117-96-1	pCi/g	9.14E-01	2.74E+04	3.34E-05	4.36E+03	2.10E-04
UPR-300-17_Shallow	Rad	Uranium-238	U-238	pCi/g	4.04E+00	1.57E+04	2.57E-04	5.15E+03	7.85E-04
UPR-300-17_Shallow	non-Rad	Vanadium	7440-62-2	µg/kg	52149.755	2.00E+03	**2.61E+01**	3.11E+04	**1.68E+00**
UPR-300-17_Shallow	non-Rad	Zinc	7440-66-6	µg/kg	157172	5.00E+04	**3.14E+00**	6.78E+04	**2.32E+00**
UPR-300-46_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	4.90E+03	5.00E+03	9.79E-01	7.86E+05	6.23E-03
UPR-300-46_Shallow	non-Rad	Acenaphthene	83-32-9	µg/kg	1.31E+01	2.00E+04	6.54E-04	1.10E+06	1.19E-05
UPR-300-46_Shallow	non-Rad	Antimony	7440-36-0	µg/kg	3.81E+02	5.00E+03	7.61E-02	5.98E+03	6.37E-02
UPR-300-46_Shallow	non-Rad	Aroclor-1248	12672-29-6	µg/kg	8.79E+02	4.00E+04	2.20E-02	3.25E+02	**2.70E+00**
UPR-300-46_Shallow	non-Rad	Aroclor-1254	11097-69-1	µg/kg	4.90E+02	4.00E+04	1.22E-02	1.47E+03	3.33E-01
UPR-300-46_Shallow	non-Rad	Aroclor-1260	11096-82-5	µg/kg	8.44E+01	4.00E+04	2.11E-03	1.47E+03	5.74E-02
UPR-300-46_Shallow	non-Rad	Aroclors HI	--	µg/kg	--	--	3.63E-02	--	**3.09E+00**
UPR-300-46_Shallow	non-Rad	Arsenic	7440-38-2	µg/kg	2.85E+03	1.00E+04	2.85E-01	1.90E+05	1.50E-02
UPR-300-46_Shallow	non-Rad	Barium	7440-39-3	µg/kg	8.21E+04	3.30E+05	2.49E-01	1.32E+06	6.22E-02
UPR-300-46_Shallow	non-Rad	Benzo(a)anthracene	56-55-3	µg/kg	3.88E+00	1.80E+04	2.15E-04	6.40E+04	6.06E-05
UPR-300-46_Shallow	non-Rad	Benzo(a)pyrene	50-32-8	µg/kg	3.40E+00	1.80E+04	1.89E-04	7.64E+04	4.46E-05
UPR-300-46_Shallow	non-Rad	Benzo(b)fluoranthene	205-99-2	µg/kg	5.30E+00	1.80E+04	2.95E-04	3.92E+04	1.35E-04
UPR-300-46_Shallow	non-Rad	Benzo(k)fluoranthene	207-08-9	µg/kg	2.78E+00	1.80E+04	1.55E-04	3.92E+04	7.10E-05
UPR-300-46_Shallow	non-Rad	Beryllium	7440-41-7	µg/kg	2.22E+02	1.00E+04	2.22E-02	1.39E+04	1.60E-02
UPR-300-46_Shallow	non-Rad	Boron	7440-42-8	µg/kg	1713.9346	5.00E+02	**3.43E+00**	1.33E+05	1.29E-02
UPR-300-46_Shallow	non-Rad	Cadmium	7440-43-9	µg/kg	9.47E+01	4.00E+03	2.37E-02	1.63E+03	5.81E-02
UPR-300-46_Shallow	Rad	Cesium-137	10045-97-3	pCi/g	7.00E-02	2.21E+03	3.17E-05	9.24E+02	7.58E-05
UPR-300-46_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	10173.082	4.00E+02	**2.54E+01**	3.82E+04	2.66E-01
UPR-300-46_Shallow	non-Rad	Chrysene	218-01-9	µg/kg	5.58E+00	1.80E+04	3.10E-04	4.45E+04	1.25E-04
UPR-300-46_Shallow	non-Rad	Cobalt	7440-48-4	µg/kg	6.36E+03	1.30E+04	4.89E-01	1.11E+05	5.73E-02
UPR-300-46_Shallow	non-Rad	Copper	7440-50-8	µg/kg	1.32E+04	5.00E+04	2.63E-01	1.07E+05	1.23E-01
UPR-300-46_Shallow	non-Rad	Dibenz[a,h]anthracene	53-70-3	µg/kg	1.25E+00	1.80E+04	6.94E-05	4.41E+04	2.83E-05
UPR-300-46_Shallow	non-Rad	Fluoranthene	206-44-0	µg/kg	9.55E+00	1.80E+04	5.31E-04	8.39E+05	1.14E-05
UPR-300-46_Shallow	non-Rad	Fluorene	86-73-7	µg/kg	2.15E+00	2.90E+04	7.41E-05	1.75E+05	1.23E-05
UPR-300-46_Shallow	non-Rad	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	7.80E+00	1.80E+04	4.33E-04	3.57E+04	2.18E-04
UPR-300-46_Shallow	non-Rad	Lead	7439-92-1	µg/kg	7.11E+03	5.00E+04	1.42E-01	3.56E+04	2.00E-01
UPR-300-46_Shallow	non-Rad	Manganese	7439-96-5	µg/kg	311000.56	2.20E+05	**1.41E+00**	5.80E+06	5.36E-02
UPR-300-46_Shallow	non-Rad	Mercury	7439-97-6	µg/kg	2.92E+01	1.00E+02	2.92E-01	1.87E+03	1.56E-02
UPR-300-46_Shallow	non-Rad	Molybdenum	7439-98-7	µg/kg	4.56E+02	2.00E+03	2.28E-01	1.40E+04	3.26E-02
UPR-300-46_Shallow	non-Rad	Naphthalene	91-20-3	µg/kg	3.57E+01	2.90E+04	1.23E-03	1.00E+05	3.57E-04
UPR-300-46_Shallow	non-Rad	Nickel	7440-02-0	µg/kg	9.23E+03	3.00E+04	3.08E-01	3.26E+04	2.83E-01
UPR-300-46_Shallow	non-Rad	Pyrene	129-00-0	µg/kg	4.44E+00	1.80E+04	2.46E-04	6.00E+05	7.39E-06
UPR-300-46_Shallow	Rad	RADs SOF	--	pCi/g	--	--	1.85E-04	--	7.45E-04
UPR-300-46_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	1.77E+00	5.16E+04	3.43E-05	6.37E+03	2.78E-04
UPR-300-46_Shallow	Rad	Uranium-235	15117-96-1	pCi/g	2.43E-01	2.74E+04	8.87E-06	4.36E+03	5.57E-05
UPR-300-46_Shallow	Rad	Uranium-238	U-238	pCi/g	1.73E+00	1.57E+04	1.10E-04	5.15E+03	3.35E-04
UPR-300-46_Shallow	non-Rad	Vanadium	7440-62-2	µg/kg	53808.248	2.00E+03	**2.69E+01**	3.11E+04	**1.73E+00**
UPR-300-46_Shallow	non-Rad	Zinc	7440-66-6	µg/kg	4.79E+04	5.00E+04	9.59E-01	6.78E+04	7.07E-01

Table H-5. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient

Notes:

Bolded HQ values are greater than or equal to 1.

[1] = Plant/Invertebrate SSL are the lowest available Generic Lookup Value (ECF-Hanford-11-0060).

[2] = Wildlife SSLs are the lowest available Tier 1 avian or mammal preliminary remediation goal (ECF-Hanford-11-0060).

All data represent detected concentrations of the chemicals.

µg/kg = Microgram per kilogram
Aroclors HI - Sum of HQs within each decisional unit
Hazard Quotients greater than one are in bold font.
pCi/g = pico Curie per gram

Rad = Radionuclide

RADs SOF = Sum of HQs for radionuclide isotopes within each decisional unit

SOF = Sum of fractions

SSL = Soil screening level

Uranium 234 SSLs were used as surrogates for Uranium 233/234.

Table H-6. Comparison of 300 Area Waste Sites Exposure Point Concentrations (Exceeding SSLs) to Background for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Lognormal 90th Percentile Background Value	EPC > 90th Percentile Background Value
300-10_Shallow_Focused	non-Rad	Arsenic	7440-38-2	µg/kg	13,500	6.47E+03	**Yes**
300-109_Shallow_Focused	non-Rad	Boron	7440-42-8	µg/kg	632	3.89E+03	No
300-109_Shallow_Focused	non-Rad	Chromium	7440-47-3	µg/kg	6,950	1.85E+04	No
300-109_Shallow_Focused	non-Rad	Manganese	7439-96-5	µg/kg	278,000	5.12E+05	No
300-109_Shallow_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	47,600	8.51E+04	No
300-109_Staging Pile Area_Focused	non-Rad	Boron	7440-42-8	µg/kg	1,060	3.89E+03	No
300-109_Staging Pile Area_Focused	non-Rad	Chromium	7440-47-3	µg/kg	8,170	1.85E+04	No
300-109_Staging Pile Area_Focused	non-Rad	Manganese	7439-96-5	µg/kg	286,000	5.12E+05	No
300-109_Staging Pile Area_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	45,100	8.51E+04	No
300-109_Staging Pile Area_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	6877	3.21E+03	**Yes**
300-18_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	6,900	1.85E+04	No
300-259_Shallow	non-Rad	Boron	7440-42-8	µg/kg	1,303	3.89E+03	No
300-259_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	7,901	1.85E+04	No
300-259_Shallow	non-Rad	Manganese	7439-96-5	µg/kg	318,874	5.12E+05	No
300-259_Shallow	non-Rad	Vanadium	7440-62-2	µg/kg	42,626	8.51E+04	No
300-259_Shallow	non-Rad	Zinc	7440-66-6	µg/kg	479,584	6.78E+04	**Yes**
300-260_Shallow_Focused	non-Rad	Boron	7440-42-8	µg/kg	8,360	3.89E+03	**Yes**
300-260_Shallow_Focused	non-Rad	Chromium	7440-47-3	µg/kg	9,890	1.85E+04	No
300-260_Shallow_Focused	non-Rad	Copper	7440-50-8	µg/kg	73,300	2.20E+04	**Yes**
300-260_Shallow_Focused	non-Rad	Manganese	7439-96-5	µg/kg	328,000	5.12E+05	No
300-260_Shallow_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	59,000	8.51E+04	No
300-260_Shallow_Focused	non-Rad	Zinc	7440-66-6	µg/kg	77,400	6.78E+04	**Yes**
300-260_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	12800	3.21E+03	**Yes**
300-275_Shallow_1	non-Rad	Boron	7440-42-8	µg/kg	1,466	3.89E+03	No
300-275_Shallow_1	non-Rad	Chromium	7440-47-3	µg/kg	8,022	1.85E+04	No
300-275_Shallow_1	non-Rad	Lithium	7439-93-2	µg/kg	6,686	1.33E+04	No
300-275_Shallow_1	non-Rad	Manganese	7439-96-5	µg/kg	276,815	5.12E+05	No
300-275_Shallow_1	non-Rad	Vanadium	7440-62-2	µg/kg	45,128	8.51E+04	No
300-275_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	22251	3.21E+03	**Yes**

Table H-6. Comparison of 300 Area Waste Sites Exposure Point Concentrations (Exceeding SSLs) to Background for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Lognormal 90th Percentile Background Value	EPC > 90th Percentile Background Value
300-275_Shallow_2	non-Rad	Boron	7440-42-8	µg/kg	1,147	3.89E+03	No
300-275_Shallow_2	non-Rad	Chromium	7440-47-3	µg/kg	8,994	1.85E+04	No
300-275_Shallow_2	non-Rad	Lithium	7439-93-2	µg/kg	7,067	1.33E+04	No
300-275_Shallow_2	non-Rad	Manganese	7439-96-5	µg/kg	292,731	5.12E+05	No
300-275_Shallow_2	non-Rad	Vanadium	7440-62-2	µg/kg	51,632	8.51E+04	No
300-33, 300-41, 300-256_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	5349	3.21E+03	**Yes**
300-33, 300-41, 300-256_Shallow	non-Rad	Boron	7440-42-8	µg/kg	1,484	3.89E+03	No
300-33, 300-41, 300-256_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	8,781	1.85E+04	No
300-33, 300-41, 300-256_Shallow	non-Rad	Lithium	7439-93-2	µg/kg	5,495	1.33E+04	No
300-33, 300-41, 300-256_Shallow	non-Rad	Manganese	7439-96-5	µg/kg	314,762	5.12E+05	No
300-33, 300-41, 300-256_Shallow	non-Rad	Uranium	7440-61-1	µg/kg	7,260	3.21E+03	**Yes**
300-33, 300-41, 300-256_Shallow	non-Rad	Vanadium	7440-62-2	µg/kg	52,694	8.51E+04	No
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	µg/kg	330	--	--
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	µg/kg	385	--	--
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	µg/kg	52	--	--
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Boron	7440-42-8	µg/kg	1,030	3.89E+03	No
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Chromium	7440-47-3	µg/kg	8,080	1.85E+04	No
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Lithium	7439-93-2	µg/kg	6,580	1.33E+04	No
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Manganese	7439-96-5	µg/kg	259,000	5.12E+05	No
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	51,400	8.51E+04	No
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	6460	3.21E+03	**Yes**
300-37_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	µg/kg	100	--	--
300-37_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	µg/kg	3200	--	--
300-44_Shallow_Focused	non-Rad	Arsenic	7440-38-2	µg/kg	16,900	6.47E+03	**Yes**
300-44_Shallow_Focused	non-Rad	Chromium	7440-47-3	µg/kg	9,300	1.85E+04	No
300-44_Shallow_Focused	non-Rad	Manganese	7439-96-5	µg/kg	303,000	5.12E+05	No
300-44_Shallow_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	43,200	8.51E+04	No
300-49_Overburden	non-Rad	Aroclor-1254	11097-69-1	µg/kg	3007.72	--	--
300-49_Overburden	non-Rad	Chromium	7440-47-3	µg/kg	18,106	1.85E+04	No

Table H-6. Comparison of 300 Area Waste Sites Exposure Point Concentrations (Exceeding SSLs) to Background for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Lognormal 90th Percentile Background Value	EPC > 90th Percentile Background Value
300-49_Overburden	non-Rad	Copper	7440-50-8	µg/kg	536,000	2.20E+04	**Yes**
300-49_Overburden	non-Rad	Lead	7439-92-1	µg/kg	36,964	1.02E+04	**Yes**
300-49_Overburden	non-Rad	Manganese	7439-96-5	µg/kg	316,669	5.12E+05	No
300-49_Overburden	non-Rad	Vanadium	7440-62-2	µg/kg	50,380	8.51E+04	No
300-49_Overburden	non-Rad	Zinc	7440-66-6	µg/kg	141,984	6.78E+04	**Yes**
300-49_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	9,170	1.85E+04	No
300-49_Shallow	non-Rad	Manganese	7439-96-5	µg/kg	361,805	5.12E+05	No
300-49_Shallow	non-Rad	Vanadium	7440-62-2	µg/kg	58,672	8.51E+04	No
300-49_Shallow	non-Rad	Zinc	7440-66-6	µg/kg	54,651	6.78E+04	No
300-50_Overburden	non-Rad	Chromium	7440-47-3	µg/kg	12,197	1.85E+04	No
300-50_Overburden	non-Rad	Copper	7440-50-8	µg/kg	64,527	2.20E+04	**Yes**
300-50_Overburden	non-Rad	Manganese	7439-96-5	µg/kg	314,271	5.12E+05	No
300-50_Overburden	non-Rad	Vanadium	7440-62-2	µg/kg	45,243	8.51E+04	No
300-50_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	17919	3.21E+03	**Yes**
300-50_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	16,841	1.85E+04	No
300-50_Shallow	non-Rad	Manganese	7439-96-5	µg/kg	318,120	5.12E+05	No
300-50_Shallow	non-Rad	Silver	7440-22-4	µg/kg	2,992	1.67E+02	**Yes**
300-50_Shallow	non-Rad	Vanadium	7440-62-2	µg/kg	46,964	8.51E+04	No
300-50_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	22938	3.21E+03	**Yes**
316-1_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	40572	3.21E+03	**Yes**
316-1_Shallow_1	non-Rad	Aroclor-1248	12672-29-6	µg/kg	3000	--	--
316-1_Shallow_1	non-Rad	Arsenic	7440-38-2	µg/kg	19,014	6.47E+03	**Yes**
316-1_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	83027	3.21E+03	**Yes**
316-1_Shallow_3	non-Rad	Chromium	7440-47-3	µg/kg	50,455	1.85E+04	**Yes**
316-1_Shallow_3	non-Rad	Copper	7440-50-8	µg/kg	1.37E+06	2.20E+04	**Yes**
316-1_Shallow_3	non-Rad	Manganese	7439-96-5	µg/kg	392,825	5.12E+05	No
316-1_Shallow_3	non-Rad	Mercury	7439-97-6	µg/kg	1,105	1.31E+01	**Yes**
316-1_Shallow_3	non-Rad	Nickel	7440-02-0	µg/kg	94,656	1.91E+04	**Yes**
316-1_Shallow_3	non-Rad	Selenium	7782-49-2	µg/kg	1,444	7.80E+02	**Yes**

Table H-6. Comparison of 300 Area Waste Sites Exposure Point Concentrations (Exceeding SSLs) to Background for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Lognormal 90th Percentile Background Value	EPC > 90th Percentile Background Value
316-1_Shallow_3	non-Rad	Silver	7440-22-4	µg/kg	13,196	1.67E+02	**Yes**
316-1_Shallow_3	non-Rad	Vanadium	7440-62-2	µg/kg	56,707	8.51E+04	No
316-1_Shallow_3	non-Rad	Zinc	7440-66-6	µg/kg	82,016	6.78E+04	**Yes**
316-1_Shallow_3	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	63074	3.21E+03	**Yes**
316-1_Shallow_4	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	42963	3.21E+03	**Yes**
316-2_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	210452	3.21E+03	**Yes**
316-2_Shallow_2	non-Rad	Aroclor-1248	12672-29-6	µg/kg	696.77511	--	--
316-2_Shallow_2	non-Rad	Aroclor-1254	11097-69-1	µg/kg	42	--	--
316-2_Shallow_2	non-Rad	Aroclor-1260	11096-82-5	µg/kg	110	--	--
316-2_Shallow_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	291369	3.21E+03	**Yes**
316-2_Shallow_3	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	73174	3.21E+03	**Yes**
316-5_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	271835	3.21E+03	**Yes**
316-5_Shallow_2	non-Rad	Chromium	7440-47-3	µg/kg	6,900	1.85E+04	No
316-5_Shallow_2	non-Rad	Silver	7440-22-4	µg/kg	3,600	1.67E+02	**Yes**
316-5_Shallow_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	204701	3.21E+03	**Yes**
316-5_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	138095	3.21E+03	**Yes**
331 LSLDF_Shallow_Focused	non-Rad	Boron	7440-42-8	µg/kg	1,700	3.89E+03	No
331 LSLDF_Shallow_Focused	non-Rad	Chromium	7440-47-3	µg/kg	10,300	1.85E+04	No
331 LSLDF_Shallow_Focused	non-Rad	Manganese	7439-96-5	µg/kg	349,000	5.12E+05	No
331 LSLDF_Shallow_Focused	non-Rad	Mercury	7439-97-6	µg/kg	110	1.31E+01	**Yes**
331 LSLDF_Shallow_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	53,100	8.51E+04	No
331 LSLDF_Shallow_Focused	non-Rad	Zinc	7440-66-6	µg/kg	137,000	6.78E+04	**Yes**
600-243_Shallow	non-Rad	Boron	7440-42-8	µg/kg	294,463	3.89E+03	**Yes**
600-243_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	18,006	1.85E+04	No
600-243_Shallow	non-Rad	Copper	7440-50-8	µg/kg	53,981	2.20E+04	**Yes**
600-243_Shallow	non-Rad	Lead	7439-92-1	µg/kg	40,139	1.02E+04	**Yes**
600-243_Shallow	non-Rad	Selenium	7782-49-2	µg/kg	5,709	7.80E+02	**Yes**
600-243_Shallow	non-Rad	Vanadium	7440-62-2	µg/kg	46,986	8.51E+04	No
600-243_Shallow	non-Rad	Zinc	7440-66-6	µg/kg	84,099	6.78E+04	**Yes**

Table H-6. Comparison of 300 Area Waste Sites Exposure Point Concentrations (Exceeding SSLs) to Background for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Lognormal 90th Percentile Background Value	EPC > 90th Percentile Background Value
600-47_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	5,500	1.85E+04	No
618-1_Shallow	non-Rad	Boron	7440-42-8	µg/kg	1,190	3.89E+03	No
618-1_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	7,930	1.85E+04	No
618-1_Shallow	non-Rad	Lithium	7439-93-2	µg/kg	6,380	1.33E+04	No
618-1_Shallow	non-Rad	Manganese	7439-96-5	µg/kg	300,000	5.12E+05	No
618-1_Shallow	non-Rad	Vanadium	7440-62-2	µg/kg	56,300	8.51E+04	No
618-1_Shallow_Focused	non-Rad	Boron	7440-42-8	µg/kg	3,740	3.89E+03	**Yes**
618-1_Shallow_Focused	non-Rad	Chromium	7440-47-3	µg/kg	19,500	1.85E+04	**Yes**
618-1_Shallow_Focused	non-Rad	Lithium	7439-93-2	µg/kg	13,300	1.33E+04	No
618-1_Shallow_Focused	non-Rad	Manganese	7439-96-5	µg/kg	403,000	5.12E+05	No
618-1_Shallow_Focused	non-Rad	Mercury	7439-97-6	µg/kg	198	1.31E+01	**Yes**
618-1_Shallow_Focused	non-Rad	Uranium	7440-61-1	µg/kg	7,080	3.21E+03	**Yes**
618-1_Shallow_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	64,700	8.51E+04	No
618-1_Shallow_Focused	non-Rad	Zinc	7440-66-6	µg/kg	68,100	6.78E+04	**Yes**
618-1_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	24957	3.21E+03	**Yes**
618-12_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	32092	3.21E+03	**Yes**
618-13_Shallow	non-Rad	Boron	7440-42-8	µg/kg	1,050	3.89E+03	No
618-13_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	10,700	1.85E+04	No
618-13_Shallow	non-Rad	Manganese	7439-96-5	µg/kg	344,000	5.12E+05	No
618-13_Shallow	non-Rad	Vanadium	7440-62-2	µg/kg	55,800	8.51E+04	No
618-13_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	5061	3.21E+03	**Yes**
618-13_Shallow_Focused	non-Rad	Boron	7440-42-8	µg/kg	960	3.89E+03	No
618-13_Shallow_Focused	non-Rad	Chromium	7440-47-3	µg/kg	8,740	1.85E+04	No
618-13_Shallow_Focused	non-Rad	Manganese	7439-96-5	µg/kg	268,000	5.12E+05	No
618-13_Shallow_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	48,600	8.51E+04	No
618-2_Overburden	non-Rad	Chromium	7440-47-3	µg/kg	6,600	1.85E+04	No
618-2_Overburden	non-Rad	Selenium	7782-49-2	µg/kg	1,000	7.80E+02	**Yes**
618-2_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	7,100	1.85E+04	No
618-2_Shallow	non-Rad	Selenium	7782-49-2	µg/kg	760	7.80E+02	No

Table H-6. Comparison of 300 Area Waste Sites Exposure Point Concentrations (Exceeding SSLs) to Background for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Lognormal 90th Percentile Background Value	EPC > 90th Percentile Background Value
618-2_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	5852	3.21E+03	**Yes**
618-2_Staging Pile	non-Rad	Chromium	7440-47-3	µg/kg	6,424	1.85E+04	No
618-2_Staging Pile	non-Rad	Uranium	7440-61-1	µg/kg	5,022	3.21E+03	**Yes**
618-2_Staging Pile	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	9201	3.21E+03	**Yes**
618-3_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	9,700	1.85E+04	No
618-3_Shallow	non-Rad	Selenium	7782-49-2	µg/kg	659	7.80E+02	No
618-3_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	238577	3.21E+03	**Yes**
618-4_Shallow	non-Rad	Lead	7439-92-1	µg/kg	49,000	1.02E+04	**Yes**
618-4_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	7456	3.21E+03	**Yes**
618-5_Overburden	non-Rad	Chromium	7440-47-3	µg/kg	9,700	1.85E+04	No
618-5_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	9773	3.21E+03	**Yes**
618-5_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	11,300	1.85E+04	No
618-5_Staging Pile_4	non-Rad	Chromium	7440-47-3	µg/kg	11,800	1.85E+04	No
618-5_Staging Pile_5	non-Rad	Chromium	7440-47-3	µg/kg	10,300	1.85E+04	No
618-7_Shallow_1	non-Rad	Chromium	7440-47-3	µg/kg	10,227	1.85E+04	No
618-7_Shallow_1	non-Rad	Manganese	7439-96-5	µg/kg	326,067	5.12E+05	No
618-7_Shallow_1	non-Rad	Vanadium	7440-62-2	µg/kg	74,576	8.51E+04	No
618-7_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	10814	3.21E+03	**Yes**
618-7_Shallow_2	non-Rad	Chromium	7440-47-3	µg/kg	6,800	1.85E+04	No
618-7_Shallow_2	non-Rad	Manganese	7439-96-5	µg/kg	364,000	5.12E+05	No
618-7_Shallow_2	non-Rad	Vanadium	7440-62-2	µg/kg	74,700	8.51E+04	No
618-7_Shallow_3	non-Rad	Chromium	7440-47-3	µg/kg	10,100	1.85E+04	No
618-7_Shallow_3	non-Rad	Manganese	7439-96-5	µg/kg	357,000	5.12E+05	No
618-7_Shallow_3	non-Rad	Vanadium	7440-62-2	µg/kg	68,200	8.51E+04	No
618-7_Shallow_4	non-Rad	Chromium	7440-47-3	µg/kg	11,400	1.85E+04	No
618-7_Shallow_4	non-Rad	Manganese	7439-96-5	µg/kg	285,000	5.12E+05	No
618-7_Shallow_4	non-Rad	Vanadium	7440-62-2	µg/kg	54,800	8.51E+04	No
618-7_Shallow_Focused	non-Rad	Cadmium	7440-43-9	µg/kg	6,200	5.63E+02	**Yes**
618-7_Shallow_Focused	non-Rad	Chromium	7440-47-3	µg/kg	65,900	1.85E+04	**Yes**

Table H-6. Comparison of 300 Area Waste Sites Exposure Point Concentrations (Exceeding SSLs) to Background for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Lognormal 90th Percentile Background Value	EPC > 90th Percentile Background Value
618-7_Shallow_Focused	non-Rad	Manganese	7439-96-5	µg/kg	425,000	5.12E+05	No
618-7_Shallow_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	80,500	8.51E+04	No
618-7_Shallow_Focused	non-Rad	Zinc	7440-66-6	µg/kg	52,400	6.78E+04	No
618-7_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	19563	3.21E+03	**Yes**
618-8_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	12,400	1.85E+04	No
618-8_Shallow	non-Rad	Selenium	7782-49-2	µg/kg	846	7.80E+02	**Yes**
618-9_Shallow_Focused	non-Rad	Aldrin	309-00-2	µg/kg	390	--	--
618-9_Shallow_Focused	non-Rad	Aroclor-1016	12674-11-2	µg/kg	1900	--	--
618-9_Shallow_Focused	non-Rad	Aroclor-1221	11104-28-2	µg/kg	1900	--	--
618-9_Shallow_Focused	non-Rad	Aroclor-1232	11141-16-5	µg/kg	1900	--	--
618-9_Shallow_Focused	non-Rad	Aroclor-1242	53469-21-9	µg/kg	1900	--	--
618-9_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	µg/kg	1900	--	--
618-9_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	µg/kg	3900	--	--
618-9_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	µg/kg	3900	--	--
618-9_Shallow_Focused	non-Rad	Arsenic	7440-38-2	µg/kg	11,600	6.47E+03	**Yes**
618-9_Shallow_Focused	non-Rad	Chromium	7440-47-3	µg/kg	9,700	1.85E+04	**No**
618-9_Shallow_Focused	non-Rad	Manganese	7439-96-5	µg/kg	359,000	5.12E+05	**No**
618-9_Shallow_Focused	non-Rad	Mercury	7439-97-6	µg/kg	330	1.31E+01	**Yes**
618-9_Shallow_Focused	non-Rad	Vanadium	7440-62-2	µg/kg	59,300	8.51E+04	**No**
618-9_Shallow_Focused	non-Rad	Zinc	7440-66-6	µg/kg	52,300	6.78E+04	**No**
618-9_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	8963	3.21E+03	**Yes**
628-4_Shallow	non-Rad	Aroclor-1242	53469-21-9	µg/kg	42.354	--	**--**
628-4_Shallow	non-Rad	Aroclor-1248	12672-29-6	µg/kg	1115.476	--	**--**
628-4_Shallow	non-Rad	Aroclor-1254	11097-69-1	µg/kg	404.954	--	**--**
628-4_Shallow	non-Rad	Aroclor-1260	11096-82-5	µg/kg	37.768	--	**--**
628-4_Shallow	non-Rad	Lead	7439-92-1	µg/kg	99,167	1.02E+04	**Yes**
UPR-300-17_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	µg/kg	12420	3.21E+03	**Yes**
UPR-300-17_Shallow	non-Rad	Aroclor-1248	12672-29-6	µg/kg	1970	--	**--**
UPR-300-17_Shallow	non-Rad	Aroclor-1254	11097-69-1	µg/kg	450.00081	--	**--**

Table H-6. Comparison of 300 Area Waste Sites Exposure Point Concentrations (Exceeding SSLs) to Background for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Lognormal 90th Percentile Background Value	EPC > 90th Percentile Background Value
UPR-300-17_Shallow	non-Rad	Aroclor-1260	11096-82-5	µg/kg	113.2752	--	--
UPR-300-17_Shallow	non-Rad	Boron	7440-42-8	µg/kg	3,903	3.89E+03	Yes
UPR-300-17_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	13,795	1.85E+04	No
UPR-300-17_Shallow	non-Rad	Manganese	7439-96-5	µg/kg	285,159	5.12E+05	No
UPR-300-17_Shallow	non-Rad	Nickel	7440-02-0	µg/kg	563,654	1.91E+04	Yes
UPR-300-17_Shallow	non-Rad	Vanadium	7440-62-2	µg/kg	52,150	8.51E+04	No
UPR-300-17_Shallow	non-Rad	Zinc	7440-66-6	µg/kg	157,172	6.78E+04	Yes
UPR-300-46_Shallow	non-Rad	Aroclor-1248	12672-29-6	µg/kg	8.79E+02	--	--
UPR-300-46_Shallow	non-Rad	Aroclor-1254	11097-69-1	µg/kg	4.90E+02	--	--
UPR-300-46_Shallow	non-Rad	Aroclor-1260	11096-82-5	µg/kg	8.44E+01	--	--
UPR-300-46_Shallow	non-Rad	Boron	7440-42-8	µg/kg	1.71E+03	3.89E+03	No
UPR-300-46_Shallow	non-Rad	Chromium	7440-47-3	µg/kg	1.02E+04	1.85E+04	No
UPR-300-46_Shallow	non-Rad	Manganese	7439-96-5	µg/kg	3.11E+05	5.12E+05	No
UPR-300-46_Shallow	non-Rad	Vanadium	7440-62-2	µg/kg	5.38E+04	8.51E+04	No

Notes-

EPC = Exposure point concentration

pCi/g = picocuries per gram

SSL = Soil screening level

ug/kg - microgram per kilogram

Table H-7. Ecological PRG Comparisons for 300 Area Waste Site Decision Units

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/ Invertebrate PRG (µg/kg)	Hazard Quotient	Wildlife PRG (µg/kg)	Hazard Quotient
300-10_Shallow_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	1.35E+04	1.28E+05	1.05E-01	1.27E+05	1.06E-01
300-109_Staging Pile Area_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	6.88E+03	1.00E+05	6.88E-02	4.03E+04	1.71E-01
300-259_Shallow	non-Rad	Zinc	7440-66-6	ug/kg	4.80E+05	6.21E+05	7.72E-01	8.56E+05	5.60E-01
300-260_Shallow_Focused	non-Rad	Boron	7440-42-8	ug/kg	8.36E+03	2.96E+04	2.82E-01	9.06E+04	9.23E-02
300-260_Shallow_Focused	non-Rad	Copper	7440-50-8	ug/kg	7.33E+04	5.80E+04	**1.26E+00**	2.13E+05	3.44E-01
300-260_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.28E+04	1.00E+05	1.28E-01	4.03E+04	3.18E-01
300-260_Shallow_Focused	non-Rad	Zinc	7440-66-6	ug/kg	7.74E+04	6.21E+05	1.25E-01	8.56E+05	9.04E-02
300-275_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.23E+04	1.00E+05	2.23E-01	4.03E+04	5.52E-01
300-33, 300-41, 300-256_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	5.35E+03	1.00E+05	5.35E-02	4.03E+04	1.33E-01
300-33, 300-41, 300-256_Shallow	non-Rad	Uranium	7440-61-1	ug/kg	7.26E+03	1.00E+05	7.26E-02	4.03E+04	1.80E-01
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	ug/kg	3.30E+02	No Value	--	No Value	--
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	ug/kg	3.85E+02	No Value	--	No Value	--
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	ug/kg	5.20E+01	No Value	--	No Value	--
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	6.46E+03	1.00E+05	6.46E-02	4.03E+04	1.60E-01
300-37_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	ug/kg	1.00E+02	No Value	--	No Value	--
300-37_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	ug/kg	3.20E+03	No Value	--	No Value	--
300-44_Shallow_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	1.69E+04	1.28E+05	1.32E-01	1.27E+05	1.33E-01
300-49_Overburden	non-Rad	Aroclor-1254	11097-69-1	ug/kg	3.01E+03	No Value	--	No Value	--
300-49_Overburden	non-Rad	Copper	7440-50-8	ug/kg	5.36E+05	5.80E+04	**9.24E+00**	2.13E+05	**2.52E+00**
300-49_Overburden	non-Rad	Lead	7439-92-1	ug/kg	3.70E+04	1.70E+06	2.17E-02	1.56E+05	2.37E-01
300-49_Overburden	non-Rad	Zinc	7440-66-6	ug/kg	1.42E+05	6.21E+05	2.29E-01	8.56E+05	1.66E-01
300-50_Overburden	non-Rad	Copper	7440-50-8	ug/kg	6.45E+04	5.80E+04	**1.11E+00**	2.13E+05	3.03E-01
300-50_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.79E+04	1.00E+05	1.79E-01	4.03E+04	4.45E-01
300-50_Shallow	non-Rad	Silver	7440-22-4	ug/kg	2.99E+03	2.99E+03	**1.00E+00**	9.83E+05	3.04E-03
300-50_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.29E+04	1.00E+05	2.29E-01	4.03E+04	5.69E-01
316-1_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	4.06E+04	1.00E+05	4.06E-01	4.03E+04	**1.01E+00**
316-1_Shallow_1	non-Rad	Aroclor-1248	12672-29-6	ug/kg	3.00E+03	No Value	--	No Value	--
316-1_Shallow_1	non-Rad	Arsenic	7440-38-2	ug/kg	1.90E+04	1.28E+05	1.49E-01	1.27E+05	1.50E-01
316-1_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	8.30E+04	1.00E+05	8.30E-01	4.03E+04	**2.06E+00**
316-1_Shallow_3	non-Rad	Chromium	7440-47-3	ug/kg	5.05E+04	1.49E+05	3.39E-01	1.09E+05	4.63E-01
316-1_Shallow_3	non-Rad	Copper	7440-50-8	ug/kg	1.37E+06	5.80E+04	**2.36E+01**	2.13E+05	**6.41E+00**
316-1_Shallow_3	non-Rad	Mercury	7439-97-6	ug/kg	1.11E+03	3.00E+02	**3.68E+00**	1.56E+03	7.09E-01
316-1_Shallow_3	non-Rad	Nickel	7440-02-0	ug/kg	9.47E+04	3.80E+04	**2.49E+00**	2.47E+05	3.83E-01
316-1_Shallow_3	non-Rad	Selenium	7782-49-2	ug/kg	1.44E+03	2.02E+03	7.15E-01	1.43E+03	**1.01E+00**
316-1_Shallow_3	non-Rad	Silver	7440-22-4	ug/kg	1.32E+04	2.99E+03	**4.41E+00**	9.83E+05	1.34E-02

Table H-7. Ecological PRG Comparisons for 300 Area Waste Site Decision Units

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/ Invertebrate PRG (µg/kg)	Hazard Quotient	Wildlife PRG (µg/kg)	Hazard Quotient
316-1_Shallow_3	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	6.31E+04	1.00E+05	6.31E-01	4.03E+04	**1.56E+00**
316-1_Shallow_3	non-Rad	Zinc	7440-66-6	ug/kg	8.20E+04	6.21E+05	1.32E-01	8.56E+05	9.58E-02
316-1_Shallow_4	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	4.30E+04	1.00E+05	4.30E-01	4.03E+04	**1.07E+00**
316-2_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.10E+05	1.00E+05	**2.10E+00**	4.03E+04	**5.22E+00**
316-2_Shallow_2	non-Rad	Aroclor-1248	12672-29-6	ug/kg	6.97E+02	No Value	--	No Value	--
316-2_Shallow_2	non-Rad	Aroclor-1254	11097-69-1	ug/kg	4.20E+01	No Value	--	No Value	--
316-2_Shallow_2	non-Rad	Aroclor-1260	11096-82-5	ug/kg	1.10E+02	No Value	--	No Value	--
316-2_Shallow_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.91E+05	1.00E+05	**2.91E+00**	4.03E+04	**7.23E+00**
316-2_Shallow_3	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	7.32E+04	1.00E+05	7.32E-01	4.03E+04	**1.82E+00**
316-5_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.72E+05	1.00E+05	**2.72E+00**	4.03E+04	**6.74E+00**
316-5_Shallow_2	non-Rad	Silver	7440-22-4	ug/kg	3.60E+03	2.99E+03	**1.20E+00**	9.83E+05	3.66E-03
316-5_Shallow_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.05E+05	1.00E+05	**2.05E+00**	4.03E+04	**5.08E+00**
316-5_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.38E+05	1.00E+05	**1.38E+00**	4.03E+04	**3.43E+00**
331 LSLDF_Shallow_Focused	non-Rad	Mercury	7439-97-6	ug/kg	1.10E+02	3.00E+02	3.67E-01	1.56E+03	7.05E-02
331 LSLDF_Shallow_Focused	non-Rad	Zinc	7440-66-6	ug/kg	1.37E+05	6.21E+05	2.21E-01	8.56E+05	1.60E-01
600-243_Shallow	non-Rad	Boron	7440-42-8	ug/kg	2.94E+05	2.96E+04	**9.95E+00**	9.06E+04	**3.25E+00**
600-243_Shallow	non-Rad	Copper	7440-50-8	ug/kg	5.40E+04	5.80E+04	9.31E-01	2.13E+05	2.53E-01
600-243_Shallow	non-Rad	Lead	7439-92-1	ug/kg	4.01E+04	1.70E+06	2.36E-02	1.56E+05	2.57E-01
600-243_Shallow	non-Rad	Selenium	7782-49-2	ug/kg	5.71E+03	2.02E+03	**2.83E+00**	1.43E+03	**3.99E+00**
600-243_Shallow	non-Rad	Zinc	7440-66-6	ug/kg	8.41E+04	6.21E+05	1.35E-01	8.56E+05	9.82E-02
618-1_Shallow_Focused	non-Rad	Boron	7440-42-8	ug/kg	3.74E+03	2.96E+04	1.26E-01	9.06E+04	4.13E-02
618-1_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	1.95E+04	1.49E+05	1.31E-01	1.09E+05	1.79E-01
618-1_Shallow_Focused	non-Rad	Mercury	7439-97-6	ug/kg	1.98E+02	3.00E+02	6.60E-01	1.56E+03	1.27E-01
618-1_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.50E+04	1.00E+05	2.50E-01	4.03E+04	6.19E-01
618-1_Shallow_Focused	non-Rad	Uranium	7440-61-1	ug/kg	7.08E+03	1.00E+05	7.08E-02	4.03E+04	1.76E-01
618-1_Shallow_Focused	non-Rad	Zinc	7440-66-6	ug/kg	6.81E+04	6.21E+05	1.10E-01	8.56E+05	7.96E-02
618-12_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	3.21E+04	1.00E+05	3.21E-01	4.03E+04	7.96E-01
618-13_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	5.06E+03	1.00E+05	5.06E-02	4.03E+04	1.26E-01
618-2_Overburden	non-Rad	Selenium	7782-49-2	ug/kg	1.00E+03	2.02E+03	4.95E-01	1.43E+03	6.99E-01
618-2_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	5.85E+03	1.00E+05	5.85E-02	4.03E+04	1.45E-01
618-2_Staging Pile	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	9.20E+03	1.00E+05	9.20E-02	4.03E+04	2.28E-01
618-2_Staging Pile	non-Rad	Uranium	7440-61-1	ug/kg	5.02E+03	1.00E+05	5.02E-02	4.03E+04	1.25E-01
618-3_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.39E+05	1.00E+05	**2.39E+00**	4.03E+04	**5.92E+00**
618-4_Shallow	non-Rad	Lead	7439-92-1	ug/kg	4.90E+04	1.70E+06	2.88E-02	1.56E+05	3.14E-01
618-4_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	7.46E+03	1.00E+05	7.46E-02	4.03E+04	1.85E-01

Table H-7. Ecological PRG Comparisons for 300 Area Waste Site Decision Units

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/ Invertebrate PRG (µg/kg)	Hazard Quotient	Wildlife PRG (µg/kg)	Hazard Quotient
618-5_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	9.77E+03	1.00E+05	9.77E-02	4.03E+04	2.42E-01
618-7_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.08E+04	1.00E+05	1.08E-01	4.03E+04	2.68E-01
618-7_Shallow_Focused	non-Rad	Cadmium	7440-43-9	ug/kg	6.20E+03	9.84E+03	6.30E-01	2.86E+04	2.17E-01
618-7_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	6.59E+04	1.49E+05	4.42E-01	1.09E+05	6.05E-01
618-7_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.96E+04	1.00E+05	1.96E-01	4.03E+04	4.85E-01
618-8_Shallow	non-Rad	Selenium	7782-49-2	ug/kg	8.46E+02	2.02E+03	4.19E-01	1.43E+03	5.92E-01
618-9_Shallow_Focused	non-Rad	Aldrin	309-00-2	ug/kg	3.90E+02	No Value	--	9.90E+00	**3.94E+01**
618-9_Shallow_Focused	non-Rad	Aroclor-1016	12674-11-2	ug/kg	1.90E+03	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Aroclor-1221	11104-28-2	ug/kg	1.90E+03	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Aroclor-1232	11141-16-5	ug/kg	1.90E+03	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Aroclor-1242	53469-21-9	ug/kg	1.90E+03	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	ug/kg	1.90E+03	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	ug/kg	3.90E+03	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	ug/kg	3.90E+03	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	1.16E+04	1.28E+05	9.06E-02	1.27E+05	9.13E-02
618-9_Shallow_Focused	non-Rad	Mercury	7439-97-6	ug/kg	3.30E+02	3.00E+02	**1.10E+00**	1.56E+03	2.12E-01
618-9_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	8.96E+03	1.00E+05	8.96E-02	4.03E+04	2.22E-01
628-4_Shallow	non-Rad	Aroclor-1242	53469-21-9	ug/kg	4.24E+01	No Value	--	No Value	--
628-4_Shallow	non-Rad	Aroclor-1248	12672-29-6	ug/kg	1.12E+03	No Value	--	No Value	--
628-4_Shallow	non-Rad	Aroclor-1254	11097-69-1	ug/kg	4.05E+02	No Value	--	No Value	--
628-4_Shallow	non-Rad	Aroclor-1260	11096-82-5	ug/kg	3.78E+01	No Value	--	No Value	--
628-4_Shallow	non-Rad	Lead	7439-92-1	ug/kg	9.92E+04	1.70E+06	5.83E-02	1.56E+05	6.36E-01
UPR-300-17_Shallow	non-Rad	Aroclor-1248	12672-29-6	ug/kg	1.97E+03	No Value	--	No Value	--
UPR-300-17_Shallow	non-Rad	Aroclor-1254	11097-69-1	ug/kg	4.50E+02	No Value	--	No Value	--
UPR-300-17_Shallow	non-Rad	Aroclor-1260	11096-82-5	ug/kg	1.13E+02	No Value	--	No Value	--
UPR-300-17_Shallow	non-Rad	Boron	7440-42-8	ug/kg	3.90E+03	2.96E+04	1.32E-01	9.06E+04	4.31E-02
UPR-300-17_Shallow	non-Rad	Nickel	7440-02-0	ug/kg	5.64E+05	3.80E+04	**1.48E+01**	2.47E+05	**2.28E+00**
UPR-300-17_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.24E+04	1.00E+05	1.24E-01	4.03E+04	3.08E-01
UPR-300-17_Shallow	non-Rad	Zinc	7440-66-6	ug/kg	1.57E+05	6.21E+05	2.53E-01	8.56E+05	1.84E-01
UPR-300-46_Shallow	non-Rad	Aroclor-1248	12672-29-6	ug/kg	8.79E+02	No Value	--	No Value	--
UPR-300-46_Shallow	non-Rad	Aroclor-1254	11097-69-1	ug/kg	4.90E+02	No Value	--	No Value	--
UPR-300-46_Shallow	non-Rad	Aroclor-1260	11096-82-5	ug/kg	8.44E+01	No Value	--	No Value	--

Acronyms:

PRG = Preliminary remediation goal

Table H-8. Summary of 300 Area Waste Sites Ecological Evaluation Based on PRGs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Plant/Invertebrate HQ	Wildlife HQ
300-223_Shallow_Focused	TPH-Motor Oil (uncertainty)	--
300-23_Shallow_Focused	TPH-Motor Oil (uncertainty)	--
300-260_Shallow_Focused	Copper (1.3)	--
300-49_Overburden	Copper (9.2)	Copper (2.5)
300-50_Overburden	Copper (1.1)	--
316-1_Overburden	--	Total Uranium Isotopes (1.0e00)
316-1_Shallow_1	--	Aroclor-1248 (NoPRG) Total Uranium Isotopes (2.1e00)
316-1_Shallow_3	Copper (2.3e01) Mercury (3.7e00) Nickel (2.5e00) Silver (4.4e00)	Copper (6.4e00) Selenium (1.0e00) Total Uranium Isotopes (1.6e00)
316-1_Shallow_4	--	Total Uranium Isotopes (1.1e00)
316-2_Shallow_1	Total Uranium Isotopes (2.1e00)	Total Uranium Isotopes (5.2e00)
316-2_Shallow_2	Total Uranium Isotopes (2.9e00)	Aroclor-1248 (NoPRG) Aroclors HI (No PRGs) Total Uranium Isotopes (7.2e00)
316-2_Shallow_3	--	Total Uranium Isotopes (1.8e00)
316-5_Shallow_1	Total Uranium Isotopes (2.7e00)	Total Uranium Isotopes (6.7e00)
316-5_Shallow_2	Silver (1.2e00) Total Uranium Isotopes (2.1e00)	Total Uranium Isotopes (5.1e00)
316-5_Shallow_Focused	Total Uranium Isotopes (1.4e00)	Total Uranium Isotopes (3.4e00)
300-33, 300-41, 300-256_Shallow_Focused	--	Aroclor-1248 (NoPRG) Aroclors HI (No PRGs)
300-37_Shallow_Focused	--	Aroclor-1260 (NoPRG) Aroclors HI (No PRGs)
600-243_Shallow	Boron (9.9e00) Selenium (2.8e00) TPH-Motor Oil (uncertainty)	Boron (3.3e00) Selenium (4.0e00)
618-3_Shallow_Focused	Total Uranium Isotopes (2.4e00)	Total Uranium Isotopes (5.9e00)
618-7_Shallow_Focused	TPH-Motor Oil (uncertainty)	--
618-9_Shallow_Focused	Mercury (1.1e00)	Aldrin (3.9e01) Aroclor-1016 (NoPRG) Aroclor-1221 (NoPRG) Aroclor-1232 (NoPRG) Aroclor-1242 (NoPRG) Aroclor-1248 (NoPRG) Aroclor-1254 (NoPRG) Aroclor-1260 (NoPRG) Aroclors HI (No PRGs)
628-4_Shallow	--	Aroclor-1248 (NoPRG) Aroclors HI (No PRGs)
UPR-300-17_Shallow	Nickel (1.5e01) TPH-Motor Oil (uncertainty)	Aroclor-1248 (NoPRG) Aroclors HI (No PRGs) Nickel (2.3e00)
UPR-300-46_Shallow	--	Aroclor-1248 (NoPRG) Aroclors HI (No PRGs)

PRG = Preliminary remediation goal
HQ = Hazard Quotient

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RESPONSIBLE CONTACTS

	Name	**Phone Number**
Author:	Michael Elias	
Manager:	Alaa Aly	376-0300

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Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
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CH2MHILL
Plateau Remediation Company

P.O. Box 1600
Richland, Washington 99352

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M. Elias
CH2M HILL Plateau Remediation Company

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Preparer:

Michael Elias/Senior Risk Assessor
NAME/POSITION

Signed via e-mail 12/8/11
SIGNATURE DATE

Checker:

Chris McCarthy/Senior Ecological Risk Assessor
NAME/POSITION

Signed via e-mail 12/8/11
SIGNATURE DATE

Senior Reviewer:

Harry Ohlendorf/Principal Scientist
NAME/POSITION

Signed via e-mail 12/8/11
SIGNATURE DATE

Responsible Manager:

Alaa Aly/Risk and Modeling Integration Manager
NAME/POSITION

SIGNATURE 12/8/11
DATE

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1 Purpose

This Environmental Calculation for the 300 Area documents the following:

- Calculation of Hazard Quotients (HQs), Hazard Indexes (HIs), and Sum of Fractions (SOFs) for the evaluation of risk to ecological receptors (plants, soil invertebrates, and wildlife) from chemical constituents and radionuclides in the upper 4.6 m (15 ft) of the upland area soils; and,
- Evaluation of the site-relatedness of constituents based on the comparison of site concentrations to non site-impacted background concentrations for chemical constituents and radionuclides with HQs, HIs, or SOFs $\geq$ 1.

The HQ, HI, SOF, and background comparisons presented in this document are intended for use in the Ecological Risk Assessment (ERA) being prepared for the 300 Decision Area of the Hanford Site. That ERA completes both a Tier 1 and Tier 2 evaluation; the results of the ERA will be used to evaluate the ecological risk remaining following previously completed remediation and to provide information for risk managers to consider when deciding if additional remediation is necessary with respect to ecological risks for the 300 Area.

HQs and HIs are intended to characterize the potential for risk to the specified receptors from exposure to contaminants via the evaluated exposure pathways. HQs are the ratios of the estimated site-specific exposures to a constituent compared to the estimated exposure levels at which no adverse health effects are likely to occur. Additive effects from two or more related constituents (i.e., Aroclors or radionuclides) are calculated as ratios of the estimated site-specific exposures from a group of constituents. For constituents indicating a potential risk (HQ, HI, or SOF $\geq$ 1) for at least one ecological receptor, background comparisons were additionally conducted to determine if the concentrations of those constituents are elevated above those in non site-impacted areas. Risks are not considered to be site-related in the ERA if onsite concentrations do not exceed those concentrations present as background.

The risk characterization process described in this document is consistent with that presented in *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, Interim Final* (EPA/540-R-97-006). The HQs, HIs, SOFs, and background comparison outcomes presented in this Environmental Calculation are not intended to be final risk outcomes. This Environmental Calculation document will be revised as needed to incorporate updates to the risk characterization process and/or underlying values used to calculate risks that occur during the Remedial Investigation/Feasibility Study (RI/FS) process for the 300 Area.

The risk characterization process presented in this document is intended for use in evaluating risks for waste sites located in upland habitats. It is not intended for evaluating riparian or near-shore areas of the River Corridor, as these have been defined in the *River Corridor Baseline Risk Assessment: Evaluation of Current Conditions and Completed Interim Actions Volume 1: Ecological Risk Assessment* (DOE/RL-2007-21, Draft B). It should be noted, however, that the River Corridor document is currently undergoing revision.

2 Methodology

The HQs, HIs, SOFs, and background comparisons are based on the evaluation of risk to ecological receptors as described in Section 1. The following sections describe the steps used to develop the Tier 1 HQs, HIs, and SOFs (Section 2.1), the approach for comparing site to background concentrations (Section 2.2), and the approach for developing the Tier 2 HQs (Section 2.3).

2.1 Tier 1 HQ, HI, and SOF Calculation

Risks at the 300 Area were evaluated based on the ratio of EPCs (Exposure Point Concentrations) to SSLs (defined below), resulting in HQs, and are described by the following equation:

$$HQ = EPC/SSL$$

where:

HQ	=	ecological hazard quotient (unitless)
EPC	=	soil concentration (µg/kg for non-radionuclides and pCi/g for radionuclides)
SSL	=	soil screening level (µg/kg for non-radionuclides and pCi/g for radionuclides)

Once the HQ was calculated, the HI for Aroclors and SOF for radionuclides were calculated as follows:

$$HI \text{ or } SOF = \sum_{j=1}^{n} Exposurej / SSLj$$

where:

HI = Hazard Index

SOF = sum of fractions

Exposurej = exposure concentration for chemical constituents or radionuclides

SSLj = Tier 1 soil screening level for chemical constituents or radionuclides

Table 1 identifies the soil decision units that were designated for each waste site in the 300 Area. Table 2 defines the area and depth sampled within each soil decision unit and describes the sampling design used. The soil depth decision units evaluated in the ERA, and for which EPCs were calculated, are staging-pile footprint, overburden and overburden focused (backfill), shallow (0 to 15 ft bgs), and shallow-focused (0 to 15 ft bgs). Samples collected greater than 15 ft bgs (deep soil) were not included in the risk assessment. All focused samples were collected using the focused study design.

The EPC represents the 95% Upper Confidence Limit (UCL) of the arithmetic mean concentration of the analyzed constituent for each decision unit within the footprint of each remediated waste site. A detailed description of the process used to calculate the EPCs and the resulting EPC values for the constituents analyzed within the soils of each decision unit in the 300 Area are provided in the ECF-300NPL-11-0137, Computation of Exposure Point Concentrations for the 300-FF-2 Source Operable Unit.

The soil EPCs for each evaluated waste site and decision unit were compared to the following SSLs for each receptor group selected for evaluation in the ERA:

- Terrestrial Plants and Soil Invertebrates - The overall lowest of the available Generic Tier 1 plant and soil invertebrate values in *Tier 1 Risk Based Concentrations for the Protection of Ecological Receptors at the Hanford Site* (CHPRC-00784) as summarized in ECF-Hanford-11-0060 were used as the SSLs for this calculation.
- Avian and Mammalian Wildlife - The overall lowest of the Tier 1 avian and mammalian lowest observed adverse effect level (LOAEL)-based values in CHPRC-00784 as summarized in ECF-Hanford-11-0060 were used as the SSLs for this calculation.

HQ, HI, and SOF values less than 1.0 indicate that adverse effects associated with exposure to a given analyte are unlikely (EPA/540-R-97-006). These analytes were not considered to represent a risk and were excluded from further evaluation in the ERA. An HQ, HI, or SOF equal to or greater than 1.0 indicates a potential for risk, but does not indicate that a risk is actually present. Constituents with HQs, HIs, or SOFs equal to or greater than 1.0 for at least one ecological receptor (plant, invertebrate, bird, or mammal) were further evaluated, as discussed in Section 2.2, to determine if the detected concentration of the constituent(s) with an HQ $\geq$ 1 exceeds background. Where the HI or SOF were equal to or greater than 1.0, the individual constituents where carried into the background evaluation for that decision unit.

2.2 Background Concentration Comparison

The soil EPC (Section 2.1) for each inorganic or radionuclide with an HQ, HI, or SOF $\geq$ 1.0 was compared to the lognormal 90th percentile background concentrations for the Hanford Site. Background concentrations for inorganic constituents in soil at the Hanford Site are described in DOE/RL-92-24, *Hanford Site Background, Part 1, Soil Background for Nonradioactive Analytes*. That document provides the 90th percentile background concentrations for several inorganic constituents. For selected inorganic constituents not included in DOE/RL-92-24, the 90th percentile state-wide concentrations were obtained from Ecology (Ecology Publication 94-115) or from Pacific Northwest National Laboratory (PNNL) (PNNL-18577, *A Review of Metal Concentrations Measured in Surface Soil Samples Collected on and Around the Hanford Site)*, or from DOE/RL-96-17 (*Remedial Design Report/Remedial Action Work Plan for the 100 Area*) for uranium. Background concentrations for radiological constituents in soil at the Hanford Site are described in DOE/RL-96-12, *Hanford Site Background, Part 2, Soil Background for Radionuclides*, which provides the 90th percentile background concentrations for several radiological constituents.

Constituents with EPCs meeting or exceeding SSLs (i.e., HQ $\geq$ 1.0) but with EPCs that do not exceed the 90th percentile background concentration were not considered to represent a site-related risk and were excluded from further evaluation. Constituents with EPCs meeting or exceeding SSLs and with EPCs greater than the 90th percentile background concentrations were further considered in the Tier 2 evaluation.

2.3 Tier 2 HQ Calculation

Chemicals meeting or exceeding the SSLs and with EPCs greater than the 90th percentile background concentrations at the 300 Area were further evaluated based on the ratio of EPCs to PRGs (defined below), resulting in HQs, and are described by the following equation:

$$HQ = EPC/PRG$$

where:

HQ = ecological hazard quotient (unitless)
EPC = soil concentration (µg/kg for non-radionuclides and pCi/g for radionuclides)
PRG = preliminary remediation goal (µg/kg for non-radionuclides and pCi/g for radionuclides)

For those detected Aroclors contributing to Tier 1 SSL HIs greater than 1, the individual analytes were carried forward to the background evaluation.

As described in Section 2.1, the EPC represents the 95% UCL of the arithmetic mean concentration of the analyzed constituent for each decision unit within the footprint of each remediated waste site. The soil

EPCs for each evaluated waste site and decision unit were compared to PRGs for each receptor group with EPCs exceeding Tier 1 values and background.

The primary difference between the Tier 1 and Tier 2 comparison for wildlife is the use of bioaccumulation factors based on the foodchain present at the Hanford site (e.g., arthropods in soil) for the calculation of the Tier 2 PRG, and the incorporation of Hanford-specific tissue data in the models. Development of the Tier 2 PRGs for birds and mammals focused on the integration of available Hanford-specific bioaccumulation data for plants, terrestrial arthropods, and small mammals with data from existing bioaccumulation models to more accurately reflect site-specific conditions and the potential exposure of wildlife to chemicals from the ingestion of prey at this Site. Details of the calculations of the avian and mammalian Tier 2 PRGs are found in CHPRC-01311 (*Tier 2 Risk Based Concentrations for the Protection of Ecological Receptors at the Hanford Site).* As with Tier 1 values, the Tier 2 values selected are also based on LOAELs.

For the evaluation of potential impacts to terrestrial plants and soil invertebrates, no observed effect concentrations (NOECs) presented in the RCBRA (DOE/RL-2007-21, Draft B) were used as the PRG for the Tier 2 comparison when the NOECs were greater than the existing Tier 1 SSLs.

3 Assumptions and Inputs

The following sections provide the input values for the HQ calculations (Sections 3.1, 3.2, and 3.4) and comparison to background concentrations (Section 3.3).

3.1 EPC Concentrations

Site and decision unit EPCs (described in Section 2.1) used to calculate HQs, HIs, and SOFs are shown in Table 3.

3.2 SSLs: Generic Screening and Tier 1 Values

Tier 1 SSLs (described in Section 2.1) used to calculate the Tier 1 HQs, HIs, and SOFs are included in Table 3.

3.3 Background Concentrations

Background concentrations (described in Section 2.2) used to evaluate exceedances of background are provided in Table 4. The results of the comparisons are then summarized in Table 5.

3.4 Tier 2 Evaluation

Tier 2 PRGs (described in Section 2.3) used to calculate the Tier 2 HQs for chemicals with EPCs that exceeded both Tier 1 SSLs and background are provided in Table 6. Aroclors contributing to HIs that exceeded the Tier 1 threshold are included within this table as well. However, since no Tier 2 effects data (i.e., PRGs) were available, HQs are not calculated for the Aroclors. Those analytes are included strictly so that they will be included and not lost when generating the final list of chemicals exceeding their highest tier of evaluation.

4 Software Applications

All supporting calculations were performed on electronic spreadsheets using Microsoft Excel. Electronic versions of all spreadsheets are provided with calculations included to facilitate comparison with hand calculations and checking of logical or lookup functions. This approach meets the requirements for

"Single Use Software" as described in *CHPRC Environmental Calculation Preparation and Issue*, PRC-PRO-EP-40205.

5 Calculation

5.1 Tier 1 HQ, HI, and SOF and Tier 2 HQ Calculations

HQs were calculated by comparing EPC concentrations to SSLs and PRGs using Microsoft Excel spreadsheets. EPCs were compared to SSLs for the Tier 1 comparison and PRGs for the Tier 2 comparison for both terrestrial plants or soil invertebrates (the lower of the two) and for avian or mammalian wildlife (similarly, the lower of the two). The HIs and SOFs were calculated by the addition of HQs for Aroclors and radioisotopes, by decision unit. The results of these calculations are presented in Table 3 for the Tier 1 comparison and Table 6 for the Tier 2 comparison.

5.2 Background Concentration Comparison

Site concentrations were compared to background by comparing EPC concentrations to background concentrations using Microsoft Excel spreadsheets. EPCs were compared only for constituents with Tier 1 SSL-based HQs, HIs, or SOFs $\geq$ 1.0. The results of these calculations are presented in Table 4.

6 Results/Conclusions

A summary of the chemicals exceeding the Tier 1 SSLs (plant/invertebrate and/or wildlife) or both the Tier 1 SSLs and background is presented in Table 5 for the 300 Area. The SOFs for radionuclides were less than 1 for all waste sites. Arsenic, boron, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, total uranium isotopes, uranium, zinc, aldrin, Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, and Aroclor-1260 were detected greater than the Tier 1 SSL and either detected outside of the range of background or a background value was not available so these COPCs were carried forward for additional evaluation.

Summaries of the chemicals exceeding the Tier 2 PRGs at the 300 Area waste sites are presented in Table 7. Tier 2 PRGs were not available for Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, and Aroclor-1260, so these COPCs were carried forward. The inorganic chemicals boron, cadmium, chromium, copper, mercury, nickel, selenium, zinc, total uranium isotopes, and the pesticide aldrin were detected at concentrations exceeding one or both groups of Tier 2 PRGs (plants/invertebrates, wildlife). COPCs were retained from the following 300 Area waste sites:

- 300-259_Shallow: Zinc
- 300-260_Shallow_Focused: Copper
- 300-49_Overburden: Copper
- 300-50_Overburden: Copper
- 316-1_Shallow_1: Aroclor-1248, Total Uranium Isotopes
- 316-1_Shallow_3: Chromium, Copper, Mercury, Nickel, Selenium, Total Uranium Isotopes
- 316-1_Overburden: Total Uranium Isotopes
- 316-1_Shallow_4: Total Uranium Isotopes
- 316-2_Shallow_1: Total Uranium Isotopes

- 316-2_Shallow_2: Aroclor-1248, Aroclors HI, Total Uranium Isotopes
- 316-2_Shallow_3: Total Uranium Isotopes
- 316-5_Shallow_1: Total Uranium Isotopes
- 316-5_Shallow_2: Total Uranium Isotopes
- 316-5_Shallow_Focused: Total Uranium Isotopes
- 300-33, 300-41, 300-256_Shallow_Focused: Aroclor-1248, Aroclors HI
- 300-37_Shallow_Focused: Aroclor-1260, Aroclors HI
- 600-243_Shallow: Boron, Copper, Selenium
- 618-3_Shallow_Focused: Total Uranium Isotopes
- 618-7_Shallow_Focused: Cadmium, Chromium
- 618-9_Shallow_Focused: Aldrin, Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260, Aroclors HI
- 628-4_Shallow: Aroclor-1248, Aroclor HI
- UPR-300-17_Shallow: Nickel, Aroclor-1248, Aroclors HI
- UPR-300-46_Shallow: Aroclor-1248, Aroclors HI

6.1 Supporting Information

The backup information supporting these calculations is provided in the following files:

Microsoft Excel workbook “300AreaEcoRiskCalcBriefTables.xlsx” containing:

- Table 1. Waste Sites and Decision Units for the 300 Area
- Table 2. Summary of Decision Unit Soil Reaches
- Table 3. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)
- Table 4. Comparison of 300 Area Waste Sites Exposure Point Concentrations (Exceeding SSLs) to Background for Surface Soils (0 to 15 feet)
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- Table 7. Summary of 300 Area Waste Sites Ecological Evaluation Based on Tier 2 PRGs for Surface Soils (0 to 15 feet)

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Table 1. Waste Sites and Decision Units for the 300 Area Source OU

Waste Site	Decision Unit
300 ASH PITS	Shallow
300 VTS	Shallow
300-10	Shallow_Focused
300-109	Shallow_Focused
	Staging Pile Area_Focused
300-18	Shallow
300-223	Shallow_Focused
300-23	Overburden_Focused
	Shallow_Focused
300-259	Shallow
300-260	Shallow_Focused
300-272	Overburden_Focused
	Shallow_Focused
300-275	Shallow_1
	Shallow_2
300-33, 300-41, 300-256	Shallow
	Shallow_Focused
300-37	Shallow_Focused
300-44	Overburden_Focused
	Shallow_Focused
300-45	Shallow_Focused
300-49	Overburden
	Shallow
300-50	Overburden
	Shallow
300-8	Shallow
316-1	Overburden
	Shallow_1
	Shallow_3
	Shallow_4
316-2	Shallow_1
	Shallow_2
	Shallow_3
316-5	Shallow_1
	Shallow_2
	Shallow_Focused
331 LSLDF	Shallow_Focused
600-243	Shallow
600-259	Overburden
	Shallow
	Shallow_Focused
600-47	Shallow
618-1	Deep
	Deep_Focused
	Shallow
	Shallow_Focused
618-12	Shallow
618-13	Shallow
	Shallow_Focused
618-2	Deep
	Deep_Focused
	Overburden
	Shallow
	Staging Pile
618-3	Shallow
	Shallow_Focused
618-4	Deep
	Deep_Focused
	Overburden_2
	Overburden_3
	Overburden_4
	Shallow

Table 1. Waste Sites and Decision Units for the 300 Area Source OU

Waste Site	Decision Unit
618-5	Deep
	Deep_Focused
	Overburden
	Shallow
	Staging Pile_4
	Staging Pile_5
618-7	Shallow_1
	Shallow_2
	Shallow_3
	Shallow_4
	Shallow_Focused
618-8	Shallow
618-9	Shallow_Focused
628-4	Overburden
	Shallow
UPR-300-17	Shallow
UPR-300-46	Shallow

Table 2. Summary of Decision Unit Soil Reaches

Decision Unit Name	Depth	Sampling Design Description
Shallow	0 to 4.6 m (15 ft) bgs	Samples collected using a statistical sampling design
Deep	Greater than 4.6 m (15 ft) bgs	
Overburden	Not applicable	
Shallow_Focused	0 to 4.6 m (15 ft) bgs	Samples collected using a focused sampling design
Deep_Focused	Greater than 4.6 m (15 ft) bgs	
Staging pile area_Footprint	Not applicable	
Overburden_Focused	Not applicable	

Table 3. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildife SSL[2]	Hazard Quotient
300 ASH PITS_Shallow	non-Rad	Aroclor-1248	12672-29-6	ug/kg	5.20E+01	4.00E+04	1.30E-03	3.25E+02	1.60E-01
300 ASH PITS_Shallow	non-Rad	Arsenic	7440-38-2	ug/kg	6.08E+03	1.00E+04	6.08E-01	1.90E+05	3.20E-02
300 ASH PITS_Shallow	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	ug/kg	9.60E+01	1.00E+05	9.60E-04	4.54E+04	2.11E-03
300 ASH PITS_Shallow	non-Rad	Butylbenzylphthalate	85-68-7	ug/kg	7.60E+01	No Value	--	No Value	--
300 ASH PITS_Shallow	Rad	RADs SOF	--	pCi/g	--	--	5.38E-05	--	1.69E-04
300 ASH PITS_Shallow	Rad	Uranium-235	15117-96-1	pCi/g	3.88E-02	2.74E+04	1.42E-06	4.36E+03	8.89E-06
300 ASH PITS_Shallow	Rad	Uranium-238	U-238	pCi/g	8.23E-01	1.57E+04	5.24E-05	5.15E+03	1.60E-04
300 ASH PITS_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.45E+03	5.00E+03	4.90E-01	7.86E+05	3.12E-03
300 VTS_Shallow	Rad	Cesium-137	10045-97-3	pCi/g	2.90E-02	2.21E+03	1.31E-05	9.24E+02	3.14E-05
300-10_Shallow_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	1.35E+04	1.00E+04	**1.35E+00**	1.90E+05	7.11E-02
300-10_Shallow_Focused	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	ug/kg	2.00E+02	1.00E+05	2.00E-03	4.54E+04	4.41E-03
300-10_Shallow_Focused	non-Rad	Butylbenzylphthalate	85-68-7	ug/kg	2.30E+02	No Value	--	No Value	--
300-10_Shallow_Focused	Rad	Cesium-137	10045-97-3	pCi/g	1.55E-01	2.21E+03	7.01E-05	9.24E+02	1.68E-04
300-10_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	1.59E-04	--	4.43E-04
300-10_Shallow_Focused	Rad	Uranium-235	15117-96-1	pCi/g	4.06E-02	2.74E+04	1.48E-06	4.36E+03	9.31E-06
300-10_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	1.37E+00	1.57E+04	8.73E-05	5.15E+03	2.66E-04
300-10_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	4.08E+03	5.00E+03	8.16E-01	7.86E+05	5.19E-03
300-109_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	ug/kg	1.22E+02	4.00E+04	3.05E-03	1.47E+03	8.30E-02
300-109_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	ug/kg	3.97E+01	4.00E+04	9.93E-04	1.47E+03	2.70E-02
300-109_Shallow_Focused	non-Rad	Aroclors HI	--	ug/kg	--	--	4.04E-03	--	1.10E-01
300-109_Shallow_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	2.42E+03	1.00E+04	2.42E-01	1.90E+05	1.27E-02
300-109_Shallow_Focused	non-Rad	Barium	7440-39-3	ug/kg	6.33E+04	3.30E+05	1.92E-01	1.32E+06	4.80E-02
300-109_Shallow_Focused	non-Rad	Benzo(a)pyrene	50-32-8	ug/kg	1.24E+00	1.80E+04	6.89E-05	7.64E+04	1.62E-05
300-109_Shallow_Focused	non-Rad	Benzo(b)fluoranthene	205-99-2	ug/kg	2.30E+00	1.80E+04	1.28E-04	3.92E+04	5.87E-05
300-109_Shallow_Focused	non-Rad	Beryllium	7440-41-7	ug/kg	1.80E+02	1.00E+04	1.80E-02	1.39E+04	1.29E-02
300-109_Shallow_Focused	non-Rad	Boron	7440-42-8	ug/kg	6.32E+02	5.00E+02	**1.26E+00**	1.33E+05	4.75E-03
300-109_Shallow_Focused	non-Rad	Cadmium	7440-43-9	ug/kg	5.90E+01	4.00E+03	1.48E-02	1.63E+03	3.62E-02
300-109_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	6.95E+03	4.00E+02	**1.74E+01**	3.82E+04	1.82E-01
300-109_Shallow_Focused	non-Rad	Chrysene	218-01-9	ug/kg	1.77E+00	1.80E+04	9.83E-05	4.45E+04	3.98E-05
300-109_Shallow_Focused	non-Rad	Cobalt	7440-48-4	ug/kg	6.42E+03	1.30E+04	4.94E-01	1.11E+05	5.78E-02
300-109_Shallow_Focused	non-Rad	Copper	7440-50-8	ug/kg	1.08E+04	5.00E+04	2.16E-01	1.07E+05	1.01E-01
300-109_Shallow_Focused	non-Rad	Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg	1.40E+01	1.80E+04	7.78E-04	3.57E+04	3.92E-04
300-109_Shallow_Focused	non-Rad	Lead	7439-92-1	ug/kg	2.89E+03	5.00E+04	5.78E-02	3.56E+04	8.12E-02
300-109_Shallow_Focused	non-Rad	Manganese	7439-96-5	ug/kg	2.78E+05	2.20E+05	**1.26E+00**	5.80E+06	4.79E-02
300-109_Shallow_Focused	non-Rad	Mercury	7439-97-6	ug/kg	2.20E+01	1.00E+02	2.20E-01	1.87E+03	1.18E-02
300-109_Shallow_Focused	non-Rad	Molybdenum	7439-98-7	ug/kg	3.41E+02	2.00E+03	1.71E-01	1.40E+04	2.44E-02
300-109_Shallow_Focused	non-Rad	Nickel	7440-02-0	ug/kg	8.49E+03	3.00E+04	2.83E-01	3.26E+04	2.60E-01
300-109_Shallow_Focused	non-Rad	Pyrene	129-00-0	ug/kg	1.56E+00	1.80E+04	8.67E-05	6.00E+05	2.60E-06
300-109_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	1.15E-04	--	4.88E-04
300-109_Shallow_Focused	Rad	Uranium-233/234	U-233/234	pCi/g	1.40E+00	5.16E+04	2.71E-05	6.37E+03	2.20E-04
300-109_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	1.38E+00	1.57E+04	8.79E-05	5.15E+03	2.68E-04
300-109_Shallow_Focused	non-Rad	Vanadium	7440-62-2	ug/kg	4.76E+04	2.00E+03	**2.38E+01**	3.11E+04	**1.53E+00**
300-109_Shallow_Focused	non-Rad	Zinc	7440-66-6	ug/kg	3.47E+04	5.00E+04	6.94E-01	6.78E+04	5.12E-01
300-109_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	4.11E+03	5.00E+03	8.22E-01	7.86E+05	5.23E-03
300-109_Staging Pile Area_Focused	non-Rad	Aroclor-1254	11097-69-1	ug/kg	3.68E+01	4.00E+04	9.20E-04	1.47E+03	2.50E-02
300-109_Staging Pile Area_Focused	non-Rad	Aroclor-1260	11096-82-5	ug/kg	1.94E+01	4.00E+04	4.85E-04	1.47E+03	1.32E-02
300-109_Staging Pile Area_Focused	non-Rad	Aroclors HI	--	ug/kg	--	--	1.41E-03	--	3.82E-02
300-109_Staging Pile Area_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	2.58E+03	1.00E+04	2.58E-01	1.90E+05	1.36E-02
300-109_Staging Pile Area_Focused	non-Rad	Barium	7440-39-3	ug/kg	7.27E+04	3.30E+05	2.20E-01	1.32E+06	5.51E-02
300-109_Staging Pile Area_Focused	non-Rad	Benzo(a)anthracene	56-55-3	ug/kg	2.08E+00	1.80E+04	1.16E-04	6.40E+04	3.25E-05
300-109_Staging Pile Area_Focused	non-Rad	Benzo(a)pyrene	50-32-8	ug/kg	3.30E+00	1.80E+04	1.83E-04	7.64E+04	4.32E-05
300-109_Staging Pile Area_Focused	non-Rad	Benzo(b)fluoranthene	205-99-2	ug/kg	1.31E+00	1.80E+04	7.28E-05	3.92E+04	3.34E-05
300-109_Staging Pile Area_Focused	non-Rad	Beryllium	7440-41-7	ug/kg	2.03E+02	1.00E+04	2.03E-02	1.39E+04	1.46E-02
300-109_Staging Pile Area_Focused	non-Rad	Boron	7440-42-8	ug/kg	1.06E+03	5.00E+02	**2.12E+00**	1.33E+05	7.97E-03
300-109_Staging Pile Area_Focused	non-Rad	Cadmium	7440-43-9	ug/kg	6.60E+01	4.00E+03	1.65E-02	1.63E+03	4.05E-02
300-109_Staging Pile Area_Focused	non-Rad	Chromium	7440-47-3	ug/kg	8.17E+03	4.00E+02	**2.04E+01**	3.82E+04	2.14E-01
300-109_Staging Pile Area_Focused	non-Rad	Cobalt	7440-48-4	ug/kg	5.95E+03	1.30E+04	4.58E-01	1.11E+05	5.36E-02
300-109_Staging Pile Area_Focused	non-Rad	Copper	7440-50-8	ug/kg	1.16E+04	5.00E+04	2.32E-01	1.07E+05	1.08E-01
300-109_Staging Pile Area_Focused	non-Rad	Fluoranthene	206-44-0	ug/kg	5.14E+00	1.80E+04	2.86E-04	8.39E+05	6.13E-06
300-109_Staging Pile Area_Focused	non-Rad	Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg	2.92E+01	1.80E+04	1.62E-03	3.57E+04	8.18E-04
300-109_Staging Pile Area_Focused	non-Rad	Lead	7439-92-1	ug/kg	5.03E+03	5.00E+04	1.01E-01	3.56E+04	1.41E-01
300-109_Staging Pile Area_Focused	non-Rad	Manganese	7439-96-5	ug/kg	2.86E+05	2.20E+05	**1.30E+00**	5.80E+06	4.93E-02
300-109_Staging Pile Area_Focused	non-Rad	Molybdenum	7439-98-7	ug/kg	4.08E+02	2.00E+03	2.04E-01	1.40E+04	2.91E-02
300-109_Staging Pile Area_Focused	non-Rad	Nickel	7440-02-0	ug/kg	8.57E+03	3.00E+04	2.86E-01	3.26E+04	2.63E-01
300-109_Staging Pile Area_Focused	non-Rad	Pyrene	129-00-0	ug/kg	6.96E+00	1.80E+04	3.87E-04	6.00E+05	1.16E-05
300-109_Staging Pile Area_Focused	Rad	RADs SOF	--	pCi/g	--	--	1.96E-04	--	8.48E-04
300-109_Staging Pile Area_Focused	non-Rad	Tin	7440-31-5	ug/kg	1.45E+03	5.00E+04	2.90E-02	2.04E+05	7.11E-03
300-109_Staging Pile Area_Focused	Rad	Uranium-233/234	U-233/234	pCi/g	2.54E+00	5.16E+04	4.92E-05	6.37E+03	3.99E-04
300-109_Staging Pile Area_Focused	Rad	Uranium-238	U-238	pCi/g	2.31E+00	1.57E+04	1.47E-04	5.15E+03	4.49E-04
300-109_Staging Pile Area_Focused	non-Rad	Vanadium	7440-62-2	ug/kg	4.51E+04	2.00E+03	**2.26E+01**	3.11E+04	**1.45E+00**
300-109_Staging Pile Area_Focused	non-Rad	Zinc	7440-66-6	ug/kg	4.88E+04	5.00E+04	9.76E-01	6.78E+04	7.20E-01
300-109_Staging Pile Area_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	6.88E+03	5.00E+03	**1.38E+00**	7.86E+05	8.75E-03
300-18_Shallow	non-Rad	Arsenic	7440-38-2	ug/kg	2.20E+03	1.00E+04	2.20E-01	1.90E+05	1.16E-02
300-18_Shallow	non-Rad	Barium	7440-39-3	ug/kg	6.34E+04	3.30E+05	1.92E-01	1.32E+06	4.80E-02
300-18_Shallow	non-Rad	Beryllium	7440-41-7	ug/kg	6.50E+02	1.00E+04	6.50E-02	1.39E+04	4.68E-02
300-18_Shallow	non-Rad	Cadmium	7440-43-9	ug/kg	4.00E+01	4.00E+03	1.00E-02	1.63E+03	2.45E-02
300-18_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	6.90E+03	4.00E+02	**1.73E+01**	3.82E+04	1.81E-01
300-18_Shallow	non-Rad	Lead	7439-92-1	ug/kg	3.60E+03	5.00E+04	7.20E-02	3.56E+04	1.01E-01
300-18_Shallow	Rad	RADs SOF	--	pCi/g	--	--	3.88E-05	--	1.82E-04
300-18_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	6.49E-01	5.16E+04	1.26E-05	6.37E+03	1.02E-04
300-18_Shallow	Rad	Uranium-238	U-238	pCi/g	4.11E-01	1.57E+04	2.62E-05	5.15E+03	7.98E-05
300-18_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.14E+03	5.00E+03	2.27E-01	7.86E+05	1.45E-03
300-223_Shallow_Focused	non-Rad	Total petroleum hydrocarbons - diesel range	TPHDIESEL	ug/kg	1.20E+05	2.00E+05	6.00E-01	3.56E+08	3.37E-04
300-223_Shallow_Focused	non-Rad	Total petroleum hydrocarbons - motor oil (high boiling)	TPH/OILH	ug/kg	2.30E+05	No Value	--	No Value	--
300-23_Shallow_Focused	non-Rad	Total petroleum hydrocarbons - motor oil (high boiling)	TPH/OILH	ug/kg	5.20E+04	No Value	--	No Value	--
300-259_Shallow	non-Rad	Antimony	7440-36-0	ug/kg	3.22E+02	5.00E+03	6.45E-02	5.98E+03	5.39E-02
300-259_Shallow	non-Rad	Arsenic	7440-38-2	ug/kg	2.10E+03	1.00E+04	2.10E-01	1.90E+05	1.10E-02
300-259_Shallow	non-Rad	Barium	7440-39-3	ug/kg	7.52E+04	3.30E+05	2.28E-01	1.32E+06	5.70E-02
300-259_Shallow	non-Rad	Beryllium	7440-41-7	ug/kg	2.26E+02	1.00E+04	2.26E-02	1.39E+04	1.62E-02
300-259_Shallow	non-Rad	Boron	7440-42-8	ug/kg	1.30E+03	5.00E+02	**2.61E+00**	1.33E+05	9.80E-03
300-259_Shallow	non-Rad	Cadmium	7440-43-9	ug/kg	2.52E+02	4.00E+03	6.29E-02	1.63E+03	1.54E-01
300-259_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	7.90E+03	4.00E+02	**1.98E+01**	3.82E+04	2.07E-01
300-259_Shallow	non-Rad	Cobalt	7440-48-4	ug/kg	5.83E+03	1.30E+04	4.49E-01	1.11E+05	5.25E-02

Table 3. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
300-259_Shallow	non-Rad	Copper	7440-50-8	ug/kg	1.07E+04	5.00E+04	2.14E-01	1.07E+05	9.99E-02
300-259_Shallow	non-Rad	Lead	7439-92-1	ug/kg	4.62E+03	5.00E+04	9.25E-02	3.56E+04	1.30E-01
300-259_Shallow	non-Rad	Manganese	7439-96-5	ug/kg	3.19E+05	2.20E+05	**1.45E+00**	5.80E+06	5.50E-02
300-259_Shallow	non-Rad	Mercury	7439-97-6	ug/kg	1.00E+01	1.00E+02	1.00E-01	1.87E+03	5.35E-03
300-259_Shallow	non-Rad	Molybdenum	7439-98-7	ug/kg	3.03E+02	2.00E+03	1.51E-01	1.40E+04	2.16E-02
300-259_Shallow	non-Rad	Nickel	7440-02-0	ug/kg	8.75E+03	3.00E+04	2.92E-01	3.26E+04	2.68E-01
300-259_Shallow	Rad	RADs SOF	--	pCi/g	--	--	1.17E-04	--	5.12E-04
300-259_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	1.59E+00	5.16E+04	3.09E-05	6.37E+03	2.50E-04
300-259_Shallow	Rad	Uranium-238	U-238	pCi/g	1.35E+00	1.57E+04	8.58E-05	5.15E+03	2.62E-04
300-259_Shallow	non-Rad	Vanadium	7440-62-2	ug/kg	4.26E+04	2.00E+03	**2.13E+01**	3.11E+04	**1.37E+00**
300-259_Shallow	non-Rad	Zinc	7440-66-6	ug/kg	4.80E+05	5.00E+04	**9.59E+00**	6.78E+04	**7.07E+00**
300-259_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	3.88E+03	5.00E+03	7.75E-01	7.86E+05	4.93E-03
300-260_Shallow_Focused	non-Rad	Antimony	7440-36-0	ug/kg	9.22E+02	5.00E+03	1.84E-01	5.98E+03	1.54E-01
300-260_Shallow_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	3.16E+03	1.00E+04	3.16E-01	1.90E+05	1.66E-02
300-260_Shallow_Focused	non-Rad	Barium	7440-39-3	ug/kg	1.22E+05	3.30E+05	3.70E-01	1.32E+06	9.24E-02
300-260_Shallow_Focused	non-Rad	Beryllium	7440-41-7	ug/kg	2.39E+02	1.00E+04	2.39E-02	1.39E+04	1.72E-02
300-260_Shallow_Focused	non-Rad	Boron	7440-42-8	ug/kg	8.36E+03	5.00E+02	**1.67E+01**	1.33E+05	6.29E-02
300-260_Shallow_Focused	non-Rad	Cadmium	7440-43-9	ug/kg	1.10E+02	4.00E+03	2.75E-02	1.63E+03	6.75E-02
300-260_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	9.89E+03	4.00E+02	**2.47E+01**	3.82E+04	2.59E-01
300-260_Shallow_Focused	non-Rad	Cobalt	7440-48-4	ug/kg	7.43E+03	1.30E+04	5.72E-01	1.11E+05	6.69E-02
300-260_Shallow_Focused	non-Rad	Copper	7440-50-8	ug/kg	7.33E+04	5.00E+04	**1.47E+00**	1.07E+05	6.85E-01
300-260_Shallow_Focused	non-Rad	Lead	7439-92-1	ug/kg	1.83E+04	5.00E+04	3.66E-01	3.56E+04	5.14E-01
300-260_Shallow_Focused	non-Rad	Manganese	7439-96-5	ug/kg	3.28E+05	2.20E+05	**1.49E+00**	5.80E+06	5.66E-02
300-260_Shallow_Focused	non-Rad	Mercury	7439-97-6	ug/kg	1.20E+01	1.00E+02	1.20E-01	1.87E+03	6.42E-03
300-260_Shallow_Focused	non-Rad	Molybdenum	7439-98-7	ug/kg	5.37E+02	2.00E+03	2.69E-01	1.40E+04	3.84E-02
300-260_Shallow_Focused	non-Rad	Nickel	7440-02-0	ug/kg	1.02E+04	3.00E+04	3.40E-01	3.26E+04	3.13E-01
300-260_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	2.83E-04	--	8.93E-04
300-260_Shallow_Focused	non-Rad	Silver	7440-22-4	ug/kg	2.06E+02	2.00E+03	1.03E-01	4.96E+04	4.15E-03
300-260_Shallow_Focused	Rad	Uranium-235	15117-96-1	pCi/g	2.51E-01	2.74E+04	9.16E-06	4.36E+03	5.76E-05
300-260_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	4.30E+00	1.57E+04	2.74E-04	5.15E+03	8.35E-04
300-260_Shallow_Focused	non-Rad	Vanadium	7440-62-2	ug/kg	5.90E+04	2.00E+03	**2.95E+01**	3.11E+04	**1.90E+00**
300-260_Shallow_Focused	non-Rad	Zinc	7440-66-6	ug/kg	7.74E+04	5.00E+04	**1.55E+00**	6.78E+04	**1.14E+00**
300-260_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.28E+04	5.00E+03	**2.56E+00**	7.86E+05	1.63E-02
300-272_Overburden_Focused	non-Rad	Total petroleum hydrocarbons - diesel range	TPHDIESEL	ug/kg	1.31E+04	2.00E+05	6.55E-02	3.56E+08	3.68E-05
300-272_Shallow_Focused	non-Rad	Total petroleum hydrocarbons - diesel range	TPHDIESEL	ug/kg	4.31E+04	2.00E+05	2.16E-01	3.56E+08	1.21E-04
300-275_Shallow_1	non-Rad	Acenaphthene	83-32-9	ug/kg	9.60E+02	2.00E+04	4.80E-02	1.10E+06	8.73E-04
300-275_Shallow_1	non-Rad	Antimony	7440-36-0	ug/kg	2.60E+02	5.00E+03	5.20E-02	5.98E+03	4.35E-02
300-275_Shallow_1	non-Rad	Arsenic	7440-38-2	ug/kg	2.21E+03	1.00E+04	2.21E-01	1.90E+05	1.16E-02
300-275_Shallow_1	non-Rad	Barium	7440-39-3	ug/kg	7.53E+04	3.30E+05	2.28E-01	1.32E+06	5.70E-02
300-275_Shallow_1	non-Rad	Benzo(a)pyrene	50-32-8	ug/kg	1.30E+00	1.80E+04	7.22E-05	7.64E+04	1.70E-05
300-275_Shallow_1	non-Rad	Benzo(b)fluoranthene	205-99-2	ug/kg	1.86E+00	1.80E+04	1.03E-04	3.92E+04	4.73E-05
300-275_Shallow_1	non-Rad	Beryllium	7440-41-7	ug/kg	4.52E+02	1.00E+04	4.52E-02	1.39E+04	3.25E-02
300-275_Shallow_1	non-Rad	Boron	7440-42-8	ug/kg	1.47E+03	5.00E+02	**2.93E+00**	1.33E+05	1.10E-02
300-275_Shallow_1	non-Rad	Cadmium	7440-43-9	ug/kg	8.33E+01	4.00E+03	2.08E-02	1.63E+03	5.11E-02
300-275_Shallow_1	Rad	Cesium-137	10045-97-3	pCi/g	8.20E-02	2.21E+03	3.71E-05	9.24E+02	8.87E-05
300-275_Shallow_1	non-Rad	Chromium	7440-47-3	ug/kg	8.02E+03	4.00E+02	**2.01E+01**	3.82E+04	2.10E-01
300-275_Shallow_1	non-Rad	Chrysene	218-01-9	ug/kg	2.20E+00	1.80E+04	1.22E-04	4.45E+04	4.94E-05
300-275_Shallow_1	non-Rad	Cobalt	7440-48-4	ug/kg	5.85E+03	1.30E+04	4.50E-01	1.11E+05	5.27E-02
300-275_Shallow_1	non-Rad	Copper	7440-50-8	ug/kg	4.29E+04	5.00E+04	8.58E-01	1.07E+05	4.01E-01
300-275_Shallow_1	non-Rad	Fluoranthene	206-44-0	ug/kg	2.30E+03	1.80E+04	1.28E-01	8.39E+05	2.74E-03
300-275_Shallow_1	non-Rad	Fluorene	86-73-7	ug/kg	8.11E+01	2.90E+04	2.80E-03	1.75E+05	4.64E-04
300-275_Shallow_1	non-Rad	Lead	7439-92-1	ug/kg	7.19E+03	5.00E+04	1.44E-01	3.56E+04	2.02E-01
300-275_Shallow_1	non-Rad	Lithium	7439-93-2	ug/kg	6.69E+03	2.00E+03	**3.34E+00**	5.15E+05	1.30E-02
300-275_Shallow_1	non-Rad	Manganese	7439-96-5	ug/kg	2.77E+05	2.20E+05	**1.26E+00**	5.80E+06	4.77E-02
300-275_Shallow_1	non-Rad	Mercury	7439-97-6	ug/kg	1.67E+01	1.00E+02	1.67E-01	1.87E+03	8.91E-03
300-275_Shallow_1	non-Rad	Molybdenum	7439-98-7	ug/kg	3.78E+02	2.00E+03	1.89E-01	1.40E+04	2.70E-02
300-275_Shallow_1	non-Rad	Nickel	7440-02-0	ug/kg	9.46E+03	3.00E+04	3.15E-01	3.26E+04	2.90E-01
300-275_Shallow_1	Rad	RADs SOF	--	pCi/g	--	--	6.96E-04	--	2.97E-03
300-275_Shallow_1	non-Rad	Silver	7440-22-4	ug/kg	1.21E+02	2.00E+03	6.04E-02	4.96E+04	2.44E-03
300-275_Shallow_1	non-Rad	Strontium	7440-24-6	ug/kg	2.02E+04	No Value	**--**	4.23E+06	4.77E-03
300-275_Shallow_1	non-Rad	Tin	7440-31-5	ug/kg	1.47E+03	5.00E+04	2.93E-02	2.04E+05	7.18E-03
300-275_Shallow_1	non-Rad	Uranium	7440-61-1	ug/kg	2.50E+03	5.00E+03	5.00E-01	7.86E+05	3.18E-03
300-275_Shallow_1	Rad	Uranium-233/234	U-233/234	pCi/g	7.72E+00	5.16E+04	1.50E-04	6.37E+03	1.21E-03
300-275_Shallow_1	Rad	Uranium-235	15117-96-1	pCi/g	1.00E+00	2.74E+04	3.65E-05	4.36E+03	2.29E-04
300-275_Shallow_1	Rad	Uranium-238	U-238	pCi/g	7.41E+00	1.57E+04	4.72E-04	5.15E+03	1.44E-03
300-275_Shallow_1	non-Rad	Vanadium	7440-62-2	ug/kg	4.51E+04	2.00E+03	**2.26E+01**	3.11E+04	**1.45E+00**
300-275_Shallow_1	non-Rad	Zinc	7440-66-6	ug/kg	4.10E+04	5.00E+04	8.20E-01	6.78E+04	6.05E-01
300-275_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.23E+04	5.00E+03	**4.45E+00**	7.86E+05	2.83E-02
300-275_Shallow_2	non-Rad	Acenaphthene	83-32-9	ug/kg	3.60E+00	2.00E+04	1.80E-04	1.10E+06	3.27E-06
300-275_Shallow_2	non-Rad	Arsenic	7440-38-2	ug/kg	2.76E+03	1.00E+04	2.76E-01	1.90E+05	1.45E-02
300-275_Shallow_2	non-Rad	Barium	7440-39-3	ug/kg	6.86E+04	3.30E+05	2.08E-01	1.32E+06	5.20E-02
300-275_Shallow_2	non-Rad	Beryllium	7440-41-7	ug/kg	2.54E+02	1.00E+04	2.54E-02	1.39E+04	1.83E-02
300-275_Shallow_2	non-Rad	Boron	7440-42-8	ug/kg	1.15E+03	5.00E+02	**2.29E+00**	1.33E+05	8.62E-03
300-275_Shallow_2	non-Rad	Cadmium	7440-43-9	ug/kg	1.44E+02	4.00E+03	3.60E-02	1.63E+03	8.83E-02
300-275_Shallow_2	non-Rad	Chromium	7440-47-3	ug/kg	8.99E+03	4.00E+02	**2.25E+01**	3.82E+04	2.35E-01
300-275_Shallow_2	non-Rad	Cobalt	7440-48-4	ug/kg	5.98E+03	1.30E+04	4.60E-01	1.11E+05	5.38E-02
300-275_Shallow_2	non-Rad	Copper	7440-50-8	ug/kg	1.16E+04	5.00E+04	2.32E-01	1.07E+05	1.08E-01
300-275_Shallow_2	non-Rad	Fluoranthene	206-44-0	ug/kg	5.60E+01	1.80E+04	3.11E-03	8.39E+05	6.67E-05
300-275_Shallow_2	non-Rad	Fluorene	86-73-7	ug/kg	2.60E+00	2.90E+04	8.97E-05	1.75E+05	1.49E-05
300-275_Shallow_2	non-Rad	Lead	7439-92-1	ug/kg	4.10E+03	5.00E+04	8.20E-02	3.56E+04	1.15E-01
300-275_Shallow_2	non-Rad	Lithium	7439-93-2	ug/kg	7.07E+03	2.00E+03	**3.53E+00**	5.15E+05	1.37E-02
300-275_Shallow_2	non-Rad	Manganese	7439-96-5	ug/kg	2.93E+05	2.20E+05	**1.33E+00**	5.80E+06	5.05E-02
300-275_Shallow_2	non-Rad	Mercury	7439-97-6	ug/kg	2.73E+01	1.00E+02	2.73E-01	1.87E+03	1.46E-02
300-275_Shallow_2	non-Rad	Molybdenum	7439-98-7	ug/kg	4.04E+02	2.00E+03	2.02E-01	1.40E+04	2.88E-02
300-275_Shallow_2	non-Rad	Nickel	7440-02-0	ug/kg	9.59E+03	3.00E+04	3.20E-01	3.26E+04	2.94E-01
300-275_Shallow_2	Rad	RADs SOF	--	pCi/g	--	--	1.13E-04	--	5.01E-04
300-275_Shallow_2	non-Rad	Strontium	7440-24-6	ug/kg	2.71E+04	No Value	**--**	4.23E+06	6.40E-03
300-275_Shallow_2	non-Rad	Tin	7440-31-5	ug/kg	1.15E+03	5.00E+04	2.30E-02	2.04E+05	5.63E-03
300-275_Shallow_2	Rad	Uranium-233/234	U-233/234	pCi/g	1.31E+00	5.16E+04	2.53E-05	6.37E+03	2.05E-04
300-275_Shallow_2	Rad	Uranium-235	15117-96-1	pCi/g	2.37E-01	2.74E+04	8.65E-06	4.36E+03	5.44E-05
300-275_Shallow_2	Rad	Uranium-238	U-238	pCi/g	1.24E+00	1.57E+04	7.93E-05	5.15E+03	2.42E-04
300-275_Shallow_2	non-Rad	Vanadium	7440-62-2	ug/kg	5.16E+04	2.00E+03	**2.58E+01**	3.11E+04	**1.66E+00**

Table 3. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
300-275_Shallow_2	non-Rad	Zinc	7440-66-6	ug/kg	4.12E+04	5.00E+04	8.25E-01	6.78E+04	6.08E-01
300-275_Shallow_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	3.73E+03	5.00E+03	7.45E-01	7.86E+05	4.74E-03
300-33, 300-41, 300-256_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	5.35E+03	5.00E+03	**1.07E+00**	7.86E+05	6.81E-03
300-33, 300-41, 300-256_Shallow	non-Rad	Aroclor-1016	12674-11-2	ug/kg	1.03E+01	4.00E+04	2.58E-04	1.82E+03	5.66E-03
300-33, 300-41, 300-256_Shallow	non-Rad	Aroclor-1242	53469-21-9	ug/kg	1.64E+01	4.00E+04	4.10E-04	1.49E+03	1.10E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Aroclor-1248	12672-29-6	ug/kg	1.90E+02	4.00E+04	4.75E-03	3.25E+02	5.85E-01
300-33, 300-41, 300-256_Shallow	non-Rad	Aroclor-1254	11097-69-1	ug/kg	8.49E+01	4.00E+04	2.12E-03	1.47E+03	5.78E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Aroclor-1260	11096-82-5	ug/kg	1.75E+01	4.00E+04	4.36E-04	1.47E+03	1.19E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Aroclors HI	--	ug/kg	--	--	7.97E-03	--	6.71E-01
300-33, 300-41, 300-256_Shallow	non-Rad	Arsenic	7440-38-2	ug/kg	2.64E+03	1.00E+04	2.64E-01	1.90E+05	1.39E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Barium	7440-39-3	ug/kg	7.24E+04	3.30E+05	2.19E-01	1.32E+06	5.49E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Beryllium	7440-41-7	ug/kg	2.56E+02	1.00E+04	2.56E-02	1.39E+04	1.84E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Boron	7440-42-8	ug/kg	1.48E+03	5.00E+02	**2.97E+00**	1.33E+05	1.12E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Butylbenzylphthalate	85-68-7	ug/kg	2.28E+02	No Value	--	No Value	--
300-33, 300-41, 300-256_Shallow	non-Rad	Cadmium	7440-43-9	ug/kg	9.37E+01	4.00E+03	2.34E-02	1.63E+03	5.75E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	8.78E+03	4.00E+02	**2.20E+01**	3.82E+04	2.30E-01
300-33, 300-41, 300-256_Shallow	non-Rad	Cobalt	7440-48-4	ug/kg	6.27E+03	1.30E+04	4.83E-01	1.11E+05	5.65E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Copper	7440-50-8	ug/kg	1.37E+04	5.00E+04	2.73E-01	1.07E+05	1.28E-01
300-33, 300-41, 300-256_Shallow	non-Rad	Fluoride	16984-48-8	ug/kg	1.65E+03	No Value	--	2.28E+06	7.24E-04
300-33, 300-41, 300-256_Shallow	non-Rad	Lead	7439-92-1	ug/kg	4.27E+03	5.00E+04	8.54E-02	3.56E+04	1.20E-01
300-33, 300-41, 300-256_Shallow	non-Rad	Lithium	7439-93-2	ug/kg	5.50E+03	2.00E+03	**2.75E+00**	5.15E+05	1.07E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Manganese	7439-96-5	ug/kg	3.15E+05	2.20E+05	**1.43E+00**	5.80E+06	5.43E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Mercury	7439-97-6	ug/kg	1.60E+01	1.00E+02	1.60E-01	1.87E+03	8.56E-03
300-33, 300-41, 300-256_Shallow	non-Rad	Methylene chloride	75-09-2	ug/kg	2.91E+00	No Value	--	1.66E+05	1.76E-05
300-33, 300-41, 300-256_Shallow	non-Rad	Molybdenum	7439-98-7	ug/kg	4.86E+02	2.00E+03	2.43E-01	1.40E+04	3.47E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Nickel	7440-02-0	ug/kg	8.88E+03	3.00E+04	2.96E-01	3.26E+04	2.72E-01
300-33, 300-41, 300-256_Shallow	non-Rad	Nitrate	14797-55-8	ug/kg	8.87E+03	No Value	--	3.40E+08	2.61E-05
300-33, 300-41, 300-256_Shallow	Rad	RADs SOF	--	pCi/g	--	--	1.85E-04	--	8.14E-04
300-33, 300-41, 300-256_Shallow	non-Rad	Silver	7440-22-4	ug/kg	7.82E+02	2.00E+03	3.91E-01	4.96E+04	1.58E-02
300-33, 300-41, 300-256_Shallow	non-Rad	Uranium	7440-61-1	ug/kg	7.26E+03	5.00E+03	**1.45E+00**	7.86E+05	9.24E-03
300-33, 300-41, 300-256_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	2.14E+00	5.16E+04	4.14E-05	6.37E+03	3.36E-04
300-33, 300-41, 300-256_Shallow	Rad	Uranium-235	15117-96-1	pCi/g	3.38E-01	2.74E+04	1.23E-05	4.36E+03	7.75E-05
300-33, 300-41, 300-256_Shallow	Rad	Uranium-238	U-238	pCi/g	2.06E+00	1.57E+04	1.31E-04	5.15E+03	4.00E-04
300-33, 300-41, 300-256_Shallow	non-Rad	Vanadium	7440-62-2	ug/kg	5.27E+04	2.00E+03	**2.63E+01**	3.11E+04	**1.69E+00**
300-33, 300-41, 300-256_Shallow	non-Rad	Zinc	7440-66-6	ug/kg	4.15E+04	5.00E+04	8.29E-01	6.78E+04	6.12E-01
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Aroclor-1248	12672-29-6	ug/kg	3.30E+02	4.00E+04	8.25E-03	3.25E+02	**1.02E+00**
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Aroclor-1254	11097-69-1	ug/kg	3.85E+02	4.00E+04	9.63E-03	1.47E+03	2.62E-01
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Aroclor-1260	11096-82-5	ug/kg	5.20E+01	4.00E+04	1.30E-03	1.47E+03	3.54E-02
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Aroclors HI	--	ug/kg	--	--	1.92E-02	--	**1.32E+00**
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Arsenic	7440-38-2	ug/kg	3.24E+03	1.00E+04	3.24E-01	1.90E+05	1.71E-02
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Barium	7440-39-3	ug/kg	6.46E+04	3.30E+05	1.96E-01	1.32E+06	4.89E-02
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Beryllium	7440-41-7	ug/kg	1.69E+02	1.00E+04	1.69E-02	1.39E+04	1.22E-02
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Boron	7440-42-8	ug/kg	1.03E+03	5.00E+02	**2.06E+00**	1.33E+05	7.74E-03
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Cadmium	7440-43-9	ug/kg	1.00E+02	4.00E+03	2.50E-02	1.63E+03	6.13E-02
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Chromium	7440-47-3	ug/kg	8.08E+03	4.00E+02	**2.02E+01**	3.82E+04	2.12E-01
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Cobalt	7440-48-4	ug/kg	5.64E+03	1.30E+04	4.34E-01	1.11E+05	5.08E-02
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Copper	7440-50-8	ug/kg	1.04E+04	5.00E+04	2.08E-01	1.07E+05	9.72E-02
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Fluoride	16984-48-8	ug/kg	1.30E+03	No Value	--	2.28E+06	5.70E-04
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Lead	7439-92-1	ug/kg	3.16E+03	5.00E+04	6.32E-02	3.56E+04	8.88E-02
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Lithium	7439-93-2	ug/kg	6.58E+03	2.00E+03	**3.29E+00**	5.15E+05	1.28E-02
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Manganese	7439-96-5	ug/kg	2.59E+05	2.20E+05	**1.18E+00**	5.80E+06	4.47E-02
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Methylene chloride	75-09-2	ug/kg	2.21E+00	No Value	--	1.66E+05	1.33E-05
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Molybdenum	7439-98-7	ug/kg	2.75E+02	2.00E+03	1.38E-01	1.40E+04	1.96E-02
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Nickel	7440-02-0	ug/kg	8.04E+03	3.00E+04	2.68E-01	3.26E+04	2.47E-01
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Nitrate	14797-55-8	ug/kg	1.79E+04	No Value	--	3.40E+08	5.26E-05
300-33, 300-41, 300-256_Shallow_Focus	Rad	RADs SOF	--	pCi/g	--	--	1.97E-04	--	8.95E-04
300-33, 300-41, 300-256_Shallow_Focus	Rad	Uranium-233/234	U-233/234	pCi/g	3.02E+00	5.16E+04	5.85E-05	6.37E+03	4.74E-04
300-33, 300-41, 300-256_Shallow_Focus	Rad	Uranium-238	U-238	pCi/g	2.17E+00	1.57E+04	1.38E-04	5.15E+03	4.21E-04
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Vanadium	7440-62-2	ug/kg	5.14E+04	2.00E+03	**2.57E+01**	3.11E+04	**1.65E+00**
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Zinc	7440-66-6	ug/kg	3.89E+04	5.00E+04	7.78E-01	6.78E+04	5.74E-01
300-33, 300-41, 300-256_Shallow_Focus	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	6.46E+03	5.00E+03	**1.29E+00**	7.86E+05	8.22E-03
300-37_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	ug/kg	1.00E+02	4.00E+04	2.50E-03	1.47E+03	6.80E-02
300-37_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	ug/kg	3.20E+03	4.00E+04	8.00E-02	1.47E+03	**2.18E+00**
300-37_Shallow_Focused	non-Rad	Aroclors HI	--	ug/kg	--	--	8.25E-02	--	**2.25E+00**
300-44_Overburden_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	9.10E+03	1.00E+04	9.10E-01	1.90E+05	4.79E-02
300-44_Overburden_Focused	Rad	Uranium-238	U-238	pCi/g	3.45E-01	1.57E+04	2.20E-05	5.15E+03	6.70E-05
300-44_Overburden_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.03E+03	5.00E+03	2.05E-01	7.86E+05	1.31E-03
300-44_Shallow_Focused	non-Rad	Antimony	7440-36-0	ug/kg	4.10E+03	5.00E+03	8.20E-01	5.98E+03	6.86E-01
300-44_Shallow_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	1.69E+04	1.00E+04	**1.69E+00**	1.90E+05	8.89E-02
300-44_Shallow_Focused	non-Rad	Barium	7440-39-3	ug/kg	7.52E+04	3.30E+05	2.28E-01	1.32E+06	5.70E-02
300-44_Shallow_Focused	non-Rad	Beryllium	7440-41-7	ug/kg	4.80E+02	1.00E+04	4.80E-02	1.39E+04	3.45E-02
300-44_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	9.30E+03	4.00E+02	**2.33E+01**	3.82E+04	2.43E-01
300-44_Shallow_Focused	non-Rad	Cobalt	7440-48-4	ug/kg	8.20E+03	1.30E+04	6.31E-01	1.11E+05	7.39E-02
300-44_Shallow_Focused	non-Rad	Copper	7440-50-8	ug/kg	7.80E+03	5.00E+04	1.56E-01	1.07E+05	7.29E-02
300-44_Shallow_Focused	non-Rad	Manganese	7439-96-5	ug/kg	3.03E+05	2.20E+05	**1.38E+00**	5.80E+06	5.22E-02
300-44_Shallow_Focused	non-Rad	Nickel	7440-02-0	ug/kg	8.60E+03	3.00E+04	2.87E-01	3.26E+04	2.64E-01
300-44_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	2.93E-01	1.57E+04	1.87E-05	5.15E+03	5.69E-05
300-44_Shallow_Focused	non-Rad	Vanadium	7440-62-2	ug/kg	4.32E+04	2.00E+03	**2.16E+01**	3.11E+04	**1.39E+00**
300-44_Shallow_Focused	non-Rad	Zinc	7440-66-6	ug/kg	3.78E+04	5.00E+04	7.56E-01	6.78E+04	5.58E-01
300-44_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	8.72E+02	5.00E+03	1.74E-01	7.86E+05	1.11E-03
300-45_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	ug/kg	8.60E+01	4.00E+04	2.15E-03	1.47E+03	5.85E-02
300-45_Shallow_Focused	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	ug/kg	2.90E+02	1.00E+05	2.90E-03	4.54E+04	6.39E-03
300-45_Shallow_Focused	Rad	Cesium-137	10045-97-3	pCi/g	2.28E-02	2.21E+03	1.03E-05	9.24E+02	2.47E-05
300-45_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	8.89E-05	--	2.72E-04
300-45_Shallow_Focused	Rad	Uranium-235	15117-96-1	pCi/g	6.06E-02	2.74E+04	2.21E-06	4.36E+03	1.39E-05
300-45_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	1.20E+00	1.57E+04	7.64E-05	5.15E+03	2.33E-04
300-45_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	3.60E+03	5.00E+03	7.20E-01	7.86E+05	4.58E-03
300-49_Overburden	non-Rad	1,2,4-Trichlorobenzene	120-82-1	ug/kg	3.05E+01	No Value	--	No Value	--
300-49_Overburden	non-Rad	1,4-Dichlorobenzene	106-46-7	ug/kg	2.88E+01	No Value	--	No Value	--
300-49_Overburden	non-Rad	2,4-Dinitrotoluene	121-14-2	ug/kg	1.89E+01	No Value	--	2.64E+04	7.17E-04
300-49_Overburden	non-Rad	2-Chlorophenol	95-57-8	ug/kg	5.13E+01	No Value	--	No Value	--
300-49_Overburden	non-Rad	4-Chloro-3-methylphenol	59-50-7	ug/kg	4.60E+01	No Value	--	No Value	--
300-49_Overburden	non-Rad	Acenaphthene	83-32-9	ug/kg	3.07E+01	2.00E+04	1.54E-03	1.10E+06	2.79E-05

Table 3. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
300-49_Overburden	non-Rad	Antimony	7440-36-0	ug/kg	2.32E+02	5.00E+03	4.64E-02	5.98E+03	3.88E-02
300-49_Overburden	non-Rad	Aroclor-1254	11097-69-1	ug/kg	3.01E+03	4.00E+04	7.52E-02	1.47E+03	**2.05E+00**
300-49_Overburden	non-Rad	Arsenic	7440-38-2	ug/kg	3.29E+03	1.00E+04	3.29E-01	1.90E+05	1.73E-02
300-49_Overburden	non-Rad	Barium	7440-39-3	ug/kg	7.61E+04	3.30E+05	2.31E-01	1.32E+06	5.76E-02
300-49_Overburden	non-Rad	Beryllium	7440-41-7	ug/kg	2.01E+02	1.00E+04	2.01E-02	1.39E+04	1.45E-02
300-49_Overburden	non-Rad	Cadmium	7440-43-9	ug/kg	1.74E+02	4.00E+03	4.36E-02	1.63E+03	1.07E-01
300-49_Overburden	non-Rad	Chromium	7440-47-3	ug/kg	1.81E+04	4.00E+02	**4.53E+01**	3.82E+04	4.74E-01
300-49_Overburden	non-Rad	Cobalt	7440-48-4	ug/kg	7.13E+03	1.30E+04	5.48E-01	1.11E+05	6.42E-02
300-49_Overburden	non-Rad	Copper	7440-50-8	ug/kg	5.36E+05	5.00E+04	**1.07E+01**	1.07E+05	**5.01E+00**
300-49_Overburden	non-Rad	Di-n-butylphthalate	84-74-2	ug/kg	5.16E+01	No Value	--	No Value	--
300-49_Overburden	non-Rad	Lead	7439-92-1	ug/kg	3.70E+04	5.00E+04	7.39E-01	3.56E+04	**1.04E+00**
300-49_Overburden	non-Rad	Manganese	7439-96-5	ug/kg	3.17E+05	2.20E+05	**1.44E+00**	5.80E+06	5.46E-02
300-49_Overburden	non-Rad	Nickel	7440-02-0	ug/kg	1.30E+04	3.00E+04	4.35E-01	3.26E+04	4.00E-01
300-49_Overburden	non-Rad	n-Nitrosodi-n-dipropylamine	621-64-7	ug/kg	3.97E+01	No Value	--	No Value	--
300-49_Overburden	non-Rad	Pentachlorophenol	87-86-5	ug/kg	4.98E+01	No Value	--	No Value	--
300-49_Overburden	non-Rad	Phenol	108-95-2	ug/kg	5.00E+01	3.00E+04	1.67E-03	1.51E+06	3.31E-05
300-49_Overburden	non-Rad	Pyrene	129-00-0	ug/kg	4.01E+01	1.80E+04	2.23E-03	6.00E+05	6.69E-05
300-49_Overburden	Rad	RADs SOF	--	pCi/g	--	--	8.70E-05	--	3.70E-04
300-49_Overburden	non-Rad	Silver	7440-22-4	ug/kg	7.03E+02	2.00E+03	3.51E-01	4.96E+04	1.42E-02
300-49_Overburden	Rad	Uranium-233/234	U-233/234	pCi/g	1.01E+00	5.16E+04	1.95E-05	6.37E+03	1.58E-04
300-49_Overburden	Rad	Uranium-235	15117-96-1	pCi/g	5.70E-02	2.74E+04	2.08E-06	4.36E+03	1.31E-05
300-49_Overburden	Rad	Uranium-238	U-238	pCi/g	1.03E+00	1.57E+04	6.54E-05	5.15E+03	1.99E-04
300-49_Overburden	non-Rad	Vanadium	7440-62-2	ug/kg	5.04E+04	2.00E+03	**2.52E+01**	3.11E+04	**1.62E+00**
300-49_Overburden	non-Rad	Zinc	7440-66-6	ug/kg	1.42E+05	5.00E+04	**2.84E+00**	6.78E+04	**2.09E+00**
300-49_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	3.07E+03	5.00E+03	6.13E-01	7.86E+05	3.90E-03
300-49_Shallow	non-Rad	Antimony	7440-36-0	ug/kg	1.76E+02	5.00E+03	3.52E-02	5.98E+03	2.94E-02
300-49_Shallow	non-Rad	Arsenic	7440-38-2	ug/kg	4.43E+03	1.00E+04	4.43E-01	1.90E+05	2.33E-02
300-49_Shallow	non-Rad	Barium	7440-39-3	ug/kg	8.99E+04	3.30E+05	2.72E-01	1.32E+06	6.81E-02
300-49_Shallow	non-Rad	Beryllium	7440-41-7	ug/kg	3.03E+02	1.00E+04	3.03E-02	1.39E+04	2.18E-02
300-49_Shallow	Rad	Cesium-137	10045-97-3	pCi/g	1.51E-01	2.21E+03	6.83E-05	9.24E+02	1.63E-04
300-49_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	9.17E+03	4.00E+02	**2.29E+01**	3.82E+04	2.40E-01
300-49_Shallow	non-Rad	Cobalt	7440-48-4	ug/kg	9.32E+03	1.30E+04	7.17E-01	1.11E+05	8.40E-02
300-49_Shallow	non-Rad	Copper	7440-50-8	ug/kg	1.49E+04	5.00E+04	2.97E-01	1.07E+05	1.39E-01
300-49_Shallow	non-Rad	Lead	7439-92-1	ug/kg	6.63E+03	5.00E+04	1.33E-01	3.56E+04	1.86E-01
300-49_Shallow	non-Rad	Manganese	7439-96-5	ug/kg	3.62E+05	2.20E+05	**1.64E+00**	5.80E+06	6.24E-02
300-49_Shallow	non-Rad	Nickel	7440-02-0	ug/kg	1.07E+04	3.00E+04	3.55E-01	3.26E+04	3.27E-01
300-49_Shallow	Rad	RADs SOF	--	pCi/g	--	--	1.70E-04	--	6.32E-04
300-49_Shallow	non-Rad	Silver	7440-22-4	ug/kg	3.82E+02	2.00E+03	1.91E-01	4.96E+04	7.71E-03
300-49_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	1.32E+00	5.16E+04	2.55E-05	6.37E+03	2.07E-04
300-49_Shallow	Rad	Uranium-235	15117-96-1	pCi/g	2.40E-01	2.74E+04	8.76E-06	4.36E+03	5.50E-05
300-49_Shallow	Rad	Uranium-238	U-238	pCi/g	1.06E+00	1.57E+04	6.78E-05	5.15E+03	2.07E-04
300-49_Shallow	non-Rad	Vanadium	7440-62-2	ug/kg	5.87E+04	2.00E+03	**2.93E+01**	3.11E+04	**1.89E+00**
300-49_Shallow	non-Rad	Zinc	7440-66-6	ug/kg	5.47E+04	5.00E+04	**1.09E+00**	6.78E+04	8.06E-01
300-49_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.98E+03	5.00E+03	5.97E-01	7.86E+05	3.80E-03
300-50_Overburden	non-Rad	Aroclor-1254	11097-69-1	ug/kg	3.34E+01	4.00E+04	8.36E-04	1.47E+03	2.28E-02
300-50_Overburden	non-Rad	Aroclor-1260	11096-82-5	ug/kg	2.29E+02	4.00E+04	5.73E-03	1.47E+03	1.56E-01
300-50_Overburden	non-Rad	Aroclors HI	--	ug/kg	--	--	6.57E-03	--	1.79E-01
300-50_Overburden	non-Rad	Arsenic	7440-38-2	ug/kg	6.90E+03	1.00E+04	6.90E-01	1.90E+05	3.63E-02
300-50_Overburden	non-Rad	Barium	7440-39-3	ug/kg	1.18E+05	3.30E+05	3.57E-01	1.32E+06	8.92E-02
300-50_Overburden	non-Rad	Beryllium	7440-41-7	ug/kg	3.25E+02	1.00E+04	3.25E-02	1.39E+04	2.34E-02
300-50_Overburden	non-Rad	Cadmium	7440-43-9	ug/kg	5.63E+02	4.00E+03	1.41E-01	1.63E+03	3.45E-01
300-50_Overburden	Rad	Cesium-137	10045-97-3	pCi/g	5.60E-02	2.21E+03	2.53E-05	9.24E+02	6.06E-05
300-50_Overburden	non-Rad	Chromium	7440-47-3	ug/kg	1.22E+04	4.00E+02	**3.05E+01**	3.82E+04	3.19E-01
300-50_Overburden	non-Rad	Cobalt	7440-48-4	ug/kg	9.39E+03	1.30E+04	7.22E-01	1.11E+05	8.46E-02
300-50_Overburden	non-Rad	Copper	7440-50-8	ug/kg	6.45E+04	5.00E+04	**1.29E+00**	1.07E+05	6.03E-01
300-50_Overburden	non-Rad	Lead	7439-92-1	ug/kg	5.90E+03	5.00E+04	1.18E-01	3.56E+04	1.66E-01
300-50_Overburden	non-Rad	Manganese	7439-96-5	ug/kg	3.14E+05	2.20E+05	**1.43E+00**	5.80E+06	5.42E-02
300-50_Overburden	non-Rad	Nickel	7440-02-0	ug/kg	1.52E+04	3.00E+04	5.08E-01	3.26E+04	4.67E-01
300-50_Overburden	Rad	RADs SOF	--	pCi/g	--	--	5.38E-04	--	2.27E-03
300-50_Overburden	non-Rad	Silver	7440-22-4	ug/kg	1.20E+03	2.00E+03	6.01E-01	4.96E+04	2.42E-02
300-50_Overburden	Rad	Uranium-233/234	U-233/234	pCi/g	6.03E+00	5.16E+04	1.17E-04	6.37E+03	9.46E-04
300-50_Overburden	Rad	Uranium-235	15117-96-1	pCi/g	4.49E-01	2.74E+04	1.64E-05	4.36E+03	1.03E-04
300-50_Overburden	Rad	Uranium-238	U-238	pCi/g	5.95E+00	1.57E+04	3.79E-04	5.15E+03	1.16E-03
300-50_Overburden	non-Rad	Vanadium	7440-62-2	ug/kg	4.52E+04	2.00E+03	**2.26E+01**	3.11E+04	**1.45E+00**
300-50_Overburden	non-Rad	Zinc	7440-66-6	ug/kg	4.59E+04	5.00E+04	9.18E-01	6.78E+04	6.77E-01
300-50_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.79E+04	5.00E+03	**3.58E+00**	7.86E+05	2.28E-02
300-50_Shallow	non-Rad	Antimony	7440-36-0	ug/kg	3.00E+03	5.00E+03	6.00E-01	5.98E+03	5.02E-01
300-50_Shallow	non-Rad	Aroclor-1254	11097-69-1	ug/kg	1.26E+02	4.00E+04	3.16E-03	1.47E+03	8.59E-02
300-50_Shallow	non-Rad	Arsenic	7440-38-2	ug/kg	6.40E+03	1.00E+04	6.40E-01	1.90E+05	3.37E-02
300-50_Shallow	non-Rad	Barium	7440-39-3	ug/kg	1.03E+05	3.30E+05	3.12E-01	1.32E+06	7.81E-02
300-50_Shallow	non-Rad	Beryllium	7440-41-7	ug/kg	2.82E+02	1.00E+04	2.82E-02	1.39E+04	2.03E-02
300-50_Shallow	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	ug/kg	1.93E+01	1.00E+05	1.93E-04	4.54E+04	4.25E-04
300-50_Shallow	non-Rad	Cadmium	7440-43-9	ug/kg	4.63E+02	4.00E+03	1.16E-01	1.63E+03	2.84E-01
300-50_Shallow	Rad	Cesium-137	10045-97-3	pCi/g	5.60E-02	2.21E+03	2.53E-05	9.24E+02	6.06E-05
300-50_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	1.68E+04	4.00E+02	**4.21E+01**	3.82E+04	4.41E-01
300-50_Shallow	non-Rad	Cobalt	7440-48-4	ug/kg	9.11E+03	1.30E+04	7.01E-01	1.11E+05	8.21E-02
300-50_Shallow	non-Rad	Copper	7440-50-8	ug/kg	1.68E+04	5.00E+04	3.36E-01	1.07E+05	1.57E-01
300-50_Shallow	non-Rad	Lead	7439-92-1	ug/kg	6.38E+03	5.00E+04	1.28E-01	3.56E+04	1.79E-01
300-50_Shallow	non-Rad	Manganese	7439-96-5	ug/kg	3.18E+05	2.20E+05	**1.45E+00**	5.80E+06	5.48E-02
300-50_Shallow	non-Rad	Nickel	7440-02-0	ug/kg	1.24E+04	3.00E+04	4.14E-01	3.26E+04	3.81E-01
300-50_Shallow	Rad	RADs SOF	--	pCi/g	--	--	7.39E-04	--	3.08E-03
300-50_Shallow	non-Rad	Silver	7440-22-4	ug/kg	2.99E+03	2.00E+03	**1.50E+00**	4.96E+04	6.03E-02
300-50_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	7.89E+00	5.16E+04	1.53E-04	6.37E+03	1.24E-03
300-50_Shallow	Rad	Uranium-235	15117-96-1	pCi/g	6.64E-01	2.74E+04	2.42E-05	4.36E+03	1.52E-04
300-50_Shallow	Rad	Uranium-238	U-238	pCi/g	8.41E+00	1.57E+04	5.36E-04	5.15E+03	1.63E-03
300-50_Shallow	non-Rad	Vanadium	7440-62-2	ug/kg	4.70E+04	2.00E+03	**2.35E+01**	3.11E+04	**1.51E+00**
300-50_Shallow	non-Rad	Zinc	7440-66-6	ug/kg	4.13E+04	5.00E+04	8.27E-01	6.78E+04	6.10E-01
300-50_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.29E+04	5.00E+03	**4.59E+00**	7.86E+05	2.92E-02

Table 3. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildife SSL[2]	Hazard Quotient
300-8_Shallow	non-Rad	Beryllium	7440-41-7	ug/kg	5.74E+02	1.00E+04	5.74E-02	1.39E+04	4.13E-02
300-8_Shallow	Rad	RADs SOF	--	pCi/g	--	--	6.75E-05	--	2.83E-04
300-8_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	7.86E-01	5.16E+04	1.52E-05	6.37E+03	1.23E-04
300-8_Shallow	Rad	Uranium-238	U-238	pCi/g	8.21E-01	1.57E+04	5.23E-05	5.15E+03	1.60E-04
300-8_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.37E+03	5.00E+03	4.75E-01	7.86E+05	3.02E-03
316-1_Overburden	Rad	Cesium-137	10045-97-3	pCi/g	1.01E-01	2.21E+03	4.57E-05	9.24E+02	1.09E-04
316-1_Overburden	Rad	Cobalt-60	10198-40-0	pCi/g	3.18E-01	6.13E+03	5.19E-05	8.05E+02	3.95E-04
316-1_Overburden	Rad	RADs SOF	--	pCi/g	--	--	1.25E-03	--	5.39E-03
316-1_Overburden	Rad	Uranium-233/234	U-233/234	pCi/g	1.30E+01	5.16E+04	2.51E-04	6.37E+03	2.03E-03
316-1_Overburden	Rad	Uranium-235	15117-96-1	pCi/g	1.08E+00	2.74E+04	3.94E-05	4.36E+03	2.48E-04
316-1_Overburden	Rad	Uranium-238	U-238	pCi/g	1.35E+01	1.57E+04	8.57E-04	5.15E+03	2.61E-03
316-1_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	4.06E+04	5.00E+03	**8.11E+00**	7.86E+05	5.16E-02
316-1_Shallow_1	non-Rad	Aroclor-1248	12672-29-6	ug/kg	3.00E+03	4.00E+04	7.50E-02	3.25E+02	**9.23E+00**
316-1_Shallow_1	non-Rad	Arsenic	7440-38-2	ug/kg	1.90E+04	1.00E+04	**1.90E+00**	1.90E+05	1.00E-01
316-1_Shallow_1	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	ug/kg	6.86E+01	1.00E+05	6.86E-04	4.54E+04	1.51E-03
316-1_Shallow_1	non-Rad	Butylbenzylphthalate	85-68-7	ug/kg	9.77E+01	No Value	**--**	No Value	**--**
316-1_Shallow_1	Rad	Cesium-137	10045-97-3	pCi/g	3.18E-02	2.21E+03	1.44E-05	9.24E+02	3.44E-05
316-1_Shallow_1	Rad	RADs SOF	--	pCi/g	--	--	1.82E-03	--	5.69E-03
316-1_Shallow_1	Rad	Uranium-235	15117-96-1	pCi/g	1.21E+00	2.74E+04	4.43E-05	4.36E+03	2.78E-04
316-1_Shallow_1	Rad	Uranium-238	U-238	pCi/g	2.77E+01	1.57E+04	1.76E-03	5.15E+03	5.38E-03
316-1_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	8.30E+04	5.00E+03	**1.66E+01**	7.86E+05	1.06E-01
316-1_Shallow_3	non-Rad	Antimony	7440-36-0	ug/kg	4.90E+02	5.00E+03	9.80E-02	5.98E+03	8.19E-02
316-1_Shallow_3	non-Rad	Aroclor-1254	11097-69-1	ug/kg	9.99E+01	4.00E+04	2.50E-03	1.47E+03	6.79E-02
316-1_Shallow_3	non-Rad	Arsenic	7440-38-2	ug/kg	5.14E+03	1.00E+04	5.14E-01	1.90E+05	2.70E-02
316-1_Shallow_3	non-Rad	Barium	7440-39-3	ug/kg	1.29E+05	3.30E+05	3.91E-01	1.32E+06	9.78E-02
316-1_Shallow_3	non-Rad	Beryllium	7440-41-7	ug/kg	4.16E+02	1.00E+04	4.16E-02	1.39E+04	2.99E-02
316-1_Shallow_3	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	ug/kg	3.42E+02	1.00E+05	3.42E-03	4.54E+04	7.54E-03
316-1_Shallow_3	non-Rad	Cadmium	7440-43-9	ug/kg	4.70E+02	4.00E+03	1.18E-01	1.63E+03	2.88E-01
316-1_Shallow_3	Rad	Cesium-137	10045-97-3	pCi/g	3.77E-01	2.21E+03	1.71E-04	9.24E+02	4.08E-04
316-1_Shallow_3	non-Rad	Chromium	7440-47-3	ug/kg	5.05E+04	4.00E+02	**1.26E+02**	3.82E+04	**1.32E+00**
316-1_Shallow_3	non-Rad	Cobalt	7440-48-4	ug/kg	9.70E+03	1.30E+04	7.46E-01	1.11E+05	8.74E-02
316-1_Shallow_3	Rad	Cobalt-60	10198-40-0	pCi/g	2.28E+00	6.13E+03	3.72E-04	8.05E+02	2.83E-03
316-1_Shallow_3	non-Rad	Copper	7440-50-8	ug/kg	1.37E+06	5.00E+04	**2.73E+01**	1.07E+05	**1.28E+01**
316-1_Shallow_3	non-Rad	Heptachlor epoxide	1024-57-3	ug/kg	2.65E+00	No Value	**--**	No Value	**--**
316-1_Shallow_3	non-Rad	Lead	7439-92-1	ug/kg	1.44E+04	5.00E+04	2.88E-01	3.56E+04	4.05E-01
316-1_Shallow_3	non-Rad	Manganese	7439-96-5	ug/kg	3.93E+05	2.20E+05	**1.79E+00**	5.80E+06	6.77E-02
316-1_Shallow_3	non-Rad	Mercury	7439-97-6	ug/kg	1.11E+03	1.00E+02	**1.11E+01**	1.87E+03	5.91E-01
316-1_Shallow_3	non-Rad	Nickel	7440-02-0	ug/kg	9.47E+04	3.00E+04	**3.16E+00**	3.26E+04	**2.90E+00**
316-1_Shallow_3	non-Rad	Phenol	108-95-2	ug/kg	2.80E+01	3.00E+04	9.33E-04	1.51E+06	1.85E-05
316-1_Shallow_3	Rad	RADs SOF	--	pCi/g	--	--	2.41E-03	--	1.14E-02
316-1_Shallow_3	non-Rad	Selenium	7782-49-2	ug/kg	1.44E+03	5.20E+02	**2.78E+00**	1.90E+03	7.60E-01
316-1_Shallow_3	non-Rad	Silver	7440-22-4	ug/kg	1.32E+04	2.00E+03	**6.60E+00**	4.96E+04	2.66E-01
316-1_Shallow_3	Rad	Uranium-233/234	U-233/234	pCi/g	2.27E+01	5.16E+04	4.40E-04	6.37E+03	3.57E-03
316-1_Shallow_3	Rad	Uranium-235	15117-96-1	pCi/g	2.55E+00	2.74E+04	9.30E-05	4.36E+03	5.84E-04
316-1_Shallow_3	Rad	Uranium-238	U-238	pCi/g	2.08E+01	1.57E+04	1.33E-03	5.15E+03	4.04E-03
316-1_Shallow_3	non-Rad	Vanadium	7440-62-2	ug/kg	5.67E+04	2.00E+03	**2.84E+01**	3.11E+04	**1.82E+00**
316-1_Shallow_3	non-Rad	Zinc	7440-66-6	ug/kg	8.20E+04	5.00E+04	**1.64E+00**	6.78E+04	**1.21E+00**
316-1_Shallow_3	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	6.31E+04	5.00E+03	**1.26E+01**	7.86E+05	8.02E-02
316-1_Shallow_4	non-Rad	Aroclor-1254	11097-69-1	ug/kg	6.20E+01	4.00E+04	1.55E-03	1.47E+03	4.22E-02
316-1_Shallow_4	Rad	Cobalt-60	10198-40-0	pCi/g	1.20E-01	6.13E+03	1.96E-05	8.05E+02	1.49E-04
316-1_Shallow_4	Rad	RADs SOF	--	pCi/g	--	--	1.28E-03	--	5.69E-03
316-1_Shallow_4	Rad	Uranium-233/234	U-233/234	pCi/g	1.61E+01	5.16E+04	3.13E-04	6.37E+03	2.53E-03
316-1_Shallow_4	Rad	Uranium-235	15117-96-1	pCi/g	1.07E+00	2.74E+04	3.90E-05	4.36E+03	2.45E-04
316-1_Shallow_4	Rad	Uranium-238	U-238	pCi/g	1.43E+01	1.57E+04	9.09E-04	5.15E+03	2.77E-03
316-1_Shallow_4	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	4.30E+04	5.00E+03	**8.59E+00**	7.86E+05	5.47E-02
316-2_Shallow_1	Rad	Cesium-137	10045-97-3	pCi/g	3.10E-02	2.21E+03	1.40E-05	9.24E+02	3.35E-05
316-2_Shallow_1	Rad	Cobalt-60	10198-40-0	pCi/g	9.22E-02	6.13E+03	1.50E-05	8.05E+02	1.14E-04
316-2_Shallow_1	Rad	RADs SOF	--	pCi/g	--	--	6.53E-03	--	2.99E-02
316-2_Shallow_1	Rad	Uranium-233/234	U-233/234	pCi/g	8.64E+01	5.16E+04	1.67E-03	6.37E+03	1.36E-02
316-2_Shallow_1	Rad	Uranium-235	15117-96-1	pCi/g	1.22E+01	2.74E+04	4.45E-04	4.36E+03	2.80E-03
316-2_Shallow_1	Rad	Uranium-238	U-238	pCi/g	6.88E+01	1.57E+04	4.39E-03	5.15E+03	1.34E-02
316-2_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.10E+05	5.00E+03	**4.21E+01**	7.86E+05	2.68E-01
316-2_Shallow_2	non-Rad	Aroclor-1248	12672-29-6	ug/kg	6.97E+02	4.00E+04	1.74E-02	3.25E+02	**2.14E+00**
316-2_Shallow_2	non-Rad	Aroclor-1254	11097-69-1	ug/kg	4.20E+01	4.00E+04	1.05E-03	1.47E+03	2.86E-02
316-2_Shallow_2	non-Rad	Aroclor-1260	11096-82-5	ug/kg	1.10E+02	4.00E+04	2.75E-03	1.47E+03	7.48E-02
316-2_Shallow_2	non-Rad	Aroclors HI	--	ug/kg	--	--	2.12E-02	--	**2.24E+00**
316-2_Shallow_2	Rad	Cesium-137	10045-97-3	pCi/g	4.48E-01	2.21E+03	2.03E-04	9.24E+02	4.85E-04
316-2_Shallow_2	Rad	Cobalt-60	10198-40-0	pCi/g	4.53E-01	6.13E+03	7.38E-05	8.05E+02	5.62E-04
316-2_Shallow_2	Rad	RADs SOF	--	pCi/g	--	--	9.03E-03	--	4.03E-02
316-2_Shallow_2	Rad	Uranium-233/234	U-233/234	pCi/g	1.15E+02	5.16E+04	2.22E-03	6.37E+03	1.80E-02
316-2_Shallow_2	Rad	Uranium-235	15117-96-1	pCi/g	1.11E+01	2.74E+04	4.05E-04	4.36E+03	2.55E-03
316-2_Shallow_2	Rad	Uranium-238	U-238	pCi/g	9.62E+01	1.57E+04	6.13E-03	5.15E+03	1.87E-02
316-2_Shallow_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.91E+05	5.00E+03	**5.83E+01**	7.86E+05	3.71E-01
316-2_Shallow_3	non-Rad	Arsenic	7440-38-2	ug/kg	8.00E+03	1.00E+04	8.00E-01	1.90E+05	4.21E-02
316-2_Shallow_3	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	ug/kg	2.60E+02	1.00E+05	2.60E-03	4.54E+04	5.73E-03
316-2_Shallow_3	non-Rad	Butylbenzylphthalate	85-68-7	ug/kg	1.80E+02	No Value	**--**	No Value	**--**
316-2_Shallow_3	Rad	RADs SOF	--	pCi/g	--	--	1.59E-03	--	4.96E-03
316-2_Shallow_3	Rad	Uranium-235	15117-96-1	pCi/g	9.09E-01	2.74E+04	3.32E-05	4.36E+03	2.08E-04
316-2_Shallow_3	Rad	Uranium-238	U-238	pCi/g	2.44E+01	1.57E+04	1.56E-03	5.15E+03	4.75E-03
316-2_Shallow_3	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	7.32E+04	5.00E+03	**1.46E+01**	7.86E+05	9.31E-02
316-5_Shallow_1	Rad	Americium-241	14596-10-2	pCi/g	4.79E-01	2.15E+04	2.23E-05	4.84E+03	9.90E-05
316-5_Shallow_1	non-Rad	Arsenic	7440-38-2	ug/kg	3.07E+03	1.00E+04	3.07E-01	1.90E+05	1.62E-02
316-5_Shallow_1	non-Rad	Benzo(a)anthracene	56-55-3	ug/kg	3.80E+01	1.80E+04	2.11E-03	6.40E+04	5.94E-04
316-5_Shallow_1	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	ug/kg	1.46E+02	1.00E+05	1.46E-03	4.54E+04	3.21E-03
316-5_Shallow_1	non-Rad	Butylbenzylphthalate	85-68-7	ug/kg	1.00E+02	No Value	**--**	No Value	**--**
316-5_Shallow_1	Rad	Cesium-137	10045-97-3	pCi/g	2.29E+00	2.21E+03	1.04E-03	9.24E+02	2.48E-03
316-5_Shallow_1	Rad	RADs SOF	--	pCi/g	--	--	7.42E-03	--	2.41E-02
316-5_Shallow_1	Rad	Uranium-235	15117-96-1	pCi/g	1.86E+01	2.74E+04	6.79E-04	4.36E+03	4.27E-03
316-5_Shallow_1	Rad	Uranium-238	U-238	pCi/g	8.92E+01	1.57E+04	5.68E-03	5.15E+03	1.73E-02

Table 3. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
316-5_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.72E+05	5.00E+03	**5.44E+01**	7.86E+05	3.46E-01
316-5_Shallow_2	non-Rad	1,1,2,2-Tetrachloroethane	79-34-5	ug/kg	1.40E+02	No Value	--	1.65E+05	8.48E-04
316-5_Shallow_2	non-Rad	2-Butoxyethanol	111-76-2	ug/kg	2.40E+02	No Value	--	No Value	--
316-5_Shallow_2	Rad	Americium-241	14596-10-2	pCi/g	1.24E-01	2.15E+04	5.77E-06	4.84E+03	2.56E-05
316-5_Shallow_2	non-Rad	Arsenic	7440-38-2	ug/kg	3.18E+03	1.00E+04	3.18E-01	1.90E+05	1.67E-02
316-5_Shallow_2	non-Rad	Barium	7440-39-3	ug/kg	7.67E+04	3.30E+05	2.32E-01	1.32E+06	5.81E-02
316-5_Shallow_2	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	ug/kg	1.80E+02	1.00E+05	1.80E-03	4.54E+04	3.97E-03
316-5_Shallow_2	non-Rad	Butylbenzylphthalate	85-68-7	ug/kg	1.10E+02	No Value	--	No Value	--
316-5_Shallow_2	Rad	Cesium-137	10045-97-3	pCi/g	1.71E+00	2.21E+03	7.76E-04	9.24E+02	1.85E-03
316-5_Shallow_2	non-Rad	Chromium	7440-47-3	ug/kg	6.90E+03	4.00E+02	**1.73E+01**	3.82E+04	1.81E-01
316-5_Shallow_2	non-Rad	Chrysene	218-01-9	ug/kg	3.80E+01	1.80E+04	2.11E-03	4.45E+04	8.54E-04
316-5_Shallow_2	Rad	Cobalt-60	10198-40-0	pCi/g	1.18E-01	6.13E+03	1.92E-05	8.05E+02	1.47E-04
316-5_Shallow_2	non-Rad	Di-n-butylphthalate	84-74-2	ug/kg	1.46E+02	No Value	--	No Value	--
316-5_Shallow_2	non-Rad	Lead	7439-92-1	ug/kg	3.20E+03	5.00E+04	6.40E-02	3.56E+04	8.99E-02
316-5_Shallow_2	Rad	RADs SOF	--	pCi/g	--	--	5.43E-03	--	1.72E-02
316-5_Shallow_2	non-Rad	Selenium	7782-49-2	ug/kg	4.90E+02	5.20E+02	9.42E-01	1.90E+03	2.58E-01
316-5_Shallow_2	non-Rad	Silver	7440-22-4	ug/kg	3.60E+03	2.00E+03	**1.80E+00**	4.96E+04	7.26E-02
316-5_Shallow_2	Rad	Uranium-235	15117-96-1	pCi/g	9.04E+00	2.74E+04	3.30E-04	4.36E+03	2.07E-03
316-5_Shallow_2	Rad	Uranium-238	U-238	pCi/g	6.75E+01	1.57E+04	4.30E-03	5.15E+03	1.31E-02
316-5_Shallow_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.05E+05	5.00E+03	**4.09E+01**	7.86E+05	2.60E-01
316-5_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	ug/kg	5.70E+01	4.00E+04	1.43E-03	3.25E+02	1.75E-01
316-5_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	ug/kg	7.00E+01	4.00E+04	1.75E-03	1.47E+03	4.76E-02
316-5_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	ug/kg	5.20E+01	4.00E+04	1.30E-03	1.47E+03	3.54E-02
316-5_Shallow_Focused	non-Rad	Aroclors HI	--	ug/kg	--	--	4.48E-03	--	2.58E-01
316-5_Shallow_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	4.30E+03	1.00E+04	4.30E-01	1.90E+05	2.26E-02
316-5_Shallow_Focused	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	ug/kg	1.90E+02	1.00E+05	1.90E-03	4.54E+04	4.19E-03
316-5_Shallow_Focused	Rad	Cesium-137	10045-97-3	pCi/g	1.83E+00	2.21E+03	8.28E-04	9.24E+02	1.98E-03
316-5_Shallow_Focused	non-Rad	Di-n-butylphthalate	84-74-2	ug/kg	1.50E+03	No Value	--	No Value	--
316-5_Shallow_Focused	Rad	Europium-155	14391-16-3	pCi/g	7.19E-02	1.53E+05	4.70E-07	3.34E+04	2.15E-06
316-5_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	3.99E-03	--	1.25E-02
316-5_Shallow_Focused	Rad	Uranium-235	15117-96-1	pCi/g	7.67E+00	2.74E+04	2.80E-04	4.36E+03	1.76E-03
316-5_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	4.52E+01	1.57E+04	2.88E-03	5.15E+03	8.78E-03
316-5_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.38E+05	5.00E+03	**2.76E+01**	7.86E+05	1.76E-01
331 LSLDF_Shallow_Focused	non-Rad	4,4'-DDE (Dichlorodiphenyldichloroethylene)	72-55-9	ug/kg	2.50E+01	No Value	--	4.00E+02	6.25E-02
331 LSLDF_Shallow_Focused	non-Rad	Acetone	67-64-1	ug/kg	5.90E+02	No Value	--	No Value	--
331 LSLDF_Shallow_Focused	non-Rad	Aldrin	309-00-2	ug/kg	5.60E-01	No Value	--	1.65E+02	3.39E-03
331 LSLDF_Shallow_Focused	non-Rad	Alpha-BHC	319-84-6	ug/kg	3.90E-01	No Value	--	No Value	--
331 LSLDF_Shallow_Focused	non-Rad	Antimony	7440-36-0	ug/kg	3.60E+02	5.00E+03	7.20E-02	5.98E+03	6.02E-02
331 LSLDF_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	ug/kg	8.50E+02	4.00E+04	2.13E-02	1.47E+03	5.78E-01
331 LSLDF_Shallow_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	2.40E+03	1.00E+04	2.40E-01	1.90E+05	1.26E-02
331 LSLDF_Shallow_Focused	non-Rad	Barium	7440-39-3	ug/kg	7.86E+04	3.30E+05	2.38E-01	1.32E+06	5.95E-02
331 LSLDF_Shallow_Focused	non-Rad	Beryllium	7440-41-7	ug/kg	5.70E+02	1.00E+04	5.70E-02	1.39E+04	4.10E-02
331 LSLDF_Shallow_Focused	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	ug/kg	9.10E+02	1.00E+05	9.10E-03	4.54E+04	2.00E-02
331 LSLDF_Shallow_Focused	non-Rad	Boron	7440-42-8	ug/kg	1.70E+03	5.00E+02	**3.40E+00**	1.33E+05	1.28E-02
331 LSLDF_Shallow_Focused	non-Rad	Butylbenzylphthalate	85-68-7	ug/kg	3.40E+02	No Value	--	No Value	--
331 LSLDF_Shallow_Focused	non-Rad	Cadmium	7440-43-9	ug/kg	1.40E+02	4.00E+03	3.50E-02	1.63E+03	8.59E-02
331 LSLDF_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	1.03E+04	4.00E+02	**2.58E+01**	3.82E+04	2.70E-01
331 LSLDF_Shallow_Focused	non-Rad	Cobalt	7440-48-4	ug/kg	8.60E+03	1.30E+04	6.62E-01	1.11E+05	7.75E-02
331 LSLDF_Shallow_Focused	non-Rad	Copper	7440-50-8	ug/kg	1.54E+04	5.00E+04	3.08E-01	1.07E+05	1.44E-01
331 LSLDF_Shallow_Focused	non-Rad	Dieldrin	60-57-1	ug/kg	1.30E+01	No Value	--	2.09E+01	6.22E-01
331 LSLDF_Shallow_Focused	non-Rad	Di-n-butylphthalate	84-74-2	ug/kg	9.80E+01	No Value	--	No Value	--
331 LSLDF_Shallow_Focused	non-Rad	Endosulfan I	959-98-8	ug/kg	1.90E+00	No Value	--	7.10E+02	2.68E-03
331 LSLDF_Shallow_Focused	non-Rad	Endosulfan II	33213-65-9	ug/kg	3.10E+00	No Value	--	7.10E+02	4.37E-03
331 LSLDF_Shallow_Focused	non-Rad	Lead	7439-92-1	ug/kg	9.00E+03	5.00E+04	1.80E-01	3.56E+04	2.53E-01
331 LSLDF_Shallow_Focused	non-Rad	Manganese	7439-96-5	ug/kg	3.49E+05	2.20E+05	**1.59E+00**	5.80E+06	6.02E-02
331 LSLDF_Shallow_Focused	non-Rad	Mercury	7439-97-6	ug/kg	1.10E+02	1.00E+02	**1.10E+00**	1.87E+03	5.88E-02
331 LSLDF_Shallow_Focused	non-Rad	Methoxychlor	72-43-5	ug/kg	3.30E+00	No Value	--	2.18E+04	1.51E-04
331 LSLDF_Shallow_Focused	non-Rad	Methylene chloride	75-09-2	ug/kg	1.10E+01	No Value	--	1.66E+05	6.63E-05
331 LSLDF_Shallow_Focused	non-Rad	Molybdenum	7439-98-7	ug/kg	5.90E+02	2.00E+03	2.95E-01	1.40E+04	4.21E-02
331 LSLDF_Shallow_Focused	non-Rad	Nickel	7440-02-0	ug/kg	1.00E+04	3.00E+04	3.33E-01	3.26E+04	3.07E-01
331 LSLDF_Shallow_Focused	non-Rad	Nitrate	14797-55-8	ug/kg	4.17E+04	No Value	--	3.40E+08	1.23E-04
331 LSLDF_Shallow_Focused	non-Rad	Nitrogen in Nitrite and Nitrate	NO2+NO3-N	ug/kg	9.50E+03	No Value	--	No Value	--
331 LSLDF_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	4.05E-05	--	1.76E-04
331 LSLDF_Shallow_Focused	non-Rad	Silver	7440-22-4	ug/kg	1.10E+03	2.00E+03	5.50E-01	4.96E+04	2.22E-02
331 LSLDF_Shallow_Focused	non-Rad	Uranium	7440-61-1	ug/kg	2.30E+03	5.00E+03	4.60E-01	7.86E+05	2.93E-03
331 LSLDF_Shallow_Focused	Rad	Uranium-233/234	U-233/234	pCi/g	5.40E-01	5.16E+04	1.05E-05	6.37E+03	8.48E-05
331 LSLDF_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	4.71E-01	1.57E+04	3.00E-05	5.15E+03	9.15E-05
331 LSLDF_Shallow_Focused	non-Rad	Vanadium	7440-62-2	ug/kg	5.31E+04	2.00E+03	**2.66E+01**	3.11E+04	**1.71E+00**
331 LSLDF_Shallow_Focused	non-Rad	Zinc	7440-66-6	ug/kg	1.37E+05	5.00E+04	**2.74E+00**	6.78E+04	**2.02E+00**
331 LSLDF_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.40E+03	5.00E+03	2.80E-01	7.86E+05	1.78E-03
600-243_Shallow	non-Rad	2-Methylnaphthalene	91-57-6	ug/kg	2.79E+02	2.90E+04	9.61E-03	6.01E+03	4.64E-02
600-243_Shallow	non-Rad	Anthracene	120-12-7	ug/kg	3.13E+01	2.90E+04	1.08E-03	6.78E+05	4.61E-05
600-243_Shallow	non-Rad	Antimony	7440-36-0	ug/kg	1.30E+03	5.00E+03	2.60E-01	5.98E+03	2.17E-01
600-243_Shallow	non-Rad	Aroclor-1254	11097-69-1	ug/kg	2.70E+01	4.00E+04	6.75E-04	1.47E+03	1.84E-02
600-243_Shallow	non-Rad	Aroclor-1260	11096-82-5	ug/kg	1.85E+01	4.00E+04	4.63E-04	1.47E+03	1.26E-02
600-243_Shallow	non-Rad	Aroclors HI	--	ug/kg	--	--	1.14E-03	--	3.10E-02
600-243_Shallow	non-Rad	Arsenic	7440-38-2	ug/kg	6.16E+03	1.00E+04	6.16E-01	1.90E+05	3.24E-02
600-243_Shallow	non-Rad	Barium	7440-39-3	ug/kg	2.92E+05	3.30E+05	8.85E-01	1.32E+06	2.21E-01
600-243_Shallow	non-Rad	Benzo(a)anthracene	56-55-3	ug/kg	4.33E+01	1.80E+04	2.40E-03	6.40E+04	6.76E-04
600-243_Shallow	non-Rad	Benzo(a)pyrene	50-32-8	ug/kg	4.27E+01	1.80E+04	2.37E-03	7.64E+04	5.59E-04
600-243_Shallow	non-Rad	Benzo(b)fluoranthene	205-99-2	ug/kg	4.63E+01	1.80E+04	2.57E-03	3.92E+04	1.18E-03
600-243_Shallow	non-Rad	Benzo(k)fluoranthene	207-08-9	ug/kg	3.18E+01	1.80E+04	1.76E-03	3.92E+04	8.10E-04
600-243_Shallow	non-Rad	Beryllium	7440-41-7	ug/kg	2.08E+03	1.00E+04	2.08E-01	1.39E+04	1.50E-01
600-243_Shallow	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	ug/kg	4.32E+02	1.00E+05	4.32E-03	4.54E+04	9.52E-03
600-243_Shallow	non-Rad	Boron	7440-42-8	ug/kg	2.94E+05	5.00E+02	**5.89E+02**	1.33E+05	**2.21E+00**
600-243_Shallow	non-Rad	Cadmium	7440-43-9	ug/kg	7.96E+02	4.00E+03	1.99E-01	1.63E+03	4.88E-01
600-243_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	1.80E+04	4.00E+02	**4.50E+01**	3.82E+04	4.71E-01
600-243_Shallow	non-Rad	Chrysene	218-01-9	ug/kg	6.26E+01	1.80E+04	3.48E-03	4.45E+04	1.41E-03
600-243_Shallow	non-Rad	Cobalt	7440-48-4	ug/kg	6.21E+03	1.30E+04	4.77E-01	1.11E+05	5.59E-02
600-243_Shallow	non-Rad	Copper	7440-50-8	ug/kg	5.40E+04	5.00E+04	**1.08E+00**	1.07E+05	5.04E-01
600-243_Shallow	non-Rad	Dibenzofuran	132-64-9	ug/kg	7.85E+01	No Value	--	No Value	--
600-243_Shallow	non-Rad	Di-n-butylphthalate	84-74-2	ug/kg	3.72E+01	No Value	--	No Value	--
600-243_Shallow	non-Rad	Fluoranthene	206-44-0	ug/kg	7.91E+01	1.80E+04	4.39E-03	8.39E+05	9.43E-05
600-243_Shallow	non-Rad	Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg	2.80E+01	1.80E+04	1.56E-03	3.57E+04	7.84E-04
600-243_Shallow	non-Rad	Lead	7439-92-1	ug/kg	4.01E+04	5.00E+04	8.03E-01	3.56E+04	**1.13E+00**
600-243_Shallow	non-Rad	Manganese	7439-96-5	ug/kg	2.08E+05	2.20E+05	9.47E-01	5.80E+06	3.59E-02
600-243_Shallow	non-Rad	Molybdenum	7439-98-7	ug/kg	1.87E+03	2.00E+03	9.35E-01	1.40E+04	1.34E-01
600-243_Shallow	non-Rad	Naphthalene	91-20-3	ug/kg	2.04E+02	2.90E+04	7.02E-03	1.00E+05	2.04E-03
600-243_Shallow	non-Rad	Nickel	7440-02-0	ug/kg	2.14E+04	3.00E+04	7.13E-01	3.26E+04	6.56E-01
600-243_Shallow	non-Rad	Pyrene	129-00-0	ug/kg	7.00E+01	1.80E+04	3.89E-03	6.00E+05	1.17E-04
600-243_Shallow	non-Rad	Selenium	7782-49-2	ug/kg	5.71E+03	5.20E+02	**1.10E+01**	1.90E+03	**3.00E+00**
600-243_Shallow	non-Rad	Silver	7440-22-4	ug/kg	5.00E+02	2.00E+03	2.50E-01	4.96E+04	1.01E-02

Table 3. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
600-243_Shallow	non-Rad	Total petroleum hydrocarbons - diesel range	TPHDIESEL	ug/kg	9.53E+04	2.00E+05	4.77E-01	3.56E+08	2.68E-04
600-243_Shallow	non-Rad	Total petroleum hydrocarbons - motor oil (high boiling)	TPH/OILH	ug/kg	3.35E+05	No Value	--	No Value	--
600-243_Shallow	non-Rad	Vanadium	7440-62-2	ug/kg	4.70E+04	2.00E+03	**2.35E+01**	3.11E+04	**1.51E+00**
600-243_Shallow	non-Rad	Zinc	7440-66-6	ug/kg	8.41E+04	5.00E+04	**1.68E+00**	6.78E+04	**1.24E+00**
600-259_Overburden	Rad	Cesium-137	10045-97-3	pCi/g	3.40E-02	2.21E+03	1.54E-05	9.24E+02	3.68E-05
600-259_Shallow	Rad	Cesium-137	10045-97-3	pCi/g	6.80E-02	2.21E+03	3.08E-05	9.24E+02	7.36E-05
600-259_Shallow_Focused	Rad	Cesium-137	10045-97-3	pCi/g	3.80E-02	2.21E+03	1.72E-05	9.24E+02	4.11E-05
600-47_Shallow	non-Rad	Arsenic	7440-38-2	ug/kg	2.30E+03	1.00E+04	2.30E-01	1.90E+05	1.21E-02
600-47_Shallow	non-Rad	Barium	7440-39-3	ug/kg	6.70E+04	3.30E+05	2.03E-01	1.32E+06	5.08E-02
600-47_Shallow	non-Rad	Beryllium	7440-41-7	ug/kg	5.00E+02	1.00E+04	5.00E-02	1.39E+04	3.60E-02
600-47_Shallow	non-Rad	Cadmium	7440-43-9	ug/kg	9.00E+01	4.00E+03	2.25E-02	1.63E+03	5.52E-02
600-47_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	5.50E+03	4.00E+02	**1.38E+01**	3.82E+04	1.44E-01
600-47_Shallow	non-Rad	Lead	7439-92-1	ug/kg	3.50E+03	5.00E+04	7.00E-02	3.56E+04	9.83E-02
600-47_Shallow	Rad	RADs SOF	--	pCi/g	--	--	1.27E-04	--	5.21E-04
600-47_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	1.36E+00	5.16E+04	2.64E-05	6.37E+03	2.14E-04
600-47_Shallow	Rad	Uranium-238	U-238	pCi/g	1.58E+00	1.57E+04	1.01E-04	5.15E+03	3.07E-04
600-47_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	4.30E+03	5.00E+03	8.61E-01	7.86E+05	5.47E-03
618-1_Shallow	non-Rad	Aroclor-1254	11097-69-1	ug/kg	2.64E+02	4.00E+04	6.60E-03	1.47E+03	1.80E-01
618-1_Shallow	non-Rad	Aroclor-1260	11096-82-5	ug/kg	5.35E+01	4.00E+04	1.34E-03	1.47E+03	3.64E-02
618-1_Shallow	non-Rad	Aroclors HI	--	ug/kg	--	--	7.94E-03	--	2.16E-01
618-1_Shallow	non-Rad	Arsenic	7440-38-2	ug/kg	2.28E+03	1.00E+04	2.28E-01	1.90E+05	1.20E-02
618-1_Shallow	non-Rad	Barium	7440-39-3	ug/kg	9.72E+04	3.30E+05	2.95E-01	1.32E+06	7.36E-02
618-1_Shallow	non-Rad	Beryllium	7440-41-7	ug/kg	1.88E+02	1.00E+04	1.88E-02	1.39E+04	1.35E-02
618-1_Shallow	non-Rad	Boron	7440-42-8	ug/kg	1.19E+03	5.00E+02	**2.38E+00**	1.33E+05	8.95E-03
618-1_Shallow	non-Rad	Cadmium	7440-43-9	ug/kg	6.80E+01	4.00E+03	1.70E-02	1.63E+03	4.17E-02
618-1_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	7.93E+03	4.00E+02	**1.98E+01**	3.82E+04	2.08E-01
618-1_Shallow	non-Rad	Cobalt	7440-48-4	ug/kg	6.36E+03	1.30E+04	4.89E-01	1.11E+05	5.73E-02
618-1_Shallow	non-Rad	Copper	7440-50-8	ug/kg	1.14E+04	5.00E+04	2.28E-01	1.07E+05	1.07E-01
618-1_Shallow	non-Rad	Fluoride	16984-48-8	ug/kg	4.00E+02	No Value	--	2.28E+06	1.75E-04
618-1_Shallow	non-Rad	Lead	7439-92-1	ug/kg	3.10E+03	5.00E+04	6.20E-02	3.56E+04	8.71E-02
618-1_Shallow	non-Rad	Lithium	7439-93-2	ug/kg	6.38E+03	2.00E+03	**3.19E+00**	5.15E+05	1.24E-02
618-1_Shallow	non-Rad	Manganese	7439-96-5	ug/kg	3.00E+05	2.20E+05	**1.36E+00**	5.80E+06	5.17E-02
618-1_Shallow	non-Rad	Mercury	7439-97-6	ug/kg	3.10E+01	1.00E+02	3.10E-01	1.87E+03	1.66E-02
618-1_Shallow	non-Rad	Molybdenum	7439-98-7	ug/kg	3.36E+02	2.00E+03	1.68E-01	1.40E+04	2.40E-02
618-1_Shallow	non-Rad	Nickel	7440-02-0	ug/kg	8.15E+03	3.00E+04	2.72E-01	3.26E+04	2.50E-01
618-1_Shallow	non-Rad	Nitrate	14797-55-8	ug/kg	1.60E+03	No Value	--	3.40E+08	4.71E-06
618-1_Shallow	non-Rad	Nitrogen in Nitrite and Nitrate	NO2+NO3-N	ug/kg	3.00E+02	No Value	--	No Value	--
618-1_Shallow	Rad	RADs SOF	--	pCi/g	--	--	2.67E-04	--	1.19E-03
618-1_Shallow	Rad	RADs SOF	--	pCi/g	--	--	1.34E-04	--	5.96E-04
618-1_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	1.93E+00	5.16E+04	3.74E-05	6.37E+03	3.03E-04
618-1_Shallow	Rad	Uranium-238	U-238	pCi/g	1.51E+00	1.57E+04	9.62E-05	5.15E+03	2.93E-04
618-1_Shallow	non-Rad	Vanadium	7440-62-2	ug/kg	5.63E+04	2.00E+03	**2.82E+01**	3.11E+04	**1.81E+00**
618-1_Shallow	non-Rad	Zinc	7440-66-6	ug/kg	4.21E+04	5.00E+04	8.42E-01	6.78E+04	6.21E-01
618-1_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	4.22E+03	5.00E+03	8.45E-01	7.86E+05	5.37E-03
618-1_Shallow_Focused	non-Rad	Antimony	7440-36-0	ug/kg	4.55E+02	5.00E+03	9.10E-02	5.98E+03	7.61E-02
618-1_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	ug/kg	3.51E+01	4.00E+04	8.78E-04	3.25E+02	1.08E-01
618-1_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	ug/kg	9.81E+02	4.00E+04	2.45E-02	1.47E+03	6.67E-01
618-1_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	ug/kg	5.60E+01	4.00E+04	1.40E-03	1.47E+03	3.81E-02
618-1_Shallow_Focused	non-Rad	Aroclors HI	--	ug/kg	--	--	2.68E-02	--	8.13E-01
618-1_Shallow_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	6.09E+03	1.00E+04	6.09E-01	1.90E+05	3.21E-02
618-1_Shallow_Focused	non-Rad	Barium	7440-39-3	ug/kg	1.02E+05	3.30E+05	3.09E-01	1.32E+06	7.73E-02
618-1_Shallow_Focused	non-Rad	Beryllium	7440-41-7	ug/kg	3.71E+02	1.00E+04	3.71E-02	1.39E+04	2.67E-02
618-1_Shallow_Focused	non-Rad	Boron	7440-42-8	ug/kg	3.74E+03	5.00E+02	**7.48E+00**	1.33E+05	2.81E-02
618-1_Shallow_Focused	non-Rad	Cadmium	7440-43-9	ug/kg	2.66E+02	4.00E+03	6.65E-02	1.63E+03	1.63E-01
618-1_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	1.95E+04	4.00E+02	**4.88E+01**	3.82E+04	5.10E-01
618-1_Shallow_Focused	non-Rad	Cobalt	7440-48-4	ug/kg	8.60E+03	1.30E+04	6.62E-01	1.11E+05	7.75E-02
618-1_Shallow_Focused	non-Rad	Copper	7440-50-8	ug/kg	2.38E+04	5.00E+04	4.76E-01	1.07E+05	2.22E-01
618-1_Shallow_Focused	non-Rad	Fluoride	16984-48-8	ug/kg	9.00E+02	No Value	--	2.28E+06	3.95E-04
618-1_Shallow_Focused	non-Rad	Lead	7439-92-1	ug/kg	6.21E+03	5.00E+04	1.24E-01	3.56E+04	1.74E-01
618-1_Shallow_Focused	non-Rad	Lithium	7439-93-2	ug/kg	1.33E+04	2.00E+03	**6.65E+00**	5.15E+05	2.58E-02
618-1_Shallow_Focused	non-Rad	Manganese	7439-96-5	ug/kg	4.03E+05	2.20E+05	**1.83E+00**	5.80E+06	6.95E-02
618-1_Shallow_Focused	non-Rad	Mercury	7439-97-6	ug/kg	1.98E+02	1.00E+02	**1.98E+00**	1.87E+03	1.06E-01
618-1_Shallow_Focused	non-Rad	Molybdenum	7439-98-7	ug/kg	3.56E+02	2.00E+03	1.78E-01	1.40E+04	2.54E-02
618-1_Shallow_Focused	non-Rad	Nickel	7440-02-0	ug/kg	1.68E+04	3.00E+04	5.60E-01	3.26E+04	5.15E-01
618-1_Shallow_Focused	non-Rad	Nitrate	14797-55-8	ug/kg	3.80E+03	No Value	--	3.40E+08	1.12E-05
618-1_Shallow_Focused	non-Rad	Nitrogen in Nitrite and Nitrate	NO2+NO3-N	ug/kg	2.60E+02	No Value	--	No Value	--
618-1_Shallow_Focused	non-Rad	Silver	7440-22-4	ug/kg	1.12E+03	2.00E+03	5.60E-01	4.96E+04	2.26E-02
618-1_Shallow_Focused	non-Rad	Uranium	7440-61-1	ug/kg	7.08E+03	5.00E+03	**1.42E+00**	7.86E+05	9.01E-03
618-1_Shallow_Focused	Rad	Uranium-233/234	U-233/234	pCi/g	1.13E+01	5.16E+04	2.19E-04	6.37E+03	1.77E-03
618-1_Shallow_Focused	Rad	Uranium-235	15117-96-1	pCi/g	9.87E-01	2.74E+04	3.60E-05	4.36E+03	2.26E-04
618-1_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	8.23E+00	1.57E+04	5.24E-04	5.15E+03	1.60E-03
618-1_Shallow_Focused	non-Rad	Vanadium	7440-62-2	ug/kg	6.47E+04	2.00E+03	**3.24E+01**	3.11E+04	**2.08E+00**
618-1_Shallow_Focused	non-Rad	Zinc	7440-66-6	ug/kg	6.81E+04	5.00E+04	**1.36E+00**	6.78E+04	**1.00E+00**
618-1_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.50E+04	5.00E+03	**4.99E+00**	7.86E+05	3.18E-02
618-12_Shallow	non-Rad	Arsenic	7440-38-2	ug/kg	8.52E+03	1.00E+04	8.52E-01	1.90E+05	4.49E-02
618-12_Shallow	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	ug/kg	6.30E+01	1.00E+05	6.30E-04	4.54E+04	1.39E-03
618-12_Shallow	non-Rad	Butylbenzylphthalate	85-68-7	ug/kg	6.00E+01	No Value	--	No Value	--
618-12_Shallow	Rad	RADs SOF	--	pCi/g	--	--	6.99E-04	--	2.19E-03
618-12_Shallow	Rad	Uranium-235	15117-96-1	pCi/g	4.71E-01	2.74E+04	1.72E-05	4.36E+03	1.08E-04
618-12_Shallow	Rad	Uranium-238	U-238	pCi/g	1.07E+01	1.57E+04	6.82E-04	5.15E+03	2.08E-03
618-12_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	3.21E+04	5.00E+03	**6.42E+00**	7.86E+05	4.08E-02
618-13_Shallow	non-Rad	Acetone	67-64-1	ug/kg	8.64E+00	No Value	--	No Value	--
618-13_Shallow	non-Rad	Antimony	7440-36-0	ug/kg	3.12E+02	5.00E+03	6.24E-02	5.98E+03	5.22E-02
618-13_Shallow	non-Rad	Arsenic	7440-38-2	ug/kg	3.50E+03	1.00E+04	3.50E-01	1.90E+05	1.84E-02
618-13_Shallow	non-Rad	Barium	7440-39-3	ug/kg	7.40E+04	3.30E+05	2.24E-01	1.32E+06	5.61E-02
618-13_Shallow	non-Rad	Beryllium	7440-41-7	ug/kg	2.12E+02	1.00E+04	2.12E-02	1.39E+04	1.53E-02
618-13_Shallow	non-Rad	Boron	7440-42-8	ug/kg	1.05E+03	5.00E+02	**2.10E+00**	1.33E+05	7.89E-03
618-13_Shallow	non-Rad	Cadmium	7440-43-9	ug/kg	6.30E+01	4.00E+03	1.58E-02	1.63E+03	3.87E-02
618-13_Shallow	Rad	Cesium-137	10045-97-3	pCi/g	3.80E-02	2.21E+03	1.72E-05	9.24E+02	4.11E-05
618-13_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	1.07E+04	4.00E+02	**2.68E+01**	3.82E+04	2.80E-01
618-13_Shallow	non-Rad	Cobalt	7440-48-4	ug/kg	6.29E+03	1.30E+04	4.84E-01	1.11E+05	5.67E-02
618-13_Shallow	non-Rad	Copper	7440-50-8	ug/kg	1.15E+04	5.00E+04	2.30E-01	1.07E+05	1.07E-01
618-13_Shallow	non-Rad	Lead	7439-92-1	ug/kg	3.62E+03	5.00E+04	7.24E-02	3.56E+04	1.02E-01
618-13_Shallow	non-Rad	Manganese	7439-96-5	ug/kg	3.44E+05	2.20E+05	**1.56E+00**	5.80E+06	5.93E-02
618-13_Shallow	non-Rad	Methylene chloride	75-09-2	ug/kg	5.12E+00	No Value	--	1.66E+05	3.08E-05
618-13_Shallow	non-Rad	Molybdenum	7439-98-7	ug/kg	4.20E+02	2.00E+03	2.10E-01	1.40E+04	3.00E-02
618-13_Shallow	non-Rad	Nickel	7440-02-0	ug/kg	1.24E+04	3.00E+04	4.13E-01	3.26E+04	3.80E-01
618-13_Shallow	Rad	RADs SOF	--	pCi/g	--	--	1.62E-04	--	6.72E-04
618-13_Shallow	non-Rad	Tin	7440-31-5	ug/kg	1.05E+03	5.00E+04	2.10E-02	2.04E+05	5.15E-03
618-13_Shallow	non-Rad	Uranium	7440-61-1	ug/kg	1.75E+03	5.00E+03	3.50E-01	7.86E+05	2.23E-03
618-13_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	1.92E+00	5.16E+04	3.72E-05	6.37E+03	3.01E-04
618-13_Shallow	Rad	Uranium-238	U-238	pCi/g	1.70E+00	1.57E+04	1.08E-04	5.15E+03	3.30E-04

Table 3. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
618-13_Shallow	non-Rad	Vanadium	7440-62-2	ug/kg	5.58E+04	2.00E+03	**2.79E+01**	3.11E+04	**1.79E+00**
618-13_Shallow	non-Rad	Zinc	7440-66-6	ug/kg	4.14E+04	5.00E+04	8.28E-01	6.78E+04	6.11E-01
618-13_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	5.06E+03	5.00E+03	**1.01E+00**	7.86E+05	6.44E-03
618-13_Shallow_Focused	non-Rad	Acetone	67-64-1	ug/kg	5.90E+00	No Value	--	No Value	--
618-13_Shallow_Focused	non-Rad	Antimony	7440-36-0	ug/kg	2.33E+02	5.00E+03	4.66E-02	5.98E+03	3.90E-02
618-13_Shallow_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	3.39E+03	1.00E+04	3.39E-01	1.90E+05	1.78E-02
618-13_Shallow_Focused	non-Rad	Barium	7440-39-3	ug/kg	5.77E+04	3.30E+05	1.75E-01	1.32E+06	4.37E-02
618-13_Shallow_Focused	non-Rad	Beryllium	7440-41-7	ug/kg	1.84E+02	1.00E+04	1.84E-02	1.39E+04	1.32E-02
618-13_Shallow_Focused	non-Rad	Boron	7440-42-8	ug/kg	9.60E+02	5.00E+02	**1.92E+00**	1.33E+05	7.22E-03
618-13_Shallow_Focused	non-Rad	Cadmium	7440-43-9	ug/kg	4.70E+01	4.00E+03	1.18E-02	1.63E+03	2.88E-02
618-13_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	8.74E+03	4.00E+02	**2.19E+01**	3.82E+04	2.29E-01
618-13_Shallow_Focused	non-Rad	Cobalt	7440-48-4	ug/kg	5.71E+03	1.30E+04	4.39E-01	1.11E+05	5.14E-02
618-13_Shallow_Focused	non-Rad	Copper	7440-50-8	ug/kg	1.01E+04	5.00E+04	2.02E-01	1.07E+05	9.44E-02
618-13_Shallow_Focused	non-Rad	Hexavalent Chromium	18540-29-9	ug/kg	1.50E+02	No Value	--	1.25E+06	1.20E-04
618-13_Shallow_Focused	non-Rad	Lead	7439-92-1	ug/kg	4.94E+03	5.00E+04	9.88E-02	3.56E+04	1.39E-01
618-13_Shallow_Focused	non-Rad	Manganese	7439-96-5	ug/kg	2.68E+05	2.20E+05	**1.22E+00**	5.80E+06	4.62E-02
618-13_Shallow_Focused	non-Rad	Methylene chloride	75-09-2	ug/kg	5.03E+00	No Value	--	1.66E+05	3.03E-05
618-13_Shallow_Focused	non-Rad	Molybdenum	7439-98-7	ug/kg	2.97E+02	2.00E+03	1.49E-01	1.40E+04	2.12E-02
618-13_Shallow_Focused	non-Rad	Nickel	7440-02-0	ug/kg	1.00E+04	3.00E+04	3.33E-01	3.26E+04	3.07E-01
618-13_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	8.32E-05	--	3.65E-04
618-13_Shallow_Focused	non-Rad	Tin	7440-31-5	ug/kg	7.45E+02	5.00E+04	1.49E-02	2.04E+05	3.65E-03
618-13_Shallow_Focused	non-Rad	Uranium	7440-61-1	ug/kg	1.50E+03	5.00E+03	3.00E-01	7.86E+05	1.91E-03
618-13_Shallow_Focused	Rad	Uranium-233/234	U-233/234	pCi/g	1.14E+00	5.16E+04	2.21E-05	6.37E+03	1.79E-04
618-13_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	9.59E-01	1.57E+04	6.11E-05	5.15E+03	1.86E-04
618-13_Shallow_Focused	non-Rad	Vanadium	7440-62-2	ug/kg	4.86E+04	2.00E+03	**2.43E+01**	3.11E+04	**1.56E+00**
618-13_Shallow_Focused	non-Rad	Zinc	7440-66-6	ug/kg	3.71E+04	5.00E+04	7.42E-01	6.78E+04	5.47E-01
618-13_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.85E+03	5.00E+03	5.71E-01	7.86E+05	3.63E-03
618-2_Overburden	non-Rad	Arsenic	7440-38-2	ug/kg	2.70E+03	1.00E+04	2.70E-01	1.90E+05	1.42E-02
618-2_Overburden	non-Rad	Barium	7440-39-3	ug/kg	7.47E+04	3.30E+05	2.26E-01	1.32E+06	5.66E-02
618-2_Overburden	Rad	Cesium-137	10045-97-3	pCi/g	5.80E-02	2.21E+03	2.62E-05	9.24E+02	6.28E-05
618-2_Overburden	non-Rad	Chromium	7440-47-3	ug/kg	6.60E+03	4.00E+02	**1.65E+01**	3.82E+04	1.73E-01
618-2_Overburden	non-Rad	Lead	7439-92-1	ug/kg	4.30E+03	5.00E+04	8.60E-02	3.56E+04	1.21E-01
618-2_Overburden	Rad	RADs SOF	--	pCi/g	--	--	7.63E-05	--	2.79E-04
618-2_Overburden	non-Rad	Selenium	7782-49-2	ug/kg	1.00E+03	5.20E+02	**1.92E+00**	1.90E+03	5.26E-01
618-2_Overburden	non-Rad	Tin	7440-31-5	ug/kg	2.70E+03	5.00E+04	5.40E-02	2.04E+05	1.32E-02
618-2_Overburden	non-Rad	Uranium	7440-61-1	ug/kg	1.14E+00	5.00E+03	2.28E-04	7.86E+05	1.45E-06
618-2_Overburden	Rad	Uranium-233/234	U-233/234	pCi/g	6.44E-01	5.16E+04	1.25E-05	6.37E+03	1.01E-04
618-2_Overburden	Rad	Uranium-238	U-238	pCi/g	5.91E-01	1.57E+04	3.76E-05	5.15E+03	1.15E-04
618-2_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.75E+03	5.00E+03	3.50E-01	7.86E+05	2.23E-03
618-2_Shallow	Rad	Americium-241	14596-10-2	pCi/g	8.13E-01	2.15E+04	3.78E-05	4.84E+03	1.68E-04
618-2_Shallow	non-Rad	Arsenic	7440-38-2	ug/kg	1.90E+03	1.00E+04	1.90E-01	1.90E+05	1.00E-02
618-2_Shallow	non-Rad	Barium	7440-39-3	ug/kg	7.91E+04	3.30E+05	2.40E-01	1.32E+06	5.99E-02
618-2_Shallow	Rad	Cesium-137	10045-97-3	pCi/g	2.24E+00	2.21E+03	1.01E-03	9.24E+02	2.42E-03
618-2_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	7.10E+03	4.00E+02	**1.78E+01**	3.82E+04	1.86E-01
618-2_Shallow	non-Rad	Lead	7439-92-1	ug/kg	5.60E+03	5.00E+04	1.12E-01	3.56E+04	1.57E-01
618-2_Shallow	Rad	Plutonium-239/240	PU-239/240	pCi/g	7.67E+00	1.27E+04	6.04E-04	6.27E+03	1.22E-03
618-2_Shallow	Rad	RADs SOF	--	pCi/g	--	--	1.84E-03	--	4.63E-03
618-2_Shallow	non-Rad	Selenium	7782-49-2	ug/kg	7.60E+02	5.20E+02	**1.46E+00**	1.90E+03	4.00E-01
618-2_Shallow	non-Rad	Tin	7440-31-5	ug/kg	2.40E+03	5.00E+04	4.80E-02	2.04E+05	1.18E-02
618-2_Shallow	non-Rad	Uranium	7440-61-1	ug/kg	4.53E+03	5.00E+03	9.06E-01	7.86E+05	5.76E-03
618-2_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	2.20E+00	5.16E+04	4.26E-05	6.37E+03	3.45E-04
618-2_Shallow	Rad	Uranium-235	15117-96-1	pCi/g	2.14E-01	2.74E+04	7.81E-06	4.36E+03	4.91E-05
618-2_Shallow	Rad	Uranium-238	U-238	pCi/g	2.20E+00	1.57E+04	1.40E-04	5.15E+03	4.27E-04
618-2_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	5.85E+03	5.00E+03	**1.17E+00**	7.86E+05	7.45E-03
618-2_Staging Pile	Rad	Americium-241	14596-10-2	pCi/g	8.18E-01	2.15E+04	3.80E-05	4.84E+03	1.69E-04
618-2_Staging Pile	non-Rad	Arsenic	7440-38-2	ug/kg	3.06E+03	1.00E+04	3.06E-01	1.90E+05	1.61E-02
618-2_Staging Pile	non-Rad	Barium	7440-39-3	ug/kg	6.77E+04	3.30E+05	2.05E-01	1.32E+06	5.13E-02
618-2_Staging Pile	Rad	Cesium-137	10045-97-3	pCi/g	9.50E-02	2.21E+03	4.30E-05	9.24E+02	1.03E-04
618-2_Staging Pile	non-Rad	Chromium	7440-47-3	ug/kg	6.42E+03	4.00E+02	**1.61E+01**	3.82E+04	1.68E-01
618-2_Staging Pile	non-Rad	Lead	7439-92-1	ug/kg	4.01E+03	5.00E+04	8.02E-02	3.56E+04	1.13E-01
618-2_Staging Pile	Rad	Plutonium-239/240	PU-239/240	pCi/g	1.00E+01	1.27E+04	7.87E-04	6.27E+03	1.59E-03
618-2_Staging Pile	Rad	RADs SOF	--	pCi/g	--	--	1.04E-03	--	8.14E-03
618-2_Staging Pile	Rad	Tritium	10028-17-8	pCi/g	2.33E+00	1.68E+06	1.39E-06	4.20E+02	5.55E-03
618-2_Staging Pile	non-Rad	Uranium	7440-61-1	ug/kg	5.02E+03	5.00E+03	**1.00E+00**	7.86E+05	6.39E-03
618-2_Staging Pile	Rad	Uranium-233/234	U-233/234	pCi/g	2.04E+00	5.16E+04	3.95E-05	6.37E+03	3.20E-04
618-2_Staging Pile	Rad	Uranium-235	15117-96-1	pCi/g	1.23E-01	2.74E+04	4.50E-06	4.36E+03	2.83E-05
618-2_Staging Pile	Rad	Uranium-238	U-238	pCi/g	1.97E+00	1.57E+04	1.26E-04	5.15E+03	3.83E-04
618-2_Staging Pile	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	9.20E+03	5.00E+03	**1.84E+00**	7.86E+05	1.17E-02
618-3_Shallow	non-Rad	Arsenic	7440-38-2	ug/kg	2.80E+03	1.00E+04	2.80E-01	1.90E+05	1.47E-02
618-3_Shallow	non-Rad	Barium	7440-39-3	ug/kg	7.65E+04	3.30E+05	2.32E-01	1.32E+06	5.80E-02
618-3_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	9.70E+03	4.00E+02	**2.43E+01**	3.82E+04	2.54E-01
618-3_Shallow	non-Rad	Lead	7439-92-1	ug/kg	3.90E+03	5.00E+04	7.80E-02	3.56E+04	1.10E-01
618-3_Shallow	Rad	RADs SOF	--	pCi/g	--	--	6.07E-05	--	2.51E-04
618-3_Shallow	non-Rad	Selenium	7782-49-2	ug/kg	6.59E+02	5.20E+02	**1.27E+00**	1.90E+03	3.47E-01
618-3_Shallow	non-Rad	Uranium	7440-61-1	ug/kg	1.61E+03	5.00E+03	3.22E-01	7.86E+05	2.05E-03
618-3_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	6.77E-01	5.16E+04	1.31E-05	6.37E+03	1.06E-04
618-3_Shallow	Rad	Uranium-238	U-238	pCi/g	7.47E-01	1.57E+04	4.76E-05	5.15E+03	1.45E-04
618-3_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.22E+03	5.00E+03	4.45E-01	7.86E+05	2.83E-03
618-3_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	6.78E-03	--	2.90E-02
618-3_Shallow_Focused	Rad	Uranium-233/234	U-233/234	pCi/g	7.96E+01	5.16E+04	1.54E-03	6.37E+03	1.25E-02
618-3_Shallow_Focused	Rad	Uranium-235	15117-96-1	pCi/g	4.79E+00	2.74E+04	1.75E-04	4.36E+03	1.10E-03
618-3_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	7.94E+01	1.57E+04	5.06E-03	5.15E+03	1.54E-02
618-3_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.39E+05	5.00E+03	**4.77E+01**	7.86E+05	3.04E-01
618-4_Overburden_2	non-Rad	Arsenic	7440-38-2	ug/kg	2.50E+03	1.00E+04	2.50E-01	1.90E+05	1.32E-02
618-4_Overburden_2	non-Rad	Lead	7439-92-1	ug/kg	4.70E+03	5.00E+04	9.40E-02	3.56E+04	1.32E-01
618-4_Overburden_2	Rad	RADs SOF	--	pCi/g	--	--	1.15E-04	--	4.78E-04
618-4_Overburden_2	Rad	Uranium-233/234	U-233/234	pCi/g	1.30E+00	5.16E+04	2.52E-05	6.37E+03	2.04E-04
618-4_Overburden_2	Rad	Uranium-238	U-238	pCi/g	1.41E+00	1.57E+04	8.98E-05	5.15E+03	2.74E-04
618-4_Overburden_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	4.20E+03	5.00E+03	8.39E-01	7.86E+05	5.34E-03

Table 3. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
618-4_Overburden_3	non-Rad	Lead	7439-92-1	ug/kg	5.00E+03	5.00E+04	1.00E-01	3.56E+04	1.40E-01
618-4_Overburden_3	Rad	RADs SOF	--	pCi/g	--	--	3.73E-05	--	1.59E-04
618-4_Overburden_3	Rad	Uranium-233/234	U-233/234	pCi/g	4.24E-01	5.16E+04	8.22E-06	6.37E+03	6.66E-05
618-4_Overburden_3	Rad	Uranium-235	15117-96-1	pCi/g	3.20E-02	2.74E+04	1.17E-06	4.36E+03	7.34E-06
618-4_Overburden_3	Rad	Uranium-238	U-238	pCi/g	4.38E-01	1.57E+04	2.79E-05	5.15E+03	8.50E-05
618-4_Overburden_3	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.17E+03	5.00E+03	2.34E-01	7.86E+05	1.49E-03
618-4_Overburden_4	non-Rad	Lead	7439-92-1	ug/kg	4.80E+03	5.00E+04	9.60E-02	3.56E+04	1.35E-01
618-4_Overburden_4	Rad	RADs SOF	--	pCi/g	--	--	7.83E-05	--	3.31E-04
618-4_Overburden_4	Rad	Uranium-233/234	U-233/234	pCi/g	9.42E-01	5.16E+04	1.83E-05	6.37E+03	1.48E-04
618-4_Overburden_4	Rad	Uranium-238	U-238	pCi/g	9.42E-01	1.57E+04	6.00E-05	5.15E+03	1.83E-04
618-4_Overburden_4	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.32E+03	5.00E+03	4.65E-01	7.86E+05	2.96E-03
618-4_Shallow	non-Rad	Arsenic	7440-38-2	ug/kg	3.20E+03	1.00E+04	3.20E-01	1.90E+05	1.68E-02
618-4_Shallow	non-Rad	Lead	7439-92-1	ug/kg	4.90E+04	5.00E+04	9.80E-01	3.56E+04	**1.38E+00**
618-4_Shallow	Rad	RADs SOF	--	pCi/g	--	--	2.58E-04	--	1.10E-03
618-4_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	3.22E+00	5.16E+04	6.24E-05	6.37E+03	5.05E-04
618-4_Shallow	Rad	Uranium-238	U-238	pCi/g	3.07E+00	1.57E+04	1.96E-04	5.15E+03	5.96E-04
618-4_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	7.46E+03	5.00E+03	**1.49E+00**	7.86E+05	9.49E-03
618-5_Overburden	non-Rad	Arsenic	7440-38-2	ug/kg	3.40E+03	1.00E+04	3.40E-01	1.90E+05	1.79E-02
618-5_Overburden	non-Rad	Cadmium	7440-43-9	ug/kg	1.70E+02	4.00E+03	4.25E-02	1.63E+03	1.04E-01
618-5_Overburden	non-Rad	Chromium	7440-47-3	ug/kg	9.70E+03	4.00E+02	**2.43E+01**	3.82E+04	2.54E-01
618-5_Overburden	non-Rad	Lead	7439-92-1	ug/kg	7.50E+03	5.00E+04	1.50E-01	3.56E+04	2.11E-01
618-5_Overburden	Rad	RADs SOF	--	pCi/g	--	--	3.70E-04	--	1.54E-03
618-5_Overburden	Rad	Uranium-233/234	U-233/234	pCi/g	4.14E+00	5.16E+04	8.02E-05	6.37E+03	6.50E-04
618-5_Overburden	Rad	Uranium-238	U-238	pCi/g	4.56E+00	1.57E+04	2.90E-04	5.15E+03	8.85E-04
618-5_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	9.77E+03	5.00E+03	**1.95E+00**	7.86E+05	1.24E-02
618-5_Shallow	non-Rad	Arsenic	7440-38-2	ug/kg	4.30E+03	1.00E+04	4.30E-01	1.90E+05	2.26E-02
618-5_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	1.13E+04	4.00E+02	**2.83E+01**	3.82E+04	2.96E-01
618-5_Shallow	non-Rad	Lead	7439-92-1	ug/kg	6.10E+03	5.00E+04	1.22E-01	3.56E+04	1.71E-01
618-5_Shallow	Rad	RADs SOF	--	pCi/g	--	--	8.51E-05	--	3.51E-04
618-5_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	9.38E-01	5.16E+04	1.82E-05	6.37E+03	1.47E-04
618-5_Shallow	Rad	Uranium-238	U-238	pCi/g	1.05E+00	1.57E+04	6.69E-05	5.15E+03	2.04E-04
618-5_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.85E+03	5.00E+03	5.70E-01	7.86E+05	3.62E-03
618-5_Staging Pile_4	non-Rad	Arsenic	7440-38-2	ug/kg	3.30E+03	1.00E+04	3.30E-01	1.90E+05	1.74E-02
618-5_Staging Pile_4	non-Rad	Cadmium	7440-43-9	ug/kg	5.00E+01	4.00E+03	1.25E-02	1.63E+03	3.07E-02
618-5_Staging Pile_4	non-Rad	Chromium	7440-47-3	ug/kg	1.18E+04	4.00E+02	**2.95E+01**	3.82E+04	3.09E-01
618-5_Staging Pile_4	non-Rad	Lead	7439-92-1	ug/kg	5.30E+03	5.00E+04	1.06E-01	3.56E+04	1.49E-01
618-5_Staging Pile_4	Rad	RADs SOF	--	pCi/g	--	--	9.43E-05	--	4.00E-04
618-5_Staging Pile_4	Rad	Uranium-233/234	U-233/234	pCi/g	1.15E+00	5.16E+04	2.23E-05	6.37E+03	1.81E-04
618-5_Staging Pile_4	Rad	Uranium-238	U-238	pCi/g	1.13E+00	1.57E+04	7.20E-05	5.15E+03	2.19E-04
618-5_Staging Pile_4	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	3.36E+03	5.00E+03	6.73E-01	7.86E+05	4.28E-03
618-5_Staging Pile_5	non-Rad	Arsenic	7440-38-2	ug/kg	2.70E+03	1.00E+04	2.70E-01	1.90E+05	1.42E-02
618-5_Staging Pile_5	non-Rad	Chromium	7440-47-3	ug/kg	1.03E+04	4.00E+02	**2.58E+01**	3.82E+04	2.70E-01
618-5_Staging Pile_5	non-Rad	Lead	7439-92-1	ug/kg	3.90E+03	5.00E+04	7.80E-02	3.56E+04	1.10E-01
618-5_Staging Pile_5	Rad	RADs SOF	--	pCi/g	--	--	1.45E-04	--	6.10E-04
618-5_Staging Pile_5	Rad	Uranium-233/234	U-233/234	pCi/g	1.52E+00	5.16E+04	2.95E-05	6.37E+03	2.39E-04
618-5_Staging Pile_5	Rad	Uranium-235	15117-96-1	pCi/g	1.68E-01	2.74E+04	6.13E-06	4.36E+03	3.85E-05
618-5_Staging Pile_5	Rad	Uranium-238	U-238	pCi/g	1.71E+00	1.57E+04	1.09E-04	5.15E+03	3.32E-04
618-5_Staging Pile_5	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	4.33E+03	5.00E+03	8.65E-01	7.86E+05	5.50E-03
618-7_Shallow_1	non-Rad	Antimony	7440-36-0	ug/kg	5.59E+02	5.00E+03	1.12E-01	5.98E+03	9.34E-02
618-7_Shallow_1	non-Rad	Arsenic	7440-38-2	ug/kg	1.89E+03	1.00E+04	1.89E-01	1.90E+05	9.95E-03
618-7_Shallow_1	non-Rad	Barium	7440-39-3	ug/kg	6.89E+04	3.30E+05	2.09E-01	1.32E+06	5.22E-02
618-7_Shallow_1	non-Rad	Beryllium	7440-41-7	ug/kg	2.77E+02	1.00E+04	2.77E-02	1.39E+04	1.99E-02
618-7_Shallow_1	non-Rad	Cadmium	7440-43-9	ug/kg	6.54E+01	4.00E+03	1.63E-02	1.63E+03	4.01E-02
618-7_Shallow_1	Rad	Cesium-137	10045-97-3	pCi/g	8.20E-02	2.21E+03	3.71E-05	9.24E+02	8.87E-05
618-7_Shallow_1	non-Rad	Chromium	7440-47-3	ug/kg	1.02E+04	4.00E+02	**2.56E+01**	3.82E+04	2.68E-01
618-7_Shallow_1	non-Rad	Cobalt	7440-48-4	ug/kg	9.15E+03	1.30E+04	7.04E-01	1.11E+05	8.25E-02
618-7_Shallow_1	non-Rad	Copper	7440-50-8	ug/kg	1.61E+04	5.00E+04	3.22E-01	1.07E+05	1.51E-01
618-7_Shallow_1	non-Rad	Lead	7439-92-1	ug/kg	1.46E+04	5.00E+04	2.91E-01	3.56E+04	4.09E-01
618-7_Shallow_1	non-Rad	Manganese	7439-96-5	ug/kg	3.26E+05	2.20E+05	**1.48E+00**	5.80E+06	5.62E-02
618-7_Shallow_1	non-Rad	Mercury	7439-97-6	ug/kg	4.43E+01	1.00E+02	4.43E-01	1.87E+03	2.37E-02
618-7_Shallow_1	non-Rad	Nickel	7440-02-0	ug/kg	2.10E+04	3.00E+04	6.99E-01	3.26E+04	6.43E-01
618-7_Shallow_1	Rad	RADs SOF	--	pCi/g	--	--	3.49E-04	--	1.43E-03
618-7_Shallow_1	non-Rad	Tin	7440-31-5	ug/kg	1.55E+03	5.00E+04	3.09E-02	2.04E+05	7.58E-03
618-7_Shallow_1	Rad	Uranium-233/234	U-233/234	pCi/g	3.61E+00	5.16E+04	7.01E-05	6.37E+03	5.67E-04
618-7_Shallow_1	Rad	Uranium-235	15117-96-1	pCi/g	3.64E-01	2.74E+04	1.33E-05	4.36E+03	8.34E-05
618-7_Shallow_1	Rad	Uranium-238	U-238	pCi/g	3.57E+00	1.57E+04	2.28E-04	5.15E+03	6.94E-04
618-7_Shallow_1	non-Rad	Vanadium	7440-62-2	ug/kg	7.46E+04	2.00E+03	**3.73E+01**	3.11E+04	**2.40E+00**
618-7_Shallow_1	non-Rad	Zinc	7440-66-6	ug/kg	4.92E+04	5.00E+04	9.84E-01	6.78E+04	7.25E-01
618-7_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.08E+04	5.00E+03	**2.16E+00**	7.86E+05	1.38E-02
618-7_Shallow_2	non-Rad	Antimony	7440-36-0	ug/kg	6.60E+02	5.00E+03	1.32E-01	5.98E+03	1.10E-01
618-7_Shallow_2	non-Rad	Arsenic	7440-38-2	ug/kg	2.50E+03	1.00E+04	2.50E-01	1.90E+05	1.32E-02
618-7_Shallow_2	non-Rad	Barium	7440-39-3	ug/kg	7.38E+04	3.30E+05	2.24E-01	1.32E+06	5.59E-02
618-7_Shallow_2	non-Rad	Beryllium	7440-41-7	ug/kg	4.40E+02	1.00E+04	4.40E-02	1.39E+04	3.17E-02
618-7_Shallow_2	non-Rad	Chromium	7440-47-3	ug/kg	6.80E+03	4.00E+02	**1.70E+01**	3.82E+04	1.78E-01
618-7_Shallow_2	non-Rad	Cobalt	7440-48-4	ug/kg	9.30E+03	1.30E+04	7.15E-01	1.11E+05	8.38E-02
618-7_Shallow_2	non-Rad	Copper	7440-50-8	ug/kg	1.36E+04	5.00E+04	2.72E-01	1.07E+05	1.27E-01
618-7_Shallow_2	non-Rad	Lead	7439-92-1	ug/kg	2.80E+03	5.00E+04	5.60E-02	3.56E+04	7.87E-02
618-7_Shallow_2	non-Rad	Manganese	7439-96-5	ug/kg	3.64E+05	2.20E+05	**1.65E+00**	5.80E+06	6.28E-02
618-7_Shallow_2	non-Rad	Mercury	7439-97-6	ug/kg	2.00E+01	1.00E+02	2.00E-01	1.87E+03	1.07E-02
618-7_Shallow_2	non-Rad	Nickel	7440-02-0	ug/kg	9.70E+03	3.00E+04	3.23E-01	3.26E+04	2.98E-01
618-7_Shallow_2	Rad	RADs SOF	--	pCi/g	--	--	4.50E-05	--	1.93E-04
618-7_Shallow_2	non-Rad	Tin	7440-31-5	ug/kg	1.50E+03	5.00E+04	3.00E-02	2.04E+05	7.35E-03
618-7_Shallow_2	Rad	Uranium-233/234	U-233/234	pCi/g	5.66E-01	5.16E+04	1.10E-05	6.37E+03	8.89E-05
618-7_Shallow_2	Rad	Uranium-238	U-238	pCi/g	5.34E-01	1.57E+04	3.40E-05	5.15E+03	1.04E-04
618-7_Shallow_2	non-Rad	Vanadium	7440-62-2	ug/kg	7.47E+04	2.00E+03	**3.74E+01**	3.11E+04	**2.40E+00**
618-7_Shallow_2	non-Rad	Zinc	7440-66-6	ug/kg	4.62E+04	5.00E+04	9.24E-01	6.78E+04	6.81E-01
618-7_Shallow_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.57E+03	5.00E+03	3.15E-01	7.86E+05	2.00E-03
618-7_Shallow_3	non-Rad	Antimony	7440-36-0	ug/kg	4.50E+02	5.00E+03	9.00E-02	5.98E+03	7.53E-02
618-7_Shallow_3	non-Rad	Arsenic	7440-38-2	ug/kg	2.80E+03	1.00E+04	2.80E-01	1.90E+05	1.47E-02

Table 3. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
618-7_Shallow_3	non-Rad	Barium	7440-39-3	ug/kg	8.25E+04	3.30E+05	2.50E-01	1.32E+06	6.25E-02
618-7_Shallow_3	non-Rad	Beryllium	7440-41-7	ug/kg	3.10E+02	1.00E+04	3.10E-02	1.39E+04	2.23E-02
618-7_Shallow_3	non-Rad	Cadmium	7440-43-9	ug/kg	1.90E+02	4.00E+03	4.75E-02	1.63E+03	1.17E-01
618-7_Shallow_3	non-Rad	Chromium	7440-47-3	ug/kg	1.01E+04	4.00E+02	**2.53E+01**	3.82E+04	2.64E-01
618-7_Shallow_3	non-Rad	Cobalt	7440-48-4	ug/kg	8.60E+03	1.30E+04	6.62E-01	1.11E+05	7.75E-02
618-7_Shallow_3	non-Rad	Copper	7440-50-8	ug/kg	1.36E+04	5.00E+04	2.72E-01	1.07E+05	1.27E-01
618-7_Shallow_3	non-Rad	Lead	7439-92-1	ug/kg	4.30E+03	5.00E+04	8.60E-02	3.56E+04	1.21E-01
618-7_Shallow_3	non-Rad	Manganese	7439-96-5	ug/kg	3.57E+05	2.20E+05	**1.62E+00**	5.80E+06	6.16E-02
618-7_Shallow_3	non-Rad	Mercury	7439-97-6	ug/kg	2.00E+01	1.00E+02	2.00E-01	1.87E+03	1.07E-02
618-7_Shallow_3	non-Rad	Nickel	7440-02-0	ug/kg	1.01E+04	3.00E+04	3.37E-01	3.26E+04	3.10E-01
618-7_Shallow_3	Rad	RADs SOF	--	pCi/g	--	--	8.40E-05	--	3.71E-04
618-7_Shallow_3	non-Rad	Tin	7440-31-5	ug/kg	1.80E+03	5.00E+04	3.60E-02	2.04E+05	8.82E-03
618-7_Shallow_3	Rad	Uranium-233/234	U-233/234	pCi/g	1.07E+00	5.16E+04	2.07E-05	6.37E+03	1.68E-04
618-7_Shallow_3	Rad	Uranium-235	15117-96-1	pCi/g	8.50E-02	2.74E+04	3.10E-06	4.36E+03	1.95E-05
618-7_Shallow_3	Rad	Uranium-238	U-238	pCi/g	9.45E-01	1.57E+04	6.02E-05	5.15E+03	1.83E-04
618-7_Shallow_3	non-Rad	Vanadium	7440-62-2	ug/kg	6.82E+04	2.00E+03	**3.41E+01**	3.11E+04	**2.19E+00**
618-7_Shallow_3	non-Rad	Zinc	7440-66-6	ug/kg	4.45E+04	5.00E+04	8.90E-01	6.78E+04	6.56E-01
618-7_Shallow_3	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.85E+03	5.00E+03	5.70E-01	7.86E+05	3.63E-03
618-7_Shallow_4	non-Rad	Antimony	7440-36-0	ug/kg	2.50E+02	5.00E+03	5.00E-02	5.98E+03	4.18E-02
618-7_Shallow_4	non-Rad	Arsenic	7440-38-2	ug/kg	5.20E+03	1.00E+04	5.20E-01	1.90E+05	2.74E-02
618-7_Shallow_4	non-Rad	Barium	7440-39-3	ug/kg	5.79E+04	3.30E+05	1.75E-01	1.32E+06	4.39E-02
618-7_Shallow_4	non-Rad	Beryllium	7440-41-7	ug/kg	2.20E+02	1.00E+04	2.20E-02	1.39E+04	1.58E-02
618-7_Shallow_4	non-Rad	Cadmium	7440-43-9	ug/kg	9.00E+01	4.00E+03	2.25E-02	1.63E+03	5.52E-02
618-7_Shallow_4	non-Rad	Chromium	7440-47-3	ug/kg	1.14E+04	4.00E+02	**2.85E+01**	3.82E+04	2.98E-01
618-7_Shallow_4	non-Rad	Cobalt	7440-48-4	ug/kg	6.70E+03	1.30E+04	5.15E-01	1.11E+05	6.04E-02
618-7_Shallow_4	non-Rad	Copper	7440-50-8	ug/kg	1.32E+04	5.00E+04	2.64E-01	1.07E+05	1.23E-01
618-7_Shallow_4	non-Rad	Lead	7439-92-1	ug/kg	3.00E+03	5.00E+04	6.00E-02	3.56E+04	8.43E-02
618-7_Shallow_4	non-Rad	Manganese	7439-96-5	ug/kg	2.85E+05	2.20E+05	**1.30E+00**	5.80E+06	4.91E-02
618-7_Shallow_4	non-Rad	Nickel	7440-02-0	ug/kg	1.29E+04	3.00E+04	4.30E-01	3.26E+04	3.96E-01
618-7_Shallow_4	Rad	RADs SOF	--	pCi/g	--	--	6.20E-05	--	2.56E-04
618-7_Shallow_4	non-Rad	Tin	7440-31-5	ug/kg	7.10E+02	5.00E+04	1.42E-02	2.04E+05	3.48E-03
618-7_Shallow_4	Rad	Uranium-233/234	U-233/234	pCi/g	6.89E-01	5.16E+04	1.34E-05	6.37E+03	1.08E-04
618-7_Shallow_4	Rad	Uranium-238	U-238	pCi/g	7.63E-01	1.57E+04	4.86E-05	5.15E+03	1.48E-04
618-7_Shallow_4	non-Rad	Vanadium	7440-62-2	ug/kg	5.48E+04	2.00E+03	**2.74E+01**	3.11E+04	**1.76E+00**
618-7_Shallow_4	non-Rad	Zinc	7440-66-6	ug/kg	3.70E+04	5.00E+04	7.40E-01	6.78E+04	5.46E-01
618-7_Shallow_4	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.06E+03	5.00E+03	4.13E-01	7.86E+05	2.63E-03
618-7_Shallow_Focused	non-Rad	Acenaphthene	83-32-9	ug/kg	1.50E+02	2.00E+04	7.50E-03	1.10E+06	1.36E-04
618-7_Shallow_Focused	non-Rad	Antimony	7440-36-0	ug/kg	9.80E+02	5.00E+03	1.96E-01	5.98E+03	1.64E-01
618-7_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	ug/kg	6.70E+00	4.00E+04	1.68E-04	3.25E+02	2.06E-02
618-7_Shallow_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	4.20E+03	1.00E+04	4.20E-01	1.90E+05	2.21E-02
618-7_Shallow_Focused	non-Rad	Barium	7440-39-3	ug/kg	9.28E+04	3.30E+05	2.81E-01	1.32E+06	7.03E-02
618-7_Shallow_Focused	non-Rad	Benzo(a)anthracene	56-55-3	ug/kg	8.80E+01	1.80E+04	4.89E-03	6.40E+04	1.38E-03
618-7_Shallow_Focused	non-Rad	Benzo(a)pyrene	50-32-8	ug/kg	6.60E+01	1.80E+04	3.67E-03	7.64E+04	8.64E-04
618-7_Shallow_Focused	non-Rad	Benzo(b)fluoranthene	205-99-2	ug/kg	5.20E+01	1.80E+04	2.89E-03	3.92E+04	1.33E-03
618-7_Shallow_Focused	non-Rad	Benzo(k)fluoranthene	207-08-9	ug/kg	1.10E+01	1.80E+04	6.11E-04	3.92E+04	2.81E-04
618-7_Shallow_Focused	non-Rad	Beryllium	7440-41-7	ug/kg	3.70E+02	1.00E+04	3.70E-02	1.39E+04	2.66E-02
618-7_Shallow_Focused	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	ug/kg	4.70E+02	1.00E+05	4.70E-03	4.54E+04	1.04E-02
618-7_Shallow_Focused	non-Rad	Cadmium	7440-43-9	ug/kg	6.20E+03	4.00E+03	**1.55E+00**	1.63E+03	**3.80E+00**
618-7_Shallow_Focused	Rad	Cesium-137	10045-97-3	pCi/g	1.00E-02	2.21E+03	4.52E-06	9.24E+02	1.08E-05
618-7_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	6.59E+04	4.00E+02	**1.65E+02**	3.82E+04	**1.73E+00**
618-7_Shallow_Focused	non-Rad	Chrysene	218-01-9	ug/kg	6.90E+01	1.80E+04	3.83E-03	4.45E+04	1.55E-03
618-7_Shallow_Focused	non-Rad	Cobalt	7440-48-4	ug/kg	1.10E+04	1.30E+04	8.46E-01	1.11E+05	9.91E-02
618-7_Shallow_Focused	non-Rad	Copper	7440-50-8	ug/kg	2.50E+04	5.00E+04	5.00E-01	1.07E+05	2.34E-01
618-7_Shallow_Focused	non-Rad	Dibenz[a,h]anthracene	53-70-3	ug/kg	4.50E+01	1.80E+04	2.50E-03	4.41E+04	1.02E-03
618-7_Shallow_Focused	non-Rad	Di-n-butylphthalate	84-74-2	ug/kg	3.30E+01	No Value	--	No Value	--
618-7_Shallow_Focused	non-Rad	Fluoranthene	206-44-0	ug/kg	4.80E+01	1.80E+04	2.67E-03	8.39E+05	5.72E-05
618-7_Shallow_Focused	non-Rad	Lead	7439-92-1	ug/kg	6.50E+03	5.00E+04	1.30E-01	3.56E+04	1.83E-01
618-7_Shallow_Focused	non-Rad	Manganese	7439-96-5	ug/kg	4.25E+05	2.20E+05	**1.93E+00**	5.80E+06	7.33E-02
618-7_Shallow_Focused	non-Rad	Mercury	7439-97-6	ug/kg	2.00E+01	1.00E+02	2.00E-01	1.87E+03	1.07E-02
618-7_Shallow_Focused	non-Rad	Nickel	7440-02-0	ug/kg	1.72E+04	3.00E+04	5.73E-01	3.26E+04	5.28E-01
618-7_Shallow_Focused	non-Rad	Pyrene	129-00-0	ug/kg	4.10E+02	1.80E+04	2.28E-02	6.00E+05	6.83E-04
618-7_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	6.60E-04	--	3.19E-03
618-7_Shallow_Focused	non-Rad	Tin	7440-31-5	ug/kg	1.20E+03	5.00E+04	2.40E-02	2.04E+05	5.88E-03
618-7_Shallow_Focused	non-Rad	Total petroleum hydrocarbons - motor oil (high boiling)	TPH/OILH	ug/kg	6.80E+05	No Value	--	No Value	--
618-7_Shallow_Focused	Rad	Uranium-233/234	U-233/234	pCi/g	1.09E+01	5.16E+04	2.11E-04	6.37E+03	1.71E-03
618-7_Shallow_Focused	Rad	Uranium-235	15117-96-1	pCi/g	9.74E-01	2.74E+04	3.55E-05	4.36E+03	2.23E-04
618-7_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	6.42E+00	1.57E+04	4.09E-04	5.15E+03	1.25E-03
618-7_Shallow_Focused	non-Rad	Vanadium	7440-62-2	ug/kg	8.05E+04	2.00E+03	**4.03E+01**	3.11E+04	**2.59E+00**
618-7_Shallow_Focused	non-Rad	Zinc	7440-66-6	ug/kg	5.24E+04	5.00E+04	**1.05E+00**	6.78E+04	7.73E-01
618-7_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.96E+04	5.00E+03	**3.91E+00**	7.86E+05	2.49E-02
618-8_Shallow	non-Rad	Arsenic	7440-38-2	ug/kg	4.10E+03	1.00E+04	4.10E-01	1.90E+05	2.16E-02
618-8_Shallow	non-Rad	Barium	7440-39-3	ug/kg	9.76E+04	3.30E+05	2.96E-01	1.32E+06	7.39E-02
618-8_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	1.24E+04	4.00E+02	**3.10E+01**	3.82E+04	3.25E-01
618-8_Shallow	non-Rad	Lead	7439-92-1	ug/kg	5.10E+03	5.00E+04	1.02E-01	3.56E+04	1.43E-01
618-8_Shallow	Rad	RADs SOF	--	pCi/g	--	--	6.99E-05	--	3.30E-04
618-8_Shallow	non-Rad	Selenium	7782-49-2	ug/kg	8.46E+02	5.20E+02	**1.63E+00**	1.90E+03	4.45E-01
618-8_Shallow	non-Rad	Uranium	7440-61-1	ug/kg	1.72E+03	5.00E+03	3.44E-01	7.86E+05	2.19E-03
618-8_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	1.19E+00	5.16E+04	2.31E-05	6.37E+03	1.87E-04
618-8_Shallow	Rad	Uranium-238	U-238	pCi/g	7.34E-01	1.57E+04	4.68E-05	5.15E+03	1.43E-04
618-8_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.94E+03	5.00E+03	3.87E-01	7.86E+05	2.46E-03
618-9_Shallow_Focused	non-Rad	1,1,2,2-Tetrachloroethane	79-34-5	ug/kg	1.10E+02	No Value	--	1.65E+05	6.67E-04
618-9_Shallow_Focused	non-Rad	Acetone	67-64-1	ug/kg	6.80E+02	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Aldrin	309-00-2	ug/kg	3.90E+02	No Value	--	1.65E+02	**2.36E+00**
618-9_Shallow_Focused	non-Rad	Aroclor-1016	12674-11-2	ug/kg	1.90E+03	4.00E+04	4.75E-02	1.82E+03	**1.04E+00**
618-9_Shallow_Focused	non-Rad	Aroclor-1221	11104-28-2	ug/kg	1.90E+03	4.00E+04	4.75E-02	1.47E+03	**1.29E+00**
618-9_Shallow_Focused	non-Rad	Aroclor-1232	11141-16-5	ug/kg	1.90E+03	4.00E+04	4.75E-02	1.44E+03	**1.32E+00**
618-9_Shallow_Focused	non-Rad	Aroclor-1242	53469-21-9	ug/kg	1.90E+03	4.00E+04	4.75E-02	1.49E+03	**1.28E+00**
618-9_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	ug/kg	1.90E+03	4.00E+04	4.75E-02	3.25E+02	**5.85E+00**
618-9_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	ug/kg	3.90E+03	4.00E+04	9.75E-02	1.47E+03	**2.65E+00**
618-9_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	ug/kg	3.90E+03	4.00E+04	9.75E-02	1.47E+03	**2.65E+00**
618-9_Shallow_Focused	non-Rad	Aroclors HI	--	ug/kg	--	--	4.33E-01	--	**1.61E+01**
618-9_Shallow_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	1.16E+04	1.00E+04	**1.16E+00**	1.90E+05	6.11E-02

Table 3. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildife SSL[2]	Hazard Quotient
618-9_Shallow_Focused	non-Rad	Barium	7440-39-3	ug/kg	9.02E+04	3.30E+05	2.73E-01	1.32E+06	6.83E-02
618-9_Shallow_Focused	non-Rad	Beryllium	7440-41-7	ug/kg	3.30E+02	1.00E+04	3.30E-02	1.39E+04	2.37E-02
618-9_Shallow_Focused	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	ug/kg	5.20E+03	1.00E+05	5.20E-02	4.54E+04	1.15E-01
618-9_Shallow_Focused	non-Rad	Butylbenzylphthalate	85-68-7	ug/kg	2.70E+03	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Chlordane	57-74-9	ug/kg	6.90E+01	1.00E+03	6.90E-02	5.04E+04	1.37E-03
618-9_Shallow_Focused	non-Rad	Chloroform	67-66-3	ug/kg	9.00E+00	No Value	--	1.65E+05	5.45E-05
618-9_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	9.70E+03	4.00E+02	**2.43E+01**	3.82E+04	2.54E-01
618-9_Shallow_Focused	non-Rad	Cobalt	7440-48-4	ug/kg	1.14E+04	1.30E+04	8.77E-01	1.11E+05	1.03E-01
618-9_Shallow_Focused	non-Rad	Copper	7440-50-8	ug/kg	1.67E+04	5.00E+04	3.34E-01	1.07E+05	1.56E-01
618-9_Shallow_Focused	non-Rad	Di-n-butylphthalate	84-74-2	ug/kg	7.20E+03	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Heptachlor epoxide	1024-57-3	ug/kg	4.40E+01	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Hexachlorobutadiene	87-68-3	ug/kg	7.60E+02	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Hexachloroethane	67-72-1	ug/kg	1.70E+04	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Lead	7439-92-1	ug/kg	7.70E+03	5.00E+04	1.54E-01	3.56E+04	2.16E-01
618-9_Shallow_Focused	non-Rad	Manganese	7439-96-5	ug/kg	3.59E+05	2.20E+05	**1.63E+00**	5.80E+06	6.19E-02
618-9_Shallow_Focused	non-Rad	Mercury	7439-97-6	ug/kg	3.30E+02	1.00E+02	**3.30E+00**	1.87E+03	1.76E-01
618-9_Shallow_Focused	non-Rad	Methylene chloride	75-09-2	ug/kg	2.30E+03	No Value	--	1.66E+05	1.39E-02
618-9_Shallow_Focused	non-Rad	Nickel	7440-02-0	ug/kg	1.06E+04	3.00E+04	3.53E-01	3.26E+04	3.25E-01
618-9_Shallow_Focused	non-Rad	Nitrate	14797-55-8	ug/kg	1.67E+06	No Value	--	3.40E+08	4.91E-03
618-9_Shallow_Focused	Rad	RADs SOF	--	pCi/g	--	--	1.94E-04	--	5.99E-04
618-9_Shallow_Focused	non-Rad	Tetrachloroethene	127-18-4	ug/kg	9.20E+02	No Value	--	6.98E+04	1.32E-02
618-9_Shallow_Focused	non-Rad	Toluene	108-88-3	ug/kg	9.00E+00	2.00E+05	4.50E-05	5.20E+06	1.73E-06
618-9_Shallow_Focused	non-Rad	Trichloroethene	79-01-6	ug/kg	2.00E+00	No Value	--	7.01E+04	2.85E-05
618-9_Shallow_Focused	non-Rad	Uranium	7440-61-1	ug/kg	3.10E+03	5.00E+03	6.20E-01	7.86E+05	3.94E-03
618-9_Shallow_Focused	Rad	Uranium-235	15117-96-1	pCi/g	7.10E-02	2.74E+04	2.59E-06	4.36E+03	1.63E-05
618-9_Shallow_Focused	Rad	Uranium-238	U-238	pCi/g	3.00E+00	1.57E+04	1.91E-04	5.15E+03	5.83E-04
618-9_Shallow_Focused	non-Rad	Vanadium	7440-62-2	ug/kg	5.93E+04	2.00E+03	**2.97E+01**	3.11E+04	**1.91E+00**
618-9_Shallow_Focused	non-Rad	Zinc	7440-66-6	ug/kg	5.23E+04	5.00E+04	**1.05E+00**	6.78E+04	7.71E-01
618-9_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	8.96E+03	5.00E+03	**1.79E+00**	7.86E+05	1.14E-02
628-4_Overburden	non-Rad	Arsenic	7440-38-2	ug/kg	3.37E+03	1.00E+04	3.37E-01	1.90E+05	1.78E-02
628-4_Overburden	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	ug/kg	6.09E+01	1.00E+05	6.09E-04	4.54E+04	1.34E-03
628-4_Overburden	Rad	Cesium-137	10045-97-3	pCi/g	3.30E-02	2.21E+03	1.49E-05	9.24E+02	3.57E-05
628-4_Overburden	non-Rad	Lead	7439-92-1	ug/kg	7.28E+03	5.00E+04	1.46E-01	3.56E+04	2.05E-01
628-4_Overburden	Rad	RADs SOF	--	pCi/g	--	--	8.12E-05	--	3.24E-04
628-4_Overburden	Rad	Uranium-233/234	U-233/234	pCi/g	8.70E-01	5.16E+04	1.69E-05	6.37E+03	1.37E-04
628-4_Overburden	Rad	Uranium-238	U-238	pCi/g	7.75E-01	1.57E+04	4.94E-05	5.15E+03	1.51E-04
628-4_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.31E+03	5.00E+03	4.62E-01	7.86E+05	2.94E-03
628-4_Shallow	non-Rad	Aroclor-1242	53469-21-9	ug/kg	4.24E+01	4.00E+04	1.06E-03	1.49E+03	2.84E-02
628-4_Shallow	non-Rad	Aroclor-1248	12672-29-6	ug/kg	1.12E+03	4.00E+04	2.79E-02	3.25E+02	**3.43E+00**
628-4_Shallow	non-Rad	Aroclor-1254	11097-69-1	ug/kg	4.05E+02	4.00E+04	1.01E-02	1.47E+03	2.75E-01
628-4_Shallow	non-Rad	Aroclor-1260	11096-82-5	ug/kg	3.78E+01	4.00E+04	9.44E-04	1.47E+03	2.57E-02
628-4_Shallow	non-Rad	Aroclors HI	--	ug/kg	--	--	4.00E-02	--	**3.76E+00**
628-4_Shallow	non-Rad	Arsenic	7440-38-2	ug/kg	3.86E+03	1.00E+04	3.86E-01	1.90E+05	2.03E-02
628-4_Shallow	non-Rad	Lead	7439-92-1	ug/kg	9.92E+04	5.00E+04	**1.98E+00**	3.56E+04	**2.79E+00**
628-4_Shallow	Rad	RADs SOF	--	pCi/g	--	--	9.28E-05	--	4.07E-04
628-4_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	1.13E+00	5.16E+04	2.19E-05	6.37E+03	1.77E-04
628-4_Shallow	Rad	Uranium-235	15117-96-1	pCi/g	1.12E-01	2.74E+04	4.08E-06	4.36E+03	2.57E-05
628-4_Shallow	Rad	Uranium-238	U-238	pCi/g	1.05E+00	1.57E+04	6.68E-05	5.15E+03	2.04E-04
628-4_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	3.16E+03	5.00E+03	6.33E-01	7.86E+05	4.02E-03
UPR-300-17_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.24E+04	5.00E+03	**2.48E+00**	7.86E+05	1.58E-02
UPR-300-17_Shallow	non-Rad	Acenaphthene	83-32-9	ug/kg	1.17E+02	2.00E+04	5.85E-03	1.10E+06	1.06E-04
UPR-300-17_Shallow	non-Rad	Anthracene	120-12-7	ug/kg	7.01E+00	2.90E+04	2.42E-04	6.78E+05	1.03E-05
UPR-300-17_Shallow	non-Rad	Antimony	7440-36-0	ug/kg	3.59E+02	5.00E+03	7.17E-02	5.98E+03	6.00E-02
UPR-300-17_Shallow	non-Rad	Aroclor-1248	12672-29-6	ug/kg	1.97E+03	4.00E+04	4.93E-02	3.25E+02	**6.06E+00**
UPR-300-17_Shallow	non-Rad	Aroclor-1254	11097-69-1	ug/kg	4.50E+02	4.00E+04	1.13E-02	1.47E+03	3.06E-01
UPR-300-17_Shallow	non-Rad	Aroclor-1260	11096-82-5	ug/kg	1.13E+02	4.00E+04	2.83E-03	1.47E+03	7.71E-02
UPR-300-17_Shallow	non-Rad	Aroclors HI	--	ug/kg	--	--	6.34E-02	--	**6.44E+00**
UPR-300-17_Shallow	non-Rad	Arsenic	7440-38-2	ug/kg	2.57E+03	1.00E+04	2.57E-01	1.90E+05	1.35E-02
UPR-300-17_Shallow	non-Rad	Barium	7440-39-3	ug/kg	8.10E+04	3.30E+05	2.45E-01	1.32E+06	6.14E-02
UPR-300-17_Shallow	non-Rad	Benzo(a)anthracene	56-55-3	ug/kg	5.92E+01	1.80E+04	3.29E-03	6.40E+04	9.26E-04
UPR-300-17_Shallow	non-Rad	Benzo(a)pyrene	50-32-8	ug/kg	4.38E+01	1.80E+04	2.43E-03	7.64E+04	5.73E-04
UPR-300-17_Shallow	non-Rad	Benzo(b)fluoranthene	205-99-2	ug/kg	3.27E+01	1.80E+04	1.82E-03	3.92E+04	8.34E-04
UPR-300-17_Shallow	non-Rad	Benzo(k)fluoranthene	207-08-9	ug/kg	1.00E+01	1.80E+04	5.57E-04	3.92E+04	2.56E-04
UPR-300-17_Shallow	non-Rad	Beryllium	7440-41-7	ug/kg	2.40E+02	1.00E+04	2.40E-02	1.39E+04	1.73E-02
UPR-300-17_Shallow	non-Rad	Boron	7440-42-8	ug/kg	3.90E+03	5.00E+02	**7.81E+00**	1.33E+05	2.93E-02
UPR-300-17_Shallow	non-Rad	Cadmium	7440-43-9	ug/kg	1.73E+02	4.00E+03	4.31E-02	1.63E+03	1.06E-01
UPR-300-17_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	1.38E+04	4.00E+02	**3.45E+01**	3.82E+04	3.61E-01
UPR-300-17_Shallow	non-Rad	Chrysene	218-01-9	ug/kg	3.93E+01	1.80E+04	2.18E-03	4.45E+04	8.82E-04
UPR-300-17_Shallow	non-Rad	Cobalt	7440-48-4	ug/kg	6.69E+03	1.30E+04	5.14E-01	1.11E+05	6.02E-02
UPR-300-17_Shallow	non-Rad	Copper	7440-50-8	ug/kg	1.51E+04	5.00E+04	3.03E-01	1.07E+05	1.41E-01
UPR-300-17_Shallow	non-Rad	Fluoranthene	206-44-0	ug/kg	3.53E+01	1.80E+04	1.96E-03	8.39E+05	4.21E-05
UPR-300-17_Shallow	non-Rad	Fluorene	86-73-7	ug/kg	2.93E+00	2.90E+04	1.01E-04	1.75E+05	1.67E-05
UPR-300-17_Shallow	non-Rad	Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg	5.85E+00	1.80E+04	3.25E-04	3.57E+04	1.64E-04
UPR-300-17_Shallow	non-Rad	Lead	7439-92-1	ug/kg	1.12E+04	5.00E+04	2.25E-01	3.56E+04	3.16E-01
UPR-300-17_Shallow	non-Rad	Manganese	7439-96-5	ug/kg	2.85E+05	2.20E+05	**1.30E+00**	5.80E+06	4.92E-02
UPR-300-17_Shallow	non-Rad	Mercury	7439-97-6	ug/kg	6.90E+01	1.00E+02	6.90E-01	1.87E+03	3.69E-02
UPR-300-17_Shallow	non-Rad	Molybdenum	7439-98-7	ug/kg	4.12E+02	2.00E+03	2.06E-01	1.40E+04	2.95E-02
UPR-300-17_Shallow	non-Rad	Naphthalene	91-20-3	ug/kg	4.79E+01	2.90E+04	1.65E-03	1.00E+05	4.79E-04
UPR-300-17_Shallow	non-Rad	Nickel	7440-02-0	ug/kg	5.64E+05	3.00E+04	**1.88E+01**	3.26E+04	**1.73E+01**
UPR-300-17_Shallow	non-Rad	Pyrene	129-00-0	ug/kg	3.41E+01	1.80E+04	1.90E-03	6.00E+05	5.69E-05
UPR-300-17_Shallow	Rad	RADs SOF	--	pCi/g	--	--	4.09E-04	--	1.96E-03
UPR-300-17_Shallow	non-Rad	Silver	7440-22-4	ug/kg	3.40E+02	2.00E+03	1.70E-01	4.96E+04	6.85E-03
UPR-300-17_Shallow	non-Rad	Total petroleum hydrocarbons - diesel range	TPHDIESEL	ug/kg	2.95E+03	2.00E+05	1.48E-02	3.56E+08	8.29E-06
UPR-300-17_Shallow	non-Rad	Total petroleum hydrocarbons - motor oil (high boiling)	TPH/OILH	ug/kg	2.10E+05	No Value	--	No Value	--
UPR-300-17_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	6.15E+00	5.16E+04	1.19E-04	6.37E+03	9.65E-04
UPR-300-17_Shallow	Rad	Uranium-235	15117-96-1	pCi/g	9.14E-01	2.74E+04	3.34E-05	4.36E+03	2.10E-04
UPR-300-17_Shallow	Rad	Uranium-238	U-238	pCi/g	4.04E+00	1.57E+04	2.57E-04	5.15E+03	7.85E-04
UPR-300-17_Shallow	non-Rad	Vanadium	7440-62-2	ug/kg	5.21E+04	2.00E+03	**2.61E+01**	3.11E+04	**1.68E+00**
UPR-300-17_Shallow	non-Rad	Zinc	7440-66-6	ug/kg	1.57E+05	5.00E+04	**3.14E+00**	6.78E+04	**2.32E+00**
UPR-300-46_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	4.90E+03	5.00E+03	9.79E-01	7.86E+05	6.23E-03
UPR-300-46_Shallow	non-Rad	Acenaphthene	83-32-9	ug/kg	1.31E+01	2.00E+04	6.54E-04	1.10E+06	1.19E-05
UPR-300-46_Shallow	non-Rad	Antimony	7440-36-0	ug/kg	3.81E+02	5.00E+03	7.61E-02	5.98E+03	6.37E-02
UPR-300-46_Shallow	non-Rad	Aroclor-1248	12672-29-6	ug/kg	8.79E+02	4.00E+04	2.20E-02	3.25E+02	**2.70E+00**
UPR-300-46_Shallow	non-Rad	Aroclor-1254	11097-69-1	ug/kg	4.90E+02	4.00E+04	1.22E-02	1.47E+03	3.33E-01
UPR-300-46_Shallow	non-Rad	Aroclor-1260	11096-82-5	ug/kg	8.44E+01	4.00E+04	2.11E-03	1.47E+03	5.74E-02
UPR-300-46_Shallow	non-Rad	Aroclors HI	--	ug/kg	--	--	3.63E-02	--	**3.09E+00**
UPR-300-46_Shallow	non-Rad	Arsenic	7440-38-2	ug/kg	2.85E+03	1.00E+04	2.85E-01	1.90E+05	1.50E-02
UPR-300-46_Shallow	non-Rad	Barium	7440-39-3	ug/kg	8.21E+04	3.30E+05	2.49E-01	1.32E+06	6.22E-02

Table 3. 300 Area Waste Sites Ecological Evaluation Based on SSLs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/Invertebrate SSL[1]	Hazard Quotient	Wildlife SSL[2]	Hazard Quotient
UPR-300-46_Shallow	non-Rad	Benzo(a)anthracene	56-55-3	ug/kg	3.88E+00	1.80E+04	2.15E-04	6.40E+04	6.06E-05
UPR-300-46_Shallow	non-Rad	Benzo(a)pyrene	50-32-8	ug/kg	3.40E+00	1.80E+04	1.89E-04	7.64E+04	4.46E-05
UPR-300-46_Shallow	non-Rad	Benzo(b)fluoranthene	205-99-2	ug/kg	5.30E+00	1.80E+04	2.95E-04	3.92E+04	1.35E-04
UPR-300-46_Shallow	non-Rad	Benzo(k)fluoranthene	207-08-9	ug/kg	2.78E+00	1.80E+04	1.55E-04	3.92E+04	7.10E-05
UPR-300-46_Shallow	non-Rad	Beryllium	7440-41-7	ug/kg	2.22E+02	1.00E+04	2.22E-02	1.39E+04	1.60E-02
UPR-300-46_Shallow	non-Rad	Boron	7440-42-8	ug/kg	1.71E+03	5.00E+02	**3.43E+00**	1.33E+05	1.29E-02
UPR-300-46_Shallow	non-Rad	Cadmium	7440-43-9	ug/kg	9.47E+01	4.00E+03	2.37E-02	1.63E+03	5.81E-02
UPR-300-46_Shallow	Rad	Cesium-137	10045-97-3	pCi/g	7.00E-02	2.21E+03	3.17E-05	9.24E+02	7.58E-05
UPR-300-46_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	1.02E+04	4.00E+02	**2.54E+01**	3.82E+04	2.66E-01
UPR-300-46_Shallow	non-Rad	Chrysene	218-01-9	ug/kg	5.58E+00	1.80E+04	3.10E-04	4.45E+04	1.25E-04
UPR-300-46_Shallow	non-Rad	Cobalt	7440-48-4	ug/kg	6.36E+03	1.30E+04	4.89E-01	1.11E+05	5.73E-02
UPR-300-46_Shallow	non-Rad	Copper	7440-50-8	ug/kg	1.32E+04	5.00E+04	2.63E-01	1.07E+05	1.23E-01
UPR-300-46_Shallow	non-Rad	Dibenz[a,h]anthracene	53-70-3	ug/kg	1.25E+00	1.80E+04	6.94E-05	4.41E+04	2.83E-05
UPR-300-46_Shallow	non-Rad	Fluoranthene	206-44-0	ug/kg	9.55E+00	1.80E+04	5.31E-04	8.39E+05	1.14E-05
UPR-300-46_Shallow	non-Rad	Fluorene	86-73-7	ug/kg	2.15E+00	2.90E+04	7.41E-05	1.75E+05	1.23E-05
UPR-300-46_Shallow	non-Rad	Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg	7.80E+00	1.80E+04	4.33E-04	3.57E+04	2.18E-04
UPR-300-46_Shallow	non-Rad	Lead	7439-92-1	ug/kg	7.11E+03	5.00E+04	1.42E-01	3.56E+04	2.00E-01
UPR-300-46_Shallow	non-Rad	Manganese	7439-96-5	ug/kg	3.11E+05	2.20E+05	**1.41E+00**	5.80E+06	5.36E-02
UPR-300-46_Shallow	non-Rad	Mercury	7439-97-6	ug/kg	2.92E+01	1.00E+02	2.92E-01	1.87E+03	1.56E-02
UPR-300-46_Shallow	non-Rad	Molybdenum	7439-98-7	ug/kg	4.56E+02	2.00E+03	2.28E-01	1.40E+04	3.26E-02
UPR-300-46_Shallow	non-Rad	Naphthalene	91-20-3	ug/kg	3.57E+01	2.90E+04	1.23E-03	1.00E+05	3.57E-04
UPR-300-46_Shallow	non-Rad	Nickel	7440-02-0	ug/kg	9.23E+03	3.00E+04	3.08E-01	3.26E+04	2.83E-01
UPR-300-46_Shallow	non-Rad	Pyrene	129-00-0	ug/kg	4.44E+00	1.80E+04	2.46E-04	6.00E+05	7.39E-06
UPR-300-46_Shallow	Rad	RADs SOF	--	pCi/g	--	--	1.85E-04	--	7.45E-04
UPR-300-46_Shallow	Rad	Uranium-233/234	U-233/234	pCi/g	1.77E+00	5.16E+04	3.43E-05	6.37E+03	2.78E-04
UPR-300-46_Shallow	Rad	Uranium-235	15117-96-1	pCi/g	2.43E-01	2.74E+04	8.87E-06	4.36E+03	5.57E-05
UPR-300-46_Shallow	Rad	Uranium-238	U-238	pCi/g	1.73E+00	1.57E+04	1.10E-04	5.15E+03	3.35E-04
UPR-300-46_Shallow	non-Rad	Vanadium	7440-62-2	ug/kg	5.38E+04	2.00E+03	**2.69E+01**	3.11E+04	**1.73E+00**
UPR-300-46_Shallow	non-Rad	Zinc	7440-66-6	ug/kg	4.79E+04	5.00E+04	9.59E-01	6.78E+04	7.07E-01

Notes:

Bolded HQ values are greater than or equal to 1.

[1] = Plant/Invertebrate SSL are the lowest available Generic Lookup Value (ECF-Hanford-11-0060).

[2] = Wildlife SSLs are the lowest available Tier 1 avian or mammal preliminary remediation goal (ECF-Hanford-11-0060).

All data represent detected concentrations of the chemicals.

µg/kg = Microgram per kilogram

Aroclors HI - Sum of HQs within each decisional unit

Hazard Quotients greater than one are in bold font.

pCi/g = pico Curie per gram

Rad = Radionuclide

RADs SOF = Sum of HQs for radionuclide isotopes within each decisional unit

SOF = Sum of fractions

SSL = Soil screening level

Uranium 234 SSLs were used as surrogates for Uranium 233/234.

Table 4. Comparison of 300 Area Waste Sites Exposure Point Concentrations (Exceeding SSLs) to Background for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Lognormal 90th Percentile Background Value	Is EPC > 90th Percentile Background Value?
300-10_Shallow_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	1.35E+04	6.47E+03	**Yes**
300-109_Shallow_Focused	non-Rad	Boron	7440-42-8	ug/kg	6.32E+02	3.62E+03	No
300-109_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	6.95E+03	1.85E+04	No
300-109_Shallow_Focused	non-Rad	Manganese	7439-96-5	ug/kg	2.78E+05	5.12E+05	No
300-109_Shallow_Focused	non-Rad	Vanadium	7440-62-2	ug/kg	4.76E+04	8.51E+04	No
300-109_Staging Pile Area_Focused	non-Rad	Boron	7440-42-8	ug/kg	1.06E+03	3.62E+03	No
300-109_Staging Pile Area_Focused	non-Rad	Chromium	7440-47-3	ug/kg	8.17E+03	1.85E+04	No
300-109_Staging Pile Area_Focused	non-Rad	Manganese	7439-96-5	ug/kg	2.86E+05	5.12E+05	No
300-109_Staging Pile Area_Focused	non-Rad	Vanadium	7440-62-2	ug/kg	4.51E+04	8.51E+04	No
300-109_Staging Pile Area_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	6.88E+03	3.21E+03	**Yes**
300-18_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	6.90E+03	1.85E+04	No
300-259_Shallow	non-Rad	Boron	7440-42-8	ug/kg	1.30E+03	3.62E+03	No
300-259_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	7.90E+03	1.85E+04	No
300-259_Shallow	non-Rad	Manganese	7439-96-5	ug/kg	3.19E+05	5.12E+05	No
300-259_Shallow	non-Rad	Vanadium	7440-62-2	ug/kg	4.26E+04	8.51E+04	No
300-259_Shallow	non-Rad	Zinc	7440-66-6	ug/kg	4.80E+05	6.78E+04	**Yes**
300-260_Shallow_Focused	non-Rad	Boron	7440-42-8	ug/kg	8.36E+03	3.62E+03	**Yes**
300-260_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	9.89E+03	1.85E+04	No
300-260_Shallow_Focused	non-Rad	Copper	7440-50-8	ug/kg	7.33E+04	2.20E+04	**Yes**
300-260_Shallow_Focused	non-Rad	Manganese	7439-96-5	ug/kg	3.28E+05	5.12E+05	No
300-260_Shallow_Focused	non-Rad	Vanadium	7440-62-2	ug/kg	5.90E+04	8.51E+04	No
300-260_Shallow_Focused	non-Rad	Zinc	7440-66-6	ug/kg	7.74E+04	6.78E+04	**Yes**
300-260_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.28E+04	3.21E+03	**Yes**
300-275_Shallow_1	non-Rad	Boron	7440-42-8	ug/kg	1.47E+03	3.62E+03	No
300-275_Shallow_1	non-Rad	Chromium	7440-47-3	ug/kg	8.02E+03	1.85E+04	No
300-275_Shallow_1	non-Rad	Lithium	7439-93-2	ug/kg	6.69E+03	3.35E+04	No
300-275_Shallow_1	non-Rad	Manganese	7439-96-5	ug/kg	2.77E+05	5.12E+05	No
300-275_Shallow_1	non-Rad	Vanadium	7440-62-2	ug/kg	4.51E+04	8.51E+04	No
300-275_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.23E+04	3.21E+03	**Yes**
300-275_Shallow_2	non-Rad	Boron	7440-42-8	ug/kg	1.15E+03	3.62E+03	No
300-275_Shallow_2	non-Rad	Chromium	7440-47-3	ug/kg	8.99E+03	1.85E+04	No
300-275_Shallow_2	non-Rad	Lithium	7439-93-2	ug/kg	7.07E+03	3.35E+04	No
300-275_Shallow_2	non-Rad	Manganese	7439-96-5	ug/kg	2.93E+05	5.12E+05	No
300-275_Shallow_2	non-Rad	Vanadium	7440-62-2	ug/kg	5.16E+04	8.51E+04	No
300-33, 300-41, 300-256_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	5.35E+03	3.21E+03	**Yes**
300-33, 300-41, 300-256_Shallow	non-Rad	Boron	7440-42-8	ug/kg	1.48E+03	3.62E+03	No
300-33, 300-41, 300-256_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	8.78E+03	1.85E+04	No
300-33, 300-41, 300-256_Shallow	non-Rad	Lithium	7439-93-2	ug/kg	5.50E+03	3.35E+04	No
300-33, 300-41, 300-256_Shallow	non-Rad	Manganese	7439-96-5	ug/kg	3.15E+05	5.12E+05	No
300-33, 300-41, 300-256_Shallow	non-Rad	Uranium	7440-61-1	ug/kg	7.26E+03	3.21E+03	**Yes**
300-33, 300-41, 300-256_Shallow	non-Rad	Vanadium	7440-62-2	ug/kg	5.27E+04	8.51E+04	No
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	ug/kg	3.30E+02	--	--
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	ug/kg	3.85E+02	--	--
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	ug/kg	5.20E+01	--	--
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Boron	7440-42-8	ug/kg	1.03E+03	3.62E+03	No
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	8.08E+03	1.85E+04	No
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Lithium	7439-93-2	ug/kg	6.58E+03	3.35E+04	No
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Manganese	7439-96-5	ug/kg	2.59E+05	5.12E+05	No
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Vanadium	7440-62-2	ug/kg	5.14E+04	8.51E+04	No
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	6.46E+03	3.21E+03	**Yes**
300-37_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	ug/kg	1.00E+02	--	--
300-37_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	ug/kg	3.20E+03	--	--
300-44_Shallow_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	1.69E+04	6.47E+03	**Yes**
300-44_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	9.30E+03	1.85E+04	No
300-44_Shallow_Focused	non-Rad	Manganese	7439-96-5	ug/kg	3.03E+05	5.12E+05	No
300-44_Shallow_Focused	non-Rad	Vanadium	7440-62-2	ug/kg	4.32E+04	8.51E+04	No
300-49_Overburden	non-Rad	Aroclor-1254	11097-69-1	ug/kg	3.01E+03	--	--
300-49_Overburden	non-Rad	Chromium	7440-47-3	ug/kg	1.81E+04	1.85E+04	No
300-49_Overburden	non-Rad	Copper	7440-50-8	ug/kg	5.36E+05	2.20E+04	**Yes**
300-49_Overburden	non-Rad	Lead	7439-92-1	ug/kg	3.70E+04	1.02E+04	**Yes**
300-49_Overburden	non-Rad	Manganese	7439-96-5	ug/kg	3.17E+05	5.12E+05	No
300-49_Overburden	non-Rad	Vanadium	7440-62-2	ug/kg	5.04E+04	8.51E+04	No
300-49_Overburden	non-Rad	Zinc	7440-66-6	ug/kg	1.42E+05	6.78E+04	**Yes**
300-49_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	9.17E+03	1.85E+04	No
300-49_Shallow	non-Rad	Manganese	7439-96-5	ug/kg	3.62E+05	5.12E+05	No
300-49_Shallow	non-Rad	Vanadium	7440-62-2	ug/kg	5.87E+04	8.51E+04	No
300-49_Shallow	non-Rad	Zinc	7440-66-6	ug/kg	5.47E+04	6.78E+04	No
300-50_Overburden	non-Rad	Chromium	7440-47-3	ug/kg	1.22E+04	1.85E+04	No
300-50_Overburden	non-Rad	Copper	7440-50-8	ug/kg	6.45E+04	2.20E+04	**Yes**
300-50_Overburden	non-Rad	Manganese	7439-96-5	ug/kg	3.14E+05	5.12E+05	No
300-50_Overburden	non-Rad	Vanadium	7440-62-2	ug/kg	4.52E+04	8.51E+04	No
300-50_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.79E+04	3.21E+03	**Yes**
300-50_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	1.68E+04	1.85E+04	No
300-50_Shallow	non-Rad	Manganese	7439-96-5	ug/kg	3.18E+05	5.12E+05	No
300-50_Shallow	non-Rad	Silver	7440-22-4	ug/kg	2.99E+03	7.30E+02	**Yes**
300-50_Shallow	non-Rad	Vanadium	7440-62-2	ug/kg	4.70E+04	8.51E+04	No
300-50_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.29E+04	3.21E+03	**Yes**
316-1_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	4.06E+04	3.21E+03	**Yes**
316-1_Shallow_1	non-Rad	Aroclor-1248	12672-29-6	ug/kg	3.00E+03	--	--
316-1_Shallow_1	non-Rad	Arsenic	7440-38-2	ug/kg	1.90E+04	6.47E+03	**Yes**
316-1_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	8.30E+04	3.21E+03	**Yes**
316-1_Shallow_3	non-Rad	Chromium	7440-47-3	ug/kg	5.05E+04	1.85E+04	**Yes**
316-1_Shallow_3	non-Rad	Copper	7440-50-8	ug/kg	1.37E+06	2.20E+04	**Yes**
316-1_Shallow_3	non-Rad	Manganese	7439-96-5	ug/kg	3.93E+05	5.12E+05	No
316-1_Shallow_3	non-Rad	Mercury	7439-97-6	ug/kg	1.11E+03	3.30E+02	**Yes**
316-1_Shallow_3	non-Rad	Nickel	7440-02-0	ug/kg	9.47E+04	1.91E+04	**Yes**
316-1_Shallow_3	non-Rad	Selenium	7782-49-2	ug/kg	1.44E+03	7.80E+02	**Yes**
316-1_Shallow_3	non-Rad	Silver	7440-22-4	ug/kg	1.32E+04	7.30E+02	**Yes**
316-1_Shallow_3	non-Rad	Vanadium	7440-62-2	ug/kg	5.67E+04	8.51E+04	No
316-1_Shallow_3	non-Rad	Zinc	7440-66-6	ug/kg	8.20E+04	6.78E+04	**Yes**

Table 4. Comparison of 300 Area Waste Sites Exposure Point Concentrations (Exceeding SSLs) to Background for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Lognormal 90th Percentile Background Value	Is EPC > 90th Percentile Background Value?
316-1_Shallow_3	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	6.31E+04	3.21E+03	**Yes**
316-1_Shallow_4	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	4.30E+04	3.21E+03	**Yes**
316-2_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.10E+05	3.21E+03	**Yes**
316-2_Shallow_2	non-Rad	Aroclor-1248	12672-29-6	ug/kg	6.97E+02	--	--
316-2_Shallow_2	non-Rad	Aroclor-1254	11097-69-1	ug/kg	4.20E+01	--	--
316-2_Shallow_2	non-Rad	Aroclor-1260	11096-82-5	ug/kg	1.10E+02	--	--
316-2_Shallow_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.91E+05	3.21E+03	**Yes**
316-2_Shallow_3	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	7.32E+04	3.21E+03	**Yes**
316-5_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.72E+05	3.21E+03	**Yes**
316-5_Shallow_2	non-Rad	Chromium	7440-47-3	ug/kg	6.90E+03	1.85E+04	No
316-5_Shallow_2	non-Rad	Silver	7440-22-4	ug/kg	3.60E+03	7.30E+02	**Yes**
316-5_Shallow_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.05E+05	3.21E+03	**Yes**
316-5_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.38E+05	3.21E+03	**Yes**
331 LSLDF_Shallow_Focused	non-Rad	Boron	7440-42-8	ug/kg	1.70E+03	3.62E+03	No
331 LSLDF_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	1.03E+04	1.85E+04	No
331 LSLDF_Shallow_Focused	non-Rad	Manganese	7439-96-5	ug/kg	3.49E+05	5.12E+05	No
331 LSLDF_Shallow_Focused	non-Rad	Mercury	7439-97-6	ug/kg	1.10E+02	3.30E+02	No
331 LSLDF_Shallow_Focused	non-Rad	Vanadium	7440-62-2	ug/kg	5.31E+04	8.51E+04	No
331 LSLDF_Shallow_Focused	non-Rad	Zinc	7440-66-6	ug/kg	1.37E+05	6.78E+04	**Yes**
600-243_Shallow	non-Rad	Boron	7440-42-8	ug/kg	2.94E+05	3.62E+03	**Yes**
600-243_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	1.80E+04	1.85E+04	No
600-243_Shallow	non-Rad	Copper	7440-50-8	ug/kg	5.40E+04	2.20E+04	**Yes**
600-243_Shallow	non-Rad	Lead	7439-92-1	ug/kg	4.01E+04	1.02E+04	**Yes**
600-243_Shallow	non-Rad	Selenium	7782-49-2	ug/kg	5.71E+03	7.80E+02	**Yes**
600-243_Shallow	non-Rad	Vanadium	7440-62-2	ug/kg	4.70E+04	8.51E+04	No
600-243_Shallow	non-Rad	Zinc	7440-66-6	ug/kg	8.41E+04	6.78E+04	**Yes**
600-47_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	5.50E+03	1.85E+04	No
618-1_Shallow	non-Rad	Boron	7440-42-8	ug/kg	1.19E+03	3.62E+03	No
618-1_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	7.93E+03	1.85E+04	No
618-1_Shallow	non-Rad	Lithium	7439-93-2	ug/kg	6.38E+03	3.35E+04	No
618-1_Shallow	non-Rad	Manganese	7439-96-5	ug/kg	3.00E+05	5.12E+05	No
618-1_Shallow	non-Rad	Vanadium	7440-62-2	ug/kg	5.63E+04	8.51E+04	No
618-1_Shallow_Focused	non-Rad	Boron	7440-42-8	ug/kg	3.74E+03	3.62E+03	**Yes**
618-1_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	1.95E+04	1.85E+04	**Yes**
618-1_Shallow_Focused	non-Rad	Lithium	7439-93-2	ug/kg	1.33E+04	3.35E+04	No
618-1_Shallow_Focused	non-Rad	Manganese	7439-96-5	ug/kg	4.03E+05	5.12E+05	No
618-1_Shallow_Focused	non-Rad	Mercury	7439-97-6	ug/kg	1.98E+02	3.30E+02	No
618-1_Shallow_Focused	non-Rad	Uranium	7440-61-1	ug/kg	7.08E+03	3.21E+03	**Yes**
618-1_Shallow_Focused	non-Rad	Vanadium	7440-62-2	ug/kg	6.47E+04	8.51E+04	No
618-1_Shallow_Focused	non-Rad	Zinc	7440-66-6	ug/kg	6.81E+04	6.78E+04	**Yes**
618-1_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.50E+04	3.21E+03	**Yes**
618-12_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	3.21E+04	3.21E+03	**Yes**
618-13_Shallow	non-Rad	Boron	7440-42-8	ug/kg	1.05E+03	3.62E+03	No
618-13_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	1.07E+04	1.85E+04	No
618-13_Shallow	non-Rad	Manganese	7439-96-5	ug/kg	3.44E+05	5.12E+05	No
618-13_Shallow	non-Rad	Vanadium	7440-62-2	ug/kg	5.58E+04	8.51E+04	No
618-13_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	5.06E+03	3.21E+03	**Yes**
618-13_Shallow_Focused	non-Rad	Boron	7440-42-8	ug/kg	9.60E+02	3.62E+03	No
618-13_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	8.74E+03	1.85E+04	No
618-13_Shallow_Focused	non-Rad	Manganese	7439-96-5	ug/kg	2.68E+05	5.12E+05	No
618-13_Shallow_Focused	non-Rad	Vanadium	7440-62-2	ug/kg	4.86E+04	8.51E+04	No
618-2_Overburden	non-Rad	Chromium	7440-47-3	ug/kg	6.60E+03	1.85E+04	No
618-2_Overburden	non-Rad	Selenium	7782-49-2	ug/kg	1.00E+03	7.80E+02	**Yes**
618-2_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	7.10E+03	1.85E+04	No
618-2_Shallow	non-Rad	Selenium	7782-49-2	ug/kg	7.60E+02	7.80E+02	No
618-2_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	5.85E+03	3.21E+03	**Yes**
618-2_Staging Pile	non-Rad	Chromium	7440-47-3	ug/kg	6.42E+03	1.85E+04	No
618-2_Staging Pile	non-Rad	Uranium	7440-61-1	ug/kg	5.02E+03	3.21E+03	**Yes**
618-2_Staging Pile	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	9.20E+03	3.21E+03	**Yes**
618-3_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	9.70E+03	1.85E+04	No
618-3_Shallow	non-Rad	Selenium	7782-49-2	ug/kg	6.59E+02	7.80E+02	No
618-3_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.39E+05	3.21E+03	**Yes**
618-4_Shallow	non-Rad	Lead	7439-92-1	ug/kg	4.90E+04	1.02E+04	**Yes**
618-4_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	7.46E+03	3.21E+03	**Yes**
618-5_Overburden	non-Rad	Chromium	7440-47-3	ug/kg	9.70E+03	1.85E+04	No
618-5_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	9.77E+03	3.21E+03	**Yes**
618-5_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	1.13E+04	1.85E+04	No
618-5_Staging Pile_4	non-Rad	Chromium	7440-47-3	ug/kg	1.18E+04	1.85E+04	No
618-5_Staging Pile_5	non-Rad	Chromium	7440-47-3	ug/kg	1.03E+04	1.85E+04	No
618-7_Shallow_1	non-Rad	Chromium	7440-47-3	ug/kg	1.02E+04	1.85E+04	No
618-7_Shallow_1	non-Rad	Manganese	7439-96-5	ug/kg	3.26E+05	5.12E+05	No
618-7_Shallow_1	non-Rad	Vanadium	7440-62-2	ug/kg	7.46E+04	8.51E+04	No
618-7_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.08E+04	3.21E+03	**Yes**
618-7_Shallow_2	non-Rad	Chromium	7440-47-3	ug/kg	6.80E+03	1.85E+04	No
618-7_Shallow_2	non-Rad	Manganese	7439-96-5	ug/kg	3.64E+05	5.12E+05	No
618-7_Shallow_2	non-Rad	Vanadium	7440-62-2	ug/kg	7.47E+04	8.51E+04	No
618-7_Shallow_3	non-Rad	Chromium	7440-47-3	ug/kg	1.01E+04	1.85E+04	No
618-7_Shallow_3	non-Rad	Manganese	7439-96-5	ug/kg	3.57E+05	5.12E+05	No
618-7_Shallow_3	non-Rad	Vanadium	7440-62-2	ug/kg	6.82E+04	8.51E+04	No
618-7_Shallow_4	non-Rad	Chromium	7440-47-3	ug/kg	1.14E+04	1.85E+04	No
618-7_Shallow_4	non-Rad	Manganese	7439-96-5	ug/kg	2.85E+05	5.12E+05	No
618-7_Shallow_4	non-Rad	Vanadium	7440-62-2	ug/kg	5.48E+04	8.51E+04	No
618-7_Shallow_Focused	non-Rad	Cadmium	7440-43-9	ug/kg	6.20E+03	7.84E+02	**Yes**
618-7_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	6.59E+04	1.85E+04	**Yes**

Table 4. Comparison of 300 Area Waste Sites Exposure Point Concentrations (Exceeding SSLs) to Background for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Lognormal 90th Percentile Background Value	Is EPC > 90th Percentile Background Value?
618-7_Shallow_Focused	non-Rad	Manganese	7439-96-5	ug/kg	4.25E+05	5.12E+05	No
618-7_Shallow_Focused	non-Rad	Vanadium	7440-62-2	ug/kg	8.05E+04	8.51E+04	No
618-7_Shallow_Focused	non-Rad	Zinc	7440-66-6	ug/kg	5.24E+04	6.78E+04	No
618-7_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.96E+04	3.21E+03	**Yes**
618-8_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	1.24E+04	1.85E+04	No
618-8_Shallow	non-Rad	Selenium	7782-49-2	ug/kg	8.46E+02	7.80E+02	**Yes**
618-9_Shallow_Focused	non-Rad	Aldrin	309-00-2	ug/kg	3.90E+02	--	--
618-9_Shallow_Focused	non-Rad	Aroclor-1016	12674-11-2	ug/kg	1.90E+03	--	--
618-9_Shallow_Focused	non-Rad	Aroclor-1221	11104-28-2	ug/kg	1.90E+03	--	--
618-9_Shallow_Focused	non-Rad	Aroclor-1232	11141-16-5	ug/kg	1.90E+03	--	--
618-9_Shallow_Focused	non-Rad	Aroclor-1242	53469-21-9	ug/kg	1.90E+03	--	--
618-9_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	ug/kg	1.90E+03	--	--
618-9_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	ug/kg	3.90E+03	--	--
618-9_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	ug/kg	3.90E+03	--	--
618-9_Shallow_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	1.16E+04	6.47E+03	**Yes**
618-9_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	9.70E+03	1.85E+04	No
618-9_Shallow_Focused	non-Rad	Manganese	7439-96-5	ug/kg	3.59E+05	5.12E+05	No
618-9_Shallow_Focused	non-Rad	Mercury	7439-97-6	ug/kg	3.30E+02	3.30E+02	No
618-9_Shallow_Focused	non-Rad	Vanadium	7440-62-2	ug/kg	5.93E+04	8.51E+04	No
618-9_Shallow_Focused	non-Rad	Zinc	7440-66-6	ug/kg	5.23E+04	6.78E+04	No
618-9_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	8.96E+03	3.21E+03	**Yes**
628-4_Shallow	non-Rad	Aroclor-1242	53469-21-9	ug/kg	4.24E+01	--	--
628-4_Shallow	non-Rad	Aroclor-1248	12672-29-6	ug/kg	1.12E+03	--	--
628-4_Shallow	non-Rad	Aroclor-1254	11097-69-1	ug/kg	4.05E+02	--	--
628-4_Shallow	non-Rad	Aroclor-1260	11096-82-5	ug/kg	3.78E+01	--	--
628-4_Shallow	non-Rad	Lead	7439-92-1	ug/kg	9.92E+04	1.02E+04	**Yes**
UPR-300-17_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.24E+04	3.21E+03	**Yes**
UPR-300-17_Shallow	non-Rad	Aroclor-1248	12672-29-6	ug/kg	1.97E+03	--	--
UPR-300-17_Shallow	non-Rad	Aroclor-1254	11097-69-1	ug/kg	4.50E+02	--	--
UPR-300-17_Shallow	non-Rad	Aroclor-1260	11096-82-5	ug/kg	1.13E+02	--	--
UPR-300-17_Shallow	non-Rad	Boron	7440-42-8	ug/kg	3.90E+03	3.62E+03	**Yes**
UPR-300-17_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	1.38E+04	1.85E+04	No
UPR-300-17_Shallow	non-Rad	Manganese	7439-96-5	ug/kg	2.85E+05	5.12E+05	No
UPR-300-17_Shallow	non-Rad	Nickel	7440-02-0	ug/kg	5.64E+05	1.91E+04	**Yes**
UPR-300-17_Shallow	non-Rad	Vanadium	7440-62-2	ug/kg	5.21E+04	8.51E+04	No
UPR-300-17_Shallow	non-Rad	Zinc	7440-66-6	ug/kg	1.57E+05	6.78E+04	**Yes**
UPR-300-46_Shallow	non-Rad	Aroclor-1248	12672-29-6	ug/kg	8.79E+02	--	--
UPR-300-46_Shallow	non-Rad	Aroclor-1254	11097-69-1	ug/kg	4.90E+02	--	--
UPR-300-46_Shallow	non-Rad	Aroclor-1260	11096-82-5	ug/kg	8.44E+01	--	--
UPR-300-46_Shallow	non-Rad	Boron	7440-42-8	ug/kg	1.71E+03	3.62E+03	No
UPR-300-46_Shallow	non-Rad	Chromium	7440-47-3	ug/kg	1.02E+04	1.85E+04	No
UPR-300-46_Shallow	non-Rad	Manganese	7439-96-5	ug/kg	3.11E+05	5.12E+05	No
UPR-300-46_Shallow	non-Rad	Vanadium	7440-62-2	ug/kg	5.38E+04	8.51E+04	No

Notes-

EPC = Exposure point concentration

pCi/g = picocuries per gram

SSL = Soil screening level

ug/kg - microgram per kilogram

Table 5. Summary of 300 Area Waste Sites Ecological Evaluation Based on SSLs and Background for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	SSL-based Exceedances		Exceedances based on comparisons to SSLs and Background[1]	
	Plant/Invertebrate SSL-based HQ	Wildlife SSL-based HQ	Plant/Invertebrate SSL-based HQ	Wildlife SSL-based HQ
300-10_Shallow_Focused	Arsenic (1.35e00)	--	Arsenic (1.35e00)	--
300-109_Shallow_Focused	Boron (1.26e00) Chromium (1.74e01) Manganese (1.26e00) Vanadium (2.38e01)	Vanadium (1.53e00)	--	--
300-109_Staging Pile Area_Focused	Boron (2.12e00) Chromium (2.04e01) Manganese (1.30e00) Total Uranium Isotopes (1.38e00) Vanadium (2.26e01)	Vanadium (1.45e00)	Total Uranium Isotopes (1.38e00)	--
300-18_Shallow	Chromium (1.73e01)	--	--	--
300-259_Shallow	Boron (2.61e00) Chromium (1.98e01) Manganese (1.45e00) Vanadium (2.13e01) Zinc (9.59e00)	Vanadium (1.37e00) Zinc (7.07e00)	Zinc (9.59e00)	Zinc (7.07e00)
300-260_Shallow_Focused	Boron (1.67e01) Chromium (2.47e01) Copper (1.47e00) Manganese (1.49e00) Total Uranium Isotopes (2.56e00) Vanadium (2.95e01) Zinc (1.55e00)	Vanadium (1.90e00) Zinc (1.14e00)	Boron (1.67e01) Copper (1.47e00) Total Uranium Isotopes (2.56e00) Zinc (1.55e00)	Zinc (1.14e00)
300-275_Shallow_1	Boron (2.93e00) Chromium (2.01e01) Lithium (3.34e00) Manganese (1.26e00) Total Uranium Isotopes (4.45e00) Vanadium (2.26e01)	Vanadium (1.45e00)	Total Uranium Isotopes (4.45e00)	--
300-275_Shallow_2	Boron (2.29e00) Chromium (2.25e01) Lithium (3.53e00) Manganese (1.33e00) Vanadium (2.58e01)	Vanadium (1.66e00)	--	--
300-33, 300-41, 300-256_Shallow	Boron (2.97e00) Chromium (2.20e01) Lithium (2.75e00) Manganese (1.43e00) Total Uranium Isotopes (1.07e00) Uranium (1.45e00) Vanadium (2.63e01)	Vanadium (1.69e00)	Total Uranium Isotopes (1.07e00) Uranium (1.45e00)	--
300-33, 300-41, 300-256_Shallow_Focused	Boron (2.06e00) Chromium (2.02e01) Lithium (3.29e00) Manganese (1.18e00) Total Uranium Isotopes (1.29e00) Vanadium (2.57e01)	Aroclor-1248 (1.02e00) Aroclor HI (1.32e00) Vanadium (1.65e00)	Total Uranium Isotopes (1.29e00)	Aroclor-1248 (1.02e00) Aroclor HI (1.32e00)
300-37_Shallow_Focused	--	Aroclor-1260 (2.18e00) Aroclor HI (2.25e00)	--	Aroclor-1260 (2.18e00) Aroclor HI (2.25e00)
300-44_Shallow_Focused	Arsenic (1.69e00) Chromium (2.33e01) Manganese (1.38e00) Vanadium (2.16e01)	Vanadium (1.39e00)	Arsenic (1.69e00)	--
300-49_Overburden	Chromium (4.53e01) Copper (1.07e01) Manganese (1.44e00) Vanadium (2.52e01) Zinc (2.84e00)	Aroclor-1254 (2.05e00) Copper (5.01e00) Lead (1.04e00) Vanadium (1.62e00) Zinc (2.09e00)	Copper (1.07e01) Zinc (2.84e00)	Aroclor-1254 (2.05e00) Copper (5.01e00) Lead (1.04e00) Zinc (2.09e00)

Table 5. Summary of 300 Area Waste Sites Ecological Evaluation Based on SSLs and Background for Surface Soils (0 to 15 feet)

300-49_Shallow	Chromium (2.29e01) Manganese (1.64e00) Vanadium (2.93e01) Zinc (1.09e00)	Vanadium (1.89e00)	--	--
300-50_Overburden	Chromium (3.05e01) Copper (1.29e00) Manganese (1.43e00) Total Uranium Isotopes (3.58e00) Vanadium (2.26e01)	Vanadium (1.45e00)	Copper (1.29e00) Total Uranium Isotopes (3.58e00)	--
300-50_Shallow	Chromium (4.21e01) Manganese (1.45e00) Silver (1.50e00) Total Uranium Isotopes (4.59e00) Vanadium (2.35e01)	Vanadium (1.51e00)	Silver (1.50e00) Total Uranium Isotopes (4.59e00)	--
316-1_Overburden	Total Uranium Isotopes (8.11e00)	--	Total Uranium Isotopes (8.11e00)	--
316-1_Shallow_1	Arsenic (1.90e00) Total Uranium Isotopes (1.66e01)	Aroclor-1248 (9.23e00)	Arsenic (1.90e00) Total Uranium Isotopes (1.66e01)	Aroclor-1248 (9.23e00)
316-1_Shallow_3	Chromium (1.26e02) Copper (2.73e01) Manganese (1.79e00) Mercury (1.11e01) Nickel (3.16e00) Selenium (2.78e00) Silver (6.60e00) Total Uranium Isotopes (1.26e01) Vanadium (2.84e01) Zinc (1.64e00)	Chromium (1.32e00) Copper (1.28e01) Nickel (2.90e00) Vanadium (1.82e00) Zinc (1.21e00)	Chromium (1.26e02) Copper (2.73e01) Mercury (1.11e01) Nickel (3.16e00) Total Uranium Isotopes (1.26e01) Selenium (2.78e00) Silver (6.60e00) Zinc (1.64e00)	Chromium (1.32e00) Copper (1.28e01) Nickel (2.90e00) Zinc (1.21e00)
316-1_Shallow_4	Total Uranium Isotopes (8.59e00)	--	Total Uranium Isotopes (8.59e00)	--
316-2_Shallow_1	Total Uranium Isotopes (4.21e01)	--	Total Uranium Isotopes (4.21e01)	--
316-2_Shallow_2	Total Uranium Isotopes (5.83e01)	Aroclor-1248 (2.14e00) Aroclor HI (2.24e00)	Total Uranium Isotopes (5.83e01)	Aroclor-1248 (2.14e00) Aroclor HI (2.24e00)
316-2_Shallow_3	Total Uranium Isotopes (1.46e01)	--	Total Uranium Isotopes (1.46e01)	--
316-5_Shallow_1	Total Uranium Isotopes (5.44e01)	--	Total Uranium Isotopes (5.44e01)	--
316-5_Shallow_2	Chromium (1.73e01) Silver (1.80e00) Total Uranium Isotopes (4.09e01)	--	Silver (1.80e00) Total Uranium Isotopes (4.09e01)	--
316-5_Shallow_Focused	Total Uranium Isotopes (2.76e01)	--	Total Uranium Isotopes (2.76e01)	--
331 LSLDF_Shallow_Focused	Boron (3.40e00) Chromium (2.58e01) Manganese (1.59e00) Mercury (1.10e00) Vanadium (2.66e01) Zinc (2.74e00)	Vanadium (1.71e00) Zinc (2.02e00)	Zinc (2.74e00)	Zinc (2.02e00)
600-243_Shallow	Boron (5.89e02) Chromium (4.50e01) Copper (1.08e00) Selenium (1.10e01) Vanadium (2.35e01) Zinc (1.68e00)	Boron (2.21e00) Lead (1.13e00) Selenium (3.00e00) Vanadium (1.51e00) Zinc (1.24e00)	Boron (5.89e02) Copper (1.08e00) Selenium (1.10e01) Zinc (1.68e00)	Boron (2.21e00) Lead (1.13e00) Selenium (3.00e00) Zinc (1.24e00)
600-47_Shallow	Chromium (1.38e01)	--	--	--
618-1_Shallow	Boron (2.38e00) Chromium (1.98e01) Lithium (3.19e00) Manganese (1.36e00) Vanadium (2.82e01)	Vanadium (1.81e00)	--	--

Table 5. Summary of 300 Area Waste Sites Ecological Evaluation Based on SSLs and Background for Surface Soils (0 to 15 feet)

618-1_Shallow_Focused	Boron (7.48e00) Chromium (4.88e01) Lithium (6.65e00) Manganese (1.83e00) Mercury (1.98e00) Total Uranium Isotopes (4.99e00) Uranium (1.42e00) Vanadium (3.24e01) Zinc (1.36e00)	Vanadium (2.08e00) Zinc (1.00e00)	Boron (7.48e00) Chromium (4.88e01) Total Uranium Isotopes (4.99e00) Uranium (1.42e00) Zinc (1.36e00)	Zinc (1.00e00)
618-12_Shallow	Total Uranium Isotopes (6.42e00)	--	Total Uranium Isotopes (6.42e00)	--
618-13_Shallow	Boron (2.10e00) Chromium (2.68e01) Manganese (1.56e00) Total Uranium Isotopes (1.01e00) Vanadium (2.79e01)	Vanadium (1.79e00)	Total Uranium Isotopes (1.01e00)	--
618-13_Shallow_Focused	Boron (1.92e00) Chromium (2.19e01) Manganese (1.22e00) Vanadium (2.43e01)	Vanadium (1.56e00)	--	--
618-2_Overburden	Chromium (1.65e01) Selenium (1.92e00)	--	Selenium (1.92e00)	--
618-2_Shallow	Chromium (1.78e01) Selenium (1.46e00) Total Uranium Isotopes (1.17e00)	--	Total Uranium Isotopes (1.17e00)	--
618-2_Staging Pile	Chromium (1.61e01) Total Uranium Isotopes (1.84e00) Uranium (1.00e00)	--	Total Uranium Isotopes (1.84e00) Uranium (1.00e00)	--
618-3_Shallow	Chromium (2.43e01) Selenium (1.27e00)	--	--	--
618-3_Shallow_Focused	Total Uranium Isotopes (4.77e01)	--	Total Uranium Isotopes (4.77e01)	--
618-4_Shallow	Total Uranium Isotopes (1.49e00)	Lead (1.38e00)	Total Uranium Isotopes (1.49e00)	Lead (1.38e00)
618-5_Overburden	Chromium (2.43e01) Total Uranium Isotopes (1.95e00)	--	Total Uranium Isotopes (1.95e00)	--
618-5_Shallow	Chromium (2.83e01)	--	--	--
618-5_Staging Pile_4	Chromium (2.95e01)	--	--	--
618-5_Staging Pile_5	Chromium (2.58e01)	--	--	--
618-7_Shallow_1	Chromium (2.56e01) Manganese (1.48e00) Total Uranium Isotopes (2.16e00) Vanadium (3.73e01)	Vanadium (2.40e00)	Total Uranium Isotopes (2.16e00)	--
618-7_Shallow_2	Chromium (1.70e01) Manganese (1.65e00) Vanadium (3.74e01)	Vanadium (2.40e00)	--	--
618-7_Shallow_3	Chromium (2.53e01) Manganese (1.62e00) Vanadium (3.41e01)	Vanadium (2.19e00)	--	--
618-7_Shallow_4	Chromium (2.85e01) Manganese (1.30e00) Vanadium (2.74e01)	Vanadium (1.76e00)	--	--
618-7_Shallow_Focused	Cadmium (1.55e00) Chromium (1.65e02) Manganese (1.93e00) Total Uranium Isotopes (3.91e00) Vanadium (4.03e01) Zinc (1.05e00)	Cadmium (3.80e00) Chromium (1.73e00) Vanadium (2.59e00)	Cadmium (1.55e00) Chromium (1.65e02) Total Uranium Isotopes (3.91e00)	Cadmium (3.80e00) Chromium (1.73e00)
618-8_Shallow	Chromium (3.10e01) Selenium (1.63e00)	--	Selenium (1.63e00)	--

Table 5. Summary of 300 Area Waste Sites Ecological Evaluation Based on SSLs and Background for Surface Soils (0 to 15 feet)

618-9_Shallow_Focused	Arsenic (1.16e00) Chromium (2.43e01) Manganese (1.63e00) Mercury (3.30e00) Total Uranium Isotopes (1.79e00) Vanadium (2.97e01) Zinc (1.05e00)	Aldrin (2.36e00) Aroclor-1016 (1.04e00) Aroclor-1221 (1.29e00) Aroclor-1232 (1.32e00) Aroclor-1242 (1.28e00) Aroclor-1248 (5.85e00) Aroclor-1254 (2.65e00) Aroclor-1260 (2.65e00) Aroclor HI (1.61e+01) Vanadium (1.91e00)	Arsenic (1.16e00) Total Uranium Isotopes (1.79e00)	Aldrin (2.36e00) Aroclor-1016 (1.04e00) Aroclor-1221 (1.29e00) Aroclor-1232 (1.32e00) Aroclor-1242 (1.28e00) Aroclor-1248 (5.85e00) Aroclor-1254 (2.65e00) Aroclor-1260 (2.65e00) Aroclor HI (1.61e+01)
628-4_Shallow	Lead (1.98e00)	Aroclor-1248 (3.43e00) Aroclor HI (3.76e00) Lead (2.79e00)	Lead (1.98e00)	Aroclor-1248 (3.43e00) Aroclor HI (3.76e00) Lead (2.79e00)
UPR-300-17_Shallow	Boron (7.81e00) Chromium (3.45e01) Manganese (1.30e00) Nickel (1.88e01) Total Uranium Isotopes (2.48e00) Vanadium (2.61e01) Zinc (3.14e00)	Aroclor-1248 (6.06e00) Aroclor HI (6.44e00) Nickel (1.73e01) Vanadium (1.68e00) Zinc (2.32e00)	Boron (7.81e00) Nickel (1.88e01) Total Uranium Isotopes (2.48e00) Zinc (3.14e00)	Aroclor-1248 (6.06e00) Aroclor HI (6.44e00) Nickel (1.73e01) Zinc (2.32e00)
UPR-300-46_Shallow	Boron (3.43e00) Chromium (2.54e01) Manganese (1.41e00) Vanadium (2.69e01)	Aroclor-1248 (2.70e00) Aroclor HI (3.09e00) Vanadium (1.73e00)	--	Aroclor-1248 (2.70e00) Aroclor HI (3.09e00)

Notes:

1 = 90th percentile of Hanford site background concentration

HQ = Hazard Quotient

SSL = Soil screening level

Table 6. Tier 2 Ecological PRG Comparisons for 300 Area Source OU Waste Site Decision Units

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/ Invertebrate PRG	Hazard Quotient	Wildlife PRG	Hazard Quotient
300-10_Shallow_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	1.35E+04	1.93E+04	6.99E-01	1.27E+05	1.06E-01
300-109_Staging Pile Area_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	6.88E+03	2.50E+05	2.75E-02	4.03E+04	1.71E-01
300-259_Shallow	non-Rad	Zinc	7440-66-6	ug/kg	4.80E+05	3.93E+05	**1.22E+00**	8.56E+05	5.60E-01
300-260_Shallow_Focused	non-Rad	Boron	7440-42-8	ug/kg	8.36E+03	2.96E+04	2.82E-01	9.06E+04	9.23E-02
300-260_Shallow_Focused	non-Rad	Copper	7440-50-8	ug/kg	7.33E+04	5.00E+04	**1.47E+00**	2.13E+05	3.44E-01
300-260_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.28E+04	2.50E+05	5.12E-02	4.03E+04	3.18E-01
300-260_Shallow_Focused	non-Rad	Zinc	7440-66-6	ug/kg	7.74E+04	3.93E+05	1.97E-01	8.56E+05	9.04E-02
300-275_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.23E+04	2.50E+05	8.90E-02	4.03E+04	5.52E-01
300-33, 300-41, 300-256_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	5.35E+03	2.50E+05	2.14E-02	4.03E+04	1.33E-01
300-33, 300-41, 300-256_Shallow	non-Rad	Uranium	7440-61-1	ug/kg	7.26E+03	2.50E+05	2.90E-02	4.03E+04	1.80E-01
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	ug/kg	3.30E+02	No Value	--	No Value	--
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	ug/kg	3.85E+02	No Value	--	No Value	--
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	ug/kg	5.20E+01	No Value	--	No Value	--
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	6.46E+03	2.50E+05	2.58E-02	4.03E+04	1.60E-01
300-37_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	ug/kg	1.00E+02	No Value	--	No Value	--
300-37_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	ug/kg	3.20E+03	No Value	--	No Value	--
300-44_Shallow_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	1.69E+04	1.93E+04	8.76E-01	1.27E+05	1.33E-01
300-49_Overburden	non-Rad	Aroclor-1254	11097-69-1	ug/kg	3.01E+03	No Value	--	No Value	--
300-49_Overburden	non-Rad	Copper	7440-50-8	ug/kg	5.36E+05	5.00E+04	**1.07E+01**	2.13E+05	**2.52E+00**
300-49_Overburden	non-Rad	Lead	7439-92-1	ug/kg	3.70E+04	1.25E+05	2.96E-01	1.56E+05	2.37E-01
300-49_Overburden	non-Rad	Zinc	7440-66-6	ug/kg	1.42E+05	3.93E+05	3.61E-01	8.56E+05	1.66E-01
300-50_Overburden	non-Rad	Copper	7440-50-8	ug/kg	6.45E+04	5.00E+04	**1.29E+00**	2.13E+05	3.03E-01
300-50_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.79E+04	2.50E+05	7.17E-02	4.03E+04	4.45E-01
300-50_Shallow	non-Rad	Silver	7440-22-4	ug/kg	2.99E+03	5.60E+05	5.34E-03	9.83E+05	3.04E-03
300-50_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.29E+04	2.50E+05	9.18E-02	4.03E+04	5.69E-01
316-1_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	4.06E+04	2.50E+05	1.62E-01	4.03E+04	**1.01E+00**
316-1_Shallow_1	non-Rad	Aroclor-1248	12672-29-6	ug/kg	3.00E+03	No Value	--	No Value	--
316-1_Shallow_1	non-Rad	Arsenic	7440-38-2	ug/kg	1.90E+04	1.93E+04	9.85E-01	1.27E+05	1.50E-01
316-1_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	8.30E+04	2.50E+05	3.32E-01	4.03E+04	**2.06E+00**
316-1_Shallow_3	non-Rad	Chromium	7440-47-3	ug/kg	5.05E+04	4.20E+04	**1.20E+00**	1.09E+05	4.63E-01
316-1_Shallow_3	non-Rad	Copper	7440-50-8	ug/kg	1.37E+06	5.00E+04	**2.73E+01**	2.13E+05	**6.41E+00**
316-1_Shallow_3	non-Rad	Mercury	7439-97-6	ug/kg	1.11E+03	3.30E+02	**3.35E+00**	1.56E+03	7.09E-01
316-1_Shallow_3	non-Rad	Nickel	7440-02-0	ug/kg	9.47E+04	3.80E+04	**2.49E+00**	2.47E+05	3.83E-01
316-1_Shallow_3	non-Rad	Selenium	7782-49-2	ug/kg	1.44E+03	1.20E+03	**1.20E+00**	1.43E+03	**1.01E+00**
316-1_Shallow_3	non-Rad	Silver	7440-22-4	ug/kg	1.32E+04	5.60E+05	2.36E-02	9.83E+05	1.34E-02
316-1_Shallow_3	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	6.31E+04	2.50E+05	2.52E-01	4.03E+04	**1.56E+00**
316-1_Shallow_3	non-Rad	Zinc	7440-66-6	ug/kg	8.20E+04	3.93E+05	2.09E-01	8.56E+05	9.58E-02
316-1_Shallow_4	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	4.30E+04	2.50E+05	1.72E-01	4.03E+04	**1.07E+00**
316-2_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.10E+05	2.50E+05	8.42E-01	4.03E+04	**5.22E+00**
316-2_Shallow_2	non-Rad	Aroclor-1248	12672-29-6	ug/kg	6.97E+02	No Value	--	No Value	--
316-2_Shallow_2	non-Rad	Aroclor-1254	11097-69-1	ug/kg	4.20E+01	No Value	--	No Value	--
316-2_Shallow_2	non-Rad	Aroclor-1260	11096-82-5	ug/kg	1.10E+02	No Value	--	No Value	--
316-2_Shallow_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.91E+05	2.50E+05	**1.17E+00**	4.03E+04	**7.23E+00**
316-2_Shallow_3	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	7.32E+04	2.50E+05	2.93E-01	4.03E+04	**1.82E+00**
316-5_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.72E+05	2.50E+05	**1.09E+00**	4.03E+04	**6.74E+00**
316-5_Shallow_2	non-Rad	Silver	7440-22-4	ug/kg	3.60E+03	5.60E+05	6.43E-03	9.83E+05	3.66E-03
316-5_Shallow_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.05E+05	2.50E+05	8.19E-01	4.03E+04	**5.08E+00**
316-5_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.38E+05	2.50E+05	5.52E-01	4.03E+04	**3.43E+00**
331 LSLDF_Shallow_Focused	non-Rad	Zinc	7440-66-6	ug/kg	1.37E+05	3.93E+05	3.49E-01	8.56E+05	1.60E-01
600-243_Shallow	non-Rad	Boron	7440-42-8	ug/kg	2.94E+05	2.96E+04	**9.95E+00**	9.06E+04	**3.25E+00**
600-243_Shallow	non-Rad	Copper	7440-50-8	ug/kg	5.40E+04	5.00E+04	**1.08E+00**	2.13E+05	2.53E-01

Table 6. Tier 2 Ecological PRG Comparisons for 300 Area Source OU Waste Site Decision Units

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/ Invertebrate PRG	Hazard Quotient	Wildlife PRG	Hazard Quotient
600-243_Shallow	non-Rad	Lead	7439-92-1	ug/kg	4.01E+04	1.25E+05	3.21E-01	1.56E+05	2.57E-01
600-243_Shallow	non-Rad	Selenium	7782-49-2	ug/kg	5.71E+03	1.20E+03	**4.76E+00**	1.43E+03	**3.99E+00**
600-243_Shallow	non-Rad	Zinc	7440-66-6	ug/kg	8.41E+04	3.93E+05	2.14E-01	8.56E+05	9.82E-02
618-1_Shallow_Focused	non-Rad	Boron	7440-42-8	ug/kg	3.74E+03	2.96E+04	1.26E-01	9.06E+04	4.13E-02
618-1_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	1.95E+04	4.20E+04	4.64E-01	1.09E+05	1.79E-01
618-1_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.50E+04	2.50E+05	9.98E-02	4.03E+04	6.19E-01
618-1_Shallow_Focused	non-Rad	Uranium	7440-61-1	ug/kg	7.08E+03	2.50E+05	2.83E-02	4.03E+04	1.76E-01
618-1_Shallow_Focused	non-Rad	Zinc	7440-66-6	ug/kg	6.81E+04	3.93E+05	1.73E-01	8.56E+05	7.96E-02
618-12_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	3.21E+04	2.50E+05	1.28E-01	4.03E+04	7.96E-01
618-13_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	5.06E+03	2.50E+05	2.02E-02	4.03E+04	1.26E-01
618-2_Overburden	non-Rad	Selenium	7782-49-2	ug/kg	1.00E+03	1.20E+03	8.33E-01	1.43E+03	6.99E-01
618-2_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	5.85E+03	2.50E+05	2.34E-02	4.03E+04	1.45E-01
618-2_Staging Pile	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	9.20E+03	2.50E+05	3.68E-02	4.03E+04	2.28E-01
618-2_Staging Pile	non-Rad	Uranium	7440-61-1	ug/kg	5.02E+03	2.50E+05	2.01E-02	4.03E+04	1.25E-01
618-3_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	2.39E+05	2.50E+05	9.54E-01	4.03E+04	**5.92E+00**
618-4_Shallow	non-Rad	Lead	7439-92-1	ug/kg	4.90E+04	1.25E+05	3.92E-01	1.56E+05	3.14E-01
618-4_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	7.46E+03	2.50E+05	2.98E-02	4.03E+04	1.85E-01
618-5_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	9.77E+03	2.50E+05	3.91E-02	4.03E+04	2.42E-01
618-7_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.08E+04	2.50E+05	4.33E-02	4.03E+04	2.68E-01
618-7_Shallow_Focused	non-Rad	Cadmium	7440-43-9	ug/kg	6.20E+03	4.00E+03	1.55E+00	2.86E+04	2.17E-01
618-7_Shallow_Focused	non-Rad	Chromium	7440-47-3	ug/kg	6.59E+04	4.20E+04	1.57E+00	1.09E+05	6.05E-01
618-7_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.96E+04	2.50E+05	7.82E-02	4.03E+04	4.85E-01
618-8_Shallow	non-Rad	Selenium	7782-49-2	ug/kg	8.46E+02	1.20E+03	7.05E-01	1.43E+03	5.92E-01
618-9_Shallow_Focused	non-Rad	Aldrin	309-00-2	ug/kg	3.90E+02	No Value	--	9.90E+00	3.94E+01
618-9_Shallow_Focused	non-Rad	Aroclor-1016	12674-11-2	ug/kg	1.90E+03	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Aroclor-1221	11104-28-2	ug/kg	1.90E+03	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Aroclor-1232	11141-16-5	ug/kg	1.90E+03	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Aroclor-1242	53469-21-9	ug/kg	1.90E+03	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	ug/kg	1.90E+03	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	ug/kg	3.90E+03	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	ug/kg	3.90E+03	No Value	--	No Value	--
618-9_Shallow_Focused	non-Rad	Arsenic	7440-38-2	ug/kg	1.16E+04	1.93E+04	6.01E-01	1.27E+05	9.13E-02
618-9_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	8.96E+03	2.50E+05	3.58E-02	4.03E+04	2.22E-01
628-4_Shallow	non-Rad	Aroclor-1242	53469-21-9	ug/kg	4.24E+01	No Value	--	No Value	--
628-4_Shallow	non-Rad	Aroclor-1248	12672-29-6	ug/kg	1.12E+03	No Value	--	No Value	--
628-4_Shallow	non-Rad	Aroclor-1254	11097-69-1	ug/kg	4.05E+02	No Value	--	No Value	--
628-4_Shallow	non-Rad	Aroclor-1260	11096-82-5	ug/kg	3.78E+01	No Value	--	No Value	--
628-4_Shallow	non-Rad	Lead	7439-92-1	ug/kg	9.92E+04	1.25E+05	7.93E-01	1.56E+05	6.36E-01
UPR-300-17_Shallow	non-Rad	Aroclor-1248	12672-29-6	ug/kg	1.97E+03	No Value	--	No Value	--

Table 6. Tier 2 Ecological PRG Comparisons for 300 Area Source OU Waste Site Decision Units

Waste Site/Decision Unit	Analyte Group	Analyte Name	CAS No.	Units	Exposure Point Concentration	Plant/ Invertebrate PRG	Hazard Quotient	Wildlife PRG	Hazard Quotient
UPR-300-17_Shallow	non-Rad	Aroclor-1254	11097-69-1	ug/kg	4.50E+02	No Value	--	No Value	--
UPR-300-17_Shallow	non-Rad	Aroclor-1260	11096-82-5	ug/kg	1.13E+02	No Value	--	No Value	--
UPR-300-17_Shallow	non-Rad	Boron	7440-42-8	ug/kg	3.90E+03	2.96E+04	1.32E-01	9.06E+04	4.31E-02
UPR-300-17_Shallow	non-Rad	Nickel	7440-02-0	ug/kg	5.64E+05	3.80E+04	1.48E+01	2.47E+05	2.28E+00
UPR-300-17_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	ug/kg	1.24E+04	2.50E+05	4.97E-02	4.03E+04	3.08E-01
UPR-300-17_Shallow	non-Rad	Zinc	7440-66-6	ug/kg	1.57E+05	3.93E+05	4.00E-01	8.56E+05	1.84E-01
UPR-300-46_Shallow	non-Rad	Aroclor-1248	12672-29-6	ug/kg	8.79E+02	No Value	--	No Value	--
UPR-300-46_Shallow	non-Rad	Aroclor-1254	11097-69-1	ug/kg	4.90E+02	No Value	--	No Value	--
UPR-300-46_Shallow	non-Rad	Aroclor-1260	11096-82-5	ug/kg	8.44E+01	No Value	--	No Value	--

Acronyms:

PRG = Preliminary remediation goal

Table 7. Summary of 300 Area Source OU Waste Sites Ecological Evaluation Based on Tier 2 PRGs for Surface Soils (0 to 15 feet)

Waste Site/Decision Unit	Plant/Invertebrate HQ	Wildlife HQ
300-259_Shallow	Zinc (1.22e00)	--
300-260_Shallow_Focused	Copper (1.47e00)	--
300-49_Overburden	Copper (1.07e01)	Copper (2.52e00)
300-50_Overburden	Copper (1.29e00)	--
300-259_Shallow	Zinc (1.22e00)	--
300-260_Shallow_Focused	Copper (1.47e00)	--
300-49_Overburden	Copper (1.07e01)	Copper (2.52e00)
300-50_Overburden	Copper (1.29e00)	--
316-1_Overburden	--	Total Uranium Isotopes (1.01e00)
316-1_Shallow_1	--	Aroclor-1248 (NoPRG) Total Uranium Isotopes (2.06e00)
316-1_Shallow_3	Chromium (1.20e00) Copper (2.73e01) Mercury (3.35e00) Nickel (2.49e00) Selenium (1.20e00)	Copper (6.41e00) Selenium (1.01e00) Total Uranium Isotopes (1.56e00)
316-1_Shallow_4	--	Total Uranium Isotopes (1.07e00)
316-2_Shallow_1	--	Total Uranium Isotopes (5.22e00)
316-2_Shallow_2	Total Uranium Isotopes (1.17e00)	Aroclor-1248 (NoPRG) Aroclors HI (No PRGs) Total Uranium Isotopes (7.23e00)
316-2_Shallow_3	--	Total Uranium Isotopes (1.82e00)
316-5_Shallow_1	Total Uranium Isotopes (1.09e00)	Total Uranium Isotopes (6.74e00)
316-5_Shallow_2	--	Total Uranium Isotopes (5.08e00)
316-5_Shallow_Focused	--	Total Uranium Isotopes (3.43e00)
300-33, 300-41, 300-256_Shallow_Focused	--	Aroclor-1248 (NoPRG) Aroclors HI (No PRGs)
300-37_Shallow_Focused	--	Aroclor-1260 (NoPRG) Aroclors HI (No PRGs)
600-243_Shallow	Boron (9.95e00) Copper (1.08e00) Selenium (4.76e00)	Boron (3.25e00) Selenium (3.99e00)
618-3_Shallow_Focused	--	Total Uranium Isotopes (5.92e00)
618-7_Shallow_Focused	Cadmium (1.55e00) Chromium (1.57e00)	--
618-9_Shallow_Focused	Aldrin (NoPRG)	Aldrin (3.94e+01) Aroclor-1016 (NoPRG) Aroclor-1221 (NoPRG) Aroclor-1232 (NoPRG) Aroclor-1242 (NoPRG) Aroclor-1248 (NoPRG) Aroclor-1254 (NoPRG) Aroclor-1260 (NoPRG) Aroclors HI (No PRGs)
628-4_Shallow	--	Aroclor-1248 (NoPRG) Aroclor HI (NoPRG)
UPR-300-17_Shallow	Nickel (1.48e01)	Nickel (2.28e00) Aroclor-1248 (NoPRG) Aroclors HI (No PRGs)
UPR-300-46_Shallow	--	Aroclor-1248 (NoPRG) Aroclors HI (No PRGs)

Notes:

PRG = Preliminary remediation goal

HQ = Hazard Quotient

Appendix G

Human Health Risk Assessment Tables and Calculation Briefs

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This appendix provides the risk estimates for each of the exposure scenarios considered for the 300 Area Source OU.

Residential Scenario. PRGs developed for the residential scenario are the numeric values that represent the remedial action objectives presented in Chapter 8. The results of comparing EPCs to the RBSLs in this supplemental risk evaluation will be used to help determine whether additional remedial action is necessary for waste sites where remediation has been completed, and whether the goals and objectives of the interim action records of decision have been met, as demonstrated by verification sampling and analysis. A complete description of the residential exposure scenario is provided in Section 6.2.3.3. Risk estimates, which include all COPCs regardless of their EPCs relative to background concentrations for each waste site decision unit, are presented in Tables G-20 through G-28.

This appendix also describes risk estimates for each waste site decision unit, which include only those COPCs with EPCs greater than background values or do not have a background value. These risk estimates are presented in Tables G-29 through G-38. The risk estimates without background contributions are summarized and discussed in the risk characterization provided in Section 6.2.5.1, and this information is used for decisions concerning appropriate remedial actions. A summary of the risk estimates, including contributions from background for each scenario, is provided in the following sections for completeness. Risk estimates were calculated for each decision unit within a waste site including shallow vadose zone material, deep vadose zone material, overburden material, and staging pile area footprint material. The results for the residential scenario are presented in Tables G-20 and G-21.

Shallow Zone. A total of 54 shallow zone decision units (from 38 waste sites) are in the 300 Area Source OU. Of the 38 waste sites, 11 waste sites were sampled using a focused sampling design, 20 waste sites were sampled using a statistical sampling design (with one site having two statistically distinct decision units and two waste sites with three statistically distinct decision units), and seven waste sites were sampled using both a statistical and a focused sampling design (with one site having two statistically distinct decision units and one waste sites with four statistically distinct decision units). The residential scenario results for shallow vadose zone materials are summarized in Tables G-22 and G-23.

As presented in Table G-22, the potential cumulative ELCR from all radiological COPCs ranges from 5.4×10^{-7} to 3.6×10^{-4} for 49 of the 54 shallow zone decision units. The potential cumulative ELCR is greater than the upper range of the regulatory target risk threshold value of 1×10^{-4} for seven decision units; is within the regulatory target risk range of 10^{-6} to 10^{-4} for 39 decision units, and is less than the lower risk threshold of 1×10^{-6} for three decision units. Radiological COPCs were not reported at five decision units.

Three waste sites (five decision units) report concentrations of site-related COPCs that exceed the upper range of the regulatory target threshold. The cancer risks levels are as follows:

- The EPC of uranium-238 at 316-2 (shallow decision unit 1) is 69 pCi/g which is greater than the residential RBSL of 54 pCi/g and results in a risk of 1.3×10^{-4}. The EPC is also greater than the current uranium-238 unrestricted direct exposure RAG of 26 pCi/g published in the 300 Area RDR/RAWP (DOE/RL-2001-47).
- The EPC of uranium-238 at 316-2 (shallow decision unit 2) is 96 pCi/g which is greater than the residential RBSL of 54 pCi/g and results in a risk of 1.8×10^{-4}. The EPC is also greater than the current uranium-238 unrestricted direct exposure RAG of 26 pCi/g published in the 300 Area RDR/RAWP (DOE/RL-2001-47).

- The EPCs of uranium-235 and uranium-238 at 316-5 (shallow decision unit 1) are 19 pCi/g and 89 pCi/g, respectively, which are greater than the residential RBSLs of 16 pCi/g and 54 pCi/g respectively. These concentrations result in a risk of 1.1 x 10^{-4} and 1.7 x 10^{-4} for uranium-235 and uranium-238, respectively. These EPCs are also greater than the current uranium-235 and uranium-238 unrestricted direct exposure RAGs of 2.7 pCi/g and 26 pCi/g, respectively, published in the 300 Area RDR/RAWP (DOE/RL-2001-47).
- The EPC of uranium-238 at 316-5 (shallow decision unit 2) is 68 pCi/g which is greater than the residential RBSL of 54 pCi/g and results in a risk of 1.3 x 10^{-4}. The EPC is also greater than the current uranium-238 unrestricted direct exposure RAG of 26 pCi/g published in the 300 Area RDR/RAWP (DOE/RL-2001-47).
- The EPC of uranium-238 at 618-3 (shallow focused decision unit) is 79 pCi/g which is greater than the residential RBSL of 54 pCi/g and results in a risk of 1.5×10^{-4}. The EPC is also greater than the current uranium-238 unrestricted direct exposure RAG of 26 pCi/g published in 300 Area RDR/RAWP (DOE/RL-2001-47).

As presented in Table G-22, the potential cumulative ELCR from direct contact for all nonradiological carcinogenic COPCs ranges from 1.2×10^{-7} to 5.6×10^{-5} for 45 of the 54 shallow zone decision units. The potential cumulative ELCR is within the regulatory target risk range of 10^{-6} to 10^{-4} for 43 decision units; is less than the lower risk threshold of 1×10^{-6} for two decision units; and is greater than the "Human Health Risk Assessment Procedures" WAC 173-340-708(5) cumulative risk threshold of 1×10^{-5} for seven decision units. Nonradiological carcinogenic COPCs were not reported at nine decision units. Forty-three waste sites were reported with individual carcinogens greater than the target risk level of 1×10^{-6}.

Arsenic is a primary contributor to risk at 41 of these 43 shallow zone decision units. EPCs of arsenic range from 1.9 mg/kg to 19 mg/kg at these 41 decision units. Although the EPCs are greater than the lognormal 90th percentile value of 6.5 mg/kg at six decision units; they are consistent with naturally occurring levels at the Hanford site (see Table G-19) and considered naturally occurring and are not the result of a site release. Additionally, all of the EPCs for arsenic are less than the residential direct exposure RAG of 20 mg/kg published in the 300 Area RDR/RAWP (DOE/RL-2001-47).

In addition to arsenic, nine decision units report concentrations of site-related COPCs that result in cancer risk levels for individual carcinogens that exceed the "Unrestricted Land Use Soil Cleanup Standards" (WAC 173-340-740) acceptable cancer risk level of 1×10^{-6} for individual carcinogens. The cancer risk levels are as follows:

- 300-37 shallow_focused (Aroclor-1260–6.4×10^{-6})
- 316-1 shallow_1 (Aroclor-1248–6.0×10^{-6})
- 316-2 shallow_2 (Aroclor-1248–1.4×10^{-6})
- 331 LSLDF shallow focused (Aroclor-1254–1.7×10^{-6})
- 618-1 shallow focused (Aroclor-1254–2.0×10^{-6})
- 618-9 shallow focused (Aldrin–6.6×10^{-6}, Aroclor-1221–3.8×10^{-6}, Aroclor-1232–3.8×10^{-6}, Aroclor-1242–3.8×10^{-6}, Aroclor-1248–3.8×10^{-6}, Aroclor-1254–7.8×10^{-6}, Aroclor-1260– 7.8×10^{-6})
- 628-4 shallow (Aroclor-1248–2.2×10^{-6})

- UPR-300-17 shallow (Aroclor-1248–3.9×10^{-6})
- UPR-300-46 shallow (Aroclor-1248–1.8×10^{-6})

The individual risk estimates for each of the PCB aroclors and aldrin is greater than the acceptable risk threshold of 1×10^{-6} for individual carcinogens but is less than the WAC 173-340-708(5) cumulative risk threshold of 1×10^{-5} for multiple contaminants and multiple pathways for each of the above decision units except for the 618-9 shallow focused decision unit. The cumulative risk at the 618-9 shallow focused decision unit is 5.6×10^{-5} which is greater than the WAC 173-340-708(5) cumulative risk threshold of 1×10^{-5} for multiple contaminants and multiple pathways.

As presented in Table G-22, the potential HI from direct contact for noncancer effects ranges from less than 1 to 5 for the shallow zone decision units. The HI is greater than the EPA target HI of 1 and the WAC 173-340-740 target HI of 1 for 20 shallow zone decision units. With the exception of one decision unit, no individual COPCs were reported with an HQ greater than 1. At the 618-9 shallow focused decision unit, an HQ of 2.4 is associated with aroclor-1254.

As presented in Table G-23, the potential cumulative ELCR for the MTCA Method B inhalation pathway from all nonradiological carcinogenic COPCs ranges from 1.9×10^{-13} to 1.6×10^{-6} for 46 of the 54 shallow zone decision units. The potential cumulative ELCR is within the regulatory target risk range of 10^{-6} to 10^{-4} for one decision unit and is less than "Cleanup Standards to Protect Air Quality" (WAC 173-340-750) Method B risk threshold of 1×10^{-6} for 45 decision units. All individual COPCs were reported with a risk less than or equal to 1×10^{-6}. Nonradiological carcinogenic COPCs were not reported at eight decision units.

As presented in Table G-23, the potential HI for the MTCA Method B inhalation pathway from noncancer effects is less than 1 for all shallow zone decision units. The potential HI is less than the EPA target HI of 1 and the WAC 173-340-750 Method B target HI of 1.

As shown in Table G-31, all arsenic and lead EPCs are less than the Method A soil cleanup levels for unrestricted land use of 20 mg/kg and 250 mg/kg, respectively.

Overburden. A total of 13 overburden decision units (from 11 waste sites) are in the 300 Area Source OU. Of the 11 waste sites, three waste sites were sampled using a focused sampling design and eight waste sites were sampled using a statistical sampling design (with one site having three statistically distinct decision units). One decision unit (300-23) did not report any analytes with an associated RBSL, resulting in 12 overburden decision units for evaluation. The residential scenario results for overburden materials are summarized in Tables G-24 and G-25.

As presented in Table G-24, potential cumulative ELCR from all radiological COPCs ranges from 6.4×10^{-7} to 5.4×10^{-5} for 11 of the 12 overburden decision units. The potential cumulative ELCR is within the regulatory target risk range of 10^{-6} to 10^{-4} for nine decision units and is less than the lower target risk threshold of 1×10^{-6} for two decision units. Radiological COPCs were not reported at one decision unit.

As presented in Table G-24, the potential cumulative ELCR for direct contact from all nonradiological carcinogenic COPCs ranges from 3.8×10^{-6} to 1.4×10^{-5} for seven of the 12 overburden decision units. The potential cumulative ELCR is within the regulatory target risk range of 10^{-6} to 10^{-4} for the seven decision units and is greater than the WAC 173-340-708(5) cumulative risk threshold of 1×10^{-5} for three decision units. Nonradiological carcinogenic COPCs were not reported in five decision units. Seven decision units were reported with individual carcinogens greater than the target risk level of 1×10^{-6}.

Arsenic is a primary contributor to risk at these seven decision units. The EPCs of arsenic ranged from 2.5 mg/kg to 9.1 mg/kg. Although the EPCs are greater than the lognormal 90th percentile value of 6.5 mg/kg at two decision units, they are consistent with naturally occurring levels at the Hanford Site (see Table G-19) and are considered naturally occurring and not the result of a site release. Additionally, the EPCs for arsenic are less than the residential direct exposure RAG of 20 mg/kg published in the 300 Area RDR/RAWP (DOE/RL-2001-47).

In addition to arsenic, one decision unit reports a concentration of a site-related COPC that results in a cancer risk level for individual carcinogens that exceeds the WAC 173-340-740 acceptable cancer risk level of 1×10^{-6} for individual carcinogens. The cancer risk level is 300-49 overburden (Aroclor-1254–6.0×10^{-6}).

Although the individual risk estimate for aroclor-1254 exceeds the acceptable risk threshold of 1×10^{-6} for individual carcinogens, the cumulative risk for this decision unit does not exceed the cumulative risk threshold of 1×10^{-5} for multiple contaminants and multiple pathways of exposure defined in WAC 173-340-708.

As presented in Table G-24, the potential HI for direct contact from noncancer effects ranges from less than 1 to 3.1 for the overburden decision units. The HI is greater than the EPA target HI of 1 and the WAC 173-340-740 target HI of 1 for two decision units. With the exception of one overburden decision unit, no individual COPCs were reported with an HQ greater than 1. At the 300-49 overburden decision unit, an HQ of 1.9 is associated with Aroclor-1254.

As presented in Table G-25, the potential cumulative ELCR for the MTCA Method B inhalation pathway from all nonradiological carcinogenic COPCs from 5.9×10^{-11} to 2.0×10^{-8} for seven of the 12 overburden decision units. The potential cumulative ELCR is less than the WAC 173-340-750 Method B risk threshold of 1×10^{-6} for the seven decision units. Nonradiological carcinogenic COPCs were not reported at five decision units.

As presented in Table G-25, the potential HI for the MTCA Method B inhalation pathway from noncancer effects is less than 1 for all overburden decision units. The potential HI is less than the EPA target HI of 1 and the WAC 173-340-750 Method B target HI of 1.

As presented in Table G-31, all arsenic and lead EPCs are less than the Method A soil cleanup levels for unrestricted land use of 20 mg/kg and 250 mg/kg, respectively.

Staging Pile Area. There are four staging pile area decision units from three waste sites in the 300 Area Source OU. Of the three waste sites, one waste site was sampled using a focused sampling design and two waste sites were sampled using a statistical sampling design (with one site having two statistically distinct decision units). The residential scenario results for staging pile area footprint materials are summarized in Tables G-26 and G-27.

As presented in Table G-26, the potential cumulative ELCR from all radiological COPCs ranges from 3.0×10^{-6} to 1.4×10^{-5} for the four staging pile area decision units. The potential cumulative ELCR is within the regulatory target risk range of 10^{-6} to 10^{-4} for all four decision units.

As presented in Table G-26, the potential cumulative ELCR for direct contact from all nonradiological carcinogenic COPCs ranges from 4.0×10^{-6} to 5.0×10^{-6} for the four staging pile area decision units. The potential cumulative ELCR is within the regulatory target risk range of 10^{-6} to 10^{-4} and less than the WAC 173-340-708(5) cumulative risk threshold of 1×10^{-5} for the four decision units.

As presented in Table G-26, the potential HI for direct contact from noncancer effects is less than 1 for the four staging pile area decision units. The potential HI is less than the EPA target HI of 1 and the WAC 173-340-740 target HI of 1.

As presented in Table G-27, the potential cumulative ELCR for the MTCA Method B inhalation pathway from all nonradiological carcinogenic COPCs ranges from 6.4×10^{-11} to 3.7×10^{-10} for all four staging pile area decision units. The potential cumulative ELCR is less than the WAC 173-340-750 Method B risk threshold of 1×10^{-6} for the four decision units.

As presented in Table G-27, the potential HI for the MTCA Method B inhalation pathway from noncancer effects is less than 1 for all four staging pile area decision units. The potential HI is less than the EPA target HI of 1 and the WAC 173-340-750 Method B target HI of 1.

As shown in Table G-31, all arsenic and lead EPCs are less than the Method A soil cleanup levels for unrestricted land use of 20 mg/kg and 250 mg/kg, respectively.

Deep Zone. Deep vadose zone samples are compared to RBSLs developed for the residential exposure scenario, although residents are unlikely to be exposed to contaminants in the deep vadose zone. Deep vadose zone samples are collected from depths greater than 4.6 m (15 ft) bgs, as a result direct contact within the point of compliance is incomplete. Additionally, the residential exposure scenario does not reflect reasonably anticipated future land use in the River Corridor. This comparison is included because it is the most conservative land use basis for the evaluation of waste sites and presentation of these results is only included to provide additional information for risk management decisions.

There are eight deep zone decision units (four waste sites) in the 300 Area Source OU. The four waste sites were sampled using both a statistical and a focused sampling design. The residential scenario results for deep vadose zone materials are summarized in Table G-28.

As presented in Table G-28, the potential cumulative ELCR from all radiological COPCs ranges from 2.1×10^{-5} to 1.0×10^{-3} for the eight decision units. The potential cumulative ELCR is greater the upper range of the regulatory target risk threshold of 1×10^{-4} for four decision units and is within the regulatory target risk range of 10^{-6} to 10^{-4} for four decision units.

Three deep zone decision units report concentrations of site-related COPCs that exceed the upper range of the regulatory target threshold. The cancer risk levels are as follows:

- 618-1 deep focused (Cesium-137–1.5×10^{-4}, Uranium-238–1.2×10^{-4})
- 618-2 deep (Strontium-90–5.1×10^{-4}, Uranium-233/234–1.2×10^{-4}, Uranium-238–3.1×10^{-4})
- 618-2 deep focused (Strontium-90–3.2×10^{-4})

Industrial Exposure Scenario. The industrial exposure scenario represents reasonably anticipated future land use for the 300 Area. The results of this comparison are used to confirm that cleanup actions are protective of the reasonably foreseeable land uses that DOE and the USFWS anticipate for the River Corridor. The industrial exposure scenario is described in Section 6.2.3.3.

Risk estimates, which include all COPCs regardless of their EPCs relative to background concentrations for each waste site decision unit, are presented in Tables G-39 through G-47.

Appendix G also includes risk estimates for each waste site decision unit, which include only those COPCs with EPCs greater than background values or do not have a background value. These risk estimates are presented in Tables G-48 through G-57. The risk estimates without background

contributions are summarized and discussed in the risk characterization provided in Section 6.2.5.1 and it is this information that is used for decisions concerning appropriate remedial actions.

A summary of the risk estimates including contributions from background for each scenario is provided below for completeness. Risk estimates were calculated for each decision unit within a waste site including shallow vadose zone material, deep vadose zone material, overburden material, and staging pile area footprint material. The results for the industrial exposure scenario are presented in Tables G-39 and G-40.

Shallow Zone. A total of 54 shallow zone decision units (from 38 waste sites) are in the 300 Area Source OU. Of the 38 waste sites, 11 waste sites were sampled using a focused sampling design, 20 waste sites were sampled using a statistical sampling design (with one site having two statistically distinct decision units and two waste sites with three statistically distinct decision units), and seven waste sites were sampled using both a statistical and a focused sampling design (with one site having two statistically distinct decision units and one waste sites with four statistically distinct decision units). The industrial exposure scenario results for shallow vadose zone materials are summarized in Tables G-41 and G-42.

As presented in Table G-41, the potential cumulative ELCR from all radiological COPCs ranges from 1.0×10^{-7} to 7.5×10^{-5} for 49 of the 54 shallow zone decision units. The potential cumulative ELCR is within the regulatory target risk range of 10^{-6} to 10^{-4} for 25 decision units, and is less than the lower risk threshold of 1×10^{-6} for 24 decision units. Radiological COPCs were not reported at five decision units.

As presented in Table G-41, the potential cumulative ELCR from direct contact for all nonradiological carcinogenic COPCs ranges from 9.5×10^{-10} to 4.3×10^{-7} for 45 of the 54 shallow zone decision units. The potential cumulative ELCR is less than the "Soil Cleanup Standards for Industrial Properties" (WAC 173-340-745) Method C risk threshold of 1×10^{-5} at all 45 decision units. Nonradiological carcinogenic COPCs were not reported at nine decision units.

As presented in Table G-41, the potential HI from direct contact for noncancer effects is less than 1 for all shallow zone decision units. The potential HI is less than the EPA target HI of 1 and the WAC 173-340-745 Method C target HI of 1.

As presented in Table G-42, the potential cumulative ELCR for the MTCA C inhalation pathway from all nonradiological carcinogenic COPCs ranges from 1.9×10^{-14} to 1.6×10^{-7} for 46 of the 54 shallow zone decision units. The potential cumulative ELCR is less than the WAC 173-340-750 Method C risk threshold of 1×10^{-5} at all 46 decision units. Nonradiological carcinogenic COPCs were not reported at 8 decision units.

As presented in Table G-42, the potential HI for the MTCA Method C inhalation pathway from noncancer effects is less than 1 for all shallow zone decision units. The potential HI is less than the EPA target HI of 1 and the WAC 173-340-750 Method C target HI of 1.

As shown in Table G-50, all arsenic and lead EPCs are less than the Method A soil cleanup levels for industrial properties of 20 mg/kg and 1,000 mg/kg, respectively.

Overburden. A total of 13 overburden decision units (from 11 waste sites) are in the 300 Area Source OU. Of the 11 waste sites, three waste sites were sampled using a focused sampling design and eight waste sites were sampled using a statistical sampling design (with one site having three statistically distinct decision units). One decision unit (300-23) did not report any analytes with an associated RBSL, resulting in 12 overburden decision units for evaluation. The industrial exposure scenario results for overburden materials are summarized in Tables G-43 and G-44.

As presented in Table G-43, the potential cumulative ELCR from all radiological COPCs ranges from 1.2×10^{-7} to 1.1×10^{-5} for 11 of the 12 overburden decision units. The potential cumulative ELCR is within the regulatory target risk range of 10^{-6} to 10^{-4} for three decision units, and is less than the lower risk threshold of 1×10^{-6} for eight decision units. Radiological COPCs were not reported at one decision unit.

As presented in Table G-43, the potential cumulative ELCR from direct contact for all nonradiological carcinogenic COPCs ranges from 2.9×10^{-8} to 1.0×10^{-7} for seven of the 12 overburden decision units. The potential cumulative ELCR is less than the WAC 173-340-745 Method C risk threshold of 1×10^{-5} for the seven decision units. Nonradiological carcinogenic COPCs were not reported at five decision units.

As presented in Table G-43, the potential HI from direct contact for noncancer effects is less than 1 for all overburden decision units. The potential HI is less than the EPA target HI of 1 and the WAC 173-340-745 Method C target HI of 1.

As presented in Table G-44, the potential cumulative ELCR for the MTCA C inhalation pathway from all nonradiological carcinogenic COPCs ranges from 5.9×10^{-12} to 2.0×10^{-9} for seven of the 12 overburden decision units. The potential cumulative ELCR is less than the WAC 173-340-750 Method C risk threshold of 1×10^{-5} for the seven decision units. Nonradiological carcinogenic COPCs were not reported at five decision units.

As presented in Table G-44, the potential HI for the MTCA Method C inhalation pathway from noncancer effects is less than 1 for all overburden decision units. The potential HI is less than the EPA target HI of 1 and the WAC 173-340-750 Method C target HI of 1.

As shown in Table G-50, all arsenic and lead EPCs are less than the Method A soil cleanup levels for industrial properties of 20 mg/kg and 1,000 mg/kg, respectively.

Staging Pile Area. There are four staging pile area decision units from three waste sites in the 300 Area Source OU. Of the three waste sites, one waste site was sampled using a focused sampling design and two waste sites were sampled using a statistical sampling design (with one site having two statistically distinct decision units). The industrial exposure scenario results for staging pile area footprint materials are summarized in Tables G-45 and G-46.

As presented in Table G-45, the potential cumulative ELCR from all radiological COPCs ranges from 4.7×10^{-7} to 2.0×10^{-6} for the four staging pile area decision units. The potential cumulative ELCR is within the regulatory target risk range of 10^{-6} to 10^{-4} for one decision unit, and is less than the lower risk threshold of 1×10^{-6} for three decision units.

As presented in Table G-45, the potential cumulative ELCR from direct contact for all nonradiological carcinogenic COPCs ranges from 3.1×10^{-8} to 3.8×10^{-8} for the four overburden decision units. The potential cumulative ELCR is less than the WAC 173-340-745 Method C risk threshold of 1×10^{-5} for all four decision units.

As presented in Table G-45, the potential HI from direct contact for noncancer effects is less than 1 for all staging pile area decision units. The potential HI is less than the EPA target HI of 1 and the WAC 173-340-745 Method C target HI of 1.

As presented in Table G-46, the potential cumulative ELCR for the MTCA C inhalation pathway from all nonradiological carcinogenic COPCs ranges from 6.4×10^{-12} to 3.7×10^{-11} for the four staging pile area

decision units. The potential cumulative ELCR is less than the WAC 173-340-745 Method C risk threshold of 1×10^{-5} for all four decision units.

As presented in Table G-46, the potential HI for the MTCA Method C inhalation pathway from noncancer effects is less than 1 for all staging pile area decision units. The potential HI is less than the EPA target HI of 1 and the WAC 173-340-750 Method C target HI of 1.

As presented in Table G-50, all arsenic and lead EPCs are less than the Method A soil cleanup levels for industrial properties of 20 mg/kg and 1,000 mg/kg, respectively.

Deep Zone. Deep vadose zone samples are compared to RBSLs developed for the industrial exposure scenario although an industrial worker is unlikely to be exposed to contaminants in the deep vadose zone, Deep vadose zone samples are collected from depths greater than 4.6 m (15 ft) bgs; as a result, direct contact within the point of compliance is incomplete. However, the industrial exposure scenario reflects reasonably anticipated future land use in 300 Area portion of the River Corridor. This comparison is included to determine if deep vadose zone concentrations are protective of reasonably anticipated future land use and to provide additional information for risk management decisions.

There are eight deep zone decision units (four waste sites) in the 300 Area Source OU. The four waste sites were sampled using both a statistical and a focused sampling design. The industrial scenario results for deep vadose zone materials are summarized in Table G-47.

As presented in Table G-47, the potential cumulative ELCR from all radiological COPCs ranges from 3.7×10^{-6} to 7.9×10^{-5} for the eight deep zone decision units. The potential cumulative ELCR is within the regulatory target risk range of 10^{-6} to 10^{-4} for all eight decision units.

Resident Monument Worker Scenario. The resident Monument worker represents reasonably anticipated future land use. The results of this comparison are used to confirm that cleanup actions are protective of the reasonably foreseeable land uses that DOE and the USFWS anticipate for the River Corridor. The resident Monument worker scenario is described in Section 6.2.3.3.

Risk estimates, which include all COPCs regardless of their EPCs relative to background concentrations for each waste site decision unit, are presented in Tables G-58 through G-61.

Appendix G also includes risk estimates for each waste site decision unit, which includes only those radiological COPCs with EPCs greater than background values or that do not have a background value. These risk estimates are presented in Tables G-62 through G-65. The risk estimates without background contributions are summarized and discussed in the risk characterization provided in Section 6.2.5.1 and it is this information that is used for decisions concerning appropriate remedial actions.

A summary of the risk estimates including contributions from background for each scenario is provided below for completeness. Risk estimates were calculated for the shallow zone, overburden and staging pile area decision units within a waste site. Risk estimates were not calculated for the deep zone decision units because the direct contact exposure pathway is incomplete (i.e., samples are collected from depths greater than 4.6m [15 ft] bgs). The results for the resident Monument worker scenario are presented in Table G-58.

Shallow Zone. A total of 54 shallow zone decision units (from 38 waste sites) are in the 300 Area Source OU. Of the 38 waste sites, 11 waste sites were sampled using a focused sampling design, 20 waste sites were sampled using a statistical sampling design (with one site having two statistically distinct decision units and two waste sites with three statistically distinct decision units), and seven waste sites were sampled using both a statistical and a focused sampling design (with one site having two statistically

distinct decision units and one waste sites with four statistically distinct decision units). The resident Monument worker scenario results for shallow vadose zone materials are summarized in Table G-59.

As presented in Table G-59, the potential cumulative ELCR from direct contact for all radiological COPCs ranges from 3.2×10^{-7} to 2.2×10^{-4} for 49 of the 54 shallow zone decision units. The potential cumulative ELCR is greater than the upper range of the regulatory target risk threshold value of 1×10^{-4} for seven decision units; is within the regulatory target risk range of 10^{-6} to 10^{-4} for 32 decision units and is less than the lower risk threshold of 1×10^{-6} for ten decision units. Radiological COPCs were not reported at five decision units. All individual radiological COPCs were reported with a risk less than or equal to 1×10^{-4}.

Overburden. A total of 13 overburden decision units (from 11 waste sites) are in the 300 Area Source OU. Of the 11 waste sites, three waste sites were sampled using a focused sampling design and eight waste sites were sampled using a statistical sampling design (with one site having three statistically distinct decision units). One decision unit (300-23) did not report any analytes with an associated RBSL, resulting in 12 overburden decision units for evaluation. The resident Monument worker scenario results for overburden materials are summarized in Table G-60.

As presented in Table G-60, potential cumulative ELCR from all radiological COPCs ranges from 3.7×10^{-7} to 3.2×10^{-5} for 11 of the 12 overburden decision units. The potential cumulative ELCR is within the regulatory target risk range of 10^{-6} to 10^{-4} for eight decision units and less than the lower regulatory threshold of 1×10^{-6} for three decision units. Radiological COPCs were not reported at one decision unit.

Staging Pile Area. There are four staging pile area decision units from three waste sites in the 300 Area Source OU. Of the three waste sites, one waste site was sampled using a focused sampling design and two waste sites were sampled using a statistical sampling design (with one site having two statistically distinct decision units). The resident Monument worker scenario results for staging pile area footprint materials are summarized in Table G-61.

As presented in Table G-61, the potential cumulative ELCR from all radiological COPCs ranges from 1.3×10^{-6} to 6.6×10^{-6} for the four staging pile area decision units. The potential cumulative ELCR is within the regulatory target risk range of 10^{-6} to 10^{-4} for the four decision units.

Casual Recreational User Scenario. The casual recreational user represents reasonably anticipated future land use. The results of this comparison are used to confirm that cleanup actions are protective of the reasonably foreseeable land uses that DOE and USFWS anticipate for the River Corridor. The casual recreational user scenario is described in Section 6.2.3.3.

Risk estimates, which include all COPCs regardless of their EPCs relative to background concentrations for each waste site decision unit, are presented in Tables G-66 through G-69.

Appendix G also includes risk estimates for each waste site decision unit, which includes only those COPCs with EPCs greater than background values or that do not have a background value. These risk estimates are presented in Tables G-70 through G-73. The risk estimates without background contributions are summarized and discussed in the risk characterization provided in Section 6.2.5.1 and it is this information that is used for decisions concerning appropriate remedial actions.

A summary of the risk estimates including contributions from background for each scenario is provided below for completeness. Risk estimates were calculated for the shallow zone, overburden, and staging pile area decision units within a waste site. Risk estimates were not calculated for the deep zone decision units because the direct contact exposure pathway is incomplete (i.e., samples are collected from depths

greater than 4.6 [15 ft] bgs). The results for the casual recreational user scenario are presented in Table G-66.

Shallow Zone. A total of 54 shallow zone decision units (from 38 waste sites) are in the 300 Area Source OU. Of the 38 waste sites, 11 waste sites were sampled using a focused sampling design, 20 waste sites were sampled using a statistical sampling design (with one site having two statistically distinct decision units and two waste sites with three statistically distinct decision units), and seven waste sites were sampled using both a statistical and a focused sampling design (with one site having two statistically distinct decision units and one waste sites with four statistically distinct decision units). The casual recreational user scenario results for shallow vadose zone materials are summarized in Table G-67.

As presented in Table G-67, the potential cumulative ELCR from direct contact for all radiological COPCs ranges from 2.7×10^{-8} to 1.7×10^{-5} for 49 of the 54 shallow zone decision units. The potential cumulative ELCR is within the regulatory target risk range of 10^{-6} to 10^{-4} for 16 decision units and is less than the lower risk threshold of 1×10^{-6} for 33 decision units. Radiological COPCs were not reported at five decision units.

As presented in Table G-67, the potential cumulative ELCR for direct contact from all nonradiological COPCs ranges from 1.7×10^{-13} to 1.0×10^{-5} for 46 of the 54 decision units. The potential cumulative ELCR is within the regulatory target risk range of 10^{-6} to 10^{-4} for 19 decision units and is less than the lower risk threshold of 1×10^{-6} for 27 decision units. All individual COPCs were reported with a risk less than 1×10^{-4}. Nonradiological carcinogenic COPCs were not reported at eight decision units.

As presented in Table G-67, the potential HI from noncancer effects without background is less than 1 for all shallow zone decision units. The potential HI is less than the EPA target HI of 1.

Overburden. A total of 13 overburden decision units (from 11 waste sites) are in the 300 Area Source OU. Of the 11 waste sites, three waste sites were sampled using a focused sampling design and eight waste sites were sampled using a statistical sampling design (with one site having three statistically distinct decision units). One decision unit (300-23) did not report any analytes with an associated RBSL, resulting in 12 overburden decision units for evaluation. The casual recreational user scenario results for overburden soils are summarized in Table G-68.

As presented in Table G-68, the potential cumulative ELCR from direct contact for all radiological COPCs ranges from 3.2×10^{-8} to 2.4×10^{-6} for 11 of the 12 overburden decision units. The potential cumulative ELCR is within the regulatory target risk range of 10^{-6} to 10^{-4} for one decision unit and is less than the lower risk threshold of 1×10^{-6} for ten decision units. Radiological COPCs were not reported at one decision unit.

As presented in Table G-68, the potential cumulative ELCR for direct contact from all nonradiological COPCs ranges from 5.5×10^{-7} to 2.0×10^{-6} for seven of the 12 decision units. The potential cumulative ELCR is within the regulatory target risk range of 10^{-6} to 10^{-4} for three decision units and is less than the lower risk threshold of 1×10^{-6} for four decision units. All individual COPCs were reported with a risk less than or equal to 1×10^{-4}. Nonradiological carcinogenic COPCs were not reported at five decision units.

As presented in Table G-68, the potential HI from noncancer effects is less than 1 for all overburden decision units. The potential HI is less than the EPA target HI of 1.

Staging Pile Area. There are four staging pile area decision units from three waste sites in the 300 Area Source OU. Of the three waste sites, one waste site was sampled using a focused sampling design and two waste sites were sampled using a statistical sampling design (with one site having two statistically distinct

decision units). The casual user scenario results for staging pile area footprint materials are summarized in Table G-69.

As presented in Table G-69, the potential cumulative ELCR from direct contact for all radiological COPCs ranges from 1.2×10^{-7} to 7.0×10^{-7} for the four staging pile area decision units. The potential cumulative ELCR is less than the lower risk threshold of 1×10^{-6} for the four decision units.

As presented in Table G-69, the potential cumulative ELCR for direct contact from all nonradiological COPCs ranges from 6.0×10^{-7} to 7.3×10^{-7} for the four staging pile area decision units. The potential cumulative ELCR is less than the lower risk threshold of 1×10^{-6} for the four decision units.
As presented in Table G-69, the potential HI from noncancer effects is less than 1 for all staging pile area decision units. The potential HI is less than the EPA target HI of 1.

References

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WAC 173-340, "Model Toxics Control Act—Cleanup," *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=173-340.

340-708, "Human Health Risk Assessment Procedures."

340-740, "Unrestricted Land Use Soil Cleanup Standards."

340-745, "Soil Cleanup Standards for Industrial Properties."

340-750, "Cleanup Standards to Protect Air Quality."

Table G-1. Summary of Waste Sites, Decision Units, and Reclassification Status for the 300 Area Source OU

Site Code	Decision unit	Operable Unit	Reasonable Anticipated Future Land Use	Reclassification Status	RCBRA?
300-FF-1					
300 ASH PITS	Shallow	300-FF-1	Industrial	Closed Out	Yes
300-44	Overburden_Focused	300-FF-1	Industrial	Closed Out	No
	Shallow_Focused				
300-49	Overburden	300-FF-1	Industrial	Closed Out	Yes
	Shallow				
300-50	Overburden	300-FF-1	Industrial	Closed Out	Yes
	Shallow				
316-1	Overburden	300-FF-1	Industrial	Closed Out	Yes
	Shallow_1				
	Shallow_3				
	Shallow_4				
316-2	Shallow_1	300-FF-1	Industrial	Closed Out	Yes
	Shallow_2				
	Shallow_3				
316-5	Shallow_1	300-FF-1	Industrial	Closed Out	Yes
	Shallow_2				
	Shallow_Focused				
618-12	Shallow	300-FF-1	Industrial	Closed Out	Yes
618-4	Deep	300-FF-1	Industrial	Closed Out	Yes
	Deep_Focused				
	Overburden_2				
	Overburden_3				
	Overburden_4				
	Shallow				
628-4	Overburden	300-FF-1	Industrial	Closed Out	Yes
	Shallow				
300 RFBP	See 316-1	300-FF-1	Industrial	Closed Out	No
UPR-300-15	See 316-5	300-FF-1	Industrial	Closed Out	No
UPR-300-19	See 316-5	300-FF-1	Industrial	Closed Out	No
UPR-300-20	See 316-5	300-FF-1	Industrial	Closed Out	No
UPR-300-21	See 316-5	300-FF-1	Industrial	Closed Out	No
UPR-300-22	See 316-5	300-FF-1	Industrial	Closed Out	No

Table G-1. Summary of Waste Sites, Decision Units, and Reclassification Status for the 300 Area Source OU

Site Code	Decision unit	Operable Unit	Reasonable Anticipated Future Land Use	Reclassification Status	RCBRA?
UPR-300-23	See 316-5	300-FF-1	Industrial	Closed Out	No
UPR-300-24	See 316-5	300-FF-1	Industrial	Closed Out	No
UPR-300-25	See 316-5	300-FF-1	Industrial	Closed Out	No
UPR-300-26	See 316-5	300-FF-1	Industrial	Closed Out	No
UPR-300-27	See 316-5	300-FF-1	Industrial	Closed Out	No
UPR-300-28	See 316-5	300-FF-1	Industrial	Closed Out	No
UPR-300-29	See 316-5	300-FF-1	Industrial	Closed Out	No
UPR-300-30	See 316-5	300-FF-1	Industrial	Closed Out	No
UPR-300-32	See 316-1	300-FF-1	Industrial	Closed Out	No
UPR-300-33	See 316-1	300-FF-1	Industrial	Closed Out	No
UPR-300-34	See 316-1	300-FF-1	Industrial	Closed Out	No
UPR-300-35	See 316-1	300-FF-1	Industrial	Closed Out	No
UPR-300-36	See 316-1	300-FF-1	Industrial	Closed Out	No
UPR-300-37	See 316-1	300-FF-1	Industrial	Closed Out	No
UPR-300-47	See 316-5	300-FF-1	Industrial	Closed Out	No
UPR-300-8	See 316-5	300-FF-1	Industrial	Closed Out	No
UPR-300-9	See 316-5	300-FF-1	Industrial	Closed Out	No
UPR-300-FF-1	See 316-1	300-FF-1	Industrial	Closed Out	No
300-FF-2					
300 VTS	Shallow	300-FF-2	Unrestricted	Interim Closed Out	Yes
300-10	Shallow_Focused	300-FF-2	Industrial	Closed Out	Yes
300-109	Shallow_Focused Staging Pile Area_Focused	300-FF-2	Industrial	Interim Closed Out	No
300-110	See 618-1	300-FF-2	Industrial	Interim Closed Out	No
300-18	Shallow	300-FF-2	Industrial	Interim Closed Out	Yes
300-223	Shallow_Focused	300-FF-2	Industrial	Closed Out	No
300-23	Overburden_Focused Shallow_Focused	300-FF-2	Industrial	Closed Out	No
300-259	Shallow	300-FF-2	Industrial	Interim Closed Out	No
300-260	Shallow_Focused	300-FF-2	Industrial	No Action	No
300-262	See 316-1	300-FF-1	Industrial	Closed Out	No
300-272	Overburden_Focused Shallow_Focused	300-FF-2	Industrial	Closed Out	No

Table G-1. Summary of Waste Sites, Decision Units, and Reclassification Status for the 300 Area Source OU

Site Code	Decision unit	Operable Unit	Reasonable Anticipated Future Land Use	Reclassification Status	RCBRA?
300-275	Shallow_1	300-FF-2	Industrial	Interim Closed Out	No
	Shallow_2				
300-33, 300-41, 300-256	Shallow	300-FF-2	Industrial	Interim Closed Out	No
	Shallow_Focused				
300-37	Shallow_Focused	300-FF-2	Industrial	Closed Out	No
300-45	Shallow_Focused	300-FF-2	Industrial	Closed Out	Yes
300-8	Shallow	300-FF-2	Industrial	Interim Closed Out	Yes
303-M SA	See 618-1	300-FF-2	Industrial	Interim Closed Out	No
303-M UOF	See 618-1	300-FF-2	Industrial	Interim Closed Out	No
331 LSLDF	Shallow_Focused	300-FF-2	Industrial	No Action	No
333 ESHWSA	See 618-1	300-FF-2	Industrial	Interim Closed Out	No
600-243	Shallow	300-FF-2	Industrial	Interim Closed Out	No
600-259	Overburden	300-FF-2	Unrestricted	Interim Closed Out	Yes
	Shallow				
	Shallow_Focused				
600-47	Shallow	300-FF-2	Unrestricted	Interim Closed Out	Yes
618-1	Deep	300-FF-2	Industrial	Interim Closed Out	No
	Deep_Focused				
	Shallow				
	Shallow_Focused				
618-13	Shallow	300-FF-2	Unrestricted	Interim closed Out	No
	Shallow_Focused				
618-2	Deep	300-FF-2	Industrial	Interim Closed out	No
	Deep_Focused				
	Overburden				
	Shallow				
	Staging Pile				
618-3	Shallow	300-FF-2	Industrial	Interim Closed Out	No
	Shallow_Focused				

Table G-1. Summary of Waste Sites, Decision Units, and Reclassification Status for the 300 Area Source OU

Site Code	Decision unit	Operable Unit	Reasonable Anticipated Future Land Use	Reclassification Status	RCBRA?
618-5	Deep	300-FF-2	Industrial	Interim Closed Out	Yes
	Deep_Focused				
	Overburden				
	Shallow				
	Staging Pile_4				
	Staging Pile_5				
618-7	Shallow_1	300-FF-2	Unrestricted	Interim Closed Out	No
	Shallow_2				
	Shallow_3				
	Shallow_4				
	Shallow_Focused				
618-8	Shallow	300-FF-2	Industrial	Interim Closed Out	No
618-9	Shallow_Focused	300-FF-2	Industrial	Closed Out	No
UPR-300-17	Shallow	300-FF-2	Industrial	Interim Closed Out	No
UPR-300-46	Shallow	300-FF-2	Industrial	Interim Closed Out	No
600-290:1	See 618-13	300-FF-2	Unrestricted	Interim Closed Out	No

Table G-2. 300 Area Source Operable Unit Waste Site Decision Units

Waste Site Code	Decision Unit	Sample Type	Sampling Plan Design	Sample Number	Statistical Group	QC Type	Sample Date/Time	WSP easting (m)	WSP northing (m)
300 ASH PITS	Shallow	Grab	Statistical	B0L704			8/13/1997 14:22	594366	115989
300 ASH PITS	Shallow	Grab	Statistical	B0L705			8/14/1997 8:52	594359	115947
300 ASH PITS	Shallow	Grab	Statistical	B0L706			8/14/1997 9:40	594315	115936
300 ASH PITS	Shallow	Grab	Statistical	B0L707			8/14/1997 10:49	594284	115946
300 ASH PITS	Shallow	Grab	Statistical	B0L708			8/14/1997 11:30	594250	115973
300 ASH PITS	Shallow	Grab	Statistical	B0L709			8/14/1997 13:37	594281	115978
300 VTS	Shallow	Composite	Statistical	J03WW7	1		8/22/2005 8:05	593245.43	116391.28
300 VTS	Shallow	Composite	Statistical	J03WW8	1		8/22/2005 8:17	593262.79	116391.99
300 VTS	Shallow	Composite	Statistical	J03WW9	1		8/22/2005 8:28	593253.74	116376.92
300 VTS	Shallow	Composite	Statistical	J03WX0	1		8/22/2005 8:42	593266.52	116368.36
300 VTS	Shallow	Composite	Statistical	J03WX1	1	R	8/22/2005 8:05	593245.43	116391.28
300-10	Shallow_Focused	Grab	Focused	B0L944	NA		8/26/1997 16:14	594043	116569
300-10	Shallow_Focused	Grab	Focused	B0L945	NA		8/26/1997 16:02	594019	116569
300-10	Shallow_Focused	Grab	Focused	B0L959	NA		10/3/1997 10:50	594039	116572
300-10	Shallow_Focused	Grab	Focused	B0L961	NA		10/3/1997 11:19	594017	116573
300-109	Shallow_Focused	Grab	Focused	J19DM3	NA		1/6/2010 12:20	593963.6	116294.4
300-109	Staging Pile Area_Focused	Composite	Focused	J190L5	NA		6/17/2009 7:00	593949.9	116291.4
300-18	Shallow	Composite	Statistical	J036W6	1		5/25/2005 8:30	593808.28	117042.1
300-18	Shallow	Composite	Statistical	J036W7	1		5/25/2005 8:37	593811.49	117039.88
300-18	Shallow	Composite	Statistical	J036W8	1		5/25/2005 8:43	593814.65	117046.34
300-18	Shallow	Composite	Statistical	J036W9	1		5/25/2005 8:46	593818.28	117042.75
300-18	Shallow	Composite	Statistical	J036X0	1	R	5/25/2005 8:30	593808.28	117042.1
300-223	Shallow_Focused	Grab	Focused	B0WCN5			9/21/1999 8:10		
300-223	Shallow_Focused	Grab	Focused	B0WCN6			9/21/1999 8:17		
300-223	Shallow_Focused	Grab	Focused	B0WCN7			9/21/1999 8:23		
300-223	Shallow_Focused	Grab	Focused	B0WCN8			9/21/1999 8:30		
300-223	Shallow_Focused	Grab	Focused	B0WCN9			9/21/1999 8:33		
300-23	Overburden_Focused	Grab	Focused	B0J080			8/24/1996 11:25	594123	115620
300-23	Overburden_Focused	Grab	Focused	B0J081			8/24/1996 11:31	594123	115620
300-23	Overburden_Focused	Grab	Focused	B0J082			8/24/1996 11:40	594123	115620
300-23	Shallow_Focused	Grab	Focused	B0J083			8/24/1996 11:48	594128	115620
300-23	Shallow_Focused	Grab	Focused	B0J084			8/24/1996 12:00	594124	115623
300-23	Shallow_Focused	Grab	Focused	B0J085			8/24/1996 12:09	594123	115620
300-23	Shallow_Focused	Grab	Focused	B0J086			8/24/1996 12:09	594123	115620
300-23	Shallow_Focused	Grab	Focused	B0J087			8/24/1996 12:15	594124	115623
300-23	Shallow_Focused	Grab	Focused	B0J088			8/24/1996 12:25	594127	115613
300-23	Shallow_Focused	Grab	Focused	B0J089			8/24/1996 12:36	594126	115613
300-259	Shallow	Grab	Statistical	J19C15	1		10/19/2009 8:40	594062.8	116189.4
300-259	Shallow	Grab	Statistical	J19C16	1		10/19/2009 8:43	594054.4	116203.8
300-259	Shallow	Grab	Statistical	J19C17	1		10/19/2009 8:47	594054.4	116232.7
300-259	Shallow	Grab	Statistical	J19C18	1		10/19/2009 8:53	594046.1	116247.1
300-259	Shallow	Grab	Statistical	J19C19	1		10/19/2009 8:58	594054.4	116261.5
300-259	Shallow	Grab	Statistical	J19C20	1		10/19/2009 9:13	594046.1	116275.9
300-259	Shallow	Grab	Statistical	J19C21	1		10/19/2009 9:19	594004.5	116290.3
300-259	Shallow	Grab	Statistical	J19C22	1		10/19/2009 9:24	594037.8	116290.3
300-259	Shallow	Grab	Statistical	J19C23	1		10/19/2009 9:29	594054.4	116290.3
300-259	Shallow	Grab	Statistical	J19C24	1		10/19/2009 9:34	594012.8	116304.7
300-259	Shallow	Grab	Statistical	J19C25	1		10/19/2009 9:37	594029.5	116304.7
300-259	Shallow	Grab	Statistical	J19C26	1		10/19/2009 9:40	594046.1	116304.7
300-259	Shallow	Grab	Statistical	J19C27	1	R	10/19/2009 9:13	594046.1	116275.9
300-260	Shallow_Focused	Grab	Focused	J1B634	NA		6/2/2010 13:10	593800.4	116149.5
300-260	Shallow_Focused	Grab	Focused	J1B635	NA		6/2/2010 13:15	593800.4	116149.5
300-260	Shallow_Focused	Grab	Focused	J1B636	NA		6/3/2010 8:10	593807	116144

Table G-2. 300 Area Source Operable Unit Waste Site Decision Units

Waste Site Code	Decision Unit	Sample Type	Sampling Plan Design	Sample Number	Statistical Group	QC Type	Sample Date/Time	WSP easting (m)	WSP northing (m)
300-260	Shallow_Focused	Grab	Focused	J1B637	NA		6/3/2010 8:15	593807	116144
300-260	Shallow_Focused	Grab	Focused	J1B638	NA		6/3/2010 9:35	593800	116135
300-260	Shallow_Focused	Grab	Focused	J1B639	NA		6/3/2010 9:40	593800	116135
300-260	Shallow_Focused	Grab	Focused	J1B640	NA		6/3/2010 10:25	593793	116143
300-260	Shallow_Focused	Grab	Focused	J1B641	NA		6/3/2010 10:30	593793	116143
300-260	Shallow_Focused	Grab	Focused	J1B642	NA		6/3/2010 11:50	593813	116176
300-260	Shallow_Focused	Grab	Focused	J1B643	NA		6/3/2010 11:55	593813	116176
300-260	Shallow_Focused	Grab	Focused	J1B644	NA		6/3/2010 12:10	593812	116122
300-260	Shallow_Focused	Grab	Focused	J1B645	NA		6/3/2010 12:15	593812	116122
300-260	Shallow_Focused	Grab	Focused	J1B646	NA		6/3/2010 12:35	593780	116120
300-260	Shallow_Focused	Grab	Focused	J1B647	NA		6/3/2010 12:40	593780	116120
300-260	Shallow_Focused	Grab	Focused	J1B648	NA		6/3/2010 12:55	593780	116162
300-260	Shallow_Focused	Grab	Focused	J1B649	NA		6/3/2010 13:00	593780	116162
300-272	Shallow_Focused	Grab	Focused	377UST-10		R	2/22/2002 0:00		
300-272	Overburden_Focused	Composite	Focused	377UST-11			2/22/2002 0:00		
300-272	Overburden_Focused	Composite	Focused	377UST-12		R	2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-13			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-14			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-15			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-16			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-17			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-18			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-19			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-21			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-22			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-23			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-24			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-25			2/22/2002 0:00		
300-272	Overburden_Focused	Composite	Focused	377UST-26			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-27			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-28		R	2/22/2002 0:00		
300-272	Overburden_Focused	Composite	Focused	377UST-29			2/22/2002 0:00		
300-272	Overburden_Focused	Grab	Focused	377UST-3			2/22/2002 0:00		
300-272	Overburden_Focused	Composite	Focused	377UST-30		R	2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-31			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-32			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-33			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-34			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-35			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-36			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-37			2/22/2002 0:00		
300-272	Overburden_Focused	Grab	Focused	377UST-4			2/22/2002 0:00		
300-272	Overburden_Focused	Grab	Focused	377UST-5			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-6			2/22/2002 0:00		
300-272	Shallow_Focused	Grab	Focused	377UST-7			2/22/2002 0:00		
300-272	Shallow_Focused	Composite	Focused	377UST-8			2/22/2002 0:00		
300-272	Overburden_Focused	Grab	Focused	377UST-9			2/22/2002 0:00		
300-275	Shallow	Grab	Statistical	J17XW5	1		11/19/2008 12:55	594293	116987.6
300-275	Shallow	Grab	Statistical	J17XW6	1		11/19/2008 13:00	594284.1	116972.9
300-275	Shallow	Grab	Statistical	J17XW7	1		11/19/2008 13:05	594288.2	116965.4
300-275	Shallow	Grab	Statistical	J17XW8	1		11/19/2008 13:10	594301.3	116972.5
300-275	Shallow	Grab	Statistical	J17XW9	1	R	11/19/2008 13:10	594301.3	116972.5
300-275	Shallow	Grab	Statistical	J17XX0	1		11/19/2008 13:15	594296.8	116965.2

Table G-2. 300 Area Source Operable Unit Waste Site Decision Units

Waste Site Code	Decision Unit	Sample Type	Sampling Plan Design	Sample Number	Statistical Group	QC Type	Sample Date/Time	WSP easting (m)	WSP northing (m)
300-275	Shallow	Grab	Statistical	J17XX1	1		11/19/2008 13:20	594292.3	116957.8
300-275	Shallow	Grab	Statistical	J17XX2	1		11/19/2008 13:25	594309.9	116972.3
300-275	Shallow	Grab	Statistical	J17XX3	1		11/19/2008 13:30	594305.4	116964.9
300-275	Shallow	Grab	Statistical	J17XX4	1		11/19/2008 13:35	594323	116979.4
300-275	Shallow	Grab	Statistical	J17XX5	1		11/19/2008 13:40	594318.5	116972.1
300-275	Shallow	Grab	Statistical	J17XX6	1		11/19/2008 13:45	594314	116964.7
300-275	Shallow	Grab	Statistical	J17XX7	1		11/19/2008 13:50	594327.1	116971.8
300-275	Shallow	Grab	Statistical	J17XX8	2		11/20/2008 11:45	594325.7	116875.9
300-275	Shallow	Grab	Statistical	J17XX9	2		11/20/2008 11:50	594328.9	116875.9
300-275	Shallow	Grab	Statistical	J17XY0	2		11/20/2008 11:55	594324.1	116878.6
300-275	Shallow	Grab	Statistical	J17XY1	2		11/20/2008 12:00	594327.3	116878.6
300-275	Shallow	Grab	Statistical	J17XY2	2		11/20/2008 12:05	594325.7	116881.3
300-275	Shallow	Grab	Statistical	J17XY3	2		11/20/2008 12:10	594328.9	116881.3
300-275	Shallow	Grab	Statistical	J17XY4	2		11/20/2008 12:15	594322.6	116886.8
300-275	Shallow	Grab	Statistical	J17XY5	2		11/20/2008 12:20	594325.7	116886.8
300-275	Shallow	Grab	Statistical	J17XY6	2		11/20/2008 12:25	594321	116889.6
300-275	Shallow	Grab	Statistical	J17XY7	2		11/20/2008 12:30	594324.1	116889.6
300-33, 300-41, 300-256	Shallow	Grab	Statistical	J19YW8	1	R	5/6/2010 8:20	594021.6	116114.7
300-33, 300-41, 300-256	Shallow	Grab	Statistical	J19J36	1		5/6/2010 8:06	594043.5	116099
300-33, 300-41, 300-256	Shallow	Grab	Statistical	J19J37	1		5/6/2010 8:08	594068	116110.2
300-33, 300-41, 300-256	Shallow	Grab	Statistical	J19J38	1		5/6/2010 8:18	593997.1	116103.6
300-33, 300-41, 300-256	Shallow	Grab	Statistical	J19J39	1		5/6/2010 8:20	594021.6	116114.7
300-33, 300-41, 300-256	Shallow	Grab	Statistical	J19J40	1		5/6/2010 8:25	594046.1	116125.8
300-33, 300-41, 300-256	Shallow	Grab	Statistical	J19J41	1		5/6/2010 8:50	593950.6	116108.1
300-33, 300-41, 300-256	Shallow	Grab	Statistical	J19J42	1		5/6/2010 8:43	593975.1	116119.2
300-33, 300-41, 300-256	Shallow	Grab	Statistical	J19J43	1		5/6/2010 8:46	593999.7	116130.4
300-33, 300-41, 300-256	Shallow	Grab	Statistical	J19J44	1		5/6/2010 8:27	594024.2	116141.5
300-33, 300-41, 300-256	Shallow	Grab	Statistical	J19YW3	1		5/6/2010 8:32	594048.7	116152.6
300-33, 300-41, 300-256	Shallow	Grab	Statistical	J19YW4	1		5/6/2010 9:02	593953.2	116134.9
300-33, 300-41, 300-256	Shallow	Grab	Statistical	J19YW5	1		5/6/2010 9:05	593977.7	116146
300-33, 300-41, 300-256	Shallow_Focused	Grab	Focused	J19YW6	NA		5/6/2010 8:35	594017.3	116144.3
300-33, 300-41, 300-256	Shallow_Focused	Grab	Focused	J19YW7	NA		5/6/2010 9:10	593948.8	116140.7
300-33, 300-41, 300-256	Shallow	Statistical	Grab	J19J41			5/6/2010 8:50	593950.6	116108.1
300-33, 300-41, 300-256	Shallow	Statistical	Grab	J19J36			5/6/2010 8:06	594043.5	116099
300-33, 300-41, 300-256	Shallow	Statistical	Grab	J19J37			5/6/2010 8:08	594068	116110.2
300-33, 300-41, 300-256	Shallow	Statistical	Grab	J19J38			5/6/2010 8:18	593997.1	116103.6
300-33, 300-41, 300-256	Shallow	Statistical	Grab	J19J39			5/6/2010 8:20	594021.6	116114.7
300-33, 300-41, 300-256	Shallow	Statistical	Grab	J19J40			5/6/2010 8:25	594046.1	116125.8
300-33, 300-41, 300-256	Shallow	Statistical	Grab	J19J42			5/6/2010 8:43	593975.1	116119.2
300-33, 300-41, 300-256	Shallow	Statistical	Grab	J19J43			5/6/2010 8:46	593999.7	116130.4
300-33, 300-41, 300-256	Shallow	Statistical	Grab	J19J44			5/6/2010 8:27	594024.2	116141.5
300-33, 300-41, 300-256	Shallow	Statistical	Grab	J19YW3			5/6/2010 8:32	594048.7	116152.6
300-33, 300-41, 300-256	Shallow	Statistical	Grab	J19YW4			5/6/2010 9:02	593953.2	116134.9
300-33, 300-41, 300-256	Shallow	Statistical	Grab	J19YW5			5/6/2010 9:05	593977.7	116146
300-33, 300-41, 300-256	Shallow	Statistical	Grab	J19YW8		R	5/6/2010 8:20	594021.6	116114.7
300-33, 300-41, 300-256	Shallow_Focused	Focused	Grab	J19YW6			5/6/2010 8:35	594017.3	116144.3
300-33, 300-41, 300-256	Shallow_Focused	Focused	Grab	J19YW7			5/6/2010 9:10	593948.8	116140.7
300-37	Shallow_Focused	Grab	Focused	N2890			8/25/1994 0:00		
300-37	Shallow_Focused	Grab	Focused	N2891			8/25/1994 0:00		
300-44	Shallow_Focused	Grab	Focused	B0M1V6			9/25/1997 9:23	593847	116939
300-44	Shallow_Focused	Grab	Focused	B0M1V9			9/25/1997 9:38	593847	116949
300-44	Overburden_Focused	Grab	Focused	B0M6B3			11/18/1997 11:57		
300-44	Overburden_Focused	Grab	Focused	B0M6B6			11/18/1997 11:48		

Table G-2. 300 Area Source Operable Unit Waste Site Decision Units

Waste Site Code	Decision Unit	Sample Type	Sampling Plan Design	Sample Number	Statistical Group	QC Type	Sample Date/Time	WSP easting (m)	WSP northing (m)
300-45	Shallow_Focused	Grab	Focused	B0L946	NA		9/22/1997 9:17	594050	116446
300-45	Shallow_Focused	Grab	Focused	B0L947	NA		9/22/1997 9:35	594055	116456
300-49	Overburden	Grab	Statistical	B0Y6M0			6/28/2000 8:30		
300-49	Overburden	Grab	Statistical	B0Y6M1			6/28/2000 8:40		
300-49	Overburden	Grab	Statistical	B0Y6M2			6/28/2000 8:50		
300-49	Overburden	Grab	Statistical	B0Y6M3			6/28/2000 9:05		
300-49	Overburden	Grab	Statistical	B0Y6M4			6/28/2000 9:15		
300-49	Overburden	Grab	Statistical	B0Y6M5			6/28/2000 9:25		
300-49	Overburden	Grab	Statistical	B0Y6M5			6/28/2000 9:25	594300	116810
300-49	Shallow	Grab	Statistical	B0Y6M6			6/28/2000 8:37	594300	116810
300-49	Shallow	Grab	Statistical	B0Y6M6			6/28/2000 8:37	594300	116830
300-49	Shallow	Grab	Statistical	B0Y6M7			6/28/2000 8:53	594300	116830
300-49	Shallow	Grab	Statistical	B0Y6M7			6/28/2000 8:53	594315	116830
300-49	Shallow	Grab	Statistical	B0Y6M8			6/28/2000 9:06	594315	116830
300-49	Shallow	Grab	Statistical	B0Y6M8			6/28/2000 9:06	594295	116845
300-49	Shallow	Grab	Statistical	B0Y6M9			6/28/2000 9:16	594295	116845
300-49	Shallow	Grab	Statistical	B0Y6P0			6/28/2000 9:25	594285	116860
300-49	Shallow	Grab	Statistical	B0Y6P1			6/28/2000 9:49	594350	116875
300-49	Shallow	Grab	Statistical	B0Y6P2		R	6/28/2000 9:25	594285	116860
300-50	Overburden	Grab	Statistical	B0Y750			6/28/2000 10:00		
300-50	Overburden	Grab	Statistical	B0Y751			6/28/2000 10:10		
300-50	Overburden	Grab	Statistical	B0Y752			6/28/2000 10:20		
300-50	Overburden	Grab	Statistical	B0Y753			6/28/2000 10:35		
300-50	Overburden	Grab	Statistical	B0Y754			6/28/2000 10:45		
300-50	Overburden	Grab	Statistical	B0Y755			6/28/2000 10:55		
300-50	Shallow	Grab	Statistical	B0Y756			7/5/2000 9:45	594230	116725
300-50	Shallow	Grab	Statistical	B0Y757		R	7/5/2000 9:45	594230	116725
300-50	Shallow	Grab	Statistical	B0Y758			7/5/2000 10:05	594240	116725
300-50	Shallow	Grab	Statistical	B0Y759			7/5/2000 8:50	594170	116685
300-50	Shallow	Grab	Statistical	B0Y770			7/5/2000 9:00	594235	116695
300-50	Shallow	Grab	Statistical	B0Y771			7/5/2000 9:15	594220	116715
300-50	Shallow	Grab	Statistical	B0Y772			7/5/2000 10:20	594165	116745
300-8	Shallow	Composite	Statistical	J03VD4	1		7/27/2005 8:25	593874.98	116628.63
300-8	Shallow	Composite	Statistical	J03VD5	1		7/27/2005 8:35	593848.9	116609.35
300-8	Shallow	Composite	Statistical	J03VD6	1		7/27/2005 8:45	593807.22	116644.17
300-8	Shallow	Composite	Statistical	J03VD7	1		7/27/2005 8:53	593843.33	116666.09
300-8	Shallow	Composite	Statistical	J03VD8	1		7/27/2005 8:58	593827.88	116735.95
300-8	Shallow	Composite	Statistical	J03VD9	1		7/27/2005 9:06	593813.73	116727.24
300-8	Shallow	Composite	Statistical	J03VF0	1		7/27/2005 9:11	593765.77	116694.26
300-8	Shallow	Composite	Statistical	J03VF1	1		7/27/2005 9:17	593799.44	116597.01
300-8	Shallow	Composite	Statistical	J03VF2	1		7/28/2005 8:10	593801.7	116578.86
300-8	Shallow	Composite	Statistical	J03VF3	1		7/28/2005 8:17	593771.75	116565.71
300-8	Shallow	Composite	Statistical	J03VF4	1		7/28/2005 8:24	593828.56	116526.1
300-8	Shallow	Composite	Statistical	J03VF5	1		7/28/2005 8:29	593877.53	116436.96
300-8	Shallow	Composite	Statistical	J03VF6	1		7/28/2005 8:33	593883.72	116385.02
300-8	Shallow	Composite	Statistical	J03VF7	1		7/28/2005 8:41	593902.4	116342.65
300-8	Shallow	Composite	Statistical	J03VF8	1		7/28/2005 8:48	593885.48	116513.64
300-8	Shallow	Composite	Statistical	J03VF9	1		7/28/2005 8:53	593946.28	116462.53
300-8	Shallow	Composite	Statistical	J03VH0	1	R	7/27/2005 8:25	593874.98	116628.63
316-1	Shallow	Grab	Statistical	B0L884	1		8/20/1997 13:40		
316-1	Shallow	Grab	Statistical	B0L885	1		8/27/1997 9:25		
316-1	Shallow	Grab	Statistical	B0L886	1		8/28/1997 8:57		
316-1	Shallow	Grab	Statistical	B0L887	1		9/8/1997 8:45		

Table G-2. 300 Area Source Operable Unit Waste Site Decision Units

Waste Site Code	Decision Unit	Sample Type	Sampling Plan Design	Sample Number	Statistical Group	QC Type	Sample Date/Time	WSP easting (m)	WSP northing (m)
316-1	Shallow	Grab	Statistical	B0L888	1		9/9/1997 11:44		
316-1	Shallow	Grab	Statistical	B0L889	1		9/10/1997 10:34		
316-1	Shallow	Grab	Statistical	B0L890	1		9/11/1997 11:23		
316-1	Shallow	Grab	Statistical	B0L891	1		9/12/1997 9:56		
316-1	Shallow	Grab	Statistical	B0R3R1	3		12/17/1998 8:10	594243	116057
316-1	Shallow	Grab	Statistical	B0R3R2	3	R	12/17/1998 8:10	594243	116057
316-1	Shallow	Grab	Statistical	B0R3R4	3		12/17/1998 8:32	594242	116031
316-1	Shallow	Grab	Statistical	B0R3R5	3		12/17/1998 8:50	594235	116027
316-1	Shallow	Grab	Statistical	B0R3R6	3		12/17/1998 9:11	594264	116021
316-1	Shallow	Grab	Statistical	B0R3R7	3		12/17/1998 9:34	594303	116116
316-1	Shallow	Grab	Statistical	B0R3R8	3		12/17/1998 9:52	594288	116133
316-1	Shallow	Grab	Statistical	B0R3R9	3		12/17/1998 10:14	594299	116156
316-1	Shallow	Grab	Statistical	B0R3T0	3		12/17/1998 10:20	594315	116162
316-1	Shallow	Grab	Statistical	B0R3T1	3		12/17/1998 10:20	594290	116173
316-1	Shallow	Grab	Statistical	B0YNM1	3		7/13/2000 10:30	594266	116077
316-1	Shallow	Grab	Statistical	B0YNM2	3		7/13/2000 10:45	594288	116186
316-1	Shallow	Grab	Statistical	B0YNM3	3		7/13/2000 10:50	594251	116133
316-1	Shallow	Grab	Statistical	B0YNM4	3		7/13/2000 11:00	594213	116033
316-1	Shallow	Grab	Statistical	B0YNM5	3		7/13/2000 11:10	594330	116075
316-1	Shallow	Grab	Statistical	B0YNM6	3		7/13/2000 11:20	594326	116081
316-1	Shallow	Grab	Statistical	B0YNM7	3		7/13/2000 12:20	594371	116044
316-1	Shallow	Grab	Statistical	B0YNM8	3		7/13/2000 12:45	594424	116025
316-1	Shallow	Grab	Statistical	B0YNM9	3		7/13/2000 13:00	594280	116076
316-1	Shallow	Grab	Statistical	B0YNN0	3		7/13/2000 13:10	594416	116145
316-1	Shallow	Grab	Statistical	B0YNN1	4		7/14/2000 8:25	594203	116066
316-1	Shallow	Grab	Statistical	B0YNN2	4		7/14/2000 8:37	594203	116132
316-1	Shallow	Grab	Statistical	B0YNN3	4		7/14/2000 8:45	594235	116109
316-1	Shallow	Grab	Statistical	B0YNN4	4		7/14/2000 8:58	594218	116142
316-1	Shallow	Grab	Statistical	B0YNN5	4		7/14/2000 9:11	594219	116175
316-1	Shallow	Grab	Statistical	B0YNN6	4		7/14/2000 9:20	594190	116152
316-1	Shallow	Grab	Statistical	B0YNN7	4		7/14/2000 9:32	594179	116155
316-1	Shallow	Grab	Statistical	B0YNN8	4		7/14/2000 9:43	594206	116102
316-1	Shallow	Grab	Statistical	B0YNN9	4		7/14/2000 9:55	594220	116087
316-1	Shallow	Grab	Statistical	B0YNP0	4		7/14/2000 10:12	594214	116111
316-1	Overburden	Grab	Statistical	B0YNP1			7/14/2000 10:20		
316-1	Overburden	Grab	Statistical	B0YNP2			7/14/2000 10:28		
316-1	Overburden	Grab	Statistical	B0YNP3			7/14/2000 10:39		
316-1	Overburden	Grab	Statistical	B0YNP4			7/14/2000 10:45		
316-1	Overburden	Grab	Statistical	B0YNP5			7/14/2000 10:55		
316-1	Overburden	Grab	Statistical	B0YNP6			7/14/2000 11:05		
316-1	Shallow	Grab	Statistical	B0YNP7	3	R	7/13/2000 13:10	594416	116145
316-1	Shallow	Grab	Statistical	B0YNP8	4	R	7/14/2000 10:12	594214	116111
316-2	Shallow	Grab	Statistical	B0L633	3		6/26/1997 9:42	594182.5	116677
316-2	Shallow	Grab	Statistical	B0L635	3		6/26/1997 14:16	594191	116658
316-2	Shallow	Grab	Statistical	B0L636	3		7/2/1997 14:00	594242.5	116704.5
316-2	Shallow	Grab	Statistical	B0L648	3		8/8/1997 14:27	594325	116480
316-2	Shallow	Grab	Statistical	B0L649	3		7/30/1997 13:20	594335	116641
316-2	Shallow	Grab	Statistical	B0L650	3		7/31/1997 13:28	594350	116559.5
316-2	Shallow	Grab	Statistical	B0V024	1		3/12/1999 10:00	594195	116582
316-2	Shallow	Grab	Statistical	B0V025	1		3/12/1999 10:12	594180	116575
316-2	Shallow	Grab	Statistical	B0V026	1		3/12/1999 10:20	594213	116605
316-2	Shallow	Grab	Statistical	B0V027	1		3/12/1999 10:40	594201	116489
316-2	Shallow	Grab	Statistical	B0V028	1		3/12/1999 11:07	594142	116619

Table G-2. 300 Area Source Operable Unit Waste Site Decision Units

Waste Site Code	Decision Unit	Sample Type	Sampling Plan Design	Sample Number	Statistical Group	QC Type	Sample Date/Time	WSP easting (m)	WSP northing (m)
316-2	Shallow	Grab	Statistical	B0V029	1		3/12/1999 11:25	594185	116629
316-2	Shallow	Grab	Statistical	B0V030	2		3/12/1999 12:55	594233	116587
316-2	Shallow	Grab	Statistical	B0V031	2		3/12/1999 13:15	594258	116561
316-2	Shallow	Grab	Statistical	B0V032	2		3/12/1999 13:40	594289	116582
316-2	Shallow	Grab	Statistical	B0V033	2		3/12/1999 13:55	594343	116517
316-2	Shallow	Grab	Statistical	B0V034	2		3/12/1999 14:10	594250	116511
316-2	Shallow	Grab	Statistical	B0V035	2		3/12/1999 14:35	594226	116541
316-5	Shallow_Focused	Grab	Focused	B0M4N1			10/7/1997 10:10	594091	116451
316-5	Shallow_Focused	Grab	Focused	B0M4N4			10/7/1997 10:40	594076	116451
316-5	Shallow_Focused	Focused	Grab	B0L942			6/20/1997 11:05		
316-5	Shallow	Grab	Statistical	B0L950	1		11/12/1997 9:30	594076	116930
316-5	Shallow	Grab	Statistical	B0L951	1	R	11/12/1997 9:30	594076	116930
316-5	Shallow	Grab	Statistical	B0L952	1		11/12/1997 10:11	594044	116913
316-5	Shallow	Grab	Statistical	B0L953	1		11/12/1997 10:27	594028	116910
316-5	Shallow	Grab	Statistical	B0L954	1		11/12/1997 10:42	594012	116879
316-5	Shallow	Grab	Statistical	B0L955	1		11/12/1997 10:51	594025	116874
316-5	Shallow	Grab	Statistical	B0L956	1		11/12/1997 11:10	594088	116880
316-5	Shallow	Grab	Statistical	B0L963	2		11/13/1997 8:05	594070	116816
316-5	Shallow	Grab	Statistical	B0MD75	2		11/13/1997 9:37	594088	116918
316-5	Shallow	Grab	Statistical	B0MD78	2		11/13/1997 8:35	594070	116840
316-5	Shallow	Grab	Statistical	B0MDK0	2		11/13/1997 8:55	594088	116836
316-5	Shallow	Grab	Statistical	B0MDK3	2		11/13/1997 9:16	594088	116882
316-5	Shallow	Grab	Statistical	B0N1R4	2		2/3/1998 9:14	594070	116857
331 LSLDF	Shallow_Focused	Grab	Focused	J134V6	NA		4/18/2007 15:15	594640	115369
331 LSLDF	Shallow_Focused	Grab	Focused	J134V7	NA	R	4/18/2007 15:20	594640	115369
331 LSLDF	Shallow_Focused	Grab	Focused	J134V8	NA		4/19/2007 14:00	594640	115359
331 LSLDF	Shallow_Focused	Grab	Focused	J134V9	NA		4/19/2007 15:30	594640	115359
331 LSLDF	Shallow_Focused	Grab	Focused	J134W2	NA		4/18/2007 14:50	594640	115369
600-243	Shallow	Grab	Statistical	J15HN1	1		10/1/2007 8:00	593173.9	116122.4
600-243	Shallow	Grab	Statistical	J15HN2	1		10/1/2007 8:10	593134.2	116114
600-243	Shallow	Grab	Statistical	J15HN3	1		10/1/2007 8:20	593147.3	116121.9
600-243	Shallow	Grab	Statistical	J15HN4	1		10/1/2007 8:20	593160.5	116129.9
600-243	Shallow	Grab	Statistical	J15HN5	1		10/1/2007 8:40	593173.7	116137.8
600-243	Shallow	Grab	Statistical	J15HN6	1		10/1/2007 8:50	593133.9	116129.4
600-243	Shallow	Grab	Statistical	J15HN7	1		10/1/2007 9:00	593147.1	116137.3
600-243	Shallow	Grab	Statistical	J15HN8	1		10/1/2007 9:10	593160.3	116145.2
600-243	Shallow	Grab	Statistical	J15HN9	1		10/1/2007 9:20	593173.4	116153.1
600-243	Shallow	Grab	Statistical	J15HP0	1		10/1/2007 9:30	593133.6	116144.8
600-243	Shallow	Grab	Statistical	J15HP1	1		10/1/2007 9:40	593146.8	116152.7
600-243	Shallow	Grab	Statistical	J15HP2	1	R	10/1/2007 9:40	593146.8	116152.7
600-259	Shallow	Composite	Statistical	J03WM5	1		8/23/2005 10:05	591196.58	121609.44
600-259	Shallow	Composite	Statistical	J03WM6	1		8/23/2005 10:12	591200.88	121608.34
600-259	Shallow	Composite	Statistical	J03WM7	1		8/23/2005 10:23	591204.78	121615.89
600-259	Shallow	Composite	Statistical	J03WM8	1		8/23/2005 10:39	591208.99	121608.96
600-259	Shallow	Composite	Statistical	J03WM9	1	R	8/23/2005 10:05	591196.58	121609.44
600-259	Shallow_Focused	Grab	Focused	J03X41	NA		8/23/2005 10:43	591202.31	121612.73
600-259	Shallow_Focused	Grab	Focused	J03X42	NA		8/23/2005 10:49	591204.26	121610.15
600-259	Overburden	Composite	Statistical	J10738	2		9/21/2005 8:10	591233.04	121590.96
600-259	Overburden	Composite	Statistical	J10739	2		9/21/2005 8:10	591238.16	121598.65
600-259	Overburden	Composite	Statistical	J10740	2		9/21/2005 8:10	591242.01	121604.25
600-259	Overburden	Composite	Statistical	J10741	2		9/21/2005 8:10	591248.78	121609.35
600-259	Overburden	Composite	Statistical	J10742	2	R	9/21/2005 8:10	591233.04	121590.96
600-47	Shallow	Composite	Statistical	J036X2	1		5/25/2005 9:03	594137.17	117635.48

Table G-2. 300 Area Source Operable Unit Waste Site Decision Units

Waste Site Code	Decision Unit	Sample Type	Sampling Plan Design	Sample Number	Statistical Group	QC Type	Sample Date/Time	WSP easting (m)	WSP northing (m)
600-47	Shallow	Composite	Statistical	J036X3	1		5/25/2005 9:12	594237.34	117620.29
600-47	Shallow	Composite	Statistical	J036X4	1		5/25/2005 9:16	594266.77	117603.49
600-47	Shallow	Composite	Statistical	J036X5	1		5/25/2005 9:21	594224.32	117418.78
600-47	Shallow	Composite	Statistical	J036X6	1	R	5/25/2005 9:03	594137.17	117635.48
618-1	Shallow	Composite	Statistical	J19HH7	1		1/27/2010 10:30	594007.75	116255.25
618-1	Shallow	Composite	Statistical	J19HH8	1		1/27/2010 10:45	594004.85	116197.2
618-1	Shallow	Composite	Statistical	J19HH9	1		1/27/2010 12:30	594027.1	116271.6
618-1	Shallow	Composite	Statistical	J19HJ0	1		1/27/2010 11:00	594043.2	116204.73
618-1	Shallow	Composite	Statistical	J19HJ2	1	R	1/27/2010 12:30	594027.1	116271.6
618-1	Deep	Composite	Statistical	J19HN3	2		1/27/2010 8:47	594012.73	116203.68
618-1	Deep	Composite	Statistical	J19HN4	2		1/27/2010 9:05	594015	116193.23
618-1	Deep	Composite	Statistical	J19HN5	2		1/27/2010 9:30	594029.3	116203.88
618-1	Deep	Composite	Statistical	J19HN6	2		1/27/2010 10:05	594031.38	116189.2
618-1	Deep	Composite	Statistical	J19HN7	2	R	1/27/2010 10:05	594031.38	116189.2
618-1	Deep_Focused	Grab	Focused	J19HP2	NA		1/26/2010 8:36	594013	116210
618-1	Deep_Focused	Grab	Focused	J19HP3	NA		1/26/2010 8:30	594017	116204.5
618-1	Deep_Focused	Grab	Focused	J19HP4	NA		1/26/2010 8:25	594021	116199
618-1	Deep_Focused	Grab	Focused	J19HP5	NA		1/26/2010 14:02	594025.7	116191.4
618-1	Shallow_Focused	Grab	Focused	J19HP6	NA		1/26/2010 13:00	594022	116273.1
618-1	Shallow_Focused	Grab	Focused	J19HP7	NA		1/26/2010 12:53	594019.7	116278
618-1	Shallow_Focused	Grab	Focused	J19HP8	NA		1/26/2010 13:05	594023.2	116248.6
618-1	Shallow_Focused	Grab	Focused	J19HP9	NA		1/26/2010 13:30	594048.7	116221.6
618-1	Shallow_Focused	Grab	Focused	J19HR0	NA		1/26/2010 14:07	594012.1	116182.1
618-1	Deep_Focused	Grab	Focused	J19HR1	NA		1/26/2010 14:10	594021.9	116205.6
618-1	Deep_Focused	Grab	Focused	J19HR2	NA		1/26/2010 8:42	594010.7	116204.9
618-1	Shallow_Focused	Grab	Focused	J19J25	NA		1/26/2010 13:32	593991.4	116204.9
618-1	Deep_Focused	Grab	Focused	J19J26	NA		1/26/2010 13:57	594023.4	116190.2
618-1	Deep_Focused	Grab	Focused	J19J27	NA		1/26/2010 13:36	594035.7	116191.6
618-1	Shallow_Focused	Grab	Focused	J19J28	NA		1/26/2010 14:12	594003.7	116250.4
618-1	Shallow_Focused	Grab	Focused	J19J29	NA		1/26/2010 13:57	594008.4	116244.2
618-1	Shallow_Focused	Grab	Focused	J19J30	NA		1/26/2010 13:45	593995	116228.7
618-1	Shallow_Focused	Grab	Focused	J19J31	NA		1/26/2010 13:40	593998.8	116215.1
618-1	Shallow_Focused	Grab	Focused	J19J32	NA		1/26/2010 14:20	593992.6	116185
618-1	Deep_Focused	Grab	Focused	J19J33	NA		1/26/2010 14:15	594013	116194
618-1	Shallow_Focused	Grab	Focused	J19J34	NA		1/26/2010 13:25	594036	116263
618-12	Shallow	Grab	Statistical	B0L651			8/11/1997 11:39	594291	116436
618-12	Shallow	Grab	Statistical	B0L653			8/11/1997 14:24	594249	116450
618-12	Shallow	Grab	Statistical	B0L654			8/12/1997 8:29	594212	116445
618-12	Shallow	Grab	Statistical	B0L655			8/12/1997 9:46	594205	116412
618-12	Shallow	Grab	Statistical	B0L656			8/12/1997 13:20	594161	116436
618-12	Shallow	Grab	Statistical	B0L657			8/12/1997 14:19	594167	116388
618-12	Shallow	Grab	Statistical	B0L658			8/13/1997 9:31	594261	116406
618-12	Shallow	Grab	Statistical	B0L659			8/13/1997 11:44	594284	116478
618-13	Shallow	Composite	Statistical	J18PX0	1		4/28/2009 10:00	592856.73	116243.92
618-13	Shallow	Composite	Statistical	J18PX1	1		4/28/2009 10:05	592878.91	116247.97
618-13	Shallow	Composite	Statistical	J18PX2	1		4/28/2009 10:15	592856.02	116235.96
618-13	Shallow	Composite	Statistical	J18PX3	1		4/28/2009 10:20	592877.91	116222.46
618-13	Shallow	Composite	Statistical	J18PX4	1	R	4/28/2009 10:05	592878.91	116247.97
618-13	Shallow_Focused	Grab	Focused	J18R00	NA		4/28/2009 10:35	592861	116248
618-13	Shallow_Focused	Grab	Focused	J18R01	NA		4/28/2009 10:45	592880	116240
618-2	Staging Pile	Composite	Statistical	J13D59	4	R	9/6/2006 6:50	594077.65	116585.47
618-2	Staging Pile	Composite	Statistical	J13D60	4		9/6/2006 7:30	594144.9	116600.35
618-2	Staging Pile	Composite	Statistical	J13D61	4		9/6/2006 7:20	594125.08	116592.69

Table G-2. 300 Area Source Operable Unit Waste Site Decision Units

Waste Site Code	Decision Unit	Sample Type	Sampling Plan Design	Sample Number	Statistical Group	QC Type	Sample Date/Time	WSP easting (m)	WSP northing (m)
618-2	Staging Pile	Composite	Statistical	J13D62	4		9/6/2006 7:10	594109.23	116598.05
618-2	Staging Pile	Composite	Statistical	J13D63	4		9/6/2006 8:10	594156.85	116604.9
618-2	Staging Pile	Composite	Statistical	J13D64	4		9/6/2006 8:40	594172.82	116592.65
618-2	Staging Pile	Composite	Statistical	J13D65	4		9/6/2006 8:50	594064.92	116527.42
618-2	Staging Pile	Composite	Statistical	J13D66	4		9/6/2006 9:00	594087.92	116519.32
618-2	Staging Pile	Composite	Statistical	J13D67	4		9/6/2006 9:10	594104.28	116523.19
618-2	Staging Pile	Composite	Statistical	J13D68	4		9/6/2006 9:20	594119.49	116500.48
618-2	Staging Pile	Composite	Statistical	J13D69	4		9/6/2006 9:30	594133.1	116532.33
618-2	Staging Pile	Composite	Statistical	J13D70	4		9/6/2006 9:40	594146.33	116507.48
618-2	Staging Pile	Composite	Statistical	J13D71	4		9/6/2006 9:50	594159.46	116501.37
618-2	Staging Pile	Composite	Statistical	J13D72	4		9/6/2006 10:00	594175.83	116519.22
618-2	Staging Pile	Composite	Statistical	J13D73	4		9/6/2006 6:40	594063.88	116599.62
618-2	Staging Pile	Composite	Statistical	J13D74	4		9/6/2006 6:50	594077.65	116585.47
618-2	Staging Pile	Composite	Statistical	J13D75	4		9/6/2006 7:00	594093.34	116618.54
618-2	Overburden	Composite	Statistical	J13DF9	3		9/7/2006 10:00	594007.39	116413.14
618-2	Overburden	Composite	Statistical	J13DH0	3		9/7/2006 10:05	593993.6	116412.74
618-2	Overburden	Composite	Statistical	J13DH1	3	R	9/7/2006 10:05	593993.6	116412.74
618-2	Overburden	Composite	Statistical	J13DH2	3		9/7/2006 10:10	594025.72	116407.29
618-2	Overburden	Composite	Statistical	J13DH3	3		9/7/2006 10:15	594022.36	116374.96
618-2	Deep_Focused	Grab	Focused	J13DH9	NA		9/7/2006 9:40	594043.35	116319.61
618-2	Deep	Composite	Statistical	J13DJ0	2		9/7/2006 9:10	594023.22	116341.38
618-2	Deep	Composite	Statistical	J13DJ1	2	R	9/7/2006 9:10	594023.22	116341.38
618-2	Deep	Composite	Statistical	J13DJ2	2		9/7/2006 9:20	594037.15	116341.54
618-2	Deep	Composite	Statistical	J13DJ3	2		9/7/2006 9:30	594032.36	116321.18
618-2	Deep	Composite	Statistical	J13DJ4	2		9/7/2006 9:00	594034.31	116357.73
618-2	Deep_Focused	Grab	Focused	J13DJ5	NA		9/7/2006 9:50	594038.66	116321.76
618-2	Shallow	Composite	Statistical	J13DJ6	1		9/7/2006 8:00	594033.64	116361.8
618-2	Shallow	Composite	Statistical	J13DJ7	1		9/7/2006 8:10	594035.87	116351.82
618-2	Shallow	Composite	Statistical	J13DJ8	1	R	9/7/2006 8:10	594035.87	116351.82
618-2	Shallow	Composite	Statistical	J13DJ9	1		9/7/2006 8:20	591502.9	116331.33
618-2	Shallow	Composite	Statistical	J13DK0	1		9/7/2006 8:30	594026.98	116315.6
618-2	Deep_Focused	Grab	Focused	J13DN0	NA		9/26/2006 10:10	594010	116319
618-2	Deep_Focused	Grab	Focused	J13DN1	NA		9/26/2006 10:20	594018	116318
618-2	Deep_Focused	Grab	Focused	J13DN2	NA		9/26/2006 10:30	594039	116320
618-2	Deep_Focused	Grab	Focused	J13DN3	NA		9/26/2006 10:50	594015	116339
618-2	Deep_Focused	Grab	Focused	J13DN4	NA		9/26/2006 11:00	594032	116339
618-2	Deep_Focused	Grab	Focused	J13H86	NA		9/28/2006 12:35	594041	116335
618-2	Deep_Focused	Grab	Focused	J13H87	NA		9/28/2006 12:50	594044	116334.4
618-3	Shallow_Focused	Grab	Focused	J10TX0	NA		11/30/2005 12:05	593976	116378
618-3	Shallow_Focused	Grab	Focused	J10TX1	NA		11/30/2005 12:10	593957	116380
618-3	Shallow_Focused	Grab	Focused	J10TX2	NA		11/30/2005 12:15	593972	116396
618-3	Shallow	Composite	Statistical	J11264	1		1/31/2006 12:30	593949.68	116378.18
618-3	Shallow	Composite	Statistical	J11265	1	R	1/31/2006 12:30	593949.68	116378.18
618-3	Shallow	Composite	Statistical	J11266	1		1/31/2006 12:40	593970.02	116387.38
618-3	Shallow	Composite	Statistical	J11267	1		1/31/2006 12:45	593946.22	116333.14
618-3	Shallow	Composite	Statistical	J11268	1		1/31/2006 12:50	593974.39	116324.37
618-4	Overburden	Composite	Statistical	J00HD0	2		2/18/2003 12:30	593856.93	117028.51
618-4	Overburden	Composite	Statistical	J00HD1	2		2/18/2003 12:40	593870.54	117026.19
618-4	Overburden	Composite	Statistical	J00HD2	2		2/18/2003 12:50	593888.14	117054.29
618-4	Overburden	Composite	Statistical	J00HD3	2		2/18/2003 13:00	593903.91	117053.58
618-4	Overburden	Composite	Statistical	J00HD4	2	R	2/18/2003 12:40	593870.54	117026.19
618-4	Deep	Composite	Statistical	J00WT8	Deep		8/25/2003 8:40	593890.58	116994.56
618-4	Deep	Composite	Statistical	J00WT9	Deep		8/25/2003 8:50	593903.2	116988.71

Table G-2. 300 Area Source Operable Unit Waste Site Decision Units

Waste Site Code	Decision Unit	Sample Type	Sampling Plan Design	Sample Number	Statistical Group	QC Type	Sample Date/Time	WSP easting (m)	WSP northing (m)
618-4	Deep	Composite	Statistical	J00WV0	Deep		8/25/2003 9:30	593928.74	117030.94
618-4	Deep	Composite	Statistical	J00WV1	Deep		8/25/2003 10:06	593947.98	117022.56
618-4	Deep	Composite	Statistical	J00WV2	Deep	R	8/25/2003 8:40	593886.05	116988.35
618-4	Shallow	Composite	Statistical	J00WV3			8/26/2003 8:10	593893.9	117011.41
618-4	Shallow	Composite	Statistical	J00WV4			8/26/2003 8:25	593895.55	116969.18
618-4	Shallow	Composite	Statistical	J00WV5			8/26/2003 8:45	593978.05	117033.57
618-4	Shallow	Composite	Statistical	J00WV6			8/26/2003 8:55	593968.67	117055.08
618-4	Shallow	Composite	Statistical	J00WV7		R	8/26/2003 8:10	593893.9	117011.41
618-4	Overburden	Composite	Statistical	J00WV8	3		8/27/2003 8:30	593859.37	116999.11
618-4	Overburden	Composite	Statistical	J00WV9	3		8/27/2003 8:40	593866.36	116998.26
618-4	Overburden	Composite	Statistical	J00WW0	3		8/27/2003 8:50	593877.06	117012.97
618-4	Overburden	Composite	Statistical	J00WW1	3		8/27/2003 9:00	593885.91	117012.12
618-4	Overburden	Composite	Statistical	J00WW2	3	R	8/27/2003 8:30	593859.37	116999.11
618-4	Overburden	Composite	Statistical	J00WW3	4		8/27/2003 9:10	593923.91	116977.26
618-4	Overburden	Composite	Statistical	J00WW4	4		8/27/2003 9:20	593929.05	116974.08
618-4	Overburden	Composite	Statistical	J00WW5	4		8/27/2003 9:30	593931.35	116983.13
618-4	Overburden	Composite	Statistical	J00WW6	4		8/27/2003 9:40	593937.58	116979.8
618-4	Overburden	Composite	Statistical	J00WW7	4	R	8/27/2003 9:10	593923.91	116977.26
618-4	Deep_Focused	Grab	Focused	J00H62			2/12/2003 13:20	593930.86	117019.58
618-4	Deep_Focused	Grab	Focused	J00H63			2/12/2003 13:25	593930.86	117019.58
618-4	Deep_Focused	Grab	Focused	J00H64			2/12/2003 13:30	593930.86	117019.58
618-4	Deep_Focused	Grab	Focused	J00H65			2/12/2003 13:40	593930.86	117019.58
618-4	Deep_Focused	Grab	Focused	J00H66			2/12/2003 13:50	593930.86	117019.58
618-4	Deep_Focused	Grab	Focused	J00H67			2/12/2003 14:00	593930.86	117019.58
618-4	Deep_Focused	Grab	Focused	J00H68			2/12/2003 13:55	593930.86	117019.58
618-4	Deep_Focused	Grab	Focused	J00H69			2/12/2003 14:05	593930.86	117019.58
618-4	Deep_Focused	Grab	Focused	J00H70			2/20/2003 9:20	593930.86	117019.58
618-4	Deep_Focused	Grab	Focused	J00H71			2/20/2003 9:40	593930.86	117019.58
618-4	Deep_Focused	Grab	Focused	J00WX2			8/25/2003 9:08	593866.36	116974.65
618-4	Deep_Focused	Grab	Focused	J00WX3			8/25/2003 9:10	593870.18	116968.91
618-4	Deep_Focused	Grab	Focused	J00WX4			8/25/2003 9:12	593874.02	116961.44
618-4	Deep_Focused	Grab	Focused	J00WX5			8/25/2003 9:16	593883.59	116957.03
618-4	Deep_Focused	Grab	Focused	J00WX8			8/25/2003 9:50	593933.75	117024.98
618-4	Deep_Focused	Grab	Focused	J00WX9			8/25/2003 9:55	593935.64	117017.27
618-4	Deep_Focused	Grab	Focused	J00WY0			8/25/2003 10:00	593930.86	117019.58
618-5	Deep_Focused	Grab	Focused	J00HM5	NA		2/26/2003 8:20	594167.9	116804.79
618-5	Deep_Focused	Grab	Focused	J00HM6	NA		2/26/2003 8:40	594167.9	116804.79
618-5	Deep_Focused	Grab	Focused	J00HM7	NA		2/26/2003 8:50	594167.9	116804.79
618-5	Deep_Focused	Grab	Focused	J00HM8	NA		2/26/2003 9:44	594182.06	116820.91
618-5	Deep_Focused	Grab	Focused	J00HM9	NA		2/26/2003 10:10	594182.06	116820.91
618-5	Deep	Composite	Statistical	J00YJ8	1		9/24/2003 9:00	594185.46	116845.7
618-5	Deep	Composite	Statistical	J00YJ9	1		9/24/2003 9:15	594162.55	116827.3
618-5	Deep	Composite	Statistical	J00YK0	1		9/24/2003 9:30	594169.89	116813.85
618-5	Deep	Composite	Statistical	J00YK1	1		9/24/2003 9:40	594196.66	116830.2
618-5	Deep	Composite	Statistical	J00YK2	1	R	9/24/2003 9:00	594185.46	116845.7
618-5	Shallow	Composite	Statistical	J00YK3	2		9/24/2003 9:50	594205.88	116865.36
618-5	Shallow	Composite	Statistical	J00YK4	2		9/24/2003 10:05	594145.26	116817.62
618-5	Shallow	Composite	Statistical	J00YK5	2		9/24/2003 10:15	594154.46	116776.53
618-5	Shallow	Composite	Statistical	J00YK6	2		9/24/2003 10:25	594224.31	116838.38
618-5	Shallow	Composite	Statistical	J00YK7	2	R	9/24/2003 9:50	594205.88	116865.36
618-5	Overburden	Composite	Statistical	J00YK8	3		9/25/2003 8:05	594158.35	116943.33
618-5	Overburden	Composite	Statistical	J00YK9	3		9/25/2003 8:20	594138.31	116931.84
618-5	Overburden	Composite	Statistical	J00YL0	3		9/25/2003 8:35	594147.26	116921.97

Table G-2. 300 Area Source Operable Unit Waste Site Decision Units

Waste Site Code	Decision Unit	Sample Type	Sampling Plan Design	Sample Number	Statistical Group	QC Type	Sample Date/Time	WSP easting (m)	WSP northing (m)
618-5	Overburden	Composite	Statistical	J00YL1	3		9/25/2003 8:45	594180.4	116942.6
618-5	Overburden	Composite	Statistical	J00YL2	3	R	9/25/2003 8:05	594158.35	116943.33
618-5	Staging Pile	Composite	Statistical	J00YL3	4		9/25/2003 9:00	594121.39	116837.88
618-5	Staging Pile	Composite	Statistical	J00YL4	4		9/25/2003 9:10	594110.12	116828.59
618-5	Staging Pile	Composite	Statistical	J00YL5	4		9/25/2003 9:20	594108.28	116789.74
618-5	Staging Pile	Composite	Statistical	J00YL6	4		9/25/2003 9:30	594121.97	116771.51
618-5	Staging Pile	Composite	Statistical	J00YL7	4	R	9/25/2003 9:00	594121.39	116837.88
618-5	Staging Pile_5	Composite	Statistical	J00YL8	5		9/25/2003 9:40	594230.07	116791.54
618-5	Staging Pile_5	Composite	Statistical	J00YL9	5		9/25/2003 9:45	594178.57	116720.99
618-5	Staging Pile_5	Composite	Statistical	J00YM0	5		9/25/2003 9:55	594204.68	116737.05
618-5	Staging Pile_5	Composite	Statistical	J00YM1	5		9/25/2003 10:00	594266.86	116763
618-5	Staging Pile_5	Composite	Statistical	J00YM2	5	R	9/25/2003 9:40	594230.07	116791.54
618-7	Shallow	Composite	Statistical	J17J15	1		9/10/2008 13:20	593288	116578
618-7	Shallow	Composite	Statistical	J17J17	1		9/10/2008 13:50	593298	116618
618-7	Shallow	Composite	Statistical	J17J18	1		9/10/2008 14:00	593243	116611
618-7	Shallow	Composite	Statistical	J17J19	1		10/6/2008 9:30	593146	116631
618-7	Shallow	Composite	Statistical	J17J20	1	R	10/6/2008 9:30	593146	116631
618-7	Shallow	Composite	Statistical	J17J21	1		10/6/2008 9:40	593192	116630
618-7	Shallow	Composite	Statistical	J17J22	1		10/6/2008 12:50	593246	116572
618-7	Shallow	Composite	Statistical	J17J23	1		10/13/2008 12:40	593193	116589
618-7	Shallow	Composite	Statistical	J17J24	1		10/13/2008 12:50	593193	116610
618-7	Shallow	Composite	Statistical	J17J25	1		10/13/2008 13:00	593146	116609
618-7	Shallow	Composite	Statistical	J17J26	1		10/13/2008 13:15	593243	116592
618-7	Shallow	Composite	Statistical	J17J27	1		10/6/2008 12:55	593296	116600
618-7	Shallow	Composite	Statistical	J17J28	1		10/6/2008 13:10	593241	116630
618-7	Shallow	Composite	Statistical	J17J29	1		10/6/2008 13:20	593194	116596
618-7	Shallow	Composite	Statistical	J17J31	1		10/15/2008 9:30	593142	116590
618-7	Shallow	Composite	Statistical	J17J32	1		10/15/2008 9:45	593143	116570
618-7	Shallow_Focused	Grab	Focused	J17R29	NA		10/15/2008 10:15	593172.1	116568
618-7	Shallow_Focused	Grab	Focused	J17R30	NA		10/15/2008 8:55	593207.4	116602.1
618-7	Shallow_Focused	Grab	Focused	J17R31	NA		10/15/2008 8:40	593262	116507
618-7	Shallow_Focused	Grab	Focused	J17R32	NA		10/15/2008 9:30	593308	116614
618-7	Shallow_Focused	Grab	Focused	J17R33	NA		10/15/2008 9:45	593231	116619
618-7	Shallow_Focused	Grab	Focused	J17R34	NA		10/15/2008 10:30	593150.6	116571.9
618-7	Shallow_Focused	Grab	Focused	J17R35	NA		10/15/2008 9:05	593234.2	116577
618-7	Shallow_Focused	Grab	Focused	J17R36	NA		10/15/2008 9:15	593253.8	116577
618-7	Shallow	Composite	Statistical	J17R51	1		10/15/2008 8:30	593298	116635
618-7	Shallow	Composite	Statistical	J17R54	2		10/16/2008 9:45	593174.2	116506.4
618-7	Shallow	Composite	Statistical	J17R55	2		10/16/2008 8:55	593212.6	116509.2
618-7	Shallow	Composite	Statistical	J17R56	2		10/16/2008 9:20	593244.7	116511.2
618-7	Shallow	Composite	Statistical	J17R57	2		10/16/2008 7:45	593286	116503.5
618-7	Shallow	Composite	Statistical	J17R58	2	R	10/16/2008 7:45	593286	116503.5
618-7	Shallow_Focused	Grab	Focused	J17R59	NA		10/16/2008 9:00	593208	116518
618-7	Shallow_Focused	Grab	Focused	J17R60	NA		10/16/2008 8:15	593237.2	116514.1
618-7	Shallow	Composite	Statistical	J17RK1	4		10/21/2008 13:00	593180	116715
618-7	Shallow	Composite	Statistical	J17RK3	4		10/21/2008 14:00	593203	116681
618-7	Shallow	Composite	Statistical	J17RK4	4		10/21/2008 14:30	593185	116681
618-7	Shallow	Composite	Statistical	J17RK5	4	R	10/21/2008 14:00	593203	116681
618-7	Shallow	Composite	Statistical	J17WL0	4		11/14/2008 10:00	593214	116715
618-7	Shallow_Focused	Grab	Focused	J17WL1	NA		11/14/2008 10:10	593215	116702
618-7	Shallow_Focused	Grab	Focused	J17XN3	NA		11/15/2008 12:35	593320	116599
618-7	Shallow_Focused	Grab	Focused	J17XN4	NA		11/15/2008 12:40	593317	116582
618-7	Shallow	Composite	Statistical	J17XV9	3		11/18/2008 9:55	593309	116594

Table G-2. 300 Area Source Operable Unit Waste Site Decision Units

Waste Site Code	Decision Unit	Sample Type	Sampling Plan Design	Sample Number	Statistical Group	QC Type	Sample Date/Time	WSP easting (m)	WSP northing (m)
618-7	Shallow	Composite	Statistical	J17XW0	3		11/18/2008 10:00	593318	116599
618-7	Shallow	Composite	Statistical	J17XW1	3		11/18/2008 10:05	593303	116579
618-7	Shallow	Composite	Statistical	J17XW2	3	R	11/18/2008 10:05	593303	116579
618-7	Shallow	Composite	Statistical	J17XW3	3		11/18/2008 10:10	593312	116573
618-8	Shallow	Composite	Statistical	J11271	1		1/31/2006 13:10	593818.19	116509.05
618-8	Shallow	Composite	Statistical	J11272	1	R	1/31/2006 13:10	593818.19	116509.05
618-8	Shallow	Composite	Statistical	J11273	1		1/31/2006 13:15	593816.59	116488.32
618-8	Shallow	Composite	Statistical	J11274	1		1/31/2006 13:20	593821.09	116477.89
618-8	Shallow	Composite	Statistical	J11275	1		1/31/2006 13:25	593839.54	116453.3
618-9	Shallow_Focused	Grab	Focused	B00Y80	NA		5/22/1991 7:05	592807	116326
618-9	Shallow_Focused	Grab	Focused	B00Y81	NA		5/22/1991 7:05	592807	116326
618-9	Shallow_Focused	Grab	Focused	B00Y82	NA		5/22/1991 7:05	592807	116326
618-9	Shallow_Focused	Grab	Focused	B00Y83	NA		5/22/1991 7:20	592808	116327
618-9	Shallow_Focused	Grab	Focused	B00Y84	NA		5/22/1991 7:25	592804	116324
618-9	Shallow_Focused	Grab	Focused	B00Y85	NA		5/22/1991 7:35	592799	116323
618-9	Shallow_Focused	Grab	Focused	B00Y86	NA		5/22/1991 7:50	592799	116323
618-9	Shallow_Focused	Grab	Focused	B00Y87	NA		5/22/1991 8:00	592799	116324
618-9	Shallow_Focused	Grab	Focused	B00Y88	NA		5/22/1991 8:20	592803	116326
618-9	Shallow_Focused	Grab	Focused	B00Y89	NA		5/22/1991 8:30	592803	116326
618-9	Shallow_Focused	Grab	Focused	B00Y90	NA		5/22/1991 8:45	592803	116325
618-9	Shallow_Focused	Grab	Focused	B00Y91	NA		5/22/1991 8:58	592803	116325
618-9	Shallow_Focused	Grab	Focused	B00Y92	NA		5/22/1991 9:10	592804	116322
618-9	Shallow_Focused	Grab	Focused	B00Y93	NA		5/22/1991 9:20	592804	116322
618-9	Shallow_Focused	Grab	Focused	B00Y97	NA		5/28/1991 7:10	592807	116313
618-9	Shallow_Focused	Grab	Focused	B00Y98	NA		5/28/1991 7:20	592797	116313
618-9	Shallow_Focused	Grab	Focused	B00Y99	NA		5/28/1991 7:34	592807	116337
618-9	Shallow_Focused	Grab	Focused	B00YB3	NA		5/28/1991 7:42	592797	116337
618-9	Shallow_Focused	Grab	Focused	B00YB4	NA		5/28/1991 8:50	592838	116326
618-9	Shallow_Focused	Grab	Focused	B00YB5	NA		5/28/1991 9:00	592833	116323
618-9	Shallow_Focused	Grab	Focused	B00YB6	NA		5/28/1991 9:10	592836	116324
618-9	Shallow_Focused	Grab	Focused	B00YB8	NA		5/28/1991 9:15	592831	116324
618-9	Shallow_Focused	Grab	Focused	B00YB9	NA		5/28/1991 9:10	592836	116324
618-9	Shallow_Focused	Grab	Focused	B00YC0	NA		5/28/1991 9:25	592831	116324
618-9	Shallow_Focused	Grab	Focused	B00YC1	NA		5/28/1991 9:36	592828	116323
618-9	Shallow_Focused	Grab	Focused	B00YC2	NA		5/28/1991 9:45	592828	116323
618-9	Shallow_Focused	Grab	Focused	B00YC3	NA		5/28/1991 9:56	592829	116324
618-9	Shallow_Focused	Grab	Focused	B00YC4	NA		5/28/1991 10:05	592827	116325
618-9	Shallow_Focused	Grab	Focused	B00YC5	NA		5/28/1991 10:16	592827	116325
618-9	Shallow_Focused	Grab	Focused	B00YC6	NA		5/29/1991 7:25	592822	116326
618-9	Shallow_Focused	Grab	Focused	B00YC7	NA		5/29/1991 7:40	592819	116322
618-9	Shallow_Focused	Grab	Focused	B00YC8	NA		5/29/1991 7:55	592822	116326
618-9	Shallow_Focused	Grab	Focused	B00YC9	NA		5/29/1991 8:05	592811	116323
618-9	Shallow_Focused	Grab	Focused	B00YD0	NA		5/29/1991 8:15	592811	116323
628-4	Overburden	Grab	Statistical	B0V052			3/11/1999 10:35		
628-4	Overburden	Grab	Statistical	B0V054			3/11/1999 10:45		
628-4	Overburden	Grab	Statistical	B0V056			3/11/1999 10:55		
628-4	Overburden	Grab	Statistical	B0V058			3/11/1999 11:06		
628-4	Overburden	Grab	Statistical	B0V060			3/11/1999 11:13		
628-4	Overburden	Grab	Statistical	B0V062			3/11/1999 11:22		
628-4	Shallow	Grab	Statistical	B0Y9W1			7/13/2000 8:05	594155	116275
628-4	Shallow	Grab	Statistical	B0Y9W2			7/13/2000 8:10	594170	116290
628-4	Shallow	Grab	Statistical	B0Y9W3			7/13/2000 8:20	594165	116295
628-4	Shallow	Grab	Statistical	B0Y9W4			7/13/2000 8:43	594170	116300

Table G-2. 300 Area Source Operable Unit Waste Site Decision Units

Waste Site Code	Decision Unit	Sample Type	Sampling Plan Design	Sample Number	Statistical Group	QC Type	Sample Date/Time	WSP easting (m)	WSP northing (m)
628-4	Shallow	Grab	Statistical	B0Y9W5			7/13/2000 9:00	594170	116280
628-4	Shallow	Grab	Statistical	B0Y9W6			7/13/2000 9:15	594180	116275
628-4	Shallow	Grab	Statistical	B0Y9W7		R	7/13/2000 9:15	594180	116275
UPR-300-17	Shallow	Grab	Statistical	J19DB7	1	R	11/18/2009 9:32	593974.4	116178.5
UPR-300-17	Shallow	Grab	Statistical	J19D94	1		11/18/2009 8:50	593971.5	116173.7
UPR-300-17	Shallow	Grab	Statistical	J19D95	1		11/18/2009 8:56	593977.2	116173.7
UPR-300-17	Shallow	Grab	Statistical	J19D96	1		11/18/2009 9:04	593982.8	116173.7
UPR-300-17	Shallow	Grab	Statistical	J19D97	1		11/18/2009 9:11	593988.3	116173.7
UPR-300-17	Shallow	Grab	Statistical	J19D98	1		11/18/2009 9:16	593968.9	116178.5
UPR-300-17	Shallow	Grab	Statistical	J19D99	1		11/18/2009 9:32	593974.4	116178.5
UPR-300-17	Shallow	Grab	Statistical	J19DB0	1		11/18/2009 9:40	593980	116178.5
UPR-300-17	Shallow	Grab	Statistical	J19DB1	1		11/18/2009 9:45	593985.6	116178.5
UPR-300-17	Shallow	Grab	Statistical	J19DB2	1		11/18/2009 9:50	593991.1	116178.5
UPR-300-17	Shallow	Grab	Statistical	J19DB3	1		11/18/2009 9:55	593971.1	116183.3
UPR-300-17	Shallow	Grab	Statistical	J19DB4	1		11/18/2009 10:00	593988.3	116183.3
UPR-300-17	Shallow	Grab	Statistical	J19DB5	1		11/18/2009 10:06	593991.1	116188.2
UPR-300-46	Shallow	Grab	Statistical	J19DM2	1	R	1/6/2010 10:10	593969.5	116307.4
UPR-300-46	Shallow	Grab	Statistical	J19DL0	1		1/6/2010 9:12	593981.3	116305.4
UPR-300-46	Shallow	Grab	Statistical	J19DL1	1		1/6/2010 9:17	593984.6	116306.6
UPR-300-46	Shallow	Grab	Statistical	J19DL2	1		1/6/2010 9:07	593987.8	116307.8
UPR-300-46	Shallow	Grab	Statistical	J19DL3	1		1/6/2010 9:41	593972.2	116305.2
UPR-300-46	Shallow	Grab	Statistical	J19DL4	1		1/6/2010 9:51	593975.4	116306.4
UPR-300-46	Shallow	Grab	Statistical	J19DL5	1		1/6/2010 9:35	593978.7	116307.6
UPR-300-46	Shallow	Grab	Statistical	J19DL6	1		1/6/2010 10:16	593963	116304.9
UPR-300-46	Shallow	Grab	Statistical	J19DL7	1		1/6/2010 10:12	593966.3	116306.2
UPR-300-46	Shallow	Grab	Statistical	J19DL8	1		1/6/2010 10:10	593969.5	116307.4
UPR-300-46	Shallow	Grab	Statistical	J19DL9	1		1/6/2010 10:30	593953.9	116304.7
UPR-300-46	Shallow	Grab	Statistical	J19DM0	1		1/6/2010 10:25	593957.1	116305.9
UPR-300-46	Shallow	Grab	Statistical	J19DM1	1		1/6/2010 10:22	593960.3	116307.1

Notes:

WSP = Washington State Plane

R = Field duplicate

Table G-3. 300 Area Source Operable Unit Excluded Analytes

Analyte	Analyte Class	Units	Begin Sample Date	End Sample Date	Total Samples	Total Detects	Frequency of Detects	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Basis for Exclusion
Bromide	ANION	µg/kg	4/18/2007	5/6/2010	46	1	2.17%	2200	3000	8800	8800	No Toxicity Value
Chloride	ANION	µg/kg	5/22/1991	5/6/2010	79	61	77.22%	2200	2800	1700	785000	No Toxicity Value
Phosphate	ANION	µg/kg	5/22/1991	5/6/2010	79	34	43.04%	1300	3000	1000	43400	No Toxicity Value
Phosphorus	ANION	µg/kg	11/19/2008	11/20/2008	22	22	100.00%	--	--	572000	868000	No Toxicity Value
Sulfate	ANION	µg/kg	5/22/1991	5/6/2010	79	64	81.01%	1300	2500	600	983000	No Toxicity Value
Bismuth	METAL	µg/kg	11/19/2008	11/20/2008	22	1	4.55%	450	8300	580	580	No Toxicity Value
Calcium	METAL	µg/kg	5/22/1991	6/3/2010	213	213	100.00%	--	--	2010000	17200000	Essential Nutrient
Magnesium	METAL	µg/kg	5/22/1991	6/3/2010	213	213	100.00%	--	--	1890000	8070000	Essential Nutrient
Potassium	METAL	µg/kg	5/22/1991	6/3/2010	213	213	100.00%	--	--	425000	2370000	Essential Nutrient
Silicon	METAL	µg/kg	4/18/2007	6/3/2010	122	122	100.00%	--	--	266000	2030000	No Toxicity Value
Sodium	METAL	µg/kg	5/22/1991	6/3/2010	213	213	100.00%	--	--	80900	701000	Essential Nutrient
Thallium	METAL	µg/kg	5/22/1991	6/17/2009	207	51	24.64%	278	7800	340	5200	No Toxicity Value
Titanium	METAL	µg/kg	11/19/2008	11/20/2008	22	22	100.00%	--	--	1130000	2210000	No Toxicity Value
Zirconium	METAL	µg/kg	9/10/2008	6/3/2010	167	167	100.00%	--	--	11100	43300	No Toxicity Value
Delta-BHC	PEST	µg/kg	5/22/1991	4/19/2007	19	0	0.00%	1.3	8.2	--	--	No Toxicity Value
Endosulfan sulfate	PEST	µg/kg	5/22/1991	4/19/2007	19	0	0.00%	1.3	16	--	--	No Toxicity Value
Endrin aldehyde	PEST	µg/kg	9/25/1997	4/19/2007	17	5	29.41%	1.7	3.8	1.5	7.4	No Toxicity Value
Endrin ketone	PEST	µg/kg	5/22/1991	4/19/2007	15	0	0.00%	1.3	16	--	--	No Toxicity Value
Antimony-125	RAD	pCi/g	9/7/2006	9/7/2006	14	0	0.00%	0.033	0.14	--	--	Half-Life less than 3 years
Barium-133	RAD	pCi/g	9/7/2006	10/16/2008	20	0	0.00%	0.014	0.088	--	--	No Toxicity Value
Barium-140	RAD	pCi/g	5/22/1991	5/28/1991	19	0	0.00%	2	6	--	--	Half-Life less than 3 years
Beryllium-7	RAD	pCi/g	5/22/1991	5/28/1991	19	0	0.00%	0.7	1	--	--	Half-Life less than 3 years
Cerium-141	RAD	pCi/g	5/22/1991	5/28/1991	19	0	0.00%	0.3	0.6	--	--	Half-Life less than 3 years
Cerium-144	RAD	pCi/g	5/22/1991	5/28/1991	19	0	0.00%	0.2	0.5	--	--	Half-Life less than 3 years
Cesium-134	RAD	pCi/g	5/22/1991	9/21/2005	29	0	0.00%	0.03	0.06	--	--	Half-Life less than 3 years
Cobalt-58	RAD	pCi/g	5/22/1991	5/28/1991	19	0	0.00%	0.05	0.8	--	--	Half-Life less than 3 years
Curium-242	RAD	pCi/g	4/18/2007	4/19/2007	4	0	0.00%	-0.0561	0.0235	--	--	Half-Life less than 3 years
Gross alpha	RAD	pCi/g	10/7/1997	11/18/2009	52	41	78.85%	0.993	8.51	4.6	62.7	No Toxicity Value
Gross beta	RAD	pCi/g	10/7/1997	11/18/2009	52	52	100.00%	--	--	12.2	67.6	No Toxicity Value
Iodine-131	RAD	pCi/g	5/22/1991	5/28/1991	19	0	0.00%	0.7	100	--	--	Half-Life less than 3 years
Iron-59	RAD	pCi/g	5/22/1991	5/28/1991	19	0	0.00%	0.2	0.4	--	--	Half-Life less than 3 years
Lead-212	RAD	pCi/g	6/2/2010	6/3/2010	16	11	68.75%	1.93	2.53	0.674	1.18	Half-Life less than 3 years
Manganese-54	RAD	pCi/g	5/22/1991	9/21/2005	29	0	0.00%	0.026	0.5	--	--	Half-Life less than 3 years
Potassium-40	RAD	pCi/g	5/22/1991	6/3/2010	369	367	99.46%	0.27	1.8	6.8	26.1	Background Radionuclide—not site- related
Radium-224	RAD	pCi/g	6/26/1997	2/3/1998	44	44	100.00%	--	--	0.38	1.08	Half-Life less than 3 years
Radium-226	RAD	pCi/g	5/22/1991	6/3/2010	368	351	95.38%	0.7	5.1	0.16	2.36	Background Radionuclide—not site- related
Radium-228	RAD	pCi/g	6/26/1997	5/6/2010	333	329	98.80%	0.311	1	0.33	1.35	Background Radionuclide—not site- related
Ruthenium-103	RAD	pCi/g	5/22/1991	8/22/2005	23	0	0.00%	0.024	0.2	--	--	Half-Life less than 3 years
Ruthenium-106	RAD	pCi/g	5/22/1991	8/22/2005	23	0	0.00%	0.23	0.5	--	--	Half-Life less than 3 years
Thorium-228	RAD	pCi/g	5/22/1991	5/6/2010	310	298	96.13%	0.037	0.435	0.226	2.23	Background Radionuclide—not site- related
Thorium-230	RAD	pCi/g	11/30/2005	5/6/2010	65	47	72.31%	-0.106	0.49	0.258	2.2	Background Radionuclide—not site- related

Table G-3. 300 Area Source Operable Unit Excluded Analytes

Analyte	Analyte Class	Units	Begin Sample Date	End Sample Date	Total Samples	Total Detects	Frequency of Detects	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Basis for Exclusion
Thorium-232	RAD	pCi/g	12/17/1998	6/3/2010	307	292	95.11%	-0.0393	0.849	0.251	2.35	Background Radionuclide—not site- related
Thorium-234	RAD	pCi/g	11/12/1997	11/13/1997	6	6	100.00%	--	--	18	75	Half-Life less than 3 years
Uranium-234	RAD	pCi/g	5/22/1991	2/3/1998	72	72	100.00%	--	--	0.084	172	No Toxicity Value
Zinc-65	RAD	pCi/g	5/22/1991	5/28/1991	19	0	0.00%	0.09	0.1	--	--	Half-Life less than 3 years
Zirconium-95	RAD	pCi/g	5/22/1991	5/28/1991	19	0	0.00%	0.07	0.1	--	--	Half-Life less than 3 years
2-Nitrophenol	SVOC	µg/kg	5/22/1991	5/6/2010	125	0	0.00%	20	3500	--	--	No Toxicity Value
3+4 Methylphenol (cresol, m+p)	SVOC	µg/kg	2/12/2003	5/6/2010	51	0	0.00%	324	1800	--	--	No Toxicity Value
4-Bromophenylphenyl ether	SVOC	µg/kg	5/22/1991	5/6/2010	123	0	0.00%	20	3500	--	--	No Toxicity Value
4-Chlorophenylphenyl ether	SVOC	µg/kg	5/22/1991	5/6/2010	125	0	0.00%	20	3500	--	--	No Toxicity Value
Acenaphthylene	SVOC	µg/kg	5/22/1991	5/6/2010	173	1	0.58%	3.51	3500	439	439	No Toxicity Value
Benzo(ghi)perylene	SVOC	µg/kg	5/22/1991	5/6/2010	173	11	6.36%	3.35	3500	1.4	44	No Toxicity Value
Dimethyl phthalate	SVOC	µg/kg	5/22/1991	5/6/2010	125	0	0.00%	20	3500	--	--	No Toxicity Value
Di-n-octylphthalate	SVOC	µg/kg	5/22/1991	5/6/2010	125	0	0.00%	20	3500	--	--	No Toxicity Value
Phenanthrene	SVOC	µg/kg	5/22/1991	5/6/2010	173	54	31.21%	3.43	3500	0.908	240	No Toxicity Value
1,3-Dichlorobenzene	VOC	µg/kg	5/22/1991	5/6/2010	125	0	0.00%	20	3500	--	--	No Toxicity Value
1-Propanol	VOC	µg/kg	8/25/2003	8/25/2003	3	0	0.00%	1000	1000	--	--	No Toxicity Value
3-Methyloctane	VOC	µg/kg	5/22/1991	5/22/1991	1	0	0.00%	3600	3600	--	--	No Toxicity Value
4-Methyloctane	VOC	µg/kg	5/22/1991	5/22/1991	1	1	100.00%	--	--	5100	5100	No Toxicity Value
Chloroethane	VOC	µg/kg	5/22/1991	5/6/2010	59	0	0.00%	8.22	1300	--	--	No Toxicity Value
Chloromethane	VOC	µg/kg	5/22/1991	5/6/2010	59	0	0.00%	8.22	1300	--	--	No Toxicity Value
Cyclohexane	VOC	µg/kg	8/25/2003	8/25/2003	3	0	0.00%	5	6	--	--	No Toxicity Value
Decane	VOC	µg/kg	5/22/1991	8/25/2003	4	1	25.00%	1000	1000	1500	1500	No Toxicity Value
Ethanol	VOC	µg/kg	8/25/2003	8/25/2003	3	0	0.00%	1000	1000	--	--	No Toxicity Value
Heptacosane	VOC	µg/kg	7/31/1997	7/31/1997	1	1	100.00%	--	--	250	250	No Toxicity Value
Heptadecane	VOC	µg/kg	11/12/1997	11/12/1997	1	1	100.00%	--	--	400	400	No Toxicity Value
Hexadecanoic acid (9CI)	VOC	µg/kg	6/26/1997	11/13/1997	16	16	100.00%	--	--	140	830	No Toxicity Value
n-Butylbenzene	VOC	µg/kg	8/25/2003	8/25/2003	3	0	0.00%	5	6	--	--	No Toxicity Value
Octacosane	VOC	µg/kg	7/31/1997	7/31/1997	1	1	100.00%	--	--	260	260	No Toxicity Value
Octadecanoic acid	VOC	µg/kg	9/9/1997	9/9/1997	1	1	100.00%	--	--	91	91	No Toxicity Value

Table G-4. 300 Area Source Operable Unit Nondetected Analytes

Analyte	Analyte Class	Begin Sample Date	End Sample Date	Total Samples	Total Detects	Frequency of Detects	Minimum Detection Limit	Maximum Detection Limit	Units
Nitrite	ANION	5/22/1991	5/6/2010	79	0	0.00%	1300	29000	ug/kg
Total petroleum hydrocarbons	GEN ORGANIC	9/7/2006	4/19/2007	4	0	0.00%	141000	145000	ug/kg
Total petroleum hydrocarbons - gasoline range	GEN ORGANIC	2/22/2002	2/22/2002	16	0	0.00%	108	110	ug/kg
4,4'-DDD (Dichlorodiphenyldichloroethane)	PEST	5/22/1991	4/19/2007	19	0	0.00%	1.3	16	ug/kg
4,4'-DDT (Dichlorodiphenyltrichloroethane)	PEST	5/22/1991	4/19/2007	19	0	0.00%	1.3	16	ug/kg
Alpha-Chlordane	PEST	5/22/1991	4/19/2007	15	0	0.00%	1.3	82	ug/kg
beta-1,2,3,4,5,6-Hexachlorocyclohexane (beta-BHC)	PEST	5/22/1991	4/19/2007	19	0	0.00%	1.3	8.2	ug/kg
Endrin	PEST	5/22/1991	4/19/2007	19	0	0.00%	1.3	16	ug/kg
Gamma-BHC (Lindane)	PEST	5/22/1991	4/19/2007	19	0	0.00%	1.3	8.2	ug/kg
Heptachlor	PEST	5/22/1991	4/19/2007	19	0	0.00%	1.3	8.2	ug/kg
Toxaphene	PEST	5/22/1991	4/19/2007	19	0	0.00%	13	190	ug/kg
Curium-243	RAD	6/2/2010	6/3/2010	16	0	0.00%	-0.419	0.454	pCi/g
Curium-243/244	RAD	4/18/2007	4/19/2007	4	0	0.00%	-0.0736	0.103	pCi/g
Curium-245	RAD	6/2/2010	6/3/2010	16	0	0.00%	-0.286	0.31	pCi/g
Europium-152	RAD	6/20/1997	6/3/2010	358	0	0.00%	-0.211	0.523	pCi/g
Europium-154	RAD	6/20/1997	6/3/2010	358	0	0.00%	-0.304	0.788	pCi/g
Neptunium-237	RAD	4/18/2007	4/19/2007	4	0	0.00%	0	0.0797	pCi/g
Nickel-63	RAD	9/6/2006	4/19/2007	41	0	0.00%	-2.75	1.49	pCi/g
Niobium-94	RAD	6/2/2010	6/3/2010	16	0	0.00%	-0.169	0.157	pCi/g
Silver-108 metastable	RAD	10/16/2008	6/3/2010	22	0	0.00%	-0.143	0.0889	pCi/g
Technetium-99	RAD	8/23/2005	1/6/2010	28	0	0.00%	-0.133	0.319	pCi/g
2,4,5-Trichlorophenol	SVOC	5/22/1991	5/6/2010	125	0	0.00%	30	17000	ug/kg
2,4,6-Trichlorophenol	SVOC	5/22/1991	5/6/2010	125	0	0.00%	20	3500	ug/kg
2,4-Dichlorophenol	SVOC	5/22/1991	5/6/2010	125	0	0.00%	20	3500	ug/kg
2,4-Dimethylphenol	SVOC	5/22/1991	5/6/2010	123	0	0.00%	20	3500	ug/kg
2,4-Dinitrophenol	SVOC	5/22/1991	5/6/2010	125	0	0.00%	50	17000	ug/kg
2,6-Dinitrotoluene	SVOC	5/22/1991	5/6/2010	125	0	0.00%	20	3500	ug/kg
2-Chloronaphthalene	SVOC	5/22/1991	5/6/2010	125	0	0.00%	20	3500	ug/kg
2-Methylphenol (cresol, o-)	SVOC	5/22/1991	5/6/2010	125	0	0.00%	20	3500	ug/kg
2-Nitroaniline	SVOC	5/22/1991	5/6/2010	125	0	0.00%	50	17000	ug/kg
3,3'-Dichlorobenzidine	SVOC	5/22/1991	5/6/2010	125	0	0.00%	20	7000	ug/kg
3-Nitroaniline	SVOC	5/22/1991	5/6/2010	125	0	0.00%	50	17000	ug/kg
4,6-Dinitro-2-methylphenol	SVOC	5/22/1991	5/6/2010	125	0	0.00%	50	17000	ug/kg
4-Chloroaniline	SVOC	5/22/1991	5/6/2010	123	0	0.00%	20	3500	ug/kg
4-Methylphenol (cresol, p-)	SVOC	5/22/1991	7/5/2000	72	0	0.00%	20	3500	ug/kg
4-Nitroaniline	SVOC	5/22/1991	5/6/2010	123	0	0.00%	50	17000	ug/kg
4-Nitrophenol	SVOC	5/22/1991	5/6/2010	123	0	0.00%	50	17000	ug/kg
Bis(2-chloro-1-methylethyl)ether	SVOC	5/22/1991	5/6/2010	123	0	0.00%	20	3500	ug/kg

Table G-4. 300 Area Source Operable Unit Nondetected Analytes

Analyte	Analyte Class	Begin Sample Date	End Sample Date	Total Samples	Total Detects	Frequency of Detects	Minimum Detection Limit	Maximum Detection Limit	Units
Bis(2-Chloroethoxy)methane	SVOC	5/22/1991	5/6/2010	125	0	0.00%	20	3500	ug/kg
Bis(2-chloroethyl) ether	SVOC	5/22/1991	5/6/2010	125	0	0.00%	20	3500	ug/kg
Carbazole	SVOC	8/27/1997	5/6/2010	99	0	0.00%	20	1800	ug/kg
Diethylphthalate	SVOC	5/22/1991	5/6/2010	125	0	0.00%	20	3500	ug/kg
Hexachlorobenzene	SVOC	5/22/1991	5/6/2010	125	0	0.00%	20	3500	ug/kg
Hexachlorocyclopentadiene	SVOC	5/22/1991	5/6/2010	125	0	0.00%	20	3500	ug/kg
Nitrobenzene	SVOC	5/22/1991	5/6/2010	125	0	0.00%	20	3500	ug/kg
n-Nitrosodiphenylamine	SVOC	5/22/1991	5/6/2010	125	0	0.00%	20	3500	ug/kg
1,1,1-Trichloroethane	VOC	5/22/1991	5/6/2010	59	0	0.00%	4.11	660	ug/kg
1,1,2-Trichloroethane	VOC	5/22/1991	5/6/2010	59	0	0.00%	4.11	660	ug/kg
1,1-Dichloroethane	VOC	5/22/1991	5/6/2010	59	0	0.00%	4.11	660	ug/kg
1,1-Dichloroethene	VOC	5/22/1991	5/6/2010	62	0	0.00%	4.11	660	ug/kg
1,2-Dichlorobenzene	VOC	5/22/1991	5/6/2010	125	0	0.00%	20	3500	ug/kg
1,2-Dichloroethane	VOC	5/22/1991	5/6/2010	59	0	0.00%	4.93	660	ug/kg
1,2-Dichloroethene (Total)	VOC	5/22/1991	5/6/2010	53	0	0.00%	4.71	660	ug/kg
1,2-Dichloropropane	VOC	5/22/1991	5/6/2010	59	0	0.00%	4.11	660	ug/kg
1-Butanol	VOC	8/25/2003	8/25/2003	3	0	0.00%	240	280	ug/kg
2-Hexanone	VOC	5/22/1991	5/6/2010	59	0	0.00%	9.86	1300	ug/kg
4-Methyl-2-Pentanone	VOC	5/22/1991	5/6/2010	59	0	0.00%	9.86	1300	ug/kg
Aniline	VOC	5/22/1991	5/22/1991	2	0	0.00%	30	31	ug/kg
Benzene	VOC	5/22/1991	5/6/2010	62	0	0.00%	4.11	660	ug/kg
Benzoic acid	VOC	5/22/1991	5/29/1991	26	0	0.00%	200	17000	ug/kg
Benzyl alcohol	VOC	5/22/1991	5/29/1991	26	0	0.00%	30	3500	ug/kg
Bromodichloromethane	VOC	5/22/1991	5/6/2010	59	0	0.00%	4.93	660	ug/kg
Bromoform	VOC	5/22/1991	5/6/2010	59	0	0.00%	4.11	660	ug/kg
Bromomethane	VOC	5/22/1991	5/6/2010	59	0	0.00%	8.22	1300	ug/kg
Carbon disulfide	VOC	5/22/1991	5/6/2010	59	0	0.00%	4.11	660	ug/kg
Carbon tetrachloride	VOC	5/22/1991	5/6/2010	59	0	0.00%	4.11	660	ug/kg
Chlorobenzene	VOC	5/22/1991	5/6/2010	59	0	0.00%	4.11	660	ug/kg
cis-1,2-Dichloroethylene	VOC	4/18/2007	5/6/2010	23	0	0.00%	4.11	5.11	ug/kg
cis-1,3-Dichloropropene	VOC	5/22/1991	5/6/2010	59	0	0.00%	4.11	660	ug/kg
Dibromochloromethane	VOC	5/22/1991	5/6/2010	59	0	0.00%	4.11	660	ug/kg
Ethylbenzene	VOC	5/22/1991	5/6/2010	59	0	0.00%	4.11	660	ug/kg
Ethylene glycol	VOC	10/16/2008	10/16/2008	1	0	0.00%	42000	42000	ug/kg
Hexane	VOC	8/25/2003	8/25/2003	3	0	0.00%	1000	1000	ug/kg
Isophorone	VOC	5/22/1991	5/6/2010	125	0	0.00%	20	3500	ug/kg
m-Xylene	VOC	4/18/2007	4/19/2007	3	0	0.00%	5	5	ug/kg
o-Xylene	VOC	4/18/2007	4/19/2007	2	0	0.00%	5	5	ug/kg

Table G-4. 300 Area Source Operable Unit Nondetected Analytes

Analyte	Analyte Class	Begin Sample Date	End Sample Date	Total Samples	Total Detects	Frequency of Detects	Minimum Detection Limit	Maximum Detection Limit	Units
Styrene	VOC	5/22/1991	5/6/2010	59	0	0.00%	4.11	660	ug/kg
trans-1,2-Dichloroethylene	VOC	4/18/2007	5/6/2010	23	0	0.00%	4.11	5.11	ug/kg
trans-1,3-Dichloropropene	VOC	5/22/1991	5/6/2010	59	0	0.00%	4.11	660	ug/kg
Vinyl acetate	VOC	5/22/1991	5/29/1991	26	0	0.00%	10	1300	ug/kg
Vinyl chloride	VOC	5/22/1991	5/6/2010	59	0	0.00%	8.22	1300	ug/kg
Xylenes (total)	VOC	5/22/1991	5/6/2010	59	0	0.00%	4.71	660	ug/kg

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Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300 ASH PITS_Shallow	non-Rad	Aroclor-1248	12672-29-6	6	1	5	17	µg/kg	35	36	52	52	--	52	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Aroclor-1248 was not processed!
300 ASH PITS_Shallow	non-Rad	Arsenic	7440-38-2	6	6	0	100	µg/kg	--	--	950	8,200	0.94	6,078	¹ Approximate Gamma l	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300 ASH PITS_Shallow	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	2	2	0	100	µg/kg	--	--	67	96	0.25	96	Maximum Detect	Warning: This data set only has 2 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Bis(2-ethylhexyl) phthalate was not processed!
300 ASH PITS_Shallow	non-Rad	Butylbenzylphthalate	85-68-7	1	1	0	100	µg/kg	--	--	76	76	--	76	Maximum Detect	Warning: This data set only has 1 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Butylbenzylphthalate was not processed!
300 ASH PITS_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	6	6	0	100	µg/kg	--	--	1,359	2,450	0.19	2,450	Maximum Detect	Recommended UCL Exceeds Maximum Concentration: EPC defaults to Maximum Concentration.
300 ASH PITS_Shallow	Rad	Uranium-235	15117-96-1	6	4	2	67	pCi/g	0.0062	0.016	0.033	0.043	0.12	0.039	95% KM (t) UCL	Warning: There are only 4 Distinct Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
300 ASH PITS_Shallow	Rad	Uranium-238	U-238	6	6	0	100	pCi/g	--	--	0.45	0.82	0.19	0.82	Maximum Detect	Recommended UCL Exceeds Maximum Concentration: EPC defaults to Maximum Concentration.
300 VTS_Shallow	Rad	Cesium-137	10045-97-3	4	1	3	25	pCi/g	0.025	0.033	0.029	0.029	--	0.029	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Cesium-137 was not processed!
300-10_Shallow_Focused	non-Rad	Arsenic	7440-38-2	4	2	2	50	µg/kg	7,600	7,800	10,600	13,500	0.17	13,500	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-10_Shallow_Focused	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	3	3	0	100	µg/kg	--	--	62	200	0.72	200	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-10_Shallow_Focused	non-Rad	Butylbenzylphthalate	85-68-7	2	2	0	100	µg/kg	--	--	190	230	0.13	230	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-10_Shallow_Focused	Rad	Cesium-137	10045-97-3	4	2	2	50	pCi/g	0.011	0.013	0.10	0.16	0.30	0.16	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-10_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	4	4	0	100	µg/kg	--	--	2,444	4,078	0.21	4,078	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-10_Shallow_Focused	Rad	Uranium-235	15117-96-1	4	1	3	25	pCi/g	0.026	0.041	0.041	0.041	--	0.041	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-10_Shallow_Focused	Rad	Uranium-238	U-238	4	4	0	100	pCi/g	--	--	0.82	1.4	0.21	1.4	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-109_Shallow_Focused	non-Rad	Aluminum	7429-90-5	1	1	0	100	µg/kg	--	--	5.62E+06	5.62E+06	--	5.62E+06	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	1	1	0	100	µg/kg	--	--	122	122	--	122	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	1	1	0	100	µg/kg	--	--	40	40	--	40	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Arsenic	7440-38-2	1	1	0	100	µg/kg	--	--	2,420	2,420	--	2,420	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Barium	7440-39-3	1	1	0	100	µg/kg	--	--	63,300	63,300	--	63,300	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Benzo(a)pyrene	50-32-8	1	1	0	100	µg/kg	--	--	1.2	1.2	--	1.2	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Benzo(b)fluoranthene	205-99-2	1	1	0	100	µg/kg	--	--	2.3	2.3	--	2.3	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Beryllium	7440-41-7	1	1	0	100	µg/kg	--	--	180	180	--	180	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Boron	7440-42-8	1	1	0	100	µg/kg	--	--	632	632	--	632	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Cadmium	7440-43-9	1	1	0	100	µg/kg	--	--	59	59	--	59	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Chromium	7440-47-3	1	1	0	100	µg/kg	--	--	6,950	6,950	--	6,950	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Chrysene	218-01-9	1	1	0	100	µg/kg	--	--	1.8	1.8	--	1.8	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Cobalt	7440-48-4	1	1	0	100	µg/kg	--	--	6,420	6,420	--	6,420	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Copper	7440-50-8	1	1	0	100	µg/kg	--	--	10,800	10,800	--	10,800	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Indeno(1,2,3-cd)pyrene	193-39-5	1	1	0	100	µg/kg	--	--	14	14	--	14	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Iron	7439-89-6	1	1	0	100	µg/kg	--	--	1.75E+07	1.75E+07	--	1.75E+07	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Lead	7439-92-1	1	1	0	100	µg/kg	--	--	2,890	2,890	--	2,890	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Manganese	7439-96-5	1	1	0	100	µg/kg	--	--	278,000	278,000	--	278,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Mercury	7439-97-6	1	1	0	100	µg/kg	--	--	22	22	--	22	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Molybdenum	7439-98-7	1	1	0	100	µg/kg	--	--	341	341	--	341	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Nickel	7440-02-0	1	1	0	100	µg/kg	--	--	8,490	8,490	--	8,490	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Pyrene	129-00-0	1	1	0	100	µg/kg	--	--	1.6	1.6	--	1.6	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	1	1	0	100	µg/kg	--	--	4,108	4,108	--	4,108	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	Rad	Uranium-233/234	U-233/234	1	1	0	100	pCi/g	--	--	1.4	1.4	--	1.4	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	Rad	Uranium-238	U-238	1	1	0	100	pCi/g	--	--	1.4	1.4	--	1.4	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Shallow_Focused	non-Rad	Vanadium	7440-62-2	1	1	0	100	µg/kg	--	--	47,600	47,600	--	47,600	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-109_Shallow_Focused	non-Rad	Zinc	7440-66-6	1	1	0	100	µg/kg	--	--	34,700	34,700	--	34,700	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Aluminum	7429-90-5	1	1	0	100	µg/kg	--	--	5.78E+06	5.78E+06	--	5.78E+06	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Aroclor-1254	11097-69-1	1	1	0	100	µg/kg	--	--	37	37	--	37	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Aroclor-1260	11096-82-5	1	1	0	100	µg/kg	--	--	19	19	--	19	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Arsenic	7440-38-2	1	1	0	100	µg/kg	--	--	2,580	2,580	--	2,580	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Barium	7440-39-3	1	1	0	100	µg/kg	--	--	72,700	72,700	--	72,700	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Benzo(a)anthracene	56-55-3	1	1	0	100	µg/kg	--	--	2.1	2.1	--	2.1	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Benzo(a)pyrene	50-32-8	1	1	0	100	µg/kg	--	--	3.3	3.3	--	3.3	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Benzo(b)fluoranthene	205-99-2	1	1	0	100	µg/kg	--	--	1.3	1.3	--	1.3	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Beryllium	7440-41-7	1	1	0	100	µg/kg	--	--	203	203	--	203	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Boron	7440-42-8	1	1	0	100	µg/kg	--	--	1,060	1,060	--	1,060	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Cadmium	7440-43-9	1	1	0	100	µg/kg	--	--	66	66	--	66	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Chromium	7440-47-3	1	1	0	100	µg/kg	--	--	8,170	8,170	--	8,170	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Cobalt	7440-48-4	1	1	0	100	µg/kg	--	--	5,950	5,950	--	5,950	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Copper	7440-50-8	1	1	0	100	µg/kg	--	--	11,600	11,600	--	11,600	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Fluoranthene	206-44-0	1	1	0	100	µg/kg	--	--	5.1	5.1	--	5.1	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Indeno(1,2,3-cd)pyrene	193-39-5	1	1	0	100	µg/kg	--	--	29	29	--	29	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Iron	7439-89-6	1	1	0	100	µg/kg	--	--	1.84E+07	1.84E+07	--	1.84E+07	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Lead	7439-92-1	1	1	0	100	µg/kg	--	--	5,030	5,030	--	5,030	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Manganese	7439-96-5	1	1	0	100	µg/kg	--	--	286,000	286,000	--	286,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Molybdenum	7439-98-7	1	1	0	100	µg/kg	--	--	408	408	--	408	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Nickel	7440-02-0	1	1	0	100	µg/kg	--	--	8,570	8,570	--	8,570	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Pyrene	129-00-0	1	1	0	100	µg/kg	--	--	7.0	7.0	--	7.0	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Tin	7440-31-5	1	1	0	100	µg/kg	--	--	1,450	1,450	--	1,450	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	1	1	0	100	µg/kg	--	--	6,877	6,877	--	6,877	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	Rad	Uranium-233/234	U-233/234	1	1	0	100	pCi/g	--	--	2.5	2.5	--	2.5	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-109_Staging Pile Area_Focused	Rad	Uranium-238	U-238	1	1	0	100	pCi/g	--	--	2.3	2.3	--	2.3	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Vanadium	7440-62-2	1	1	0	100	µg/kg	--	--	45,100	45,100	--	45,100	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-109_Staging Pile Area_Focused	non-Rad	Zinc	7440-66-6	1	1	0	100	µg/kg	--	--	48,800	48,800	--	48,800	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-18_Shallow	non-Rad	Arsenic	7440-38-2	4	4	0	100	µg/kg	--	--	1,800	2,200	0.082	2,200	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Arsenic was not processed!
300-18_Shallow	non-Rad	Barium	7440-39-3	4	4	0	100	µg/kg	--	--	58,000	63,400	0.047	63,400	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Barium was not processed!
300-18_Shallow	non-Rad	Beryllium	7440-41-7	4	4	0	100	µg/kg	--	--	520	650	0.11	650	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Beryllium was not processed!
300-18_Shallow	non-Rad	Cadmium	7440-43-9	4	1	3	25	µg/kg	30	30	40	40	--	40	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Cadmium was not processed!
300-18_Shallow	non-Rad	Chromium	7440-47-3	4	4	0	100	µg/kg	--	--	4,700	6,900	0.16	6,900	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Chromium was not processed!
300-18_Shallow	non-Rad	Lead	7439-92-1	4	4	0	100	µg/kg	--	--	2,800	3,600	0.11	3,600	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Lead was not processed!
300-18_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	5	4	1	80	µg/kg	--	--	908	1,223	0.13	1,136	95% KM (t) UCL	Warning: There are only 4 Distinct Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
300-18_Shallow	Rad	Uranium-233/234	U-233/234	4	3	1	75	pCi/g	0.18	0.18	0.31	0.65	0.41	0.65	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-233/234 was not processed!
300-18_Shallow	Rad	Uranium-238	U-238	4	4	0	100	pCi/g	--	--	0.31	0.41	0.13	0.41	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-238 was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-223_Shallow_Focused	non-Rad	Total petroleum hydrocarbons - diesel range	TPHDIESEL	5	4	1	80	µg/kg	74,000	74,000	39,000	120,000	0.64	120,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-223_Shallow_Focused	non-Rad	Total petroleum hydrocarbons - motor oil (high boiling)	TPH/OILH	5	5	0	100	µg/kg	--	--	51,000	230,000	0.44	230,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-23_Shallow_Focused	non-Rad	Total petroleum hydrocarbons - motor oil (high boiling)	TPH/OILH	7	1	6	14	µg/kg	25,000	27,000	52,000	52,000	--	52,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-259_Shallow	non-Rad	Aluminum	7429-90-5	12	12	0	100	µg/kg	--	--	4.43E+06	6.36E+06	0.083	5.99E+06	95% Student's-t UCL	--
300-259_Shallow	non-Rad	Antimony	7440-36-0	12	10	2	83	µg/kg	471	533	224	353	0.14	322	95% KM (t) UCL	--
300-259_Shallow	non-Rad	Arsenic	7440-38-2	12	12	0	100	µg/kg	--	--	1,710	2,330	0.097	2,096	95% Student's-t UCL	--
300-259_Shallow	non-Rad	Barium	7440-39-3	12	12	0	100	µg/kg	--	--	56,500	82,600	0.11	75,232	95% Student's-t UCL	--
300-259_Shallow	non-Rad	Beryllium	7440-41-7	12	12	0	100	µg/kg	--	--	163	241	0.097	226	95% Student's-t UCL	--
300-259_Shallow	non-Rad	Boron	7440-42-8	12	12	0	100	µg/kg	--	--	732	2,240	0.37	1,303	% Approximate Gamma l	--
300-259_Shallow	non-Rad	Cadmium	7440-43-9	12	12	0	100	µg/kg	--	--	45	495	1.4	252	Chebyshev (Mean, Sd)	--
300-259_Shallow	non-Rad	Chromium	7440-47-3	12	12	0	100	µg/kg	--	--	6,390	9,320	0.10	7,901	95% Student's-t UCL	--
300-259_Shallow	non-Rad	Cobalt	7440-48-4	12	12	0	100	µg/kg	--	--	5,340	6,020	0.036	5,831	95% Student's-t UCL	--
300-259_Shallow	non-Rad	Copper	7440-50-8	12	12	0	100	µg/kg	--	--	8,350	11,900	0.095	10,692	95% Student's-t UCL	--
300-259_Shallow	non-Rad	Iron	7439-89-6	12	12	0	100	µg/kg	--	--	1.76E+07	2.05E+07	0.050	1.96E+07	95% Student's-t UCL	--
300-259_Shallow	non-Rad	Lead	7439-92-1	12	12	0	100	µg/kg	--	--	2,930	6,990	0.24	4,625	% Approximate Gamma l	--
300-259_Shallow	non-Rad	Manganese	7439-96-5	12	12	0	100	µg/kg	--	--	262,000	338,000	0.082	318,874	95% Student's-t UCL	--
300-259_Shallow	non-Rad	Mercury	7439-97-6	12	1	11	8	µg/kg	20	30	10	10	--	10	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Mercury was not processed!
300-259_Shallow	non-Rad	Molybdenum	7439-98-7	12	12	0	100	µg/kg	--	--	229	379	0.14	303	95% Student's-t UCL	--
300-259_Shallow	non-Rad	Nickel	7440-02-0	12	12	0	100	µg/kg	--	--	6,810	11,700	0.15	8,751	95% Modified-t UCL	--
300-259_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	13	12	1	92.31	µg/kg	54	54	1,700	6,251	0.35	3,876	95% KM (t) UCL	
300-259_Shallow	Rad	Uranium-233/234	U-233/234	12	12	0	100	pCi/g	--	--	0.65	3.0	0.50	1.6	% Approximate Gamma l	--
300-259_Shallow	Rad	Uranium-238	U-238	12	12	0	100	pCi/g	--	--	0.57	2.1	0.35	1.3	95% Student's-t UCL	--
300-259_Shallow	non-Rad	Vanadium	7440-62-2	12	12	0	100	µg/kg	--	--	35,500	46,600	0.065	42,626	95% Student's-t UCL	--
300-259_Shallow	non-Rad	Zinc	7440-66-6	12	12	0	100	µg/kg	--	--	32,600	1.03E+06	2.4	479,584	Chebyshev (Mean, Sd)	--
300-260_Shallow_Focused	non-Rad	Aluminum	7429-90-5	16	16	0	100	µg/kg	--	--	5.61E+06	8.17E+06	0.092	8.17E+06	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	non-Rad	Antimony	7440-36-0	16	16	0	100	µg/kg	--	--	253	922	0.33	922	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	non-Rad	Arsenic	7440-38-2	16	16	0	100	µg/kg	--	--	2,220	3,160	0.12	3,160	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	non-Rad	Barium	7440-39-3	16	16	0	100	µg/kg	--	--	65,400	122,000	0.16	122,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	non-Rad	Beryllium	7440-41-7	16	16	0	100	µg/kg	--	--	180	239	0.083	239	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	non-Rad	Boron	7440-42-8	16	16	0	100	µg/kg	--	--	1,120	8,360	0.81	8,360	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	non-Rad	Cadmium	7440-43-9	16	15	1	94	µg/kg	155	155	38	110	0.28	110	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	non-Rad	Chromium	7440-47-3	16	16	0	100	µg/kg	--	--	7,340	9,890	0.089	9,890	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	non-Rad	Cobalt	7440-48-4	16	16	0	100	µg/kg	--	--	5,540	7,430	0.081	7,430	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-260_Shallow_Focused	non-Rad	Copper	7440-50-8	16	16	0	100	µg/kg	--	--	10,000	73,300	0.95	73,300	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	non-Rad	Iron	7439-89-6	16	16	0	100	µg/kg	--	--	1.62E+07	2.04E+07	0.063	2.04E+07	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	non-Rad	Lead	7439-92-1	16	16	0	100	µg/kg	--	--	3,740	18,300	0.59	18,300	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	non-Rad	Manganese	7439-96-5	16	16	0	100	µg/kg	--	--	245,000	328,000	0.088	328,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	non-Rad	Mercury	7439-97-6	16	2	14	13	µg/kg	24	30	11	12	0.061	12	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	non-Rad	Molybdenum	7439-98-7	16	16	0	100	µg/kg	--	--	348	537	0.11	537	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	non-Rad	Nickel	7440-02-0	16	16	0	100	µg/kg	--	--	7,450	10,200	0.086	10,200	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	non-Rad	Silver	7440-22-4	16	8	8	50	µg/kg	142	207	143	206	0.13	206	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	16	14	2	87.5	µg/kg	5,090	7,769	49	12,800	0.96	12,800	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	Rad	Uranium-235	15117-96-1	16	9	7	56	pCi/g	-3.30E-01	0.48	0.11	0.25	0.30	0.25	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	Rad	Uranium-238	U-238	16	8	8	50	pCi/g	0.94	4.7	2.0	4.3	0.30	4.3	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	non-Rad	Vanadium	7440-62-2	16	16	0	100	µg/kg	--	--	47,300	59,000	0.066	59,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-260_Shallow_Focused	non-Rad	Zinc	7440-66-6	16	16	0	100	µg/kg	--	--	36,800	77,400	0.22	77,400	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-272_Overburden_Focused	non-Rad	Total petroleum hydrocarbons - diesel range	TPHDIESEL	5	1	4	20	µg/kg	8,900	9,000	13,100	13,100	--	13,100	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-272_Shallow_Focused	non-Rad	Total petroleum hydrocarbons - diesel range	TPHDIESEL	11	2	9	18	µg/kg	8,700	9,000	15,700	43,100	0.66	43,100	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-275_Shallow_1	non-Rad	Acenaphthene	83-32-9	12	1	11	8	µg/kg	34	35	960	960	--	960	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Acenaphthene was not processed!
300-275_Shallow_1	non-Rad	Aluminum	7429-90-5	12	12	0	100	µg/kg	--	--	3.72E+06	7.85E+06	0.21	5.61E+06	% Approximate Gamma l	--
300-275_Shallow_1	non-Rad	Antimony	7440-36-0	12	1	11	8	µg/kg	230	250	260	260	--	260	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Antimony was not processed!
300-275_Shallow_1	non-Rad	Arsenic	7440-38-2	12	12	0	100	µg/kg	--	--	1,600	2,800	0.16	2,211	95% Student's-t UCL	--
300-275_Shallow_1	non-Rad	Barium	7440-39-3	12	12	0	100	µg/kg	--	--	49,500	108,000	0.25	75,261	% Approximate Gamma l	--

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-275_Shallow_1	non-Rad	Benzo(a)pyrene	50-32-8	12	1	11	8	µg/kg	3.4	3.5	1.3	1.3	--	1.3	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Benzo(a)pyrene was not processed!
300-275_Shallow_1	non-Rad	Benzo(b)fluoranthene	205-99-2	12	4	8	33	µg/kg	3.4	3.5	0.88	4.6	1.00	1.9	95% KM (% Bootstrap) U	Warning: There are only 4 Distinct Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
300-275_Shallow_1	non-Rad	Beryllium	7440-41-7	12	12	0	100	µg/kg	--	--	320	650	0.20	452	95% Modified-t UCL	--
300-275_Shallow_1	non-Rad	Boron	7440-42-8	12	12	0	100	µg/kg	--	--	440	3,400	0.75	1,466	% Approximate Gamma l	--
300-275_Shallow_1	non-Rad	Cadmium	7440-43-9	12	8	4	67	µg/kg	40	40	40	130	0.41	83	KM (Percentile Bootstra	Warning: There are only 8 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
300-275_Shallow_1	Rad	Cesium-137	10045-97-3	12	3	9	25	pCi/g	0.014	0.033	0.034	0.082	0.54	0.046	95% KM (t) UCL	Warning: There are only 3 Distinct Detected Values in this data set The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods. Those methods will return a 'N/A' value on your output display!
300-275_Shallow_1	non-Rad	Chromium	7440-47-3	12	12	0	100	µg/kg	--	--	5,600	10,300	0.16	8,022	95% Student's-t UCL	--
300-275_Shallow_1	non-Rad	Chrysene	218-01-9	12	1	11	8	µg/kg	3.4	3.5	2.2	2.2	--	2.2	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Chrysene was not processed!
300-275_Shallow_1	non-Rad	Cobalt	7440-48-4	12	12	0	100	µg/kg	--	--	3,900	7,600	0.17	5,847	95% Student's-t UCL	--
300-275_Shallow_1	non-Rad	Copper	7440-50-8	12	12	0	100	µg/kg	--	--	7,400	84,200	1.4	42,923	Chebyshev (Mean, Sd)	--
300-275_Shallow_1	non-Rad	Fluoranthene	206-44-0	12	3	9	25	µg/kg	2.9	3.5	20	2,300	1.6	2,300	KM (Percentile Bootstra	Warning: There are only 3 Distinct Detected Values in this data set The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods. Those methods will return a 'N/A' value on your output display!
300-275_Shallow_1	non-Rad	Fluorene	86-73-7	12	10	2	83	µg/kg	3.4	3.5	1.8	130	2.4	81	95% KM (Chebyshev) U	--
300-275_Shallow_1	non-Rad	Iron	7439-89-6	12	12	0	100	µg/kg	--	--	1.31E+07	2.19E+07	0.14	1.79E+07	95% Student's-t UCL	--
300-275_Shallow_1	non-Rad	Lead	7439-92-1	12	12	0	100	µg/kg	--	--	2,600	17,400	0.82	7,189	95% Modified-t UCL	--
300-275_Shallow_1	non-Rad	Lithium	7439-93-2	12	12	0	100	µg/kg	--	--	5,000	9,000	0.18	6,686	% Approximate Gamma l	--
300-275_Shallow_1	non-Rad	Manganese	7439-96-5	12	12	0	100	µg/kg	--	--	212,000	307,000	0.11	276,815	95% Student's-t UCL	--

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-275_Shallow_1	non-Rad	Mercury	7439-97-6	12	5	7	42	µg/kg	8.0	10	10	30	0.56	17	KM (Percentile Bootstra	Warning: There are only 3 Distinct Detected Values in this data set The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods. Those methods will return a 'N/A' value on your output display!
300-275_Shallow_1	non-Rad	Molybdenum	7439-98-7	12	7	5	58	µg/kg	230	250	240	670	0.43	378	95% KM (t) UCL	Warning: There are only 7 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
300-275_Shallow_1	non-Rad	Nickel	7440-02-0	12	12	0	100	µg/kg	--	--	6,900	13,500	0.20	9,461	% Approximate Gamma l	--
300-275_Shallow_1	non-Rad	Silver	7440-22-4	12	3	9	25	µg/kg	80	80	80	200	0.42	121	95% KM (t) UCL	Warning: There are only 3 Distinct Detected Values in this data set The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods. Those methods will return a 'N/A' value on your output display!
300-275_Shallow_1	non-Rad	Strontium	7440-24-6	12	12	0	100	µg/kg	--	--	15,300	25,100	0.16	20,196	95% Student's-t UCL	--
300-275_Shallow_1	non-Rad	Tin	7440-31-5	12	9	3	75	µg/kg	460	470	560	3,000	0.67	1,483	KM (Percentile Bootstra	Warning: There are only 9 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
300-275_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	12	12	0	100	µg/kg	--	--	1,167	46,604	2.1	22,251	Chebyshev (Mean, Sd)	UCL
300-275_Shallow_1	non-Rad	Uranium	7440-61-1	12	1	11	8	µg/kg	1,500	1,700	2,500	2,500	--	2,500	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Uranium was not processed!
300-275_Shallow_1	Rad	Uranium-233/234	U-233/234	12	12	0	100	pCi/g	--	--	0.34	16	2.1	7.7	Chebyshev (Mean, Sd)	--
300-275_Shallow_1	Rad	Uranium-235	15117-96-1	12	1	11	8	pCi/g	0.071	0.20	1.0	1.0	--	1.0	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Uranium-235 was not processed!
300-275_Shallow_1	Rad	Uranium-238	U-238	12	12	0	100	pCi/g	--	--	0.39	16	2.1	7.4	Chebyshev (Mean, Sd)	--
300-275_Shallow_1	non-Rad	Vanadium	7440-62-2	12	12	0	100	µg/kg	--	--	32,000	58,700	0.16	45,128	% Approximate Gamma l	--
300-275_Shallow_1	non-Rad	Zinc	7440-66-6	12	12	0	100	µg/kg	--	--	26,600	53,200	0.19	41,014	95% Student's-t UCL	--
300-275_Shallow_2	non-Rad	Acenaphthene	83-32-9	10	2	8	20	µg/kg	34	35	1.4	3.6	0.62	3.6	Maximum Detect	Recommended UCL Exceeds Maximum Concentration: EPC defaults to Maximum Concentration.
300-275_Shallow_2	non-Rad	Aluminum	7429-90-5	10	10	0	100	µg/kg	--	--	5.50E+06	6.55E+06	0.050	6.24E+06	95% Student's-t UCL	--
300-275_Shallow_2	non-Rad	Arsenic	7440-38-2	10	10	0	100	µg/kg	--	--	2,330	2,920	0.073	2,761	95% Student's-t UCL	--
300-275_Shallow_2	non-Rad	Barium	7440-39-3	10	10	0	100	µg/kg	--	--	58,400	74,300	0.084	68,607	95% Student's-t UCL	--
300-275_Shallow_2	non-Rad	Beryllium	7440-41-7	10	10	0	100	µg/kg	--	--	220	270	0.065	254	95% Student's-t UCL	--

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-275_Shallow_2	non-Rad	Boron	7440-42-8	10	10	0	100	µg/kg	--	--	810	1,240	0.13	1,147	95% Student's-t UCL	--
300-275_Shallow_2	non-Rad	Cadmium	7440-43-9	10	10	0	100	µg/kg	--	--	100	210	0.26	144	95% Modified-t UCL	--
300-275_Shallow_2	non-Rad	Chromium	7440-47-3	10	10	0	100	µg/kg	--	--	7,970	9,430	0.050	8,994	95% Student's-t UCL	--
300-275_Shallow_2	non-Rad	Cobalt	7440-48-4	10	10	0	100	µg/kg	--	--	5,280	6,340	0.061	5,977	95% Student's-t UCL	--
300-275_Shallow_2	non-Rad	Copper	7440-50-8	10	10	0	100	µg/kg	--	--	8,280	15,300	0.19	11,596	% Approximate Gamma l	--
300-275_Shallow_2	non-Rad	Fluoranthene	206-44-0	10	3	7	30	µg/kg	3.4	3.5	5.0	56	0.79	56	KM (Percentile Bootstra	Warning: There are only 3 Distinct Detected Values in this data set The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods. Those methods will return a 'N/A' value on your output display!
300-275_Shallow_2	non-Rad	Fluorene	86-73-7	10	10	0	100	µg/kg	--	--	1.6	3.6	0.26	2.6	95% Student's-t UCL	--
300-275_Shallow_2	non-Rad	Iron	7439-89-6	10	10	0	100	µg/kg	--	--	1.81E+07	2.04E+07	0.042	1.96E+07	95% Student's-t UCL	--
300-275_Shallow_2	non-Rad	Lead	7439-92-1	10	10	0	100	µg/kg	--	--	3,070	5,070	0.18	4,099	% Approximate Gamma l	--
300-275_Shallow_2	non-Rad	Lithium	7439-93-2	10	10	0	100	µg/kg	--	--	6,470	7,330	0.042	7,067	95% Student's-t UCL	--
300-275_Shallow_2	non-Rad	Manganese	7439-96-5	10	10	0	100	µg/kg	--	--	261,000	307,000	0.054	292,731	95% Student's-t UCL	--
300-275_Shallow_2	non-Rad	Mercury	7439-97-6	10	5	5	50	µg/kg	30	30	9.0	40	0.65	28	KM (Percentile Bootstra	Warning: There are only 4 Distinct Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
300-275_Shallow_2	non-Rad	Molybdenum	7439-98-7	10	10	0	100	µg/kg	--	--	380	420	0.042	404	95% Modified-t UCL	Warning: There are only 4 Distinct Values in this data There are insufficient Distinct Values to perform some GOF tests and bootstrap methods. Those methods will return a 'N/A' value on your output display!
300-275_Shallow_2	non-Rad	Nickel	7440-02-0	10	10	0	100	µg/kg	--	--	8,270	11,100	0.092	9,593	% Approximate Gamma l	--
300-275_Shallow_2	non-Rad	Strontium	7440-24-6	10	10	0	100	µg/kg	--	--	17,200	36,600	0.24	27,081	95% Student's-t UCL	--
300-275_Shallow_2	non-Rad	Tin	7440-31-5	10	10	0	100	µg/kg	--	--	800	1,400	0.20	1,149	95% Student's-t UCL	--
300-275_Shallow_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	10	10	0	100	µg/kg	--	--	1,411	5,329	0.47	3,725	95% Student's-t UCL	
300-275_Shallow_2	Rad	Uranium-233/234	U-233/234	10	10	0	100	pCi/g	--	--	0.32	2.2	0.60	1.3	95% Student's-t UCL	--
300-275_Shallow_2	Rad	Uranium-235	15117-96-1	10	1	9	10	pCi/g	0.025	0.12	0.24	0.24	--	0.24	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Uranium-235 was not processed!
300-275_Shallow_2	Rad	Uranium-238	U-238	10	10	0	100	pCi/g	--	--	0.47	1.8	0.47	1.2	95% Student's-t UCL	--
300-275_Shallow_2	non-Rad	Vanadium	7440-62-2	10	10	0	100	µg/kg	--	--	47,000	53,100	0.035	51,632	95% Student's-t UCL	--
300-275_Shallow_2	non-Rad	Zinc	7440-66-6	10	10	0	100	µg/kg	--	--	34,500	44,100	0.075	41,245	95% Student's-t UCL	--
300-33, 300-41, 300-256_Shallow	non-Rad	Aluminum	7429-90-5	12	12	0	100	µg/kg	--	--	5.02E+06	6.53E+06	0.070	6.32E+06	% Approximate Gamma l	--
300-33, 300-41, 300-256_Shallow	non-Rad	Aroclor-1016	12674-11-2	12	1	11	8	µg/kg	13	14	10	10	--	10	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Aroclor-1016 was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-33, 300-41, 300-256_Shallow	non-Rad	Aroclor-1242	53469-21-9	12	1	11	8	µg/kg	13	14	16	16	--	16	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Aroclor-1242 was not processed!
300-33, 300-41, 300-256_Shallow	non-Rad	Aroclor-1248	12672-29-6	12	1	11	8	µg/kg	13	14	190	190	--	190	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Aroclor-1248 was not processed!
300-33, 300-41, 300-256_Shallow	non-Rad	Aroclor-1254	11097-69-1	12	9	3	75	µg/kg	13	14	18	186	0.89	84	KM (Percentile Bootstra	Warning: There are only 9 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
300-33, 300-41, 300-256_Shallow	non-Rad	Aroclor-1260	11096-82-5	12	9	3	75	µg/kg	13	14	4.0	36	0.83	17	KM (Percentile Bootstra	Warning: There are only 9 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
300-33, 300-41, 300-256_Shallow	non-Rad	Arsenic	7440-38-2	12	12	0	100	µg/kg	--	--	2,040	2,930	0.11	2,638	95% Student's-t UCL	--
300-33, 300-41, 300-256_Shallow	non-Rad	Barium	7440-39-3	12	12	0	100	µg/kg	--	--	49,900	84,000	0.13	72,411	95% Student's-t UCL	--
300-33, 300-41, 300-256_Shallow	non-Rad	Beryllium	7440-41-7	12	12	0	100	µg/kg	--	--	153	436	0.33	256	95% Modified-t UCL	--
300-33, 300-41, 300-256_Shallow	non-Rad	Boron	7440-42-8	12	12	0	100	µg/kg	--	--	650	2,250	0.43	1,484	‘ Approximate Gamma l	--
300-33, 300-41, 300-256_Shallow	non-Rad	Butylbenzylphthalate	85-68-7	12	1	11	8	µg/kg	324	992	228	228	--	228	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Butylbenzylphthalate was not processed!
300-33, 300-41, 300-256_Shallow	non-Rad	Cadmium	7440-43-9	12	9	3	75	µg/kg	150	170	43	174	0.51	94	KM (Percentile Bootstra	Warning: There are only 9 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
300-33, 300-41, 300-256_Shallow	non-Rad	Chromium	7440-47-3	12	12	0	100	µg/kg	--	--	7,160	9,740	0.093	8,781	95% Student's-t UCL	--
300-33, 300-41, 300-256_Shallow	non-Rad	Cobalt	7440-48-4	12	12	0	100	µg/kg	--	--	4,890	6,400	0.067	6,273	95% Student's-t UCL	--
300-33, 300-41, 300-256_Shallow	non-Rad	Copper	7440-50-8	12	12	0	100	µg/kg	--	--	8,130	22,500	0.33	13,662	95% Modified-t UCL	--
300-33, 300-41, 300-256_Shallow	non-Rad	Fluoride	16984-48-8	12	12	0	100	µg/kg	--	--	600	3,900	0.75	1,651	95% Modified-t UCL	--
300-33, 300-41, 300-256_Shallow	non-Rad	Iron	7439-89-6	12	12	0	100	µg/kg	--	--	1.61E+07	2.05E+07	0.059	2.00E+07	95% Student's-t UCL	--
300-33, 300-41, 300-256_Shallow	non-Rad	Lead	7439-92-1	12	12	0	100	µg/kg	--	--	2,680	5,950	0.34	4,268	95% Modified-t UCL	--
300-33, 300-41, 300-256_Shallow	non-Rad	Lithium	7439-93-2	12	12	0	100	µg/kg	--	--	4,050	6,400	0.15	5,495	95% Student's-t UCL	--
300-33, 300-41, 300-256_Shallow	non-Rad	Manganese	7439-96-5	12	12	0	100	µg/kg	--	--	236,000	373,000	0.10	314,762	95% Modified-t UCL	--

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-33, 300-41, 300-256_Shallow	non-Rad	Mercury	7439-97-6	12	1	11	8	µg/kg	25	30	16	16	--	16	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Mercury was not processed!
300-33, 300-41, 300-256_Shallow	non-Rad	Methylene chloride	75-09-2	12	11	1	92	µg/kg	6.1	6.1	2.1	3.4	0.16	2.9	95% KM (t) UCL	--
300-33, 300-41, 300-256_Shallow	non-Rad	Molybdenum	7439-98-7	12	12	0	100	µg/kg	--	--	222	1,090	0.66	486	95% Modified-t UCL	--
300-33, 300-41, 300-256_Shallow	non-Rad	Nickel	7440-02-0	12	12	0	100	µg/kg	--	--	7,020	9,440	0.077	8,880	95% Student's-t UCL	--
300-33, 300-41, 300-256_Shallow	non-Rad	Nitrate	14797-55-8	12	10	2	83	µg/kg	2,400	2,500	1,300	19,600	0.86	8,617	95% KM (BCA) UCL	--
300-33, 300-41, 300-256_Shallow	non-Rad	Silver	7440-22-4	12	1	11	8	µg/kg	135	170	782	782	--	782	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Silver was not processed!
300-33, 300-41, 300-256_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	13	13	0	100	µg/kg	--	--	0.18	10,456	0.84	5,349	95% Student's-t UCL	
300-33, 300-41, 300-256_Shallow	non-Rad	Uranium	7440-61-1	12	2	10	17	µg/kg	13,500	17,000	1,730	7,260	0.87	7,260	95% KM (BCA) UCL	Warning: Data set has only 2 Distinct Detected Values. This may not be adequate enough to compute meaningful and reliable test statistics and estimates. The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).
300-33, 300-41, 300-256_Shallow	Rad	Uranium-233/234	U-233/234	12	12	0	100	pCi/g	--	--	0.40	4.2	0.86	2.1	¼ Approximate Gamma l	--
300-33, 300-41, 300-256_Shallow	Rad	Uranium-235	15117-96-1	12	1	11	8	pCi/g	0.059	0.17	0.34	0.34	--	0.34	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Uranium-235 was not processed!
300-33, 300-41, 300-256_Shallow	Rad	Uranium-238	U-238	12	12	0	100	pCi/g	--	--	0.38	3.5	0.75	2.1	¼ Approximate Gamma l	--
300-33, 300-41, 300-256_Shallow	non-Rad	Vanadium	7440-62-2	12	12	0	100	µg/kg	--	--	42,700	54,700	0.066	52,694	95% Student's-t UCL	--
300-33, 300-41, 300-256_Shallow	non-Rad	Zinc	7440-66-6	12	12	0	100	µg/kg	--	--	30,500	51,000	0.14	41,462	95% Student's-t UCL	--
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aluminum	7429-90-5	2	2	0	100	µg/kg	--	--	5.17E+06	5.51E+06	0.045	5.51E+06	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	2	1	1	50	µg/kg	14	14	330	330	--	330	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	2	2	0	100	µg/kg	--	--	22	385	1.3	385	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	2	2	0	100	µg/kg	--	--	3.9	52	1.2	52	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Arsenic	7440-38-2	2	2	0	100	µg/kg	--	--	2,460	3,240	0.19	3,240	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Barium	7440-39-3	2	2	0	100	µg/kg	--	--	57,100	64,600	0.087	64,600	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Beryllium	7440-41-7	2	2	0	100	µg/kg	--	--	162	169	0.030	169	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Boron	7440-42-8	2	2	0	100	µg/kg	--	--	978	1,030	0.037	1,030	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Cadmium	7440-43-9	2	2	0	100	µg/kg	--	--	57	100	0.39	100	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Chromium	7440-47-3	2	2	0	100	µg/kg	--	--	6,870	8,080	0.11	8,080	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Cobalt	7440-48-4	2	2	0	100	µg/kg	--	--	5,600	5,640	0.0050	5,640	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Copper	7440-50-8	2	2	0	100	µg/kg	--	--	8,970	10,400	0.10	10,400	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Fluoride	16984-48-8	2	2	0	100	µg/kg	--	--	700	1,300	0.42	1,300	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Iron	7439-89-6	2	2	0	100	µg/kg	--	--	1.77E+07	1.86E+07	0.035	1.86E+07	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Lead	7439-92-1	2	2	0	100	µg/kg	--	--	2,750	3,160	0.098	3,160	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Lithium	7439-93-2	2	2	0	100	µg/kg	--	--	5,560	6,580	0.12	6,580	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Manganese	7439-96-5	2	2	0	100	µg/kg	--	--	256,000	259,000	0.0082	259,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Methylene chloride	75-09-2	2	2	0	100	µg/kg	--	--	2.1	2.2	0.023	2.2	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Molybdenum	7439-98-7	2	2	0	100	µg/kg	--	--	264	275	0.029	275	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Nickel	7440-02-0	2	2	0	100	µg/kg	--	--	7,210	8,040	0.077	8,040	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Nitrate	14797-55-8	2	2	0	100	µg/kg	--	--	2,700	17,900	1.0	17,900	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	2	2	0	100	µg/kg	--	--	2,105	6,460	0.72	6,460	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	Rad	Uranium-233/234	U-233/234	2	2	0	100	pCi/g	--	--	0.89	3.0	0.77	3.0	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	Rad	Uranium-238	U-238	2	2	0	100	pCi/g	--	--	0.71	2.2	0.72	2.2	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Vanadium	7440-62-2	2	2	0	100	µg/kg	--	--	49,300	51,400	0.029	51,400	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-33, 300-41, 300-256_Shallow_Focused	non-Rad	Zinc	7440-66-6	2	2	0	100	µg/kg	--	--	35,700	38,900	0.061	38,900	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-37_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	2	1	1	50	µg/kg	50	50	100	100	--	100	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-37_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	2	2	0	100	µg/kg	--	--	520	3,200	1.0	3,200	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-44_Overburden_Focused	non-Rad	Arsenic	7440-38-2	2	2	0	100	µg/kg	--	--	6,000	9,100	0.29	9,100	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-44_Overburden_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	2	2	0	100	µg/kg	--	--	628	1,027	0.34	1,027	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-44_Overburden_Focused	Rad	Uranium-238	U-238	2	2	0	100	pCi/g	--	--	0.21	0.35	0.34	0.35	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-44_Shallow_Focused	non-Rad	Aluminum	7429-90-5	2	2	0	100	µg/kg	--	--	6.09E+06	6.71E+06	0.069	6.71E+06	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-44_Shallow_Focused	non-Rad	Antimony	7440-36-0	2	1	1	50	µg/kg	3,600	3,600	4,100	4,100	--	4,100	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-44_Shallow_Focused	non-Rad	Arsenic	7440-38-2	2	2	0	100	µg/kg	--	--	15,500	16,900	0.061	16,900	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-44_Shallow_Focused	non-Rad	Barium	7440-39-3	2	2	0	100	µg/kg	--	--	71,200	75,200	0.039	75,200	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-44_Shallow_Focused	non-Rad	Beryllium	7440-41-7	2	2	0	100	µg/kg	--	--	480	480	0	480	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-44_Shallow_Focused	non-Rad	Chromium	7440-47-3	2	2	0	100	µg/kg	--	--	8,600	9,300	0.055	9,300	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-44_Shallow_Focused	non-Rad	Cobalt	7440-48-4	2	2	0	100	µg/kg	--	--	7,900	8,200	0.026	8,200	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-44_Shallow_Focused	non-Rad	Copper	7440-50-8	2	2	0	100	µg/kg	--	--	7,800	7,800	0	7,800	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-44_Shallow_Focused	non-Rad	Iron	7439-89-6	2	2	0	100	µg/kg	--	--	1.78E+07	1.94E+07	0.061	1.94E+07	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-44_Shallow_Focused	non-Rad	Manganese	7439-96-5	2	2	0	100	µg/kg	--	--	281,000	303,000	0.053	303,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-44_Shallow_Focused	non-Rad	Nickel	7440-02-0	2	2	0	100	µg/kg	--	--	7,200	8,600	0.13	8,600	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-44_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	2	2	0	100	µg/kg	--	--	723	872	0.13	872	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-44_Shallow_Focused	Rad	Uranium-238	U-238	2	2	0	100	pCi/g	--	--	0.24	0.29	0.13	0.29	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-44_Shallow_Focused	non-Rad	Vanadium	7440-62-2	2	2	0	100	µg/kg	--	--	40,200	43,200	0.051	43,200	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-44_Shallow_Focused	non-Rad	Zinc	7440-66-6	2	2	0	100	µg/kg	--	--	36,500	37,800	0.025	37,800	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-45_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	2	1	1	50	µg/kg	36	36	86	86	--	86	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-45_Shallow_Focused	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	1	1	0	100	µg/kg	--	--	290	290	--	290	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-45_Shallow_Focused	Rad	Cesium-137	10045-97-3	2	1	1	50	pCi/g	0.0026	0.0026	0.023	0.023	--	0.023	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-45_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	2	2	0	100	µg/kg	--	--	3,512	3,600	0.017	3,600	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-45_Shallow_Focused	Rad	Uranium-235	15117-96-1	2	1	1	50	pCi/g	0.045	0.045	0.061	0.061	--	0.061	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-45_Shallow_Focused	Rad	Uranium-238	U-238	2	2	0	100	pCi/g	--	--	1.2	1.2	0.012	1.2	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
300-49_Overburden	non-Rad	1,2,4-Trichlorobenzene	120-82-1	6	1	5	17	µg/kg	330	340	31	31	--	31	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable 1,2,4-Trichlorobenzene was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-49_Overburden	non-Rad	1,4-Dichlorobenzene	106-46-7	6	1	5	17	µg/kg	330	340	29	29	--	29	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable 1,4-Dichlorobenzene was not processed!
300-49_Overburden	non-Rad	2,4-Dinitrotoluene	121-14-2	6	1	5	17	µg/kg	330	340	19	19	--	19	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable 2,4-Dinitrotoluene was not processed!
300-49_Overburden	non-Rad	2-Chlorophenol	95-57-8	6	1	5	17	µg/kg	330	340	51	51	--	51	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable 2-Chlorophenol was not processed!
300-49_Overburden	non-Rad	4-Chloro-3-methylphenol	59-50-7	6	1	5	17	µg/kg	330	340	46	46	--	46	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable 4-Chloro-3-methylphenol was not processed!
300-49_Overburden	non-Rad	Acenaphthene	83-32-9	6	1	5	17	µg/kg	330	340	31	31	--	31	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Acenaphthene was not processed!
300-49_Overburden	non-Rad	Aluminum	7429-90-5	6	6	0	100	µg/kg	--	--	5.57E+06	6.38E+06	0.052	6.30E+06	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Overburden	non-Rad	Antimony	7440-36-0	6	2	4	33	µg/kg	187	200	208	232	0.077	232	95% KM (% Bootstrap) U	Warning: Data set has only 2 Distinct Detected Values. This may not be adequate enough to compute meaningful and reliable test statistics and estimates. The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-49_Overburden	non-Rad	Aroclor-1254	11097-69-1	6	4	2	67	µg/kg	34	34	39	3,008	1.9	3,008	Maximum Detect	Recommended UCL Exceeds Maximum Concentration: EPC defaults to Maximum Concentration.
300-49_Overburden	non-Rad	Arsenic	7440-38-2	6	6	0	100	µg/kg	--	--	2,800	3,500	0.089	3,291	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Overburden	non-Rad	Barium	7440-39-3	6	6	0	100	µg/kg	--	--	61,800	80,000	0.088	76,068	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Overburden	non-Rad	Beryllium	7440-41-7	6	6	0	100	µg/kg	--	--	10	201	0.50	201	Maximum Detect	Recommended UCL Exceeds Maximum Concentration: EPC defaults to Maximum Concentration.
300-49_Overburden	non-Rad	Cadmium	7440-43-9	6	5	1	83	µg/kg	33	33	34	216	0.53	174	95% KM (t) UCL	Warning: There are only 5 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
300-49_Overburden	non-Rad	Chromium	7440-47-3	6	6	0	100	µg/kg	--	--	8,900	25,500	0.53	18,106	95% Modified-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Overburden	non-Rad	Cobalt	7440-48-4	6	6	0	100	µg/kg	--	--	6,500	7,200	0.040	7,127	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Overburden	non-Rad	Copper	7440-50-8	6	6	0	100	µg/kg	--	--	12,700	536,000	2.1	536,000	Maximum Detect	Recommended UCL Exceeds Maximum Concentration: EPC defaults to Maximum Concentration.
300-49_Overburden	non-Rad	Di-n-butylphthalate	84-74-2	6	2	4	33	µg/kg	340	340	21	52	0.59	52	Maximum Detect	Recommended UCL Exceeds Maximum Concentration: EPC defaults to Maximum Concentration.
300-49_Overburden	non-Rad	Iron	7439-89-6	6	6	0	100	µg/kg	--	--	1.91E+07	2.12E+07	0.034	2.08E+07	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Overburden	non-Rad	Lead	7439-92-1	6	6	0	100	µg/kg	--	--	4,600	40,500	1.2	36,964	Chebyshev (Mean, Sd)	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-49_Overburden	non-Rad	Manganese	7439-96-5	6	6	0	100	µg/kg	--	--	298,000	321,000	0.033	316,669	95% Student's-t UCL	Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates! It is suggested to collect at least 8 to 10 observations using these statistical methods! If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.
300-49_Overburden	non-Rad	Nickel	7440-02-0	6	6	0	100	µg/kg	--	--	9,700	15,100	0.18	13,035	% Approximate Gamma L	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Overburden	non-Rad	n-Nitrosodi-n-dipropylamine	621-64-7	6	1	5	17	µg/kg	330	340	40	40	--	40	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable n-Nitrosodi-n-dipropylamine was not processed!
300-49_Overburden	non-Rad	Pentachlorophenol	87-86-5	6	1	5	17	µg/kg	840	850	50	50	--	50	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Pentachlorophenol was not processed!
300-49_Overburden	non-Rad	Phenol	108-95-2	6	1	5	17	µg/kg	330	340	50	50	--	50	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Phenol was not processed!
300-49_Overburden	non-Rad	Pyrene	129-00-0	6	1	5	17	µg/kg	330	340	40	40	--	40	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Pyrene was not processed!
300-49_Overburden	non-Rad	Silver	7440-22-4	6	4	2	67	µg/kg	42	45	108	1,200	1.2	703	95% KM (BCA) UCL	Warning: There are only 4 Distinct Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-49_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	6	6	0	100	µg/kg	--	--	1,935	3,215	0.18	3,066	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Overburden	Rad	Uranium-233/234	U-233/234	6	6	0	100	pCi/g	--	--	0.67	1.1	0.16	1.0	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Overburden	Rad	Uranium-235	15117-96-1	6	1	5	17	pCi/g	0.019	0.10	0.057	0.057	--	0.057	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Uranium-235 was not processed!
300-49_Overburden	Rad	Uranium-238	U-238	6	6	0	100	pCi/g	--	--	0.65	1.1	0.18	1.0	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Overburden	non-Rad	Vanadium	7440-62-2	6	6	0	100	µg/kg	--	--	45,200	52,200	0.055	50,380	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Overburden	non-Rad	Zinc	7440-66-6	6	6	0	100	µg/kg	--	--	45,100	194,000	0.68	141,984	95% Approximate Gamma U	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Shallow	non-Rad	Aluminum	7429-90-5	6	6	0	100	µg/kg	--	--	4.90E+06	8.38E+06	0.22	6.92E+06	95% Modified-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Shallow	non-Rad	Antimony	7440-36-0	6	2	4	33	µg/kg	200	210	172	176	0.016	176	95% KM (% Bootstrap) U	Warning: Recommended UCL exceeds the maximum observation Note: DL/2 is not a recommended method. Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
300-49_Shallow	non-Rad	Arsenic	7440-38-2	6	6	0	100	µg/kg	--	--	2,600	5,500	0.31	4,431	95% H-UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-49_Shallow	non-Rad	Barium	7440-39-3	6	6	0	100	µg/kg	--	--	59,200	113,000	0.29	89,874	95% Modified-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Shallow	non-Rad	Beryllium	7440-41-7	6	6	0	100	µg/kg	--	--	144	426	0.52	303	95% Modified-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Shallow	Rad	Cesium-137	10045-97-3	6	1	5	17	pCi/g	0.011	0.022	0.15	0.15	--	0.15	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Cesium-137 was not processed!
300-49_Shallow	non-Rad	Chromium	7440-47-3	6	6	0	100	µg/kg	--	--	7,400	9,800	0.098	9,170	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Shallow	non-Rad	Cobalt	7440-48-4	6	6	0	100	µg/kg	--	--	6,400	11,700	0.28	9,323	95% Modified-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Shallow	non-Rad	Copper	7440-50-8	6	6	0	100	µg/kg	--	--	9,100	18,900	0.34	14,870	; Approximate Gamma l	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Shallow	non-Rad	Iron	7439-89-6	6	6	0	100	µg/kg	--	--	1.81E+07	3.22E+07	0.26	2.59E+07	95% Modified-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Shallow	non-Rad	Lead	7439-92-1	6	6	0	100	µg/kg	--	--	3,200	8,900	0.45	6,629	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Shallow	non-Rad	Manganese	7439-96-5	6	6	0	100	µg/kg	--	--	282,000	422,000	0.17	361,805	95% Modified-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-49_Shallow	non-Rad	Nickel	7440-02-0	6	6	0	100	µg/kg	--	--	8,500	11,100	0.085	10,664	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Shallow	non-Rad	Silver	7440-22-4	6	3	3	50	µg/kg	45	46	87	621	1.0	621	KM (Percentile Bootstra	Warning: There are only 3 Distinct Detected Values in this data set The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods. Those methods will return a 'N/A' value on your output display!
300-49_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	7	6	1	85.71	µg/kg	8.8	8.8	1,319	4,041	0.45	2,983	95% KM (t) UCL	Warning: There are only 6 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
300-49_Shallow	Rad	Uranium-233/234	U-233/234	6	6	0	100	pCi/g	--	--	0.30	1.7	0.53	1.3	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Shallow	Rad	Uranium-235	15117-96-1	6	2	4	33	pCi/g	0.019	0.088	0.065	0.24	0.81	0.24	95% KM (% Bootstrap) U	Warning: Data set has only 2 Distinct Detected Values. This may not be adequate enough to compute meaningful and reliable test statistics and estimates. The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).
300-49_Shallow	Rad	Uranium-238	U-238	6	6	0	100	pCi/g	--	--	0.44	1.3	0.43	1.1	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Shallow	non-Rad	Vanadium	7440-62-2	6	6	0	100	µg/kg	--	--	42,200	70,300	0.21	58,672	95% Modified-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-49_Shallow	non-Rad	Zinc	7440-66-6	6	6	0	100	µg/kg	--	--	35,900	58,000	0.19	54,651	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Overburden	non-Rad	Aluminum	7429-90-5	6	6	0	100	µg/kg	--	--	5.75E+06	6.94E+06	0.069	6.68E+06	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-50_Overburden	non-Rad	Aroclor-1254	11097-69-1	6	2	4	33	µg/kg	34	35	26	33	0.19	33	95% KM (% Bootstrap) U	Warning: Recommended UCL exceeds the maximum observation Note: DL/2 is not a recommended method. Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
300-50_Overburden	non-Rad	Aroclor-1260	11096-82-5	6	3	3	50	µg/kg	34	34	135	229	0.30	229	KM (Percentile Bootstra	Warning: There are only 3 Distinct Detected Values in this data set The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods. Those methods will return a 'N/A' value on your output display!
300-50_Overburden	non-Rad	Arsenic	7440-38-2	6	5	1	83	µg/kg	2,810	2,810	5,100	7,400	0.14	6,897	95% KM (t) UCL	Warning: There are only 5 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
300-50_Overburden	non-Rad	Barium	7440-39-3	6	6	0	100	µg/kg	--	--	90,200	127,000	0.12	117,742	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Overburden	non-Rad	Beryllium	7440-41-7	6	6	0	100	µg/kg	--	--	260	325	0.078	325	Maximum Detect	Recommended UCL Exceeds Maximum Concentration: EPC defaults to Maximum Concentration.
300-50_Overburden	non-Rad	Cadmium	7440-43-9	6	3	3	50	µg/kg	359	389	410	563	0.17	563	KM (Percentile Bootstra	Warning: There are only 3 Distinct Detected Values in this data set The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods. Those methods will return a 'N/A' value on your output display!
300-50_Overburden	Rad	Cesium-137	10045-97-3	6	2	4	33	pCi/g	0.048	0.082	0.031	0.056	0.41	0.056	Maximum Detect	Recommended UCL Exceeds Maximum Concentration: EPC defaults to Maximum Concentration.
300-50_Overburden	non-Rad	Chromium	7440-47-3	6	6	0	100	µg/kg	--	--	9,500	13,700	0.15	12,197	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Overburden	non-Rad	Cobalt	7440-48-4	6	6	0	100	µg/kg	--	--	8,400	9,700	0.048	9,389	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Overburden	non-Rad	Copper	7440-50-8	6	6	0	100	µg/kg	--	--	19,700	82,000	0.54	64,527	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-50_Overburden	non-Rad	Iron	7439-89-6	6	6	0	100	µg/kg	--	--	1.80E+07	1.92E+07	0.025	1.90E+07	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Overburden	non-Rad	Lead	7439-92-1	6	6	0	100	µg/kg	--	--	4,400	6,200	0.14	5,905	95% Student's-t UCL	Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates! It is suggested to collect at least 8 to 10 observations using these statistical methods! If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.
300-50_Overburden	non-Rad	Manganese	7439-96-5	6	6	0	100	µg/kg	--	--	274,000	317,000	0.055	314,271	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Overburden	non-Rad	Nickel	7440-02-0	6	6	0	100	µg/kg	--	--	11,000	17,700	0.19	15,229	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Overburden	non-Rad	Silver	7440-22-4	6	6	0	100	µg/kg	--	--	550	1,600	0.43	1,202	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	6	6	0	100	µg/kg	--	--	6,939	23,260	0.43	17,919	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Overburden	Rad	Uranium-233/234	U-233/234	6	6	0	100	pCi/g	--	--	2.6	8.0	0.44	6.0	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Overburden	Rad	Uranium-235	15117-96-1	6	6	0	100	pCi/g	--	--	0.13	0.54	0.41	0.45	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Overburden	Rad	Uranium-238	U-238	6	6	0	100	pCi/g	--	--	2.3	7.7	0.43	6.0	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-50_Overburden	non-Rad	Vanadium	7440-62-2	6	6	0	100	µg/kg	--	--	42,200	45,900	0.034	45,243	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Overburden	non-Rad	Zinc	7440-66-6	6	6	0	100	µg/kg	--	--	40,400	47,400	0.073	45,889	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Shallow	non-Rad	Aluminum	7429-90-5	6	6	0	100	µg/kg	--	--	5.72E+06	7.09E+06	0.090	6.88E+06	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Shallow	non-Rad	Antimony	7440-36-0	6	1	5	17	µg/kg	1,990	2,530	3,000	3,000	--	3,000	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Antimony was not processed!
300-50_Shallow	non-Rad	Aroclor-1254	11097-69-1	6	5	1	83	µg/kg	33	33	36	177	0.67	126	95% KM (t) UCL	Warning: There are only 5 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
300-50_Shallow	non-Rad	Arsenic	7440-38-2	6	5	1	83	µg/kg	3,380	3,380	3,400	7,400	0.30	6,403	95% KM (t) UCL	Warning: There are only 5 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
300-50_Shallow	non-Rad	Barium	7440-39-3	6	6	0	100	µg/kg	--	--	73,600	110,000	0.15	103,029	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Shallow	non-Rad	Beryllium	7440-41-7	6	6	0	100	µg/kg	--	--	245	292	0.080	282	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Shallow	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	6	1	5	17	µg/kg	20	20	19	19	--	19	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Bis(2-ethylhexyl) phthalate was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-50_Shallow	non-Rad	Cadmium	7440-43-9	6	1	5	17	µg/kg	347	442	463	463	--	463	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Cadmium was not processed!
300-50_Shallow	Rad	Cesium-137	10045-97-3	6	1	5	17	pCi/g	0.026	0.060	0.056	0.056	--	0.056	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Cesium-137 was not processed!
300-50_Shallow	non-Rad	Chromium	7440-47-3	6	6	0	100	µg/kg	--	--	9,600	20,500	0.27	16,841	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Shallow	non-Rad	Cobalt	7440-48-4	6	6	0	100	µg/kg	--	--	8,000	9,700	0.067	9,109	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Shallow	non-Rad	Copper	7440-50-8	6	6	0	100	µg/kg	--	--	10,000	20,700	0.29	16,820	95% H-UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Shallow	non-Rad	Iron	7439-89-6	6	6	0	100	µg/kg	--	--	1.72E+07	2.10E+07	0.074	1.96E+07	˚ Approximate Gamma l	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Shallow	non-Rad	Lead	7439-92-1	6	6	0	100	µg/kg	--	--	4,100	7,900	0.27	6,381	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Shallow	non-Rad	Manganese	7439-96-5	6	6	0	100	µg/kg	--	--	259,000	328,000	0.089	318,120	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Shallow	non-Rad	Nickel	7440-02-0	6	6	0	100	µg/kg	--	--	10,300	12,600	0.081	12,413	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
300-50_Shallow	non-Rad	Silver	7440-22-4	6	4	2	67	µg/kg	331	371	956	4,500	0.71	2,992	95% KM (t) UCL	Warning: There are only 4 Distinct Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
300-50_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	7	7	0	100	µg/kg	--	--	165	31,670	0.74	22,938	95% Student's-t UCL	Warning: There are only 7 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Shallow	Rad	Uranium-233/234	U-233/234	6	6	0	100	pCi/g	--	--	0.69	10	0.55	7.9	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Shallow	Rad	Uranium-235	15117-96-1	6	5	1	83	pCi/g	0.044	0.044	0.27	0.89	0.49	0.66	95% KM (t) UCL	Warning: There are only 5 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
300-50_Shallow	Rad	Uranium-238	U-238	6	6	0	100	pCi/g	--	--	0.58	11	0.56	8.4	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Shallow	non-Rad	Vanadium	7440-62-2	6	6	0	100	µg/kg	--	--	41,300	50,600	0.076	46,964	95% Modified-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-50_Shallow	non-Rad	Zinc	7440-66-6	6	6	0	100	µg/kg	--	--	35,900	43,900	0.071	41,344	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
300-8_Shallow	non-Rad	Beryllium	7440-41-7	16	16	0	100	µg/kg	--	--	486	646	0.083	574	95% Student's-t UCL	--
300-8_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	17	16	1	94.12	µg/kg	--	--	860	4,376	0.47	2,374	KM (Percentile Bootstrap) UCL	
300-8_Shallow	Rad	Uranium-233/234	U-233/234	16	16	0	100	pCi/g	--	--	0.37	1.7	0.45	0.79	% Approximate Gamma l	--
300-8_Shallow	Rad	Uranium-238	U-238	16	16	0	100	pCi/g	--	--	0.29	1.5	0.47	0.82	95% Student's-t UCL	--
316-1_Overburden	Rad	Cesium-137	10045-97-3	6	1	5	17	pCi/g	0.012	0.050	0.10	0.10	--	0.10	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Cesium-137 was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
316-1_Overburden	Rad	Cobalt-60	10198-40-0	6	1	5	17	pCi/g	0.013	0.062	0.32	0.32	--	0.32	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Cobalt-60 was not processed!
316-1_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	6	6	0	100	µg/kg	--	--	7,263	45,482	0.62	40,572	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Overburden	Rad	Uranium-233/234	U-233/234	6	6	0	100	pCi/g	--	--	1.9	15	0.62	13	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Overburden	Rad	Uranium-235	15117-96-1	6	5	1	83	pCi/g	0.13	0.13	0.24	1.2	0.50	1.1	95% KM (t) UCL	Warning: There are only 5 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
316-1_Overburden	Rad	Uranium-238	U-238	6	6	0	100	pCi/g	--	--	2.4	15	0.62	13	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_1	non-Rad	Aroclor-1248	12672-29-6	8	2	6	25	µg/kg	33	35	740	3,000	0.85	3,000	95% KM (% Bootstrap) U	Warning: Data set has only 2 Distinct Detected Values. This may not be adequate enough to compute meaningful and reliable test statistics and estimates. The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).
316-1_Shallow_1	non-Rad	Arsenic	7440-38-2	8	8	0	100	µg/kg	--	--	3,600	20,900	0.39	19,014	95% Student's-t UCL	Warning: There are only 8 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_1	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	8	8	0	100	µg/kg	--	--	57	72	0.085	69	95% Student's-t UCL	Warning: There are only 8 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_1	non-Rad	Butylbenzylphthalate	85-68-7	7	5	2	71	µg/kg	340	350	93	98	0.025	98	95% KM (t) UCL	Warning: There are only 3 Distinct Detected Values in this data set The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods. Those methods will return a 'N/A' value on your output display!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
316-1_Shallow_1	Rad	Cesium-137	10045-97-3	8	1	7	13	pCi/g	-8.55E-03	0.0036	0.032	0.032	--	0.032	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Cesium-137 was not processed!
316-1_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	8	8	0	100	µg/kg	--	--	3,203	121,718	1.2	83,027	' Approximate Gamma l	Warning: There are only 8 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_1	Rad	Uranium-235	15117-96-1	8	8	0	100	pCi/g	--	--	0.038	1.9	1.4	1.2	' Approximate Gamma l	Warning: There are only 8 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_1	Rad	Uranium-238	U-238	8	8	0	100	pCi/g	--	--	1.1	41	1.2	28	' Approximate Gamma l	Warning: There are only 8 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_3	non-Rad	Aluminum	7429-90-5	9	9	0	100	µg/kg	--	--	5.96E+06	1.45E+07	0.25	1.11E+07	95% Student's-t UCL	Warning: There are only 9 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_3	non-Rad	Antimony	7440-36-0	9	1	8	11	µg/kg	240	260	490	490	--	490	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Antimony was not processed!
316-1_Shallow_3	non-Rad	Aroclor-1254	11097-69-1	19	13	6	68	µg/kg	33	34	37	188	0.52	98	KM (Percentile Bootstra	--
316-1_Shallow_3	non-Rad	Arsenic	7440-38-2	9	9	0	100	µg/kg	--	--	2,400	8,200	0.41	5,138	95% H-UCL	Warning: There are only 9 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_3	non-Rad	Barium	7440-39-3	9	9	0	100	µg/kg	--	--	82,100	166,000	0.21	129,106	95% Student's-t UCL	Warning: There are only 9 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_3	non-Rad	Beryllium	7440-41-7	9	9	0	100	µg/kg	--	--	180	630	0.41	416	95% Student's-t UCL	Warning: There are only 9 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
316-1_Shallow_3	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	9	6	3	67	µg/kg	350	370	22	360	1.5	342	'.5% KM (Chebyshev) U	Warning: There are only 6 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_3	non-Rad	Cadmium	7440-43-9	9	6	3	67	µg/kg	40	40	70	1,000	0.93	474	KM (Percentile Bootstra	Warning: There are only 6 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_3	Rad	Cesium-137	10045-97-3	19	12	7	63	pCi/g	0.011	0.065	0.12	0.85	0.68	0.37	KM (Percentile Bootstra	--
316-1_Shallow_3	non-Rad	Chromium	7440-47-3	9	9	0	100	µg/kg	--	--	19,600	74,900	0.41	50,455	95% Student's-t UCL	Warning: There are only 9 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_3	non-Rad	Cobalt	7440-48-4	9	9	0	100	µg/kg	--	--	7,500	11,000	0.12	9,703	95% Student's-t UCL	Warning: There are only 9 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_3	Rad	Cobalt-60	10198-40-0	19	11	8	58	pCi/g	0.012	0.076	0.36	7.2	0.96	2.3	95% KM (BCA) UCL	--
316-1_Shallow_3	non-Rad	Copper	7440-50-8	9	9	0	100	µg/kg	--	--	152,000	2.40E+06	0.85	1.37E+06	' Approximate Gamma L	Warning: There are only 9 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_3	non-Rad	Heptachlor epoxide	1024-57-3	9	2	7	22	µg/kg	1.7	1.9	2.3	3.2	0.23	3.2	5% KM (% Bootstrap) U	Warning: Data set has only 2 Distinct Detected Values. This may not be adequate enough to compute meaningful and reliable test statistics and estimates. The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).
316-1_Shallow_3	non-Rad	Iron	7439-89-6	9	9	0	100	µg/kg	--	--	2.00E+07	2.62E+07	0.094	2.44E+07	95% Student's-t UCL	Warning: There are only 9 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_3	non-Rad	Lead	7439-92-1	9	9	0	100	µg/kg	--	--	6,700	18,800	0.30	14,409	95% Student's-t UCL	Warning: There are only 9 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_3	non-Rad	Manganese	7439-96-5	9	9	0	100	µg/kg	--	--	279,000	464,000	0.14	392,825	95% Student's-t UCL	Warning: There are only 9 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
316-1_Shallow_3	non-Rad	Mercury	7439-97-6	9	9	0	100	µg/kg	--	--	390	1,800	0.56	1,105	95% Student's-t UCL	Warning: There are only 9 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_3	non-Rad	Nickel	7440-02-0	9	9	0	100	µg/kg	--	--	23,600	136,000	0.54	94,656	95% Student's-t UCL	Warning: There are only 9 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_3	non-Rad	Phenol	108-95-2	9	1	8	11	µg/kg	350	380	28	28	--	28	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Phenol was not processed!
316-1_Shallow_3	non-Rad	Selenium	7782-49-2	9	9	0	100	µg/kg	--	--	970	1,600	0.17	1,444	95% Student's-t UCL	Warning: There are only 9 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_3	non-Rad	Silver	7440-22-4	9	9	0	100	µg/kg	--	--	3,500	19,000	0.54	13,196	95% Student's-t UCL	Warning: There are only 9 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_3	non-Rad	Total_U_Isotopes	Total_U_Isotopes	19	19	0	100	µg/kg	--	--	3,096	146,267	0.77	63,074	95% Student's-t UCL	
316-1_Shallow_3	Rad	Uranium-233/234	U-233/234	19	19	0	100	pCi/g	--	--	1.0	55	0.78	23	95% Student's-t UCL	--
316-1_Shallow_3	Rad	Uranium-235	15117-96-1	19	16	3	84	pCi/g	0.045	0.11	0.15	7.3	0.79	2.6	95% KM (BCA) UCL	--
316-1_Shallow_3	Rad	Uranium-238	U-238	19	19	0	100	pCi/g	--	--	1.0	48	0.76	21	95% Student's-t UCL	--
316-1_Shallow_3	non-Rad	Vanadium	7440-62-2	9	9	0	100	µg/kg	--	--	41,100	66,700	0.17	56,707	95% Student's-t UCL	Warning: There are only 9 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_3	non-Rad	Zinc	7440-66-6	9	9	0	100	µg/kg	--	--	41,300	112,000	0.33	82,016	95% Student's-t UCL	Warning: There are only 9 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_4	non-Rad	Aroclor-1254	11097-69-1	10	3	7	30	µg/kg	33	34	38	62	0.25	62	KM (Percentile Bootstra	Warning: There are only 3 Distinct Detected Values in this data set The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods. Those methods will return a 'N/A' value on your output display!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
316-1_Shallow_4	Rad	Cobalt-60	10198-40-0	10	1	9	10	pCi/g	0.024	0.058	0.12	0.12	--	0.12	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Cobalt-60 was not processed!
316-1_Shallow_4	non-Rad	Total_U_Isotopes	Total_U_Isotopes	10	10	0	100	µg/kg	--	--	5,120	87,026	0.85	42,963	95% Student's-t UCL	
316-1_Shallow_4	Rad	Uranium-233/234	U-233/234	10	10	0	100	pCi/g	--	--	1.7	30	0.91	16	% Approximate Gamma l	--
316-1_Shallow_4	Rad	Uranium-235	15117-96-1	10	8	2	80	pCi/g	0.037	0.12	0.17	2.2	0.71	1.1	95% KM (t) UCL	Warning: There are only 8 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
316-1_Shallow_4	Rad	Uranium-238	U-238	10	10	0	100	pCi/g	--	--	1.7	29	0.85	14	95% Student's-t UCL	--
316-2_Shallow_1	Rad	Cesium-137	10045-97-3	6	1	5	17	pCi/g	0.0090	0.028	0.031	0.031	--	0.031	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Cesium-137 was not processed!
316-2_Shallow_1	Rad	Cobalt-60	10198-40-0	6	4	2	67	pCi/g	0.010	0.020	0.063	0.10	0.24	0.092	KM (Percentile Bootstra	Warning: There are only 4 Distinct Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
316-2_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	6	6	0	100	µg/kg	--	--	8,929	240,818	1.3	210,452	% Approximate Gamma l	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-2_Shallow_1	Rad	Uranium-233/234	U-233/234	6	6	0	100	pCi/g	--	--	2.5	95	1.4	86	% Approximate Gamma l	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-2_Shallow_1	Rad	Uranium-235	15117-96-1	6	6	0	100	pCi/g	--	--	0.13	12	1.4	12	Maximum Detect	Recommended UCL Exceeds Maximum Concentration: EPC defaults to Maximum Concentration.
316-2_Shallow_1	Rad	Uranium-238	U-238	6	6	0	100	pCi/g	--	--	3.0	79	1.3	69	% Approximate Gamma l	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-2_Shallow_2	non-Rad	Aroclor-1248	12672-29-6	6	4	2	67	µg/kg	35	35	460	870	0.31	697	95% KM (t) UCL	Warning: There are only 4 Distinct Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
316-2_Shallow_2	non-Rad	Aroclor-1254	11097-69-1	6	2	4	33	µg/kg	70	180	40	42	0.034	42	95% KM (% Bootstrap) U	Warning: Recommended UCL exceeds the maximum observation Note: DL/2 is not a recommended method. Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
316-2_Shallow_2	non-Rad	Aroclor-1260	11096-82-5	6	1	5	17	µg/kg	35	180	110	110	--	110	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Aroclor-1260 was not processed!
316-2_Shallow_2	Rad	Cesium-137	10045-97-3	6	6	0	100	pCi/g	--	--	0.13	0.59	0.66	0.45	95% Approximate Gamma U	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-2_Shallow_2	Rad	Cobalt-60	10198-40-0	6	5	1	83	pCi/g	0.013	0.013	0.14	0.75	0.85	0.45	95% KM (BCA) UCL	Warning: There are only 5 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
316-2_Shallow_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	6	6	0	100	µg/kg	--	--	106,025	361,282	0.54	291,369	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-2_Shallow_2	Rad	Uranium-233/234	U-233/234	6	6	0	100	pCi/g	--	--	36	147	0.55	115	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-2_Shallow_2	Rad	Uranium-235	15117-96-1	6	6	0	100	pCi/g	--	--	2.7	15	0.60	11	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-2_Shallow_2	Rad	Uranium-238	U-238	6	6	0	100	pCi/g	--	--	35	119	0.54	96	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-2_Shallow_3	non-Rad	Arsenic	7440-38-2	6	3	3	50	µg/kg	7,400	8,900	4,400	8,000	0.30	8,000	KM (Percentile Bootstra	Warning: There are only 3 Distinct Detected Values in this data set The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods. Those methods will return a 'N/A' value on your output display!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
316-2_Shallow_3	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	3	3	0	100	µg/kg	--	--	130	260	0.33	260	Maximum Detect	Warning: This data set only has 3 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Bis(2-ethylhexyl) phthalate was not processed!
316-2_Shallow_3	non-Rad	Butylbenzylphthalate	85-68-7	2	2	0	100	µg/kg	--	--	170	180	0.040	180	Maximum Detect	Warning: This data set only has 2 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Butylbenzylphthalate was not processed!
316-2_Shallow_3	non-Rad	Total_U_Isotopes	Total_U_Isotopes	6	6	0	100	µg/kg	--	--	2,730	110,185	1.2	73,174	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-2_Shallow_3	Rad	Uranium-235	15117-96-1	6	5	1	83	pCi/g	0.017	0.017	0.11	1.4	1.0	0.91	95% KM (t) UCL	Warning: There are only 5 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
316-2_Shallow_3	Rad	Uranium-238	U-238	6	6	0	100	pCi/g	--	--	0.92	37	1.2	24	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-5_Shallow_1	Rad	Americium-241	14596-10-2	1	1	0	100	pCi/g	--	--	0.48	0.48	--	0.48	Maximum Detect	Warning: This data set only has 1 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Americium-241 was not processed!
316-5_Shallow_1	non-Rad	Arsenic	7440-38-2	6	6	0	100	µg/kg	--	--	1,900	3,300	0.23	3,070	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-5_Shallow_1	non-Rad	Benzo(a)anthracene	56-55-3	1	1	0	100	µg/kg	--	--	38	38	--	38	Maximum Detect	Warning: This data set only has 1 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Benzo(a)anthracene was not processed!
316-5_Shallow_1	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	6	6	0	100	µg/kg	--	--	99	150	0.19	146	95% Student's-t UCL	Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates! It is suggested to collect at least 8 to 10 observations using these statistical methods! If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
316-5_Shallow_1	non-Rad	Butylbenzylphthalate	85-68-7	4	4	0	100	µg/kg	--	--	90	100	0.061	100	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Butylbenzylphthalate was not processed!
316-5_Shallow_1	Rad	Cesium-137	10045-97-3	6	4	2	67	pCi/g	0.0072	0.027	0.084	2.9	0.70	2.3	KM (Percentile Bootstra	Warning: There are only 4 Distinct Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
316-5_Shallow_1	non-Rad	Total_U_Isotopes	Total_U_Isotopes	6	6	0	100	µg/kg	--	--	2,126	362,832	1.2	271,835	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-5_Shallow_1	Rad	Uranium-235	15117-96-1	6	6	0	100	pCi/g	--	--	0.027	19	1.3	19	Maximum Detect	Recommended UCL Exceeds Maximum Concentration: EPC defaults to Maximum Concentration.
316-5_Shallow_1	Rad	Uranium-238	U-238	6	6	0	100	pCi/g	--	--	0.71	119	1.2	89	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-5_Shallow_2	non-Rad	1,1,2,2-Tetrachloroethane	79-34-5	3	3	0	100	µg/kg	--	--	100	140	0.18	140	Maximum Detect	Warning: This data set only has 3 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable 1,1,2,2-Tetrachloroethane was not processed!
316-5_Shallow_2	non-Rad	2-Butoxyethanol	111-76-2	1	1	0	100	µg/kg	--	--	240	240	--	240	Maximum Detect	Warning: This data set only has 1 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable 2-Butoxyethanol was not processed!
316-5_Shallow_2	Rad	Americium-241	14596-10-2	2	2	0	100	pCi/g	--	--	0.052	0.12	0.58	0.12	Maximum Detect	Warning: This data set only has 2 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Americium-241 was not processed!
316-5_Shallow_2	non-Rad	Arsenic	7440-38-2	6	6	0	100	µg/kg	--	--	1,100	3,500	0.45	3,180	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-5_Shallow_2	non-Rad	Barium	7440-39-3	1	1	0	100	µg/kg	--	--	76,700	76,700	--	76,700	Maximum Detect	Warning: This data set only has 1 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Barium was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
316-5_Shallow_2	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	5	5	0	100	µg/kg	--	--	110	200	0.25	180	95% Student's-t UCL	Warning: There are only 5 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-5_Shallow_2	non-Rad	Butylbenzylphthalate	85-68-7	3	3	0	100	µg/kg	--	--	79	110	0.17	110	Maximum Detect	Warning: This data set only has 3 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Butylbenzylphthalate was not processed!
316-5_Shallow_2	Rad	Cesium-137	10045-97-3	6	6	0	100	pCi/g	--	--	0.16	2.3	0.88	1.7	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-5_Shallow_2	non-Rad	Chromium	7440-47-3	1	1	0	100	µg/kg	--	--	6,900	6,900	--	6,900	Maximum Detect	Warning: This data set only has 1 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Chromium was not processed!
316-5_Shallow_2	non-Rad	Chrysene	218-01-9	6	1	5	17	µg/kg	340	360	38	38	--	38	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Chrysene was not processed!
316-5_Shallow_2	Rad	Cobalt-60	10198-40-0	6	2	4	33	pCi/g	0.0073	0.023	0.055	0.12	0.52	0.12	95% KM (% Bootstrap) U	Warning: Data set has only 2 Distinct Detected Values. This may not be adequate enough to compute meaningful and reliable test statistics and estimates. The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).
316-5_Shallow_2	non-Rad	Di-n-butylphthalate	84-74-2	5	5	0	100	µg/kg	--	--	72	150	0.32	146	95% Student's-t UCL	Warning: A sample size of 'n' = 5 may not adequate enough to compute meaningful and reliable test statistics and estimates! It is suggested to collect at least 8 to 10 observations using these statistical methods! If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.
316-5_Shallow_2	non-Rad	Lead	7439-92-1	1	1	0	100	µg/kg	--	--	3,200	3,200	--	3,200	Maximum Detect	Warning: This data set only has 1 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Lead was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
316-5_Shallow_2	non-Rad	Selenium	7782-49-2	1	1	0	100	µg/kg	--	--	490	490	--	490	Maximum Detect	Warning: This data set only has 1 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Selenium was not processed!
316-5_Shallow_2	non-Rad	Silver	7440-22-4	1	1	0	100	µg/kg	--	--	3,600	3,600	--	3,600	Maximum Detect	Warning: This data set only has 1 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Silver was not processed!
316-5_Shallow_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	6	6	0	100	µg/kg	--	--	67,046	228,142	0.49	204,701	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-5_Shallow_2	Rad	Uranium-235	15117-96-1	6	6	0	100	pCi/g	--	--	3.4	13	0.52	9.0	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-5_Shallow_2	Rad	Uranium-238	U-238	6	6	0	100	pCi/g	--	--	22	75	0.49	68	95% Student's-t UCL	Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
316-5_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	3	1	2	33	µg/kg	33	35	57	57	--	57	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
316-5_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	3	1	2	33	µg/kg	33	35	70	70	--	70	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
316-5_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	3	1	2	33	µg/kg	33	35	52	52	--	52	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
316-5_Shallow_Focused	non-Rad	Arsenic	7440-38-2	3	2	1	67	µg/kg	7,700	7,700	2,200	4,300	0.46	4,300	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
316-5_Shallow_Focused	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	1	1	0	100	µg/kg	--	--	190	190	--	190	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
316-5_Shallow_Focused	Rad	Cesium-137	10045-97-3	3	2	1	67	pCi/g	0.11	0.11	1.7	1.8	0.048	1.8	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
316-5_Shallow_Focused	non-Rad	Di-n-butylphthalate	84-74-2	1	1	0	100	µg/kg	--	--	1,500	1,500	--	1,500	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
316-5_Shallow_Focused	Rad	Europium-155	14391-16-3	3	1	2	33	pCi/g	0.018	0.73	0.072	0.072	--	0.072	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
316-5_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	3	3	0	100	µg/kg	--	--	55,880	138,095	0.42	138,095	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
316-5_Shallow_Focused	Rad	Uranium-235	15117-96-1	3	3	0	100	pCi/g	--	--	2.5	7.7	0.65	7.7	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
316-5_Shallow_Focused	Rad	Uranium-238	U-238	3	3	0	100	pCi/g	--	--	18	45	0.42	45	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	4,4'-DDE (Dichlorodiphenyldichloroethylene)	72-55-9	4	4	0	100	µg/kg	--	--	2.5	25	0.95	25	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Acetone	67-64-1	3	3	0	100	µg/kg	--	--	170	590	0.64	590	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
331 LSLDF_Shallow_Focused	non-Rad	Aldrin	309-00-2	4	1	3	25	µg/kg	1.3	1.4	0.56	0.56	--	0.56	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Alpha-BHC	319-84-6	4	1	3	25	µg/kg	1.3	1.4	0.39	0.39	--	0.39	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Aluminum	7429-90-5	4	4	0	100	µg/kg	--	--	3.84E+06	6.90E+06	0.25	6.90E+06	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Antimony	7440-36-0	4	1	3	25	µg/kg	320	330	360	360	--	360	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	4	4	0	100	µg/kg	--	--	56	850	1.1	850	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Arsenic	7440-38-2	4	4	0	100	µg/kg	--	--	1,400	2,400	0.21	2,400	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Barium	7440-39-3	4	4	0	100	µg/kg	--	--	49,600	78,600	0.20	78,600	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Beryllium	7440-41-7	4	4	0	100	µg/kg	--	--	330	570	0.24	570	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	4	4	0	100	µg/kg	--	--	130	910	0.98	910	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Boron	7440-42-8	4	4	0	100	µg/kg	--	--	670	1,700	0.35	1,700	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Butylbenzylphthalate	85-68-7	4	4	0	100	µg/kg	--	--	24	340	1.2	340	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Cadmium	7440-43-9	4	4	0	100	µg/kg	--	--	80	140	0.24	140	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Chromium	7440-47-3	4	4	0	100	µg/kg	--	--	4,700	10,300	0.32	10,300	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Cobalt	7440-48-4	4	4	0	100	µg/kg	--	--	6,900	8,600	0.091	8,600	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Copper	7440-50-8	4	4	0	100	µg/kg	--	--	12,400	15,400	0.097	15,400	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Dieldrin	60-57-1	4	2	2	50	µg/kg	1.4	1.4	3.0	13	0.88	13	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Di-n-butylphthalate	84-74-2	4	4	0	100	µg/kg	--	--	37	98	0.52	98	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Endosulfan I	959-98-8	4	3	1	75	µg/kg	1.3	1.3	0.99	1.9	0.31	1.9	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Endosulfan II	33213-65-9	4	1	3	25	µg/kg	1.3	1.4	3.1	3.1	--	3.1	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Iron	7439-89-6	4	4	0	100	µg/kg	--	--	1.73E+07	2.20E+07	0.10	2.20E+07	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Lead	7439-92-1	4	4	0	100	µg/kg	--	--	3,700	9,000	0.45	9,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Manganese	7439-96-5	4	4	0	100	µg/kg	--	--	238,000	349,000	0.18	349,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Mercury	7439-97-6	4	4	0	100	µg/kg	--	--	50	110	0.40	110	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Methoxychlor	72-43-5	4	1	3	25	µg/kg	1.3	1.4	3.3	3.3	--	3.3	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Methylene chloride	75-09-2	3	3	0	100	µg/kg	--	--	10	11	0.054	11	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Molybdenum	7439-98-7	4	4	0	100	µg/kg	--	--	220	590	0.45	590	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
331 LSLDF_Shallow_Focused	non-Rad	Nickel	7440-02-0	4	4	0	100	µg/kg	--	--	6,900	10,000	0.17	10,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Nitrate	14797-55-8	3	3	0	100	µg/kg	--	--	8,700	41,700	0.61	41,700	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Nitrogen in Nitrite and Nitrate	NO2+NO3-N	3	3	0	100	µg/kg	--	--	2,300	9,500	0.58	9,500	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Silver	7440-22-4	4	4	0	100	µg/kg	--	--	780	1,100	0.16	1,100	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	5	5	0	100	µg/kg	--	--	0.071	1,402	0.57	1,402	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Uranium	7440-61-1	4	4	0	100	µg/kg	--	--	827	2,300	0.56	2,300	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	Rad	Uranium-233/234	U-233/234	4	4	0	100	pCi/g	--	--	0.40	0.54	0.13	0.54	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	Rad	Uranium-238	U-238	4	4	0	100	pCi/g	--	--	0.39	0.47	0.11	0.47	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Vanadium	7440-62-2	4	4	0	100	µg/kg	--	--	45,200	53,100	0.068	53,100	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
331 LSLDF_Shallow_Focused	non-Rad	Zinc	7440-66-6	4	4	0	100	µg/kg	--	--	48,600	137,000	0.53	137,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
600-243_Shallow	non-Rad	2-Methylnaphthalene	91-57-6	12	12	0	100	µg/kg	--	--	27	660	1.1	279	% Approximate Gamma L	--
600-243_Shallow	non-Rad	Anthracene	120-12-7	12	5	7	42	µg/kg	360	500	24	35	0.17	31	95% KM (t) UCL	Warning: There are only 4 Distinct Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
600-243_Shallow	non-Rad	Antimony	7440-36-0	12	1	11	8	µg/kg	640	950	1,300	1,300	--	1,300	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Antimony was not processed!
600-243_Shallow	non-Rad	Aroclor-1254	11097-69-1	12	4	8	33	µg/kg	16	20	12	67	0.95	27	95% KM (t) UCL	Warning: There are only 4 Distinct Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
600-243_Shallow	non-Rad	Aroclor-1260	11096-82-5	12	9	3	75	µg/kg	14	16	5.2	36	0.63	18	KM (Percentile Bootstra	Warning: There are only 9 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
600-243_Shallow	non-Rad	Arsenic	7440-38-2	12	12	0	100	µg/kg	--	--	2,800	10,200	0.39	6,159	% Approximate Gamma L	--
600-243_Shallow	non-Rad	Barium	7440-39-3	12	12	0	100	µg/kg	--	--	79,400	426,000	0.49	292,072	95% Student's-t UCL	--
600-243_Shallow	non-Rad	Benzo(a)anthracene	56-55-3	12	7	5	58	µg/kg	360	500	24	47	0.20	43	95% KM (t) UCL	Warning: There are only 7 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
600-243_Shallow	non-Rad	Benzo(a)pyrene	50-32-8	12	5	7	42	µg/kg	360	450	23	46	0.30	43	95% KM (t) UCL	Warning: There are only 5 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
600-243_Shallow	non-Rad	Benzo(b)fluoranthene	205-99-2	12	7	5	58	µg/kg	360	450	21	63	0.36	46	95% KM (t) UCL	Warning: There are only 7 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
600-243_Shallow	non-Rad	Benzo(k)fluoranthene	207-08-9	12	6	6	50	µg/kg	360	500	20	33	0.19	32	95% KM (t) UCL	Warning: There are only 6 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
600-243_Shallow	non-Rad	Beryllium	7440-41-7	12	12	0	100	µg/kg	--	--	210	3,800	0.79	2,079	95% Student's-t UCL	--
600-243_Shallow	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	12	12	0	100	µg/kg	--	--	59	890	1.1	432	95% H-UCL	--
600-243_Shallow	non-Rad	Boron	7440-42-8	12	12	0	100	µg/kg	--	--	11,900	497,000	0.75	294,463	95% Student's-t UCL	--
600-243_Shallow	non-Rad	Cadmium	7440-43-9	12	11	1	92	µg/kg	150	150	220	1,400	0.68	793	95% KM (BCA) UCL	--
600-243_Shallow	non-Rad	Chromium	7440-47-3	12	12	0	100	µg/kg	--	--	9,500	24,300	0.31	18,006	¿ Approximate Gamma I	--
600-243_Shallow	non-Rad	Chrysene	218-01-9	12	11	1	92	µg/kg	370	370	20	81	0.40	63	95% KM (t) UCL	--
600-243_Shallow	non-Rad	Cobalt	7440-48-4	12	12	0	100	µg/kg	--	--	2,800	7,400	0.28	6,207	95% Student's-t UCL	--
600-243_Shallow	non-Rad	Copper	7440-50-8	12	12	0	100	µg/kg	--	--	14,300	71,500	0.48	53,981	95% Student's-t UCL	--
600-243_Shallow	non-Rad	Dibenzofuran	132-64-9	12	10	2	83	µg/kg	360	370	20	130	0.50	78	95% KM (t) UCL	--
600-243_Shallow	non-Rad	Di-n-butylphthalate	84-74-2	12	9	3	75	µg/kg	370	490	23	47	0.25	37	95% KM (t) UCL	Warning: There are only 9 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
600-243_Shallow	non-Rad	Fluoranthene	206-44-0	12	12	0	100	µg/kg	--	--	27	110	0.44	79	95% Student's-t UCL	--
600-243_Shallow	non-Rad	Indeno(1,2,3-cd)pyrene	193-39-5	12	1	11	8	µg/kg	360	500	28	28	--	28	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Indeno(1,2,3-cd)pyrene was not processed!
600-243_Shallow	non-Rad	Lead	7439-92-1	12	12	0	100	µg/kg	--	--	14,700	69,900	0.61	40,139	¿ Approximate Gamma I	--
600-243_Shallow	non-Rad	Manganese	7439-96-5	12	12	0	100	µg/kg	--	--	67,800	298,000	0.50	208,289	95% Student's-t UCL	--
600-243_Shallow	non-Rad	Molybdenum	7439-98-7	12	12	0	100	µg/kg	--	--	620	2,600	0.44	1,869	95% Student's-t UCL	--
600-243_Shallow	non-Rad	Naphthalene	91-20-3	12	12	0	100	µg/kg	--	--	20	524	1.1	204	¿ Approximate Gamma I	--
600-243_Shallow	non-Rad	Nickel	7440-02-0	12	12	0	100	µg/kg	--	--	10,300	33,500	0.42	21,395	¿ Approximate Gamma I	--
600-243_Shallow	non-Rad	Pyrene	129-00-0	12	11	1	92	µg/kg	370	370	23	86	0.38	70	95% KM (t) UCL	--
600-243_Shallow	non-Rad	Selenium	7782-49-2	12	11	1	92	µg/kg	1,300	1,300	1,800	11,000	0.62	5,709	95% KM (t) UCL	--
600-243_Shallow	non-Rad	Silver	7440-22-4	12	5	7	42	µg/kg	260	310	300	670	0.34	500	KM (Percentile Bootstra	Warning: There are only 5 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
600-243_Shallow	non-Rad	Total petroleum hydrocarbons - diesel range	TPHDIESEL	12	12	0	100	µg/kg	--	--	7,600	170,000	0.77	95,319	95% Student's-t UCL	--
600-243_Shallow	non-Rad	Total petroleum hydrocarbons - motor oil (high boiling)	TPH/OILH	12	12	0	100	µg/kg	--	--	41,000	620,000	0.69	334,524	95% Student's-t UCL	--

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
600-243_Shallow	non-Rad	Vanadium	7440-62-2	12	12	0	100	µg/kg	--	--	28,600	55,900	0.21	46,986	95% Student's-t UCL	--
600-243_Shallow	non-Rad	Zinc	7440-66-6	12	12	0	100	µg/kg	--	--	45,000	126,000	0.40	84,099	¿ Approximate Gamma l	--
600-259_Overburden	Rad	Cesium-137	10045-97-3	4	1	3	25	pCi/g	0.028	0.043	0.034	0.034	--	0.034	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Cesium-137 was not processed!
600-259_Shallow	Rad	Cesium-137	10045-97-3	4	1	3	25	pCi/g	0.022	0.033	0.068	0.068	--	0.068	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Cesium-137 was not processed!
600-259_Shallow_Focused	Rad	Cesium-137	10045-97-3	2	1	1	50	pCi/g	0.036	0.036	0.038	0.038	--	0.038	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
600-47_Shallow	non-Rad	Arsenic	7440-38-2	4	4	0	100	µg/kg	--	--	1,700	2,300	0.13	2,300	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Arsenic was not processed!
600-47_Shallow	non-Rad	Barium	7440-39-3	4	4	0	100	µg/kg	--	--	50,000	67,000	0.13	67,000	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Barium was not processed!
600-47_Shallow	non-Rad	Beryllium	7440-41-7	4	4	0	100	µg/kg	--	--	400	500	0.100	500	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Beryllium was not processed!
600-47_Shallow	non-Rad	Cadmium	7440-43-9	4	4	0	100	µg/kg	--	--	60	90	0.18	90	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Cadmium was not processed!
600-47_Shallow	non-Rad	Chromium	7440-47-3	4	4	0	100	µg/kg	--	--	4,200	5,500	0.11	5,500	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Chromium was not processed!
600-47_Shallow	non-Rad	Lead	7439-92-1	4	4	0	100	µg/kg	--	--	2,700	3,500	0.12	3,500	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Lead was not processed!
600-47_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	5	5	0	100	µg/kg	--	--	0.16	4,703	0.70	4,303	95% Student's-t UCL	Warning: There are only 5 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
600-47_Shallow	Rad	Uranium-233/234	U-233/234	4	4	0	100	pCi/g	--	--	0.60	1.4	0.33	1.4	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-233/234 was not processed!
600-47_Shallow	Rad	Uranium-238	U-238	4	4	0	100	pCi/g	--	--	0.71	1.6	0.39	1.6	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-238 was not processed!
618-1_Deep	non-Rad	Aluminum	7429-90-5	4	4	0	100	µg/kg	--	--	5.62E+06	6.37E+06	0.060	6.37E+06	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Aluminum was not processed!
618-1_Deep	non-Rad	Aroclor-1254	11097-69-1	4	4	0	100	µg/kg	--	--	130	1,760	0.74	1,760	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Aroclor-1254 was not processed!
618-1_Deep	non-Rad	Aroclor-1260	11096-82-5	4	4	0	100	µg/kg	--	--	68	294	0.64	294	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Aroclor-1260 was not processed!
618-1_Deep	non-Rad	Arsenic	7440-38-2	4	4	0	100	µg/kg	--	--	1,840	2,550	0.14	2,550	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Arsenic was not processed!
618-1_Deep	non-Rad	Barium	7440-39-3	4	4	0	100	µg/kg	--	--	81,600	299,000	0.46	299,000	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Barium was not processed!
618-1_Deep	non-Rad	Beryllium	7440-41-7	4	4	0	100	µg/kg	--	--	141	218	0.18	218	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Beryllium was not processed!
618-1_Deep	non-Rad	Boron	7440-42-8	4	4	0	100	µg/kg	--	--	1,060	1,360	0.11	1,360	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Boron was not processed!
618-1_Deep	non-Rad	Cadmium	7440-43-9	4	4	0	100	µg/kg	--	--	92	263	0.53	263	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Cadmium was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-1_Deep	Rad	Cesium-137	10045-97-3	4	1	3	25	pCi/g	0.050	0.13	0.46	0.46	--	0.46	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Cesium-137 was not processed!
618-1_Deep	non-Rad	Chromium	7440-47-3	4	4	0	100	µg/kg	--	--	6,130	7,740	0.10	7,740	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Chromium was not processed!
618-1_Deep	non-Rad	Cobalt	7440-48-4	4	4	0	100	µg/kg	--	--	7,250	8,600	0.090	8,600	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Cobalt was not processed!
618-1_Deep	non-Rad	Copper	7440-50-8	4	4	0	100	µg/kg	--	--	13,600	46,300	0.64	46,300	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Copper was not processed!
618-1_Deep	non-Rad	Fluoride	16984-48-8	4	4	0	100	µg/kg	--	--	300	2,800	1.2	2,800	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Fluoride was not processed!
618-1_Deep	non-Rad	Iron	7439-89-6	4	4	0	100	µg/kg	--	--	2.19E+07	2.47E+07	0.057	2.47E+07	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Iron was not processed!
618-1_Deep	non-Rad	Lead	7439-92-1	4	4	0	100	µg/kg	--	--	2,840	58,400	1.6	58,400	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Lead was not processed!
618-1_Deep	non-Rad	Lithium	7439-93-2	4	4	0	100	µg/kg	--	--	3,950	5,980	0.19	5,980	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Lithium was not processed!
618-1_Deep	non-Rad	Manganese	7439-96-5	4	4	0	100	µg/kg	--	--	291,000	352,000	0.083	352,000	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Manganese was not processed!
618-1_Deep	non-Rad	Mercury	7439-97-6	4	4	0	100	µg/kg	--	--	23	1,180	1.6	1,180	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Mercury was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-1_Deep	non-Rad	Molybdenum	7439-98-7	4	4	0	100	µg/kg	--	--	298	493	0.23	493	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Molybdenum was not processed!
618-1_Deep	non-Rad	Nickel	7440-02-0	4	4	0	100	µg/kg	--	--	8,450	17,600	0.37	17,600	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Nickel was not processed!
618-1_Deep	non-Rad	Nitrate	14797-55-8	4	1	3	25	µg/kg	2,500	2,700	1,700	1,700	--	1,700	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Nitrate was not processed!
618-1_Deep	non-Rad	Nitrogen in Nitrite and Nitrate	NO2+NO3-N	4	4	0	100	µg/kg	--	--	160	220	0.15	220	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Nitrogen in Nitrite and Nitrate was not processed!
618-1_Deep	non-Rad	Total_U_Isotopes	Total_U_Isotopes	5	4	1	80	µg/kg	57	57	8,454	96,527	0.96	89,439	KM (Percentile Bootstra	Warning: There are only 4 Distinct Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
618-1_Deep	non-Rad	Uranium	7440-61-1	4	2	2	50	µg/kg	16,500	16,700	34,100	37,400	0.065	37,400	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium was not processed!
618-1_Deep	Rad	Uranium-233/234	U-233/234	4	4	0	100	pCi/g	--	--	3.1	33	0.93	33	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-233/234 was not processed!
618-1_Deep	Rad	Uranium-235	15117-96-1	4	2	2	50	pCi/g	0.12	0.22	2.3	2.7	0.14	2.7	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-235 was not processed!
618-1_Deep	Rad	Uranium-238	U-238	4	4	0	100	pCi/g	--	--	2.8	32	0.96	32	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-238 was not processed!
618-1_Deep	non-Rad	Vanadium	7440-62-2	4	4	0	100	µg/kg	--	--	56,000	73,000	0.13	73,000	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Vanadium was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-1_Deep	non-Rad	Zinc	7440-66-6	4	4	0	100	µg/kg	--	--	47,000	134,000	0.56	134,000	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Zinc was not processed!
618-1_Deep_Focused	non-Rad	Aluminum	7429-90-5	9	9	0	100	µg/kg	--	--	3.31E+06	8.57E+06	0.35	8.57E+06	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Antimony	7440-36-0	9	2	7	22	µg/kg	492	640	299	407	0.22	407	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Aroclor-1254	11097-69-1	9	9	0	100	µg/kg	--	--	13	1.24E+06	3.0	1.24E+06	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Aroclor-1260	11096-82-5	9	5	4	56	µg/kg	14	150,000	5.3	99	0.70	99	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Arsenic	7440-38-2	9	9	0	100	µg/kg	--	--	1,320	4,580	0.49	4,580	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Barium	7440-39-3	9	9	0	100	µg/kg	--	--	58,900	1.87E+06	1.5	1.87E+06	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Beryllium	7440-41-7	9	9	0	100	µg/kg	--	--	84	323	0.50	323	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Boron	7440-42-8	9	8	1	89	µg/kg	2,130	2,130	1,010	6,620	0.92	6,620	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Cadmium	7440-43-9	9	8	1	89	µg/kg	186	186	47	1,030	1.3	1,030	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	Rad	Cesium-137	10045-97-3	9	3	6	33	pCi/g	0.022	0.16	0.54	6.5	0.88	6.5	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Chromium	7440-47-3	9	9	0	100	µg/kg	--	--	2,870	18,900	0.65	18,900	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Cobalt	7440-48-4	9	9	0	100	µg/kg	--	--	3,260	8,920	0.31	8,920	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Copper	7440-50-8	9	9	0	100	µg/kg	--	--	11,500	68,700	0.76	68,700	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Fluoride	16984-48-8	9	3	6	33	µg/kg	2,300	2,900	400	3,300	0.74	3,300	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Iron	7439-89-6	9	9	0	100	µg/kg	--	--	1.50E+07	2.41E+07	0.14	2.41E+07	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Lead	7439-92-1	9	9	0	100	µg/kg	--	--	1,820	333,000	1.6	333,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Lithium	7439-93-2	9	9	0	100	µg/kg	--	--	2,070	8,450	0.58	8,450	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Manganese	7439-96-5	9	9	0	100	µg/kg	--	--	139,000	351,000	0.33	351,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Mercury	7439-97-6	9	7	2	78	µg/kg	24	26	27	8,940	1.8	8,940	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Molybdenum	7439-98-7	9	9	0	100	µg/kg	--	--	267	2,140	0.97	2,140	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Nickel	7440-02-0	9	9	0	100	µg/kg	--	--	4,830	13,700	0.39	13,700	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Nitrate	14797-55-8	9	3	6	33	µg/kg	2,300	3,000	1,100	11,900	1.2	11,900	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Nitrogen in Nitrite and Nitrate	NO2+NO3-N	9	8	1	89	µg/kg	200	200	120	1,560	1.1	1,560	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-1_Deep_Focused	non-Rad	Silver	7440-22-4	9	4	5	44	µg/kg	164	213	180	1,290	0.82	1,290	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	9	9	0	100	µg/kg	--	--	6,877	196,154	1.4	196,154	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Uranium	7440-61-1	9	5	4	56	µg/kg	17,600	21,300	5,170	209,000	1.4	209,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	Rad	Uranium-233/234	U-233/234	9	9	0	100	pCi/g	--	--	2.8	70	1.4	70	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	Rad	Uranium-235	15117-96-1	9	5	4	56	pCi/g	0.082	0.43	0.23	4.5	1.1	4.5	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	Rad	Uranium-238	U-238	9	9	0	100	pCi/g	--	--	2.3	65	1.4	65	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Vanadium	7440-62-2	9	9	0	100	µg/kg	--	--	42,600	70,900	0.18	70,900	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Deep_Focused	non-Rad	Zinc	7440-66-6	9	9	0	100	µg/kg	--	--	28,500	82,000	0.34	82,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow	non-Rad	Aluminum	7429-90-5	4	4	0	100	µg/kg	--	--	4.85E+06	6.21E+06	0.11	6.21E+06	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Aluminum was not processed!
618-1_Shallow	non-Rad	Aroclor-1254	11097-69-1	4	4	0	100	µg/kg	--	--	7.8	264	1.4	264	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Aroclor-1254 was not processed!
618-1_Shallow	non-Rad	Aroclor-1260	11096-82-5	4	2	2	50	µg/kg	14	14	6.6	54	1.1	54	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Aroclor-1260 was not processed!
618-1_Shallow	non-Rad	Arsenic	7440-38-2	4	4	0	100	µg/kg	--	--	1,840	2,280	0.091	2,280	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Arsenic was not processed!
618-1_Shallow	non-Rad	Barium	7440-39-3	4	4	0	100	µg/kg	--	--	56,500	97,200	0.24	97,200	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Barium was not processed!
618-1_Shallow	non-Rad	Beryllium	7440-41-7	4	4	0	100	µg/kg	--	--	146	188	0.11	188	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Beryllium was not processed!
618-1_Shallow	non-Rad	Boron	7440-42-8	4	4	0	100	µg/kg	--	--	545	1,190	0.30	1,190	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Boron was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-1_Shallow	non-Rad	Cadmium	7440-43-9	4	4	0	100	µg/kg	--	--	57	68	0.086	68	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Cadmium was not processed!
618-1_Shallow	non-Rad	Chromium	7440-47-3	4	4	0	100	µg/kg	--	--	5,820	7,930	0.14	7,930	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Chromium was not processed!
618-1_Shallow	non-Rad	Cobalt	7440-48-4	4	4	0	100	µg/kg	--	--	5,250	6,360	0.082	6,360	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Cobalt was not processed!
618-1_Shallow	non-Rad	Copper	7440-50-8	4	4	0	100	µg/kg	--	--	9,160	11,400	0.097	11,400	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Copper was not processed!
618-1_Shallow	non-Rad	Fluoride	16984-48-8	4	1	3	25	µg/kg	2,500	2,600	400	400	--	400	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Fluoride was not processed!
618-1_Shallow	non-Rad	Iron	7439-89-6	4	4	0	100	µg/kg	--	--	1.72E+07	2.05E+07	0.085	2.05E+07	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Iron was not processed!
618-1_Shallow	non-Rad	Lead	7439-92-1	4	4	0	100	µg/kg	--	--	2,380	3,100	0.13	3,100	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Lead was not processed!
618-1_Shallow	non-Rad	Lithium	7439-93-2	4	4	0	100	µg/kg	--	--	3,770	6,380	0.24	6,380	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Lithium was not processed!
618-1_Shallow	non-Rad	Manganese	7439-96-5	4	4	0	100	µg/kg	--	--	241,000	300,000	0.096	300,000	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Manganese was not processed!
618-1_Shallow	non-Rad	Mercury	7439-97-6	4	3	1	75	µg/kg	31	31	16	31	0.32	31	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Mercury was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-1_Shallow	non-Rad	Molybdenum	7439-98-7	4	4	0	100	µg/kg	--	--	254	336	0.13	336	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Molybdenum was not processed!
618-1_Shallow	non-Rad	Nickel	7440-02-0	4	4	0	100	µg/kg	--	--	6,850	8,150	0.072	8,150	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Nickel was not processed!
618-1_Shallow	non-Rad	Nitrate	14797-55-8	4	2	2	50	µg/kg	2,500	2,600	1,100	1,600	0.26	1,600	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Nitrate was not processed!
618-1_Shallow	non-Rad	Nitrogen in Nitrite and Nitrate	NO2+NO3-N	4	4	0	100	µg/kg	--	--	140	300	0.36	300	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Nitrogen in Nitrite and Nitrate was not processed!
618-1_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	5	5	0	100	µg/kg	--	--	0.31	4,495	0.64	4,224	95% Student's-t UCL	Warning: There are only 5 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
618-1_Shallow	Rad	Uranium-233/234	U-233/234	4	4	0	100	pCi/g	--	--	0.81	1.9	0.36	1.9	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-233/234 was not processed!
618-1_Shallow	Rad	Uranium-238	U-238	4	4	0	100	pCi/g	--	--	0.81	1.5	0.29	1.5	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-238 was not processed!
618-1_Shallow	non-Rad	Vanadium	7440-62-2	4	4	0	100	µg/kg	--	--	44,100	56,300	0.11	56,300	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Vanadium was not processed!
618-1_Shallow	non-Rad	Zinc	7440-66-6	4	4	0	100	µg/kg	--	--	35,200	42,100	0.084	42,100	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Zinc was not processed!
618-1_Shallow_Focused	non-Rad	Aluminum	7429-90-5	12	12	0	100	µg/kg	--	--	5.38E+06	1.22E+07	0.29	1.22E+07	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Antimony	7440-36-0	12	1	11	8	µg/kg	423	657	455	455	--	455	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Aroclor-1248	12672-29-6	12	1	11	8	µg/kg	14	143	35	35	--	35	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-1_Shallow_Focused	non-Rad	Aroclor-1254	11097-69-1	12	6	6	50	µg/kg	14	16	13	981	1.4	981	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Aroclor-1260	11096-82-5	12	4	8	33	µg/kg	14	143	4.2	56	0.77	56	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Arsenic	7440-38-2	12	12	0	100	µg/kg	--	--	1,950	6,090	0.44	6,090	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Barium	7440-39-3	12	12	0	100	µg/kg	--	--	58,200	102,000	0.17	102,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Beryllium	7440-41-7	12	12	0	100	µg/kg	--	--	164	371	0.28	371	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Boron	7440-42-8	12	12	0	100	µg/kg	--	--	504	3,740	0.76	3,740	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Cadmium	7440-43-9	12	12	0	100	µg/kg	--	--	49	266	0.68	266	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Chromium	7440-47-3	12	12	0	100	µg/kg	--	--	6,900	19,500	0.38	19,500	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Cobalt	7440-48-4	12	12	0	100	µg/kg	--	--	4,590	8,600	0.19	8,600	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Copper	7440-50-8	12	12	0	100	µg/kg	--	--	8,340	23,800	0.37	23,800	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Fluoride	16984-48-8	12	3	9	25	µg/kg	2,400	2,900	400	900	0.39	900	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Iron	7439-89-6	12	12	0	100	µg/kg	--	--	1.48E+07	2.28E+07	0.15	2.28E+07	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Lead	7439-92-1	12	12	0	100	µg/kg	--	--	2,420	6,210	0.33	6,210	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Lithium	7439-93-2	12	12	0	100	µg/kg	--	--	4,870	13,300	0.38	13,300	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Manganese	7439-96-5	12	12	0	100	µg/kg	--	--	219,000	403,000	0.18	403,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Mercury	7439-97-6	12	4	8	33	µg/kg	26	29	21	198	1.3	198	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Molybdenum	7439-98-7	12	12	0	100	µg/kg	--	--	208	356	0.20	356	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Nickel	7440-02-0	12	12	0	100	µg/kg	--	--	6,480	16,800	0.31	16,800	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Nitrate	14797-55-8	12	3	9	25	µg/kg	2,400	2,900	1,000	3,800	0.81	3,800	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Nitrogen in Nitrite and Nitrate	NO2+NO3-N	12	10	2	83	µg/kg	190	200	120	260	0.30	260	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Silver	7440-22-4	12	1	11	8	µg/kg	141	219	1,120	1,120	--	1,120	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	12	12	0	100	µg/kg	--	--	2,224	24,957	1.2	24,957	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Uranium	7440-61-1	12	1	11	8	µg/kg	14,100	21,900	7,080	7,080	--	7,080	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	Rad	Uranium-233/234	U-233/234	12	12	0	100	pCi/g	--	--	0.66	11	1.4	11	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	Rad	Uranium-235	15117-96-1	12	5	7	42	pCi/g	0.031	0.14	0.047	0.99	1.7	0.99	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	Rad	Uranium-238	U-238	12	12	0	100	pCi/g	--	--	0.75	8.2	1.2	8.2	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-1_Shallow_Focused	non-Rad	Vanadium	7440-62-2	12	12	0	100	µg/kg	--	--	37,200	64,700	0.16	64,700	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-1_Shallow_Focused	non-Rad	Zinc	7440-66-6	12	12	0	100	µg/kg	--	--	31,000	68,100	0.27	68,100	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-12_Shallow	non-Rad	Arsenic	7440-38-2	8	4	4	50	µg/kg	7,400	14,800	7,800	9,400	0.091	8,557	95% KM (% Bootstrap) U	Warning: There are only 4 Distinct Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
618-12_Shallow	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	1	1	0	100	µg/kg	--	--	63	63	--	63	Maximum Detect	Warning: This data set only has 1 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Bis(2-ethylhexyl) phthalate was not processed!
618-12_Shallow	non-Rad	Butylbenzylphthalate	85-68-7	1	1	0	100	µg/kg	--	--	60	60	--	60	Maximum Detect	Warning: This data set only has 1 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Butylbenzylphthalate was not processed!
618-12_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	8	8	0	100	µg/kg	--	--	5,507	52,405	0.73	32,092	95% Student's-t UCL	Warning: There are only 8 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
618-12_Shallow	Rad	Uranium-235	15117-96-1	8	8	0	100	pCi/g	--	--	0.12	0.68	0.70	0.47	95% Student's-t UCL	Warning: There are only 8 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
618-12_Shallow	Rad	Uranium-238	U-238	8	8	0	100	pCi/g	--	--	1.8	18	0.73	11	95% Student's-t UCL	Warning: There are only 8 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
618-13_Shallow	non-Rad	Acetone	67-64-1	4	3	1	75	µg/kg	12	12	6.6	8.6	0.13	8.6	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Acetone was not processed!
618-13_Shallow	non-Rad	Aluminum	7429-90-5	4	4	0	100	µg/kg	--	--	4.14E+06	6.34E+06	0.17	6.34E+06	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Aluminum was not processed!
618-13_Shallow	non-Rad	Antimony	7440-36-0	4	2	2	50	µg/kg	396	441	312	312	0	312	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Antimony was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-13_Shallow	non-Rad	Arsenic	7440-38-2	4	4	0	100	µg/kg	--	--	2,280	3,500	0.17	3,500	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Arsenic was not processed!
618-13_Shallow	non-Rad	Barium	7440-39-3	4	4	0	100	µg/kg	--	--	42,000	74,000	0.23	74,000	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Barium was not processed!
618-13_Shallow	non-Rad	Beryllium	7440-41-7	4	4	0	100	µg/kg	--	--	144	212	0.16	212	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Beryllium was not processed!
618-13_Shallow	non-Rad	Boron	7440-42-8	4	4	0	100	µg/kg	--	--	817	1,050	0.12	1,050	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Boron was not processed!
618-13_Shallow	non-Rad	Cadmium	7440-43-9	4	4	0	100	µg/kg	--	--	41	63	0.20	63	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Cadmium was not processed!
618-13_Shallow	Rad	Cesium-137	10045-97-3	4	1	3	25	pCi/g	0.018	0.038	0.038	0.038	--	0.038	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Cesium-137 was not processed!
618-13_Shallow	non-Rad	Chromium	7440-47-3	4	4	0	100	µg/kg	--	--	7,060	10,700	0.17	10,700	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Chromium was not processed!
618-13_Shallow	non-Rad	Cobalt	7440-48-4	4	4	0	100	µg/kg	--	--	4,350	6,290	0.16	6,290	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Cobalt was not processed!
618-13_Shallow	non-Rad	Copper	7440-50-8	4	4	0	100	µg/kg	--	--	8,300	11,500	0.14	11,500	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Copper was not processed!
618-13_Shallow	non-Rad	Iron	7439-89-6	4	4	0	100	µg/kg	--	--	1.39E+07	2.01E+07	0.16	2.01E+07	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Iron was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-13_Shallow	non-Rad	Lead	7439-92-1	4	4	0	100	µg/kg	--	--	2,940	3,620	0.10	3,620	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Lead was not processed!
618-13_Shallow	non-Rad	Manganese	7439-96-5	4	4	0	100	µg/kg	--	--	199,000	344,000	0.22	344,000	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Manganese was not processed!
618-13_Shallow	non-Rad	Methylene chloride	75-09-2	4	4	0	100	µg/kg	--	--	3.8	5.1	0.14	5.1	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Methylene chloride was not processed!
618-13_Shallow	non-Rad	Molybdenum	7439-98-7	4	4	0	100	µg/kg	--	--	241	420	0.24	420	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Molybdenum was not processed!
618-13_Shallow	non-Rad	Nickel	7440-02-0	4	4	0	100	µg/kg	--	--	7,910	12,400	0.19	12,400	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Nickel was not processed!
618-13_Shallow	non-Rad	Tin	7440-31-5	4	3	1	75	µg/kg	6,670	6,670	766	1,050	0.17	1,050	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Tin was not processed!
618-13_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	5	4	1	80	µg/kg	--	--	1,866	5,061	0.56	5,061	Maximum Detect	Recommended UCL Exceeds Maximum Concentration: EPC defaults to Maximum Concentration.
618-13_Shallow	non-Rad	Uranium	7440-61-1	4	2	2	50	µg/kg	14,700	16,600	1,350	1,750	0.18	1,750	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium was not processed!
618-13_Shallow	Rad	Uranium-233/234	U-233/234	4	4	0	100	pCi/g	--	--	0.45	1.9	0.73	1.9	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-233/234 was not processed!
618-13_Shallow	Rad	Uranium-238	U-238	4	4	0	100	pCi/g	--	--	0.63	1.7	0.56	1.7	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-238 was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-13_Shallow	non-Rad	Vanadium	7440-62-2	4	4	0	100	µg/kg	--	--	37,900	55,800	0.17	55,800	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Vanadium was not processed!
618-13_Shallow	non-Rad	Zinc	7440-66-6	4	4	0	100	µg/kg	--	--	31,500	41,400	0.12	41,400	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Zinc was not processed!
618-13_Shallow_Focused	non-Rad	Acetone	67-64-1	2	1	1	50	µg/kg	11	11	5.9	5.9	--	5.9	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Aluminum	7429-90-5	2	2	0	100	µg/kg	--	--	4.90E+06	5.22E+06	0.045	5.22E+06	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Antimony	7440-36-0	2	1	1	50	µg/kg	397	397	233	233	--	233	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Arsenic	7440-38-2	2	2	0	100	µg/kg	--	--	2,610	3,390	0.18	3,390	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Barium	7440-39-3	2	2	0	100	µg/kg	--	--	56,000	57,700	0.021	57,700	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Beryllium	7440-41-7	2	2	0	100	µg/kg	--	--	160	184	0.099	184	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Boron	7440-42-8	2	2	0	100	µg/kg	--	--	782	960	0.14	960	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Cadmium	7440-43-9	2	2	0	100	µg/kg	--	--	43	47	0.063	47	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Chromium	7440-47-3	2	2	0	100	µg/kg	--	--	8,250	8,740	0.041	8,740	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Cobalt	7440-48-4	2	2	0	100	µg/kg	--	--	5,070	5,710	0.084	5,710	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Copper	7440-50-8	2	2	0	100	µg/kg	--	--	9,240	10,100	0.063	10,100	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Hexavalent Chromium	18540-29-9	2	1	1	50	µg/kg	200	200	150	150	--	150	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Iron	7439-89-6	2	2	0	100	µg/kg	--	--	1.70E+07	1.79E+07	0.036	1.79E+07	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Lead	7439-92-1	2	2	0	100	µg/kg	--	--	3,340	4,940	0.27	4,940	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Manganese	7439-96-5	2	2	0	100	µg/kg	--	--	265,000	268,000	0.0080	268,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Methylene chloride	75-09-2	2	2	0	100	µg/kg	--	--	4.8	5.0	0.040	5.0	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Molybdenum	7439-98-7	2	2	0	100	µg/kg	--	--	286	297	0.027	297	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Nickel	7440-02-0	2	2	0	100	µg/kg	--	--	8,230	10,000	0.14	10,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Tin	7440-31-5	2	1	1	50	µg/kg	7,080	7,080	745	745	--	745	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	2	2	0	100	µg/kg	--	--	2,036	2,855	0.24	2,855	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Uranium	7440-61-1	2	1	1	50	µg/kg	13,200	13,200	1,500	1,500	--	1,500	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-13_Shallow_Focused	Rad	Uranium-233/234	U-233/234	2	2	0	100	pCi/g	--	--	0.96	1.1	0.12	1.1	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	Rad	Uranium-238	U-238	2	2	0	100	pCi/g	--	--	0.68	0.96	0.24	0.96	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Vanadium	7440-62-2	2	2	0	100	µg/kg	--	--	46,900	48,600	0.025	48,600	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-13_Shallow_Focused	non-Rad	Zinc	7440-66-6	2	2	0	100	µg/kg	--	--	36,800	37,100	0.0057	37,100	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep	Rad	Americium-241	14596-10-2	4	4	0	100	pCi/g	--	--	0.31	7.9	0.80	7.9	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Americium-241 was not processed!
618-2_Deep	non-Rad	Arsenic	7440-38-2	4	2	2	50	µg/kg	1,100	1,100	1,400	1,500	0.049	1,500	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Arsenic was not processed!
618-2_Deep	non-Rad	Barium	7440-39-3	4	4	0	100	µg/kg	--	--	58,500	83,300	0.17	83,300	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Barium was not processed!
618-2_Deep	Rad	Cesium-137	10045-97-3	4	4	0	100	pCi/g	--	--	0.059	1.0	0.76	1.0	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Cesium-137 was not processed!
618-2_Deep	non-Rad	Chromium	7440-47-3	4	4	0	100	µg/kg	--	--	3,700	6,700	0.28	6,700	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Chromium was not processed!
618-2_Deep	non-Rad	Lead	7439-92-1	4	4	0	100	µg/kg	--	--	2,700	6,600	0.43	6,600	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Lead was not processed!
618-2_Deep	Rad	Plutonium-238	13981-16-3	4	1	3	25	pCi/g	0.098	0.42	1.5	1.5	--	1.5	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Plutonium-238 was not processed!
618-2_Deep	Rad	Plutonium-239/240	PU-239/240	4	4	0	100	pCi/g	--	--	2.2	91	0.88	91	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Plutonium-239/240 was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-2_Deep	Rad	Plutonium-241	14119-32-5	4	3	1	75	pCi/g	7.1	7.1	21	42	0.35	42	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Plutonium-241 was not processed!
618-2_Deep	non-Rad	Selenium	7782-49-2	4	1	3	25	µg/kg	750	760	780	780	--	780	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Selenium was not processed!
618-2_Deep	non-Rad	Tin	7440-31-5	4	4	0	100	µg/kg	--	--	2,000	2,900	0.16	2,900	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Tin was not processed!
618-2_Deep	Rad	Total beta radiostrontium	SR-RAD	4	3	1	75	pCi/g	0.099	0.099	1.8	12	1.1	12	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Total beta radiostrontium was not processed!
618-2_Deep	non-Rad	Total_U_Isotopes	Total_U_Isotopes	4	4	0	100	µg/kg	--	--	8,544	491,176	1.7	491,176	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Total_U_Isotopes was not processed!
618-2_Deep	non-Rad	Uranium	7440-61-1	4	4	0	100	µg/kg	--	--	4,540	501,000	1.7	501,000	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium was not processed!
618-2_Deep	Rad	Uranium-233/234	U-233/234	4	4	0	100	pCi/g	--	--	3.3	161	1.7	161	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-233/234 was not processed!
618-2_Deep	Rad	Uranium-235	15117-96-1	4	1	3	25	pCi/g	0.10	3.4	0.78	0.78	--	0.78	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-235 was not processed!
618-2_Deep	Rad	Uranium-238	U-238	4	4	0	100	pCi/g	--	--	2.9	165	1.7	165	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-238 was not processed!
618-2_Deep_Focused	Rad	Americium-241	14596-10-2	9	6	3	67	pCi/g	-3.00E-03	0.086	0.044	9.2	1.3	9.2	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	non-Rad	Aroclor-1254	11097-69-1	1	1	0	100	µg/kg	--	--	6.9	6.9	--	6.9	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	non-Rad	Arsenic	7440-38-2	9	9	0	100	µg/kg	--	--	1,400	3,300	0.31	3,300	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-2_Deep_Focused	non-Rad	Barium	7440-39-3	9	9	0	100	µg/kg	--	--	56,100	109,000	0.28	109,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	1	1	0	100	µg/kg	--	--	27	27	--	27	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	non-Rad	Cadmium	7440-43-9	9	2	7	22	µg/kg	90	90	160	200	0.16	200	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	Rad	Cesium-137	10045-97-3	9	6	3	67	pCi/g	0.018	0.061	0.069	1.1	1.2	1.1	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	non-Rad	Chromium	7440-47-3	9	9	0	100	µg/kg	--	--	3,200	10,400	0.45	10,400	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	non-Rad	Di-n-butylphthalate	84-74-2	1	1	0	100	µg/kg	--	--	18	18	--	18	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	non-Rad	Lead	7439-92-1	9	9	0	100	µg/kg	--	--	1,600	6,800	0.60	6,800	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	Rad	Plutonium-238	13981-16-3	9	2	7	22	pCi/g	-8.10E-02	0.16	0.53	1.6	0.70	1.6	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	Rad	Plutonium-239/240	PU-239/240	9	5	4	56	pCi/g	0.24	0.24	1.1	92	1.1	92	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	Rad	Plutonium-241	14119-32-5	9	1	8	11	pCi/g	-6.99E+00	20	33	33	--	33	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	non-Rad	Selenium	7782-49-2	9	3	6	33	µg/kg	740	780	820	1,200	0.20	1,200	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	non-Rad	Silver	7440-22-4	9	2	7	22	µg/kg	310	340	320	600	0.43	600	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	non-Rad	Tin	7440-31-5	9	4	5	44	µg/kg	1,000	1,100	1,200	42,500	1.7	42,500	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	Rad	Total beta radiostrontium	SR-RAD	9	5	4	56	pCi/g	0.0060	0.062	0.38	7.2	1.0	7.2	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	9	9	0	100	µg/kg	--	--	1,471	150,259	1.3	150,259	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	non-Rad	Uranium	7440-61-1	9	9	0	100	µg/kg	--	--	878	148,000	1.5	148,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	Rad	Uranium-233/234	U-233/234	9	9	0	100	pCi/g	--	--	0.50	48	1.3	48	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	Rad	Uranium-235	15117-96-1	9	7	2	78	pCi/g	0.033	0.033	0.29	2.4	0.98	2.4	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Deep_Focused	Rad	Uranium-238	U-238	9	9	0	100	pCi/g	--	--	0.49	50	1.3	50	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-2_Overburden	non-Rad	Arsenic	7440-38-2	4	4	0	100	µg/kg	--	--	1,500	2,700	0.26	2,700	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Arsenic was not processed!
618-2_Overburden	non-Rad	Barium	7440-39-3	4	4	0	100	µg/kg	--	--	62,900	74,700	0.085	74,700	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Barium was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-2_Overburden	Rad	Cesium-137	10045-97-3	4	3	1	75	pCi/g	0.036	0.036	0.040	0.058	0.19	0.058	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Cesium-137 was not processed!
618-2_Overburden	non-Rad	Chromium	7440-47-3	4	4	0	100	µg/kg	--	--	5,100	6,600	0.13	6,600	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Chromium was not processed!
618-2_Overburden	non-Rad	Lead	7439-92-1	4	4	0	100	µg/kg	--	--	3,400	4,300	0.11	4,300	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Lead was not processed!
618-2_Overburden	non-Rad	Selenium	7782-49-2	4	1	3	25	µg/kg	750	820	1,000	1,000	--	1,000	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Selenium was not processed!
618-2_Overburden	non-Rad	Tin	7440-31-5	4	4	0	100	µg/kg	--	--	1,600	2,700	0.22	2,700	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Tin was not processed!
618-2_Overburden	non-Rad	Total_U_Isotopes	Total_U_Isotopes	5	5	0	100	µg/kg	--	--	0.10	1,759	0.60	1,749	95% Student's-t UCL	Warning: There are only 5 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
618-2_Overburden	non-Rad	Uranium	7440-61-1	4	4	0	100	µg/kg	--	--	872	1,140	0.12	1,140	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium was not processed!
618-2_Overburden	Rad	Uranium-233/234	U-233/234	4	4	0	100	pCi/g	--	--	0.44	0.64	0.16	0.64	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-233/234 was not processed!
618-2_Overburden	Rad	Uranium-238	U-238	4	4	0	100	pCi/g	--	--	0.36	0.59	0.21	0.59	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-238 was not processed!
618-2_Shallow	Rad	Americium-241	14596-10-2	4	1	3	25	pCi/g	-3.70E-02	0.056	0.81	0.81	--	0.81	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Americium-241 was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-2_Shallow	non-Rad	Arsenic	7440-38-2	4	4	0	100	µg/kg	--	--	1,700	1,900	0.045	1,900	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Arsenic was not processed!
618-2_Shallow	non-Rad	Barium	7440-39-3	4	4	0	100	µg/kg	--	--	58,500	79,100	0.12	79,100	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Barium was not processed!
618-2_Shallow	Rad	Cesium-137	10045-97-3	4	2	2	50	pCi/g	0.021	0.048	0.040	2.2	1.4	2.2	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Cesium-137 was not processed!
618-2_Shallow	non-Rad	Chromium	7440-47-3	4	4	0	100	µg/kg	--	--	4,200	7,100	0.24	7,100	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Chromium was not processed!
618-2_Shallow	non-Rad	Lead	7439-92-1	4	4	0	100	µg/kg	--	--	3,300	5,600	0.26	5,600	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Lead was not processed!
618-2_Shallow	Rad	Plutonium-239/240	PU-239/240	4	2	2	50	pCi/g	0.069	0.36	0.82	7.7	1.1	7.7	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Plutonium-239/240 was not processed!
618-2_Shallow	non-Rad	Selenium	7782-49-2	4	1	3	25	µg/kg	740	750	760	760	--	760	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Selenium was not processed!
618-2_Shallow	non-Rad	Tin	7440-31-5	4	4	0	100	µg/kg	--	--	2,000	2,400	0.079	2,400	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Tin was not processed!
618-2_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	5	5	0	100	µg/kg	--	--	99	6,549	0.55	5,852	95% Hall's Bootstrap UC	Warning: There are only 5 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
618-2_Shallow	non-Rad	Uranium	7440-61-1	4	4	0	100	µg/kg	--	--	3,350	4,530	0.14	4,530	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-2_Shallow	Rad	Uranium-233/234	U-233/234	4	4	0	100	pCi/g	--	--	1.6	2.2	0.15	2.2	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-233/234 was not processed!
618-2_Shallow	Rad	Uranium-235	15117-96-1	4	1	3	25	pCi/g	0.033	0.19	0.21	0.21	--	0.21	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-235 was not processed!
618-2_Shallow	Rad	Uranium-238	U-238	4	4	0	100	pCi/g	--	--	1.9	2.2	0.079	2.2	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-238 was not processed!
618-2_Staging Pile	Rad	Americium-241	14596-10-2	16	1	15	6	pCi/g	-2.00E-02	0.061	0.82	0.82	--	0.82	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Americium-241 was not processed!
618-2_Staging Pile	non-Rad	Arsenic	7440-38-2	16	6	10	38	µg/kg	2,800	2,900	2,800	3,400	0.065	3,063	KM (Percentile Bootstra	Warning: There are only 4 Distinct Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
618-2_Staging Pile	non-Rad	Barium	7440-39-3	16	15	1	94	µg/kg	57,400	57,400	56,800	82,100	0.11	67,690	95% KM (t) UCL	--
618-2_Staging Pile	Rad	Cesium-137	10045-97-3	16	1	15	6	pCi/g	0.020	0.055	0.095	0.095	--	0.095	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Cesium-137 was not processed!
618-2_Staging Pile	non-Rad	Chromium	7440-47-3	16	16	0	100	µg/kg	--	--	4,500	7,800	0.13	6,424	95% Student's-t UCL	--
618-2_Staging Pile	non-Rad	Lead	7439-92-1	16	16	0	100	µg/kg	--	--	2,800	5,100	0.15	4,011	95% Student's-t UCL	--
618-2_Staging Pile	Rad	Plutonium-239/240	PU-239/240	16	3	13	19	pCi/g	--	0.19	0.63	10	1.4	10	KM (Percentile Bootstra	Warning: There are only 3 Distinct Detected Values in this data set The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods. Those methods will return a 'N/A' value on your output display!
618-2_Staging Pile	non-Rad	Total_U_Isotopes	Total_U_Isotopes	17	17	0	100	µg/kg	--	--	0.14	11,495	0.86	9,201	Chebyshev (Mean, Sd) UCL	

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-2_Staging Pile	Rad	Tritium	10028-17-8	16	1	15	6	pCi/g	-1.28E-01	1.3	2.3	2.3	--	2.3	Maximum Detect	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV). The data set for variable Tritium was not processed!
618-2_Staging Pile	non-Rad	Uranium	7440-61-1	16	16	0	100	µg/kg	--	--	989	11,200	1.1	5,022	Chebyshev (Mean, Sd)	--
618-2_Staging Pile	Rad	Uranium-233/234	U-233/234	16	16	0	100	pCi/g	--	--	0.47	4.1	0.82	2.0	Chebyshev (Mean, Sd)	--
618-2_Staging Pile	Rad	Uranium-235	15117-96-1	16	9	7	56	pCi/g	0.090	0.090	0.051	0.27	0.58	0.12	KM (Percentile Bootstra	Warning: There are only 9 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
618-2_Staging Pile	Rad	Uranium-238	U-238	16	16	0	100	pCi/g	--	--	0.47	3.8	0.80	2.0	Chebyshev (Mean, Sd)	--
618-3_Shallow	non-Rad	Arsenic	7440-38-2	4	4	0	100	µg/kg	--	--	2,500	2,800	0.049	2,800	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Arsenic was not processed!
618-3_Shallow	non-Rad	Barium	7440-39-3	4	4	0	100	µg/kg	--	--	62,700	76,500	0.093	76,500	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Barium was not processed!
618-3_Shallow	non-Rad	Chromium	7440-47-3	4	4	0	100	µg/kg	--	--	8,400	9,700	0.060	9,700	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Chromium was not processed!
618-3_Shallow	non-Rad	Lead	7439-92-1	4	4	0	100	µg/kg	--	--	2,700	3,900	0.15	3,900	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Lead was not processed!
618-3_Shallow	non-Rad	Selenium	7782-49-2	4	4	0	100	µg/kg	--	--	440	659	0.21	659	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Selenium was not processed!
618-3_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	5	5	0	100	µg/kg	--	--	0.098	2,224	0.62	2,224	Maximum Detect	Recommended UCL Exceeds Maximum Concentration: EPC defaults to Maximum Concentration.
618-3_Shallow	non-Rad	Uranium	7440-61-1	4	4	0	100	µg/kg	--	--	1,330	1,610	0.094	1,610	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-3_Shallow	Rad	Uranium-233/234	U-233/234	4	4	0	100	pCi/g	--	--	0.52	0.68	0.13	0.68	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-233/234 was not processed!
618-3_Shallow	Rad	Uranium-238	U-238	4	4	0	100	pCi/g	--	--	0.45	0.75	0.24	0.75	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-238 was not processed!
618-3_Shallow_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	3	3	0	100	µg/kg	--	--	35,624	238,577	0.92	238,577	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-3_Shallow_Focused	Rad	Uranium-233/234	U-233/234	3	3	0	100	pCi/g	--	--	12	80	0.90	80	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-3_Shallow_Focused	Rad	Uranium-235	15117-96-1	3	3	0	100	pCi/g	--	--	0.43	4.8	1.0	4.8	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-3_Shallow_Focused	Rad	Uranium-238	U-238	3	3	0	100	pCi/g	--	--	12	79	0.92	79	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep	non-Rad	Arsenic	7440-38-2	4	4	0	100	µg/kg	--	--	1,400	2,200	0.18	2,200	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Arsenic was not processed!
618-4_Deep	non-Rad	Lead	7439-92-1	4	4	0	100	µg/kg	--	--	3,100	20,000	0.77	20,000	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Lead was not processed!
618-4_Deep	non-Rad	Total_U_Isotopes	Total_U_Isotopes	4	4	0	100	µg/kg	--	--	1,524	64,506	1.6	64,506	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Total_U_Isotopes was not processed!
618-4_Deep	Rad	Uranium-233/234	U-233/234	4	4	0	100	pCi/g	--	--	0.33	20	1.6	20	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-233/234 was not processed!
618-4_Deep	Rad	Uranium-235	15117-96-1	4	1	3	25	pCi/g	0.031	0.12	1.1	1.1	--	1.1	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-235 was not processed!
618-4_Deep	Rad	Uranium-238	U-238	4	4	0	100	pCi/g	--	--	0.51	22	1.6	22	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-238 was not processed!
618-4_Deep_Focused	non-Rad	2-Butanone	78-93-3	13	1	12	8	µg/kg	10	15	130	130	--	130	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	non-Rad	Acetone	67-64-1	10	3	7	30	µg/kg	11	15	2.0	16	0.96	16	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-4_Deep_Focused	non-Rad	Aroclor-1254	11097-69-1	13	4	9	31	µg/kg	15	4,600	42	1,600	0.74	1,600	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	non-Rad	Arsenic	7440-38-2	10	2	8	20	µg/kg	309	2,800	2,100	2,700	0.18	2,700	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	non-Rad	Barium	7440-39-3	15	15	0	100	µg/kg	--	--	56,700	104,000	0.17	104,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	non-Rad	Bis(2-ethylhexyl) phthalate	117-81-7	10	9	1	90	µg/kg	460	460	25	4,700	1.5	4,700	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	non-Rad	Cadmium	7440-43-9	13	3	10	23	µg/kg	40	320	70	1,500	0.82	1,500	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	non-Rad	Chromium	7440-47-3	12	12	0	100	µg/kg	--	--	2,600	27,700	0.84	27,700	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	non-Rad	Diethyl ether	60-29-7	3	1	2	33	µg/kg	10	11	1.0	1.0	--	1.0	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	non-Rad	Lead	7439-92-1	17	14	3	82	µg/kg	230	1,600	2,300	24,900	0.90	24,900	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	non-Rad	Methylene chloride	75-09-2	10	10	0	100	µg/kg	--	--	14	40	0.26	40	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	non-Rad	Phenol	108-95-2	10	1	9	10	µg/kg	360	750	110	110	--	110	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	non-Rad	Tetrachloroethene	127-18-4	13	3	10	23	µg/kg	5.0	8.0	14	24	0.26	24	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	non-Rad	Toluene	108-88-3	10	3	7	30	µg/kg	6.0	8.0	1.0	4.8	0.76	4.8	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	non-Rad	Total petroleum hydrocarbons - diesel range	TPHDIESEL	13	8	5	62	µg/kg	13	16,400	18	34,000	2.3	34,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	non-Rad	Total petroleum hydrocarbons - kerosene range	TPHKEROSENE	10	6	4	60	µg/kg	13	16,400	19	42,000	2.0	42,000	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	non-Rad	Total petroleum hydrocarbons - motor oil (high boiling)	TPH/OILH	3	3	0	100	µg/kg	--	--	46	65	0.18	65	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	non-Rad	Total_U_Isotopes	Total_U_Isotopes	17	16	1	94.12	µg/kg	497	497	783	20,777	1.3	20,777	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	non-Rad	Trichloroethene	79-01-6	13	2	11	15	µg/kg	5.0	8.0	1.0	2.0	0.47	2.0	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	non-Rad	Trichloromonofluoromethane	75-69-4	3	1	2	33	µg/kg	5.0	6.0	12	12	--	12	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	Rad	Uranium-233/234	U-233/234	17	16	1	94	pCi/g	0.14	0.14	0.27	7.2	1.4	7.2	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	Rad	Uranium-235	15117-96-1	17	4	13	24	pCi/g	0.073	0.21	0.028	0.51	1.4	0.51	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Deep_Focused	Rad	Uranium-238	U-238	17	16	1	94	pCi/g	0.17	0.17	0.26	6.9	1.3	6.9	Maximum Detect	Focused Sampling Design: EPC defaults to Maximum Concentration.
618-4_Overburden_2	non-Rad	Arsenic	7440-38-2	4	2	2	50	µg/kg	2,000	2,300	2,200	2,500	0.090	2,500	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Arsenic was not processed!
618-4_Overburden_2	non-Rad	Lead	7439-92-1	4	4	0	100	µg/kg	--	--	3,400	4,700	0.14	4,700	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Lead was not processed!

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-4_Overburden_2	non-Rad	Total_U_Isotopes	Total_U_Isotopes	4	4	0	100	µg/kg	--	--	0.058	4,197	0.92	4,197	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Total_U_Isotopes was not processed!
618-4_Overburden_2	Rad	Uranium-233/234	U-233/234	4	4	0	100	pCi/g	--	--	0.36	1.3	0.74	1.3	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-233/234 was not processed!
618-4_Overburden_2	Rad	Uranium-238	U-238	4	3	1	75	pCi/g	0.19	0.19	0.55	1.4	0.58	1.4	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-238 was not processed!
618-4_Overburden_3	non-Rad	Lead	7439-92-1	4	4	0	100	µg/kg	--	--	3,800	5,000	0.12	5,000	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Lead was not processed!
618-4_Overburden_3	non-Rad	Total_U_Isotopes	Total_U_Isotopes	5	5	0	100	µg/kg	--	--	0.068	1,316	0.57	1,171	95% Hall's Bootstrap UC	Warning: There are only 5 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
618-4_Overburden_3	Rad	Uranium-233/234	U-233/234	4	4	0	100	pCi/g	--	--	0.37	0.42	0.067	0.42	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-233/234 was not processed!
618-4_Overburden_3	Rad	Uranium-235	15117-96-1	4	3	1	75	pCi/g	0.010	0.010	0.026	0.032	0.11	0.032	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-235 was not processed!
618-4_Overburden_3	Rad	Uranium-238	U-238	4	4	0	100	pCi/g	--	--	0.34	0.44	0.11	0.44	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-238 was not processed!
618-4_Overburden_4	non-Rad	Lead	7439-92-1	4	4	0	100	µg/kg	--	--	4,000	4,800	0.080	4,800	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Lead was not processed!
618-4_Overburden_4	non-Rad	Total_U_Isotopes	Total_U_Isotopes	5	4	1	80	µg/kg	9.7	9.7	1,197	2,804	0.39	2,323	95% KM (t) UCL	Warning: There are only 4 Distinct Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

Table G-5. 300 Area Source Operable Unit Exposure Point Concentration Summary

Waste Site Decision Unit	Analyte Group	Analyte Name	CAS No.	Total Samples	Total Detects	Total Non-Detects	Frequency of Detection (%)	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Result	Maximum Detected Result	Coefficient of Variation	Exposure Point Concentration	Exposure Point Concentration Basis	Comment
618-4_Overburden_4	Rad	Uranium-233/234	U-233/234	4	4	0	100	pCi/g	--	--	0.37	0.94	0.49	0.94	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-233/234 was not processed!
618-4_Overburden_4	Rad	Uranium-238	U-238	4	4	0	100	pCi/g	--	--	0.40	0.94	0.39	0.94	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-238 was not processed!
618-4_Shallow	non-Rad	Arsenic	7440-38-2	4	4	0	100	µg/kg	--	--	2,700	3,200	0.088	3,200	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Arsenic was not processed!
618-4_Shallow	non-Rad	Lead	7439-92-1	4	4	0	100	µg/kg	--	--	4,100	49,000	1.3	49,000	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Lead was not processed!
618-4_Shallow	non-Rad	Total_U_Isotopes	Total_U_Isotopes	5	4	1	80	µg/kg	--	--	2,018	9,139	0.60	7,456	95% KM (t) UCL	Warning: There are only 4 Distinct Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions
618-4_Shallow	Rad	Uranium-233/234	U-233/234	4	4	0	100	pCi/g	--	--	0.74	3.2	0.70	3.2	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-233/234 was not processed!
618-4_Shallow	Rad	Uranium-238	U-238	4	4	0	100	pCi/g	--	--	0.68	3.1	0.60	3.1	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Uranium-238 was not processed!
618-5_Deep	non-Rad	Arsenic	7440-38-2	4	4	0	100	µg/kg	--	--	3,000	5,200	0.23	5,200	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Arsenic was not processed!
618-5_Deep	non-Rad	Cadmium	7440-43-9	4	1	3	25	µg/kg	230	240	470	470	--	470	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Cadmium was not processed!
618-5_Deep	non-Rad	Chromium	7440-47-3	4	4	0	100	µg/kg	--	--	11,100	14,700	0.13	14,700	Maximum Detect	Warning: This data set only has 4 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable Chromium was not processed!