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SECTION 2

Document Information			
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Sect 2 of 3

4.0 RISK ASSESSMENT

4.1 INTRODUCTION

This chapter provides the results of the human-health baseline risk assessment, which includes the human-health risk assessment for nonradionuclides and the RESRAD modeling for radionuclides (ANL/EAD-4). This evaluation consists of a discussion of the conceptual site model (Section 4.2), human health risk assessment for nonradionuclide contaminants (Section 4.3), and RESRAD modeling to assess the dose and risk from radionuclides (Section 4.4). The risk evaluation provides a characterization of site risks to determine if remedial actions are warranted and to support evaluation of remedial alternatives in the FS.

This chapter also compares the ecological risk screening of contaminants in the 200-PW-2 and 200-PW-4 OUs against screening concentrations in WAC 173-340-900, Table 749-3, for non-radionuclides and in DOE-STD-1153–2002, *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota*, for radionuclides (Section 4.5). This latter document was prepared for the DOE by the Biota Dose Assessment Committee (BDAC) and presents screening levels (BCG) for radionuclides, as well as a methodology for conducting ecological risk assessments for radionuclides. DOE/RL-2001-54 contains additional details on the BDAC document.

4.2 CONCEPTUAL SITE MODEL

This conceptual site model provides a current understanding of the sources of contamination, physical and ecological setting, and current and future land use and identifies potentially complete human and ecological exposure pathways for the 200-PW-2 and 200-PW-4 OUs. Information generated during the development of the RI/FS has been incorporated into this conceptual site model to identify potential exposure scenarios.

4.2.1 Physical Setting

The sites sampled and evaluated in this ecological screening are six of the representative sites for the 200-PW-2 and 200-PW-4 OUs. The waste sites are described in greater detail in Chapters 1.0 and 3.0. These sites lie on the Central Plateau in and near an industrial area. The areas proximal to these representative sites have been disturbed by operations for several decades The surrounding habitats on the Central Plateau are described in Section 4.2.2. The Hanford Site climate is classified as mid-latitude semiarid or mid-latitude desert, depending on the climatological classification scheme. Most precipitation occurs during late autumn and winter with more than half of the annual amount occurring from November through February (PNNL-6415, *Hanford Site National Environmental Policy Act (NEPA) Characterization*). Normal annual precipitation is 17.7 cm (6.98 in.). The prevailing wind direction is from the northwest, particularly in the winter and summer.

Wind speeds are lowest in the winter (averaging 6 to 7 mi/hour) and highest in the summer (averaging 8 to-9 mi/hour with frequent gusts to 30 mph). Summertime temperatures can exceed 37.8°°C (100°°F), and winter temperatures may drop below -17.8°°C (0°°F) (DOE/RL-2001-54).

The Central Plateau lies between the ridges of Gable Mountain and the lower altitude area of dunes. The 200 Areas lie on a prominent geologic flood bar, the Cold Creek bar. As described in Section 3.1.1, the Cold Creek Bar trends generally east-west with elevations between 197 m and 225 m (647 and 740 ft) above mean sea level. The plateau drops off rather steeply to the north and northwest into a former flood channel with elevation changes of between 15 m and 30 m (50 and 100 ft). The plateau decreases more gently in elevation to the south into the Cold Creek valley and to the east toward the Columbia River. Most of the 200 West Area and the southern half of the 200 East Area are situated on the Cold Creek Bar, while the northern half of the 200 East Area lies within the former flood channel. A secondary flood channel running south from the main channel bisects the 200 West Area. A generalized stratigraphic column and descriptions of the geologic strata are presented is Section 3.2.1. Currently, much of the 200 Areas are covered with industrial facilities associated with current and past operations.

4.2.2 Ecological Setting

The broad classification for the ecology of the Hanford Site area is shrub-steppe, though this broad classification can be refined into a number of separate types of communities found within the shrub-steppe classification. The 200 Area representative sites consist mainly of highly disturbed areas with little vegetative cover because of past industrial and remedial activities. The sites have been stabilized with a substantial gravel cover, further impeding reestablishment of any of the surrounding habitats. In addition, some nearby areas, particularly by the 200 West Area sites, were burned in the 2000 range fire. However, these representative sites and their contamination can be accessed by species from the surrounding habitats; these species are considered to be the potential receptors for which this screening with generalized receptors was conducted. In the absence of future activities, any of the surrounding habitats could potentially occur on or near the representative sites. The surrounding plant communities and the available census data on plant, bird, and mammal species are described in depth in DOE/RL-2001-54 and are only summarized here. In general, aside from the highly disturbed areas, four plant communities occur in the vicinity of the 200 Areas: sagebrush-dominated communities, gray rabbitbrush-cheatgrass communities, bunchgrass communities, and cheatgrass-dominated communities. Characteristic vegetation and the percent cover of each plant species associated with each habitat type are described in detail in DOE/RL-2001-54.

Reptiles found in the Central Plateau include gopher snakes (*Pituophis melanoleucus*) and side-blotched lizards (*Uta stansburiana*). Rattlesnakes (*Crotalus viridis*) also have been observed. Observations of reptiles were not widespread, with only 23 observations of side-blotched lizards at 316 sites surveyed in 2001 (DOE/RL-2001-54).

Numerous species of birds and mammals occupy these habitats. Based on the results of bird point counts, the species of bird observed at the largest number of stations in the 200 East Area are the American robin (*Turdus migratus*), the European starling (*Sturnus vulgaris*), and the western meadowlark (*Sturnella neglecta*). The species of bird observed at the largest number of

stations in the 200 West Area are the western meadowlark (*Sturnella neglecta*), the sage sparrow (*Amphispiza belli*), the lark sparrow (*Chondestes grammacus*), and the loggerhead shrike (*Lanius ludovicianus*). Mammal species in these habitats consist primarily of small rodents including the Great Basin Pocket Mouse (*Perognathus parvus*) and deer mice (*Peromyscus maniculatus*). Other small mammals such as the pocket gopher (*Thomomys talpoides*) could potentially occur in the less disturbed surrounding habitat. The surrounding habitats also are home to black-tailed jackrabbits (*Lepus californicus*), mountain cottontails (*Sylvilagus nutalli*), badgers (*Taxidiea taxus*), coyotes (*Canis latrans)*, mule deer (*Odocoileus hemionus*), and an occasional elk (*Cervus elaphus*) (DOE/RL-2001-54). This screening assessment uses soil media concentrations based on species that are designed to be broad representatives of groups of mammals and birds that include the species occurring at the 200 Area sites.

Three of the most common groups of insects found at the Hanford Site are darkling beetles, grasshoppers, and ants. Darkling beetles are a dominant part of the insect community in the 200 Areas, where they occur with very little seasonal restriction but exhibit dramatic changes in abundance from year to year (PNL-2253, *Ecology of the 200 Area Plateau Waste Management Environs: A Status Report*). Grasshoppers are herbivorous insects common to the Central Plateau. This screening assessment includes soil media concentrations based on soil invertebrate species that are designed to be broad representatives of insects and other soil invertebrates such as earthworms that include the invertebrate species occurring at the 200 Area sites. The role of soil invertebrate species in transport of contaminants from the subsurface is discussed in Section 4.2.4.6.

4.2.2.1 Sensitive Habitat

Sensitive habitats are those identified in DOE/RL-96-32, *Hanford Site Biological Resources Management Plan*, as rare or wetlands (riparian) habitat. The Federal and state governments protect wetlands. Rare habitats are those that have a low availability but are important for plant, fish, and wildlife species (DOE/RL-96-32). On the Central Plateau, the only identified rare habitat areas (rated as Level IV in DOE/RL-96-32) are located in proximity of the basalt ridges of Gable Butte and Gable Mountain. These basalt outcrops have limited availability, are associated with rare plant communities, and are easily disturbed. No waste sites are near these rare habitats.

On the Central Plateau, man-made ponds and ditches, including the B Pond Complex located near the 200 East Area, once were present and were sources of riparian habitat. In 1995, all contaminated effluent discharges to liquid waste sites were ceased. All riparian habitats within the fence line have been eliminated, except for a small riparian area that was identified in the 200 East Area during the 2001 survey. This may be a seasonal wetland; the value of this small riparian area has not been evaluated. No wetland habitat was located in the 200 West Area.

Vernal pools, such as those on Gable Butte and Gable Mountain, are temporary and are considered seasonally flooded wetlands. Approximately 20 vernal pools were located on the eastern end of Umtanum Ridge, near the central part of Gable Butte, and on the eastern end of Gable Mountain. None of these pools are near waste sites in the Central Plateau (*Biodiversity Inventory and Analysis of the Hanford Site, Final Report 1994-1999* [TNC 1999]).

4.2.2.2 Endangered, Threatened, and Sensitive Species

Two Federally protected species have been observed at the Hanford Site: the Aleutian Canada Goose and the bald eagle (Haliaeetus leucocephalus). Both depend on the river corridor and rarely are seen in the Central Plateau. As migratory birds, these species are protected under the *Migratory Bird Treaty Act of 1918.*

No plants, invertebrates, amphibians, reptiles, or mammals on the Federal or State of Washington threatened and endangered species lists are known to inhabit the Central Plateau. Sensitive species include threatened and endangered species that are protected by Federal and state laws. Washington State defines sensitive species as "any wildlife species native to the State of Washington that is vulnerable or declining and is likely to become endangered or threatened throughout a significant portion of its range within the state without cooperative management or removal of threats" (WAC 232-12-297, "Endangered, Threatened, and Sensitive Wildlife Species Classification").

4.2.2.3 Rare Plants

Rare plant species are vascular plant species listed by the Washington Natural Heritage Program (*Washington Rare Plant Species by County*[WNHP 1998]) as endangered, threatened, or sensitive in the State of Washington. The Nature Conservancy survey discovered 112 populations of 28 rare plant taxa on the Hanford Site (TNC 1999). Although rare plants were found dispersed throughout the Site, the highest densities occurred on the east end of the Umtanum Ridge, the basalt-derived sands near Gable Mountain, the White Bluffs, Rattlesnake Mountain, and the Yakima Ridge.

4.2.2.4 Mammals of Concern

The state has classified the pygmy rabbit (*Brachylagus idahoensis*) as a candidate endangered species. None have been observed to date in the Central Plateau. The pygmy rabbit depends on sagebrush, primarily big sagebrush *(Artemisia tridentata)*, and usually is found in areas where big sagebrush grows in very dense stands.

4.2.2.5 New-to-Science Species

The Nature Conservancy conducted a biodiversity survey of plants, mammals, reptiles and amphibians, birds, and insects at the Hanford Site between 1994 and 1998 (TNC 1999). This survey found two species and one variety of plants and 41 species and two subspecies of insects that had not been known to science. The new plant and insect species are listed at http://www.pnl.gov/ecology/ecosystem/Species/Species.html.

Insects were dispersed throughout the Hanford Site, with the new species found in shrub-steppe, areas around the basalt talus, springs, and upland areas. The size, diversity, and relatively undisturbed nature of the Hanford Site shrub-steppe habitat has provided for a large and diverse insect population, of which the new-to-science species are a part. The U.S. Fish and Wildlife Service and the State of Washington have not yet determined the protective status of these new-to-science species (i.e., are they considered threatened or endangered). The habitat-based

management plan at the Hanford Site will offer protection to most of these species. With the exception of some of the insects, none of these new-to-science species are expected to be located near the 200-PW-2 and 200-PW-4 OU waste sites. Habitat protection will be key to preserving the insect diversity at the Hanford Site.

4.2.3 Characterization of Land Use

As discussed in Section 1.3.2, the land-use boundary around the 200 East and 200 West Areas has been designated as industrial-exclusive in DOE/EIS-0222-F. Based on standards in specific sections of DOE/EIS-0222-F and the associated 64 FR 61615, industrial-exclusive land use is defined as "preserving DOE control of the continuing remediation activities and use of the existing compatible infrastructure required to support activities such as dangerous waste, radioactive waste, and mixed waste treatment, storage, and disposal facilities" (DOE/EIS-0222-F). All of the waste sites associated with the 200-PW-2 and 200-PW-4 OUs are located within this industrial-exclusive land-use boundary.

4.2.4 Conceptual Exposure Model for Human Health and the Environment

This section describes the potential exposure pathways from site contaminants, based on currently available site information. The conceptual exposure model is formulated according to EPA/540/G-89/004, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final*, and WAC 173-340. Guidance from the EPA and standards provided in specific sections of WAC 173-340 were supplemented with the use of professional judgment and information on contaminant sources, release mechanisms, migration routes, potential exposure points, potential exposure routes, and potential receptor groups associated with the site.

An exposure pathway can be described as the physical course that a COPC takes from the point of release to the receptor. Contaminant intake or exposure route is the means by which a COPC enters a receptor. For an exposure pathway to be complete, all of the following components must be present:

- A contaminant source
- A mechanism of contaminant release and transport
- An exposure point (i.e., a location where people or wildlife can come into contact with the contaminants)
- An exposure route
- A receptor or exposed population.

In the absence of any one of these components, an exposure pathway is considered incomplete and, by definition, no risk or hazard exists. The conceptual exposure model for the waste sites is presented in Figure 4-1.

4.2.4.1 Contaminant Sources

The 200-PW-2 OU waste sites received uranium-rich process condensate and/or process waste, primarily from waste streams generated at the 221/224-U Plant Uranium Recovery Project, the REDOX Facility, and the 224-U/UO_3 Program for the PUREX Facility, as well as at B Plant and C Plant facilities in the 200 East and 200 West Areas. The 200-PW-4 OU waste sites received mostly process drainage, process distillate discharge, and miscellaneous condensates from the U and T Plants, the REDOX Plant, the PUREX Facility, C Plant, and several contributing tank farm-related facilities, such as the S and A Tank Farm and the 242-A Evaporator. Most process waste was uranium-rich solutions from the cold runs that used nonirradiated uranium or the startup phases that used irradiated uranium, before the three main plants began operation. The process condensates were vapors collected from thermally hot processes.

4.2.4.2 Release Mechanisms and Environmental Transport Media

The primary release and transport mechanisms for COPCs from the source via environmental media to potentially contaminated media are as follows:

- Surface and subsurface liquid discharge, followed by deposition on surface and subsurface soils
- Infiltration, percolation, and leaching contaminants from waste sites to subsurface soils and groundwater
- Generation of dust emanating from shallow-zone soil to ambient air from wind or during maintenance or construction activities at the release site
- Volatilization of chemicals emanating from shallow-zone soil to ambient air at the release site.

4.2.4.3 Potentially Complete Human Exposure Pathways and Receptors

The most plausible exposure pathways considered for characterizing human health risks were determined on the basis of the current understanding of land-use conditions at and near the site. The pathways are shown in Figure 4-1 and are described in the following sections.

The point of compliance for shallow-zone soils is defined as 0 m to 4.6 m (0 to 15 ft) bgs. This soil depth is associated with potential exposure under unrestricted land use in WAC 173-340-740(6)(d) as follows:

> "For soil cleanup levels based on human exposure via direct contact or other exposure pathways where contact with the soil is required to complete the pathway, the point of compliance shall be established in the soils throughout the site from the ground surface to fifteen feet below the ground surface. This represents a reasonable estimate of the depth of soil that could be excavated and distributed at the soil surface as a result of site development activities."

The point of compliance to evaluate the protection of groundwater is defined as those samples collected throughout the soil profile.

Evaluation of radiological constituents in shallow-zone soil (for the direct-contact exposure pathways) was conducted using two different methods. The first evaluation method, the "cover" alternative, is considered representative of current site conditions because it accounts for existing clean cover over the waste site. The shielding effects of the clean cover influence the resulting dose and risk estimates. The second evaluation method, the "no cover" alternative is considered representative of worst case conditions; it assumes that existing cover is removed from the representative waste site (i.e., the exposure point concentration [EPC] is representative of the entire shallow zone).

4.2.4.4 Industrial Land-Use Scenario

Under current and likely future site conditions, onsite industrial workers potentially could be exposed to shallow-zone soils from the waste site.

The industrial land-use scenario assumes that no groundwater from the waste site will be used for drinking purposes. Soil screening levels for nonradiological constituents consider exposure through direct-contact pathways (incidental soil ingestion and dermal contact) and inhalation of dust and vapors in ambient air. For radiological constituents, potential routes of exposure to shallow-zone soil include external gamma radiation, incidental soil ingestion, and inhalation of dust particulates.

4.2.4.5 Protection of Groundwater

Constituents were evaluated for protection of groundwater. Potential impacts to groundwater for nonradionuclides were screened by comparing the maximum detected soil concentration at any depth in the vadose zone to WAC 173-340-747, "Deriving Soil Concentrations for Ground Water Protection," soil screening values. The exposure parameters, chemical properties, and toxicity values used as the basis of these groundwater screening values are discussed in Section 4.3. Potential groundwater impacts of radionuclides were evaluated within the RESRAD modeling framework, as discussed in Section 5.2.2.

4.2.4.6 Potentially Complete Ecological Exposure Pathways and Receptors

The following ecological exposures potentially associated with the OUs will be considered for characterizing ecological risks:

- Potential current or future direct contact with or ingestion of surface soil by invertebrates (e.g., beetles)
- Direct contact with or ingestion of surface soil by avian (e.g., western meadowlark) and terrestrial (e.g., coyote) wildlife that may use the waste sites
- Bioaccumulation through ingestion of food items (e.g., plants, prey) consumed by wildlife that may forage at the waste sites.

The major pathways of exposure expected at the representative sites in the 200-PW-2 and 200-PW-4 OUs are direct ingestion of contaminated soil and ingestion of food items that have taken up contaminants from soil. These pathways are the same pathways that were used to develop the screening levels for soil. Although some standing water could potentially remain after precipitation events, these sites contain no permanent bodies of water. Therefore, only pathways associated with exposure to contaminated soil are considered to be complete at this site. Species potentially present at the site include both surface-dwelling species and burrowing species such as harvester ants. Both plants and burrowing species may move contamination from the subsurface to the surface, potentially exposing other species to these contaminants.

The exposure pathways used to develop the screening levels consist of all complete exposure pathways except for inhalation and dermal exposure. Although these pathways contribute to the dose of contaminants of potential ecological concern (COPEC) received by animals, it is expected that the contribution from these pathways is relatively small and does not contribute significantly to receptor exposure (OSWER Directive 9285.7-55, *Guidance for Developing Ecological Soil Screening Levels* [EPA 2003]). Inhalation is viewed to be an insignificant pathway for contaminated soil in areas where plants cover the contaminated ground surface or where much of the contamination is buried. Dermal exposure to wildlife is mitigated by the fur or feathers that cover the bodies of most vertebrates. In addition, the incidental consumption of soil during grooming is assumed to be included in the direct soil ingestion estimates. Dermal contact and inhalation and/or respiration pathways typically have not been assessed quantitatively in ecological risk assessments, based on guidance that suggests that the ingestion route is most important to terrestrial animals (EPA/540/R-97/006). Therefore, the exposure pathways considered in the development of the screening values used for this site are likely to capture the primary exposures for wildlife receptors at this site.

The soil concentrations used to represent the exposure point concentrations for contaminants at this site are the maximum detected concentrations seen at any point within the top 4.6 m (15 ft) of the soil column below ground surface. This value was used as the exposure point concentration because disturbance of the site through bioturbation or human activities could potentially bring these maximum concentrations of contaminants to the surface where any terrestrial receptor could be exposed to them. Also, the screening levels are based on generalized receptor species, so excluding contaminants based on the burrowing depths of individual species is not appropriate at the level of a screening assessment. The 4.5 m (15-ft) depth provided in the Ecology guidance is deeper than the expected burrowing or rooting depth of species known to occur at the site (DOE/RL-2001-54) and should represent a protective section of the soil column for species expected to inhabit these sites both now and in the future.

4.2.4.7 Computation of Exposure Point Concentrations

In the human and ecological risk assessments presented in this RI Report, EPCs at each site are represented by the maximum detected concentration in the 0 m to 4.6 m (0- to 15-ft) shallow-zone soil column. The COPC concentrations in deep-zone soils, which are used to evaluate potential impacts to groundwater, are defined as the maximum detected concentration in the 0 m-to-groundwater deep-zone soil column. The use of maximum detected concentrations results in a

protective bias that potentially is much greater than that associated with the use of an upper confidence limit (UCL) on an average concentration, which is the generally recommended approach for estimating an exposure point concentration (OSWER Directive 9285.6-10, *Calculating Exposure Point Concentrations at Hazardous Waste Sites, Draft* [EPA 1992a]). However, the relatively small number of sampling locations at the waste sites evaluated in this RI Report render the use of a maximum concentration appropriate because, in such cases, calculated UCL values may exceed the maximum detected concentration (EPA 1992a).

4.3 HUMAN HEALTH RISK EVALUATION FOR NONRADIOLOGICAL CONSTITUENTS

A baseline human health risk evaluation, in which potential adverse health effects are evaluated in the absence of any remedial action, generally consists of four steps: data collection and analysis, exposure assessment, toxicity assessment, and risk characterization (OSWER Directive 9285.7-01A, *Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation Manual (Part A), Interim Final* [EPA 1992b]). In the first step of the assessment, COPCs are identified on the basis of such criteria as detection status, comparison to background concentrations, and comparison to toxicity-based screening criteria. This human health risk evaluation is limited to identifying COPCs. Exposure pathways associated with the toxicity-based screening criteria were described in Section 4.2.4 of this RI Report. The results of the screening assessment are interpreted in an uncertainty analysis in Section 4.3.3.

4.3.1 Human Health Risk Evaluation Guidance Documents

The following guidance was used to conduct the human health evaluation for nonradiological constituents:

- **Ecology Publication No. 94-145, *Model Toxics Control Act Cleanup Levels and Risk Calculations (CLARC II) Update)*.** Provides screening levels for nonradioactive analytes regulated under WAC 173-340-740, WAC 173-340-745, and WAC 173-340-747.

- **DOE/RL-92-24**. Provides soil backgrounds for nonradioactive analytes.

- **OSWER Directive 9285.6-10 (EPA 1992a).** Recommends approaches for estimating exposure-point concentrations.

- **OSWER Directive 9285.7-01A (EPA 1992b).** Provides guidance on risk assessments and screening criteria.

4.3.2 Contaminants of Potential Concern for Human Health

Chemicals of potential concern are those constituents that pose potentially unacceptable risks to human health. Actions to improve the understanding of COPC distribution and/or migration in the environment or actions to mitigate potential exposures should be evaluated further in the FS. The technical approach for identifying nonradionuclide COPCs is diagrammed in Figure 4-2.

4.3.2.1 Data Evaluation

All soil data collected under the Work Plan (DOE/RL-2000-60, Rev. 1) were considered in the human health evaluation. Soil sampling information, including collection dates, sample identification numbers, depths, and analytical laboratories are summarized in Tables 2-1 through 2-7.

All nonradiological constituents detected in one or more samples were included in the human health risk evaluation. Sample data with estimated concentrations ("B" or "J" qualification flags) were evaluated at the reported concentration in the risk evaluation. Rejected ("R"-qualified) data were not used in the risk evaluation. If duplicate sample results were available for a sample, the highest of the reported concentrations was used in the risk evaluation.

The principal distinction for data use in the human health risk evaluation was the sample depth. Maximum detected concentrations from analytical data from samples collected at depths of 4.6 m (15 ft) or less were evaluated for direct contact by comparison to WAC 173-340-745 (industrial) soil screening levels. Maximum detected concentrations from analytical data from samples collected at all depths were evaluated for potential groundwater impacts by comparing them to soil screening values calculated using the fixed-parameter three-phase partition model. Text and tables throughout this document, including Appendix A, that reference shallow-zone soils refer to the 0 m to 4.6 m (15-ft) layer whereas references to deep-zone soils are based on data from all depths sampled from 0 m to groundwater.

Detected constituents in shallow- and deep-soils can be summarized as follows:

- *Shallow-Zone Soils*:
  - **207-A South Retention Basin**. Twenty-three radionuclides, 11 inorganic nonradionuclides, and 7 organic compounds were detected.
  - **216-A-10 Crib**. Nine radionuclides, 12 inorganic nonradionuclides, and 3 organic compounds were detected.
  - **216-A-19 Trench**. Twenty-one radionuclides, 24 inorganic compounds, and 2 organic compounds were detected.
  - **216-A-36B Crib**. Fourteen radionuclides, 15 inorganic compounds, and 1 organic compound were detected.

- **216-A-37-1 Crib**. Sixteen radionuclides, 22 inorganic compounds, and 4 organic compounds were detected.

- **216-B-12 Crib**. 10 radionuclides, 14 inorganic compounds, and 3 organic compounds were detected.

- *Deep-Zone Soils*:

  - **207-A South Retention Basin**. Twenty-three radionuclides, 11 inorganic compounds, and 7 organic compounds were detected.

  - **216-A-10 Crib**. Thirty radionuclides, 21 inorganic compounds, and 15 organic compounds were detected.

  - **216-A-19 Trench**. Twenty-three radionuclides, 27 inorganic compounds, and 7 organic compounds were detected.

  - **216-A-36B Crib**. Thirty-three radionuclides, 29 inorganic compounds, and 4 organic compounds were detected.

  - **216-A-37-1 Crib**. Twenty-four radionuclides, 29 inorganic compounds, and 6 organic compounds were detected.

  - **216-B-12 Crib**. Twenty-six radionuclides, 22 inorganic compounds, and 6 organic compounds were detected.

A number of organic tentatively identified compounds (TIC) were detected in the samples for the characterized sites. The TICs fall into the following three categories, none of which were included in the human health risk evaluations:

- Products of column bleed from the gas chromatograph that are caused by the analytical process and are likely false positives not site contaminants. These are siloxane-type compounds. These compounds do not appear in the human health or ecological risk evaluation comparisons.

- Products from heating acetone during the extraction process, e.g., diacetone alcohols or 2-pentanone 4- hydroxy. These are false positives that are not real site contaminants.

- Other TICs that are not calibrated and are estimated and that do not have risk values in the CLARC 3.1 tables (Ecology Publication No. 94-145) are 2,4,6-trimethylpyridine, 3-penten-2-one, 6-tridecene, mesityl oxide, tetramethylpiperidinone, 2-butyl-1,1,3-trimethyl-cyclohexane, decahydro-2 6-dimethyl-naphthalene, n-butylbenzenesulfonamide, bis(2-ethylhexyl)adipate, o-terphenyl, propionic acid, eicosane, n-hexanoic acid, octacosane, 1,2,4-trithiolane, 3-methyl 2-cyclohexen-1-one, and cyclohexyl isocyanate.

Tributyl phosphate is reported in some cases as a TIC; however, because of its use at the Hanford Site and because many of the laboratories under contract calibrate for this compound, it was considered during the human health risk evaluations.

4.3.2.2 Identification of Essential Nutrients

Chemicals that are considered essential human nutrients, are toxic only at very high doses, and are present at concentrations only slightly higher than naturally occurring levels are not generally evaluated in a human health risk assessment (OSWER Directive 9285.7-01A [EPA 1992b]). Examples of such chemicals described in Section 5.9.4 of OSWER Directive 9285.7-01A (EPA 1992b), are iron, magnesium, calcium, potassium, and sodium. These essential nutrients were not included in any of the comparisons as part of the human health screening assessment.

4.3.2.3 Background Screening

As shown in Figure 4-2, detected constituents that are not essential nutrients were screened for consideration in the risk-based evaluation by comparing the maximum detected concentration with background concentrations. With the following three exceptions, Hanford Site lognormal 90th percentile background values were used to identify potentially site-related contaminants in the background screening, as recommended in DOE/RL-92-24. The background values were identified in Summary Table 2 of DOE/RL-92-24.

- DOE/RL-92-24 does not list a background value for cadmium. For cadmium, the 90th percentile background value of 0.81 mg/kg was obtained from Table 7 of Ecology Publication 94-145. The cadmium background value is specific to eastern Washington.

- The background value of 20 mg/kg for arsenic was taken from Tables 740-1 and 745-1 in WAC 173-340-900, available on line at http://www.leg.wa.gov/pub/WAC/.

- Background criteria have not been developed for organic chemicals in Hanford Site soils. Therefore, concentrations of these constituents have been compared to soil screening levels without a prior background screening.

Data collected for representative sites and TSD units at the 200-PW-2 and 200-PW-4 OUs are summarized in Appendix A, Table A-1, for shallow-zone (0 to 4.6 m [15 ft]) soils, and in Table A-2 for deep-zone (0 m to groundwater) soils. The data summaries contain number of samples, frequency of detects, range of MDA for nondetects, range of results, and depth at which maximum result was found. These data are used for background comparisons.

The background comparisons for nonradionuclides are summarized in Table 4-1 for both the shallow-zone and deep-zone soils. At the 207-A South Retention Basin, three inorganic constituents in shallow-zone soils and three inorganic constituents in deep-zone soils were detected above background or were detected and no background value was available. At the 216-A-10 Crib, four inorganic constituents in shallow-zone soils and nine inorganic constituents in deep-zone soils were detected above background or were detected and no background value was available. At the 216-A-19 Trench, 9 inorganic constituents in shallow-zone soils and 15 inorganic constituents in deep-zone soils were detected above background. At the

216-A-36B Crib, 3 inorganic constituents in shallow-zone soils and 16 inorganic constituents in deep-zone soils were detected above background. At the 216-A-37-1 Crib, 9 inorganic constituents in shallow-zone soils and 18 inorganic constituents in deep-zone soils were detected above background. At the 216-B-12 Crib, 5 inorganic constituents in shallow-zone soils and 11 inorganic constituents in deep-zone soils were detected above background. The individual comparisons between each maximum detected concentration for each constituent and its background value are presented in Table 4-2 for the shallow-zone soil column and in Table 4-3 for the deep-zone soils (the entire soil column down to groundwater). Shaded rows indicate that the maximum detected concentration of an inorganic constituent exceeds its background screening value. Constituents with a maximum detected concentration exceeding background in one or both soil strata are evaluated by comparing their values to soil screening levels in Section 4.3.2.4.

The following constituents are present in shallow-zone soils (0 m to 4.6 m [15 ft] bgs) at maximum concentrations greater than background or do not have an applicable background value, and will be evaluated by comparison to RBC screening levels.

Shallow-Zone Soils (0 to 4.6 m [15 ft] bgs)

- **207-A South Retention Basin**. Nitrate as nitrogen, nitrate and nitrate/nitrite as nitrogen, silver
- **216-A-10 Crib**. Antimony, boron, nitrite as nitrogen, nitrate and nitrate/nitrite as nitrogen
- **216-A-19 Trench**. Boron, fluoride, nitrate as nitrogen, nitrate and nitrate/nitrite as nitrogen, phosphate, thallium, thorium, uranium, vanadium
- **216-A-36B Crib**. Nitrate and nitrate/nitrite as nitrogen, silver, thorium
- **216-A-37-1 Crib**. Ammonia as nitrogen, barium, boron, manganese, nitrate as nitrogen, nitrite as nitrogen, nitrate and nitrate/nitrite as nitrogen, thallium, thorium
- **216-B-12 Crib**. Antimony, boron, nitrate as nitrogen, nitrate and nitrate/nitrite as nitrogen, sulfate.

Deep-Zone Soils (0 m bgs to Groundwater)

- **207-A South Retention Basin**. Nitrate, nitrate and nitrate/nitrite (as nitrogen), silver
- **216-A-10 Crib**. Antimony, boron, mercury, nitrate (as nitrogen), nitrite (as nitrogen) nitrate and nitrate/nitrite (as nitrogen), phosphate, selenium, silver
- **216-A-19 Trench**. Bismuth, boron, fluoride, manganese, molybdenum, nitrate (as nitrogen), nitrite (as nitrogen), nitrate and nitrate/nitrite (as nitrogen), phosphate, sulfate, thallium, thorium, uranium, vanadium, zinc

- **216-A-36B Crib**. Ammonium ion as nitrogen, antimony, bismuth, boron, total chromium, mercury, molybdenum, nickel, nitrate (as nitrogen), nitrite (as nitrogen), nitrate and nitrate/nitrite (as nitrogen), selenium, silver, thallium, thorium, uranium

- **216-A-37-1 Crib**. Aluminum, ammonium ion as nitrogen, antimony, barium, boron, total chromium, cobalt, lead, manganese, molybdenum, nitrate (as nitrogen), nitrite (as nitrogen), nitrate and nitrate/nitrite (as nitrogen), phosphate, silver, thallium, thorium, vanadium

- **216-B-12 Crib**. Ammonium ion as nitrogen, antimony, boron, total chromium, mercury, nitrate (as nitrogen), nitrate and nitrate/nitrite (as nitrogen), silver, sulfate, thorium, uranium.

4.3.2.4 Screening to WAC 173-340 Soil and Groundwater Protection Screening Levels

Inorganic constituents with maximum detected concentrations exceeding background screening values and the maximum concentrations of organic chemicals detected in one or more samples were screened using WAC 173-340-745 screening levels. The maximum detected concentration in the upper 4.6 m (15 ft) was compared to direct-contact screening levels for industrial land use (WAC 173-340-745 levels). The exposure assumptions used to develop the WAC 173-340-745 levels for direct exposure to soil are summarized in Table 4-4. These exposure assumptions represent a reasonable maximum exposure scenario for an industrial worker. The maximum constituent concentrations from any depth (the deep-zone soil column extending from the surface to groundwater) are compared to WAC 173-340-747 soil screening levels for groundwater protection. The exposure assumptions that were incorporated in the development of the soil screening levels for groundwater protection are provided in Table 4-5. The fixed-parameter (default values) variant of the WAC 173-340-747 three-phase equilibrium model was used to calculate soil screening levels for groundwater protection. Developing screening levels using this model involves considering groundwater RBCs, such as MCLs, as well as the chemical and physical parameters of the chemicals being considered. Table 4-6 provides the groundwater RBC, K_d, Henry's Law Constant, and K_{oc} values used to develop the WAC 173-340-747 soil screening levels for groundwater protection. Table 4-7 provides the toxicity values used to develop both these direct-contact screening levels and the soil screening levels for groundwater protection. Direct-exposure screening levels were obtained from CLARC3.1 on-line at http://www.ecy.wa.gov/programs/tcp/tools/CLARC_v_3.1/clarc_v_3_1.htm.

The comparison of nonradionuclides against WAC 173-340-740, WAC 173-340-745, and WAC 173-340-747 screening levels is summarized in Table 4-8.

Table 4-9 shows the comparison of the maximum detected concentration of any organic constituent in shallow-zone soil to its direct-exposure screening level and the maximum detected concentration of any organic constituent in deep-zone soil to its protection-of-groundwater screening level. A shaded set of cells indicates where the maximum detected concentration of a constituent exceeds a screening level. No organic constituents exceeded direct exposure screening levels at any of the six representative sites based on comparison of maximum detected values in the top 4.6 m (15 ft) of soil to WAC 173-340-745 industrial screening values.

For groundwater protection, the following organic constituents detected in the deep-zone soils were identified as COPCs:

- **207-A South Retention Basin**. 2,4-dichlorophenoxyacetic acid, 2-(2,4,5-trichlorophenoxy)propionic acid
- **216-A-10 Crib**. Beta-1,2,3,4,5,6-hexachlorocyclohexane, methylene chloride, 1-chloropropane, 2-butoxyethanol, pentachlorophenol, tributyl phosphate, TPH-diesel range, TPH-kerosene range
- **216-A-19 Trench**. Tributyl phosphate
- **216-A-36-B Crib**. Isophorone
- **216-A-37-1 Crib**. Tributyl phosphate
- **216-B-12 Crib** Tributyl phosphate.

Only beta-1,2,3,4,5,6-hexachlorocyclohexane, methylene chloride, pentachlorophenol, and TPH-diesel range values are retained because they exceed a screening level in soil for protection of groundwater. All other organic chemicals shaded in Table 4-9 and listed in the previous paragraph are retained for consideration during the FS because no screening level for soil that is protective of groundwater was available.

Table 4-10 shows the comparison of the maximum detected concentration of any inorganic constituent in shallow-zone soil to its direct-soil-exposure screening level. No inorganic constituents exceeded their direct-soil-exposure screening levels at any of the six representative sites. However, screening levels were not available for direct exposure to sulfate or thorium. Although no direct exposure screening criteria are available for sulfate, the concentration (467 mg/kg) seen at the 216-B-12 Crib site is unlikely to represent a potential risk to users of groundwater because even the protection-of-groundwater screening level is based on a secondary MCL based on aesthetic considerations, such as taste, color, and odor, not on sulfate toxicity. Similarly, the small concentrations of thorium (present at three sites at less than 4 mg/kg) are extremely unlikely to present a health risk. Thorium has no nonradioactive isotopes, and thus does not have a steady state for presenting any toxicity. Thorium has no screening level because of this lack of potential for toxicity, so it will not be carried forward as a COPC into the FS.

Table 4-11 shows the comparison of the maximum detected concentration of each inorganic constituent in the deep-zone soils to its screening level for protection of groundwater; this comparison also was summarized in Table 4-8. For groundwater protection, the following inorganic constituents detected in the deep-zone soils were identified as COPCs:

- **207-A South Retention Basin**. None
- **216-A-10 Crib**. None

- **216-A-19 Trench**. Bismuth, boron, manganese, nitrate as nitrogen, nitrate and nitrate/nitrite as nitrogen, uranium

- **216-A-36B Crib**. Bismuth, nitrate as nitrogen, nitrite as nitrogen, nitrate and nitrate/nitrite as nitrogen, uranium

- **216-A-37-1 Crib**. Aluminum, cobalt, manganese, nitrate as nitrogen, nitrate and nitrate/nitrite as nitrogen, thallium

- **216-B-12 Crib**. Nitrate as nitrogen, nitrate and nitrate/nitrite as nitrogen, uranium.

Risk screening criteria were available for all inorganic constituents except bismuth, cobalt, sulfate, and thorium. Again, for the reasons stated earlier, thorium at the levels identified (all below 6 mg/kg) and sulfate (674 mg/kg) are not considered potential health risks and will not be carried forward for further consideration in the FS. In addition to the inorganic constituents that exceeded their screening levels, bismuth at the 216-A-19 Trench and the 216-A-36B Crib and cobalt at the 216-A-37-1 Crib will be evaluated further for potential impact to groundwater during the FS.

In addition to the comparison to WAC 173-340-747 groundwater protection screening limits, those constituents present at concentrations above their screening limits were assessed for potential mobility to groundwater based on their K_d values. The following constituents that are identified as COPCs based on potential concern over groundwater protection can be categorized with respect to their K_d values as follows:

- **Zero**. Nitrate

- **Zero to one**. Boron, pentachlorophenol, methylene chloride, 2-butoxyethanol, isophorone

- **One to 40**. 1-chloropropane, beta-1,2,3,4,5,6-hexachlorocyclohexane, 2,4-dichlorophenoxyacetic acid , uranium

- **Greater than 40**. Aluminum, bismuth, cobalt, manganese, thallium, tributyl phosphate, 2-(2,4,5-trichlorophenoxy) propionic acid.

Previous Surface Transport Over Multiple Phases (STOMP) (PNNL-12034, *Subsurface Transport Over Multiple Phases (STOMP)*) modeling in the 200 Areas has indicated that any constituent with a K_d of zero is highly likely to reach the groundwater. The constituents described in the previous paragraph with K_ds between zero and one are, therefore, also considered likely to reach groundwater.

Uranium and beta-1,2,3,4,5,6-hexachlorocyclohexane have K_ds between one and 40. Uranium is also modeled as radioactive uranium via RESRAD; the results are in Section 4.4.

Constituents with K_ds greater than 40 (aluminum, bismuth, cobalt, manganese, thallium, tributyl phosphate, and 2-(2,4,5-trichlorophenoxy) propionic acid) are unlikely to reach groundwater

based on PNNL-11800, *Composite Analysis for Low-Level Waste Disposal in the 200 Area Plateau of the Hanford Site*, that indicated that a K_d value of 40 L/kg is a reasonable metric for considering the mobility of the constituent to be insufficient for transport from the vadose zone to groundwater.

Note that K_ds are not available for the two TPH compounds identified for their potential to impact groundwater. A surrogate chemical for the range of chemicals represented by each TPH could be used to determine a conservative estimate of their K_ds. It is suggested that that be done early in the FS process to determine whether or not these compounds have sufficient mobility to reach groundwater. The screening assessment of groundwater impacts in this RI Report uses a simple partitioning model with generic input parameters to identify those constituents that might impact groundwater. More sophisticated modeling, identifying appropriate transport and toxicity surrogates for a complex mixture of hydrocarbons, is planned for the FS.

4.3.3 Uncertainty Analysis

The results of the risk evaluation indicate that no potentially significant health risks are associated with direct soil contact at any of the six representative sites under an industrial-land-use scenario. This result also indicates that no potentially significant health risks are associated with direct soil contact under an intruder scenario because that scenario would involve a lower level of exposure than the industrial worker scenario. The principal uncertainty associated with this evaluation is the use of maximum detected constituent concentrations in the top 4.6 m (15 ft) of soil to represent a chronic exposure concentration across the entire site. The use of maximum detected constituent concentrations almost certainly introduces a conservative bias into the screening evaluation, although the magnitude of the bias cannot be well estimated with existing sample support.

The results of soil screening for groundwater protection indicate that a number of soil constituents may pose potentially significant groundwater impacts. The finding of potential groundwater impacts for some of these constituents is, however, implausible because of the nature of the chemical distribution in soils and the site-specific characteristics of the vadose zone. The fixed-parameter three-phase partitioning model is an equilibrium model that does not account for transport through an uncontaminated vadose zone. In the model, soil is assumed to be uniformly contaminated to the top of the aquifer. In fact, for most of the constituents, a considerable thickness of vadose zone separates contamination from the aquifer. Constituents with relatively high K_d values (see Section 4.3.2.4), such aluminum, manganese, thallium, tributyl phosphate, 2-(2,4,5-trichlorophenoxy) propionic acid , are highly unlikely to be able to infiltrate from near the ground surface to the aquifer. Discussion in PNNL-11800 concluded that constituents with K_d values of 40 mL/g or greater are considered immobile in the vadose zone and groundwater.

4.4 RESRAD MODELING

The RESRAD computer code (ANL/EAD-4) was used to evaluate potential adverse health effects of residual radionuclides in soil at the 216-B-10 Crib, 216-A-19 Trench, 216-A-10 Crib,

216-A-36B Crib, 207-A South Retention Basin, and 216-A-37-1 Crib. The Radiological COPCs identified in Section 4.4.1 were chosen based on detection status and comparison to background concentrations. The input parameter values for the RESRAD modeling and the associated rationale and assumptions are discussed in Section 4.4.2. The results of RESRAD modeling of potential health effects and groundwater impacts associated with radionuclides in shallow- and deep-soil zones are described in Section 4.4.3. Both radiological dose and cancer risk are assessed as health-effects endpoints. An uncertainty analysis for the RESRAD modeling is provided in Section 4.4.4.

4.4.1 Criteria for Selecting Radiological Contaminants of Potential Concern in Shallow-Zone Soil Samples

The COPCs are those radionuclides that pose potentially unacceptable radiological dose and/or cancer risks. Radionuclides identified in this section will be evaluated as COPCs in the RESRAD modeling. If exposure to radionuclide COPCs exceeds dose or risk criteria as determined by the RESRAD modeling, actions to improve the understanding of COPC distribution and/or migration in the environment or actions to mitigate potential exposures should be evaluated further in the FS. The technical approach for identifying radionuclide COPCs is illustrated in Figure 4-3.

4.4.1.1 Data Evaluation

All soil data collected under the Work Plan (DOE/RL-2000-60, Rev. 1) were considered in the radiological evaluation. Soil sampling information, including collection dates, sample identification numbers, depths, and analytical laboratories, is summarized in Tables 2-1 through 2-7.

All radiological constituents detected in one or more samples were included in the radiological evaluation. Sample data with estimated concentrations ("B" or "J" qualification flags) were evaluated at the reported concentration in the radiological evaluation. Rejected ("R"-qualified) data were not used in the radiological evaluation. If duplicate sample results were available for a sample, the highest reported concentration was used.

The principal distinction for data use in the radiological evaluation was the sample depth. Analytical data from samples collected at depths of 4.6 m (15 ft) or less (shallow-zone soil) were evaluated for potentially unacceptable radiation dose and cancer risk to humans from exposure under an industrial-land-use scenario. Analytical data from samples collected at all depths (deep-zone soil) were evaluated for potential groundwater impacts using the RESRAD vadose- and saturated-zone transport models.

Radionuclides detected in one or more samples at depths of 0 m to 4.6 m (15 ft), and additional radionuclides detected only at depths below 4.6 m (15 ft), are listed in Table 4-12.

4.4.1.2 Background Screening

Hanford Site 90th percentile background values were used to identify potentially waste site-related contaminants in the background screening. The background values were identified in Table 5-1 of DOE/RL-96-12.

Summary statistics are provided in Table 5-1 of DOE/RL-96-12 for several fallout radionuclides including ^{60}Co, ^{137}Cs, ^{154}Eu, ^{155}Eu, ^{238}Pu, ^{239}Pu, and ^{90}Sr. Background data for fallout radionuclides pertain to only undisturbed surface soil, and even then are sufficient to calculate a 90th percentile value for only ^{137}Cs, ^{90}Sr and ^{239}Pu (DOE/RL-96-12). Background comparisons will not be performed for fallout radionuclides because the waste sites evaluated in this RI Report do not have undisturbed surface soils and because all site data have been collected from deep-zone soils that are associated with deposition of fallout radionuclides.

The background comparisons for radionuclides (other than fallout) are presented in Table 4-12. The use of shading indicates a concentration of a radionuclide that exceeds the background screening value. The background screening is conducted separately for shallow-zone (0 to 4.6 m [15 ft]) soils and deep-zone (0 m to groundwater) soils.

As shown in Figure 4-3, shallow-zone soil radionuclide concentrations are evaluated for health impacts related to surface exposure, whereas radionuclide concentrations from any depth may be evaluated for potential groundwater impacts. Constituents with a maximum detected concentration exceeding background in one or both soil strata (shading) are evaluated in RESRAD in Section 4.4.3.

The following constituents are present at maximum concentrations greater than background or do not have an applicable background value, and will be evaluated further for either surface exposure and/or potential groundwater impacts:

- **216-B-12 Crib.** ^{241}Am, ^{14}C, ^{137}Cs, ^{155}Eu, ^{237}Np, $^{239/240}Pu$, ^{226}Ra, ^{228}Th, ^{230}Th, ^{126}Sn, ^{90}Sr, tritium, ^{234}U, ^{235}U, and ^{238}U
- **216-A-19 Trench.** ^{241}Am, ^{137}Cs, ^{155}Eu, ^{63}Ni, $^{239/240}Pu$, ^{90}Sr, ^{234}U, ^{235}U, and ^{238}U
- **216-A-10 Crib.** ^{241}Am, ^{14}C, ^{137}Cs, ^{155}Eu, ^{129}I, ^{237}Np, ^{63}Ni, ^{238}Pu, $^{239/240}Pu$, ^{40}K, ^{226}Ra, ^{90}Sr, ^{99}Tc, ^{228}Th, tritium, ^{234}U, ^{235}U, and ^{238}U
- **216-A-36B Crib.** ^{241}Am, ^{125}Sb, ^{14}C, ^{134}Cs, ^{137}Cs, ^{60}Co, ^{154}Eu, ^{155}Eu, ^{63}Ni, ^{238}Pu, $^{239/240}Pu$, ^{40}K, ^{226}Ra, ^{90}Sr, ^{99}Tc, ^{230}Th, ^{232}Th, tritium, ^{234}U, ^{235}U, ^{236}U, and ^{238}U
- **216-A-37-1 Crib.** ^{241}Am, ^{137}Cs, ^{155}Eu, ^{63}Ni, $^{239/240}Pu$, ^{90}Sr, and tritium
- **207-A South Retention Basin.** ^{241}Am, ^{137}Cs, ^{155}Eu, ^{94}Nb, $^{239/240}Pu$, ^{226}Ra, ^{230}Th, ^{90}Sr, and tritium.

4.4.2 RESRAD Assumptions and Input Parameters

Waste site-specific or Hanford Site-specific data were used where available as input parameters for the RESRAD modeling. The types of parameters for which such data were used included vadose zone hydrogeologic characteristics, radionuclide K_d values, the dimensions of each site, and the depth of cover material on each site. A detailed explanation of the derivation and application of waste site-specific and Hanford Site-specific physical data for the RESRAD modeling is provided in Sections 5.2 and 5.3.

K_d values used preferentially in the RESRAD simulations were "conservative" values from Table E.15 of PNNL-11800. Source Category "F" K_d values, corresponding to low-organic/ low-salts/near-neutral-pH releases, were used for all sites except the 216-A-10 Crib. The 216-A-10 Crib was assigned Category "H" K_d values, corresponding to low-organic/low-salts/very-acidic releases. The category "H" K_d values pertain to a high-impact zone near the release point. However, because contaminant depth profiles at the 216-A-10 Crib indicate that liquid releases historically reached groundwater, the Category "H" K_d values were applied for modeling across the entire vadose zone.

An industrial exposure scenario is used to evaluate potential surface exposure to radionuclides in soil. The exposure scenario pathway assumptions and generic RESRAD input parameter values are generally consistent with previous work in the 200-UP-1 OU. The input parameter values also are largely in accord with those described in Appendices A and B of WDOH/320-015, *Hanford Guidance for Radiological Cleanup*. The specific parameter values and associated references for each RESRAD input parameter are provided in Tables 4-13 and 4-14 for industrial land use and groundwater protection modeling, respectively.

Maximum detected concentrations of radionuclides in the 0 m to 4.6 m (15 ft) shallow-zone soil layer were evaluated for potential radiation dose and cancer risk in the industrial-land-use scenario. The specific radionuclides and exposure concentrations used in RESRAD are those indicated in shading in the column labeled "Shallow-Zone Maximum Concentration" in Table 4-12. Potential radiation dose and cancer risk associated with these concentrations were assessed under two conditions. In the first condition, labeled the "cover" scenario, the maximum detected concentration was assumed to be uniformly present across the entire site area to a depth of 4.6 m (15 ft) or more, but the site-specific depth of cover identified in Tables 2-1 and 2-2 of the Work Plan (DOE/RL-2000-60, Rev. 1) was accounted for in the RESRAD modeling. The cover material was assumed to be "clean," meaning that the cover was free of any radionuclides. In the second condition, labeled the "no cover" scenario, the maximum detected concentration was assumed to be uniformly present across the entire site area from 0 m to 4.6 m (15 ft) bgs, or deeper if borehole data indicated.

An exception to the general protocol for evaluating radionuclides in the shallow-zone soil layer was made for the 216-A-10 Crib, 216-A-36B Crib, and the 216-B-12 Crib. At these sites, the depth of cover is approximately 7.6 m to 9.2 m (25 to 30 ft). Because the depth of cover was so great, removing the cover to create a "no cover" scenario was judged to be implausible at these sites. In addition, an evaluation of surface exposure to buried contamination with the existing cover in place was not conducted at these sites because the depth of cover was considerably greater than shallow-zone soils (0 m to 4.6 m [15 ft]). However, an evaluation of

surface exposure to radionuclides at the 216-A-10 Crib and the 216-B-12 Crib was still possible because, unlike at the other sites evaluated in the RI report, radionuclide COPCs were identified in samples of the cover material at these sites.[1] To ascertain whether unacceptable impacts may be associated with these COPCs, potential exposure to radionuclides in the existing cover was evaluated under an industrial scenario for the 216-A-10 Crib and the 216-B-12 Crib. Because no radionuclide COPCs were found above background levels in the top 4.6 m (15 ft) of soil for the 216-A-36B Crib, no industrial scenario evaluation was performed for this waste site.

Maximum detected concentrations of radionuclides from 0 m to the top of the water table (deep-zone soil layer) were evaluated for potential groundwater impacts. The specific radionuclides and source-zone concentrations used in RESRAD for this evaluation are those indicated in shading in the column labeled "Deep-Zone Maximum Concentration" in Table 4-12. The actual vertical distribution of contamination indicated in the RI data was used to assign a protective estimate of the thickness of the contaminated zone for the groundwater-impact modeling.

4.4.3 RESRAD Results

Radionuclides with maximum detected concentrations exceeding background screening values, or for which background values were unavailable or not applicable, were evaluated for potential human health effects and groundwater impacts using the RESRAD computer code, Version 6.21 (ANL/EAD-4). The results of RESRAD modeling for surface exposure to contaminants in the shallow-zone soil layer and groundwater protection modeling for the deep-zone soil layer are discussed in this section.

RESRAD modeling results are presented for the individual waste sites in Sections 4.4.3.1 through 4.4.3.6. Results are presented for both present-day surface conditions (existing cover material, if present) and potential worst case surface conditions (no cover). RESRAD output was obtained at the following model years: 0, 1, 10, 30, 100, 150, 250, 500 and 1,000.
The discussion of results in Sections 4.4.3.1 through 4.4.3.6 reflects information obtained at these points in the modeling period of 0 to 1,000 years.

4.4.3.1 RESRAD Results for the 207-A South Retention Basin

Industrial Scenario. The dose assessment and risk assessment results for the 207-A South Retention Basin are shown in Tables 4-15 and 4-16, respectively. In addition to the radiation dose and cancer risk over time, the tables indicate the primary radionuclide and exposure pathway associated with dose and risk at each time. The percent contribution of individual radionuclides to dose and cancer risk is expressed in terms of the original radionuclides present at a site, rather than as the percent contribution across all parents and progeny present at some specific time. For example, dose and risk over time from some nuclides may be associated with progeny as well as the parent nuclides themselves. If no single radionuclide contributes

[1] In RESRAD, "cover" refers to uncontaminated soil above the contaminated zone being modeled. If fill material is contaminated, as is the case with the 216-A-10 and the 216-B-12 Cribs, the waste site is modeled with a "no cover" scenario.

40 percent or more to the total dose via the primary pathway, multiple radionuclides associated with the primary pathway are tabulated.

Health effects are modeled from the present day to 1,000 years in the future. Cancer risk estimates use cancer risk morbidity slope factors from *Health Risks from Low-Level Environmental Exposure to Radionuclides, Federal Guidance Report 13, Part I—Interim Version* (EPA 1998), provided in the RESRAD computer code. The 207-A South Retention Basin is not backfilled, although the basins are lined with a 10.2 cm- (4-in.-) thick cement layer. This cement layer was modeled as earthen cover material. The ground surface for the RESRAD modeling was considered to be the base of the basins rather than the grade of the surrounding land surface. Both "cover" and "no cover" alternatives were evaluated for the 207-A South Retention Basin.

Radionuclide doses for each exposure pathway and radionuclide are summed to calculate the total dose to an individual. Radiation doses over the 1,000-year modeling period are below the 15 mrem/yr target dose limit both when the cover is in place and under the no-cover condition. Cancer risks for each exposure pathway and radionuclide are summed to calculate the total cancer risk to an individual. Cancer risk estimates are evaluated relative to the target risk range of 10^{-6} to 10^{-4} described in the National Contingency Plan. Cancer risk estimates at the 207-A South Retention Basin are within the upper portion of the target risk range for the industrial exposure scenario for both existing cover and "no cover" conditions. Cancer risk estimates range from 1×10^{-5} to 3×10^{-5} with the cement layer (modeled as earth) in place, and 3×10^{-5} to 4×10^{-5} with no cover. The time of maximum total dose and risk for the industrial scenario with existing cover is at 1,000 years. Under the no cover condition, the maximum dose and risk occurs at year 0. Figure 4-4 shows the summed dose and summed risk from all radionuclides for the cover condition; Figure 4-5 shows the summed dose and risk for the no-cover condition at the 207-A South Retention Basin.

Groundwater Protection. The RESRAD model was run to 1,500 years to determine whether any radionuclides in deep-zone soil reached groundwater. The only radionuclide to reach groundwater in this period was tritium, with a maximum estimated groundwater concentration of 9.1×10^{-15} pCi/L at approximately year 698. Although groundwater use is not anticipated under an industrial-land-use scenario, dose and risk calculations for groundwater ingestion were performed to provide a context for evaluating the results of the groundwater impact modeling. A drinking water ingestion rate of 730 L/yr, corresponding to 2 L/day for 350 days/yr, was used for these calculations. Dose and risk estimates for tritium via drinking water ingestion at year 698 were essentially zero. Figure 4-6 presents the summed dose and summed risk for all radionuclides reaching groundwater. Groundwater protection modeling results for all sites are summarized in Table 4-17.

Summary of 207-A South Retention Basin RESRAD Results

Industrial, Existing Cover. Radiation dose for industrial land use was below the target criterion of 15 mrem/yr, with a maximum value of 1.5 mrem at year 1,000. Cancer risk was within the 10^{-6} to 10^{-4} risk range throughout the modeling period, with a maximum value of 3×10^{-5}. Health impacts are associated primarily with ^{226}Ra via external irradiation throughout the modeling period.

Industrial, No Cover. Radiation dose was 2.2 mrem/yr at year0, decreasing to 1.7 mrem/yr by year 1,000. Cancer risk estimates were within the 10^{-6} to 10^{-4} risk range. Cancer risk was 4×10^{-5} through year 30, then decreased to 3×10^{-5} by year 1,000. Dose and risk were primarily associated with ^{226}Ra via the external irradiation exposure pathway.

Groundwater Protection: Only tritium reached groundwater in the groundwater protection modeling. The time of maximum groundwater concentration was 698 years. Tritium dose and cancer risk were negligible.

4.4.3.2 RESRAD Results for the 216-A-10 Crib

Industrial Scenario. The dose assessment and risk assessment results for the 216-A-10 Crib are shown in Tables 4-18 and 4-19, respectively. In addition to the radiation dose and cancer risk over time, the tables indicate the primary radionuclide and exposure pathway associated with dose and risk at each time. The percent contribution of individual radionuclides to dose and cancer risk is expressed in terms of the original radionuclides present at a site, rather than as the percent contribution across all parents and progeny present at some specific time. For example, dose and risk over time from some nuclides may be associated with progeny as well as the parent nuclides themselves. If no single radionuclide contributes 40 percent or more to the total dose via the primary pathway, multiple radionuclides associated with the primary pathway are tabulated.

Health effects are modeled from the present day to 1,000 years in the future. Cancer risk estimates employ cancer risk morbidity slope factors from Federal Guidance Report 13 (EPA 1998), provided in the RESRAD computer code. The depth of cover over the contaminated zone at the 216-A-10 Crib is approximately 9.1 m (30 ft). Therefore, the contaminated zone lies below the 0 m to 4.6 m- (15-ft-) soil layer evaluated for possible surface exposure. Low concentrations of two radionuclides (^{40}K and ^{226}Ra) were measured at levels slightly above background and one (^{237}Np) was measured where background data are unavailable. Although these radionuclides are present at very low concentrations in cover material, potential health effects related to surface exposure were evaluated to provide assurance that no significant impacts are likely under current site conditions. Because the depth of cover was so great, removing the cover to create a no-cover scenario was judged to be implausible and a no-cover evaluation was not conducted.

Radionuclide doses for each exposure pathway and radionuclide are summed to calculate the total dose to an individual. Radiation doses over the 1,000-year modeling period are below the 15 mrem/yr target dose limit. Cancer risks for each exposure pathway and radionuclide are summed to calculate the total cancer risk to an individual. Cancer risk estimates are evaluated relative to the target risk range of 10^{-6} to 10^{-4} described in Title 40 *Code of Federal Regulations* (CFR) Part 300, "National Oil and Hazardous Substances Pollution Contingency Plan." Cancer risk estimates at the 216-A-10 Crib (9×10^{-5} through year 250 and 8×10^{-5} at years 500 and 1,000) lie within the target risk range of 10^{-6} to 10^{-4} throughout the modeling period. The time of maximum total dose and risk is at year 0. Figure 4-7 shows the summed dose and summed risk from all radionuclides for the cover scenario at the 216-A-10 Crib.

Groundwater Protection. The RESRAD model was run to 1,500 years to determine whether any radionuclides in deep-zone soil reached groundwater. Only tritium reached groundwater in the first 1,000 years. Tritium concentrations reached a peak of 88,000 pCi/L at year 17. Although groundwater use is not anticipated under an industrial-land-use scenario, dose and risk calculations for groundwater ingestion were performed to provide a context for evaluating the results of the groundwater impact modeling. A drinking water ingestion rate of 730 L/yr, corresponding to 2 L/day for 350 days/yr, was used for these calculations. A dose of 4.1 mrem/yr and a cancer risk of 1×10^{-4} for tritium were calculated. Between years 1,000 and 1,100, ^{129}I, ^{99}Tc, ^{14}C also reached groundwater. Iodine-129 was the most significant radionuclide, accounting for 99.9 percent of potential dose via drinking water exposure. The maximum ^{129}I concentration of 10,400 pCi/L was reached at year 1,193. This concentration was associated with a radiation dose of 2,000 mrem/yr and cancer risk of 3×10^{-2}. Concentrations of ^{14}C and ^{99}Tc at year 1,193 were 1,740 and 275 pCi/L, respectively. Radiation dose estimates were below 15 mrem/yr for both of these radionuclides.

Tritium breakthrough to groundwater occurred more quickly than breakthrough of the other radionuclides that reached groundwater because the tritium contamination is located immediately above the water table. The RESRAD model assumption of steady-state infiltration through the unsaturated zone resulted in immediate movement of tritium into groundwater from the beginning of the modeling period. In contrast, the contaminated zone of the other radionuclides did not extend through the entire vadose zone.

Groundwater modeling for tritium in the 216-A-10 Crib was performed separately from all other radionuclides because the thickness of the contaminated zone is much greater for tritium than the other radionuclides and the time of maximum dose for tritium is very different from that for the other radionuclides. Figure 4-8 presents the summed dose and summed risk for all the radionuclides except tritium reaching groundwater. Figure 4-9 presents the summed dose and summed risk for tritium reaching groundwater. Groundwater protection modeling results for all sites are summarized in Table 4-17.

Summary of 216-A-10 Crib RESRAD Results

Industrial. Radiation dose for industrial land use was below the target criterion of 15 mrem/yr. Cancer risk was on the upper end of the 10^{-6} to 10^{-4} risk range throughout the modeling period. Health impacts are associated primarily with ^{40}K via external irradiation throughout the modeling period. The soil concentration of ^{40}K used in the dose and risk calculations is approximately 10 percent greater than the background value for this radionuclide. Hence, soil concentrations may not actually be different from ambient levels and the dose and cancer risk values estimated with RESRAD may approximate values associated with background conditions.

Groundwater Protection. Iodine-129, ^{14}C, and ^{99}Tc reached groundwater between years 1,000 and 1,100. Of these radionuclides, ^{129}I contributed 99.9 percent of a theoretical radiation dose of 2,100 mrem/yr and cancer risk of 3×10^{-2} via drinking water ingestion at year 1,193. Tritium reached a maximum groundwater concentration at year 17. Tritium dose and cancer risk were estimated to be 4.1 mrem/yr and 1×10^{-4}.

4.4.3.3 RESRAD Results for the 216-A-19 Trench

Industrial Scenario. The dose assessment and risk assessment results for the 216-A-19 Trench are shown in Tables 4-20 and 4-21, respectively. In addition to the radiation dose and cancer risk over time, the tables indicate the primary radionuclide and exposure pathway associated with dose and risk at each time. The percent contribution of individual radionuclides to dose and cancer risk is expressed in terms of the original radionuclides present at a site, rather than as the percent contribution across all parents and progeny present at some specific time. For example, dose and risk over time from some radionuclides may be associated with progeny as well as the parent radionuclides themselves. If no single radionuclide contributes 40 percent or more to the total dose via the primary pathway, multiple radionuclides associated with the primary pathway are tabulated.

Health effects are modeled from the present day to 1,000 years in the future. Cancer risk estimates employ cancer risk morbidity slope factors from Federal Guidance Report 13 (EPA 1998), provided in the RESRAD computer code. The depth of cover over the contaminated zone at the 216-A-19 Trench is approximately 4.6 m (15 ft), suggesting that the contaminated zone exists below the 0 to 4.6 m- (15-ft-) soil layer evaluated for possible surface exposure. Several radionuclide COPCs (^{241}Am, ^{155}Eu, ^{63}Ni, $^{239/240}$Pu, ^{90}Sr, ^{234}U, ^{235}U, ^{238}U) were identified in a sample interval beginning at 4.4 m (14.5 ft) bgs. Although these radionuclides likely are predominantly from deeper than 4.6 m (15 ft), these radionuclides were evaluated as if they were present in a contaminated zone within 4.6 m (15 ft) of the ground surface. Both "cover" and "no cover" alternatives were evaluated for the 216-A-19 Trench, where the cover depth was considered to be 4.6 m (15 ft) thick.

Radionuclide doses for each exposure pathway and radionuclide are summed to calculate the total dose to an individual. Radiation doses over the 1,000-year modeling period are below the 15 mrem/yr target dose limit both when the cover is in place and under the no-cover condition. Cancer risks for each exposure pathway and radionuclide are summed to calculate the total cancer risk to an individual. Cancer risk estimates are evaluated relative to the target risk range of 10^{-6} to 10^{-4} described in 40 CFR 300. Cancer risk estimates at the 216-A-19 Trench are below the target risk range for the industrial exposure scenario with the existing cover. Without the existing cover, cancer risk estimates lie within the target risk range of 10^{-6} to 10^{-4} throughout the modeling period, ranging between 3×10^{-6} and 2×10^{-5}. The time of maximum total dose and risk for the industrial scenario with existing cover is at 1,000 years. Under the no-cover condition, the maximum dose and risk occur at year 0. Figure 4-10 shows the summed dose and summed risk from all radionuclides for the cover condition; Figure 4-11 show the summed dose and risk for the no-cover condition at the 216-A-19 Trench.

Groundwater Protection. The RESRAD model was run to 1,500 years to determine whether any radionuclides in deep-zone soil reached groundwater. No radionuclides reached groundwater in this period.

Summary of 216-A-19 Trench RESRAD Results

Industrial, Existing Cover. Radiation dose was 0 until year 150, then trace values were predicted through the end of the modeling period. Cancer risk values were 0 through year 500,

differing from radiation dose perhaps because of a higher threshold for reporting a value. Both dose and cancer risk estimates were values below 10^{-20}.

Industrial, No Cover. Radiation dose was 1.4 mrem/yr at year 0, decreasing to 0.24 mrem/yr by year 1,000. Cancer risk estimates were within the 10^{-6} to 10^{-4} risk range. Cancer risk was 2×10^{-5} through year 100, then decreased to 3×10^{-6} by year 1,000. Dose and risk were primarily associated with ^{238}U via the external irradiation exposure pathway.

Groundwater Protection. No radionuclides reached groundwater during a 1,500-year period.

4.4.3.4 RESRAD Results for the 216-A-36B Crib

Industrial Scenario. No radionuclide COPCs were identified above background levels in the shallow-zone soils at the 216-A-36B Crib. Industrial scenario evaluations were not run for this waste site. The depth of cover over the contaminated zone at the 216-A-36B Crib is approximately 7.6 m (25 ft). Therefore the contaminated zone exists below the 0 m to 4.6 m (15-ft) soil layer evaluated for possible surface exposure. No radionuclides were measured at concentrations exceeding background levels in the fill material. Because the depth of cover was so great, removal of the cover to create a no-cover scenario was judged to be implausible and a no-cover scenario was not evaluated.

Groundwater Protection. The RESRAD model was run to 1,500 years to determine whether any radionuclides in deep-zone soil reached groundwater. Only tritium reached groundwater in the first 1,000 years. Tritium concentrations reached 47,000 pCi/L between years 0and 1. Although groundwater use is not anticipated under an industrial-land-use scenario, dose and risk calculations for groundwater ingestion were performed to provide a context for evaluating the results of the groundwater-impact modeling. A drinking water ingestion rate of 730 L/yr, corresponding to 2 L/day for 350 days/yr, was used for these calculations. A dose of 2.2 mrem/yr and a cancer risk of 5×10^{-5} for tritium were calculated for years 0 to 1. Groundwater modeling for tritium at the 216-A-36B Crib was performed separately from all other radionuclides because the thickness of the contaminated zone is much greater for tritium than the other radionuclides, and the time of maximum dose for tritium is different from that for the other radionuclides. Figure 4-12 presents the summed dose and summed risk for all radionuclides reaching groundwater except tritium. Figure 4-13 presents the summed dose and summed risk for the tritium reaching groundwater. Groundwater protection modeling results for all sites are summarized in Table 4-17.

Between years 1,000 and 1,100, ^{99}Tc reached groundwater. The maximum ^{99}Tc concentration of 14,400 pCi/L was reached at year 1,025. This concentration was associated with a radiation dose of 15.3 mrem/yr and cancer risk of 6×10^{-4}.

Tritium breakthrough to groundwater occurred more quickly than breakthrough for ^{99}Tc because the tritium contamination is located immediately above the water table. The RESRAD model assumption of steady-state infiltration through the unsaturated zone resulted in immediate movement of tritium into groundwater from the beginning of the modeling period. In contrast, ^{99}Tc had to migrate through the vadose zone to reach groundwater, which took approximately 1,000 years.

Summary of 216-A-36B Crib RESRAD Results

Industrial Scenario. No evaluation was performed because no radionuclide COPCs were found above background levels in shallow-zone soils at this waste site and because the depth of cover was so great that removing the cover to create a no-cover scenario was judged to be implausible.

Groundwater Protection. Technetium-99 reached groundwater between years 1,000 and 1,100. It contributed a theoretical radiation dose of 15.3 mrem/yr and cancer risk of 6×10^{-4} via drinking water ingestion at year 1,025. Tritium reached a maximum groundwater concentration at years 0 to 1. Tritium dose and cancer risk were estimated to be 2.2 mrem/yr and 5×10^{-5}.

4.4.3.5 RESRAD Results for the 216-A-37-1 Crib

Industrial Scenario. The dose assessment and risk assessment results for the 216-A-37-1 Crib are shown in Tables 4-22 and 4-23, respectively. In addition to the radiation dose and cancer risk over time, the tables indicate the primary radionuclide and exposure pathway associated with dose and risk at each time. The percent contribution of individual radionuclides to dose and cancer risk is expressed in terms of the original radionuclides present at a site, rather than as the percent contribution across all parents and progeny present at some specific time. For example, dose and risk over time from some radionuclides may be associated with progeny as well as the parent radionuclides themselves. If no single radionuclide contributes 40 percent or more to the total dose via the primary pathway, multiple radionuclides associated with the primary pathway are tabulated.

Health effects are modeled from the present day to 1,000 years in the future. Cancer risk estimates employ cancer risk morbidity slope factors from Federal Guidance Report 13 (EPA 1998), provided in the RESRAD computer code. The depth of cover over the contaminated zone at the 216-A-37-1 Crib is approximately 2.4 m (8 ft), suggesting that a portion of the contaminated zone lies within the 0 to 4.6 m (15 ft) soil layer evaluated for possible surface exposure. Both cover and no-cover alternatives were evaluated for the 216-A-37-1 Crib.

Radionuclide doses for each exposure pathway and radionuclide are summed to calculate the total dose to an individual. Radiation doses over the 1,000-year modeling period are below the 15 mrem/yr target dose limit both when the cover is in place and under the no-cover condition. Cancer risks for each exposure pathway and radionuclide are summed to calculate the total cancer risk to an individual. Cancer risk estimates are evaluated relative to the target risk range of 10^{-6} to 10^{-4} described in 40 CFR 300. Cancer risk estimates at the 216-A-37-1 Crib are below the target risk range for the industrial exposure scenario for both existing cover and no-cover conditions. The time of maximum total dose and risk for the industrial scenario under both existing cover and no-cover conditions is at 1,000 years. Figure 4-14 shows the summed dose and summed risk from all radionuclides for the cover condition and Figure 4-15 shows the summed dose and risk for the no-cover condition.

Groundwater Protection. The RESRAD model was run to 1,500 years to determine whether any radionuclides in deep-zone soil reached groundwater. The only radionuclide to reach groundwater in this period was tritium, with a maximum estimated groundwater concentration of

8.5 pCi/L at approximately year 168. Although groundwater use is not anticipated under an industrial-land-use scenario, dose and risk calculations for groundwater ingestion were performed to provide a context for evaluating the results of the groundwater impact modeling. A drinking water ingestion rate of 730 L/yr, corresponding to 2 L/day for 350 days/yr, was used for these calculations. Dose and risk estimates for tritium via drinking water ingestion at year 168 were 0.00039 mrem/yr and 9×10^{-9}, respectively. Figure 4-16 presents the summed dose and summed risk for all radionuclides reaching groundwater. Groundwater protection modeling results for all sites are summarized in Table 4-17.

Summary of 216-A-37-1 Crib RESRAD Results

Industrial, Existing Cover. Radiation dose for industrial land use was below the target criterion of 15 mrem/yr, with a maximum value of 1.1×10^{-19} at year 0. Cancer risk was below the 10^{-6} to 10^{-4} risk range throughout the modeling period, with a maximum value of 2×10^{-24}. Health impacts are primarily associated with ^{137}Cs via external irradiation throughout the modeling period.

Industrial, No Cover. Radiation dose was 0.018 mrem/yr at year 0, decreasing to 1.4×10^{-12} mrem/yr by year 1,000. Cancer risk estimates were below the 10^{-6} to 10^{-4} risk range. Cancer risk was 5×10^{-7} through year 1, then decreased to 2×10^{-17} by year 1,000. Dose and risk were associated primarily with ^{137}Cs via the external irradiation exposure pathway. However, in the first 10 years of the modeling period, tritium exposure via inhalation was important for cancer risk. The difference in the importance of tritium between dose and risk is attributable to differences in the derivation of measures of total effective dose equivalent (dose conversion factors) and cancer risk incidence (cancer slope factors).

Groundwater Protection. Only tritium reached groundwater in the groundwater protection modeling. The time of maximum groundwater concentration was 168 yrs. Tritium dose and cancer risk were estimated to be 3.9×10^{-4} mrem/yr and 9×10^{-9} for tritium.

4.4.3.6 RESRAD Results for the 216-B-12 Crib

Industrial Scenario. The dose assessment and risk assessment results for the 216-B-12 Crib are shown in Tables 4-24 and 4-25, respectively. In addition to the radiation dose and cancer risk over time, the tables indicate the primary radionuclide and exposure pathway associated with dose and risk at each time. The percent contribution of individual radionuclides to dose and cancer risk is expressed in terms of the original radionuclides present at a site, rather than as the percent contribution across all parents and progeny present at some specific time. For example, dose and risk over time from some radionuclides may be associated with progeny as well as the parent radionuclides themselves. If no single radionuclide contributes 40 percent or more to the total dose via the primary pathway, multiple radionuclides associated with the primary pathway are tabulated.

Health effects are modeled from the present day to 1,000 years in the future. Cancer risk estimates employ cancer risk morbidity slope factors from Federal Guidance Report 13 (EPA 1998), provided in the RESRAD computer code. The depth of cover over the contaminated zone at the 216-B-12 Crib is approximately 9.0 m (30 ft). Therefore, the

contaminated zone lies below the 0 m to 4.6 m (15-ft) soil layer evaluated for possible surface exposure. Low concentrations of one radionuclide (^{230}Th) were measured at levels slightly above background and low concentrations were measured of two radionuclides (^{126}Sn and tritium)where background data are unavailable. Although these radionuclides are present at very low concentrations in cover material, potential health effects related to surface exposure were evaluated to provide assurance that no significant impacts are likely under current site conditions. Because the depth of cover was so great, removal of the cover to create a no-cover scenario was judged to be implausible and a no-cover evaluation was not conducted.

Radionuclide doses for each exposure pathway and radionuclide are summed to calculate the total dose to an individual. Radiation doses are below the 15 mrem/yr target dose limit throughout the modeling period. Cancer risks for each exposure pathway and radionuclide are summed to calculate the total cancer risk to an individual. Cancer risk estimates are evaluated relative to the target risk range of 10^{-6} to 10^{-4} described in 40 CFR 300. Cancer risk estimates at the 216-B-12 Crib are below 10^{-6} through year 30, then remain in the lower end of target risk range for the rest of the modeling period. The time of maximum total dose and risk within the modeling period is at 1,000 years.

The RESRAD computer code library of radionuclides available for modeling does not contain ^{126}Sn. Therefore, this radionuclide was not included in the simulation. Comparing ingestion, inhalation, and external dose conversion factors (DCF) for ^{126}Sn (maximum soil concentration of 0.742 pCi/g) and ^{230}Th (maximum soil concentration of 1.19 pCi/g) indicates that the contribution of ^{126}Sn to radiation dose still would result in dose well below the 15 mrem/yr target limit. Dose conversion factors used in RESRAD are taken from DE89-011065, *Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion, Federal Guidance Report 11*, and EPA-402-R-93-081, *External Exposure to Radionuclides in Air, Water, and Soil, Federal Guidance Report 12*. Dose conversion factors for ^{126}Sn in DE89-011065 and EPA-402-R-93-081 are 0.115 mrem/yr/pCi/cm^3, 1.95 x 10^{-5} mrem/pCi, and 9.95E-05 mrem/pCi for external irradiation, ingestion, and inhalation, respectively. Dose conversion factors for ^{230}Th in RESRAD are 1.51x 10^{-3} mrem/yr per pCi/cm^3, 5.48E-04 mrem/pCi, and 0.326 mrem/pCi for external irradiation, ingestion, and inhalation, respectively.

Radiation dose from ^{230}Th is related primarily to soil ingestion and dust inhalation, evident in estimated doses at years 0 and 1. In later years, external irradiation related to ^{226}Ra and its progeny becomes more important as they ingrow from ^{230}Th. The ingestion and inhalation DCFs of ^{126}Sn are smaller than the corresponding DCFs for ^{230}Th. Similarly, the external DCF for ^{126}Sn is much smaller than that for ^{226}Ra (14 mrem/yr per pCi/cm^3). Therefore, it is unlikely that excluding ^{126}Sn from the RESRAD modeling significantly affected the results. Figure 4-17 shows the summed dose and summed risk from all radionuclides for the cover condition at the 216-B-12 Crib.

Groundwater Protection. The RESRAD model was run to 1,500 years to determine whether any radionuclides in deep-zone soil reached groundwater. The only radionuclide to reach groundwater in this period was tritium, with a maximum estimated groundwater concentration of 6.3 x 10^{-10} pCi/L at approximately year 526. Although groundwater use is not anticipated under

an industrial-land-use scenario, dose and risk calculations for groundwater ingestion were performed to provide a context for evaluating the results of the groundwater impact modeling. A drinking water ingestion rate of 730 L/yr, corresponding to 2 L/day for 350 days/yr, was used for these calculations. Dose and risk estimates for tritium via drinking water ingestion at year 526 were essentially 0. Figure 4-18 presents the summed dose and summed risk for all radionuclides reaching groundwater. Groundwater protection modeling results for all sites are summarized in Table 4-17.

Although ^{126}Sn is not included in the RESRAD radionuclide library, ^{113}Sn is included and is assigned a default K_d value of zero. This suggests that tin is potentially mobile in the vadose zone.

Summary of 216-B-12 Crib RESRAD Results

Industrial. Radiation dose for industrial land use was below the target criterion of 15 mrem/yr. Cancer risk was less than 1×10^{-6} through year 30, then increased slowly to 1×10^{-5} at year 1,000. Health impacts are primarily associated with ^{230}Th via external irradiation throughout the modeling period.

Groundwater Protection. Only tritium reached groundwater in the groundwater protection modeling. The time of maximum groundwater concentration was 526 years, but tritium groundwater concentrations at that time were trace and dose and risk estimates were negligible.

4.4.4 Uncertainty Analysis

The analysis of potential surface exposure and groundwater impacts using the RESRAD computer code contains protective biases meant to ensure that the results represent a reasonable worst case evaluation. Sources of uncertainty that are considered particularly significant are described in the following paragraphs. This uncertainty analysis will focus on identifying and qualifying these biases.

The protective nature of the RESRAD transport model (one-dimensional flow with no lateral dispersion) was described in Sections 5.2 and 5.3. Conditions that facilitate migration of a particular radionuclide from soil to groundwater at a site include a low K_d value, high soil concentration, and short distance to groundwater. The recharge rate also is an important factor in modeling transport through the vadose zone, but the RESRAD parameters affecting recharge were held constant across all six sites, so this factor does not differentiate one site from another in these simulations. Among the radionuclides that reached groundwater, all have K_d values of 0 except for ^{14}C, which has a K_d of 0.5. The sensitivity of the RESRAD vadose and groundwater transport model to K_d value in these model runs is evident in the groundwater protection modeling for the 216-A-36B Crib. Carbon-14 and the uranium isotopes, with K_d values of 0.5 and 0.6, respectively, did not reach groundwater even at 2,000 years. By contrast, ^{99}Tc with a K_d value of 0 reached groundwater just after year 1,000. Because of the great sensitivity of K_d values in the RESRAD modeling, conservative estimates of K_d values were used in the

groundwater protection screening. RESRAD distribution coefficient selection and sources for the values used is discussed in Section 5.3.2.

A major uncertainty associated with both the surface exposure and groundwater protection evaluations is the use of maximum detected constituent concentrations to represent a soil source term across an entire site. The use of maximum detected constituent concentrations almost certainly introduces a very conservative bias into the radionuclide dose and risk evaluations, although the magnitude of the bias cannot be well estimated with existing sample support.

The industrial exposure scenario is based on reasonable worst case exposure conditions as listed in Table 4-13. Such input parameters as soil ingestion rate, exposure frequency, and exposure duration are biased toward the upper end of likely exposure values.

In addition to the protective bias related to specific parameter values, a question of theoretical versus actual land use arises when considering the RESRAD results. Presently, the primary receptors in the area of the waste sites in the 200-PW-2 and 200-PW-4 OUs are field personnel involved with sampling and monitoring. No chronic, daily exposure scenario is being realized at these sites at this time. Hence the industrial doses and risks are inherently theoretical. Where maximum exposure occurs at time 0, the industrial scenario results also are biased from temporal discontinuity between the model time and a time when the exposure scenario might actually be realized.

Considerable uncertainty is associated with the radionuclide dose conversion factors and slope factors applied within RESRAD for these calculations. Most generally, these factors employ dose-response models that extrapolate from effects observed at relatively high radiation dose rates to the relatively low dose rates more common in environmental assessments. This type of dose-response model assumes that effects observed at high doses, such as cancer incidence, also may be observed at lower doses, albeit at correspondingly lower frequency. As dose rates decrease, it is possible, though uncertain, that the model fails and that at some dose rates little or no correlation exists between dose and response.

4.5 ECOLOGICAL RISK SCREENING

Steps 1 and 2 of the Ecological Risk Assessment Guidelines process (EPA/540/R-97/006) consist of a conducting risk screening that compares concentrations of COPECs in media at the site to ecotoxicity-based soil concentrations. For risk screening at the 200-PW-2 and 200-PW-4 representative sites, preestablished screening levels for soil from WAC 173-340-900; Table 749-3, "Ecological Indicator Soil Concentrations (mg/kg) for Protection of Plants and Animals," and the ecological soil screening levels (Eco-SSL) developed by the EPA (EPA 2003) for screening soils at contaminated sites were used for comparison to concentrations of nonradionuclides. Soil concentrations of radionuclides were compared to the dose-based soil screening levels developed in the DOE BCGs for protection of terrestrial systems (DOE-STD-1153-2002). The basis of these screening levels and the assumptions incorporated into them are discussed in the following sections. All of these screening levels were developed based on mathematical models incorporating estimates of intake through food and soil ingestion pathways. These screening levels are based on modeled risk to generalized receptors

representing plants, soil biota, mammals, and birds. The conservatively derived levels are expected to be protective of plant and animal species currently found at these sites, as well as those species that may be present at the sites in the future. The overall ecological screening approach for the 200-PW-2 and 200-PW-4 OU representative sites is illustrated in Figure 4-19.

4.5.1 Exposure Parameter Estimates

Most of the screening values used in this analysis assume that the receptor is exposed to the site 100 percent of the time. This assumption is the basis of the screening values developed for the DOE biota concentration guidelines and the EPA Eco-SSLs. The WAC 173-340-900 wildlife screening values assume an area use factor (AUF) of 1 for the mammalian herbivore receptor (a vole), but use an AUF of 0.52 for the avian predator (a robin) and an AUF of 0.50 for the mammalian predator (a shrew) to represent that these receptors may use areas outside of the site under consideration.

All screening levels considered in this analysis incorporate 100 percent bioavailability of chemicals and radionuclides in soil and food items. For many chemicals, this assumption will overestimate the dose and, therefore, the potential risk to the ecological receptor. Though this assumption is conservative, it is the only assumption that is appropriate in the absence of site-specific information regarding the actual bioavailability of these chemicals.

During the screening phase, populations of receptors potentially at the site are considered to include all life stages of a species. Therefore, toxicity data available for growth, reproduction, or survival at any stage of the receptor's life cycle is used in developing the screening levels.

The exposure parameters used in developing the screening values are designed to provide an appropriate level of conservatism for a screening assessment. The equations for soil concentration include the estimated intake through the food chain and through direct ingestion of soil by the receptor. These food ingestion rates usually are based on empirically derived allometric equations originally developed by K. A. Nagy (Nagy 1987); these allometric equations correlate food ingestion rate to body weight (EPA/600/R-93/187, *Wildlife Exposure Factors Handbook*). Body weights for receptor species used to develop screening levels are developed from EPA/600/R-93/187) or other literature values. Soil ingestion rates generally are estimated as a percentage of the total food intake (EPA/600/R-93/187).

Bioaccumulation factors are used to estimate the concentration of contaminants in food items consumed by the receptor species on which the screening levels are based.
The WAC 173-340-900 screening values use K_{plant} to represent the plant uptake coefficient and BAF to represent the earthworm bioaccumulation factor. Use of these factors accounts for the potential for some contaminants to concentrate in higher levels in food organisms such as invertebrates and plants than in the surrounding soil. These bioaccumulation factors are conservative estimates of the reasonable maximum values and are based generally on the chemical properties of the contaminant; though empirical values sometimes are available.

To account for differences in accumulation and consumption, the screening levels calculated soil levels for species representing omnivores, carnivores, and herbivores. The lowest of these soil levels was selected as the screening value protective of wildlife.

4.5.2 Ecological Toxicity of Possible Contaminants of Potential Ecological Concern

The exposure routes considered in developing the screening levels are direct ingestion of food and soil. The toxicity values used to develop the screening values therefore also are based on ingestion. The toxicity values for the WAC 173-340-7490 screening values and the EPA Eco-SSLs correspond to doses that, based on the results of toxicity studies, are expected to be low enough to produce minimal or no adverse effects in the species being considered. The radionuclide screening levels are based on a total dose of 0.1 rad/day to the terrestrial wildlife species. This radiation dose was established as a predicted safe chronic exposure dose by the International Atomic Energy Agency (1992) and the United Nations Scientific Committee on the Effects of Atomic Radiation (1996). The screening levels for soil provided in the DOE BCGs include both the internal dose from ingesting radionuclides from food or soil and the external dose provided from surface exposure to soil.

The screening levels for radionuclides and nonradionuclides are based on estimates of effects to several categories of organisms. For both the WAC 173-340-900 screening values and the EPA Eco-SSLs, exposures were modeled based on plants, soil invertebrates, mammals, and birds. Other categories of receptors, such as reptiles, were not included because adequate toxicity information was not available to develop safe doses of chemicals or radiation for these categories of organisms. The screening levels for mammals and birds included animals modeled with different diets (herbivores and carnivores) but do not include receptors representing the higher level carnivores. Because the modeled herbivores and first level carnivores are believed to have higher rates of exposure, the screening levels used should be protective of the higher level carnivores as well. The DOE BCGs for terrestrial systems consider both terrestrial plants (1.0 rad/day dose) and terrestrial animals (0.1 rad/day dose) and are developed to be protective of populations of these plant and animal species.

4.5.3 Screening-Level Risk Calculations

This section presents the results of the comparison of the maximum concentration detected in the upper 4.6 m (15 ft) of the soil column at each representative site with the applicable screening level.

For radionuclides, the results for both detected and nondetected compounds are included in these tables. Each radionuclide is screened against its individual dose guideline, therefore no comparisons were made to gross alpha and beta measurements. Tables 4-32 through 4-37 provide the screening results for radionuclide COPECs at all six of the characterized sites. Rows in the tables that are shaded designate COPECs detected at a maximum concentration that exceeded its screening level or for which no screening level was available. Radionuclides and chemicals whose maximum detected concentration was less than their background concentration

were not retained (and do not have shading). However, the dose fraction was calculated for any radionuclide for which a BCG was available, even if the radionuclide concentration was at or below the background concentration. The designation "NA" indicates that a value is not available or not applicable; "ND" designates a nondetected radionuclide. The radionuclide COPECs at each site are summarized as follows:

- **207-A South Retention Basin.** ^{228}Ac, ^{212}Bi, ^{214}Bi, ^{212}Pb, ^{214}Pb, ^{94}Nb, ^{208}Tl, ^{230}Th, ^{234}Th
- **216-A-10 Crib.** ^{237}Np, ^{40}K
- **216-A-19 Trench.** ^{228}Ac, ^{212}Bi, ^{214}Bi, ^{212}Pb, ^{214}Pb, ^{63}Ni, ^{208}Tl, ^{234}Th
- **216-A-36-B Crib.** ^{228}Ac, ^{212}Bi, ^{214}Bi, ^{212}Pb, ^{214}Pb, ^{208}Tl
- **216-A-37-1 Crib.** ^{228}Ac, ^{212}Bi, ^{214}Bi, ^{212}Pb, ^{214}Pb, ^{208}Tl
- **216-B-12 Crib.** ^{230}Th, ^{126}Sn.

All radionuclides retained as COPECs were retained because they were detected above background levels or had no background value and no DOE dose biota guideline was available. Dose biota guidelines will be developed for these radionuclides in the FS.

Tables 4-26 through 4-31 provide the screening results for nonradionuclide COPECs at six of the representative sites. Screening levels were obtained first from WAC 173-340-900, Table 749-3, for wildlife receptors. If this table contained no screening value for a wildlife receptor, a screening value for wildlife was obtained from EPA's ECO-SSLs for wildlife receptors (EPA 2003). If no wildlife screening level was available from this source, a screening level from the lower of plant or soil biota screening levels from WAC 173-340-900, Table 749-3, was used. The table footnotes provide the source for each screening level.

For inorganic compounds, the results for both detected and nondetected compounds are included in these tables. To conserve space, only detected chemicals from the organic analyses are included in the Chapter 4.0 tables. Chemicals that serve as essential nutrients (calcium, iron, magnesium, potassium, and sodium) were not evaluated as COPECs. Bismuth also was not evaluated as a COPEC because of its extremely low toxicity. The designation "NA" indicates that a value is not available or not applicable; "ND" designates a nondetected inorganic chemical. The nonradionuclide contaminants of ecological concern (COEC) at each site areas follows:

- **207-A South Retention Basin.** Nitrate*, silver; 2,4-dichlorophenoxyacetic acid; 2-(2,4,5-trichlorphenoxy) propionic acid; acetone, chloroform, methylene chloride, butylbenzylphthalate

*Although they exceed the initial screen, ammonia, chloride, fluoride, phosphate, sulfate, and sulfide are not regulated under WAC 173-340-900, are naturally occurring nutrients in soils, and therefore are not considered

- **216-A-10 Crib**. Boron, nitrite*; beta-1,2,3,4,5,6-hexachlorocyclohexane
- **216-A-19 Trench**. Boron, thorium, vanadium, fluoride*, nitrate*, phosphate*, bis(2-ethylhexyl) phthalate, tributyl phosphate
- **216-A-36B Crib**. Silver, thorium
- **216-A-37-1 Crib**. Barium, boron, thorium, ammonia*, nitrate*, nitrite* acetone, bis(2-ethylhexyl) phthalate, tributyl phosphate
- **216-B-12 Crib**. Nitrate*, boron, sulfate*, bis(2-ethylhexyl) phthalate.

The organic nonradionuclide chemicals and thorium were retained as COECs because they had no screening levels for comparison in the WAC 173-340-900 tables or the EPA's Eco-SSLs. Screening levels for these chemicals will be developed in the FS. A number of inorganic nonradionuclides (barium, boron, silver, and vanadium) were retained as COECs because they exceeded wildlife screening values. The hazard quotients (HQ), which is the ratio of the maximum detected concentration divided by its lowest available screening level, for these three metals are given in Table 4-38. These COECs will be investigated further during the FS. Appendix B presents tables of the full results for all analyses, including nondetected organic chemicals and the detected concentrations of the chemicals excluded as essential nutrient.

4.5.4 Uncertainty Assessment

The media screening levels used in this screening assessment were designed to provide concentrations that were protective enough to be used to screen out potential contaminants at a wide range of sites. These screening levels are based on potential risk to birds, mammals, soil biota, and plants. The screening levels are based on generic receptor species in these feeding guides; the receptors are not specific to a particular site and the exposure parameters chosen for each receptor. The only species-specific exposure parameters used to generate the screening levels are body weight (from which the food ingestion rate is calculated using allometric scaling) and the soil ingestion rate. The soil ingestion rate generally is estimated as a percentage of the total food ingestion rate, but for some species empirically measured values can be obtained from the literature. Clearly, the estimated soil concentration corresponding to ingestion of a toxic dose will depend primarily on these ingestion parameters.

For some of the screening levels used in this analysis, the assumed area use factor was 1. This assumption is the basis of all the screening values developed for the DOE biota concentration guidelines and the EPA Eco-SSLs. The WAC 173-340-900 screening levels for the mammalian herbivore assume an AUF of 1, but the AUF is approximately 0.5 for the other wildlife receptors considered in developing these screening levels (WAC 173-340-900, Table 749-4). The assumptions of area use may result in screening levels that over- or

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further in this evaluation. Nitrate and nitrite are essential nutrients for plants and are not considered further as COECs for ecological risk

underestimate the potential risk to the ecological receptors. A comparison of area use by species present in these portions of the 200 Areas with their home ranges used to develop the screening levels would be necessary to determine whether this factor over- or underestimates the potential risk from contamination at these sites. The size of the sites relative to the home ranges and the potential exposure to multiple sites of a single receptor also would need to be considered. The more in-depth ecological assessment currently under way for the entire Hanford Site will be used to address these issues.

Food ingestion rates for receptors used to develop the screening levels are based on empirically-derived allometric equations (Nagy 1987); these allometric equations correlate food ingestion rate to body weight (EPA/600/R-93/187). A lower body weight value will result in the calculation of a higher food intake per unit body weight (mg food/kg body weight/day) that corresponds to a higher estimated dose of contaminants per unit body weight.

Bioaccumulation factors are used to estimate the concentration of contaminants in food items consumed by the receptor species on which the screening levels are based. Use of these factors accounts for the potential for some contaminants to concentrate in higher levels in food organisms such as invertebrates and plants than in the surrounding soil. These bioaccumulation factors are conservative estimates generally based on the chemical properties of the contaminant, though empirical values sometimes are available. Bioaccumulation factors do not account for physiological regulation of chemicals within the organism or for excretion of chemicals from the organism. The bioaccumulation factors therefore generally overestimate the concentration of a contaminant within an organism that serves as food for another organism.

Differences in dietary composition can affect the calculation of an acceptable soil concentration for a contaminant. Herbivores consume a larger mass of food to meet their energetic needs, but contaminants may accumulate to higher levels in the prey consumed by omnivores and carnivores. To account for differences in accumulation and consumption, the screening levels calculated soil levels for species representing omnivores, carnivores, and herbivores. The lowest of these soil levels was considered to be protective of wildlife. This assumption provides appropriate protection for all wildlife species regardless of the composition of their diet.

The suite of available screening levels in the WAC 173-340-900 screening levels and the EPA Eco-SSLs is limited; over half of the COECs retained for further consideration were retained because no screening value was available in the selected set of values. Toxicity information from scientific literature and other databases can be used to develop screening levels for the same receptor species modeled in the WAC 173-340-900 screening levels and the EPA Eco-SSLs. It may be possible to eliminate additional COECs for these representative sites by using a larger set of screening levels. Alternatively, a set of screening levels for all COECs could be developed based on a new set of modeled receptors based on species found at the 200 Areas at the Hanford Site.

A number of the COECs retained for these sites include general inorganic compounds found in soils, such as nitrate, phosphate, and sulfate. Although these compounds were seen at some of the representative sites at concentrations above background values, they are unlikely to represent a potential threat to ecological receptors because they are naturally occurring elements of soil. Nitrate/nitrite, phosphate, ammonia, and fluoride will not be considered further in the ecological

evaluation because of their general status as nutrients, particularly for plant species, and typically low toxicity.

Data Gaps and Potential Lines of Investigation

The screening results indicate a potential for adverse ecological effects; therefore a more detailed ecological risk assessment, incorporating more site-specific information, is needed. A number of data gaps will need to be addressed in the next step of the ecological evaluation (i.e., the Sitewide ecological DQOs). Screening levels are missing for a number of chemicals and radionuclides detected at these sites; toxicity threshold values for these chemicals and radionuclides will have to be developed. The screening levels used are based on general representative species such as "herbivorous mammal"; screening levels developed for species specific to the 200 Area, such as the Great Basin pocket mouse or the meadowlark, may reduce some of the uncertainty in the screening results. An ecological risk assessment will be performed for these sites. The risk assessment will incorporate more site-specific information, such as screening levels based on actual species found at the site, and consider additional parameters, such as the size of the contaminated sites and the home range of the receptor species. This more site-specific ecological risk assessment will provide information for decision-making about the remaining COPECs for representative sites and whether additional investigation or remediation is necessary. The assessments will be performed as part of the ecological DQOs and associated sampling and analysis plan, currently planned for 2006 to 2007. The assessment will affect sites on the Central Plateau.

Figure 4-1. Conceptual Site Model For Human Health.

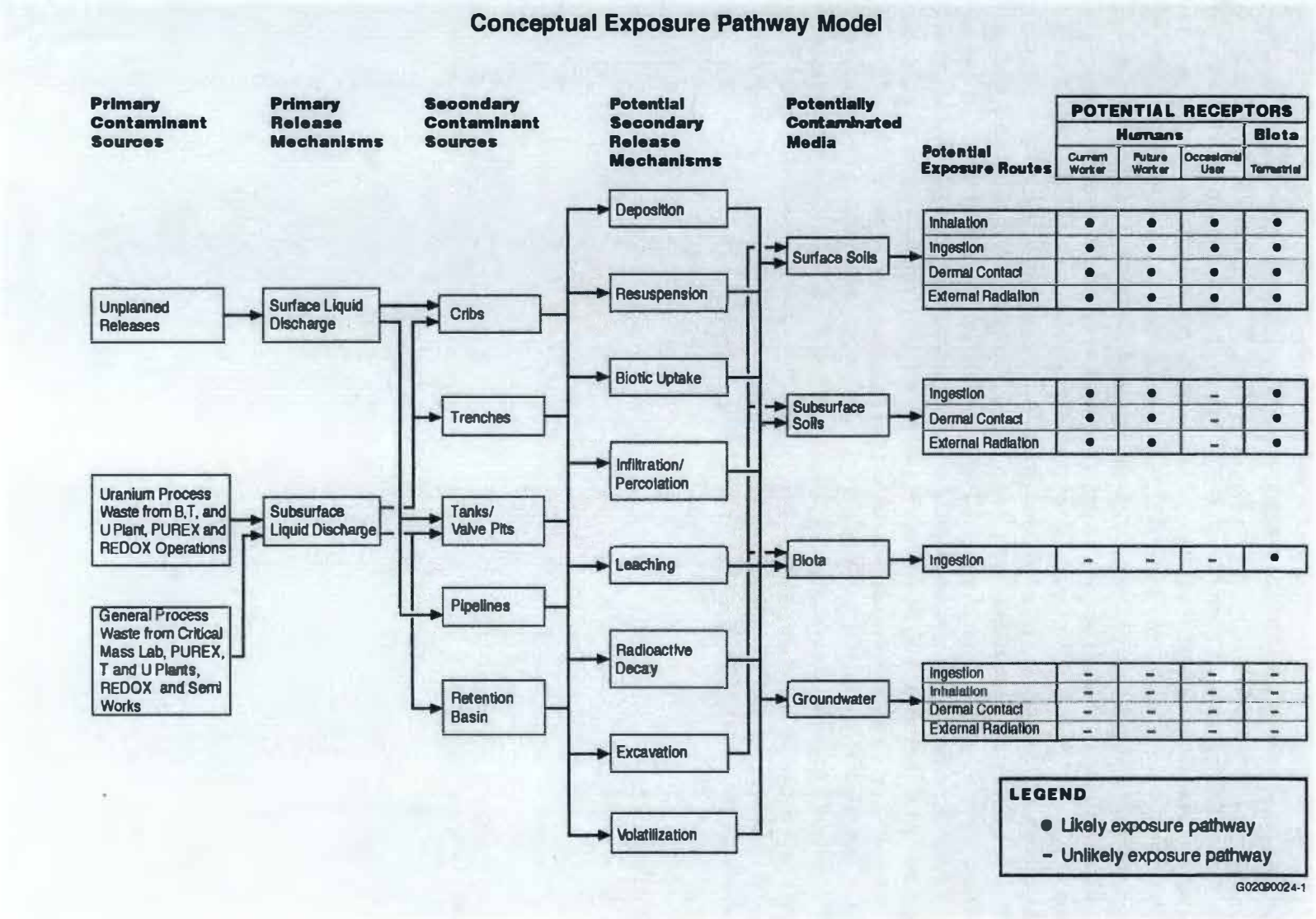


Figure 4-2. Human Health Flowchart for Nonradionuclides.

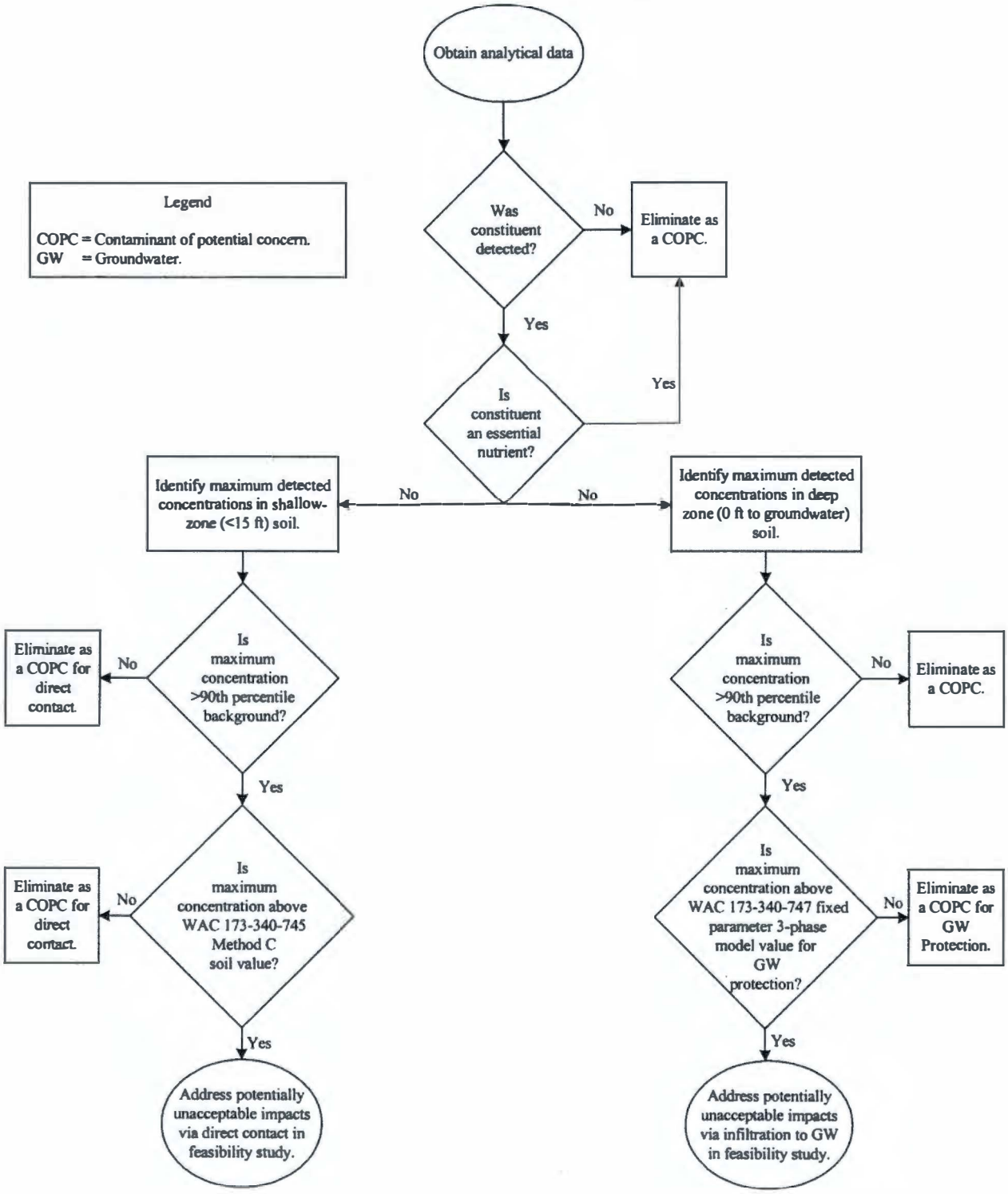


Figure 4-3. Human Health Flowchart for Radionuclides.

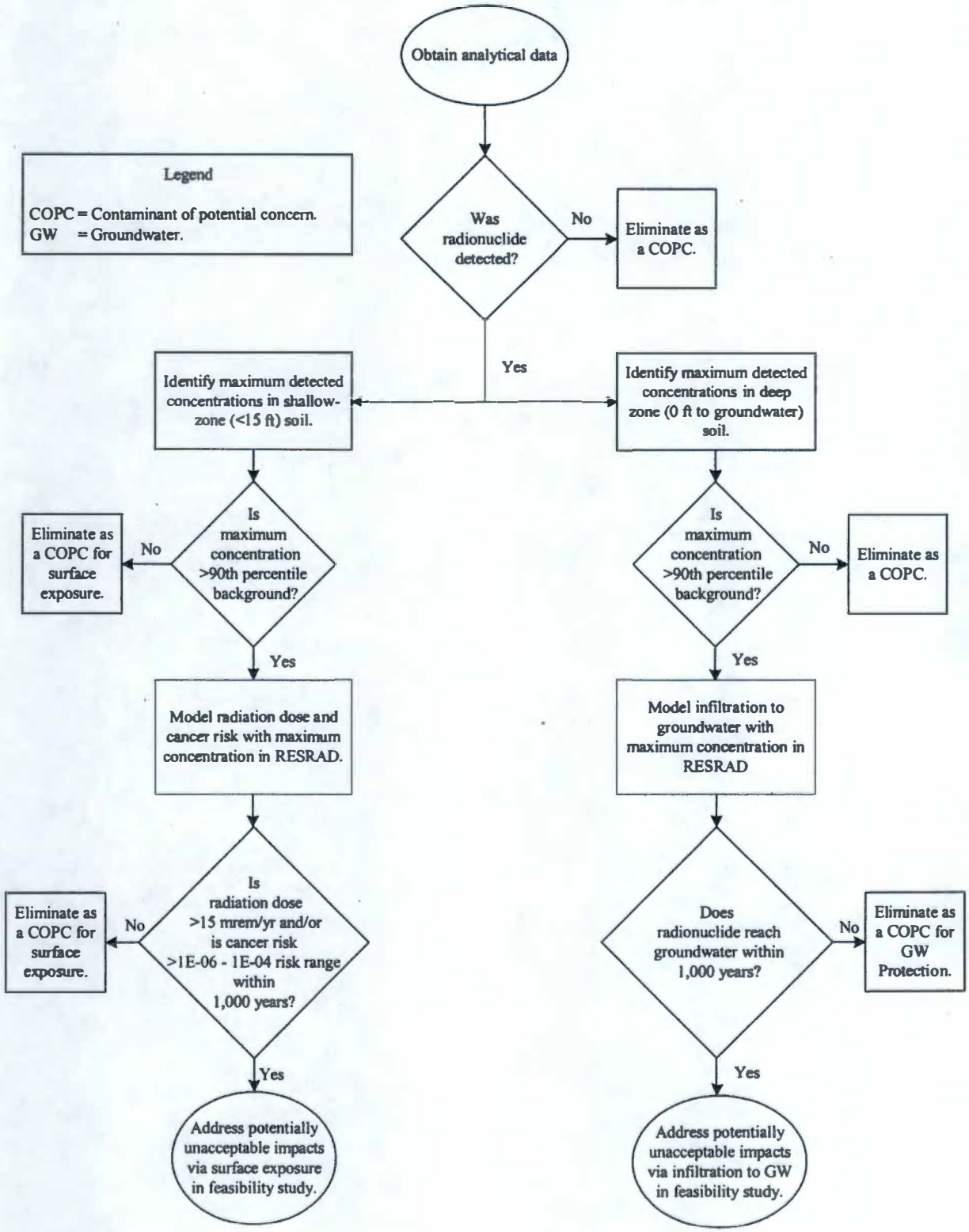
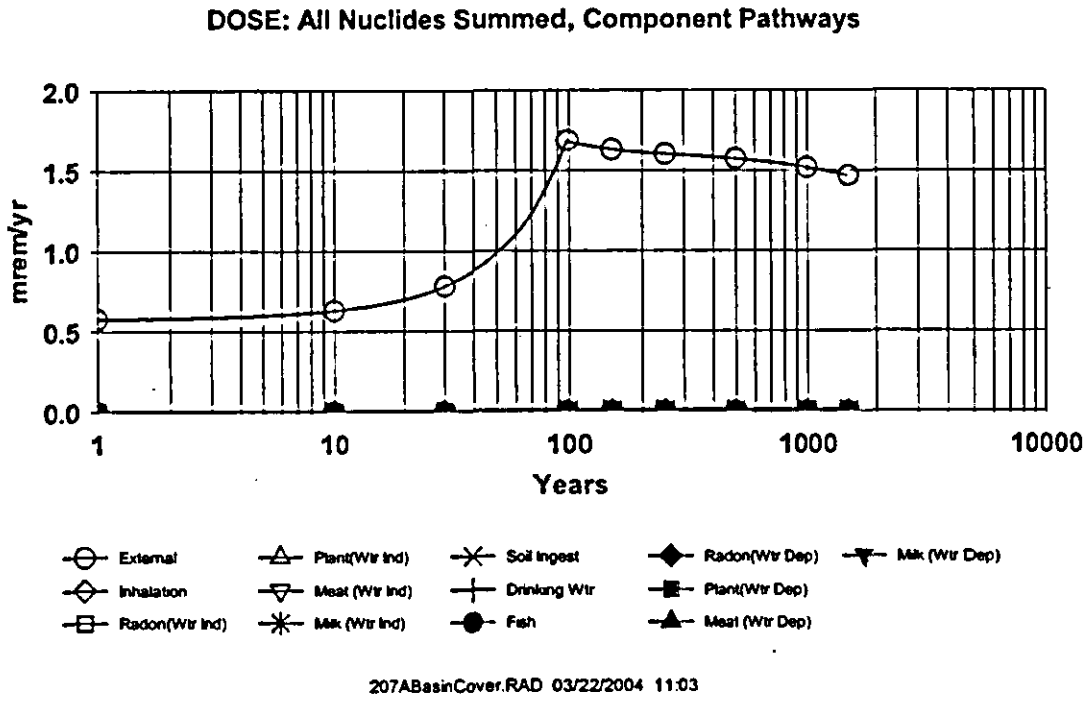


Figure 4-4. RESRAD Analysis for the 207-A South Retention Basin All Radionuclides, All Pathways Dose and Risk Estimates (Cover, Industrial Scenario).



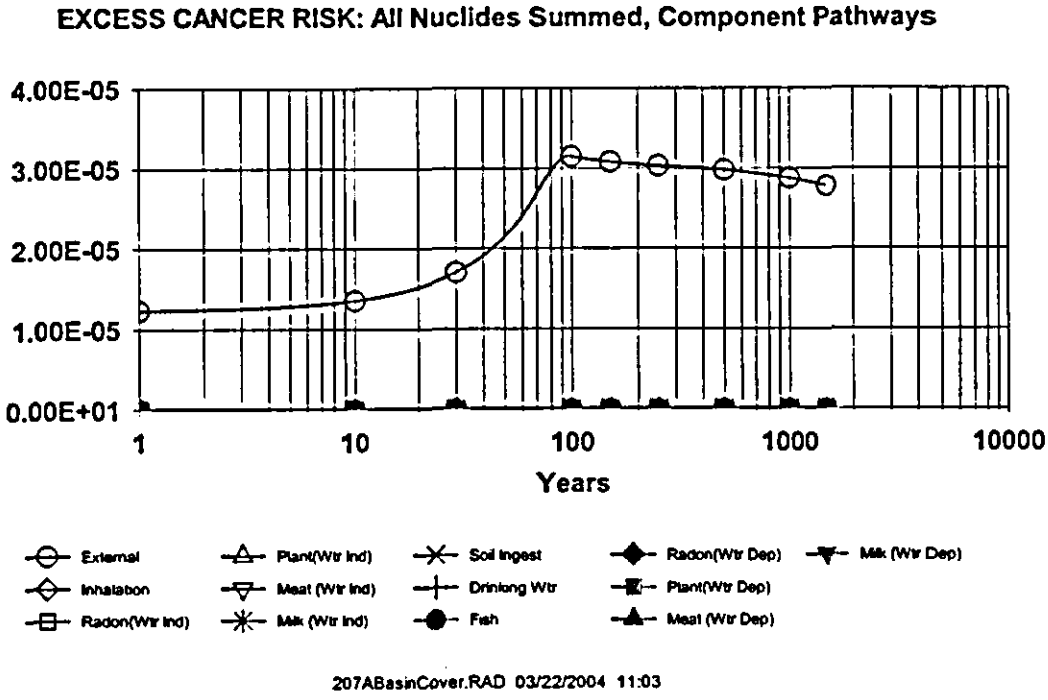
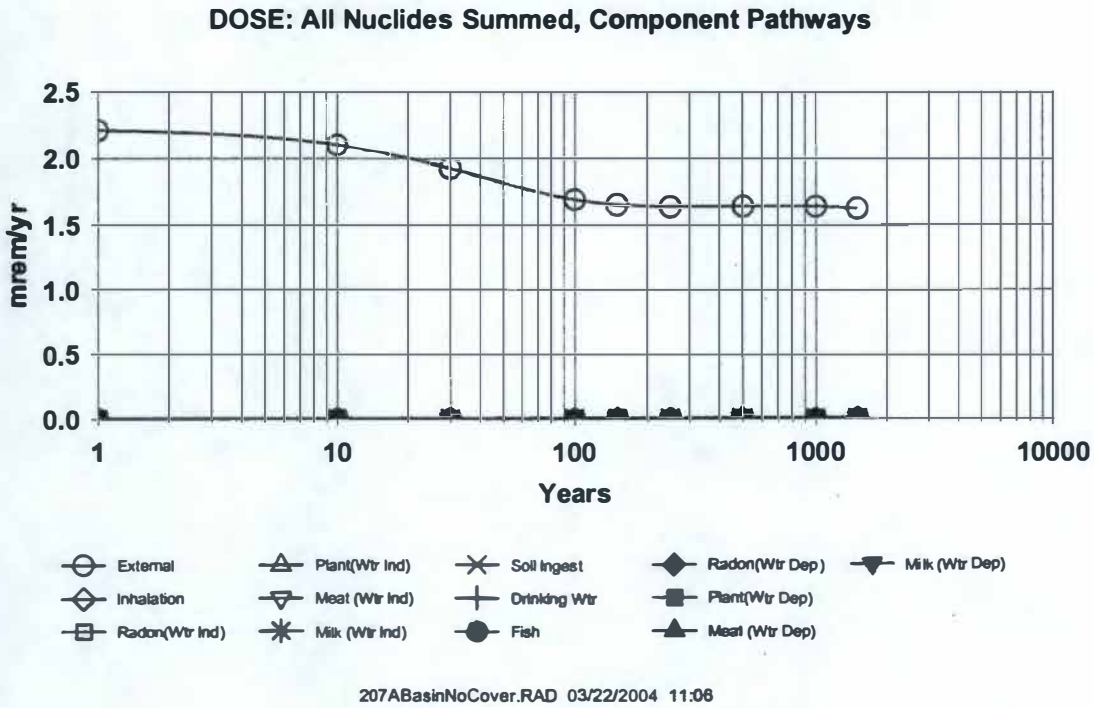


Figure 4-5. RESRAD Analysis for the 207-A South Retention Basin, All Radionuclides, All Pathways Dose and Risk Estimates (No Cover, Industrial Scenario).



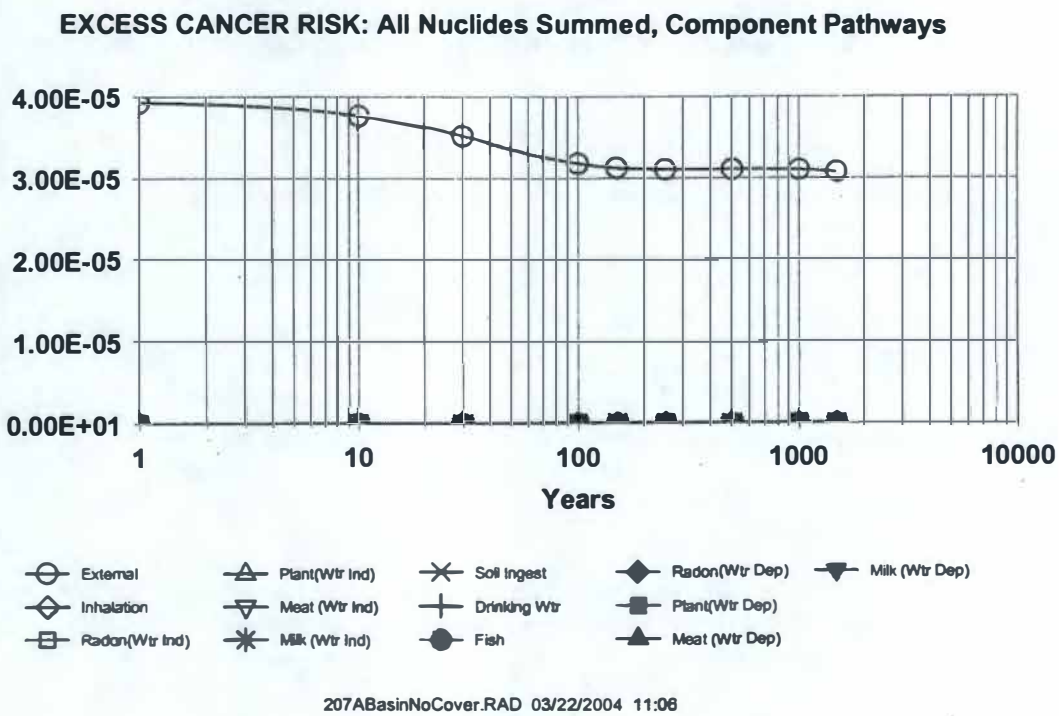
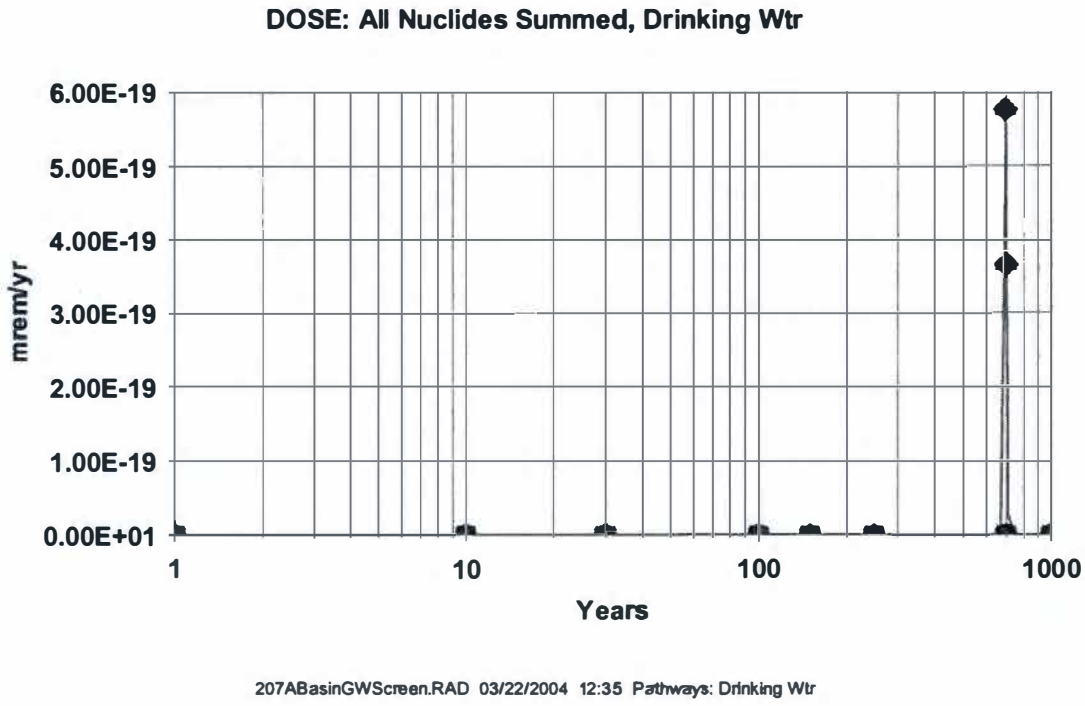


Figure 4-6. RESRAD Analysis for the 207-A South Retention Basin, All Radionuclides, Drinking Water Pathways Dose and Risk Estimates.



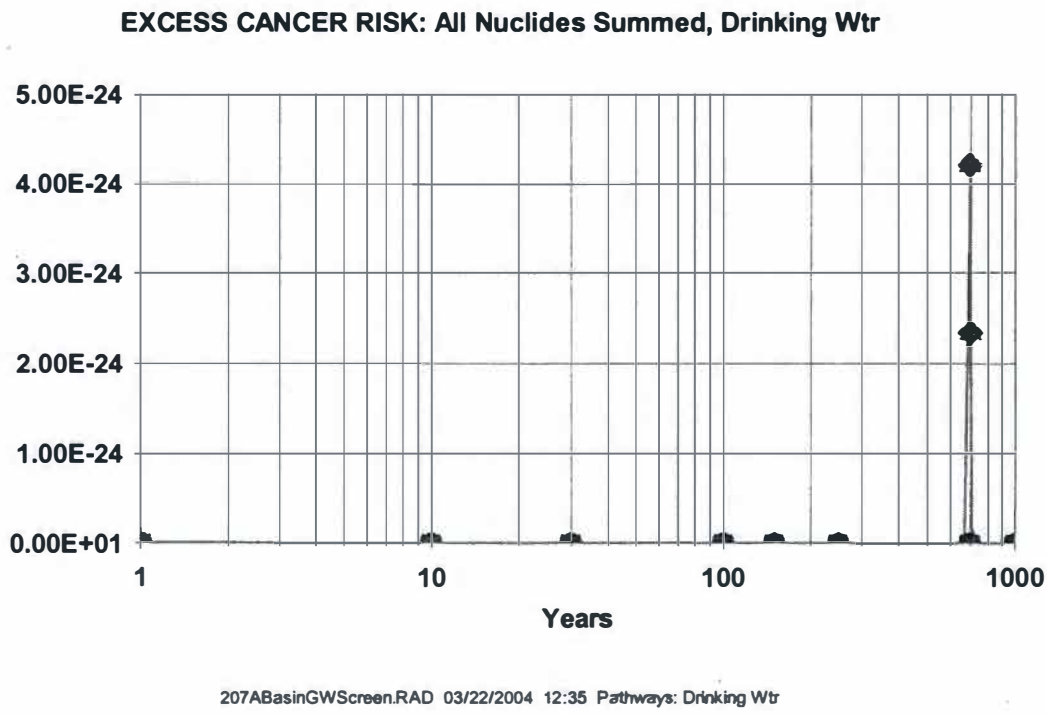
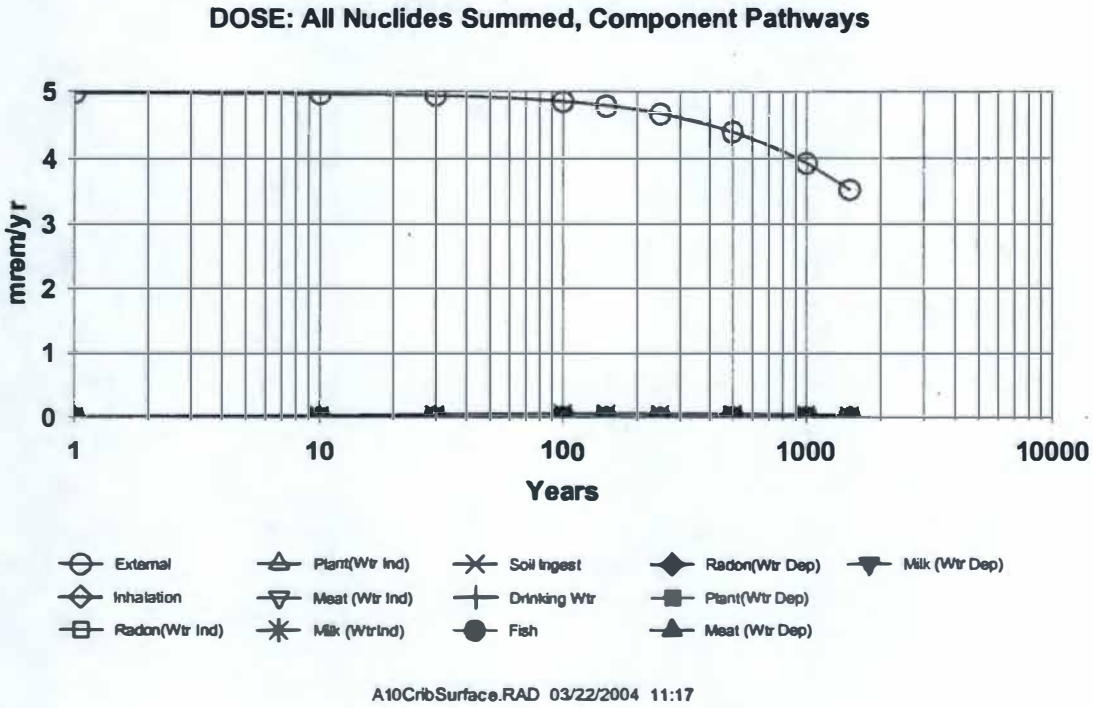


Figure 4-7. RESRAD Analysis for the 216-A-10 Crib, All Radionuclides, All Pathways Dose and Risk Estimates (Cover, Industrial Scenario).



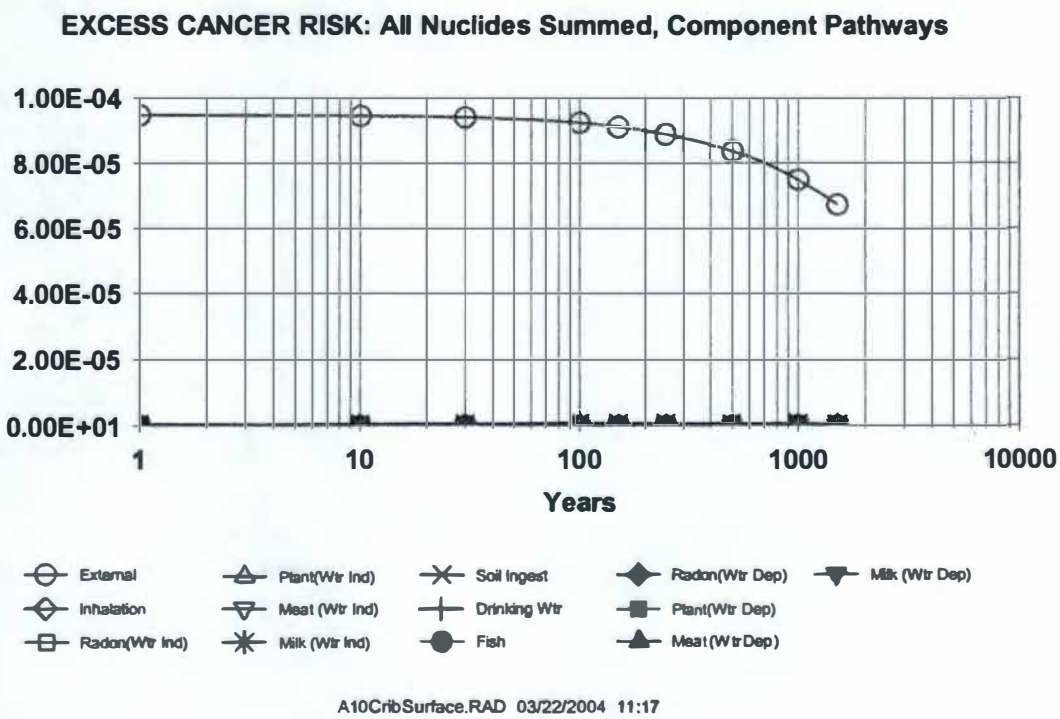
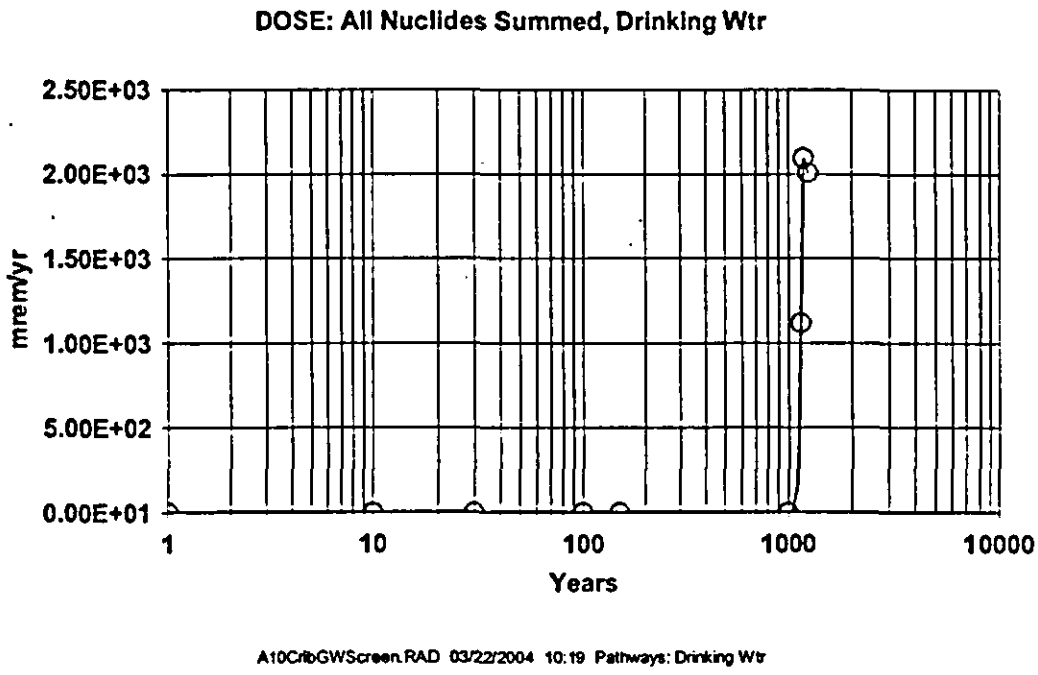


Figure 4-8. RESRAD Analysis for the 216-A-10 Crib, All Radionuclides Except Tritium, Drinking Water Pathways Dose and Risk Estimates.



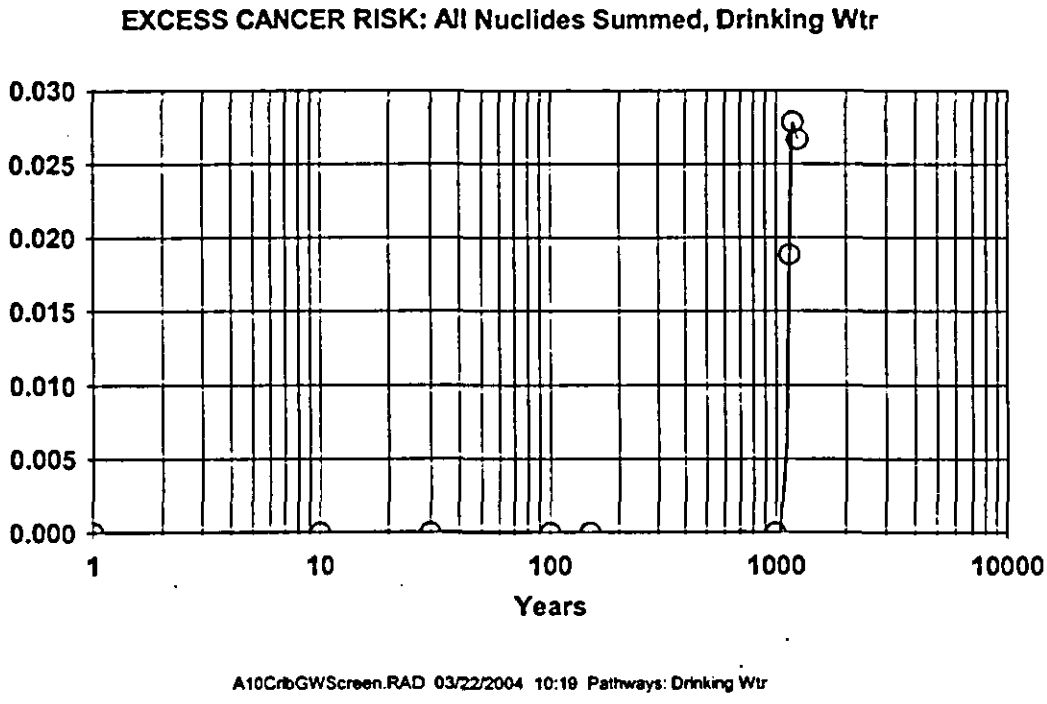
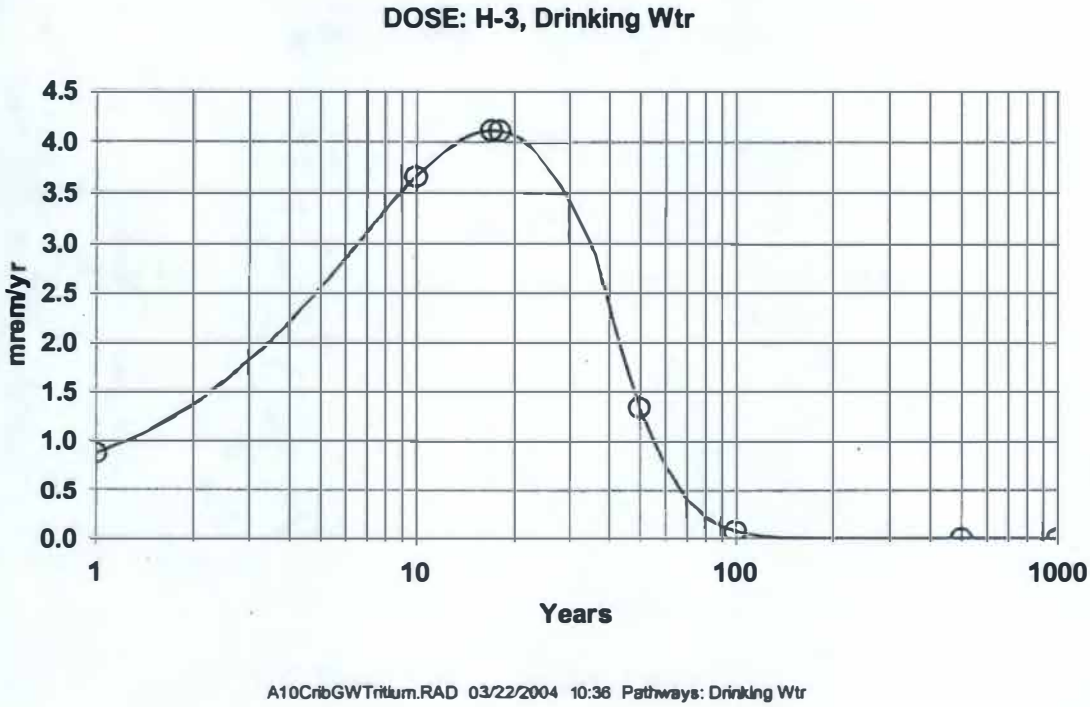


Figure 4-9. RESRAD Analysis for the 216-A-10 Crib, Tritium, Drinking Water Pathways Dose and Risk Estimates.



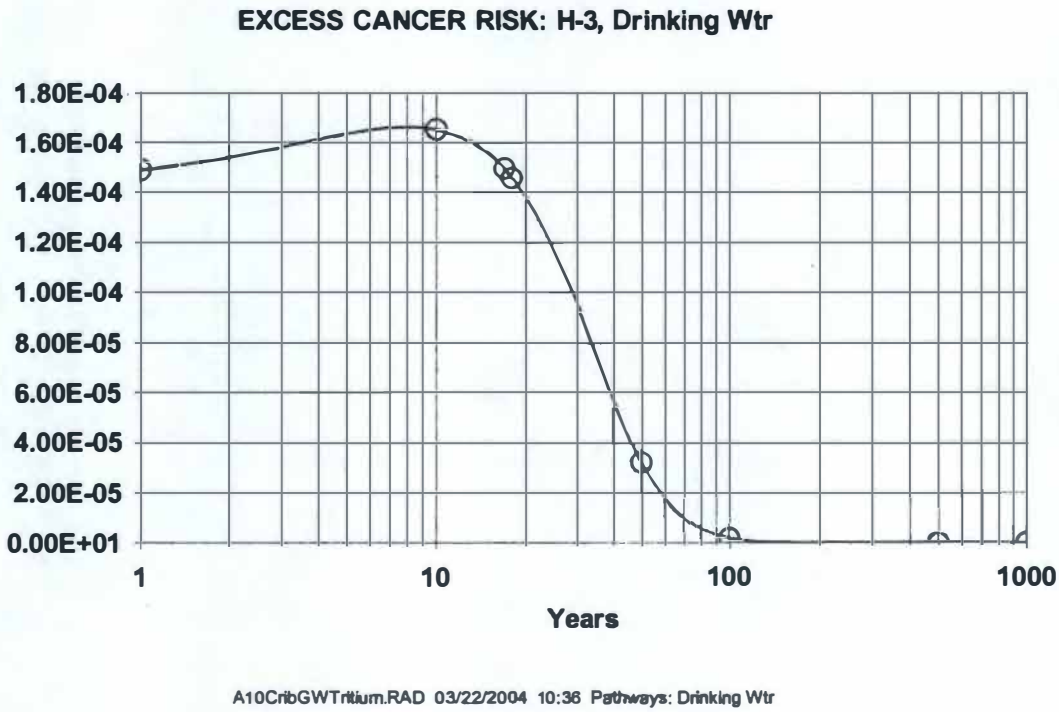
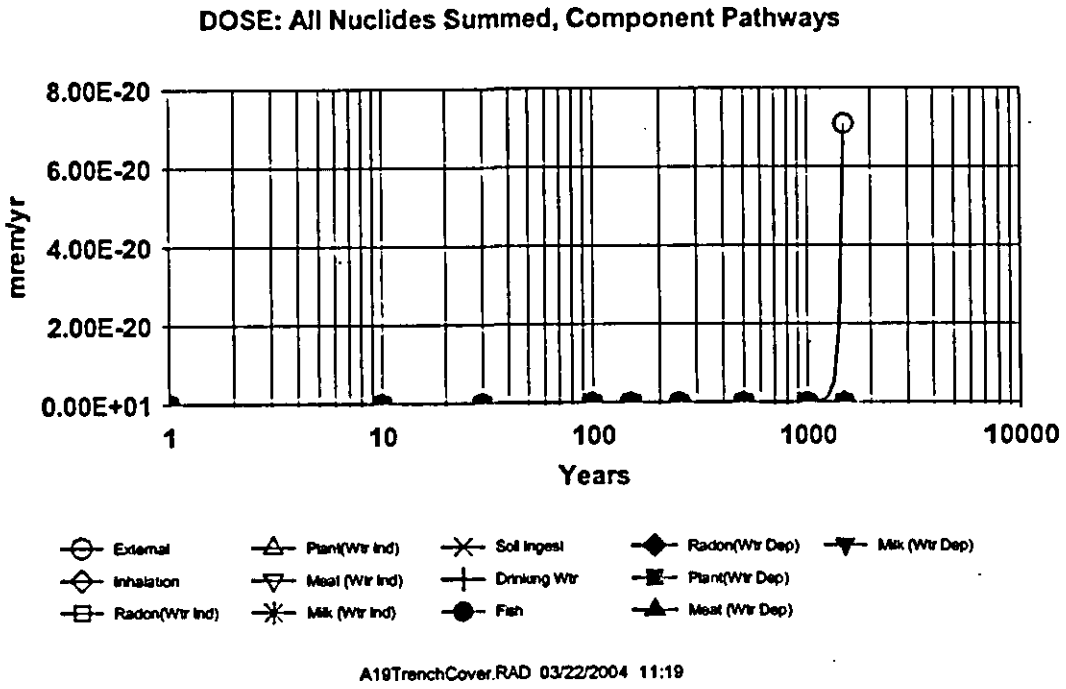


Figure 4-10. RESRAD Analysis for the 216-A-19 Trench, All Radionuclides, All Pathways Dose and Risk Estimates (Cover, Industrial Scenario).



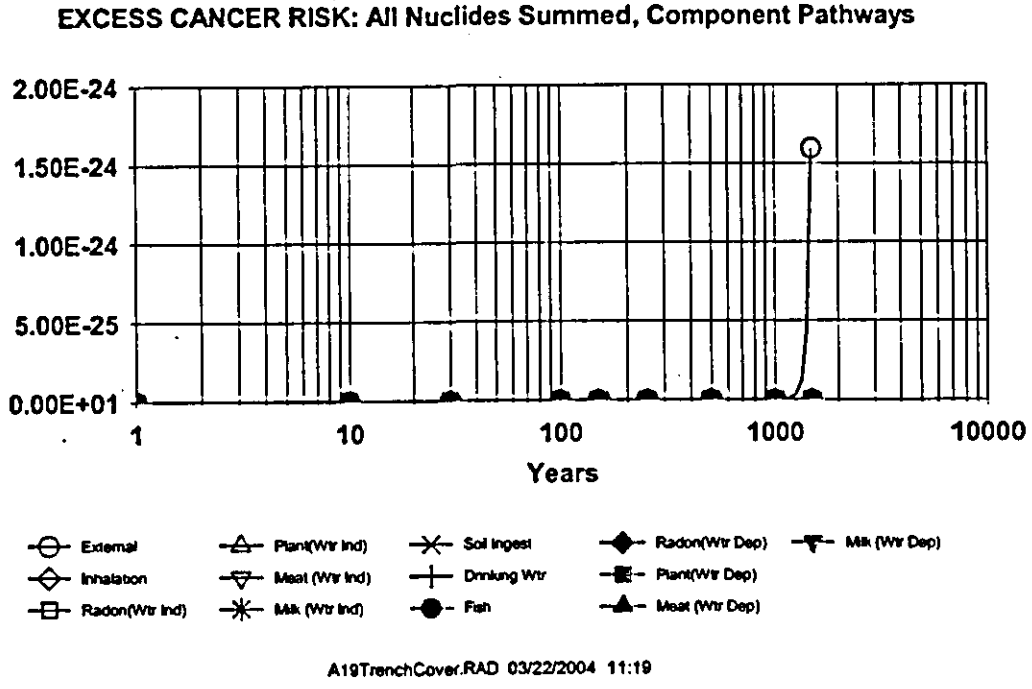
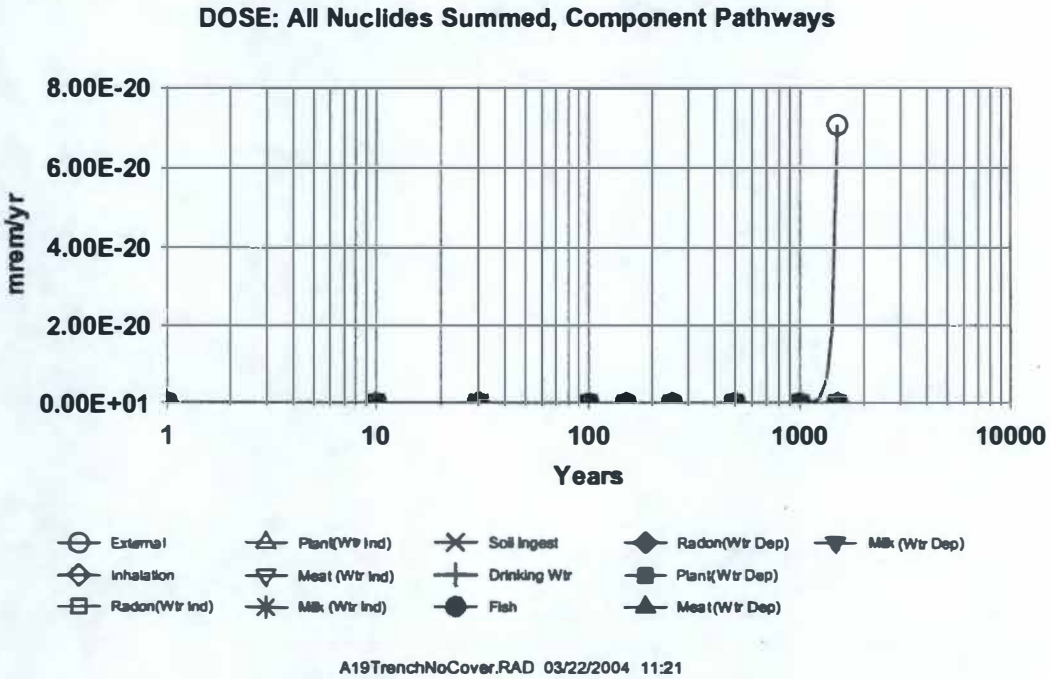


Figure 4-11. RESRAD Analysis for the 216-A-19 Trench, All Radionuclides, All Pathways Dose and Risk Estimates (No Cover, Industrial Scenario).



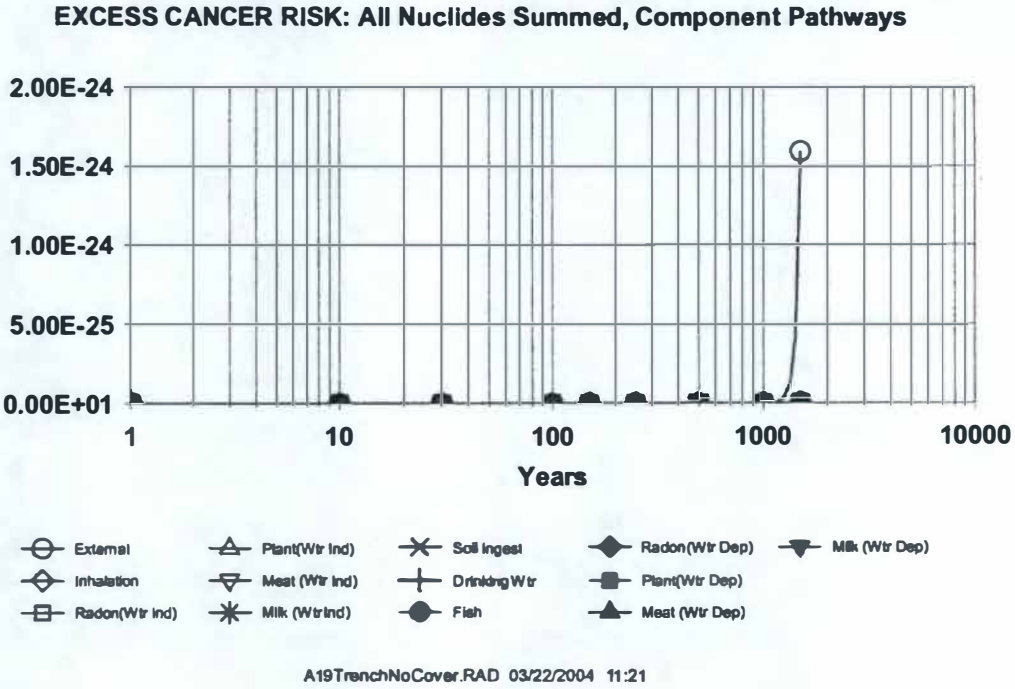
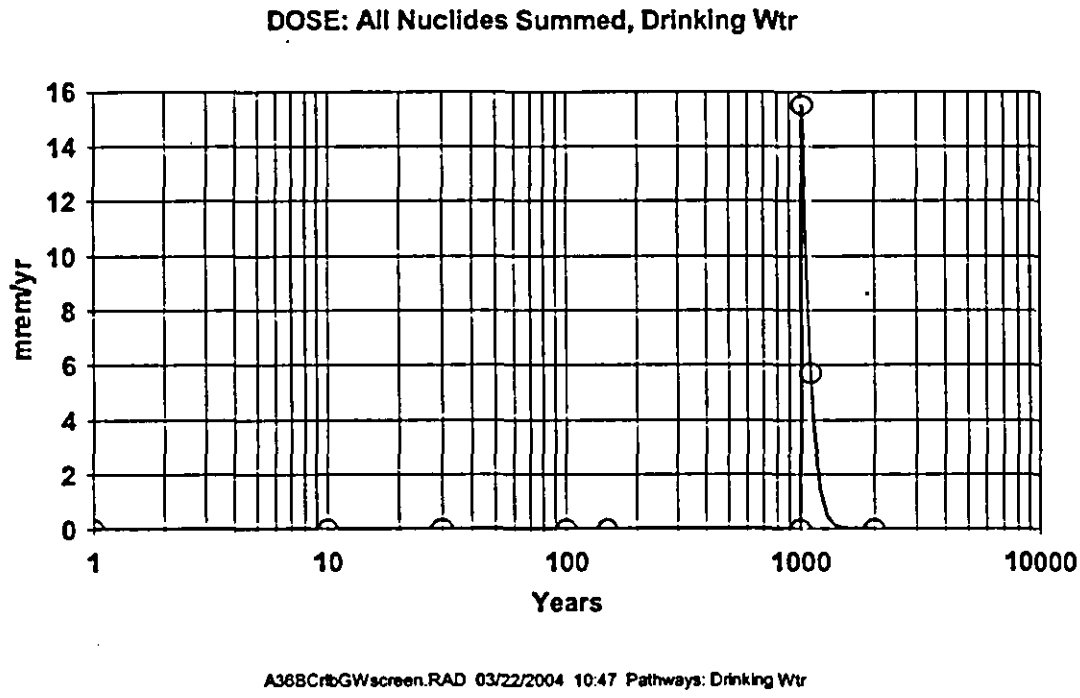


Figure 4-12. RESRAD Analysis for the 216-A-36B Crib, All Radionuclides Except Tritium, Drinking Water Pathways Dose and Risk Estimates.



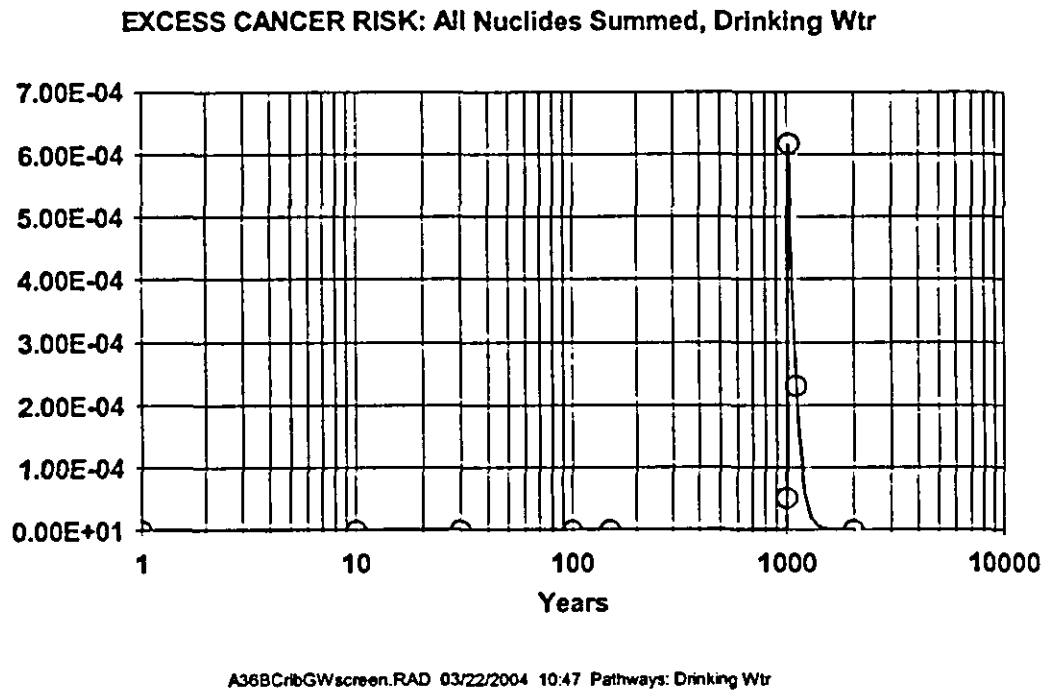
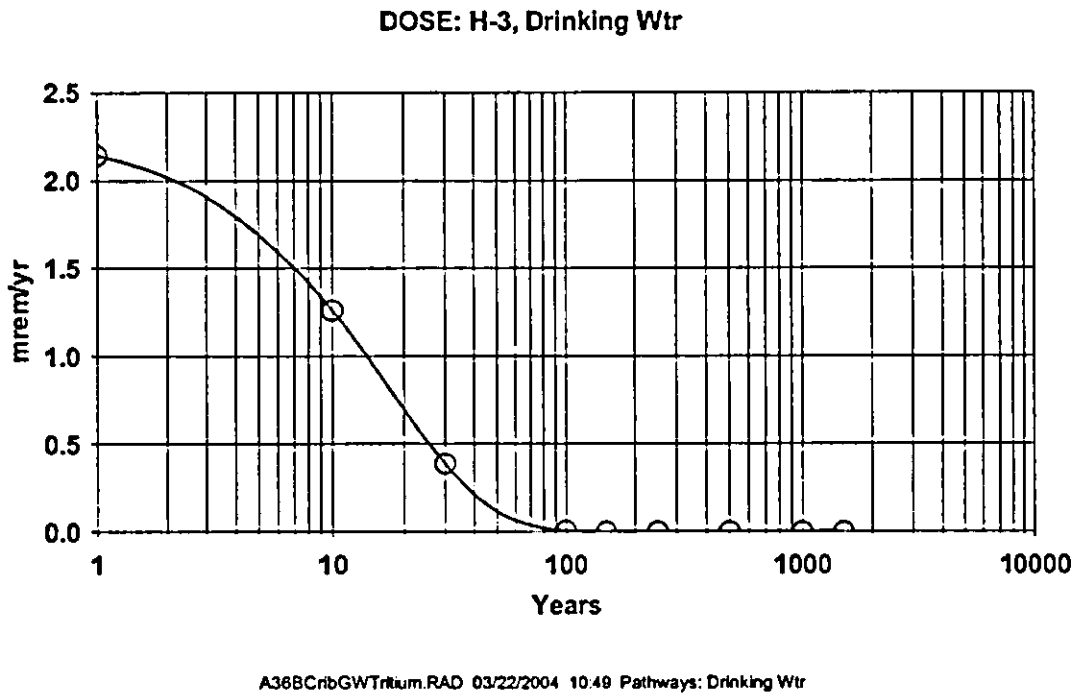


Figure 4-13. RESRAD Analysis for the 216-A-36B Crib, Tritium, Drinking Water Pathways Dose and Risk Estimates.



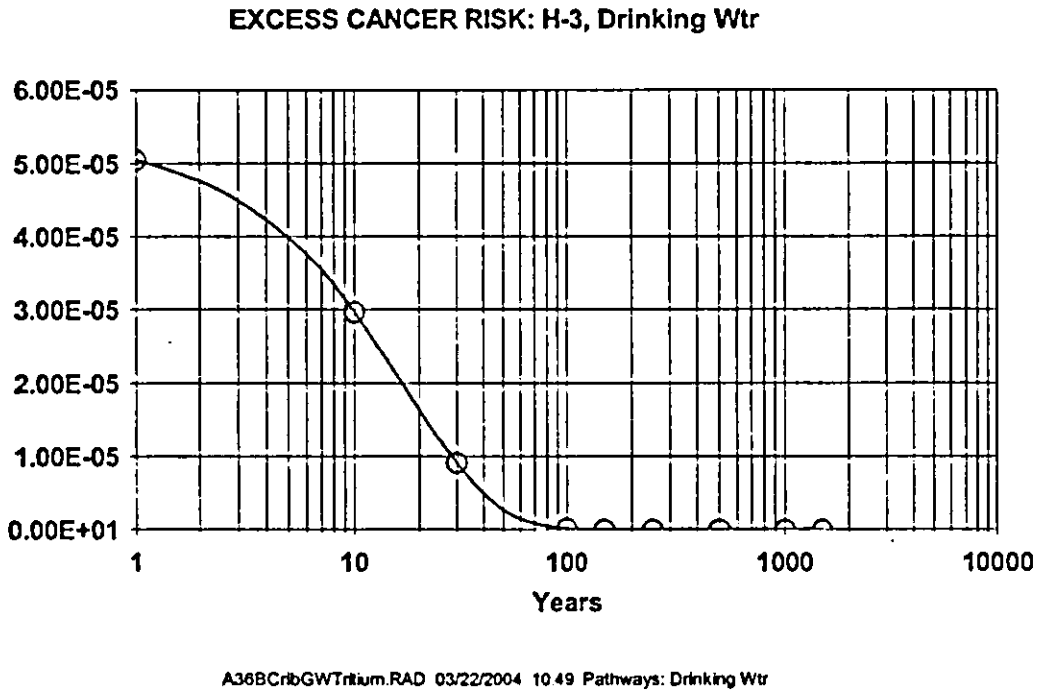
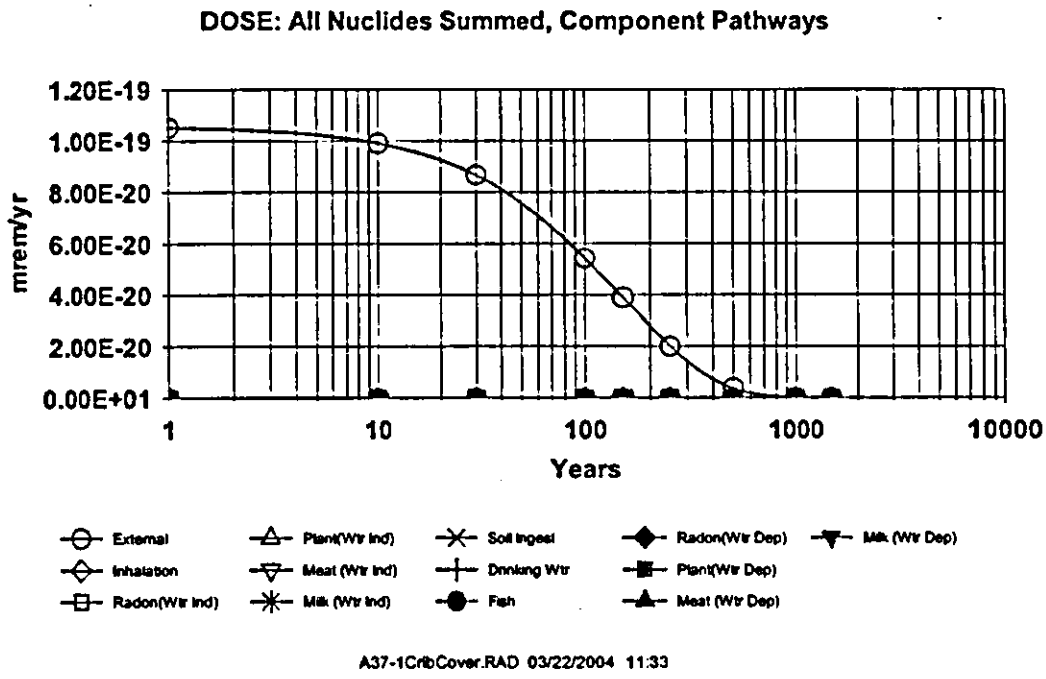


Figure 4-14. RESRAD Analysis for the 216-A-37-1 Crib, All Radionuclides, All Pathways Dose and Risk Estimates (Cover, Industrial Scenario).



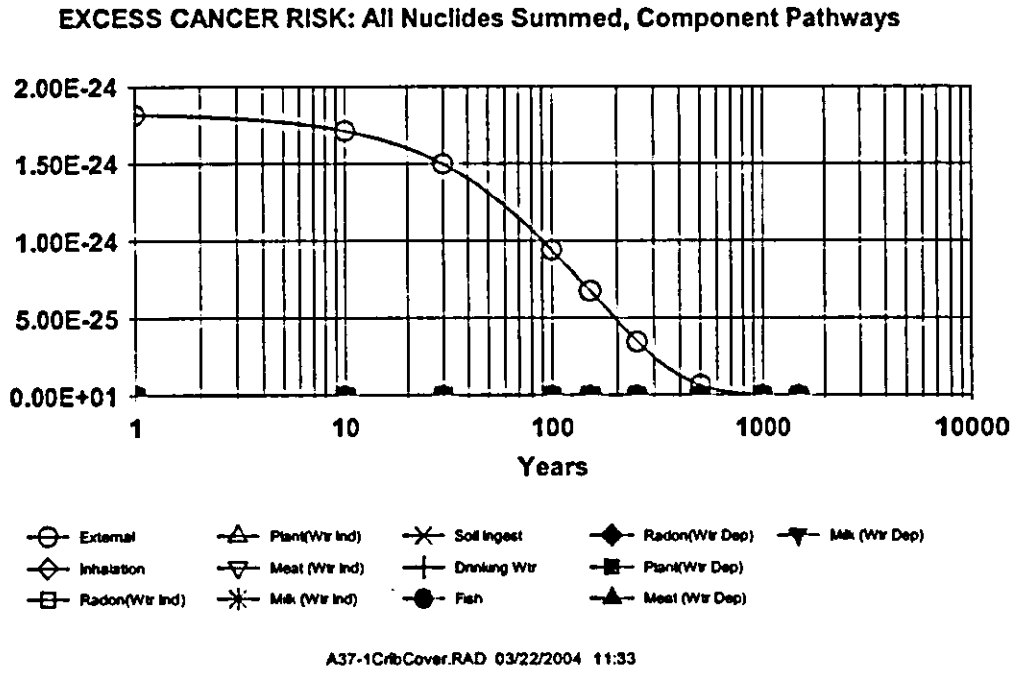
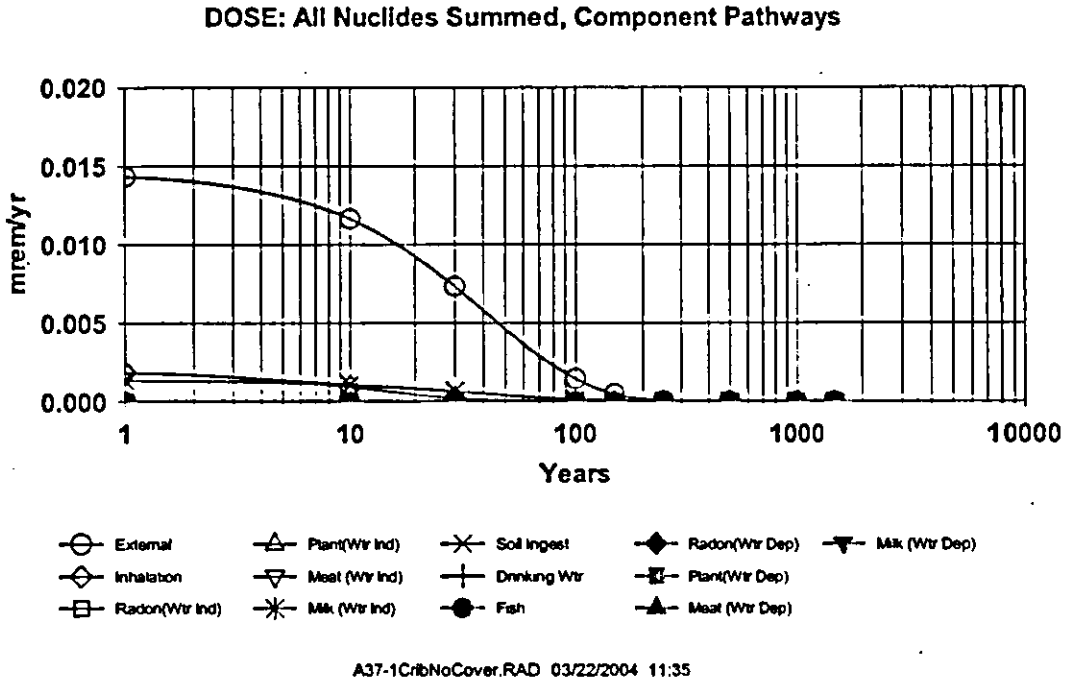


Figure 4-15. RESRAD Analysis for the 216-A-37-1 Crib, All Radionuclides, All Pathways Dose and Risk Estimates (No Cover, Industrial Scenario).



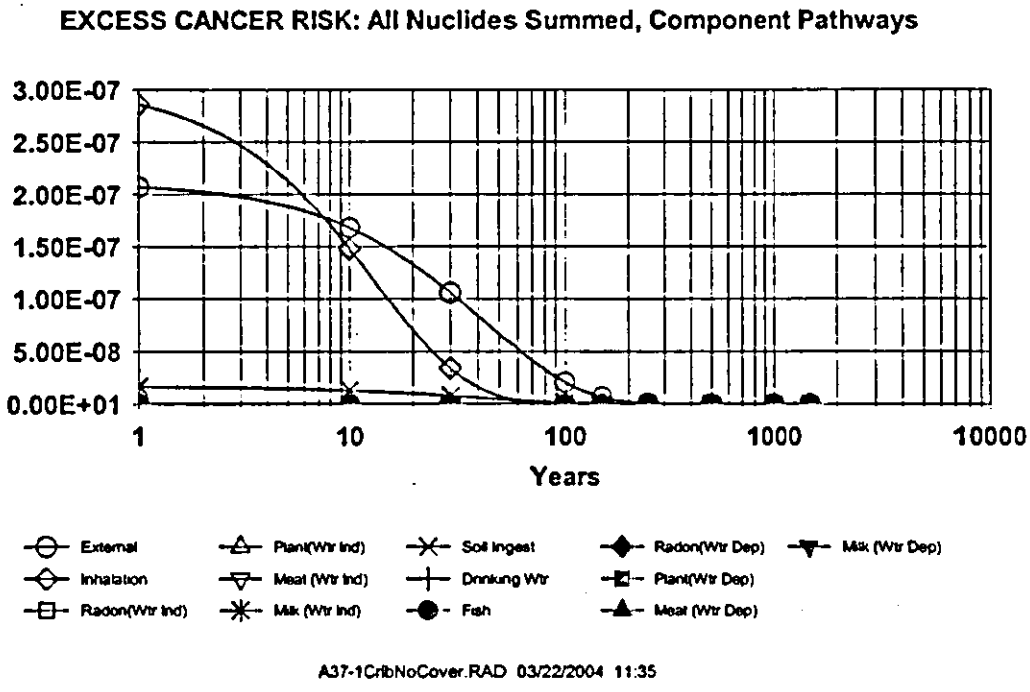
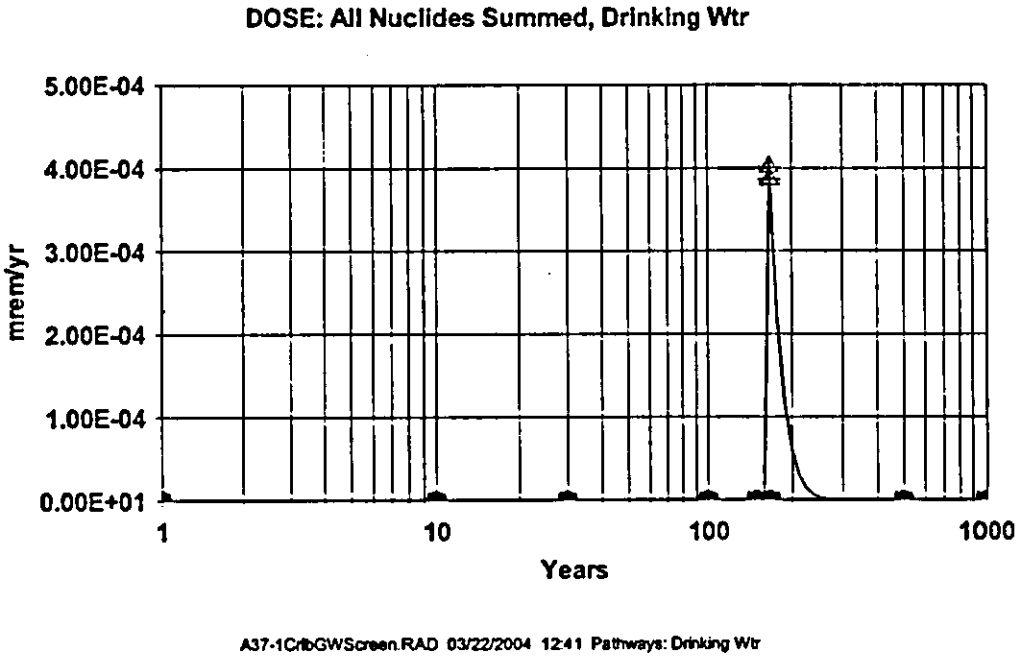


Figure 4-16. RESRAD Analysis for the 216-A-37-1 Crib, All Radionuclides, Drinking Water Pathways Dose and Risk Estimates (No Cover, Industrial Scenario).



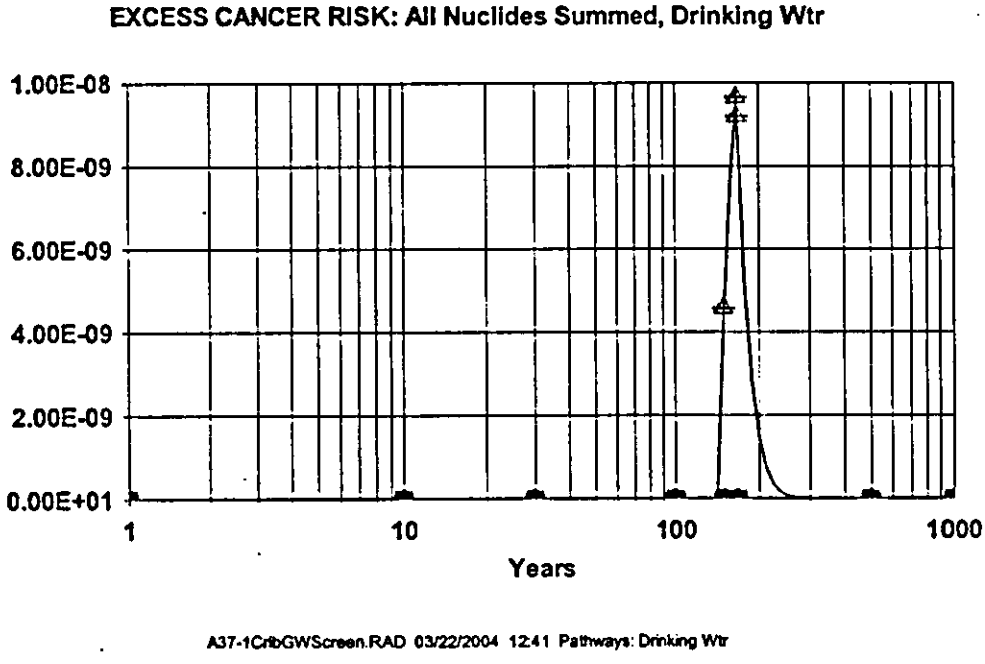
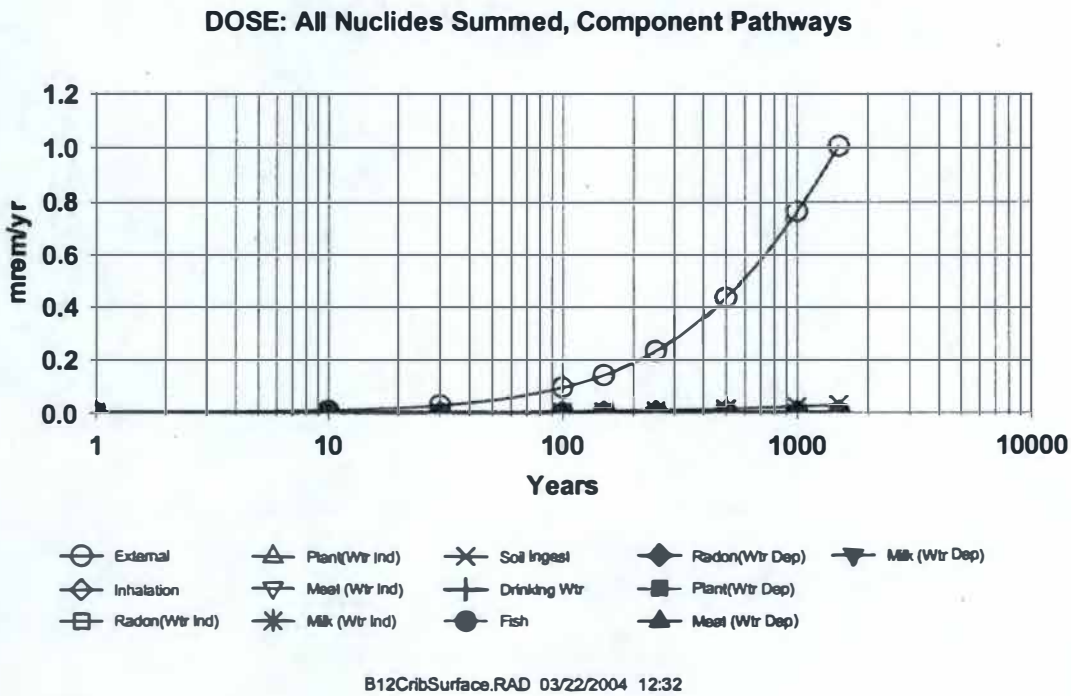


Figure 4-17. RESRAD Analysis for the 216-B-12 Crib, All Radionuclides, All Pathways Dose and Risk Estimates (Cover, Industrial Scenario).



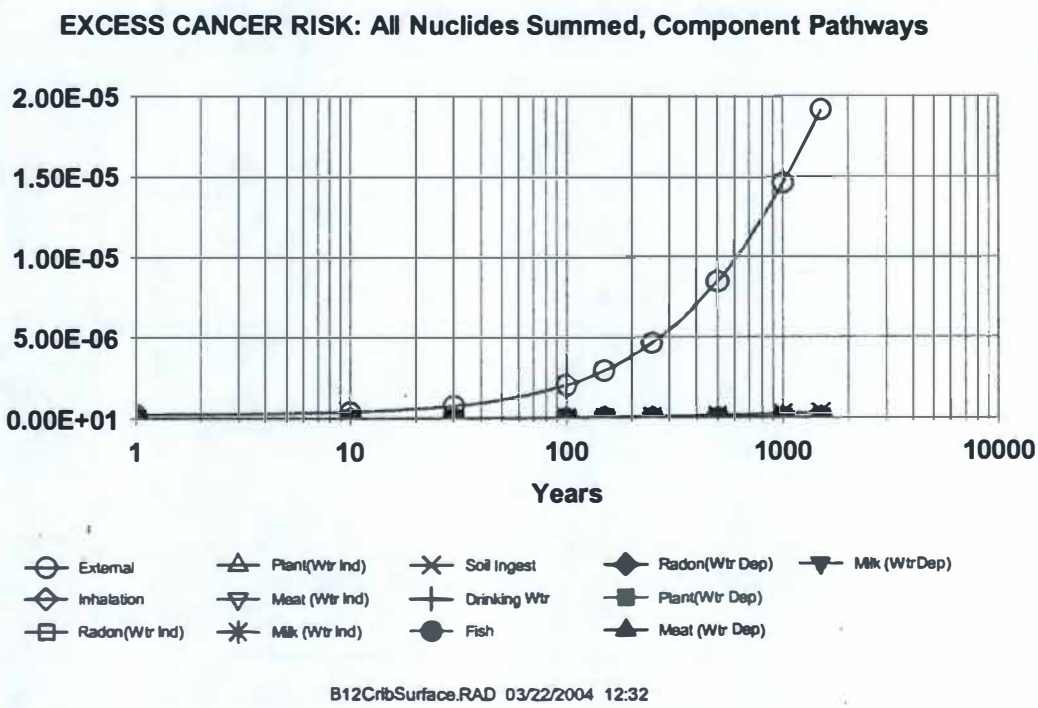
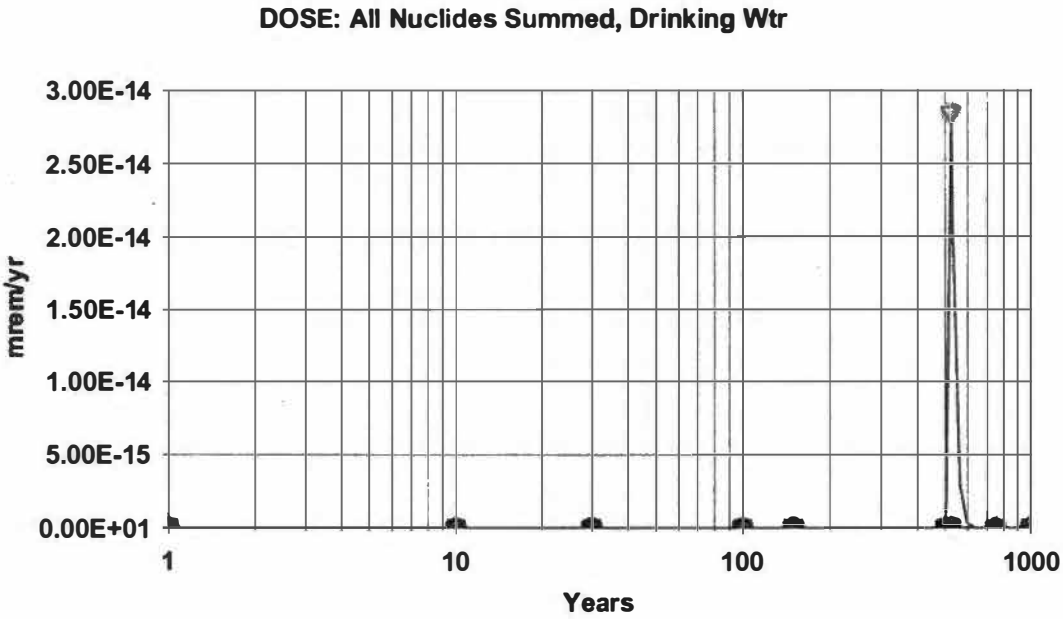


Figure 4-18. RESRAD Analysis for the 216-B-12 Crib, All Radionuclides, Drinking Water Pathways Dose and Risk Estimates.



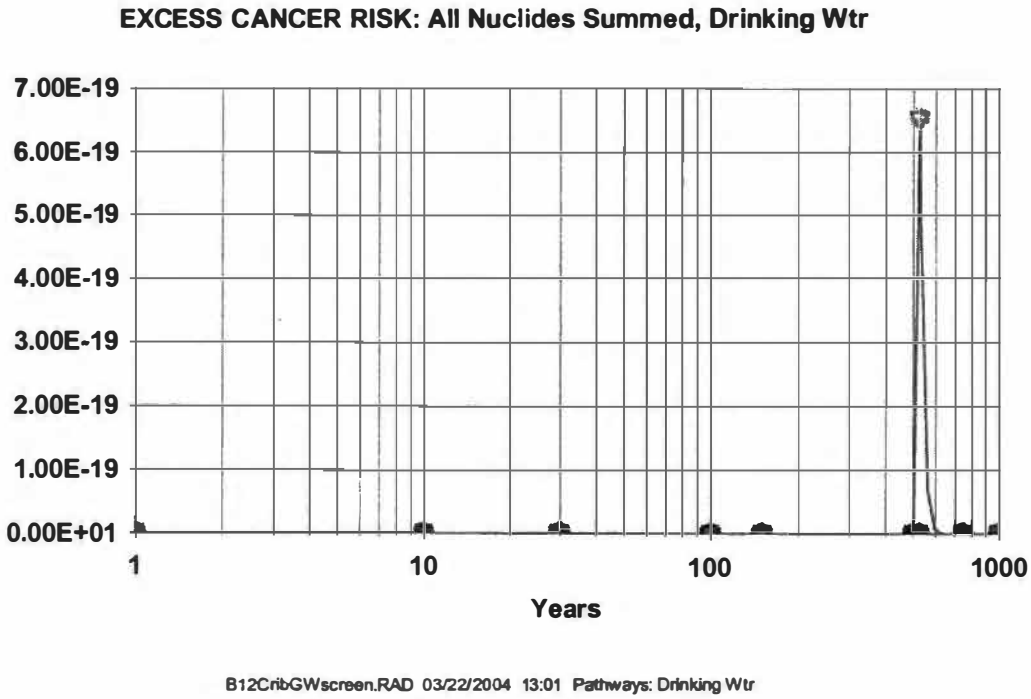
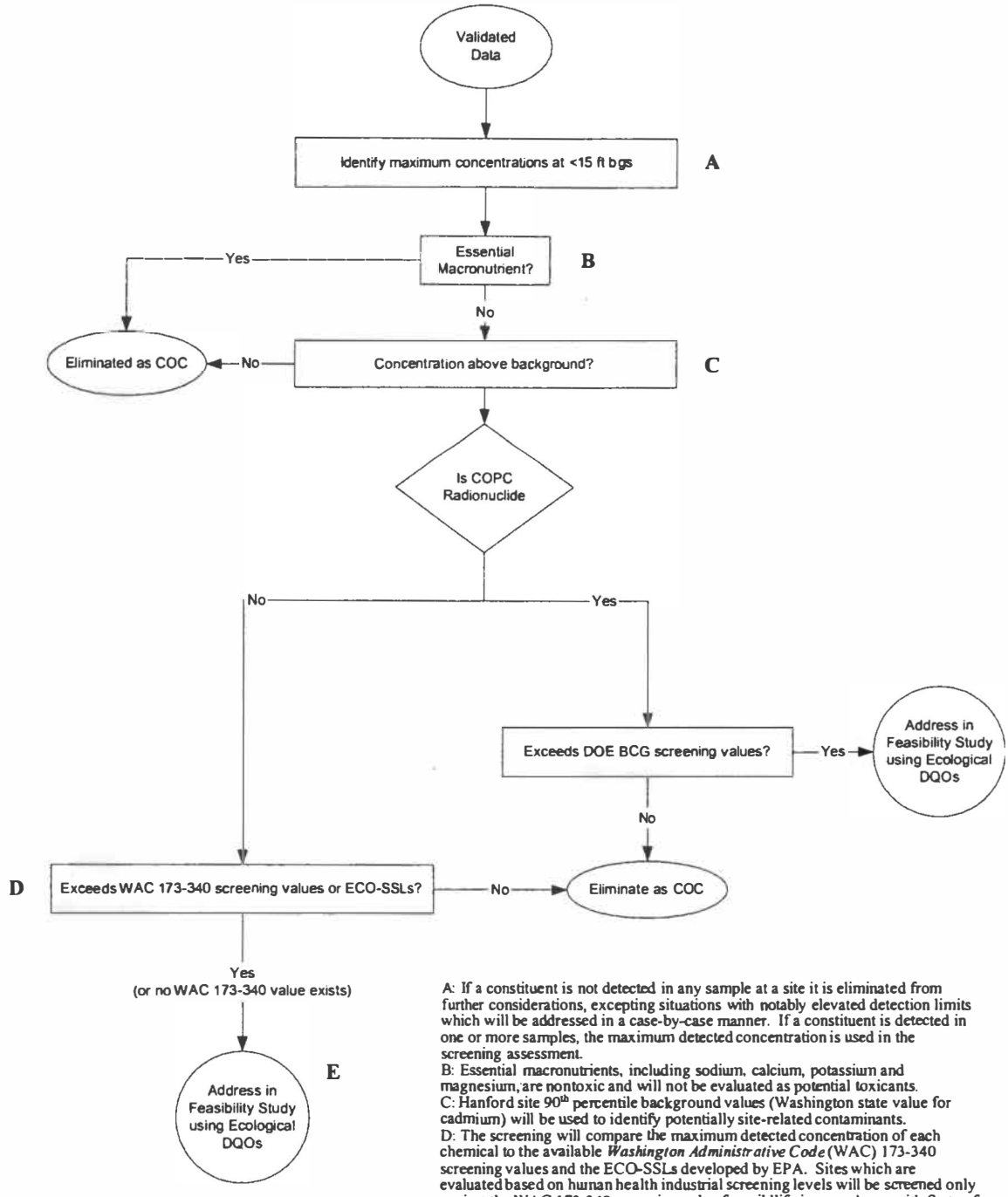


Figure 4-19. Ecological Risk Screening Approach.



A: If a constituent is not detected in any sample at a site it is eliminated from further considerations, excepting situations with notably elevated detection limits which will be addressed in a case-by-case manner. If a constituent is detected in one or more samples, the maximum detected concentration is used in the screening assessment.
B: Essential macronutrients, including sodium, calcium, potassium and magnesium, are nontoxic and will not be evaluated as potential toxicants.
C: Hanford site 90th percentile background values (Washington state value for cadmium) will be used to identify potentially site-related contaminants.
D: The screening will compare the maximum detected concentration of each chemical to the available *Washington Administrative Code* (WAC) 173-340 screening values and the ECO-SSLs developed by EPA. Sites which are evaluated based on human health industrial screening levels will be screened only against the WAC 173-340 screening value for wildlife in accordance with State of Washington guidance. Any chemicals for which no WAC 173-340 value or ECO-SSL screening levels exist will be carried through to the Feasibility Study.
E: Chemicals and radionuclides addressed in the Feasibility Study will be compared to screening levels developed for the site-specific suite of receptors developed under the site-wide ecological DQOs.

LEGEND:

BCG = Biota Concentration Guide
COC = Contaminant of Concern
DOE = Department of Energy
DQO = Data Quality Objectives
ECO-SSL = Ecological Soil Screening Level

Table 4-1. Summary of Inorganic Chemicals that Exceed Background Concentrations. (2 sheets)

Constituent Name	207-A South Retention Basin		216-A-10 Crib		216-A-19 Trench		216-A-36B Crib		216-A-37-1 Crib		216-B-12 Crib	
	Shallow Zone	Deep Zone	Shallow Zone	Deep Zone	Shallow Zone	Deep Zone	Shallow Zone	Deep Zone	Shallow Zone	Deep Zone	Shallow Zone	Deep Zone
Aluminum										X		
Ammonia as N										X		
Ammonium ion as N								X				X
Antimony[1]			X	X				X		X	X	X
Barium									X	X		
Bismuth[1]						X		X				
Boron[1]			X	X	X	X		X	X	X	X	X
Total chromium								X		X		X
Cobalt										X		
Fluoride					X	X						
Lead										X		
Manganese						X			X	X		
Mercury				X				X				X
Molybdenum[1]						X		X		X		
Nickel								X				
Nitrate as N	X	X		X	X	X		X	X	X	X	X
Nitrite as N[1]			X	X		X		X	X	X		
Nitrate and nitrate/nitrite as N[1]	X	X	X	X	X	X	X	X	X	X	X	X
Phosphate				X	X	X				X		
Selenium[1]				X				X				
Silver	X	X		X			X	X		X		X
Sulfate						X					X	X

Table 4-1. Summary of Inorganic Chemicals that Exceed Background Concentrations. (2 sheets)

Constituent Name	207-A South Retention Basin		216-A-10 Crib		216-A-19 Trench		216-A-36B Crib		216-A-37-1 Crib		216-B-12 Crib	
	Shallow Zone	Deep Zone	Shallow Zone	Deep Zone	Shallow Zone	Deep Zone	Shallow Zone	Deep Zone	Shallow Zone	Deep Zone	Shallow Zone	Deep Zone
Thallium[1]					X	X		X	X	X		
Thorium[1]					X	X	X	X	X	X		X
Uranium					X	X		X				X
Vanadium					X	X				X		
Zinc						X						

[1]Indicates that a background value was not available for this constituent.
Note – Blank cells indicate that constituents were not present in concentrations that exceeded the background screening values.

Table 4-2. Comparison of Maximum Detected Values in Shallow-Zone Soils (0 to 4.6 m [0 to 15 ft]) to Background Concentrations. (7 sheets)

Constituent Class	Constituent Name	Units	Maximum Detected Result	90th Percentile Background Concentration	Does Maximum Concentration Exceed Background?
207-A South Retention Basin					
METAL	Aluminum	mg/kg		11,800	No
METAL	Antimony	mg/kg	ND	--	No
METAL	Arsenic	mg/kg	9.98	20	No
METAL	Barium	mg/kg	65.5	132	No
METAL	Beryllium	mg/kg	ND	1.51	No
METAL	Bismuth	mg/kg	ND	--	No
METAL	Boron	mg/kg	ND	--	No
METAL	Cadmium	mg/kg	ND	0.81	No
METAL	Chromium (total)	mg/kg	15.5	18.5	No
METAL	Hexavalent chromium	mg/kg	ND	--	No
METAL	Copper	mg/kg	11.0	22	No
METAL	Lead	mg/kg	ND	10.2	No
METAL	Manganese	mg/kg		512	No
METAL	Mercury	mg/kg	ND	0.33	No
METAL	Nickel	mg/kg	9.80	19.1	No
METAL	Selenium	mg/kg	ND	--	No
METAL	Silver	mg/kg	5.01	0.73	Yes
METAL	Uranium	mg/kg	1.04	3.21	No
METAL	Vanadium	mg/kg		85.1	No
METAL	Zinc	mg/kg		67.8	No
GENCHEM	Ammonium ion as N	mg/kg	0.25	9.23	No
GENCHEM	Ammonia as N	mg/kg		9.23	No
GENCHEM	Chloride	mg/kg	7.56	100	No
GENCHEM	Cyanide	mg/kg		--	No
GENCHEM	Fluoride	mg/kg	ND	2.81	No
GENCHEM	Nitrate as N	mg/kg	21.8	12	Yes
GENCHEM	Nitrite as N	mg/kg	ND	--	No
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	20.9	--	No background
GENCHEM	Phosphate	mg/kg	ND	0.785	No
GENCHEM	Sulfate	mg/kg	53.0	237	No
216-A-10 Crib					
METAL	Aluminum	mg/kg		11,800	No
METAL	Antimony	mg/kg	0.48	--	No background

Table 4-2. Comparison of Maximum Detected Values in Shallow-Zone Soils (0 to 4.6 m [0 to 15 ft]) to Background Concentrations. (7 sheets)

Constituent Class	Constituent Name	Units	Maximum Detected Result	90th Percentile Background Concentration	Does Maximum Concentration Exceed Background?
METAL	Arsenic	mg/kg	4.10	20	No
METAL	Barium	mg/kg	53.4	132	No
METAL	Beryllium	mg/kg	0.05	1.51	No
METAL	Bismuth	mg/kg	ND	--	No
METAL	Boron	mg/kg	0.89	--	No background
METAL	Cadmium	mg/kg	0.26	0.81	No
METAL	Chromium (Total)	mg/kg	6.70	18.5	No
METAL	Hexavalent Chromium	mg/kg	ND	--	No
METAL	Cobalt	mg/kg		15.7	No
METAL	Copper	mg/kg	11.2	22	No
METAL	Lead	mg/kg	4.00	10.2	No
METAL	Mercury	mg/kg	ND	0.33	No
METAL	Molybdenum	mg/kg		--	No
METAL	Nickel	mg/kg	7.30	19.1	No
METAL	Selenium	mg/kg	ND	--	No
METAL	Silver	mg/kg	ND	0.73	No
METAL	Thallium	mg/kg		--	No
METAL	Thorium	mg/kg		--	No
METAL	Uranium	mg/kg	0.44	3.21	No
METAL	Vanadium	mg/kg		85.1	No
METAL	Zinc	mg/kg		67.8	No
GENCHEM	Ammonium ion as N	mg/kg	NA	9.23	No
GENCHEM	Ammonia as N	mg/kg	ND	9.23	No
GENCHEM	Chloride	mg/kg	ND	100	No
GENCHEM	Cyanide	mg/kg	ND	--	No
GENCHEM	Fluoride	mg/kg	ND	2.81	No
GENCHEM	Nitrate as N	mg/kg	ND	12	No
GENCHEM	Nitrite as N	mg/kg	0.40	--	No background
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	1.00	--	No background
GENCHEM	Phosphate	mg/kg	ND	0.785	No
GENCHEM	Sulfate	mg/kg	ND	237	No
216-A-19 Trench					
METAL	Aluminum	mg/kg	5890	11,800	No
METAL	Antimony	mg/kg	ND	--	No

Table 4-2. Comparison of Maximum Detected Values in Shallow-Zone Soils (0 to 4.6 m [0 to 15 ft]) to Background Concentrations. (7 sheets)

Constituent Class	Constituent Name	Units	Maximum Detected Result	90th Percentile Background Concentration	Does Maximum Concentration Exceed Background?
METAL	Arsenic	mg/kg	7.00	20	No
METAL	Barium	mg/kg	98.9	132	No
METAL	Beryllium	mg/kg	0.24	1.51	No
METAL	Bismuth	mg/kg	ND	--	No
METAL	Boron	mg/kg	38.9	--	No background
METAL	Cadmium	mg/kg	0.21	0.81	No
METAL	Chromium (total)	mg/kg	5.31	18.5	No
METAL	Hexavalent chromium	mg/kg	ND	--	No
METAL	Cobalt	mg/kg	9.71	15.7	No
METAL	Copper	mg/kg	13.4	22	No
METAL	Lead	mg/kg	3.18	10.2	No
METAL	Manganese	mg/kg	430	512	No
METAL	Mercury	mg/kg	ND	0.33	No
METAL	Molybdenum	mg/kg	ND	--	No
METAL	Nickel	mg/kg	8.54	19.1	No
METAL	Selenium	mg/kg	ND	--	No
METAL	Silver	mg/kg	ND	0.73	No
METAL	Thallium	mg/kg	0.07	--	No background
METAL	Thorium	mg/kg	3.49	--	No background
METAL	Uranium	mg/kg	129	3.21	Yes
METAL	Vanadium	mg/kg	96.1	85.1	Yes
METAL	Zinc	mg/kg	56.6	67.8	No
GENCHEM	Ammonium ion as N	mg/kg	0.47	9.23	No
GENCHEM	Ammonia as N	mg/kg		9.23	No
GENCHEM	Bromide	mg/kg	ND	--	No
GENCHEM	Chloride	mg/kg	22.5	100	No
GENCHEM	Cyanide	mg/kg	ND	--	No
GENCHEM	Fluoride	mg/kg	5.62	2.81	No background
GENCHEM	Nitrate as N	mg/kg	546	12	Yes
GENCHEM	Nitrite as N	mg/kg	ND	--	No
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	544	--	No background
GENCHEM	Phosphate	mg/kg	4.85	0.785	Yes
GENCHEM	Sulfate	mg/kg	113	237	No

Table 4-2. Comparison of Maximum Detected Values in Shallow-Zone Soils (0 to 4.6 m [0 to 15 ft]) to Background Concentrations. (7 sheets)

Constituent Class	Constituent Name	Units	Maximum Detected Result	90th Percentile Background Concentration	Does Maximum Concentration Exceed Background?
216-A-36B Crib					
METAL	Aluminum	mg/kg	7600	11,800	No
METAL	Antimony	mg/kg	ND	--	No
METAL	Arsenic	mg/kg	2.6	20	No
METAL	Barium	mg/kg	59.9	132	No
METAL	Beryllium	mg/kg	ND	1.51	No
METAL	Bismuth	mg/kg	ND	--	No
METAL	Boron	mg/kg	ND	--	No
METAL	Cadmium	mg/kg	ND	0.81	No
METAL	Chromium (total)	mg/kg	ND	18.5	No
METAL	Hexavalent chromium	mg/kg	ND	--	No
METAL	Cobalt	mg/kg	6.13	15.7	No
METAL	Copper	mg/kg	13.8	22	No
METAL	Lead	mg/kg	ND	10.2	No
METAL	Manganese	mg/kg	246	512	No
METAL	Mercury	mg/kg	ND	0.33	No
METAL	Molybdenum	mg/kg	ND	--	No
METAL	Nickel	mg/kg	4.26	19.1	No
METAL	Selenium	mg/kg	ND	--	No
METAL	Silver	mg/kg	3.12	0.73	Yes
METAL	Thallium	mg/kg	ND	--	No
METAL	Thorium	mg/kg	3.77	--	No background
METAL	Uranium	mg/kg	0.5	3.21	No
METAL	Vanadium	mg/kg	35.1	85.1	No
METAL	Zinc	mg/kg	41.5	67.8	No
GENCHEM	Ammonium ion as N	mg/kg	ND	9.23	No
GENCHEM	Ammonia as N	mg/kg		9.23	No
GENCHEM	Bromide	mg/kg	ND	--	No
GENCHEM	Chloride	mg/kg	0.24	100	No
GENCHEM	Cyanide	mg/kg	ND	--	No
GENCHEM	Fluoride	mg/kg	0.39	2.81	No
GENCHEM	Nitrate as N	mg/kg	0.5	12	No
GENCHEM	Nitrite as N	mg/kg	ND	--	No
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	2.7	--	No background

Table 4-2. Comparison of Maximum Detected Values in Shallow-Zone Soils (0 to 4.6 m [0 to 15 ft]) to Background Concentrations. (7 sheets)

Constituent Class	Constituent Name	Units	Maximum Detected Result	90th Percentile Background Concentration	Does Maximum Concentration Exceed Background?
GENCHEM	Phosphate	mg/kg	ND	0.785	No
GENCHEM	Sulfate	mg/kg	0.92	237	No
216-A-37-1 Crib					
METAL	Aluminum	mg/kg	8,660	11,800	No
METAL	Antimony	mg/kg	ND	--	No
METAL	Arsenic	mg/kg	1.7	20	No
METAL	Barium	mg/kg	165	132	Yes
METAL	Beryllium	mg/kg	0.31	1.51	No
METAL	Bismuth	mg/kg	ND	--	No
METAL	Boron	mg/kg	0.51	--	No background
METAL	Cadmium	mg/kg	ND	0.81	No
METAL	Chromium (total)	mg/kg	8.85	18.5	No
METAL	Hexavalent chromium	mg/kg	ND	--	No
METAL	Cobalt	mg/kg	12.6	15.7	No
METAL	Copper	mg/kg	14.7	22	No
METAL	Lead	mg/kg	3.9	10.2	No
METAL	Manganese	mg/kg	547	512	Yes
METAL	Mercury	mg/kg	0.02	0.33	No
METAL	Molybdenum	mg/kg	ND	--	No
METAL	Nickel	mg/kg	13	19.1	No
METAL	Selenium	mg/kg	ND	--	No
METAL	Silver	mg/kg	ND	0.73	No
METAL	Thallium	mg/kg	0.88	--	No background
METAL	Thorium	mg/kg	2.53	--	No background
METAL	Uranium	mg/kg	ND	3.21	No
METAL	Vanadium	mg/kg	82.7	85.1	No
METAL	Zinc	mg/kg	56.7	67.8	No
GENCHEM	Ammonium ion as N	mg/kg	ND	9.23	No
GENCHEM	Ammonia as N	mg/kg	266	9.23	Yes
GENCHEM	Bromide	mg/kg	ND	--	No
GENCHEM	Chloride	mg/kg	14.3	100	No
GENCHEM	Cyanide	mg/kg	ND	--	No
GENCHEM	Fluoride	mg/kg	1.06	2.81	No
GENCHEM	Nitrate as N	mg/kg	385	12	Yes

Table 4-2. Comparison of Maximum Detected Values in Shallow-Zone Soils (0 to 4.6 m [0 to 15 ft]) to Background Concentrations. (7 sheets)

Constituent Class	Constituent Name	Units	Maximum Detected Result	90th Percentile Background Concentration	Does Maximum Concentration Exceed Background?
GENCHEM	Nitrite as N	mg/kg	1.66	--	No background
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	489	--	No background
GENCHEM	Phosphate	mg/kg	ND	0.785	No
GENCHEM	Sulfate	mg/kg	32	237	No
216-B-12 Crib					
METAL	Aluminum	mg/kg		11,800	No
METAL	Antimony	mg/kg	0.38		No
METAL	Arsenic	mg/kg	7.3	20	No
METAL	Barium	mg/kg	82.3	132	No
METAL	Beryllium	mg/kg	0.33	1.51	No
METAL	Bismuth	mg/kg	ND	--	No
METAL	Boron	mg/kg	1.3	--	No background
METAL	Cadmium	mg/kg	0.08	0.81	No
METAL	Chromium (total)	mg/kg	7.1	18.5	No
METAL	Hexavalent chromium	mg/kg	ND	--	No
METAL	Cobalt	mg/kg		15.7	No
METAL	Copper	mg/kg	14.1	22	No
METAL	Lead	mg/kg	6.1	10.2	No
METAL	Manganese	mg/kg		512	No
METAL	Mercury	mg/kg		0.33	No
METAL	Molybdenum	mg/kg		--	No
METAL	Nickel	mg/kg	8.5	19.1	No
METAL	Selenium	mg/kg	ND	--	No
METAL	Silver	mg/kg	ND	0.73	No
METAL	Thallium	mg/kg		--	No
METAL	Thorium	mg/kg		--	No
METAL	Uranium	mg/kg	0.45	3.21	No
METAL	Vanadium	mg/kg		85.1	No
METAL	Zinc	mg/kg		67.8	No
GENCHEM	Ammonium ion as N	mg/kg		9.23	No
GENCHEM	Ammonia as N	mg/kg	ND	9.23	No
GENCHEM	Bromide	mg/kg		--	No
GENCHEM	Chloride	mg/kg	7.33	100	No
GENCHEM	Cyanide	mg/kg	ND	--	No

Table 4-2. Comparison of Maximum Detected Values in Shallow-Zone Soils (0 to 4.6 m [0 to 15 ft]) to Background Concentrations. (7 sheets)

Constituent Class	Constituent Name	Units	Maximum Detected Result	90th Percentile Background Concentration	Does Maximum Concentration Exceed Background?
GENCHEM	Fluoride	mg/kg	ND	2.81	No
GENCHEM	Nitrate as N	mg/kg	13	12	Yes
GENCHEM	Nitrite as N	mg/kg	ND	--	No
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	16.2	--	No background
GENCHEM	Phosphate	mg/kg	ND	0.785	No
GENCHEM	Sulfate	mg/kg	467	237	Yes

Shaded cells indicate constituents that exceeded background, or which had a detect but no background.
Blank cells indicate that the constituent was not analyzed for in shallow zone soils.

GENCHEM = General Chemistry.
METAL = Metal suite.
NA = Not available.
ND = Not detected.
-- = No background value available.

Table 4-3. Comparison of Maximum Detected Values in Deep-Zone Soils (0 m to GW [0 ft-GW]) to Background Concentrations. (7 sheets)

Constituent Class	Constituent Name	Units	Maximum Detected Result	90th Percentile Background Concentration	Does Maximum Concentration Exceed Background?
207-A South Retention Basin					
METAL	Aluminum	mg/kg		11,800	No
METAL	Antimony	mg/kg	ND	--	No
METAL	Arsenic	mg/kg	9.98	20	No
METAL	Barium	mg/kg	65.5	132	No
METAL	Beryllium	mg/kg	ND	1.51	No
METAL	Bismuth	mg/kg	ND	--	No
METAL	Boron	mg/kg	ND	--	No
METAL	Cadmium	mg/kg	ND	0.81	No
METAL	Chromium (total)	mg/kg	15.5	18.5	No
METAL	Hexavalent chromium	mg/kg	ND	--	No
METAL	Cobalt	mg/kg		15.7	No
METAL	Copper	mg/kg	11	22	No
METAL	Lead	mg/kg	ND	10.2	No
METAL	Manganese	mg/kg		512	No
METAL	Mercury	mg/kg	ND	0.33	No
METAL	Molybdenum	mg/kg		--	No
METAL	Nickel	mg/kg	9.8	19.1	No
METAL	Selenium	mg/kg	ND	--	No
METAL	Silver	mg/kg	5.01	0.73	Yes
METAL	Thallium	mg/kg		--	No
METAL	Thorium	mg/kg		--	No
METAL	Uranium	mg/kg	1.04	3.21	No
METAL	Vanadium	mg/kg		85.1	No
METAL	Zinc	mg/kg		67.8	No
GENCHEM	Ammonium ion as N	mg/kg	0.248	9.23	No
GENCHEM	Ammonia as N	mg/kg		9.23	No
GENCHEM	Chloride	mg/kg	7.56	100	No
GENCHEM	Cyanide	mg/kg	ND	--	No
GENCHEM	Fluoride	mg/kg	ND	2.81	No
GENCHEM	Nitrate as N	mg/kg	21.8	12	Yes
GENCHEM	Nitrite as N	mg/kg	ND	--	No
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	20.9	--	No background
GENCHEM	Phosphate	mg/kg	ND	0.785	No

Table 4-3. Comparison of Maximum Detected Values in Deep-Zone Soils (0 m to GW [0 ft-GW]) to Background Concentrations. (7 sheets)

Constituent Class	Constituent Name	Units	Maximum Detected Result	90th Percentile Background Concentration	Does Maximum Concentration Exceed Background?
GENCHEM	Sulfate	mg/kg	53	237	No
216-A-10 Crib					
METAL	Aluminum	mg/kg		11,800	No
METAL	Antimony	mg/kg	0.48	--	No background
METAL	Arsenic	mg/kg	5.19	20	No
METAL	Barium	mg/kg	99.3	132	No
METAL	Beryllium	mg/kg	0.42	1.51	No
METAL	Bismuth	mg/kg	ND	--	No
METAL	Boron	mg/kg	1	--	No background
METAL	Cadmium	mg/kg	0.26	0.81	No
METAL	Chromium (total)	mg/kg	13	18.5	No
METAL	Hexavalent chromium	mg/kg	ND	--	No
METAL	Cobalt	mg/kg		15.7	No
METAL	Copper	mg/kg	11.2	22	No
METAL	Lead	mg/kg	7.7	10.2	No
METAL	Mercury	mg/kg	1.25	0.33	Yes
METAL	Molybdenum	mg/kg		--	No
METAL	Nickel	mg/kg	13.5	19.1	No
METAL	Selenium	mg/kg	3.57	--	No background
METAL	Silver	mg/kg	3.08	0.73	Yes
METAL	Thallium	mg/kg		--	No
METAL	Thorium	mg/kg		--	No
METAL	Uranium	mg/kg	2.78	3.21	No
METAL	Vanadium	mg/kg		85.1	No
METAL	Zinc	mg/kg		67.8	No
GENCHEM	Ammonium ion as N	mg/kg	0.452	9.23	No
GENCHEM	Ammonia as N	mg/kg	ND	9.23	No
GENCHEM	Chloride	mg/kg	6.43	100	No
GENCHEM	Cyanide	mg/kg	ND	--	No
GENCHEM	Fluoride	mg/kg	1.9	2.81	No
GENCHEM	Nitrate as N	mg/kg	26.8	12	Yes
GENCHEM	Nitrite as N	mg/kg	0.404	--	No background
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	25.8	--	No background
GENCHEM	Phosphate	mg/kg	26.9	0.785	Yes

Table 4-3. Comparison of Maximum Detected Values in Deep-Zone Soils (0 m to GW [0 ft-GW]) to Background Concentrations. (7 sheets)

Constituent Class	Constituent Name	Units	Maximum Detected Result	90th Percentile Background Concentration	Does Maximum Concentration Exceed Background?
GENCHEM	Sulfate	mg/kg	35.6	237	No
216-A-19 Trench					
METAL	Aluminum	mg/kg	7,490	11,800	No
METAL	Antimony	mg/kg	ND	--	No
METAL	Arsenic	mg/kg	7	20	No
METAL	Barium	mg/kg	98.9	132	No
METAL	Beryllium	mg/kg	0.26	1.51	No
METAL	Bismuth	mg/kg	36,400	--	No background
METAL	Boron	mg/kg	38.9	--	No background
METAL	Cadmium	mg/kg	0.21	0.81	No
METAL	Chromium (total)	mg/kg	14.2	18.5	No
METAL	Hexavalent chromium	mg/kg	ND	--	No
METAL	Cobalt	mg/kg	11.3	15.7	No
METAL	Copper	mg/kg	15.5	22	No
METAL	Lead	mg/kg	3.18	10.2	No
METAL	Manganese	mg/kg	538	512	Yes
METAL	Mercury	mg/kg	ND	0.33	No
METAL	Molybdenum	mg/kg	4.39	--	No background
METAL	Nickel	mg/kg	13.4	19.1	No
METAL	Selenium	mg/kg	ND	--	No
METAL	Silver	mg/kg	0.12	0.73	No
METAL	Thallium	mg/kg	0.58	--	No background
METAL	Thorium	mg/kg	3.51	--	No background
METAL	Uranium	mg/kg	130	3.21	Yes
METAL	Vanadium	mg/kg	108	85.1	Yes
METAL	Zinc	mg/kg	85.6	67.8	Yes
GENCHEM	Ammonium ion as N	mg/kg	6.79	9.23	No
GENCHEM	Ammonia as N	mg/kg		9.23	No
GENCHEM	Bromide	mg/kg	ND	--	No
GENCHEM	Chloride	mg/kg	33.1	100	No
GENCHEM	Cyanide	mg/kg	ND	--	No
GENCHEM	Fluoride	mg/kg	5.62	2.81	Yes
GENCHEM	Nitrate as N	mg/kg	9,860	12	Yes
GENCHEM	Nitrite as N	mg/kg	1.12	--	No background

Table 4-3. Comparison of Maximum Detected Values in Deep-Zone Soils (0 m to GW [0 ft-GW]) to Background Concentrations. (7 sheets)

Constituent Class	Constituent Name	Units	Maximum Detected Result	90th Percentile Background Concentration	Does Maximum Concentration Exceed Background?
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	1,120	--	No background
GENCHEM	Phosphate	mg/kg	5.04	0.785	Yes
GENCHEM	Sulfate	mg/kg	294	237	Yes
216-A-36B Crib					
METAL	Aluminum	mg/kg	8,430	11,800	No
METAL	Antimony	mg/kg	1	--	No background
METAL	Arsenic	mg/kg	6.2	20	No
METAL	Barium	mg/kg	89.8	132	No
METAL	Beryllium	mg/kg	0.379	1.51	No
METAL	Bismuth	mg/kg	91.4	--	No background
METAL	Boron	mg/kg	5.8	--	No background
METAL	Cadmium	mg/kg	0.11	0.81	No
METAL	Chromium (total)	mg/kg	72.5	18.5	Yes
METAL	Hexavalent chromium	mg/kg	ND	--	No
METAL	Cobalt	mg/kg	6.13	15.7	No
METAL	Copper	mg/kg	18.6	22	No
METAL	Lead	mg/kg	6.19	10.2	No
METAL	Manganese	mg/kg	246	512	No
METAL	Mercury	mg/kg	1.71	0.33	Yes
METAL	Molybdenum	mg/kg	2.22	--	No background
METAL	Nickel	mg/kg	58	19.1	Yes
METAL	Selenium	mg/kg	0.51	--	No background
METAL	Silver	mg/kg	3.54	0.73	Yes
METAL	Thallium	mg/kg	0.815	--	No background
METAL	Thorium	mg/kg	3.77	--	No background
METAL	Uranium	mg/kg	36.8	3.21	Yes
METAL	Vanadium	mg/kg	37.7	85.1	No
METAL	Zinc	mg/kg	41.5	67.8	No
GENCHEM	Ammonium ion as N	mg/kg	58.2	9.23	Yes
GENCHEM	Ammonia as N	mg/kg	ND	9.23	No
GENCHEM	Bromide	mg/kg	ND	--	No
GENCHEM	Chloride	mg/kg	8.58	100	No
GENCHEM	Cyanide	mg/kg	ND	--	No
GENCHEM	Fluoride	mg/kg	0.975	2.81	No

Table 4-3. Comparison of Maximum Detected Values in Deep-Zone Soils (0 m to GW [0 ft-GW]) to Background Concentrations. (7 sheets)

Constituent Class	Constituent Name	Units	Maximum Detected Result	90th Percentile Background Concentration	Does Maximum Concentration Exceed Background?
GENCHEM	Nitrate as N	mg/kg	289	12	Yes
GENCHEM	Nitrite as N	mg/kg	18.8	--	No background
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	287	--	No background
GENCHEM	Phosphate	mg/kg	ND	0.785	No
GENCHEM	Sulfate	mg/kg	44.6	237	No
216-A-37-1 Crib					
METAL	Aluminum	mg/kg	15,000	11,800	Yes
METAL	Antimony	mg/kg	2	--	No background
METAL	Arsenic	mg/kg	4	20	No
METAL	Barium	mg/kg	193	132	Yes
METAL	Beryllium	mg/kg	0.39	1.51	No
METAL	Bismuth	mg/kg	ND	--	No
METAL	Boron	mg/kg	1	--	No background
METAL	Cadmium	mg/kg	0.18	0.81	No
METAL	Chromium (Total)	mg/kg	24	18.5	Yes
METAL	Hexavalent Chromium	mg/kg	ND	--	No
METAL	Cobalt	mg/kg	16	15.7	Yes
METAL	Copper	mg/kg	20	22	No
METAL	Lead	mg/kg	13	10.2	Yes
METAL	Manganese	mg/kg	652	512	Yes
METAL	Mercury	mg/kg	0.02	0.33	No
METAL	Molybdenum	mg/kg	2	--	No background
METAL	Nickel	mg/kg	17	19.1	No
METAL	Selenium	mg/kg	ND	--	No
METAL	Silver	mg/kg	4	0.73	Yes
METAL	Thallium	mg/kg	2	--	No background
METAL	Thorium	mg/kg	5	--	No background
METAL	Uranium	mg/kg	0.666	3.21	No
METAL	Vanadium	mg/kg	122	85.1	Yes
METAL	Zinc	mg/kg	66	67.8	No
GENCHEM	Ammonium ion as N	mg/kg	0.288	9.23	No
GENCHEM	Ammonia as N	mg/kg	266	9.23	Yes
GENCHEM	Bromide	mg/kg	ND	--	No
GENCHEM	Chloride	mg/kg	14.3	100	No

Table 4-3. Comparison of Maximum Detected Values in Deep-Zone Soils (0 m to GW [0 ft-GW]) to Background Concentrations. (7 sheets)

Constituent Class	Constituent Name	Units	Maximum Detected Result	90th Percentile Background Concentration	Does Maximum Concentration Exceed Background?
GENCHEM	Cyanide	mg/kg	ND	--	No
GENCHEM	Fluoride	mg/kg	1.69	2.81	No
GENCHEM	Nitrate as N	mg/kg	385	12	Yes
GENCHEM	Nitrite as N	mg/kg	1.66	--	No background
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	489	--	No background
GENCHEM	Phosphate	mg/kg	1.29	0.785	Yes
GENCHEM	Sulfate	mg/kg	32	237	No
216-B-12 Crib					
METAL	Aluminum	mg/kg	11,300	11,800	No
METAL	Antimony	mg/kg	0.65	--	No background
METAL	Arsenic	mg/kg	7.3	20	No
METAL	Barium	mg/kg	93.8	132	No
METAL	Beryllium	mg/kg	0.33	1.51	No
METAL	Bismuth	mg/kg	ND	--	No
METAL	Boron	mg/kg	1.3	--	No background
METAL	Cadmium	mg/kg	0.08	0.81	No
METAL	Chromium (total)	mg/kg	30.4	18.5	Yes
METAL	Hexavalent chromium	mg/kg	ND	--	No
METAL	Cobalt	mg/kg	7.24	15.7	No
METAL	Copper	mg/kg	16.6	22	No
METAL	Lead	mg/kg	6.1	10.2	No
METAL	Manganese	mg/kg	318	512	No
METAL	Mercury	mg/kg	1.31	0.33	Yes
METAL	Molybdenum	mg/kg	ND	--	No
METAL	Nickel	mg/kg	11.2	19.1	No
METAL	Selenium	mg/kg	ND	--	No
METAL	Silver	mg/kg	2.41	0.73	Yes
METAL	Thallium	mg/kg	ND	--	No
METAL	Thorium	mg/kg	5.43	--	No background
METAL	Uranium	mg/kg	28	3.21	Yes
METAL	Vanadium	mg/kg	45.4	85.1	No
METAL	Zinc	mg/kg	43.1	67.8	No
GENCHEM	Ammonium ion as N	mg/kg	404	9.23	Yes
GENCHEM	Ammonia as N	mg/kg	ND	9.23	No

Table 4-3. Comparison of Maximum Detected Values in Deep-Zone Soils (0 m to GW [0 ft-GW]) to Background Concentrations. (7 sheets)

Constituent Class	Constituent Name	Units	Maximum Detected Result	90th Percentile Background Concentration	Does Maximum Concentration Exceed Background?
GENCHEM	Bromide	mg/kg	ND	--	No
GENCHEM	Chloride	mg/kg	23.4	100	No
GENCHEM	Cyanide	mg/kg	ND	--	No
GENCHEM	Fluoride	mg/kg	ND	2.81	No
GENCHEM	Nitrate as N	mg/kg	165	12	Yes
GENCHEM	Nitrite as N	mg/kg	ND	--	No
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	126	--	No background
GENCHEM	Phosphate	mg/kg	ND	0.785	No
GENCHEM	Sulfate	mg/kg	647	237	Yes

Shaded cells indicate constituents that exceeded background, or which had a detect but no background.

GENCHEM = General Chemistry.
METAL = Metal suite.
ND = Not detected.
-- = No background value available.

Table 4-4. Summary of Exposure Assumptions for Industrial Soil Risk-Based Concentrations.

Parameter	Symbol	Units	Industrial Land Use [a, b]
Target risk	TR	unitless	$1x10^{-5}$
Target hazard quotient	THQ	unitless	1
Oral reference dose	RfDo	mg/kg-day	chemical specific
Oral cancer potency factor	CPFo	kg-day/mg	chemical specific
Inhalation reference dose	CPFi	mg/kg-day	chemical specific
Inhalation cancer potency factor	RfDi	kg-day/mg	chemical specific
Unit GENCHEMersion factor	UCF	mg/kg	$1.00x10^{+6}$
Body weight –adult	BWa	kg	70
Carcinogenic averaging time	ATC	years	75
Noncarcinogenic averaging time	ATN	years	20
Exposure frequency	EF	unitless	0.4
Exposure duration	ED	years	20
Incidental soil ingestion rate	SIR	mg/day	50
Inhalation rate – carcinogens	INHc	m^3/day	20
Inhalation rate – noncarcinogens	INHnc	m^3/day	20
Gastrointestinal absorption factor	ABSgi	unitless	1
Inhalation absorption fraction	ABSinh	unitless	1

[a]WAC 173-340-745, "Soil Cleanup Standards for Industrial Properties," (equations 745-1 and 745-2).
[b]WAC 173-340-750 (4), Cleanup Standards to Protect Air Quality," "Method C Air Cleanup Levels."

Table 4-5. Summary of Exposure Assumptions for Risk-Based Concentrations for Groundwater Protection.

Parameter	Symbol	Units	WAC 173-340-720 Method B Parameter [a]
Target risk	TR	unitless	1.00×10^{-6}
Target hazard quotient	THQ	unitless	1
Oral reference dose	RfDo	mg/kg-day	chemical specific
Cancer potency factor	CPF	kg-day/mg	chemical specific
Unit GENCHEMersion factor	UCF	µg/mg	1,000
Body weight – carcinogens	BW	kg	70
Body weight – noncarcinogens	BW	kg	16
Carcinogenic averaging time	ATC	years	75
Noncarcinogenic averaging time	ATN	years	6
Drinking water fraction	DWF	unitless	1
Exposure duration – carcinogens	ED	years	30
Exposure duration – noncarcinogens	ED	years	6
Drinking water ingestion rate – carcinogens	DWIR	L/day	2
Drinking water ingestion rate – noncarcinogens	DWIR	L/day	1
Inhalation correction factor - volatile compound	INH	unitless	2
Inhalation correction factor - nonvolatile compound	INH	unitless	1

[a]WAC 173-340-720, "Ground Water Cleanup Standards," (equations 720-1 and 720-2).
[b]WAC = *Washington Administrative Code.*

Table 4-6. Summary of Chemical/Physical Parameters for Soil Risk-Based Concentrations Protective of Groundwater. (4 sheets)

Chemical Name	Groundwater RBC (µg/L)	Groundwater RBC Basis	K_d (L/kg)	Source*	H_{CC} (dimensionless)	Source	K_{oc}	Source
2-Butanone	4,800	WAC 173-340-720, Method B	0.027	Region 9	0.0011	Region 9		
Acetone	7,200 (Updated)	WAC 173-340-720, Method B	0.000575	CLARC 3.1 K_d=Koc/1000	0.00159	CLARC 3.1		
Aluminum	50	SMCL	45	CLARC 3.1	0	CLARC 3.1		
Antimony	6	MCL	45	CLARC 3.1	0	CLARC 3.1		
Aroclor 1254	0.16	WAC 173-340-720, Method B	309	CLARC 3.1 K_d=Koc/1000	0.002	EPA 2000, PCB Risk Assessment Review Guidance		
Arsenic	0.0583	WAC 173-340-720, Method B	29	CLARC 3.1	0	CLARC 3.1		
Barium	1,120	WAC 173-340-720, Method B	41	CLARC 3.1	0	CLARC 3.1		
Beryllium	4	MCL	790	CLARC 3.1	0	CLARC 3.1		
Beta-1,2,3,4,5,6-hexachlorocyclohexane	0.04861	WAC 173-340-720, Method B	2.139	CLARC 3.1 K_d=Koc/1000	0.0000305	CLARC 3.1		
Bis(2-ethylhexyl) phthalate	6	MCL	111.1	CLARC 3.1 K_d=Koc/1000	0.00000418	CLARC 3.1		
Bismuth	Not available	Not Available	100	ANL/EAIS-8	Not available	Not available	Not available	Not available
Boron	1,440	WAC 173-340-720, Method B	0.19	B-Plant AAMS	0	CLARC 3.1		
Butylbenzylphthalate	3,200	WAC 173-340-720, Method B	13.75	CLARC 3.1 K_d=Koc/1000	0.0000517	CLARC 3.1		
Cadmium	5	MCL	6.7	CLARC 3.1	0	CLARC 3.1		
Chloride	250,000	SMCL	0	Conservative assumption	0	Conservative assumption		

Table 4-6. Summary of Chemical/Physical Parameters for Soil Risk-Based Concentrations Protective of Groundwater. (4 sheets)

Chemical Name	Groundwater RBC (µg/L)	Groundwater RBC Basis	K_d (L/kg)	Source*	H_{CC} (dimensionless)	Source	K_{oc}	Source
Chloroform	7.1721	WAC 173-340-720, Method B	0.053	CLARC 3.1 K_d=Koc/1000	0.15	CLARC 3.1		
Chromium, hexavalent	48	WAC 173-340-720, Method B	19	CLARC 3.1	0	CLARC 3.1		
Chromium, total	240,00	WAC 173-340-720, Method B	1000	CLARC 3.1	0	CLARC 3.1		
Cobalt	Not available	Not available	1200	PNNL-11800	Not available	Not available	Not available	Not available
Copper	592	WAC 173-340-720, Method B	22	CLARC 3.1	0	CLARC 3.1		
Cyanide	200	MCL	0	Conservative assumption	0	Conservative assumption		
Diethylphthalate	12,800	WAC 173-340-720, Method B	0.082	CLARC 3.1 K_d=Koc/1000	0.0000185	CLARC 3.1		
Di-n-butylphthalate	1,600	WAC 173-340-720, Method B	0.1567	CLARC 3.1 K_d=Koc/1000	0.0000000385	CLARC 3.1		
Fluoride	4,000	MCL	0	Conservative assumption	0	Conservative assumption		
Lead	15	MCL	10,000	CLARC 3.1	0	CLARC 3.1		
Manganese	50	SMCL	50	100 Area RDR/RAWP	0	CLARC 3.1		
Mercury	2	MCL	52	CLARC 3.1	0.47	CLARC 3.1		
Methylene chloride	5	MCL	0.01	CLARC 3.1 K_d=Koc/1000	0.0898	CLARC 3.1		
Molybdenum	80	WAC 173-340-720, Method B	10	ANL/EAIS-8	0	CLARC 3.1		
Nickel	100	MCL (WAC)	65	CLARC 3.1	0	CLARC 3.1		

Table 4-6. Summary of Chemical/Physical Parameters for Soil Risk-Based Concentrations Protective of Groundwater. (4 sheets)

Chemical Name	Groundwater RBC (µg/L)	Groundwater RBC Basis	K_d (L/kg)	Source*	H_{CC} (dimensionless)	Source	K_{oc}	Source
Nitrate as N	1,600	WAC 173-340-720, Method B	0	Conservative assumption	0	Conservative assumption		
Nitrite as N	1,000	MCL	0	Conservative assumption	0	Conservative assumption		
Nitrate and nitrate/nitrite as N	1,600	WAC 173-340-720, Method B	0	Conservative assumption	0	Conservative assumption		
Oil & grease	--	WAC 173-340-720, Method B	--	--	--	Method A		
Pentachlorophenol	0.72916	WAC 173-340-720, Method B	0.592	CLARC 3.1 K_d=Koc/1000	0.000001	CLARC 3.1		
Selenium	50	MCL	5	CLARC 3.1	0	CLARC 3.1		
Silver	80	WAC 173-340-720, Method B	8.3	CLARC 3.1	0	CLARC 3.1		
Sulfate	250,000	SMCL	0	Conservative assumption	0	Conservative assumption		
Thallium	1.12	WAC 173-340-720, Method B	71	CLARC 3.1	0	CLARC 3.1		
Toluene	1,000	MCL	0.14	CLARC 3.1 K_d=Koc/1000	0.272	CLARC 3.1		
Total petroleum hydrocarbons -diesel range	--	WAC 173-340-720, Method B	--	--	--	Method A		
Total petroleum hydrocarbons -gasoline range w/o benzene	--	WAC 173-340-720, Method B	--	--	--	Method A		
Total petroleum hydrocarbons -motor oil (high boiling)	--	WAC 173-340-720, Method B	--	--	--	Method A		
Uranium, total	30	MCL	2	100 Area RDR/RAWP	0	CLARC 3.1		

Table 4-6. Summary of Chemical/Physical Parameters for Soil Risk-Based Concentrations Protective of Groundwater. (4 sheets)

Chemical Name	Groundwater RBC (µg/L)	Groundwater RBC Basis	K_d (L/kg)	Source*	H_{CC} (dimensionless)	Source	K_{oc}	Source
Vanadium	112	WAC 173-340-720, Method B	1,000	CLARC 3.1	0	CLARC 3.1		
Zinc	4,800	WAC 173-340-720, Method B	62	CLARC 3.1	0	CLARC 3.1		

[a]Ecology 94-145, *Cleanup Levels & Risk Calculations under the Model Toxics Control Act Cleanup Regulation (CLARC)*, Version 3.1
[b]Ecology 94-145, $K_d = K_{oc}/1{,}000$.
[c]Region IX preliminary remediation goals.
[d]Oak Ridge National Laboratory.
[e]Conservative assumption.
[f]DOE/RL-99-51, *Remedial Design Report and Remedial Action Work Plan for the 100-HR-3 Groundwater Operable Unit In Situ REDOX Manipulation*, Rev. 1.
[g]DOE/RL-92-05, *B Plant Source Aggregate Area Management Study Report*, Rev. 0.
[h]ANL/EAIS-8, *Data Collection Handbook to Support Modeling Impacts of Radioactive Material in Soil.*
[i]PNNL-11800, *Composite Analysis for Low-Level Waste Disposal in the 200 Area Plateau of the Hanford Site.*

-- = Not applicable.
H_{CC} = Henry's law constant.
MCL = Maximum contaminant level.
RBC = Risk-based concentration.
SMCL = Secondary maximum contaminant level.
WAC = *Washington Administrative Code.*

Table 4-7. Summary of Toxicity Values Used to Calculate Risk-Based Concentrations. (2 sheets)

Chemical Name	Oral Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$	Oral Reference Dose (mg/kg-day)	Inhalation Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$	Inhalation Reference Dose (mg/kg-day)
2-Butanone	--	0.6	--	0.286
2,4-dichlorophenoxyacetic acid	--	0.01	--	--
2-(2,4,5-trichlorophenoxy)propionic acid	--	0.01	--	--
Acetone	--	0.9	--	--
Antimony	--	0.0004	--	--
Aroclor-1254	2	2.0E-5	2	--
Arsenic	1.5	0.0003	15.05	15
Barium	--	0.07	--	0.0001
Beryllium	--	0.002	8.4	5.71E-6
beta-1,2,3,4,5,6-hexachlorocyclohexane	1.8	--	1.86	--
Bis(2-ethylhexyl) phthalate	0.014	0.02	--	--
Boron	--	0.09	--	--
Butylbenzylphthalate	--	0.2	--	--
Cadmium in water	--	0.0005	6.3	--
Chloroform	0.006	0.01	0.081	--
Chromium	--	1.5	--	--
Copper	--	0.037	--	--
Cyanide	--	0.02	--	--
Diethylphthalate	--	0.8	--	--
Di-n-butylphthalate	--	0.1	--	--
Fluoride	--	--	--	--
Hexavalent chromium	--	0.003	0.042	2.29E-6
Isophorone	9.5E-4	0.2	--	--
Lead	--	--	--	--
Manganese	--	0.14	--	1.43E-5
Mercury	--	0.0003	--	8.57E-5
Methylene chloride	0.008	0.06	1.65E-3	0.857
Molybdenum	--	0.005	--	--
Nickel, soluble salt	--	0.02	--	--
Nitrate as N	--	0.1	--	--
Nitrite as N	--	0.1	--	--
Nitrate and nitrate/nitrite as N	--	0.1	--	--
Pentachlorophenol	0.12	0.03	--	--
Propionic acid	--	0.001	--	--

Table 4-7. Summary of Toxicity Values Used to Calculate Risk-Based Concentrations. (2 sheets)

Chemical Name	Oral Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$	Oral Reference Dose (mg/kg-day)	Inhalation Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$	Inhalation Reference Dose (mg/kg-day)
Selenium	--	0.005	--	--
Silver	--	0.005	--	--
Thallium, soluble salt	--	7.0E-5	--	--
Toluene	--	0.2	--	0.114
Total petroleum hydrocarbons - diesel range	--	--	--	--
Total petroleum hydrocarbons - gasoline range w/o benzene	--	--	--	--
Total petroleum hydrocarbons - motor oil (high boiling)	--	--	--	--
Uranium, soluble salt	--	0.003	--	--
Vanadium	--	0.007	--	--
Zinc	--	0.3	--	--

Integrated Risk Information System (IRIS 2003), a database available through the EPA National Center for Environmental Assessment. http://www.epa.gov/iris/.

EPA Region IX Preliminary Remediation Goals Table, October, 2002, available at http://www.epa.gov/region09/waste/sfund/prg/s1_01.htm.

EPA/540/R-97/036,*Health Effects Assessment Summary Tables* Fiscal Year 1997 Update,. July 1997.

EPA Region III Risk Based Concentration Table, available on the Internet at www.epa.gov/reg3hwmd/risk/index.htm. April 2, 2002.

-- = Not applicable.

EPA = U.S. Environmental Protection Agency.

Table 4-8. Summary of COPCs Exceeding Screening Levels for the Human Health Risk Assessment.

Constituent Name	207-A South Retention Basin		216-A-10 Crib		216-A-19 Trench		216-A-36B Crib		216-A-37-1 Crib		216-B-12 Crib	
	Direct Exposure	Protection of GW	Direct Exposure	Protection of GW	Direct Exposure	Protection of GW	Direct Exposure	Protection of GW	Direct Exposure	Protection of GW	Direct Exposure	Protection of GW
Nitrate as N						X		X		X		X
Nitrite as N								X				
Nitrate and nitrate/nitrite as N [a]						X		X		X		X
Aluminum										X		
Bismuth						X		X				
Boron						X						
Cobalt										X		
Manganese						X				X		
Thallium										X		
Uranium						X		X				X
Methylene chloride				X								
TPH-diesel				X								
Pentachloro-phenol				X								
Beta-1,2,3,4,5,6-hexachloro-cyclohexane				X								

[a]Compared to screening values for nitrate as N.

Note: this table does not include organics retained because there is no screening level available. Those constituents are presented in Table 4-9. This table also does not include thorium and sulfate for which screening levels are not available and an argument is made in Section 4.3.2.4 for their exclusion as COPCs.

COPC = Contaminant of potential concern.
GW = Groundwater.
TPH = Total petroleum hydrocarbons.

Table 4-9. Comparison of Organic Chemicals Detected in Both Shallow-Zone and Deep-Zone with WAC 173-340-747 Screening Levels. (3 sheets)

Constituent Name	Maximum Detected Result in 0-15 ft BGS in µg/kg	Direct Exposure screening level in µg/kg	Does Maximum Concentration Exceed Screening level?	Maximum Detected Result in 0 ft to GW in µg/kg	Protection of GW screening level in µg/kg	Does Maximum Concentration Exceed Screening level?
207-A South Retention Basin						
Acetone	26	3.15E+09	No	26	28,900	No
Chloroform	4	2.15E+07	No	4	38.1	No
Methylene chloride	3	1.75E+07	No	3	25.4	No
Butylbenzylphthalate	110	7.00E+08	No	110	8.93E+05	No
Diethylphthalate	320	2.80E+09	No	320	72,200	No
2,4-dichlorophenoxyacetic acid	7.1	3.50E+07		7.1	NA	No screening level
2-(2,4,5-trichlorophenoxy)propionic acid	3.3	3.50E+07		3.3	NA	No screening level
216-A-10 Crib						
beta-1,2,3,4,5,6-hexachlorocyclohexane	7.0	72917	no	7.0	2.27	Yes
2-butanone	NA			17.6	21,800	No
acetone	NA			138	28,900	No
Methylene chloride	NA			29.1	25.4	Yes
Toluene	NA			250	7,270	No
1-chloropropane	NA			380	--	No screening level
2-butoxyethanol	ND	--	No	22.6	--	No screening level
Bis(2-ethylhexyl)phthalate	ND	9.38E+06	No	140.8	13,900	No
Diethylphthalate	ND	2.80E+09	No	390	7,220	No
Pentachlorophenol	ND	1.09E+06	No	20.4	11.5	Yes
Tributyl phosphate	ND	--	No	2.00E+09	--	No screening level
TPH-diesel range	ND	2.00E+06	No	1.00E+07	2.00E+06	Yes
TPH-kerosene range	ND	--	No	2.40E+07	--	No screening level
TPH-gasoline range	ND	1.00E+05	No	1,500	1.00E+05	No

Table 4-9. Comparison of Organic Chemicals Detected in Both Shallow-Zone and Deep-Zone with WAC 173-340-747 Screening Levels. (3 sheets)

Constituent Name	Maximum Detected Result in 0-15 ft BGS in µg/kg	Direct Exposure screening level in µg/kg	Does Maximum Concentration Exceed Screening level?	Maximum Detected Result in 0 ft to GW in µg/kg	Protection of GW screening level in µg/kg	Does Maximum Concentration Exceed Screening level?
TPH-motor oil	NA			9.00E+04	2.00E+06	No
216-A-19 Crib						
Diethylphthalate	ND	2.80E+09	No	1,100	7,220	No
Tributyl phosphate	280,000	--	No screening level	280,000	--	No screening level
TPH-diesel range	2.3E+05	2.00E+06	No	3.0E+05	2.00E+06	No
216-A-36-B Crib						
Di-n-butylphthalate	ND	3.50E+08	No	550	11,400	No
Diethylphthalate	280	2.80E+09	No	650	72,200	No
Isophorone	ND	1.38E+08	No	500	--	No screening level
Aroclor-1254	ND	65,600	No	13	989	No
216-A-37-1 Crib						
Acetone	13	3.15E+09	No	14.9	28,900	No
Methylene chloride	ND	1.75E+07	No	6.2	25.4	No
Bis(2-ethylhexyl)phthalate	21	9.38E+06	No	2,100	13,900	No
Di-n-butylphthalate	ND	3.50E+08	No	19	11,400	No
Diethylphthalate	650	2.80E+09	No	760	72,200	No
Tributyl phosphate	45	--	No screening level	45	--	No screening level
216-B-12 Crib						
Bis(2-ethylhexyl)phthalate	18	9.38E+06	no	20	13,900	No
Di-n-butylphthalate	77	3.50E+08	no	77	11,400	No
Diethylphthalate	ND	2.80E+09	No	8,700	72,200	No
Aroclor-1254	NA			140	989	No
TPH-gasoline range	110	1.00E+05	No	110	1.00E+05	No

Table 4-9. Comparison of Organic Chemicals Detected in Both Shallow-Zone and Deep-Zone with WAC 173-340-747 Screening Levels. (3 sheets)

Constituent Name	Maximum Detected Result in 0-15 ft BGS in µg/kg	Direct Exposure screening level in µg/kg	Does Maximum Concentration Exceed Screening level?	Maximum Detected Result in 0 ft to GW in µg/kg	Protection of GW screening level in µg/kg	Does Maximum Concentration Exceed Screening level?
Tributyl phosphate	ND	--	No	2,000	--	No screening level

Shaded cells indicate that the chemical was retained as a constituent of concern after screening.

-- = No screening level is available.
GW = Groundwater.
NA = Not analyzed for. A screening level is not presented if the chemical was not analyzed for at a given depth or site.
ND = Included in analysis but not detected.
TPH = Total petroleum hydrocarbons.

Table 4-10. Comparison of Shallow-Zone Maximum Soil Concentrations for Inorganic Chemicals Higher than Background to Direct Soil Exposure Screening Concentrations. (2 sheets)

Constituent Class	Constituent Name	Units	Maximum Detected Result	Direct Exposure screening level	Does Maximum Concentration Exceed Screening level?
207-A South Retention Basin					
GENCHEM	Nitrate as N	mg/kg	21.8	3.50E+05	No
METAL	Silver	mg/kg	5.01	17,500	No
216-A-10 Crib					
METAL	Antimony	mg/kg	0.48	1400	No
METAL	Boron	mg/kg	0.89	3.15E+05	No
GENCHEM	Nitrite as N	mg/kg	0.40	3.50E+05	No
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	1.0	3.50E+05	No
216-A-19 Trench					
METAL	Boron	mg/kg	38.9	3.15E+05	No
GENCHEM	Fluoride	mg/kg	5.62	2.1E+05	No
GENCHEM	Nitrate as N	mg/kg	546	3.50E+05	No
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	544	3.50E+05	No
GENCHEM	Phosphate	mg/kg	4.85	--	Not regulated
METAL	Thallium	mg/kg	0.07	245	No
METAL	Thorium	mg/kg	[illegible]	[illegible]	No screening level
METAL	Uranium	mg/kg	129	1.05E+04	No
METAL	Vanadium	mg/kg	96.1	2.45E+05	No
216-A-36-B Crib					
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	2.7	3.50E+05	No
METAL	Silver	mg/kg	3.12	17,500	No
METAL	Thorium	mg/kg	[illegible]	[illegible]	No screening level
216-A-37-1 Crib					
GENCHEM	Ammonia as N	mg/kg	266	--	Not regulated
METAL	Barium	mg/kg	165	2.45E+05	No
METAL	Boron	mg/kg	0.51	3.15E+05	No
METAL	Manganese	mg/kg	547	4.90E+05	No
GENCHEM	Nitrate as N	mg/kg	385	3.50E+05	No
GENCHEM	Nitrite as N	mg/kg	1.66	3.50E+05	No
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	489	3.50E+05	No
METAL	Thallium	mg/kg	0.88	245	No
METAL	Thorium	mg/kg	2.53	--	No screening level
216-B-12 Crib					
METAL	Boron	mg/kg	1.3	3.15E+05	No

Table 4-10. Comparison of Shallow-Zone Maximum Soil Concentrations for Inorganic Chemicals Higher than Background to Direct Soil Exposure Screening Concentrations. (2 sheets)

Constituent Class	Constituent Name	Units	Maximum Detected Result	Direct Exposure screening level	Does Maximum Concentration Exceed Screening level?
GENCHEM	Nitrate as N	mg/kg	13	3.50E+05	No
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	16.2	3.50E+05	No
GENCHEM	Sulfate	mg/kg	467	NA	No screening level

Shaded cells indicate constituents that exceeded screening level, or which had no screening level.
GENCHEM = General Chemistry.
NA = Not available.

Table 4-11. Comparison of Overall Maximum Soil Concentrations for Inorganic Chemicals Higher than Background to Protection of Ground Water Soil Screening Concentrations. (3 sheets)

Constituent Class	Constituent Name	Units	Maximum Detected Result	Protection of GW screening level	Does Maximum Concentration Exceed Screening level?
207-A South Retention Basin					
GENCHEM	Nitrate as N	mg/kg	21.8	40	No
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	20.9	40	No
METAL	Silver	mg/kg	5.01	13.6	No
216-A-10 Crib					
METAL	Antimony	mg/kg	0.48	5.4	No
METAL	Boron	mg/kg	1	11.2	No
METAL	Mercury	mg/kg	1.25	2.09	No
GENCHEM	Nitrite as N	mg/kg	0.40	4	No
GENCHEM	Nitrate as N	mg/kg	26.8	40	No
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	25.8	40	No
METAL	Selenium	mg/kg	3.57	5.2	No
METAL	Silver	mg/kg	3.08	13.6	No
GENCHEM	Nitrate as N	mg/kg	26.8	40	No
GENCHEM	Phosphate	mg/kg	26.9	--	Not regulated
216-A-19 Crib					
METAL	Bismuth	mg/kg	36,400	--	No screening level
METAL	Boron	mg/kg	38.9	11.2	Yes
GENCHEM	Fluoride	mg/kg	5.62	16	No
METAL	Manganese	mg/kg	538	50.2	Yes
METAL	Molybdenum	mg/kg	4.39	16.3	No
GENCHEM	Nitrate as N	mg/kg	9,860	40	Yes
GENCHEM	Nitrite as N	mg/kg	1.12	4	No
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	1,120	40	Yes
GENCHEM	Phosphate	mg/kg	5.04	--	Not regulated
GENCHEM	Sulfate	mg/kg	294	1,000	No
METAL	Thallium	mg/kg	0.58	1.59	No
METAL	Thorium	mg/kg	3.51	NA	No screening level
METAL	Uranium	mg/kg	130	1.32	Yes
METAL	Vanadium	mg/kg	108	2,240	No
METAL	Zinc	mg/kg	85.6	5,970	No
216-A-36-B Crib					
GENCHEM	Ammonium ion as N	mg/kg	58.2	--	Not regulated

Table 4-11. Comparison of Overall Maximum Soil Concentrations for Inorganic Chemicals Higher than Background to Protection of Ground Water Soil Screening Concentrations. (3 sheets)

Constituent Class	Constituent Name	Units	Maximum Detected Result	Protection of GW screening level	Does Maximum Concentration Exceed Screening level?
METAL	Antimony	mg/kg	1.0	5.4	No
METAL	Bismuth	mg/kg	91.4	--	No screening level
METAL	Boron	mg/kg	5.8	11.2	No
METAL	Chromium (total)	mg/kg	72.5	2,000	No
METAL	Mercury	mg/kg	1.71	2.09	No
METAL	Molybdenum	mg/kg	2.22	16.3	No
METAL	Nickel	mg/kg	58	130	No
GENCHEM	Nitrate as N	mg/kg	289	40	Yes
GENCHEM	Nitrite as N	mg/kg	18.8	4	Yes
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	287	40	Yes
METAL	Selenium	mg/kg	0.51	5.2	No
METAL	Silver	mg/kg	3.54	13.6	No
METAL	Thallium	mg/kg	0.815	1.59	No
METAL	Thorium	mg/kg	3.77	--	No screening level
METAL	Uranium	mg/kg	36.8	1.32	Yes
GENCHEM	Ammonium ion as N	mg/kg	58.2	--	Not regulated
GENCHEM	Nitrate as N	mg/kg	289	40	Yes
GENCHEM	Nitrite as N	mg/kg	18.8	4	Yes
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	287	40	yes
216-A-37-1 Crib					
METAL	Aluminum	mg/kg	15,000	45.2	Yes
METAL	Barium	mg/kg	193	923	No
METAL	Boron	mg/kg	1	11.2	No
METAL	Chromium (total)	mg/kg	24	2,000	No
METAL	Cobalt	mg/kg	16	--	No screening level
METAL	Lead	mg/kg	13	3000	No
METAL	Manganese	mg/kg	652	50.2	Yes
METAL	Molybdenum	mg/kg	2	16.3	No
GENCHEM	Nitrate as N	mg/kg	385	40	Yes
GENCHEM	Nitrite as N	mg/kg	1.66	4	No
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	489	40	Yes
GENCHEM	Phosphate	mg/kg	0.785	--	Not regulated
METAL	Silver	mg/kg	4	13.6	No

Table 4-11. Comparison of Overall Maximum Soil Concentrations for Inorganic Chemicals Higher than Background to Protection of Ground Water Soil Screening Concentrations. (3 sheets)

Constituent Class	Constituent Name	Units	Maximum Detected Result	Protection of GW screening level	Does Maximum Concentration Exceed Screening level?
METAL	Thallium	mg/kg	2	1.59	Yes
METAL	Thorium	mg/kg	5	--	No screening level
METAL	Vanadium	mg/kg	122	2240	No
216-B-12 Crib					
GENCHEM	Ammonium ion as N	mg/kg	404	--	Not regulated
METAL	Antimony	mg/kg	0.65	5.4	No
METAL	Boron	mg/kg	1.3	11.2	No
METAL	Chromium (total)	mg/kg	30.4	2,000	No
METAL	Mercury	mg/kg	1.31	2.09	No
GENCHEM	Nitrate as N	mg/kg	165	40	Yes
GENCHEM	Nitrate and nitrate/nitrite as N	mg/kg	126	40	Yes
METAL	Silver	mg/kg	2.41	13.6	No
METAL	Thorium	mg/kg	5.43	--	No screening level available
METAL	Uranium	mg/kg	28	1.32	yes

Shaded cells indicate that the chemical was retained as a constituent of concern after screening.

-- = No screening level available.
GENCHEM = General chemistry.
GW = Groundwater.

Table 4-12. Background Comparisons for Radionuclides. (6 sheets)

Constituent Name	Background	Shallow Zone Maximum Concentration	Depth of Shallow Zone Maximum (ft)	Deep Zone Maximum Concentration	Depth of Deep Zone Maximum (ft)
216-B-12 Crib					
Americium-241	NA	ND		2.0	35.5
Antimony-125	NA	NA		ND	
Carbon-14	NA	ND		3.30	62.5
Cesium-134	NA	ND		ND	
Cesium-137	N.A.	ND		61,900	35.5
Cobalt-60	N.A.	ND		ND	
Europium-152	NA	ND		ND	
Europium-154	N.A.	ND		ND	
Europium-155	N.A.	ND		34.9	35.5
Iodine-129	NA	ND		ND	
Neptunium-237	NA	ND		0.048	40
Nickel-63	NA	ND		ND	
Niobium-94	NA	NA		ND	
Plutonium-238	N.A.	ND		ND	
Plutonium-239/240	N.A.	ND		3.9	35.5
Potassium-40	16.6	14.2	14.5	15.8	197.5
Radium-226	0.815	0.708	14.5	1.05	94.5
Radium-228	1.32	ND		1.02	94.50
Ruthenium-106	NA	NA		ND	
Technetium-99	NA	ND		ND	
Thorium-228[a]	1.32	0.584	14.5	7.54	35.5
Thorium-230	1.10	1.19	14.50	1.19	14.50
Thorium-232	1.32	0.716	14.5	0.716	14.5
Tin-126	NA	0.742	14.5	0.742	14.5
Strontium-90[b]	N.A.	ND		12700	35.5
Tritium	NA	8.28	14.5	8.28	14.5
Uranium-234	1.10	0.605	14.5	4.9	40
Uranium-235	0.109	NA		0.32	40
Uranium-236	NA	NLA		NLA	
Uranium-238	1.06	0.628	14.5	5.1	40
216-A-19 Trench					
Americium-241	NA	0.081	14.5	0.081	14.5
Antimony-125	NA	ND		ND	
Carbon-14	NA	ND		ND	

Table 4-12. Background Comparisons for Radionuclides. (6 sheets)

Constituent Name	Background	Shallow Zone Maximum Concentration	Depth of Shallow Zone Maximum (ft)	Deep Zone Maximum Concentration	Depth of Deep Zone Maximum (ft)
Cesium-134	NA	ND		ND	
Cesium-137	N.A.	ND		0.072	32.5
Cobalt-60	N.A.	ND		ND	
Europium-152	NA	ND		ND	
Europium-154	N.A.	ND		ND	
Europium-155	N.A.	0.066	14.5	0.066	14.5
Iodine-129	NA	ND		ND	
Neptunium-237	NA	ND		ND	
Nickel-63	NA	17.6	14.5	17.6	14.5
Niobium-94	NA	ND		ND	
Plutonium-238	N.A.	ND		ND	
Plutonium-239/240	N.A.	0.18	14.5	0.18	14.5
Potassium-40	16.6	NLA		NLA	
Radium-226	0.815	0.439	14.5	0.527	97.5
Radium-228	1.32	0.523	14.5	0.592	97.5
Ruthenium-106	NA	ND		ND	
Technetium-99	NA	ND		ND	
Thorium-228[a]	1.32	0.470	14.5	0.685	97.5
Thorium-230	1.10	0.507	14.5	0.742	32.5
Thorium-232	1.32	0.429	14.5	0.742	32.5
Tin-126	NA	ND		ND	
Strontium-90[b]	N.A.	16.1	14.5	20.0	17.5
Tritium	NA	ND		0.424	248
Uranium-234	1.10	6.0	14.5	6.0	14.5
Uranium-235	0.109	0.94	14.5	0.94	14.5
Uranium-236	NA	NLA		NLA	
Uranium-238	1.06	51.0	14.5	51.0	14.50
216-A-10 Crib					
Americium-241	NA	ND		1,320	52
Antimony-125	NA	NA		ND	
Carbon-14	NA	ND		7.50	62.5
Cesium-134	NA	ND		ND	
Cesium-137	N.A.	ND		2,950	62.5
Cobalt-60	N.A.	ND		ND	
Europium-152	NA	ND		ND	
Europium-154	N.A.	ND		0.20	62.5

Table 4-12. Background Comparisons for Radionuclides. (6 sheets)

Constituent Name	Background	Shallow Zone Maximum Concentration	Depth of Shallow Zone Maximum (ft)	Deep Zone Maximum Concentration	Depth of Deep Zone Maximum (ft)
Europium-155	N.A.	ND		0.054	287.5
Iodine-129	NA	ND		38.8	62.5
Neptunium-237	NA	0.043	12.5	0.132	62.5
Nickel-63	NA	ND		2.13	127.5
Niobium-94	NA	NA		ND	
Plutonium-238	N.A.	ND		316	52
Plutonium-239/240	N.A.	ND		7,110	52
Potassium-40	16.6	18.7	12.5	27.2	52
Radium-226	0.815	0.820	12.5	0.820	12.5
Radium-228	1.32	ND		1.27	62.5
Ruthenium-106	NA	NA		ND	
Technetium-99	NA	ND		1.03	62.5
Thorium-228 (a)	1.32	0.545	12.5	2.11	62.5
Thorium-230	1.10	0.481	12.5	1.10	62.5
Thorium-232	1.32	0.481	12.5	0.881	62.5
Tin-126	NA	ND		ND	
Strontium-90[b]	N.A.	ND		44.7	127.5
Tritium	NA	ND		835	317
Uranium-234	1.10	0.39	12.5	1.39	62.5
Uranium-235	0.109	ND		0.227	54
Uranium-236	NA	NLA		NLA	
Uranium-238	1.06	0.338	12.5	1.22	62.5
216-A-36B Crib					
Americium-241	NA	ND		40,000	25
Antimony-125	NA	ND		0.308	53.5
Carbon-14	NA	ND		116	25
Cesium-134	NA	ND		0.04	197.5
Cesium-137	N.A.	ND		2.65E+6	25
Cobalt-60	N.A.	ND		623	25
Europium-152	NA	ND		ND	
Europium-154	N.A.	ND		1,800	25
Europium-155	N.A.	ND		0.085	89.5
Iodine-129	NA	ND		ND	
Neptunium-237	NA	ND		ND	
Nickel-63	NA	ND		181,000	25
Niobium-94	NA	ND		ND	

Table 4-12. Background Comparisons for Radionuclides. (6 sheets)

Constituent Name	Background	Shallow Zone Maximum Concentration	Depth of Shallow Zone Maximum (ft)	Deep Zone Maximum Concentration	Depth of Deep Zone Maximum (ft)
Plutonium-238	N.A.	ND		0.05	287.5
Plutonium-239/240	N.A.	ND		98.000	25
Potassium-40	16.6	NA		19.4	53.5
Radium-226	0.815	0.416	12.5	1.27	53.5
Radium-228	1.32	0.652	12.5	1.15	53.5
Ruthenium-106	NA	ND		ND	
Technetium-99	NA	ND		41.9	25
Thorium-228 (a)	1.32	ND		0.822	89.5
Thorium-230	1.10	0.935	12.5	11.4	30
Thorium-232	1.32	0.425	12.5	4.85	25
Tin-126	NA	ND		ND	
Strontium-90	N.A.	ND		208.000	25
Tritium	NA	ND		121	287.5
Uranium-234	1.10	0.15	12.5	81.3	25
Uranium-235	0.109	0.018	12.5	3.29	25
Uranium-236	NA	NA		4.54	25
Uranium-238	1.06	0.170	12.5	70.9	25
216-A-37-1 Crib					
Americium-241	NA	ND		0.020	147.5
Antimony-125	NA	ND		ND	
Carbon-14	NA	ND		ND	
Cesium-134	NA	ND		ND	
Cesium-137	N.A.	0.113	12.5	0.113	12.5
Cobalt-60	N.A.	ND		ND	
Europium-152	NA	ND		ND	
Europium-154	N.A.	ND		ND	
Europium-155	N.A.	ND		0.043	97.5
Iodine-129	NA	ND		ND	
Neptunium-237	NA	ND		ND	
Nickel-63	NA	ND		14.4	37.5
Niobium-94	NA	ND		ND	
Plutonium-238	N.A.	ND		ND	
Plutonium-239/240	N.A.	ND		0.012	47.5
Potassium-40	16.6	NA		9.15	272.5
Radium-226	0.815	0.406	12.5	0.508	37.5
Radium-228	1.32	0.581	12.5	0.581	12.5

Table 4-12. Background Comparisons for Radionuclides. (6 sheets)

Constituent Name	Background	Shallow Zone Maximum Concentration	Depth of Shallow Zone Maximum (ft)	Deep Zone Maximum Concentration	Depth of Deep Zone Maximum (ft)
Ruthenium-106	NA	ND		ND	
Technetium-99	NA	ND		ND	
Thorium-228[a]	1.32	0.572	12.5	0.664	147.5
Thorium-230	1.10	ND		0.799	147.5
Thorium-232	1.32	0.393	12.5	0.553	197.5
Tin-126	NA	ND		ND	
Strontium-90[b]	N.A.	1.70	12.5	1.70	12.5
Tritium	NA	134	12.5	267	47.5
Uranium-234	1.10	0.17	12.5	0.374	272.5
Uranium-235	0.109	0.012	12.5	0.028	197.5
Uranium-236	NA	NLA		NLA	
Uranium-238	1.06	0.18	12.5	0.396	237
207-A-South Retention Basin					
Americium-241	NA	0.049	1	0.049	1
Antimony-125	NA	ND		ND	
Carbon-14	NA	ND		ND	
Cesium-134	NA	ND		ND	
Cesium-137	N.A.	1.07	1	1.07	1
Cobalt-60	N.A.	ND		ND	
Europium-152	NA	ND		ND	
Europium-154	N.A.	ND		ND	
Europium-155	N.A.	0.077	1	0.077	1
Iodine-129	NA	ND		ND	
Neptunium-237	NA	ND		ND	
Nickel-63	NA	ND		ND	
Niobium-94	NA	0.032	2	0.032	2
Plutonium-238	N.A.	ND		ND	
Plutonium-239/240	N.A.	0.012	6	0.012	6
Potassium-40	16.6	NLA		NLA	
Radium-226	0.815	0.859	6	0.859	6
Radium-228	1.32	1.10	6	1.10	6
Ruthenium-106	NA	ND		ND	
Technetium-99	NA	ND		ND	
Thorium-228[a]	1.32	0.737	12.5	0.737	12.5
Thorium-230	1.10	1.26	1	1.26	1
Thorium-232	1.32	0.722	1	0.722	1

Table 4-12. Background Comparisons for Radionuclides. (6 sheets)

Constituent Name	Background	Shallow Zone Maximum Concentration	Depth of Shallow Zone Maximum (ft)	Deep Zone Maximum Concentration	Depth of Deep Zone Maximum (ft)
Tin-126	NA	ND		ND	
Strontium-90[b]	N.A.	1.40	1	1.40	1
Tritium	NA	16.6	6	16.6	6
Uranium-234	1.10	0.24	6	0.24	6
Uranium-235	0.109	0.026	2	0.026	2
Uranium-236	NA	NLA		NLA	
Uranium-238	1.06	0.27	6	0.27	6

[a]Background value based on secular equilibrium with thorium-232.
[b]Strontium-90 value based on analysis of total radioactive strontium.
Data presented for radionuclides with half-life greater than 1 year.
Shaded cells indicate nuclides that exceeded background level, or which had a detect but no background level.
N.A. = Not applicable; fallout radionuclide.
NA = Not available.
ND = Not detected.
NLA = No laboratory analysis.

Table 4-13. RESidual RADioactivity Input Parameters – Industrial Scenario. (5 sheets)

Input Field Description	Parameter	Units	200-PW-2				200-PW-4		Rationale and Citation
			216-A-19 Trench	216-B-12 Crib	216-A-10 Crib	216-A-36B Crib	207-A-South Retention Basin	216-A-37-1 Crib	
Exposure pathways	--	--	External gamma: active Inhalation: active Plant ingestion: suppressed Meat ingestion: suppressed Milk ingestion: suppressed			Aquatic foods: suppressed Drinking water: suppressed Soil ingestion: active Radon: suppressed			Based on DOE/RL-2000-60, Rev. 1, and WDOH/320-015.
Soil concentrations	Soil concentration	pCi/g	nuclide-specific	nuclide-specific	nuclide-specific	(no COPCs for surface exposure)	nuclide-specific	nuclide-specific	See Table 4-12 for source term data.
	Distribution coefficients	cm^3/g	nuclide-specific	nuclide-specific	nuclide-specific	nuclide-specific	nuclide-specific	nuclide-specific	Distribution coefficients were conservative values applicable to these sites, from Table E.15 of PNNL-11800. See Table 5-2 for nuclide-specific values.
	Radiation dose limit	mrem/yr	15	15	15	15	15	15	This dose limit pertains to calculation of soil guidelines WDOH/320-015.
Contaminated zone (CZ)	Area of CZ	m^2	58	740	1,150	520	150	640	Site-specific dimensions from DOE/RL-2000-60, Rev. 1, and shown in Table 1-2 of this RI.
	Thickness of CZ (Surface Exposure; No Cover)	m	5.6	9.0 (fill modeled as contaminated zone)	9.1 (fill modeled as contaminated zone)	No COPCs in top 4.6 m (15 ft)	4.6	60.9	Assumes homogenous contamination at maximum concentrations from surface to at least 4.6 m (15 ft) bgs across site.
	Thickness of CZ (surface exposure; cover)	m	5.6	0	0	No COPCs in top 4.6 m (15 ft)	3.0	58.5	Based on measured concentrations in RI data.
	Length parallel to aquifer flow	m	7.6	49	84	152	17	213	Site-specific. For screening purposes, this value is the longest axis of the site and is conservative.
Cover and contaminated zone (CZ) hydrological data	Cover depth (no cover)	m	0	0 (fill modeled as contaminated zone)	0 (fill modeled as contaminated zone)	No COPCs in top 4.6 m (15 ft)	0	0	Assumes that site is contaminated at maximum concentration from surface to at least 4.6 m (15 ft) bgs.
	Cover depth (cover)	m	4.3	0 (fill modeled as contaminated zone)	0 (fill modeled as contaminated zone)	No COPCs in top 4.6 m (15 ft)	0.33	2.4	Based on measured thickness of fill in borehole logs and depth of waste site from DOE/RL-2000-60, Rev. 1, and shown in Table 1-2 of this RI.

Table 4-13. RESidual RADioactivity Input Parameters – Industrial Scenario. (5 sheets)

Input Field Description	Parameter	Units	200-PW-2				200-PW-4		Rationale and Citation
			216-A-19 Trench	216-B-12 Crib	216-A-10 Crib	216-A-36B Crib	207-A-South Retention Basin	216-A-37-1 Crib	
Cover and contaminated zone (CZ) hydrological data (cont.)	Cover material density	g/cm^3	1.73	1.49	1.73	1.49	1.73	1.73	Site-specific values based on RI results.
	Cover erosion rate	m/yr	0.001	0.001	0.001	0.001	0.001	0.001	RESRAD default.
	Density of CZ	g/cm^3	1.73	1.49	1.73	1.49	1.73	1.71	Site-specific values based on RI results.
	CZ erosion rate	m/yr	0.001	0.001	0.001	0.001	0.001	0.001	RESRAD default.
	CZ total porosity	unitless	0.346	0.438	0.346	0.438	0.346	0.354	WHC-EP-0883; assumed to be equal to mean effective porosity for 200 Area soils.
	CZ field capacity	unitless	0.029	0.062	0.029	0.062	0.029	0.038	Based on residual water content; consistent with RI moisture content data.
	CZ Hydraulic conductivity	m/yr	1892	315	1,892	315	1,892	2,030.7	WHC-EP-0883, mean values for 200 Area soils.
	CZ "b" parameter	unitless	4.05	4.38	4.05	4.38	4.05	4.14	Derived from RESRAD Table E.2.
	Humidity in air	g/cm^3	Not used	8	8	8	8	8	RESRAD default where H^{-3} is a COC.
	Evapo-transpiration coefficient	unitless	0.91	0.91	0.91	0.91	0.91	0.91	WDOH/320-015.
	Wind speed	m/s	3.4	3.4	3.4	3.4	3.4	3.4	PNNL-13033.
	Precipitation	m/yr	0.16	0.16	0.16	0.16	0.16	0.16	Based on 16 cm (6.3-in.) average annual rainfall (DOE/RL-92-19).
	Irrigation	m/yr	0	0	0	0	0	0	
	Irrigation mode		-	-	-	-	-	-	
	Runoff coefficient	unitless	0.2	0.2	0.2	0.2	0.2	0.2	RESRAD default.
	Watershed area for nearby stream or pond	m^2	1.0E+06	1.0E+06	1.0E+06	1.0E+06	1.0E+06	1.0E+06	RESRAD default.
	Accuracy for water/soil computations	unitless	0.001	0.001	0.001	0.001	0.001	0.001	RESRAD default.

Table 4-13. RESidual RADioactivity Input Parameters – Industrial Scenario. (5 sheets)

Input Field Description	Parameter	Units	200-PW-2				200-PW-4		Rationale and Citation
			216-A-19 Trench	216-B-12 Crib	216-A-10 Crib	216-A-36B Crib	207-A-South Retention Basin	216-A-37-1 Crib	
Saturated zone (SZ) hydrologic data	Density of SZ	g/cm3	1.96	2.45	2.21	1.73	2.21	2.21	Site-specific values based on RI results.
	SZ total porosity	unitless	0.262	0.077	0.166	0.346	0.166	0.166	Assumed equal to effective porosity.
	SZ effective porosity	unitless	0.262	0.077	0.166	0.346	0.166	0.166	WHC-EP-0883; assumed to be equal to mean effective porosity for 200 Area soils.
	SZ field capacity	unitless	0.029	0.01	0.023	0.029	0.023	0.023	Based on residual water content.
	SZ hydraulic conductivity	m/yr	4730	4,415	1,577	1,892	1,577	1,577	WHC-EP-0883; mean value for 200 Area soils, based on conductivity of last vadose stratum intersecting water table.
	SZ hydraulic gradient	unitless	2.4E-4	9.6E-5	2.4E-4	2.4E-4	2.4E-4	2.4E-4	PNNL-14187, Hanford Site Groundwater Monitoring for Fiscal Year 2002.
	SZ "b" parameter	unitless	4.05	4.05	4.05	4.05	4.05	4.05	Derived from RESRAD Table E.2.
	Water table drop rate	m/yr	0.001	0.001	0.001	0.001	0.001	0.001	RESRAD default.
	Well pump intake depth below water table	m	4.6	4.6	4.6	4.6	4.6	4.6	Typical RCRA well screen length (DOE/RL-2002-42).
	Nondisper-sion or mass-balance transport model	--	MB	MB	ND	MB	MB	MB	Per RESRAD guidance, non-dispersion (ND) model used to model potential GW impacts for sites >1000 m^2. Mass-balance (MB) model, which uses assumption that all contamination leaching from the contaminated zone enters well water, used for sites <1000 m^2.
	Well pumping rate	m^3/yr	250	250	250	250	250	250	RESRAD default.
Uncontaminated unsaturated zone data	Number of unsaturated strata below CZ	--	4	3	4	5	5	2	Site-specific values based on RI results.
	Thickness of unsaturated strata	m	1.1, 3.6, 45.1, 18.5	2.0, 63.7, 18.6	22.6, 50.9, 10.7, 4.0	3.3, 21.7, 22.4, 25.4, 20.3	5.9, 7.9, 5.4, 37.5, 19.2	22.8, 0.9	Site-specific values based on RI results.

Table 4-13. RESidual RADioactivity Input Parameters – Industrial Scenario. (5 sheets)

Input Field Description	Parameter	Units	200-PW-2				200-PW-4		Rationale and Citation
			216-A-19 Trench	216-B-12 Crib	216-A-10 Crib	216-A-36B Crib	207-A-South Retention Basin	216-A-37-1 Crib	
Uncontaminated unsaturated zone data (cont.)	Soil Density	g/cm3	1.73, 1.49, 1.73, 1.96	2.45, 1.73, 2.45	1.73, 1.49, 1.93, 2.21	1.49, 1.73, 1.49, 1.73, 1.93	1.73, 1.96, 1.49, 1.73, 2.21	1.96, 2.21	Site-specific values based on RI results.
	Total porosity	unitless	0.346, 0.438, 0.346, 0.262	0.077, 0.346, 0.077	0.346, 0.438, 0.272, 0.166	0.438, 0.346, 0.438, 0.346, 0.272	0.346, 0.262, 0.438, 0.346, 0.166	0.262, 0.166	See Cover and CZ inputs.
	Effective porosity	unitless	0.346, 0.438, 0.346, 0.262	0.077, 0.346, 0.077	0.346, 0.438, 0.272, 0.166	0.438, 0.346, 0.438, 0.346, 0.272	0.346, 0.262, 0.438, 0.346, 0.166	0.262, 0.166	See Cover and CZ inputs.
	Field capacity	unitless	0.029, 0.062, 0.029, 0.03	0.01, 0.029, 0.01	0.029, 0.062, 0.04, 0.023	0.062, 0.029, 0.062, 0.029, 0.040	0.029, 0.030,0.062,0.029, 0.023	0.030, 0.023	Based on residual water content: WHC-EP-0883, mean value for 200 Area Soils.
	Hydraulic conductivity	m/yr	1892, 315, 1892, 4730	4415, 1892, 4415	1892, 315, 946, 1577	315, 1892, 315, 1892, 946	1892, 4730, 315, 1892, 1577	4730, 1577	See Cover and CZ inputs.
	Soil-specific "b" parameter	unitless	4.05, 4.38, 4.05, 4.05	4.05, 4.05, 4.05	4.05, 4.38, 4.05, 4.05	4.38, 4.05, 4.38, 4.05, 4.05	4.05, 4.05, 4.38, 4.05, 4.05	4.05, 4.05	Derived from RESRAD Table E.2.
Occupancy	Inhalation rate	m^3/yr	7,300	7,300	7,300	7,300	7,300	7,300	WDOH/320-015
	Mass loading for inhalation	g/m^3	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	WDOH/320-015
	Exposure duration	yr	25	25	25	25	25	25	WDOH/320-015
	Indoor dust filtration factor	unitless	0.4	0.4	0.4	0.4	0.4	0.4	RESRAD default.
	External gamma shielding factor	unitless	0.8	0.8	0.8	0.8	0.8	0.8	WDOH/320-015.
	Indoor time fraction	unitless	0.137	0.137	0.137	0.137	0.137	0.137	200 Area Industrial scenario; on site 2,000 h/yr; indoors 60% (DOE/RL-2002-42).
	Outdoor time fraction	unitless	0.091	0.091	0.091	0.091	0.091	0.091	200 Area Industrial scenario; on site 2000 h/yr; outdoors 40% (DOE/RL-2002-42).

Table 4-13. RESidual RADioactivity Input Parameters – Industrial Scenario. (5 sheets)

Input Field Description	Parameter	Units	200-PW-2				200-PW-4		Rationale and Citation
			216-A-19 Trench	216-B-12 Crib	216-A-10 Crib	216-A-36B Crib	207-A-South Retention Basin	216-A-37-1 Crib	
Occupancy (cont.)	Shape factor	unitless	circular	Site specific; non-circular	Site specific; non-circular	Site specific; non-circular	Circular	Site specific; non-circular	Calculated for grossly non-circular sites using RESRAD program for external irradiation pathway. Shape factor area is used by RESRAD for Area value in CZ field.
Ingestion pathway; dietary data	Soil ingestion rate	g/yr	36.5	36.5	36.5	36.5	36.5	36.5	WDOH/320-015.
	Drinking water intake	L/yr	730	730	730	730	730	730	WDOH/320-015. Only used to screen transport of COCs to groundwater.
	Drinking water contaminated fraction		1	1	1	1	1	1	RESRAD default; only used to screen transport of COCs to groundwater.
Ingestion pathway; nondietary data	Depth of soil mixing layer	m	0.15	0.15	0.15	0.15	0.15	0.15	RESRAD default.
	Drinking water fractional use		1	1	1	1	1	1	RESRAD default; only used to screen transport of COCs to groundwater.
Storage Times	Well water storage time	days	1	1	1	1	1	1	RESRAD default; only used to screen transport of COCs to groundwater.

DOE/RL-92-19, *200 East Groundwater Aggregate Area Management Study.*
DOE/RL-2002-42, *Remedial Investigation Report for the 200-TW-1 and 200-TW-2 Operable Units (includes the 200-PW-5 Operable Unit).*
PNNL-11800, *Composite Analysis for Low-Level Waste Disposal in the 200 Area Plateau of the Hanford Site.*
PNNL-13033, *Recharge Data Package for the Immobilized Low-Activity Waste 2001 Performance Assessment.*
PNNL-14187, Hanford Site Groundwater Monitoring for Fiscal Year 2002.
Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901, et seq.
WDOH/320-015, *Hanford Guidance for Radiological Cleanup.*
WHC-EP-0883, *Variability and Scaling of Hydraulic Properties for 200 Area Soils.*

COCs = Contaminants of concern.
COPCs = Contaminants of potential concern.
RCRA = *Resource Conservation and Recovery Act of 1976.*
RESRAD = RESidual RADioactivity.
RI = Remedial investigation.

Table 4-14. RESidual RADioactivity Input Parameters – Groundwater Protection Screening. (5 sheets)

Input Field Description	Parameter	Units	200-PW-2				200-PW-4		Rationale and Citation
			216-A-19 Trench	216-B-12 Crib	216-A-10 Crib	216-A-36B Crib	207-A South Retention Basin	216-A-37-1 Crib	
Exposure pathways	--	--	External gamma: suppressed Inhalation: suppressed Plant ingestion: suppressed Meat ingestion: suppressed Milk ingestion: suppressed			Aquatic foods: suppressed Drinking water: sctive Soil ingestion: suppressed Radon: suppressed			Only the drinking water pathway is activated to facilitate evaluation of potential groundwater impacts.
Soil concentrations	Soil concentration	pCi/g	nuclide-specific	nuclide-specific	nuclide-specific	nuclide-specific	nuclide-specific	nuclide-specific	See Table 4-12 for source term data.
	Distribution coefficients	cm^3/g	nuclide-specific	nuclide-specific	nuclide-specific	nuclide-specific	nuclide-specific	nuclide-specific	Distribution coefficients were "conservative" values applicable to these sites, from PNNL-11800, Table E.15. See Table 5-2 for nuclide-specific values.
	Radiation dose limit	mrem/yr	15	15	15	15	15	15	This dose limit pertains to calculation of soil guidelines in RESRAD (WDOH/320-015.).
Contaminated zone (CZ)	Area of CZ	m^2	58	740	1,150	520	150	640	Site-specific dimensions from (DOE/RL-2000-60, Rev. 1) and shown in Table 1-2 of this RI.
	Thickness of CZ	m	5.6	18	48.9 (88.2 m for H_3)	7.4 (36.7 m for H_3)	3.0	58.5	Protective estimates of contaminated vadose based on RI borehole data.
	Length parallel to aquifer flow	m	7.6	49	84	152	17	213	Site specific. For screening purposes, this value is the longest axis of the site and is conservative.
	Cover depth	m	4.3	9	9.1	7.6	0.33 (thickness of concrete in basin)	2.4	Based on measured thickness of fill in borehole logs and depth of waste site from DOE/RL-2000-60, Rev. 1, and shown in Table 1-2 of this RI.

Table 4-14. RESidual RADioactivity Input Parameters – Groundwater Protection Screening. (5 sheets)

Input Field Description	Parameter	Units	200-PW-2				200-PW-4		Rationale and Citation
			216-A-19 Trench	216-B-12 Crib	216-A-10 Crib	216-A-36B Crib	207-A South Retention Basin	216-A-37-1 Crib	
Contaminated zone (CZ) (cont.)	Cover material density	g/cm^3	1.73	1.49	1.73	1.49	1.73	1.73	Site-specific values based on RI results.
	Cover erosion rate	m/yr	0.001	0.001	0.001	0.001	0.001	0.001	RESRAD default.
	Density of CZ	g/cm^3	1.73	1.73	1.6	1.73	1.73	1.71	Site specific values based on RI results. Weighted average of strata making up CZ, where applicable.
	CZ erosion rate	m/yr	0.001	0.001	0.001	0.001	0.001	0.001	RESRAD default.
	CZ total porosity	unitless	0.346	0.346	0.395	0.346	0.346	0.354	WHC-EP-0883; assumed to be equal to mean effective porosity for 200 Area soils. Weighted average of strata making up CZ, where applicable.
	CZ field capacity	unitless	0.029	0.029	0.047	0.029	0.029	0.038	Based on residual water content; consistent with RI moisture content data. Weighted average of strata comprising CZ, where applicable.
	CZ hydraulic conductivity	m/yr	1,892	1,892	1,044.1	1,892	1,892	2,030.7	WHC-EP-0883; mean values for 200 Area soils. Weighted average of strata comprising CZ, where applicable.
	CZ "b" parameter	unitless	4.05	4.05	4.23	4.05	4.05	4.14	Derived from RESRAD Table E.2. Weighted average of strata making up CZ, where applicable.
	Humidity in air	g/cm^3	Not used	8	8	8	8	8	RESRAD default where H^{-3} is a COC
	Evapotranspiration coefficient	unitless	0.91	0.91	0.91	0.91	0.91	0.91	WDOH/320-015.
	Wind speed	m/s	3.4	3.4	3.4	3.4	3.4	3.4	PNNL-13033.
	Precipitation	m/yr	0.16	0.16	0.16	0.16	0.16	0.16	Based on 16 cm (6.3-in.) average annual rainfall (DOE/RL-92-19).

Table 4-14. RESidual RADioactivity Input Parameters – Groundwater Protection Screening. (5 sheets)

Input Field Description	Parameter	Units	200-PW-2				200-PW-4		Rationale and Citation
			216-A-19 Trench	216-B-12 Crib	216-A-10 Crib	216-A-36B Crib	207-A South Retention Basin	216-A-37-1 Crib	
Contaminated zone (CZ) (cont.)	Irrigation	m/yr	0	0	0	0	0	0	
	Irrigation mode		-	-	-	-	-	-	
	Runoff coefficient	unitless	0.2	0.2	0.2	0.2	0.2	0.2	RESRAD default.
	Watershed area for nearby stream or pond	m^2	1.0E+06	1.0E+06	1.0E+06	1.0E+06	1.0E+06	1.0E+06	RESRAD default.
	Accuracy for water/soil computations	unitless	0.001	0.001	0.001	0.001	0.001	0.001	RESRAD default.
Saturated zone (SZ) hydrologic data	Density of SZ	g/cm3	1.96	2.45	2.21	1.73	2.21	2.21	Site-specific values based on RI results
	SZ total porosity	unitless	0.262	0.077	0.166	0.346	0.166	0.166	Assumed equal to effective porosity.
	SZ effective porosity	unitless	0.262	0.077	0.166	0.346	0.166	0.166	WHC-EP-0883; assumed to be equal to mean effective porosity for 200 Area soils.
	SZ field capacity	unitless	0.029	0.01	0.023	0.029	0.023	0.023	Based on residual water content
	SZ hydraulic conductivity	m/yr	4730	4415	1577	1892	1,577	1,577	WHC-EP-0883; mean value for 200 Area soils, based on conductivity of last vadose stratum intersecting water table.
	SZ hydraulic gradient	unitless	2.4E-4	9.6E-5	2.4E-4	2.4E-4	0.00024	0.00024	PNNL-14187
	SZ "b" parameter	unitless	4.05	4.05	4.05	4.05	4.05	4.05	Derived from RESRAD Table E.2.
	Water table drop rate	m/yr	0.001	0.001	0.001	0.001	0.001	0.001	RESRAD default.
Saturated zone (SZ) hydrologic data (cont.)	Well pump intake depth below water table	m	4.6	4.6	4.6	4.6	4.6	4.6	Typical RCRA well screen length (Report; DOE/RL-2002-42)

Table 4-14. RESidual RADioactivity Input Parameters – Groundwater Protection Screening. (5 sheets)

Input Field Description	Parameter	Units	200-PW-2				200-PW-4		Rationale and Citation
			216-A-19 Trench	216-B-12 Crib	216-A-10 Crib	216-A-36B Crib	207-A South Retention Basin	216-A-37-1 Crib	
	Nondispersion or mass-balance transport model	--	MB	MB	ND	MB	MB	MB	Per RESRAD guidance, non-dispersion (ND) model used to model potential GW impacts for sites >1000 m^2. Mass-balance (MB) model, which uses assumption that all contamination leaching from the contaminated zone enters well water, used for sites <1000 m^2.
	Well pumping rate	m^3/yr	250	250	250	250	250	250	RESRAD default.
Uncontaminated unsaturated zone data	Number of unsaturated strata below CZ	--	4	2	3	4	5	2	Site-specific values based on RI results.
	Thickness of unsaturated strata	m	1.1, 3.6, 45.1, 18.5	47.7, 18.6	24.6, 10.7, 4.0	3.3, 22, 22.4, 25.4, 20.3	5.9, 7.9, 5.4, 37.5, 19.2	22.8, 0.9	Site-specific values based on RI results.
	Soil Density	g/cm3	1.73, 1.49, 1.73, 1.96	1.73, 2.45	1.49, 1.93, 2.21	1.73, 1.49, 1.73, 1.93	1.73, 1.96, 1.49, 1.73, 2.21	1.96, 2.21	Site-specific values based on RI results.
	Total porosity	unitless	0.346, 0.438, 0.346, 0.262	0.346, 0.077	0.438, 0.272, 0.166	0.346, 0.438, 0.346, 0.272	0.346, 0.262, 0.438, 0.346, 0.166	0.262, 0.166	See cover and CZ inputs.
	Effective porosity	unitless	0.346, 0.438, 0.346, 0.262	0.346, 0.077	0.438, 0.272, 0.166	0.346, 0.438, 0.346, 0.272	0.346, 0.262, 0.438, 0.346, 0.166	0.262, 0.166	See cover and CZ inputs.
	Field capacity	unitless	0.029, 0.062, 0.029, 0.03	0.029, 0.01	0.062, 0.04, 0.023	0.029, 0.062, 0.029, 0.040	0.029, 0.030,0.062,0.029, 0.023	0.030, 0.023	Based on residual water content: WHC-EP-0883; mean value for 200 Area soils.
Uncontaminated Unsaturated Zone Data (cont.)	Hydraulic conductivity	m/yr	1892, 315, 1892, 4730	1892, 4415	315, 946, 1577	1892, 315, 1892, 946	1892, 4730, 315, 1892, 1577	4730, 1577	See cover and CZ inputs.
	Soil-specific "b" parameter	unitless	4.05, 4.38, 4.05, 4.05	4.05, 4.05	4.38, 4.05, 4.05	4.05, 4.38, 4.05, 4.05	4.05, 4.05, 4.38, 4.05, 4.05	4.05, 4.05	Derived from RESRAD Table E.2

Table 4-14. RESidual RADioactivity Input Parameters – Groundwater Protection Screening. (5 sheets)

Input Field Description	Parameter	Units	200-PW-2				200-PW-4		Rationale and Citation
			216-A-19 Trench	216-B-12 Crib	216-A-10 Crib	216-A-36B Crib	207-A South Retention Basin	216-A-37-1 Crib	
	Drinking water intake	L/yr	730	730	730	730	730	730	WDOH/320-015. Only used to screen transport of COCs to groundwater.
	Drinking water contaminated fraction		1	1	1	1	1	1	RESRAD default; only used to screen transport of COCs to groundwater.
	Drinking water fractional usage		1	1	1	1	1	1	RESRAD default; only used to screen transport of COCs to groundwater.
Storage Times	Well water storage time	days	1	1	1	1	1	1	RESRAD default; only used to screen transport of COCs to groundwater.

DOE/RL-92-19, *200 East Groundwater Aggregate Area Management Study.*
DOE/RL-2002-42, *Remedial Investigation Report for the 200-TW-1 and 200-TW-2 Operable Units (includes the 200-PW-5 Operable Unit).*
PNNL-11800, *Composite Analysis for Low-Level Waste Disposal in the 200 Area Plateau of the Hanford Site.*
PNNL-13033, *Recharge Data Package for the Immobilized Low-Activity Waste 2001 Performance Assessment.*
PNNL-14187, Hanford Site Groundwater Monitoring for Fiscal Year 2002.
Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901, et seq.
WDOH/320-015, *Hanford Guidance for Radiological Cleanup.*
WHC-EP-0883, *Variability and Scaling of Hydraulic Properties for 200 Area Soils.*

COCs = Contaminants of concern.
RESRAD = RESidual RADioactivity.
RCRA = Resource Conservation and Recovery Act of 1976.
RI = Remedial investigation.

Table 4-15. Dose Assessment Results for the 207-A-South Retention Basin.

Scenario	Total Dose (mrem/yr)	Time (year)	Primary Radionuclide	Primary Pathway	Percent Dose, Primary Rad and Pathway
Industrial, existing cover	0.57	0	Radium-226	External	74%
	0.58	1	Radium-226	External	75%
	0.63	10	Radium-226	External	77%
	0.79	30	Radium-226	External	81%
	1.7	100	Radium-226	External	87%
	1.6	150	Radium-226	External	86%
	1.6	250	Radium-226	External	82%
	1.6	500	Radium-226	External	70%
	1.5	1000	Radium-226	External	51%
Industrial, no cover	2.2	0	Radium-226	External	71%
	2.2	1	Radium-226	External	71%
	2.1	10	Radium-226	External	74%
	1.9	30	Radium-226	External	80%
	1.7	100	Radium-226	External	87%
	1.7	150	Radium-226	External	86%
	1.7	250	Radium-226	External	82%
	1.7	500	Radium-226	External	70%
	1.7	1000	Radium-226	External	52%

Table 4-16. Risk Assessment Results for the 207-A-South Retention Basin.

Scenario	Total Risk	Time (year)	Primary Radionuclide	Primary Pathway	Percent Risk, Primary Rad and Pathway
Industrial, existing cover	1E-05	0	Radium-226	External	78%
	1E-05	1	Radium-226	External	78%
	1E-05	10	Radium-226	External	80%
	2E-05	30	Radium-226	External	84%
	3E-05	100	Radium-226	External	87%
	3E-05	150	Radium-226	External	86%
	3E-05	250	Radium-226	External	82%
	3E-05	500	Radium-226	External	70%
	3E-05	1000	Radium-226	External	51%
Industrial, no cover	4E-05	0	Radium-226	External	75%
	4E-05	1	Radium-226	External	76%
	4E-05	10	Radium-226	External	78%
	4E-05	30	Radium-226	External	83%
	3E-05	100	Radium-226	External	88%
	3E-05	150	Radium-226	External	86%
	3E-05	250	Radium-226	External	82%
	3E-05	500	Radium-226	External	70%
	3E-05	1000	Radium-226	External	52%

Table 4-17. Groundwater Protection Modeling Results. (2 sheets)

Time (year)	Primary Radionuclide	Drinking Water Concentration (pCi/L)	Drinking Water Dose[a] (mrem/yr)	Drinking Water Cancer Risk[(a)]	Percent Risk and Dose
216-B-12 Crib					
0	--	--	--	--	--
30	--	--	--	--	--
150	--	--	--	--	--
500	--	--	--	--	--
526[b]	Tritium	6.3E-10	2.8E-14	7E-19	100%
1000	Tritium	1.3E-22	6.0E-27	--	100%
216-A-19 Trench					
--	No breakthrough to groundwater	--	--	--	--
216-A-10 Crib					
0	--	--	--	--	--
30	--	--	--	--	--
150	--	--	--	--	--
1000	--	--	--	--	--
1193[b]	Iodine-129	10,400	2,100	3E-02	99.9%
1250	Iodine-129	9,950	2,000	3E-02	99.9%
216-A-36B Crib					
0	--	--	--	--	--
30	--	--	--	--	--
150	--	--	--	--	--
1000	--	--	--	--	--
1025[c]	Technetium-99	14,400	15.3	6E-04	100%
1100	Technetium-99	5,400	5.7	2E-04	100%
216-A-37-1 Crib					
0	--	--	--	--	--
30	--	--	--	--	--
150	--	--	--	--	--
168[b]	Tritium	8.5	3.9E-04	9E-09	100%
500	Tritium	4.0E-08	1.8E-12	4E-17	100%
1000	Tritium	1.2E-20	5.3E-25	--	100%
207-A-South Retention Basin					
0	--	--	--	--	--
30	--	--	--	--	--
150	--	--	--	--	--

Table 4-17. Groundwater Protection Modeling Results. (2 sheets)

Time (year)	Primary Radionuclide	Drinking Water Concentration (pCi/L)	Drinking Water Dose[a] (mrem/yr)	Drinking Water Cancer Risk[(a)]	Percent Risk and Dose
500	--	--	--	--	--
698[b]	Tritium	9.1E-15	5.8E-19	4E-24	100%
1000	--	--	--	--	--

[a]Based on 730 L/yr drinking water ingestion rate.

[b]Time of maximum groundwater concentration associated with highest dose and risk.

[c]Time of maximum groundwater concentration associated with highest dose and risk. Within 1000 years, the time of highest groundwater concentration is for tritium at year zero (4.7E-04 pCi/L).

Table 4-18. Dose Assessment Results for the 216-A-10 Crib.

Scenario	Total Dose (mrem/yr)	Time (year)	Primary Radionuclide	Primary Pathway	Percent Dose, Primary Rad and Pathway
Industrial, no cover	5.0	0	Potassium-40	External	68%
	5.0	1	Potassium-40	External	68%
	5.0	10	Potassium-40	External	67%
	5.0	30	Potassium-40	External	67%
	4.9	100	Potassium-40	External	68%
	4.9	150	Potassium-40	External	68%
	4.7	250	Potassium-40	External	69%
	4.5	500	Potassium-40	External	71%
	4.0	1000	Potassium-40	External	75%

Table 4-19. Risk Assessment Results for the 216-A-10 Crib.

Scenario	Total Risk	Time (year)	Primary Radionuclide	Primary Pathway	Percent Risk, Primary Rad and Pathway
Industrial, no cover	9E-05	0	Potassium-40	External	68%
	9E-05	1	Potassium-40	External	68%
	9E-05	10	Potassium-40	External	68%
	9E-05	30	Potassium-40	External	68%
	9E-05	100	Potassium-40	External	68%
	9E-05	150	Potassium-40	External	69%
	9E-05	250	Potassium-40	External	69%
	8E-05	500	Potassium-40	External	71%
	8E-05	1000	Potassium-40	External	75%

Table 4-20. Dose Assessment Results for the 216-A-19 Trench.

Scenario	Total Dose (mrem/yr)	Time (year)	Primary Radionuclide	Primary Pathway	Percent Dose, Primary Rad and Pathway
Industrial, existing cover	0	0	NA	NA	NA
	0	1	NA	NA	NA
	0	10	NA	NA	NA
	0	30	NA	NA	NA
	0	100	NA	NA	NA
	6.5E-30	150	Uranium-234	External	100%
	1.6E-28	250	Uranium-238	External	57%
	1.2E-26	500	Uranium-234	External	72%
	3.5E-23	1000	Uranium-234	External	89%
Industrial, no cover	1.4	0	Uranium-238	External	83%
	1.4	1	Uranium-238	External	83%
	1.3	10	Uranium-238	External	84%
	1.3	30	Uranium-238	External	85%
	1.1	100	Uranium-238	External	86%
	1.0	150	Uranium-238	External	87%
	0.85	250	Uranium-238	External	87%
	0.55	500	Uranium-238	External	86%
	0.24	1000	Uranium-238	External	82%

NA = Not applicable; no dose calculated for this time.

Table 4-21. Risk Assessment Results for the 216-A-19 Trench.

Scenario	Total Risk	Time (year)	Primary Radionuclide	Primary Pathway	Percent Risk, Primary Rad and Pathway
Industrial, existing cover	0	0	NA	NA	NA
	0	1	NA	NA	NA
	0	10	NA	NA	NA
	0	30	NA	NA	NA
	0	100	NA	NA	NA
	0	150	NA	NA	NA
	0	250	NA	NA	NA
	0	500	NA	NA	NA
	8E-28	1000	Uranium-234	External	92%
Industrial, no cover	2E-05	0	Uranium-238	External	83%
	2E-05	1	Uranium-238	External	84%
	2E-05	10	Uranium-238	External	84%
	2E-05	30	Uranium-238	External	85%
	2E-05	100	Uranium-238	External	87%
	1E-05	150	Uranium-238	External	87%
	1E-05	250	Uranium-238	External	87%
	8E-06	500	Uranium-238	External	86%
	3E-06	1000	Uranium-238	External	81%

NA = Not applicable; no cancer risk calculated for this time.

Table 4-22. Dose Assessment Results for the 216-A-37-1 Crib.

Scenario	Total Dose (mrem/yr)	Time (year)	Primary Radionuclide	Primary Pathway	Percent Dose, Primary Rad and Pathway
Industrial, existing cover	1.1E-19	0	Cesium-137	External	100%
	1.1E-19	1	Cesium-137	External	100%
	9.9E-20	10	Cesium-137	External	100%
	8.7E-20	30	Cesium-137	External	100%
	5.4E-20	100	Cesium-137	External	100%
	3.9E-20	150	Cesium-137	External	100%
	2.0E-20	250	Cesium-137	External	100%
	3.8E-21	500	Cesium-137	External	100%
	1.3E-22	1000	Cesium-137	External	100%
Industrial, no cover	1.8E-02	0	Cesium-137	External	73%
	1.8E-02	1	Cesium-137	External	74%
	1.4E-02	10	Cesium-137	External	77%
	8.2E-03	30	Cesium-137	External	81%
	1.6E-03	100	Cesium-137	External	83%
	4.9E-04	150	Cesium-137	External	84%
	4.8E-05	250	Cesium-137	External	85%
	1.5E-07	500	Cesium-137	External	87%
	1.4E-12	1000	Cesium-137	External	91%

Table 4-23. Risk Assessment Results for the 216-A-37-1 Crib.

Scenario	Total Risk	Time (year)	Primary Radionuclide	Primary Pathway	Percent Risk, Primary Rad and Pathway
Industrial, existing cover	2E-24	0	Cesium-137	External	100%
	2E-24	1	Cesium-137	External	100%
	2E-24	10	Cesium-137	External	100%
	1E-24	30	Cesium-137	External	100%
	9E-25	100	Cesium-137	External	100%
	7E-25	150	Cesium-137	External	100%
	3E-25	250	Cesium-137	External	100%
	7E-26	500	Cesium-137	External	100%
	2E-27	1000	Cesium-137	External	100%
Industrial, no cover	5E-07	0	Tritium	Inhalation	58%
	5E-07	1	Tritium	Inhalation	57%
	3E-07	10	Cesium-137; Tritium	External; Inhalation	91%
	1E-07	30	Cesium-137	External	64%
	2E-08	100	Cesium-137	External	84%
	7E-09	150	Cesium-137	External	85%
	7E-10	250	Cesium-137	External	86%
	2E-12	500	Cesium-137	External	88%
	2E-17	1000	Cesium-137	External	91%

Table 4-24. Dose Assessment Results for the 216-B-12 Crib.

Scenario	Total Dose (mrem/yr)	Time (year)	Primary Radionuclide	Primary Pathway	Percent Dose, Primary Rad and Pathway
Industrial, no cover	0.0088	0	Thorium-230	Inhalation; Soil Ingestion	91%
	0.0098	1	Thorium-230	Inhalation; Soil Ingestion	81%
	0.019	10	Thorium-230	External	57%
	0.039	30	Thorium-230	External	79%
	0.11	100	Thorium-230	External	91%
	0.16	150	Thorium-230	External	93%
	0.25	250	Thorium-230	External	95%
	0.46	500	Thorium-230	External	96%
	0.79	1000	Thorium-230	External	96%

Table 4-25. Risk Assessment Results for the 216-B-12 Crib.

Scenario	Total Risk	Time (year)	Primary Radionuclide	Primary Pathway	Percent Risk, Primary Rad and Pathway
Industrial, no cover	3E-07	0	Thorium-230	External	85%
	3E-07	1	Thorium-230	External	87%
	5E-07	10	Thorium-230	External	92%
	8E-07	30	Thorium-230	External	95%
	2E-06	100	Thorium-230	External	97%
	3E-06	150	Thorium-230	External	98%
	5E-06	250	Thorium-230	External	98%
	9E-06	500	Thorium-230	External	98%
	1E-05	1000	Thorium-230	External	98%

Table 4-26. Ecological Screening Results for Chemicals at 207-A South Retention Basin. (2 sheets)

Chemical Name	Top 15 ft Maximum Concentration	Back-ground	Does Maximum Concentration Exceed Background?	Soil Indicator Value[a] (Wildlife)	COEC?	Justification
Inorganic metal (mg/kg)						
Aluminum	N.A.	11,800	No	pH dependent[b]	No	Not analyzed
Antimony	ND	--	NA	5[c]	No	Not detected
Arsenic	9.98	20[d]	No	7	No	Less than background
Barium	65.5	132	No	102	No	Less than screening value
Beryllium	ND	1.51	No	35[b]	No	Not detected
Bismuth	ND	--	NA		No	Not detected
Boron	ND	--	NA	0.5[c]	No	Not detected
Cadmium	ND	0.81	No	14	No	Not detected
Chromium (total)	15.5	18.5	No	67	No	Less than screening value
Chromium VI	ND	--	NA	NA	No	Not detected
Copper	11.0	22	No	217	No	Less than screening value
Lead	ND	10.2	No	118	No	Not detected
Mercury (inorganic)	ND	0.33	No	5.5	No	Not detected
Nickel	9.80	19.1	No	980	No	Less than screening value
Selenium	ND	--	NA	0.3	No	Not detected
Silver	5.01	0.73	No	2[c]	Yes	Exceeds screening value and background
Uranium	1.04	3.21	No	5[c]	No	Less than screening value
General Inorganic Compounds (mg/kg)						
Chloride	7.56	100	No	NA	No	Less than background
Cyanide	ND	--	NA	NA	No	Not detected
Fluoride	ND	2.81	No	NA	No	Not detected
Nitrate as N	21.8	12	yes	NA	Yes	Exceeds background
Phosphate	ND	0.785	No	NA	No	Not detected

Table 4-26. Ecological Screening Results for Chemicals at 207-A South Retention Basin. (2 sheets)

Chemical Name	Top 15 ft Maximum Concentration	Back-ground	Does Maximum Concentration Exceed Background?	Soil Indicator Value[a] (Wildlife)	COEC?	Justification
Sulfate	53.0	237	No	NA	No	Less than background
Detected Organic Compounds (ug/kg)						
2,4-dichlorophenoxy-acetic acid	7.10	--	NA	NA	Yes	Detected, no background or screening value
2-(2,4,5-trichlorophenoxy)-propionic acid	3.30	--	NA	NA	Yes	Detected, no background or screening value
Acetone	26.0	--	NA	NA	Yes	Detected, no background or screening value
Chloroform	4.00	--	NA	NA	Yes	Detected, no background or screening value
Methylene chloride	3.00	--	NA	NA	Yes	Detected, no background or screening value
Butylbenzylphthalate	110.0	--	NA	NA	Yes	Detected, no background or screening value
Diethylphthalate	320.0	--	NA	100,000[c]	No	Less than screening value

[a]Unless otherwise footnoted, screening values represent WAC-173-340-900, Table 749-3, soil values for terrestrial wildlife.

[b]No WAC-173-340-900, Table 749-3, terrestrial wildlife value available, screening value is soil screening level for wildlife from EPA (2003).

[c]No WAC-173-340-900, Table 749-3, terrestrial wildlife value available, screening value is lowest of WAC-173-340-900, Table 749-3, soil values for plants and biota.

[d]Arsenic background value from Tables 740-1 and 745-1 in WAC 173-340-900.

Shading indicates analyte was retained as a COEC.

EPA, 2003, OSWER Directive 9285.7-55, *Guidance for Developing Ecological Soil Screening Levels*.

COEC = Contaminant of ecological concern.
NA = Not applicable/not available.
ND = Not detected.
WAC = *Washington Administrative Code.*

Table 4-27. Ecological Screening Results for Chemicals at 216-A-10 Crib. (2 sheets)

Chemical Name	Top 15 ft Maximum Concentration	Back-ground	Does Maximum Concentration Exceed Background?	Soil Screening Value[a] (Wildlife)	COEC ?	Justification
Inorganic metal (mg/kg)						
Aluminum	N.A.	11,800	No	pH dependent[b]	No	Not analyzed
Antimony	0.48	--	NA	5[c]	No	Less than screening value
Arsenic	4.10	20[d]	No	7	No	Less than screening value
Barium	53.40	132	No	102	No	Less than screening value
Beryllium	0.05	1.51	No	35[b]	No	Less than screening value
Bismuth	ND	--	NA	NA	No	Not detected
Boron	0.89	--	NA	0.5[c]	Yes	Exceeds screening value
Cadmium	0.26	0.81	Yes	14	No	Less than screening value
Chromium (total)	6.70	18.5	No	67	No	Less than screening value
Chromium VI	NA	--	NA	NA	No	Not detected
Copper	11.2	22	No	217	No	Less than screening value
Lead	4.00	10.2	No	118	No	Less than screening value
Mercury (inorganic)	ND	0.33	No	5.5	No	Not detected
Nickel	7.30	19.1	No	980	No	Less than screening value
Selenium	ND	--	NA	0.3	No	Not detected
Silver	ND	0.73	No	2[c]	No	Not detected
General Inorganic Compounds (mg/kg)						
Ammonia	ND	9.23	No	NA	No	Not detected
Chloride	ND	100	No	NA	No	Not detected
Cyanide	ND	--	NA	NA	No	Not detected
Fluoride	ND	2.81	No	NA	No	Not detected
Nitrate as N	ND	12	No	NA	No	Not detected
Nitrite as N	0.40	--	NA	NA	Yes	Detected, no background or screening value

Table 4-27. Ecological Screening Results for Chemicals at 216-A-10 Crib. (2 sheets)

Chemical Name	Top 15 ft Maximum Concentration	Back-ground	Does Maximum Concentration Exceed Background?	Soil Screening Value[a] (Wildlife)	COEC ?	Justification
Phosphate	ND	0.785	No	NA	No	Not detected
Sulfate	ND	237	No	NA	No	Not detected
Detected Organic Compounds (µg/kg)						
beta-1,2,3,4,5,6-hexachlorocyclo-hexane	7.00	--	NA	NA	Yes	Detected, no background or screening value

[a]Unless otherwise footnoted, screening values represent WAC-173-340-900, Table 749-3, soil values for terrestrial wildlife.

[b]No WAC-173-340-900, Table 749-3, terrestrial wildlife value available, screening value is soil screening level for wildlife from EPA (2003).

[c]No WAC-173-340-900, Table 749-3, terrestrial wildlife value available, screening value is lowest of WAC-173-340-900, Table 749-3, soil values for plants and biota.

[d]Arsenic background value from Tables 740-1 and 745-1 in WAC 173-340-900.

Shading indicates analyte was retained as a COEC.

EPA, 2003, OSWER Directive 9285.7-55, *Guidance for Developing Ecological Soil Screening Levels*.

COEC = Contaminant of ecological concern.
NA = Not applicable/not available.
ND = Not detected.
WAC = *Washington Administrative Code*.

Table 4-28. Ecological Screening Results for Chemicals at 216-A-19 Trench. (2 sheets)

Chemical Name	Top 15 ft Maximum Concentration	Back-ground	Does Maximum Concentration Exceed Background?	Soil Indicator Value[a] (Wildlife)	COEC?	Justification
Inorganic metal (mg/kg)						
Aluminum	5,890	11,800	No	pH dependent[b]	No	Less than background
Antimony	ND	--	NA	5[c]	No	Not detected
Arsenic	7.00	20[d]	No	7	No	Less than background
Barium	98.9	132	No	102	No	Less than screening value
Beryllium	0.24	1.51	No	35[b]	No	Less than screening value
Bismuth	ND	--	NA	NA	No	Not detected
Boron	38.9	--	NA	0.5[c]	Yes	Exceeds screening value
Cadmium	0.21	0.81	No	14	No	Less than screening value
Chromium (total)	5.31	18.5	No	67	No	Less than screening value
Chromium VI	ND	--	NA	NA	No	Not detected
Cobalt	9.71	15.7	No	20[c]	No	Less than screening value
Copper	13.4	22	No	217	No	Less than screening value
Lead	3.18	10.2	No	118	No	Less than screening value
Manganese	430	512	No	1,500	No	Less than screening value
Mercury (inorganic)	ND	0.33	No	5.5	No	Not detected
Molybdenum	ND	--	NA	7	No	Not detected
Nickel	8.54	19.1	No	980	No	Less than screening value
Selenium	ND	--	NA	0.3	No	Not detected
Silver	ND	0.73	No	2[c]	No	Not detected
Thallium	0.068	--	NA	1[c]	No	Less than screening value
Thorium	3.49	--	NA	NA	Yes	Detected, no background or screening value
Uranium	0.13	3.21	No	5[c]	No	Less than screening value

Table 4-28. Ecological Screening Results for Chemicals at 216-A-19 Trench. (2 sheets)

Chemical Name	Top 15 ft Maximum Concentration	Back-ground	Does Maximum Concentration Exceed Background?	Soil Indicator Value[a] (Wildlife)	COEC?	Justification
Vanadium	96.1	85.1	Yes	2[c]	Yes	Exceeds background and screening value
Zinc	56.6	67.8	No	360	No	Less than screening value
General Inorganic Compounds (mg/kg)						
Ammonia	0.47	9.23	No	NA	No	Less than background
Bromide	ND	--	NA	NA	No	Not detected
Chloride	22.5	100	No	NA	No	Less than background
Cyanide	ND	--	NA	NA	No	Not detected
Fluoride	5.62	2.81	Yes	NA	Yes	Exceeds background, no screening value
Nitrate as N	546	12	Yes	NA	Yes	Exceeds background, no screening value
Nitrite as N	ND	--	NA	NA	No	Not detected
Phosphate	4.85	0.785	Yes	NA	Yes	Exceeds background, no screening value
Sulfate	113	237	No	NA	No	Less than background
Detected Organic Compounds (ug/kg)						
Bis(2-ethylhexyl)-phthalate	660		NA	NA	Yes	Detected, no background or screening value
Tributyl phosphate	280,000	--	NA	NA	Yes	Detected, no background or screening value
TPH -diesel range	230,000	--	NA	6.0E+6	No	Less than screening value

[a]Unless otherwise footnoted, screening values represent WAC-173-340-900, Table 749-3, soil values for terrestrial wildlife.

[b]No WAC-173-340-900, Table 749-3, terrestrial wildlife value available, screening value is soil screening level for wildlife from EPA (2003).

[c]No WAC-173-340-900, Table 749-3, terrestrial wildlife value available, screening value is lowest of WAC-173-340-900, Table 749-3, soil values for plants and biota.

[d]Arsenic background value from Tables 740-1 and 745-1 in WAC 173-340-900.

Shading indicates analyte was retained as a COEC.

EPA, 2003, OSWER Directive 9285.7-55, *Guidance for Developing Ecological Soil Screening Levels.*

COEC = Contaminant of ecological concern.
NA = Not applicable/not available.
ND = Not detected.
WAC = *Washington Administrative Code.*

Table 4-29. Ecological Screening Results for Chemicals at 216-A-36B Crib. (2 sheets)

Chemical Name	Top 15 ft Maximum Concentration	Back-ground	Does Maximum Concentration Exceed Background?	Soil Indicator Value [a] (Wildlife)	COEC?	Justification
Inorganic metal (mg/kg)						
Aluminum	7,600	11,800	No	pH dependent[b]	No	Less than background
Antimony	ND	--	NA	5[c]	No	Not detected
Arsenic	2.60	20[d]	No	7	No	Less than screening value
Barium	59.9	132	No	102	No	Less than screening value
Beryllium	ND	1.51	No	35[b]	No	Not detected
Bismuth	ND	--	NA	--	No	Not detected
Boron	ND	--	NA	0.5[c]	No	Not detected
Cadmium	ND	0.81	No	14	No	Not detected
Chromium (total)	ND	18.5	No	67	No	Not detected
Chromium VI	ND	--	NA	--	No	Not detected
Cobalt	6.13	15.7	No	20[c]	No	Less than screening value
Copper	13.8	22	No	217	No	Less than screening value
Lead	ND	10.2	No	118	No	Not detected
Manganese	246	512	No	1,500	No	Less than screening value
Mercury (inorganic)	ND	0.33	No	5.5	No	Not detected
Molybdenum	ND	--	NA	7	No	Not detected
Nickel	4.26	19.1	No	980	No	Less than screening value
Selenium	ND	--	NA	0.3	No	Not detected
Silver	3.12	0.73	Yes	2[c]	Yes	Exceeds background and screening value
Thallium	ND	--	NA	1[c]	No	Not detected
Thorium	3.77	--	NA	NA	Yes	Detected, no background or screening value
Uranium	0.50	3.21	No	5[c]	No	Less than screening value
Vanadium	35.1	85.1	No	2[c]	No	Less than background
Zinc	41.5	67.8	No	360	No	Less than screening value
General Inorganic Compounds (mg/kg)						
Ammonia	ND	9.23	No	NA	No	Not detected
Bromide	ND	--	NA	NA	No	Not detected
Chloride	0.24	100	No	NA	No	Less than background
Cyanide	ND	--	NA	NA	No	Not detected

Table 4-29. Ecological Screening Results for Chemicals at 216-A-36B Crib. (2 sheets)

Chemical Name	Top 15 ft Maximum Concentration	Back-ground	Does Maximum Concentration Exceed Background?	Soil Indicator Value[a] (Wildlife)	COEC?	Justification
Fluoride	0.39	2.81	No	NA	No	Less than background
Nitrate as N	0.50	12	No	NA	No	Less than background
Nitrite as N	ND	--	NA	NA	No	Not detected
Phosphate	ND	0.785	No	NA	No	Not detected
Sulfate	0.92	237	No	NA	No	Less than background
Detected Organic Compounds (ug/kg)						
Diethylphthalate	280	--	NA	100,000[c]	No	Less than screening value

[a]Unless otherwise footnoted, screening values represent WAC-173-340-900, Table 749-3, soil values for terrestrial wildlife.

[b]No WAC-173-340-900, Table 749-3, terrestrial wildlife value available, screening value is soil screening level for wildlife from EPA (2003).

[c]No WAC-173-340-900, Table 749-3, terrestrial wildlife value available, screening value is lowest of WAC-173-340-900, Table 749-3, soil values for plants and biota.

[d]Arsenic background value from Tables 740-1 and 745-1 in WAC 173-340-900.

Shading indicates analyte was retained as a COEC.

EPA, 2003, OSWER Directive 9285.7-55, *Guidance for Developing Ecological Soil Screening Levels.*

COEC = Contaminant of ecological concern.

NA = Not applicable/not available.

ND = Not detected.

Table 4-30. Ecological Screening Results for Chemicals at 216-A-37-1 Crib. (2 sheets)

Chemical Name	Top 15 ft Maximum Concentration	Back-ground	Does Maximum Concentration Exceed Background?	Soil Indicator Value [a] (Wildlife)	COEC?	Justification
Inorganic metal (mg/kg)						
Aluminum	8660	11,800	No	pH dependent[b]	No	Less than background
Antimony	ND	--	NA	5[c]	No	Not detected
Arsenic	1.70	20[d]	No	7	No	Less than screening value
Barium	165	132	Yes	102	Yes	Exceeds background and screening value
Beryllium	0.31	1.51	No	35[b]	No	Less than screening value
Bismuth	ND	--	NA	--	No	Not detected
Boron	0.51	--	NA	0.5[c]	Yes	Less than screening value
Cadmium	ND	0.81	No	14	No	Not detected
Chromium (total)	8.85	18.5	No	67	No	Less than screening value
Chromium VI	ND	--	NA	NA	No	Not detected
Cobalt	12.6	15.7	No	20[c]	No	Less than screening value
Copper	14.7	22	No	217	No	Less than screening value
Lead	3.9	10.2	No	118	No	Less than screening value
Manganese	547	512	Yes	1,500	No	Less than screening value
Mercury (inorganic)	0.020	0.33	No	5.5	No	Less than screening value
Molybdenum	ND	--	NA	7	No	Not detected
Nickel	13.0	19.1	No	980	No	Less than screening value
Selenium	ND	--	NA	0.3	No	Not detected
Silver	ND	0.73	No	2[c]	No	Not detected
Thallium	0.88	--	NA	1[c]	No	Less than screening value
Thorium	2.53	--	NA	NA	Yes	Detected, no background or screening value
Uranium	ND	3.21	No	5[c]	No	Not detected
Vanadium	82.7	85.1	No	2[c]	No	Less than background

Table 4-30. Ecological Screening Results for Chemicals at 216-A-37-1 Crib. (2 sheets)

Chemical Name	Top 15 ft Maximum Concentration	Back-ground	Does Maximum Concentration Exceed Background?	Soil Indicator Value[a] (Wildlife)	COEC?	Justification
Zinc	56.7	67.8	No	360	No	Less than screening value
General Inorganic Compounds (mg/kg)						
Ammonia	266	9.23	Yes	NA	Yes	Exceeds background, no screening value
Bromide	ND	--	NA	NA	No	Not detected
Chloride	14.3	100	No	NA	No	Less than background
Cyanide	ND	--	NA	NA	No	Not detected
Fluoride	1.06	2.81	No	NA	No	Less than background
Nitrate as N	385	12	Yes	NA	Yes	Exceeds background, no screening value
Nitrite as N	1.66	--	NA	NA	Yes	Detected, no background or screening value
Phosphate	ND	0.785	No	NA	No	Not detected
Sulfate	32.0	237	No	NA	No	Less than background
Detected Organic Compounds (ug/kg)						
Acetone	13.0	--	NA	NA	Yes	Detected, no background or screening value
Bis(2-ethylhexyl) phthalate	21.0	--	NA	NA	Yes	Detected, no background or screening value
Diethylphthalate	650	--	NA	100,000[c]	No	Less than screening value
Tributyl phosphate	45	--	NA	NA	Yes	Detected, no background or screening value

[a]Unless otherwise footnoted, screening values represent WAC-173-340-900, Table 749-3, soil values for terrestrial wildlife.

[b]No WAC-173-340-900, Table 749-3, terrestrial wildlife value available, screening value is soil screening level for wildlife from EPA (2003).

[c]No WAC-173-340-900, Table 749-3 terrestrial wildlife value available, screening value is lowest of WAC-173-340-900, Table 749-3, soil values for plants and biota.

[d]Arsenic background value from Tables 740-1 and 745-1 in WAC 173-340-900.

Shading indicates analyte was retained as a COEC.

EPA, 2003, OSWER Directive 9285.7-55, *Guidance for Developing Ecological Soil Screening Levels*.

COEC = Contaminant of ecological concern.
NA = Not applicable/not available.
ND = Not detected.
WAC = *Washington Administrative Code*.

Table 4-31. Ecological Screening Results for Chemicals at 216-B-12 Crib. (2 sheets)

Chemical Name	Top 15 ft Maximum Concentration	Back-ground	Does Maximum Concentration Exceed Background?	Soil Indicator Value[a] (Wildlife)	COEC ?	Justification
Inorganic metal (mg/kg)						
Aluminum	NA	11,800	No	pH dependent[b]	No	Not analyzed
Antimony	0.38	--	NA	5[c]	No	Less than screening value
Arsenic	7.30	20[d]	No	7	No	Less than background
Barium	82.3	132	No	102	No	Less than screening value
Beryllium	0.33	1.51	No	35[b]	No	Less than screening value
Bismuth	ND	--	NA		No	Not detected
Boron	1.30	--	NA	0.5[c]	Yes	Exceeds screening value
Cadmium	0.08	0.81	No	14	No	Less than screening value
Chromium (Total)	7.10	18.5	No	67	No	Less than screening value
Chromium VI	ND	--	NA	NA	No	Not detected
Cobalt	NA	15.7	No	20[c]	No	Not analyzed
Copper	14.1	22	No	217	No	Less than screening value
Lead	6.10	10.2	No	118	No	Less than screening value
Manganese	NA	512	No	1,500	No	Not analyzed
Mercury (inorganic)	ND	0.33	No	5.5	No	Not detected
Molybdenum	NA	--	NA	7	No	Not analyzed
Nickel	8.50	19.1	No	980	No	Less than screening value
Selenium	ND	--	NA	0.3	No	Not detected
Silver	ND	0.73	No	2[c]	No	Not detected
Thallium	NA	--	NA	1[c]	No	Not analyzed
Thorium	NA	--	NA	NA	No	Not analyzed
Uranium	0.45	3.21	No	5[c]	No	Less than screening value
Vanadium	NA	85.1	No	2[c]	No	Not analyzed
Zinc	NA	67.8	No	360	No	Not analyzed
General Inorganic Compounds (mg/kg)						
Ammonia	ND	9.23	No	NA	No	Not detected
Bromide	NA	--	NA	NA	No	Not analyzed
Chloride	7.33	100	No	NA	No	Less than background
Cyanide	ND	--	NA	NA	No	Not detected
Fluoride	ND	2.81	No	NA	No	Not detected
Nitrate as N	13.0	12	Yes	NA	yes	exceeds background

Table 4-31. Ecological Screening Results for Chemicals at 216-B-12 Crib. (2 sheets)

Chemical Name	Top 15 ft Maximum Concentration	Back-ground	Does Maximum Concentration Exceed Background?	Soil Indicator Value[a] (Wildlife)	COEC ?	Justification
Phosphate	ND	0.785	No	NA	No	Not detected
Sulfate	467	237	Yes	NA	Yes	Exceeds background
Detected Organic Compounds (ug/kg)						
Bis(2-ethylhexyl)phthalate	18.0	--	NA	NA	Yes	Detected, no background or screening value
Di-n-butylphthalate	77.0	--	NA	200,000	No	Less than screening value
TPH-gasoline range	110	--	NA	5.0E+6	No	Less than screening value

[a]Unless otherwise footnoted, screening values represent WAC-173-340-900, Table 749-3, soil values for terrestrial wildlife.

[b]No WAC-173-340-900, Table 749-3, terrestrial wildlife value available, screening value is soil screening level for wildlife from EPA (2003).

[c]No WAC-173-340-900, Table 749-3, terrestrial wildlife value available, screening value is lowest of WAC-173-340-900, Table 749-3, soil values for plants and biota.

[d]Arsenic background value from Tables 740-1 and 745-1 in WAC 173-340-900.

Shading indicates analyte was retained as a COEC.

EPA, 2003, OSWER Directive 9285.7-55, *Guidance for Developing Ecological Soil Screening Levels*.

COEC = Contaminant of ecological concern.
NA = Not applicable/not available.
ND = Not detected.
TPH = Total petroleum hydrocarbon.
WAC = *Washington Administrative Code*.

Table 4-32. Ecological Screening Results for Radionuclides at 207-A South Retention Basin. (2 sheets)

Radionuclides (pCi/g)	Exposure Point Concentration	90th Percentile Background Concentration	Exceeds Background?	DOE Biota Concentration Guideline (pCi/g)	COEC?	Justification
Actinium-228	1.10	--	NA	--	Yes	Detected, no background or BCG
Americium-241	0.049	--	NA	4,000	No	Less than BCG
Antimony-125	ND	--	NA	3,000	No	Not detected
Bismuth-212	0.698	--	NA	--	Yes	Detected, no background or BCG
Bismuth-214	0.859	--	NA	--	Yes	Detected, no background or BCG
Carbon-14	ND	--	NA	--	No	Not detected
Cerium-144	ND	--	NA	1,000	No	Not detected
Cesium-134	ND	--	NA	--	No	Not detected
Cesium-137	1.07	--[a]	Yes	20	No	Less than BCG
Cobalt-60	ND	--[a]	No	700	No	Not detected
Europium-152	ND	--	NA	--	No	Not detected
Europium-154	ND	--[a]	No	1,000	No	Not detected
Europium-155	0.077	--[a]	Yes	20,000	No	Less than BCG
Iodine-129	ND	--	NA	6,000	No	Not detected
Lead-212	1.18	--	NA	--	Yes	Detected, no background or BCG
Lead-214	0.971	--	NA	--	Yes	Detected, no background or BCG
Neptunium-237	ND	--	NA	--	No	Not detected
Nickel-63	ND	--	NA	--	No	Not detected
Niobium-94	0.032	--	NA	--	Yes	Detected, no background or BCG
Plutonium-238	ND	--[a]	No	--	No	Not detected
Plutonium-239/240	0.012	--[a]	No	6,000	No	Less than BCG
Radium-226	0.859	0.815	Yes	50	No	Less than BCG
Radium-228	1.10	1.32	No	40	No	Less than background and BCG
Ruthenium-103	ND	--	NA	--	No	Not detected
Ruthenium-106	ND	--	NA	--	No	Not detected

Table 4-32. Ecological Screening Results for Radionuclides at 207-A South Retention Basin. (2 sheets)

Radionuclides (pCi/g)	Exposure Point Concentration	90th Percentile Background Concentration	Exceeds Background?	DOE Biota Concentration Guideline (pCi/g)	COEC?	Justification
Technetium-99	ND	--	NA	4,000	No	Not detected
Thallium-208	0.358	--	NA	--	Yes	Detected, no background or BCG
Thorium-228	0.737	1.32	No	--	No	Less than background
Thorium-230	1.26	1.10	Yes	--	Yes	Detected above background, no BCG
Thorium-232	0.722	1.32	No	2,000	No	Less than BCG
Thorium-234	3.16	--	NA	--	Yes	Detected, no background or BCG
Tin-113	ND	--	NA	--	No	Not detected
Tin-126	ND	--	NA	--	No	Not detected
Total Radioactive Strontium	1.40	--[a]	Yes	20	No	Less than BCG
Tritium	16.6	--	NA	200,000	No	Less than BCG
Uranium-234	0.24	1.10	No	5,000	No	Less than background and BCG
Uranium-235	0.026	0.109	No	3,000	No	Less than background and BCG
Uranium-238	0.27	1.06	No	2,000	No	Less than background and BCG
Zinc-65	ND	--	NA	400	No	Not detected
				dose fractions sum		**HI for constituents with BCGs = 0.17**

[a]Surface background for fallout radionuclides was not used for comparison because maximum may be in subsurface

Shading indicates analyte was retained as a COEC.

COEC = Contaminant of Ecological Concern.

NA = Not applicable/not available.

ND = Not detected.

Table 4-33. Ecological Screening Results for Radionuclides at 216-A-10 Crib. (2 sheets)

Radionuclides	Exposure Point Concentration (pCi/g)	90th Percentile Background Concentration (pCi/g)	Exceeds Background?	DOE Biota Concentration Guideline (pCi/g)	COEC?	Justification
Actinium-228	N.A.	--	NA	--	No	Not analyzed
Americium-241	ND	--	NA	4,000	No	Not detected
Antimony-125	N.A.	--	NA	3,000	No	Not analyzed
Bismuth-212	N.A.	--	NA	--	No	Not analyzed
Bismuth-214	N.A.	--	NA	--	No	Not analyzed
Carbon-14	ND	--	NA	--	No	Not detected
Cerium-144	N.A.	--	NA	1,000	No	Not analyzed
Cesium-134	N.A.	--	NA	--	No	Not analyzed
Cesium-137	ND	--[a]	No	20	No	Not detected
Cobalt-60	ND	--[a]	No	700	No	Not detected
Europium-152	ND	--	NA	--	No	Not detected
Europium-154	ND	--[a]	No	1,000	No	Not detected
Europium-155	ND	--[a]	No	20,000	No	Not detected
Iodine-129	ND	--	NA	6,000	No	Not detected
Lead-212	N.A.	--	NA	--	No	Not analyzed
Lead-214	N.A.	--	NA	--	No	Not analyzed
Neptunium-237	0.043	--	NA	--	Yes	Detected, no background or BCG
Nickel-63	ND	--	NA	--	No	Not detected
Niobium-94	N.A.	--	NA		No	Not analyzed
Plutonium-238	ND	--[a]	No	--	No	Not detected
Plutonium-239/240	ND	--[a]	No	6,000	No	Not detected
Potassium-40	18.700	16.6	Yes	--	Yes	Exceeds background, no BCG
Radium-226	0.820	0.815	Yes	50	No	Less than BCG

Table 4-33. Ecological Screening Results for Radionuclides at 216-A-10 Crib. (2 sheets)

Radionuclides	Exposure Point Concentration (pCi/g)	90th Percentile Background Concentration (pCi/g)	Exceeds Background?	DOE Biota Concentration Guideline (pCi/g)	COEC?	Justification
Radium-228	ND	1.32	No	40	No	Not detected
Ruthenium-103	N.A.	--	NA	--	No	Not analyzed
Ruthenium-106	N.A.	--	NA	--	No	Not analyzed
Technetium-99	ND	--	NA	4,000	No	Not detected
Thallium-208	N.A.	--	NA	--	No	Not analyzed
Thorium-228	0.545	1.32	NA	--	No	Less than background
Thorium-230	0.481	1.10	No	--	No	Less than background
Thorium-232	0.481	1.32	No	2,000	No	Less than background and BCG
Thorium-234	N.A.	--	NA	--	No	Not analyzed
Tin-113	N.A.	--	NA	--	No	Not analyzed
Tin-126	N.A.	--	NA	--	No	Not analyzed
Total radioactive strontium	ND	--[a]	No	20	No	Not detected
Tritium	ND	--	NA	200,000	No	Not detected
Uranium-234	0.390	1.10	No	5,000	No	Less than background and BCG
Uranium-235	ND	0.109	No	3,000	No	Not detected
Uranium-238	0.338	1.06	No	2,000	No	Less than background and BCG
Zinc-65	N.A.	--	NA	400	No	Not analyzed
				dose fractions sum		**HI for constituents with BCGs = 0.02**

[a]Surface background for fallout radionuclides was not used for comparison because maximum may be in subsurface

Shading indicates nuclide was retained as a COEC.

BCG = Biota concentration guide.
COEC = Contaminant of ecological concern.
N.A. = Not analyzed.
NA = Not applicable/not available.
ND = Not detected.

Table 4-34. Ecological Screening Results for Radionuclides at 216-A-19 Trench. (2 sheets)

Radionuclides (pCi/g)	Exposure Point Concentration	90th Percentile Background Concentration	Exceeds Background?	DOE Biota Concentration Guideline (pCi/g)	COEC?	Justification
Actinium-228	0.523	--	NA	--	Yes	Detected, no background or BCG
Americium-241	0.081	--	NA	4,000	No	Less than BCG
Antimony-125	ND	--	NA	3,000	No	Not detected
Bismuth-212	0.343	--	NA	--	Yes	Detected, no background or BCG
Bismuth-214	0.439	--	NA	--	Yes	Detected, no background or BCG
Carbon-14	ND	--	NA	--	No	Not detected
Cerium-144	ND	--	NA	1,000	No	Not detected
Cesium-134	ND	--	NA	--	No	Not detected
Cesium-137	ND	--[a]	No	20	No	Not detected
Cobalt-60	ND	--[a]	No	700	No	Not detected
Europium-152	ND	--	NA	--	No	Not detected
Europium-154	ND	--[a]	No	1,000	No	Not detected
Europium-155	0.066	--[a]	Yes	20,000	No	Less than BCG
Iodine-129	ND	--	NA	6,000	No	Not detected
Lead-212	0.536	--	NA	--	Yes	Detected, no background or BCG
Lead-214	0.472	--	NA	--	Yes	Detected, no background or BCG
Neptunium-237	ND	--	NA	--	No	Not detected
Nickel-63	17.6	--	NA	--	Yes	Detected, no background or BCG
Niobium-94	ND	--	NA	--	No	Not detected
Plutonium-238	ND	--[a]	NA	--	No	Not detected
Plutonium-239/240	0.180	--[a]	Yes	6,000	No	Less than BCG
Radium-226	0.439	0.815	No	50	No	Less than background and BCG
Radium-228	0.523	1.32	No	40	No	Less than background and BCG

Table 4-34. Ecological Screening Results for Radionuclides at 216-A-19 Trench. (2 sheets)

Radionuclides (pCi/g)	Exposure Point Concentration	90th Percentile Background Concentration	Exceeds Background?	DOE Biota Concentration Guideline (pCi/g)	COEC?	Justification
Ruthenium-103	ND	--	NA	--	No	Not detected
Ruthenium-106	ND	--	NA	--	No	Not detected
Technetium-99	ND	--	NA	4,000	No	Not detected
Thallium-208	0.171	--	NA	--	Yes	Detected, no background or BCG
Thorium-228	0.470	1.32	No	--	No	Less than background
Thorium-230	0.507	1.10	No	--	No	Less than background
Thorium-232	0.429	1.32	No	2,000	No	Less than background and BCG
Thorium-234	56.8	--	NA	--	Yes	Detected, no background or BCG
Tin-113	ND	--	NA	--	No	Not detected
Tin-126	ND	--	NA	--	No	Not detected
Total Radioactive Strontium	16.1	--[a]	Yes	20	No	Less than BCG
Tritium	ND	--	NA	200,000	No	Not detected
Uranium-234	6.00	1.10	Yes	5,000	No	Less than BCG
Uranium-235	0.940	0.109	Yes	3,000	No	Less than BCG
Uranium-238	51.0	1.06	Yes	2,000	No	Less than BCG
Zinc-65	ND	--	NA	400	No	Not detected
					dose fractions sum	**HI for constituents with BCGs = 0.85**

[a]Surface background for fallout radionuclides was not used for comparison because maximum may be in subsurface.
Shading indicates nuclide was retained as a COEC.
BCG = Biota concentration guide.
COEC = Contaminant of ecological concern.
N.A. = Not analyzed.
NA = Not applicable/not available.
ND = Not detected.

Table 4-35. Ecological Screening Results for Radionuclides at 216-A-19 Trench. (2 sheets)

Radionuclides (pCi/g)	Exposure Point Concentration	90th Percentile Background Concentration	Exceeds Background?	DOE Biota Concentration Guideline (pCi/g)	COEC?	Justification
Actinium-228	0.523	--	NA	--	Yes	Detected, no background or BCG
Americium-241	0.081	--	NA	4,000	No	Less than BCG
Antimony-125	ND	--	NA	3,000	No	Not detected
Bismuth-212	0.343	--	NA	--	Yes	Detected, no background or BCG
Bismuth-214	0.439	--	NA	--	Yes	Detected, no background or BCG
Carbon-14	ND	--	NA	--	No	Not detected
Cerium-144	ND	--	NA	1,000	No	Not detected
Cesium-134	ND	--	NA	--	No	Not detected
Cesium-137	ND	--[a]	No	20	No	Not detected
Cobalt-60	ND	--[a]	No	700	No	Not detected
Europium-152	ND	--	NA	--	No	Not detected
Europium-154	ND	--[a]	No	1,000	No	Not detected
Europium-155	0.066	--[a]	Yes	20,000	No	Less than BCG
Iodine-129	ND	--	NA	6,000	No	Not detected
Lead-212	0.536	--	NA	--	Yes	Detected, no background or BCG
Lead-214	0.472	--	NA	--	Yes	Detected, no background or BCG
Neptunium-237	ND	--	NA	--	No	Not detected
Nickel-63	17.6	--	NA	--	Yes	Detected, no background or BCG
Niobium-94	ND	--	NA	--	No	Not detected
Plutonium-238	ND	--[a]	NA	--	No	Not detected
Plutonium-239/240	0.180	--[a]	Yes	6,000	No	Less than BCG
Radium-226	0.439	0.815	No	50	No	Less than background and BCG
Radium-228	0.523	1.32	No	40	No	Less than background and BCG
Ruthenium-103	ND	--	NA	--	No	Not detected

Table 4-35. Ecological Screening Results for Radionuclides at 216-A-19 Trench. (2 sheets)

Radionuclides (pCi/g)	Exposure Point Concentration	90th Percentile Background Concentration	Exceeds Background?	DOE Biota Concentration Guideline (pCi/g)	COEC?	Justification
Ruthenium-106	ND	--	NA	--	No	Not detected
Technetium-99	ND	--	NA	4,000	No	Not detected
Thallium-208	0.171	--	NA	--	Yes	Detected, no background or BCG
Thorium-228	0.470	1.32	No	--	No	Less than background
Thorium-230	0.507	1.10	No	--	No	Less than background
Thorium-232	0.429	1.32	No	2,000	No	Less than background and BCG
Thorium-234	[illegible]	[illegible]	NA	--	Yes	Detected, no background or BCG
Tin-113	ND	--	NA	--	No	Not detected
Tin-126	ND	--	NA	--	No	Not detected
Total Radioactive Strontium	16.1	--[a]	Yes	20	No	Less than BCG
Tritium	ND	--	NA	200,000	No	Not detected
Uranium-234	6.00	1.10	Yes	5,000	No	Less than BCG
Uranium-235	0.940	0.109	Yes	3,000	No	Less than BCG
Uranium-238	51.0	1.06	Yes	2,000	No	Less than BCG
Zinc-65	ND	--	NA	400	No	Not detected
					dose fractions sum	**HI for constituents with BCGs = 0.85**

[a]Surface background for fallout radionuclides was not used for comparison because maximum may be in subsurface.

Shading indicates nuclide was retained as a COEC.

BCG = Biota concentration guide.
COEC = Contaminant of ecological concern.
N.A. = Not analyzed.
NA = Not applicable/not available.
ND = Not detected.

Table 4-36. Ecological Screening Results for Radionuclides at 216-A-37-1 Crib. (2 sheets)

Radionuclides (pCi/g)	Exposure Point Concentration	90th Percentile Background Concentration	Exceeds Background?	DOE Biota Concentration Guideline (pCi/g)	COEC?	Justification
Actinium-228	0.581	--	NA	--	Yes	Detected, no background or BCG
Americium-241	ND	--	NA	4,000	No	Not detected
Antimony-125	ND	--	NA	3,000	No	Not detected
Bismuth-212	0.366	--	NA	--	Yes	Detected, no background or BCG
Bismuth-214	0.406	--	NA	--	Yes	Detected, no background or BCG
Carbon-14	ND	--	NA	--	No	Not detected
Cerium-144	ND	--	NA	1,000	No	Not detected
Cesium-134	ND	--	NA	--	No	Not detected
Cesium-137	0.113	--[a]	No	20	No	Less than BCG
Cobalt-60	ND	--[a]	No	700	No	Not detected
Europium-152	ND	--	NA	--	No	Not detected
Europium-154	ND	--[a]	No	1,000	No	Not detected
Europium-155	ND	--[a]	No	20,000	No	Not detected
Iodine-129	ND	--	NA	6,000	No	Not detected
Lead-212	0.592	--	NA	--	Yes	Detected, no background or BCG
Lead-214	0.492	--	NA	--	Yes	Detected, no background or BCG
Neptunium-237	ND	--	NA	--	No	Not detected
Nickel-63	ND	--	NA	--	No	Not detected
Niobium-94	ND	--	NA	--	No	Not detected
Plutonium-238	ND	--[a]	No	--	No	Not detected
Plutonium-239/240	ND	--[a]	No	6,000	No	Not detected
Potassium-40	N.A.	16.6	NA	--	No	Not analyzed
Radium-226	0.406	0.815	No	50	No	Less than background and BCG
Radium-228	0.581	1.32	No	40	No	Less than background and BCG

Table 4-36. Ecological Screening Results for Radionuclides at 216-A-37-1 Crib. (2 sheets)

Radionuclides (pCi/g)	Exposure Point Concentration	90th Percentile Background Concentration	Exceeds Background?	DOE Biota Concentration Guideline (pCi/g)	COEC?	Justification
Ruthenium-103	ND	--	NA	--	No	Not detected
Ruthenium-106	ND	--	NA	--	No	Not detected
Technetium-99	ND	--	NA	4,000	No	Not detected
Thallium-208	0.164	--	NA	--	Yes	Detected, no background or BCG
Thorium-228	0.572	1.32	No	--	No	Less than background
Thorium-230	ND	1.10	No	--	No	Not detected
Thorium-232	0.393	1.32	No	2,000	No	Less than background and BCG
Thorium-234	ND	--	NA	--	No	Not detected
Tin-113	ND	--	NA	--	No	Not detected
Tin-126	ND	--	NA	--	No	Not detected
Total Radioactive Strontium	1.700	--[a]	Yes	20	No	Less than BCG
Tritium	134.000	--	NA	200,000	No	Less than BCG
Uranium-234	0.17	1.10	No	5,000	No	Less than background and BCG
Uranium-235	0.012	0.109	No	3,000	No	Less than background and BCG
Uranium-238	0.18	1.06	No	2,000	No	Less than background and BCG
Zinc-65	ND	--	NA	400	No	Not detected
				dose fractions sum		**HI for constituents with BCGs = 0.11**

[a]Surface background for fallout radionuclides was not used for comparison because maximum may be in subsurface.
Shading indicates nuclide was retained as a COEC.
BCG = Biota concentration guide.
COEC = Contaminant of ecological concern.
N.A. = Not analyzed.
NA = Not applicable/not available.
ND = Not detected.

Table 4-37. Ecological Screening Results for Radionuclides at 216-B-12 Crib. (2 sheets)

Radionuclides (pCi/g)	Exposure Point Concentration	90th Percentile Background Concentration	Exceeds Background?	DOE Biota Concentration Guideline (pCi/g)	COEC?	Justification
Actinium-228	N.A.	--	NA	--	No	Not analyzed
Americium-241	ND	--	NA	4,000	No	Not detected
Antimony-125	N.A.	--	NA	3,000	No	Not analyzed
Bismuth-212	N.A.	--	NA	--	No	Not analyzed
Bismuth-214	N.A.	--	NA	--	No	Not analyzed
Carbon-14	ND	--	NA	--	No	Not detected
Cerium-144	N.A.	--	NA	1,000	No	Not analyzed
Cesium-134	ND	--	NA	--	No	Not detected
Cesium-137	ND	--[a]	No	20	No	Not detected
Cobalt-60	ND	--[a]	No	700	No	Not detected
Europium-152	ND	--	NA	--	No	Not detected
Europium-154	ND	--[a]	No	1,000	No	Not detected
Europium-155	ND	--[a]	No	20,000	No	Not detected
Iodine-129	ND	--	NA	6,000	No	Not detected
Lead-212	N.A.	--	NA	--	No	Not analyzed
Lead-214	N.A.	--	NA	--	No	Not analyzed
Neptunium-237	ND	--	NA	--	No	Not detected
Nickel-63	ND	--	NA	--	No	Not detected
Niobium-94	N.A.	--	NA	--	No	Not analyzed
Potassium-40	ND	16.6	No	--	No	Not detected
Plutonium-238	ND	--[a]	No	--	No	Not detected
Plutonium-239/240	14.200	--[a]	Yes	6,000	No	Less than BCG
Radium-226	0.708	0.815	No	50	No	Less than background and BCG
Radium-228	ND	1.32	No	40	No	Not detected

Table 4-37. Ecological Screening Results for Radionuclides at 216-B-12 Crib. (2 sheets)

Radionuclides (pCi/g)	Exposure Point Concentration	90th Percentile Background Concentration	Exceeds Background?	DOE Biota Concentration Guideline (pCi/g)	COEC?	Justification
Ruthenium-103	N.A.	--	NA	--	No	Not analyzed
Ruthenium-106	N.A.	--	NA	--	No	Not analyzed
Technetium-99	ND	--	NA	4,000	No	Not detected
Thallium-208	N.A.	--	NA	--	No	Not analyzed
Thorium-228	0.584	1.32	No	--	No	Less than background
Thorium-230	4.190	1.10	Yes	--	Yes	Above background, no BCG
Thorium-232	0.716	1.32	No	2,000	No	Less than background and BCG
Thorium-234	N.A.	--	NA	--	No	Not analyzed
Tin-113	N.A.	--	NA	--	No	Not analyzed
Tin-126	0.742	--	NA	--	Yes	Detected, no background or BCG
Total Radioactive Strontium	ND	--[a]	NA	20	No	Not detected
Tritium	8.28	--	NA	200,000	No	Less than BCG
Uranium-234	0.605	1.10	No	5,000	No	Less than background and BCG
Uranium-235	ND	0.109	No	3,000	No	Not detected
Uranium-238	0.628	1.06	No	2,000	No	Less than background and BCG
Zinc-65	N.A.	--	NA	400	No	Not analyzed
					dose fractions sum	**HI for constituents with BCGs = 0.01**

[a]Surface background for fallout radionuclides was not used for comparison because maximum may be in subsurface

Shading indicates nuclide was retained as a COEC.

BCG = Biota concentration guide.
COEC = Contaminant of ecological concern.
N.A. = Not analyzed.
NA = Not applicable/not available.
ND = Not detected.

Table 4-38. Hazard Quotients for Contaminants of Ecological Concern for Which Screening Levels Are Available.

Chemical Name	207-A South Retention Basin	216-A-19 Trench	216-A-36-B Crib	216-A-37-1 Crib	216-B-12 Crib
Barium				1.6	
Boron		78			2.6
Silver	2.5		1.6		
Vanadium		48			

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5.0 RISK ASSESSVADOSE ZONE CONTAMINANT FATE AND TRANSPORT MODELING

5.1 INTRODUCTION AND BACKGROUND

Groundwater impacts were evaluated at the six representative sites of the 200-PW-2 and 200-PW-4 OUs. The evaluations were conducted to identify contaminants that pose a risk to groundwater at the representative sites based on data collected during the RI and on existing data. The results of the impact evaluations will support the evaluation of remedial alternatives and closure options that will be included in the group-specific FS and specific RCRA TSD unit closure plan.

5.2 MODELING METHODOLOGY

Potential groundwater impacts at the 200-PW-2 and 200-PW-4 OUs were evaluated using different methodologies for nonradioactive (Section 5.2.1) and radioactive (Section 5.2.2) constituents. Detailed process modeling of flow and transport using the STOMP code developed by the Pacific Northwest National Laboratory (PNNL-11217, *STOMP Subsurface Transport Over Multiple Phases Theory Guide*) was not deemed necessary for this investigation. Modeling conducted previously at 200 Area sites (DOE/RL-2002-42, *Remedial Investigation Report for the 200-TW-1 and 200-TW-2 Operable Units (includes the 200-PW-5 Operable Unit)*) for nonradioactive constituents have consistently indicated breakthrough to the water table for constituents with soil-water partition coefficients (K_d) of zero. The Pacific Northwest National Laboratory has documented that constituents with K_ds of 40 L/kg or greater are effectively immobile in the vadose zone and groundwater (PNNL-11800). For many of the constituents that exceeded groundwater thresholds in the screening phase, additional modeling would only have served to restate the finding that eventually the constituent will reach groundwater. These constituents will be considered further in the FS. For other constituents, the original concentrations were sufficiently small that, although they may eventually reach groundwater, the concentrations would be far below levels of concern and, therefore no benefit would be derived from further modeling. The constituents anticipated to reach groundwater are discussed in Sections 4.3.2 and 4.4.3.

5.2.1 Nonradioactive Constituents

For nonradioactive constituents, maximum constituent concentrations in the vadose zone were compared to soil screening criteria calculated using the fixed-parameter three-phase partitioning model described in WAC 173-340-747. Use of this model for screening soil contamination for potential groundwater impacts is referenced under calculation of Method B and C soil cleanup levels in CLARC, Version 3.1 under WAC 173-340. CLARC 3.1 was obtained on-line at www.ecy.wa.gov/programs/tcp/tools/CLARC_v_3.1/clarc_v_3_1.htm

The fixed-parameter three-phase partitioning model used to calculate soil screening values for groundwater protection is described by the following equation:

$$C_s = C_w (UCF) DF \left[K_d + \frac{(\theta_w + \theta_a H_{cc})}{\rho_b} \right]$$

Where:

C_s=soil concentration (mg/kg)
C_w=groundwater cleanup level (μg/L)
UCF=unit conversion factor (1 mg/1000 μg)
DF=dilution factor (20)
K_d=distribution coefficient (L/kg)
θ_w=water-filled soil porosity (0.3)
θ_a=air-filled soil porosity (0.13)
H_{cc}=Henry's law constant
ρ_b=dry bulk soil density (1.5 kg/L).

Chemical-specific distribution coefficients and groundwater cleanup values used in the calculation of soil screening criteria for groundwater impacts are provided in Table 4-6. Unless otherwise specified, the groundwater cleanup levels are from WAC 173-340-740, and the K_d and H_{cc} values are default values from CLARC 3.1.

The key variables in the fixed-parameter three-phase partitioning model, when applying this model to the 200 Area sites in this report, are the dilution factor and K_d values. Generic K_d values obtained in CLARC 3.1 may not correspond to values estimated or measured in Hanford Site soils. The dilution factor in the fixed-parameter three-phase partitioning model is calculated as the sum of the volumetric infiltration and groundwater flow rates (m^3/yr) divided by the volumetric infiltration flow rate. The default value of 20 implies that groundwater flow volume beneath a site is about 20 times greater than the volume of vadose zone water infiltrating groundwater at the site. Considering aquifer flow rates and recharge rates for the 200 Areas, the RESRAD default value of 20 is a minimum value for dilution for these sites.

The soil screening criteria for groundwater impacts are provided in Chapter 4.0.
The WAC 173-340-747 three-phase model and associated soil screening criteria do not address transport through uncontaminated vadose zone soils below the area of contamination. Therefore, an additional screening evaluation for potential groundwater impacts was applied based on the Pacific Northwest National Laboratory report that indicated that a K_d value of 40 L/kg is a reasonable metric for considering transport from the vadose zone to groundwater. An analysis of K_d values and a table describing the physical and chemical parameters were used to develop the groundwater screening criteria given in Section 4.3 and Table 4-6. This screening supplements the comparison to the soil screening criteria by identifying those constituents that are effectively immobile in the vadose zone and therefore highly unlikely to reach groundwater.

5.2.2 Radioactive Constituents

For radioactive constituents, maximum constituent concentrations in the vadose zone were evaluated for potential groundwater impacts using the RESRAD computer model. RESRAD Version 6.1 was used for this evaluation. Implementation of the RESRAD model followed guidance described in ANL/EAD-4. Groundwater impacts were evaluated based on leaching of radionuclides from the contaminated zone followed by infiltration through the vadose zone to groundwater where exposure may occur via a well.

Leaching of radionuclides from the contaminated zone in RESRAD is described by a sorption-desorption model that incorporates such inputs as precipitation and irrigation rates, evapotranspiration rate, K_d values of the individual radionuclides, and physical characteristics of the contaminated zone such as area, thickness, soil density, and moisture content. Site- and/or 200 Area-specific information generally were used to establish appropriate values for these inputs to the leaching model. The irrigation rate was set to zero in the RESRAD simulations.

RESRAD employs a one-dimensional simplification of infiltration through the vadose zone from the bottom of the contaminated zone to the water table. Site-specific data were used to characterize the vadose zone, under the model constraint of a maximum of five geologic strata. Parameters employed in the infiltration model include soil porosity and density, moisture content, field capacity, hydraulic conductivity, and thickness for each geologic stratum. The time at which a radionuclide reaches groundwater and the rate at which it enters groundwater are calculated in RESRAD as a function of these parameters.

RESRAD contains two models that are used to calculate the time at which groundwater radionuclide concentrations reach their maximum and the dilution factor between water infiltrating from the vadose zone and groundwater at a theoretical well. For sites of less than 1000 m^2, ANL/EAD-4 recommends using the RESRAD mass-balance model. In this model, all radionuclides released from the contaminated area are assumed to be withdrawn from the theoretical well, such as might be the case if the well were located in the middle of a small site. For larger sites, ANL/EAD-4 recommends use of the nondispersion model, which allows for vertical mixing in the saturated zone and considers the location of the theoretical well to be at the downgradient edge of the site. The mass-balance model was used for all sites in this RI report except the 216-A-10 Crib, for which the nondispersion model was used.

Both the mass-balance and nondispersion models provide protective evaluations of potential groundwater impacts. By ignoring lateral dispersivity in both the unsaturated and saturated zones, the quantity of radionuclides leached from the contaminated zone that might reach a theoretical well is maximized. Certain sites, particularly the 216-A-36B and 216-A-37-1 Cribs, are long and narrow. Applying the mass-balance model at these sites ignores the fact that the geometry of the sites renders it almost impossible for any single well to capture all the contamination potentially infiltrating to groundwater. For example, all radionuclides leaching from the contaminated zone across the 150 m [500-ft] length of the 216-A-36B Crib were assumed to be captured by the well in the mass-balance model. For the 216-A-10 Crib where the nondispersion model was used, the groundwater flow was assumed to be perfectly aligned with the axis of the site such that all contamination reaching groundwater would flow directly to a theoretical well situated at the downgradient end of the crib.

Radionuclide concentrations at the theoretical groundwater well at the time of maximum concentrations were identified as the output of the RESRAD evaluation of groundwater impacts. Derivation of hydrogeological input parameter values for the RESRAD evaluation of groundwater impacts is discussed in Section 5.3. A complete tabulation of RESRAD input parameter values is provided in Section 4.4.

5.3 SITE HYDROGEOLOGIC DATA FOR RESRAD MODELING

The RESRAD computer code requires information about the flow and transport characteristics of the vadose zone and saturated zone to estimate the movement of radionuclides from a contaminated zone through the soil to the groundwater. Requirements also include information about the site meteorology, surface water hydrology, and erosion because these processes also may influence contaminant migration. Parameters related to flow will be discussed in Section 5.3.1 and those related to transport will be discussed in Section 5.3.2.

5.3.1 RESRAD Flow Parameters

For the water pathway, RESRAD requires information for the cover and contaminated zone, the uncontaminated vadose zone, and the saturated zone. A number of inputs for the water pathway depend on the characteristics of the geologic material. To assign these properties appropriately, the hydrostratigraphy of each site needs to be approximated by layers in the RESRAD model. RESRAD allows a contaminated zone layer, up to five vadose zone layers, and a saturated zone layer to be parameterized. Given these limitations, simplification of the hydrostratigraphy was necessary at some sites. Previous analyses of the hydraulic properties of the 200 Area soils (WHC-EP-0883, *Variability and Scaling of Hydraulic Properties for 200 Area Soils*) grouped them into six categories based on their hydraulic properties. These categories were used as the basis for identifying material layers for RESRAD from stratigraphic and lithologic descriptions from borehole logs at the six sites evaluated in this RI Report. Hydrostratigraphic layer thicknesses and the associated hydraulic property category are shown in Table 4-2 for each site. This information was used to assign thicknesses and properties to RESRAD model layers described in Table 5-1.

Values for the saturated hydraulic conductivity and field capacity were assigned to the cover, contaminated zone, uncontaminated vadose zone layers, and the saturated zone based on mean values from WHC-EP-0883 for the hydraulic property category associated with the given layer. Field capacity was approximated using the mean value of the residual water content for the category. The RESRAD "b" parameter for each layer was obtained from ANL/EAD-4 based on the dominant texture of the layer.

Parameters required for the saturated zone are the hydraulic gradient, water table drop rate, well pump intake depth, and the well pumping rate. Parameter values used for the well pumping rate and water table drop rate used were RESRAD default values. The hydraulic gradient varied between sites. Values used were obtained from PNNL-13116. The value used for the well pump intake depth was a typical well screen depth for the Hanford Site (DOE/RL-2002-42).

Additional meteorological parameters required are the evaporation coefficient, precipitation, wind speed, and humidity in air (for tritium only). The evaporation coefficient for the Hanford Site was obtained from WDOH/320-015. Mean annual precipitation for the Hanford Site was obtained from DOE/RL-92-19. Mean annual wind speed for the Hanford Site was obtained from 200 Area data (PNNL-13033) and humidity in air was set to the RESRAD default.
Surface water parameters, the runoff coefficient and the watershed area were set to the RESRAD default values.

5.3.2 RESRAD Transport Parameters

Parameters required for modeling transport include the area of the contaminated zone, the cover and contaminated zone thicknesses, and the length of the contaminated zone parallel to the aquifer flow. Values of the effective and total porosities and bulk densities of the geologic material composing the cover, contaminated zone, uncontaminated vadose zone, and the aquifer layers also are required. Distribution coefficients (K_d), parameters that specify the concentration ratio of the adsorbed radionuclide to the radionuclide in solution, also are required for each element modeled. Isotopes of an element are assumed to have the same distribution coefficient. Estimates of the erosion rate for the cover and contaminated zones also are required.

Site-specific areas of contaminated zones were obtained from Table 2-1 of the Work Plan (DOE/RL-2000-60, Rev. 1). When applicable, RESRAD assessments of the effects of surface exposure were conducted considering both the presence and absence of an existing site cover. For the no-cover condition, a contamination zone thickness of at least 4.6 m (15 ft) was used. For the existing-cover condition, the thickness of the contaminated zone was based on the cover thickness specified in Table 2-1 of the Work Plan (DOE/RL-2000-60, Rev. 1), corroborated by the extent of contaminant distribution determined from RI data. The length of the contaminated zone parallel to aquifer flow was protectively assumed to be equal to the longest axis of each site.

Values of effective porosity were obtained by using the mean effective porosity from WHC-EP-0883 for the hydraulic property category associated with a given layer. For RESRAD inputs, total and effective porosity were assumed to be equal. Soil bulk density was calculated from mean porosity data assuming a particle density of 2.65 g/cm^3.

Distribution coefficients for radionuclides and daughters for RESRAD models of the 200-PW-2 and 200-PW-4 sites were preferentially obtained from PNNL-11800, Appendix E. For the 200 Area composite analysis, waste chemistry and background chemistry information were used to assign values of distribution coefficients to elements. The waste sites evaluated in this RI Report were characterized as "low organic–low-salts–near neutral" releases in Table 4.4 of PNNL-11800. These waste sites were assigned Source Category F K_d values in PNNL-11800. The 216-A-10 Crib, however, was reported in the Work Plan (DOE/RL-2000-60, Rev. 1) to have received very acidic process waste that varied between pH 1 and pH 2.5. In addition, borehole data for the 216-A-10 Crib indicates that liquid releases reached groundwater; the volume of discharged liquid (reported as 2.34 x 10^8 L in DOE/RL-2000-60, Rev. 1) supports this finding. Therefore, at the 216-A-10 Crib, Category "H" K_d values were applied for modeling across the

entire vadose zone. The distribution coefficient values used for the RESRAD models were classified as "conservative" K_d values in Table E.15 of PNNL-11800 and are listed in Table 5-2.

Values used for the erosion rate of both the cover and the contaminated zone were RESRAD default values. A complete tabulation of RESRAD input parameter values is provided in Chapter 4. RESRAD modeling and risk evaluation results are reported in Section 4.4. Conclusions from the modeling are summarized in Chapter 6.

5.4 SUMMARY EVALUATION OF FATE AND TRANSPORT

This section provides the evaluation of the constituents that potentially exceed groundwater RBCs. This section also evaluates whether added modeling beyond that presented in Chapter 4.0 will provide information required to assess whether degradation of the groundwater has occurred. For example, if the constituent has already reached groundwater and already exceeds the RBC, then degradation has occurred and additional modeling will not alter that fact.

5.4.1 Nonradioactive Constituents

Table 5-3 summarizes nonradioactive constituents exceeding RBCs for each site. The information includes the site, analyte, partition coefficient (K_d), depth at which the maximum concentration occurs, maximum concentration, background, RBC, number of detects versus the number of samples collected, range of concentration of the nondetects, and range of concentration of the detects. No constituents exceeded the RBC in the 207-A South Retention Basin so this site is not discussed. Several organic constituents were discussed in Chapter 4.0 that have no RBC and no partition coefficients. These also are not discussed here.

The following four constituents exceed the groundwater RBC in the 216-A-10 Crib.

- **Methylene chloride** is a common laboratory contaminant as discussed in *Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses* (EPA 1988a) and in Hanford validation procedure, BHI-01435, *Data Validation Procedure for Chemical Analysis*. Of the 10 detections, 2 (a sample and its field duplicate) exceeded the RBC and both were flagged by the laboratory with a "B" indicating that that analyte was in the blank and in the sample. Guidance for use of data from constituents that also are common laboratory contaminants indicates that the sample should exceed the blank by a factor of 10 to be considered as actual site contamination. In the samples exceeding the RBC, the corresponding method blank result was 0.001 mg/kg and the blank spike (which was not spiked with methylene chloride) result was 0.004 mg/kg. The range of laboratory contamination multiplied by 10 was 0.010 mg/kg to 0.040 mg/kg. The sample detections are less than a factor of 10 above the range of the method blank and thus are not likely to be caused by site contamination. In addition data from the borehole is a mixture of nondetects, low detections all flagged with "B," and no pattern of increasing or decreasing concentration. The methylene chloride result probably is a false positive

and is not a risk driver. Methylene chloride is a COC at the 200-PW-4 OU (DOE/RL-2000-60, Rev. 1), and methylene chloride plumes are present at the Hanford Site; however, no plumes are known near this crib and methylene chloride is not a COC for the 200-PW-2 OU to which the 216-A-10 Crib belongs.

- **Pentachlorophenol** was detected in 1 sample at 62.5 ft bgs. The sample result of 20.4 µg/kg is flagged as estimated. The result is the only detection of this chemical in the OU. The concentration is below the MDA range for this sample (300 µg/kg to 200,000 µg/kg) and for the OU as a whole (100 µg/kg to 200,000 µg/kg). The chemical is listed in DOE/RL-2001-54 as having been detected at a maximum concentration above the screening level during the risk calculation for the Central Plateau. However, this chemical is not likely to be present at the 216-A-10 Crib; the waste site history does not include it. The broader 200 Area ecological evaluation has captured the concern over the chemical. No site-specific modeling is required for pentachlorophenol.

- **TPH diesel-range organic** was detected once at 16.4 m (54 ft) bgs. The other results in the soil column are nondetects. Samples located deeper in the boring produced nondetected results (0.012 mg/kg to 3.70 mg/kg), well below the RBC of 2,000 mg/kg. In accordance with EPA method 8015B, diesel-range organics are alkane carbon chains from C10 to C28. While partition coefficients are not presented because these are chemical mixtures, they are very large molecules and are not likely to be mobile in the vadose zone. Modeling would not effectively provide information with respect to degradation of groundwater if based on a single detection of low mobility.

- **B-BHC** was detected in one surface soil sample. One sample was collected for the purpose of waste disposal. Because B-BHC was a pesticide used before the 1970s, it is unlikely to be present in the soil column and thus will not degrade the groundwater. During the FS the removal of contaminated surface soil will be evaluated. Given these facts no additional modeling is needed to assess degradation of groundwater.

The following five constituents exceeded the RBCs in the 216-A-19 Trench.

- **Nitrate and nitrate/nitrite** exceeded the RBCs and are evaluated as one constituent. Below 14.5 m (47.5 ft) bgs concentration decreases significantly from 9860 mg/kg to 3.2 mg/kg for nitrate as nitrogen and a similar amount for nitrate/nitrite. The partition coefficient is zero and previous modeling indicates that constituents with a coefficient of zero always reach groundwater (DOE/RL 2002-42 and DOE/RL-2003-11, *Remedial Investigation for the 200-CW-5 U Pond/ Z Ditches Cooling Water Group, the 200-CW-2 S Pond and Ditches Cooling Water Group, the 200-CW-4 T Pond and Ditches Cooling Water Group, and the 200-CS-1 Steam Condensate Group Operable Units*). Added site-specific modeling would not be useful beyond confirming what has been observed from modeling at other sites.

- **Bismuth** has no RBC, no Hanford Site background, and no Hanford Site-specific partition coefficient. A partition coefficient of 100 L/kg was available in the literature. Given the high K_d and lack of mobility to groundwater, no additional modeling is required.

- **Boron** was detected in 4 (3 samples and a field duplicate) of 11 samples. The four results were flagged as estimated because of elevated laboratory control recoveries. Thus, the results are biased high. Data from depths of 8.4 m (27.5 ft) bgs to groundwater are nondetects, with all except one of the nondetects being below the RBC. Additional modeling is not warranted.

- **Manganese** was detected in each of the 11 samples; however, only 1 sample exceeded the Hanford Site accepted background of 512 mg/kg. The partition coefficient for manganese is 50 L/kg, somewhat above the coefficient of 40 L/kg that is generally accepted as not reaching groundwater at the Hanford Site (PNNL-11800). Based on the single result slightly above background and the high coefficient, modeling will not provide additional information.

- **Uranium** was detected in 7 of 11 samples. Its partition coefficient is 0.6 L/kg. Uranium has been modeled using STOMP (DOE/RL-2002-42 and DOE/RL-2003-11). Modeling has shown that uranium reaches groundwater. No added modeling is required for this constituent.

The following four constituents exceed the groundwater RBCs at the 216-A-36B Crib.

- **Nitrate and nitrate/nitrite, nitrite, and uranium** all have partition coefficients of 0 L/kg to 0.6 L/kg. Previous modeling has shown that these constituents reach groundwater at the Hanford Site. Nitrates already are documented in the groundwater in this area. No additional modeling is required for these constituents.

- **Bismuth** has no RBC, no Hanford Site background, and no Hanford Site-specific partition coefficient. A partition coefficient of 100 L/kg was available in the literature. Given the high K_d and lack of mobility to groundwater, no additional modeling is required.

The following four constituents exceed the groundwater RBCs at the 216-A-37-1 Crib.

- **Nitrate and nitrate/nitrite** have partition coefficients of 0 (for nitrate). Previous modeling has indicated that constituents with a coefficient of 0 always reach groundwater (DOE/RL 2002-42 and DOE/RL-2003-11). No additional modeling is required for these constituents.

- **Aluminum** results are below background at 45.0 m (147.5 ft) bgs to groundwater. The partition coefficient is above the 40 L/kg that typically reaches groundwater. Based on this information, added modeling is not necessary.

- **Cobalt** has no RBC, however, the maximum result was just above background (15.9 L/kg versus 15.7 mg/kg) and the partition coefficient is well above the 40 L/kg that typically will move from the middle of the vadose zone to groundwater at the Hanford Site (PNNL-11800). No additional modeling is needed because the constituent has no RBC and will not move to groundwater.

- **Manganese** had 10 results; of these, three samples and a field duplicate exceed the background of 512 mg/kg at depths of 3.8 m, 22.1 m, and 29.7 m (12.5, 72.5, and 97.5 ft) bgs. The Background exceeds the RBC for groundwater. The partition coefficient is above 40 L/kg. Wells down gradient have shown low concentrations of manganese, however, this may be caused by the degradation of the well casings and screens (PNNL-14187). Based on this information, little will be gained by additional modeling.

- **Nitrate and nitrate/nitrite and uranium** exceed the groundwater RBCs at the 216-B-12 Crib. Both constituents have partition coefficients of 0 L/kg to 0.6 L/kg. Previous modeling has shown that these constituents reach groundwater at the Hanford Site. Nitrates already are documented in the groundwater in this area. No additional information will be gained by additional modeling.

5.4.2 Radioactive Constituents

Table 5-4 summarizes the radioactive constituents predicted to break through to groundwater as shown by the RESRAD modeling reported in Chapter 4.0.

RESRAD modeling for the 216-A-19 Trench indicates that no radionuclides would reach groundwater.

RESRAD modeling for the 207-A South Retention Basin and the 216-A-36B and 216-A-37-1 Cribs indicates that tritium breaks through to groundwater at the years listed in Table 5-4. These areas are within a tritium plume discussed in Chapter 3.0; therefore additional modeling will not provide further information of importance to decision making.

RESRAD modeling for the 216-A-10 Crib indicates that ^{129}I breaks through to groundwater. Current data on groundwater wells in the area indicate that concentrations are above the MCL, therefore additional modeling will not provide further information of importance to decision making.

RESRAD modeling for the 216-A-36B Crib indicates that ^{99}Tc will provide a dose of 15.3 mrem/yr 1,025 years from now. The technetium has a partition coefficient of 0 and, based on previous modeling, eventually would reach the groundwater. Technetium-99, its mobility in the vadose zone at the Hanford Site and its impact to the groundwater have been studied extensively. Site-specific modeling would not provide useful decision-making information.

For all sites in the 200-PW-2 and 200-PW-4 OUs for which radionuclides are predicted to break through to groundwater, no extraordinary characterization data were found for which site-specific modeling is justified. Tritium, ^{129}I and ^{99}Tc are all constituents known to be in the vadose zone at the Hanford Site. They have all been studied, monitored, and modeled extensively. No unusual concentrations, distributions, or geographic features have been found at the waste sites in this RI/FS that require further modeling.

Table 5-1. Hydrostratigraphic Layer Thickness and Associated Hydraulic Property Category.

Site	Layer Thickness (m)	Category
207-A South Retention Basin (Well 299-E25-33)*	10.5	S
	7.9	SSG
	5.4	SS
	37.5	S
	19.2	SG1
216-A-10 Crib	31.7	S
	50.9	SS
	10.7	GS
	4.0	SG1
216-A-19 Trench	11.0	S
	3.6	SS
	45.1	S
	18.5	SSG
216-A-36B Crib	7.9	SS
	21.7	S
	22.4	SS
	25.4	S
	20.3	GS
216-A-37-1 Crib	19.8	S
	16.6	SS
	12.4	S
	34.9	SSG
	0.9	SG1
216-B-12 Crib	8.8	SS
	2.2	SG2
	63.7	S
	18.6	SG2

*Hydrostratigraphic information was obtained from a nearby bore hole because it is unavailable at the site.

Hydraulic Property Categories (WHC-EP-0883, *Variability and Scaling of Hydraulic Properties for 200 Area Soils*)

SS=Sand mixed with finer fraction.
S=Sand.
SSG=Sand and gravel mixed with finer fraction.
GS=Gravelly sand.
SG1=Sandy gravel: gravel content < 60% by weight.
SG2=Sandy gravel: gravel content > 60% by weight.

Table 5-2. Distribution Coefficients for RESRAD Modeling for the 200-PW-2 and 200-PW-4 Sites.

Radionuclide	K_d[a] (L/kg)	Radionuclide	K_d[a] (L/kg)
Ac-227	100 (25)	Pu-238	80 (20)
Am-241	100 (25)	Pu-239/240	80 (20)
C-14	0.5 (0.1)	Ra-226	8 (10)
Co-60	1200	Ra-228	8
Cs-134	540	Sb-125[c]	45
Cs-137	540 (10)	Sr-90	8 (10)
H-3	0	Tc-99	0 (0.1)
Eu-154	100	Th-228	40 (30)
Eu-155	100 (25)	Th-229	40 (30)
I-129	0.3 (0.1)	Th-230	40 (3)
K-40[b]	5.5	Th-232	40
Nb-94	50	U-233	0.6 (20)
Ni-63	50 (10)	U-234	0.6 (20)
Np-237	10 (3)	U-235	0.6 (20)
Pa-231	10 (3)	U-236	0.6
Pb-210	2000 (25)	U-238	0.6 (20)

[a]First values listed pertain to Source Category F. Values in parentheses pertain to Source Category H in accordance with PNNL-11800, *Composite Analysis for Low-Level Waste Disposal in the 200 Area Plateau of the Hanford Site.*

[b]Source: BJC/OR-80, *Radiological Benchmarks for Screening Contaminants of Potential Concern for Effects on Aquatic Biota at Oak Ridge National Laboratory, Oak Ridge, Tennessee.*

[c]Source: EPA530-D-98-001B, *Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities*, Volume 2.

Table 5-3. Non-Radioactive Constituents Evaluated for Additional Modeling. (2 sheets)

Analyte	Kd (L/kg)	Depth of Max (ft bgs)	Max Conc. (mg/kg)	BKG (mg/kg)	GW RBCs (mg/kg)	No. of Detections	No. of Samples	Range of Detection Limits (mg/kg)	Range of Detections (mg//kg)
207-A South Retention Basin									
(none)									
216-A-10 Crib									
Methylene chloride	0.01	62.5	0.029	NA	0.025	10	13	.002-.660	0.006-0.029
TPH-diesel	NA	54	10,000	NA	2,000	1	14	.012-14,000	NR
pentachlorophenol	0.59	62.5	0.020	NA	0.012	1	14	0.3-200	NR
beta-1,2,3,4,5,6-hexachlorocyclohexane (Beta-BHC)	2.14	0.5	0.007	NA	0.002	1	1	NR	NR
216-A-19 Trench									
Nitrate as N	0	27.5	9860	12	40	11	11	NR	2.5-9860
Nitrate and nitrite as N	0	32.5	1120	NA	40	11	11	NR	2.0-1120
Bismuth[a]	100	97.5	36400	NA	NA	2	11	0.007-8.91	8.14-36400
Boron	0.19	14.5	39	NA	11.2	4	11	8.87-920	31-39
Manganese	50	17.5	538	512	50.2	11	11	NR	237-538
Total uranium	0.6	22.5	130	3.21	1.32	7	11	437-495	2.8-130
216-A-36B Crib									
Nitrate as N	0	53.50	289	12	40	13	13	NR	0.497-289
Nitrite as N	0	25.00	19	NA	4	1	13	0.074-1.77	NR
Nitrate and nitrite as N	0	53.50	287	NA	40	11	11	NR	2.7-287
Bismuth[a]	100	30	91	NA	NA	2	13	4.58-10.7	79.7-91.4
Total uranium	0.6	30	37	3.21	1.32	10	10	NR	0.395-36.8
216-A-37-1 Crib									
Nitrate as N	0	12.5	385	12	40	21	21	NR	1.02-385
Nitrate and nitrite as N	0	12.5	489	NA	40	11	11	NR	1.2-489

Table 5-3. Non-Radioactive Constituents Evaluated for Additional Modeling. (2 sheets)

Analyte	Kd (L/kg)	Depth of Max (ft bgs)	Max Conc. (mg/kg)	BKG (mg/kg)	GW RBCs (mg/kg)	No. of Detections	No. of Samples	Range of Detection Limits (mg/kg)	Range of Detections (mg//kg)
Aluminum	45	72.5	15000	11800	45	10	10	NR	6,390-15,000
Cobalt[b]	1200	72.5	15.9	15.7	NA	10	10	NR	6.33-15.9
Manganese	50	72.5	652	512	50.2	10	10	NR	287-652
216-B-12 Crib									
Nitrate as N	0	35.5	165	12	40	9	10	2.5	6.05-165
Nitrate and nitrite as N	0	50	126	NA	40	16	16	NR	1.0-126
Total uranium	0.6	35.5	28	3.21	1.32	10	10	NR	0.334-28.0

[a]Bismuth K_d from ANL/EAD-4, *User's Manual for RESRAD, Version 6*,.
[b]Cobalt K_d from PNL 11800, *Composite Analysis for Low-Level Waste Disposal in the 200 Area Plateau of the Hanford Site.*
NA=Not available.
NR=No range applies when all results are detections, or single detections.
TPH=Total petroleum hydrocarbons.

Table 5-4. Radioactive Constituents Evaluated for Additional Modeling.

Analyte	K_d (L/kg)	Depth of Max (ft. bgs)	Max Conc. (pCi/g)	Notes [a]	No. of Detections	No. of Samples	Range of Detection Limits (pCi/g)	Range of Detections (pCi/g)
207-A South Retention Basin								
Tritium	0	6-7	16.6	trace levels at 698 years	9	13	-0.034-0.205	0.295-16.60
216-A-10 Crib								
Iodine-129	0.3	62.5	38.8	2100 mrem/year at 1193 years	5	14	-1.760-1.520	3.410-38.80
				Tc-99, C-14, and tritium also reach GW between 1,000 and 1,100 years, resulting in doses of only a few millirems per year for each				
216-A-19 Trench								
none								
216-A-36B Crib								
Technetium-99	0	25	41.9	15.3 mrem/year at 1,025 years	1	12	-0.044-3.440	NR
				Tritium maximum dose of 2.2 mrem/year at year 0.				
216-A-37-1 Crib								
Tritium	0	47.5	267	0.0004 mrem/year at 168 years	11	11	NR	44.0-267
216-B-12 Crib								
Tritium	0	14.5	8.28	trace levels at 526 years	7	10	0.992-1.660	2.620-8.28

[a]Dose estimates based on 730 L/year ingestion of well water.
NR=no range applies when all results are detections, or single detections.
GW = groundwater.

6.0 CONCLUSIONS AND PATH FORWARD

The 200-PW-2 and 200-PW-4 OUs will be remediated under the CERCLA process. These OUs include RCRA past-practice waste sites and five RCRA TSD units; therefore, while the CERCLA process will be used to fulfill the RCRA corrective action requirements, additional documentation to support the *Hanford Facility RCRA Permit* (WA7890008967) will be required in accordance with the Implementation Plan (DOE/RL-98-28). Tasks to be completed following the RI include preparing an FS, a proposed plan and proposed permit modification, and a ROD and permit modification, as described in the Implementation Plan (DOE/RL-98-28).

6.1 CONCLUSIONS

The purpose of this RI Report was to determine if sufficient data have been collected to support risk assessment and remedial decision making, to estimate risks at the representative sites based on the data collected during the RI and other existing data, to determine the need to proceed with an FS, and to determine those constituents and site-specific considerations that need to be addressed in the FS. The first purpose was met; the data collected were of sufficient quantity and quality to both support the risk assessment activities and proceed to the FS to support evaluation of remedial alternatives and identify preferred remedial actions. The second purpose was achieved by estimating risk to human health (described in Chapter 4.0). A screening of potential ecological risk also is included in Chapter 4.0. These risk estimates indicate that an FS will be required to evaluate remedial alternatives. Those constituents and site-specific considerations that the FS needs to address are presented in Tables 6-1 and 6-2. Further ecological risk evaluation will be needed in the FS.

6.2 REMEDIAL INVESTIGATION REPORT SUMMARY

The RI was conducted according to the Work Plan (DOE-RL-2000-60). The data were evaluated against the DQOs identified in two DQO summary reports (BHI-01411 and CP-14176). Through a data quality assessment, the data were found to have met the DQOs established for this work. Contaminants were identified at the 216-A-10, 216-A-36B, 216-A-37-1, and 216-B-12 Cribs; 216-A-19 Trench; and 207-A South Retention Basin that may present a risk to human health and the environment. The data from these sites were used to estimate the risk, determine the need to proceed with an FS, and determine those constituents and site-specific considerations that need to be addressed in the FS. This RI Report also provides data to support the evaluation of alternatives in the FS with regard to meeting potential applicable or relevant and appropriate requirements and reducing risk.

The evaluation of the representative sites involved site characterization, refinement of the contaminant distribution and exposure models, a baseline risk evaluation, ecological risk screening, and fate and transport modeling. The data are considered sufficient for human health risk assessment and for remedial decision making.

6.2.1 Characterization

Borehole drilling and sampling, large-diameter push-hole (drive casing) installation, direct push sampling, and sampling and analysis of soils were used to characterize the 216-A-10, 216-A-36B, 216-A-37-1, and 216-B-12 Cribs; the 216-A-19 Trench; and the 207-A South Retention Basin representative sites. Data from these sites were collected during characterization efforts in FYs 2003 and 2004. Borehole geophysical surveys were performed at the 216-A-10, 216-A-36B, 216-A-37-1, and 216-B-12 Cribs and the 216-A-19 Trench. Because of the shallow depth, no geophysical surveys were performed at the 207-A-South Retention Basin. Borehole geophysical surveys from the 216-U-12 and from 216-U-8 Cribs were performed and compared to previous data.

Geophysical logging was used to augment data previously collected for the 216-U-8 and 216-U-12 Cribs. Other than this geophysical data, no additional data were collected at these sites during the RI because the DQO summary report (BHI-01411*)* indicates that the information collected before the RI was sufficient for remedial decision making.

6.2.1.1 Contaminant Distribution Models and Exposure Models

The conceptual contaminant distribution models and the conceptual exposure model developed in the Work Plan (DOE/RL 2000-60, Rev. 0) were revised based on the data obtained during the RI and other data-collection activities. The contaminant distribution models are presented in Chapter 3.0, but generally can be described as follows.

- Contamination associated with less mobile COCs, such as cesium, plutonium, and strontium, are detected in the highest concentrations near the bottom of waste sites.
- Contaminant concentrations generally decrease with depth below the waste site bottom.
- Most of the contamination remains high in the vadose zone above the water table.
- Highly mobile COCs, such as technetium, have passed through the vadose zone and are detected sporadically across the vadose zone in low concentrations.

The exposure pathway model for the OU is presented in Chapter 4.0 and generally is summarized as follows.

- Potentially contaminated media are shallow-zone soils, deep-zone soils, biota, and groundwater.
- Potential receptors are mainly current and future workers (based on the current land-use assumptions) and terrestrial biota.
- Exposure pathways are ingestion, dermal contact, inhalation, and exposure to external radiation.

The contaminant distribution models in this RI Report generally have changed very little from the models in the Work Plan (DOE/RL-2000-60) with respect to the distribution

of contamination. However, the models were updated to better depict the nature and vertical extent of contamination relative to the physical setting. The revised models identify specific contaminants present, contaminant concentrations, and the vertical extent of contamination relative to the water table.

The conceptual model contains the following media types: surface soils or shallow-zone soils from 0 m to 4.6 m (15 ft bgs), subsurface soils or deep-zone soils from 0 m to groundwater, groundwater, and biota. Based on current land-use assumptions, potential receptors are current workers, future workers, and terrestrial biota.

6.2.1.2 Contaminants of Concern and Site Risks

Contaminants of concern were identified by following a data evaluation process that is based on regulatory guidance and professional judgment. Nonradioactive constituents analyzed in the RI were screened based on detection (constituents with no detections were eliminated), comparison to background, and comparison to regulatory requirements. Estimates for cancer risk and HQ/hazard index (HI) also were generated. Radiological constituents were screened based on detection and background. Radiological dose and cancer risk to receptors were evaluated using RESRAD. The COCs, relative risks, and radiological dose rates for each waste site are summarized in Table 6-1. Table 6-1 identifies those COCs that, based on the results of the data evaluation, must be considered for remedial action in the FS. Table 6-2 identifies those COCs that were consistently identified in the 200-PW-2 and 200-PW-4 OUs and that are the most likely contaminants for future sampling efforts (i.e., confirmatory sampling, design sampling, verification sampling).

6.2.2 Ecological Screening

Constituents in this report were compared to ecological soil screening indicators in WAC-173-340-900, Table 749-3, and DOE-STD-1153-2002. The ecological COCs that will be carried forward to the FS for further ecological risk evaluation are identified in Table 6-1.

6.2.3 Fate and Transport Modeling and Evaluation

The initial screening of the nonradioactive contaminants was performed by comparing the analysis results to the RBC based on WAC 173-340-720. For radionuclides, specific site contaminants were selected based on the results of transport screening analyses performed using RESRAD modeling (ANL/EAD-4) and regulatory considerations. A second evaluation was performed to assess whether additional modeling was required. This included evaluation of the partition coefficients, frequency of detection, location of any single detects in the soil column, and whether the constituent already has reached groundwater. Based on this evaluation, sufficient data already existed to assess the fate and transport.

The results of the fate and transport modeling and added evaluation indicate that most contaminants of concern are effectively attenuated in the vadose zone and do not pose a substantial threat to future groundwater quality during the 1,000-year simulation.

Contaminants that affect groundwater in the future in significant concentrations are ^{99}Tc, nitrate, nitrite, uranium, tritium, ^{129}I, and ^{99}Tc. Tritium is the only contaminant that is predicted to reach groundwater within the 1,000 years. Short-lived radionuclides, such as ^{137}Cs and ^{90}Sr, were shown to decay long before reaching groundwater.

6.3 PATH FORWARD

6.3.1 Feasibility Study

The FS will follow CERCLA guidance and the strategy in the Implementation Plan (DOE/RL-98-28). Although some refinement is expected during the FS, Appendix D of the Implementation Plan fulfills many of the requirements for the screening phase (steps 1 through 6) of the FS process. The potential ARARs, preliminary RAOs, preliminary remediation goals (PRG), general response actions, and the screening-level analysis of alternatives are identified in the 200 Areas Implementation Plan (DOE/RL-98-28). The information is not repeated here, but is incorporated by this reference into the RI. As a result of the work completed in the Implementation Plan (DOE/RL-98-28), the FS report will focus on the final phase of the FS, which consists of refining and analyzing in detail a limited number of alternatives identified in the screening phase. General response actions considered applicable to the 200-PW-2 and 200-PW-4 OUs are as follows:

- No action
- Institutional controls and monitored natural attenuation
- Engineered surface barriers
- Excavation and disposal with or without ex situ treatment
- In situ grouting or stabilization
- In situ vitrification.

One additional alternative (excavation, ex situ treatment, and geologic disposal of transuranic waste) was identified in the Implementation Plan (DOE/RL-98-28) because of the potential for these OUs to contain transuranic waste. Transuranic waste is defined as waste containing more than 100 nCi of alpha-emitting isotopes with an atomic number greater than 92 and a half life greater than 20 years per gram of waste. Summing the transuranic radionuclides in one sample of waste from the 216-A-36 Crib indicated that 143 nCi/g were detected. No other samples exceeded the transuranic waste limit of 100 nCi/g.

An initial activity of the FS will be the detailed evaluation of available information for the analogous waste sites in the OUs. Data will be compiled to evaluate the applicability of the contaminant distribution models and relative risks developed in the RI Report for the representative sites to the analogous sites. Sites that are determined not to be analogous to the representative sites will be evaluated against representative sites from other OUs. Based on the specific characteristics, the waste site may be reassigned to a more appropriate OU or maintained in the current OU with a requirement for confirmatory sampling. Changes to the preferred alternative would be evaluated as needed based on confirmatory data. The sites that are determined to be analogous to one or more of the representative sites will be evaluated for

appropriate remedial measures through the FS process. Additional data needs may be identified during the FS process and during the DQO to support the confirmatory sampling for these analogous sites.

6.3.2 Further Ecological Evaluations

Ecological risk will be evaluated using the EPA eight-step process as outlined in DOE/RL-2001-54. DOE/RL-2001-54 serves as the screening-level assessment for the Central Plateau. For the 200-PW-2, and 200-PW-4 OUs, an OU-specific screening has been conducted and the results are included in this RI Report.

DOE/RL-2001-54 is a foundation for the Central Plateau ecological evaluation DQO process to be conducted in FYs 2003 and 2004. This DQO process will further develop data gaps identified in DOE/RL-2001-54 and identify data needs for the Central Plateau to support remedial decision making. An ecological evaluation sampling and analysis plan will be prepared and implemented for the Central Plateau, either on an area-wide basis or by OU, depending on the actual data needs.

Based on the results of the DQO and the screening-level evaluation, additional risk assessment activities, including a baseline ecological risk assessment, may be conducted using the eight-step process. The evaluation will be conducted based on soil data collected during the RI, existing soil and ecological data, and, if identified during the Central Plateau ecological evaluation DQO, newly collected ecological data collected through a separate ecological evaluation SAP. The evaluation may be conducted on an OU-specific basis as part of the FS or on a Central Plateau basis, which would be reported in a separate report. This decision will be made through the DQO process.

6.3.3 Proposed Plan and Proposed RCRA Permit Modification

The decision-making process for the waste sites in the 200-PW-2, and 200-PW-4 OUs will be based on the use of a proposed plan and a ROD. The proposed plan will include a draft permit modification with unit-specific permit conditions for the RPP sites. A modification to the *Hanford Facility RCRA Permit* (WA7890008967) will be used to incorporate the decision in the permit for these sites. During the RI/FS process, a number of options for developing proposed plans and RODs will be evaluated. Remedial decisions may proceed on an OU-by-OU basis, but alternative site groupings may be considered for waste sites in the Central Plateau. Several alternatives currently are under consideration, some of which may be used for the waste sites addressed in this RI Report.

Three alternatives to the OU-by-OU remediation approach have been identified to provide flexibility in the decision-making process, facilitate early action, and remediate and close specific areas or zones. Examples of these alternatives are as follows.

High-Risk Waste Sites Identified for Early Action

This alternative accelerates the start of remedial actions and closure of waste sites that present an ongoing or expected future threat to groundwater. Some high-risk sites already have been identified for early actions in the B/C cribs and trenches are and near U Plant, PUREX, and PFP.

Regional Site Closure

Waste site remedial decision-making may be realigned under a regional closure strategy that aligns waste sites into groups defined by geographical zones. For example, several waste sites in the 200-PW-2 and 200-PW-4 OUs are in the U Plant Area (See Section 1.0) and would be considered for inclusion in a U Plant area closure via proposed plans and RODs.

Waste Site Grouping by Characteristics or Hazards

A third example of remedial decision-making strategies would be based on a specific characteristic or hazard that mandates additional requirements, such as supplemental ARARs, or more robust remedial alternatives. For example other OUs contain a number of waste sites that are suspected to contain concentrations of transuranic radionuclides in excess of the 100 nCi/g concentration limit for designation as TRU[1] waste. Waste sites containing concentrations of TRU radionuclides above 100 nCi/g may require selective removal actions or more protective barrier designs to prevent intrusion based on this particular hazard. Such alternatives might not be required for other process condensate or process waste sites within 200-PW-2 or 200-PW-4 OUs where only low levels of radionuclides are present. Grouping waste sites with other similarly contaminated soil sites in other OUs could streamline the decision-making process and tailor the requirements and alternatives to these specific hazards.

Following the completion of the FS and closure plan, a proposed plan will be prepared that identifies the preferred remedial alternative for the OUs (which will include RCRA closure and corrective-action requirements). In addition to identifying the preferred alternative, the proposed plan will serve the following purposes:

- Provide a summary of the completed RI/FS
- Provide criteria by which analogous waste sites within the OUs not previously characterized will be evaluated after the ROD is issued to confirm that the contaminant distribution model for the site is consistent with the preferred alternative. Contingencies to move a waste site to a more appropriate waste group also will be developed.
- Identify performance standards and ARARs applicable to the OUs.

The proposed plan also will include a draft permit modification with unit-specific permit conditions for RPPs and the RCRA TSD units for incorporation into the *Hanford Facility RCRA Permit* (WA7890008967). After the public review process is complete, Ecology (as the lead

[1] Waste materials contaminated with 100 nCi/g of transuranic materials having half-lives longer than 20 years.

regulatory agency), in concert with DOE and EPA, will make a final decision on the remedial action to be taken, which is documented in a ROD. The Hanford Facility RCRA Permit subsequently will be modified by Ecology to incorporate the ROD (and subsequent amendments) by reference, authorizing the RCRA actions. If alternative decision-making strategies are employed, lead agency realignments may be considered in consultations between EPA and Ecology.

Because the 200 Areas are composed of CERCLA past-practice, RPP, and TSD sites, the Tri-Parties have committed that the cleanup strategies will be integrated to the maximum extent possible. This is consistent with specific recommendations for integration in the Tri-Party Agreement (Ecology et al. 1989) and Section 2.4 of the Implementation Plan (DOE.RL-98-28), and can be accommodated under the *Hanford Facility RCRA Permit* (WA7890008967).

6.4 POST-RECORD OF DECISION ACTIVITIES AND ANALOGOUS SITE APPROACH

The ROD for these OUs will cover all the sites in the OUs, not just the representative sites characterized under the RI. This analogous site approach is described in more detail in the Implementation Plan (DOE/RL-98-28). The basic approach is that the representative sites contain types, concentrations, and distributions of contaminants similar to those at the other sites in the OU because the sites are grouped on the basis of similar site histories and processes. The sites, therefore, share similar risks and a similar need for remedial action. The data collected for the representative sites will be considered to be analogous to the remaining sites (Section 1.3.5).

After the ROD has been issued, a remedial design report and remedial action work plan will be prepared to detail the scope of the remedial action. As part of this activity, DQOs will be established and sampling and analysis plans will be prepared to direct confirmatory and/or remedial design and verification sampling and analysis efforts. Before starting remediation, confirmation and/or remedial design sampling will be performed to ensure that sufficient characterization data are available to confirm that the selected remedy is appropriate for the waste sites covered by the ROD, to collect data necessary for the remedial design, and to support the final cumulative risk assessment for the entire 200 Area National Priorities List (CERCLA) Site. Verification sampling will be performed after the remedial action is complete to determine if ROD requirements have been met and if the remedy was protective of human health and the environment. Additional guidance for confirmatory and verification sampling is provided in Section 6.2 of DOE/RL-98-28.

The remedial design report/remedial action work plan will include an integrated schedule of remediation activities for waste sites and releases covered by the ROD or RODs. The available options for remedy implementation throughout the 200 Area will be explored during the course of the RI/FS process and may be reflected in the remedial action work plan. Following the completion of the remediation effort, closeout activities will be performed as discussed in Section 2.4 of DOE/RL-98-28.

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Table 6-1. Contaminants of Concern, Risk, and Dose Summary.

Site	Nonradiological			Radiological[a]						
	Total Excess Lifetime Cancer Risk from Shallow Nonradiological COCs	Nonradiological Exceeding GWP Soil RBC [e]	Nonradiological COCs Exceeding Ecological Screening Levels (WAC 173-340, Table 749-3)	Total Maximum Excess Lifetime Cancer Risk from Radiological COCs	Total Maximum Dose Rate/Time	Primary Risk Contributor	Primary Dose Contributor	Total Excess Lifetime Cancer Risk Drinking Water	Total Maximum Dose Rate for groundwater @ years[c]	Radiological COCs Exceeding Ecological Screening Levels
207-A-South Retention Basin	$<1 \times 10^{-5}$	2,4-dichlorophenoxy-acetic acid [e] 2-(2,4,5-trichlorphenoxy) propionic acid [e]	Silver 2,4-dichlorophenoxyacetic acid[f] 2-(2,4,5-trichlorphenoxy) propionic acid[f]	3E-05	1.5 mrem/yr @ 1,000 years for cover scenario.	Radium-226	Radium-226	4E-24	5.8E-19 mrem/yr @ 698 years Tritium	Actinium-228 Bismuth-212 Bismuth-214 Lead-212 Lead-214 Niobium-94 Thallium-208 Thorium-230 Thorium-234
				4E-05	2.2 mrem/yr @ 0 years for no-cover scenario.	Radium-226	Radium-226			
216-A-10 Crib	$<1 \times 10^{-5}$	Methylene chloride TPH-diesel Pentachlorophenol B-BHC 1-chloropropane [e] 2-butoxyethanol [e] tributyl phosphate [e]	Boron B-BHC[f]	9E-05 for cover scenario.	5.0 mrem/yr @ 0 years for cover scenario.	Potassium-40	Potassium-40	3E-02	2.1E03 mrem/yr @ 1193 years Iodine-129	Neptunium-237 Potassium-40
				b	b					
216-A-19 Trench	$<1 \times 10^{-5}$	Nitrate Nitrate/Nitrite Bismuth [e] Boron Manganese Total uranium tributyl phosphate [e]	Boron Thorium[f] Vanadium bis(2-ethylhexyl) phthalate[f] tributyl phosphate[f]	8E-28	3.5E-23 mrem/yr @ 1,000 years for cover scenario.	Uranium-234	Uranium-234	None	None	Actinium-228 Bismuth-212 Bismuth-214 Lead-212 Lead-214 Nickel-63 Thallium-208 Thorium-234
				2E-05	1.4 mrem/yr @ 0 years for no-cover scenario.	Uranium-238	Uranium-238			

Table 6-1. Contaminants of Concern, Risk, and Dose Summary.

Site	Nonradiological			Radiological[a]						
	Total Excess Lifetime Cancer Risk from Shallow Nonradio-logical COCs	Nonradiological Exceeding GWP Soil RBC [e]	Nonradiological COCs Exceeding Ecological Screening Levels (WAC 173-340, Table 749-3)	Total Maximum Excess Lifetime Cancer Risk from Radiological COCs	Total Maximum Dose Rate/Time	Primary Risk Contributor	Primary Dose Contributor	Total Excess Lifetime Cancer Risk Drinking Water	Total Maximum Dose Rate for Groundwater @ Years[c]	Radiological COCs Exceeding Ecological Screening Levels
216-A-36B Crib	$<1 \times 10^{-5}$	Nitrate Nitrite Nitrate/nitrite Bismuth [e] Total uranium Isophorone [e]	Silver Thorium[f]	d	d	d	d	6E-04	15.3 mrem/yr @ 1,025 years Technetium-99	Actinium-228 Bismuth-212 Bismuth-214 Lead-212 Lead-214 Thallium-208
216-B-12 Crib	$<1 \times 10^{-5}$	Nitrate Nitrate/nitrite Total uranium tributyl phosphate [e]	Boron bis(2-ethylhexyl) phthalate[f]	1E-05	7.9E-01 mrem/yr @ 1,000 years for cover scenario.	Thorium-230	Thorium-230	7E-19	2.8E-14 mrem/yr @ 526 years Tritium	Thorium-230 Tin-126
				b	b					
216-37-1 Crib	$<1 \times 10^{-5}$	Nitrate Nitrate/nitrite Aluminum Cobalt [e] Manganese Thallium tributyl phosphate [e]	Barium Boron Thorium[f] Acetone[f] bis(2-ethylhexyl) phthalate[f]	2E-24 for cover scenario	1.1E-19 mrem/yr @ 0 year for cover scenario.	Cesium-137	Cesium-137	9E-09	3.9E-04mrem/yr @ 168 years Tritium	Actinium-228 Bismuth-212 Bismuth-214 Lead-212 Lead-214 Thallium-208
				5E-07 for no-cover scenario.	1.8E-02 mrem/yr @ 0 year for no-cover scenario.	Tritium	Cesium-137			

[a]No cover = contaminated zone from 0 to 15 ft bgs with no cover; clean cover above contaminated zone = 0.3 ft at the 207 A South Basin, 4.3 ft at 216-A-19 Trench, 0 ft at 216-A-36B Crib, 2.4 ft at 216-37-1 Crib.

[b]An exception to the general protocol for evaluating radionuclides in the shallow-zone soil layer was made for the 216-A-10 Crib and the 216-B-12 Crib. At these sites, the depth of cover is approximately 9 m (30 ft). Because the depth of cover was so great, removal of the cover to create a "no cover" scenario was judged to be implausible. However, unlike the other sites evaluated in the RI Report, analytical data were obtained from samples of the cover material. Low concentrations of some radionuclides were measured in these samples. Because these data were available, potential exposure to radionuclides in the existing cover was evaluated under an industrial scenario at these sites. An evaluation of surface exposure to buried contamination with the existing cover in place was not conducted at these sites because the depth of cover was considerably greater than 4.6 m (15 ft).

[c]RESRAD Code defines "cover" as any material above the source term. For groundwater, actual conditions/concentrations were used for the material above the source term.

[d]All data were either non-detects or below background in the 0-15ft zone, therefore no modeling was required.

[e]Organics and metals without a RBC.

[f]Organics and metals without values provided in WAC 173-340, Table 749-3.

WAC 173-340, "Model Toxics Control Act – Cleanup," *Washington Administrative Code*, as amended.

Bgs	=	Below ground surface.	COC	=	Contaminant of concern.	GWP	=	Groundwater protection.
RBC	=	Risk-based concentration.	WAC	=	*Washington Administrative Code*			

Table 6-2. Preliminary List of Contaminants for Confirmatory Sampling Phase at the 200-PW-2 and 200-PW-4 Operable Units.

Radioactive Constituents	
Actinium-228	Potassium-40
Bismuth-212	Radium-226
Bismuth-214	Technetium-99
Cesium-137	Thallium-208
Iodine-129	Thorium-230
Lead-212	Thorium-234
Lead-214	Tin-126
Neptunium-237	Tritium
Niobium-94	Uranium-234
Nickel-63	Uranium-238
Nonradioactive Constituents with RBCs	**Nonradioactive Constituents without Groundwater RBCs**
Acetone	1-chloropropane
Aluminum	2-(2,4,5-trichlorphenoxy) propionic acid
Barium	2,4-dichlorophenoxyacetic acid
B-BHC	2-butoxyethanol
Bis-2-ethylhexylphthalate	Bismuth
Boron	Cobalt
Manganese	Isophorone
Methylene chloride	Tributyl phosphate
Nitrate	
Nitrite	
Pentachlorophenol	
TPH-diesel	
Silver	
Thalium	
Thorium	
Uranium	
Vanadium	

RBC – Risk Based Concentration

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7.0 REFERENCES

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APPENDIX A

FREQUENCY OF DETECTION AND DATA SUMMARY TABLES

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CONTENTS

Table A-1. Data Summary Table—Shallow Zone A-3

Table A-2. Data Summary Table—Deep Zone A-40

APPENDIX A

FREQUENCY OF DETECTION AND DATA SUMMARY TABLES

Tables A-1 and A-2 are summaries of laboratory data collected for the remedial investigation. The tables are arranged in two sets. One set is for shallow-zone soils, consisting of analysis results for samples taken from the surface to 4.6 m (15 ft) below ground surface (bgs). The second set is for deep-zone soils, consisting of analysis results for samples taken from the surface to the full depth of the borehole, which varies among the waste sites.

Samples were included in the shallow-zone soil table (Table A-1) if any part of the depth interval at which the sample was taken was at or above the 4.6 m (15-ft) bgs level.

The tables include the constituent, constituent class, reporting units, number of samples, number of detects, and frequency of detects. The minimum and maximum reported detection or activity levels also are given if available, as are the minimum and maximum reported results, if any. The exposure point concentration also is indicated on the table, as is the depth at which the maximum concentration occurred.

The 207-A South Retention Basin data for concrete and soil borings were compiled separately in these tables because direct comparisons between the two types of data would not be meaningful. Data summary tables were not prepared for the residual runoff samples from the 207-A South Retention Basins because too few samples were taken to make minimum and maximum a meaningful indicator. Concrete and residual runoff samples, in any event, were intended as information for waste disposition.

Table A-1. Data Summary Table -- Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
207-A Retention Basin Soil Borings											
Actinium-228	RAD	pCi/g	13	13	100%			0.451	1.10	1.10	6-7 bgs
Americium-241	RAD	pCi/g	13	8	62%	0.011	0.022	0.019	0.049	0.049	1-2 bgs
Antimony-125	RAD	pCi/g	13	0	0%	-0.042	0.03		--	--	
Bismuth-212	RAD	pCi/g	13	13	100%			0.222	0.698	0.698	6-7 bgs
Bismuth-214	RAD	pCi/g	13	13	100%			0.290	0.859	0.859	6-7 bgs
Carbon-14	RAD	pCi/g	13	0	0%	-1.06	1.22		--	--	
Cerium-144	RAD	pCi/g	13	0	0%	-0.063	0.034		--	--	
Cesium-134	RAD	pCi/g	13	0	0%	0.008	0.072		--	--	
Cesium-137	RAD	pCi/g	13	9	69%	-0.014	0.017	0.019	1.07	1.07	1-2 bgs
Cobalt-60	RAD	pCi/g	13	0	0%	-0.008	0.009		--	--	
Europium-152	RAD	pCi/g	13	0	0%	-0.045	0.016		--	--	
Europium-154	RAD	pCi/g	13	0	0%	-0.074	0.041		--	--	
Europium-155	RAD	pCi/g	13	1	8%	-0.009	0.059	0.077	0.077	0.077	1-2 bgs
Iodine-129	RAD	pCi/g	13	0	0%	-5.00	0.513		--	--	
Lead-212	RAD	pCi/g	13	13	100%			0.470	1.18	1.18	6-7 bgs
Lead-214	RAD	pCi/g	13	13	100%			0.350	0.971	0.971	6-7 bgs
Neptunium-237	RAD	pCi/g	13	0	0%	-0.037	0.074		--	--	
Nickel-63	RAD	pCi/g	13	0	0%	-1.92	0.959		--	--	
Niobium-94	RAD	pCi/g	13	1	8%	0	0.008	0.032	0.032	0.032	2-3 bgs
Plutonium-238	RAD	pCi/g	13	0	0%	-0.021	0.024		--	--	
Plutonium-239/240	RAD	pCi/g	13	1	8%	0.002	0.012	0.012	0.012	0.012	6-7 bgs
Radium-226	RAD	pCi/g	13	13	100%			0.290	0.859	0.859	6-7 bgs
Radium-228	RAD	pCi/g	13	13	100%			0.451	1.10	1.10	6-7 bgs
Ruthenium-103	RAD	pCi/g	13	0	0%	-0.019	0.008		--	--	
Ruthenium-106	RAD	pCi/g	13	0	0%	-0.061	0.072		--	--	
Technetium-99	RAD	pCi/g	13	0	0%	-0.006	0.124		--	--	
Thallium-208	RAD	pCi/g	13	13	100%			0.127	0.358	0.358	6-7 bgs
Thorium-228	RAD	pCi/g	13	13	100%			0.120	0.737	0.737	12.5-13.5 bgs
Thorium-230	RAD	pCi/g	13	11	85%	0.225	0.28	0.252	1.26	1.26	1-2 bgs
Thorium-232	RAD	pCi/g	13	12	92%	0.18	0.18	0.327	0.722	0.722	1-2 bgs
Thorium-234	RAD	pCi/g	13	7	54%	0.258	0.908	0.734	3.16	3.16	2-3 bgs
Tin-113	RAD	pCi/g	13	0	0%	-0.01	0.015		--	--	
Tin-126	RAD	pCi/g	13	0	0%	0.079	0.283		--	--	
Total Radioactive Strontium	RAD	pCi/g	13	7	54%	-0.088	0.067	0.446	1.40	1.40	1-2 bgs
Tritium	RAD	pCi/g	13	9	69%	-0.034	0.205	0.295	16.60	16.60	6-7 bgs
Uranium (mg/kg)	METAL	mg/kg	13	2	15%	0.890	0.991	1.02	1.04	1.04	6-7 bgs
Uranium-233/234	RAD	pCi/g	13	13	100%			0.094	0.240	0.240	6-7 bgs
Uranium-235	RAD	pCi/g	13	12	92%	0.011	0.011	0.008	0.026	0.026	2-3 bgs
Uranium-238	RAD	pCi/g	13	13	100%			0.100	0.270	0.270	6-7 bgs
Zinc-65	RAD	pCi/g	13	0	0%	-0.05	0.072		--	--	
Antimony	METAL	mg/kg	13	0	0%	4.45	4.99		--	--	
Arsenic	METAL	mg/kg	13	10	77%	2.91	2.96	3.88	9.98	9.98	6-7 bgs
Barium	METAL	mg/kg	13	5	38%	1.78	1.98	15.7	65.5	65.5	6-7 bgs
Beryllium	METAL	mg/kg	13	0	0%	2.67	2.99		--	--	
Bismuth	METAL	mg/kg	13	0	0%	4.92	5.00		--	--	

Table A-1. Data Summary Table -- Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Boron	METAL	mg/kg	13	0	0%	5.01	5.10		--	--	
Cadmium	METAL	mg/kg	13	0	0%	0.89	0.998		--	--	
Chromium (Total)	METAL	mg/kg	13	3	23%	2.67	2.97	7.20	15.5	15.5	6-7 bgs
Copper	METAL	mg/kg	13	13	100%			8.40	11.0	11.0	6-7 bgs
Hexavalent Chromium	METAL	mg/kg	13	0	0%	0.410	0.450		--	--	
Lead	METAL	mg/kg	13	0	0%	10.7	12.0		--	--	
Mercury	METAL	mg/kg	13	0	0%	0.890	0.998		--	--	
Nickel	METAL	mg/kg	13	3	23%	4.45	6.50	5.26	9.80	9.80	6-7 bgs
Selenium	METAL	mg/kg	13	0	0%	2.67	2.99		--	--	
Silver	METAL	mg/kg	13	2	15%	1.78	2.00	2.04	5.01	5.01	6-7 bgs
Ammonium ion as N	CONV	mg/kg	13	3	23%	0.200	0.200	0.222	0.248	0.248	1-2 bgs
Chloride	CONV	mg/kg	13	13	100%			0.858	7.56	7.56	12.5-13.5 bgs
Cyanide	CONV	mg/kg	13	0	0%	0.200	0.200		--	--	
Fluoride	CONV	mg/kg	13	0	0%	0.350	0.350		--	--	
Nitrate as N	CONV	mg/kg	13	11	85%	0.250	0.250	0.581	21.8	21.8	2-3 bgs
Nitrite as N	CONV	mg/kg	13	0	0%	0.450	0.450		--	--	
Nitrate and nitrate/nitrite as N	CONV	mg/kg	13	13	100%			0.530	20.9	20.9	2-3 bgs
Phosphate	CONV	mg/kg	13	0	0%	0.650	0.650		--	--	
Sulfate	CONV	mg/kg	13	11	85%	1.20	1.20	5.84	53.0	53.0	12.5-13.5 bgs
% moisture (dry)	CONV	%	3	3	100%			3.2%	12.5%	12.5%	7-8 bgs
% moisture (wet)	CONV	%	3	3	100%			3.3%	14.2%	14.2%	7-8 bgs
% Solids	CONV	%	3	3	100%			87.5%	96.8%	96.8%	12.5-13.5 bgs
pH	CONV	pH	13	13	100%			8.39	9.52	9.52	6-7 bgs
Oil & grease	CONV	ug/kg	13	0	0%	680,000	748,000		--	--	
Diethyl ether	VOA	ug/kg	13	0	0%	5,000	5,000		--	--	
Ethylene glycol	VOA	ug/kg	13	0	0%	5,000	5,000		--	--	
Methanol	VOA	ug/kg	13	0	0%	1,000	1,000		--	--	
dichlorodiphenyldichloroethane	PEST	ug/kg	6	0	0%	3.50	3.70		--	--	
dichlorodiphenyldichloroethylene	PEST	ug/kg	6	0	0%	3.50	3.70		--	--	
dichlorodiphenyltrichloroethane	PEST	ug/kg	6	0	0%	3.50	3.70		--	--	
2,4,5-trichlorophenoxyacetic acid	HERB	ug/kg	6	0	0%	18	19		--	--	
2,4-dichlorophenoxyacetic acid	HERB	ug/kg	6	1	17%	35	37	7.10	7.10	7.10	1-2 bgs
2-(2,4,5-trichlorophenoxy)propionic acid	HERB	ug/kg	6	1	17%	18	19	3.30	3.30	3.30	1-2 bgs
2-secButyl-4,6-dinitrophenol (DNBP)	HERB	ug/kg	6	0	0%	18	19		--	--	
4-(2,4-Dichlorophenoxy)butanoic acid	HERB	ug/kg	6	0	0%	180	190		--	--	
Aldrin	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
Alpha-BHC	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
alpha-Chlordane	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
beta-1,2,3,4,5,6-hexachlorocyclohexane	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
Delta-BHC	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
dieldrin	PEST	ug/kg	6	0	0%	3.50	3.70		--	--	
Endosulfan I	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
Endosulfan II	PEST	ug/kg	6	0	0%	3.50	3.70		--	--	
Endosulfan sulfate	PEST	ug/kg	6	0	0%	3.50	3.70		--	--	
Endrin	PEST	ug/kg	6	0	0%	3.50	3.70		--	--	
Endrin aldehyde	PEST	ug/kg	6	0	0%	3.50	3.70		--	--	

Table A-1. Data Summary Table -- Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Endrin ketone	PEST	ug/kg	6	0	0%	3.50	3.70		--	--	
Gamma-BHC (Lindane)	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
gamma-Chlordane	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
Heptachlor	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
Heptachlor epoxide	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
Methoxychlor	PEST	ug/kg	6	0	0%	18.0	19.0		--	--	
Toxaphene	PEST	ug/kg	6	0	0%	180	190		--	--	
Dalapon	HERB	ug/kg	6	0	0%	180	190		--	--	
Dicamba	HERB	ug/kg	6	0	0%	70.0	75.0		--	--	
Dichloroprop	HERB	ug/kg	6	0	0%	180	190		--	--	
1,1,1-Trichloroethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
1,1,2,2-Tetrachloroethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
1,1,2-Trichloroethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
1,1-Dichloroethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
1,1-Dichloroethene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
1,2-Dichloroethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
1,2-Dichloroethene (Total)	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
1,2-Dichloropropane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
1-butanol	VOA	ug/kg	13	0	0%	41.0	45.0		--	--	
2-Butanone	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
2-Hexanone	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
2-Pentanone	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
4-Methyl-2-Pentanone	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Acetone	VOA	ug/kg	13	1	8%	2.00	2.20	26.0	26.0	26.0	1-2 bgs
Benzene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Bromodichloromethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Bromoform	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Bromomethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Carbon disulfide	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Carbon tetrachloride	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Chlorobenzene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Chloroethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Chloroform	VOA	ug/kg	13	1	8%	2.00	2.20	5.00	5.00	5.00	1-2 bgs
Chloromethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
cis-1,3-Dichloropropene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Dibromochloromethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Ethylbenzene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Methylene chloride	VOA	ug/kg	13	1	8%	2.00	2.20	5.00	5.00	5.00	1-2 bgs
n-Butylbenzene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Styrene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Tetrachloroethene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Toluene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
trans-1,3-Dichloropropene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Trichloroethene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Vinyl chloride	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Xylenes (total)	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	

Table A-1. Data Summary Table -- Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
1,2,4-Trichlorobenzene	SVOA	ug/kg	13	0	0%	300	320		--	--	
1,2-Dichlorobenzene	SVOA	ug/kg	13	0	0%	370	400		--	--	
1,3-Dichlorobenzene	SVOA	ug/kg	13	0	0%	330	350		--	--	
1,4-Dichlorobenzene	SVOA	ug/kg	13	0	0%	320	350		--	--	
2,4,5-Trichlorophenol	SVOA	ug/kg	13	0	0%	75.0	81.0		--	--	
2,4,6-Trichlorophenol	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
2,4-Dichlorophenol	SVOA	ug/kg	13	0	0%	82.0	88.0		--	--	
2,4-Dimethylphenol	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
2,4-Dinitrophenol	SVOA	ug/kg	13	0	0%	680	740		--	--	
2,4-Dinitrotoluene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
2,6-Dinitrotoluene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
2-Butoxyethanol	SVOA	ug/kg	13	0	0%	100	110		--	--	
2-Chloronapthalene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
2-Chlorophenol	SVOA	ug/kg	13	0	0%	150	160		--	--	
2-Methylnapthalene	SVOA	ug/kg	13	0	0%	180	200		--	--	
2-Methylphenol (cresol, o-)	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
2-Nitroaniline	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
2-Nitrophenol	SVOA	ug/kg	13	0	0%	180	190		--	--	
3,3'-Dichlorobenzidine	SVOA	ug/kg	13	0	0%	82.0	88.0		--	--	
3+4 Methylphenol (cresol m+p)	SVOA	ug/kg	13	0	0%	120	120		--	--	
3-Nitroaniline	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
4,6-Dinitro-2-methylphenol	SVOA	ug/kg	13	0	0%	680	740		--	--	
4-Bromophenylphenylether	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
4-Chloro-3-methylphenol	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
4-Chloroaniline	SVOA	ug/kg	13	0	0%	95.0	100		--	--	
4-Chlorophenylphenyl ether	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
4-Nitroaniline	SVOA	ug/kg	13	0	0%	250	270		--	--	
4-Nitrophenol	SVOA	ug/kg	13	0	0%	660	710		--	--	
Acenaphthene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Acenaphthylene	SVOA	ug/kg	13	0	0%	82.0	88.0		--	--	
Anthracene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Benzo(a)anthracene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Benzo(a)pyrene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Benzo(b)fluoranthene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Benzo(ghi)perylene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Benzo(k)fluoranthene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Benzyl alcohol	SVOA	ug/kg	13	0	0%	75.0	81.0		--	--	
Bis(2-chloro-1-methylethyl)ether	SVOA	ug/kg	13	0	0%	260	280		--	--	
Bis(2-Chloroethoxy)methane	SVOA	ug/kg	13	0	0%	120	120		--	--	
Bis(2-chloroethyl) ether	SVOA	ug/kg	13	0	0%	250	270		--	--	
Bis(2-ethylhexyl)phthalate	SVOA	ug/kg	13	0	0%	570	620		--	--	
Butylbenzylphthalate	SVOA	ug/kg	13	1	8%	68.00	74.00	110	110	110	1-2 bgs
Carbazole	SVOA	ug/kg	13	0	0%	82.00	88.00		--	--	
Chrysene	SVOA	ug/kg	13	0	0%	68.00	74.00		--	--	
Di-n-butylphthalate	SVOA	ug/kg	13	0	0%	89.00	96.00		--	--	
Di-n-octylphthalate	SVOA	ug/kg	13	0	0%	68.00	74.00		--	--	

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Dibenz[a,h]anthracene	SVOA	ug/kg	13	0	0%	68.00	74.00		--	--	
Dibenzofuran	SVOA	ug/kg	13	0	0%	68.00	74.00		--	--	
Diethylphthalate	SVOA	ug/kg	13	4	31%	190	210	210	320	320	1-2 bgs
Dimethylphthalate	SVOA	ug/kg	13	0	0%	68.00	74.00		--	--	
Fluoranthene	SVOA	ug/kg	13	0	0%	68.00	74.00		--	--	
Fluorene	SVOA	ug/kg	13	0	0%	68.00	74.00		--	--	
Hexachlorobenzene	SVOA	ug/kg	13	0	0%	68.00	74.00		--	--	
Hexachlorobutadiene	SVOA	ug/kg	13	0	0%	370	400		--	--	
Hexachlorocyclopentadiene	SVOA	ug/kg	13	0	0%	320	350		--	--	
Hexachloroethane	SVOA	ug/kg	13	0	0%	480	510		--	--	
Ideno(1,2,3-cd)pyrene	SVOA	ug/kg	13	0	0%	68.00	74.00		--	--	
Isophorone	SVOA	ug/kg	13	0	0%	68.00	74.00		--	--	
N-Nitrosodi-n-dipropylamine	SVOA	ug/kg	13	0	0%	68.00	74.00		--	--	
N-Nitrosodiphenylamine	SVOA	ug/kg	13	0	0%	68.00	74.00		--	--	
Naphthalene	SVOA	ug/kg	13	0	0%	290	320		--	--	
Nitrobenzene	SVOA	ug/kg	13	0	0%	270	290		--	--	
Pentachlorophenol	SVOA	ug/kg	13	0	0%	310	330		--	--	
Phenanthrene	SVOA	ug/kg	13	0	0%	68.00	74.00		--	--	
Phenol	SVOA	ug/kg	13	0	0%	100	110		--	--	
Pyrene	SVOA	ug/kg	13	0	0%	68.00	74.00		--	--	
Aroclor-1016	PCB	ug/kg	13	0	0%	49.00	54.00		--	--	
Aroclor-1221	PCB	ug/kg	13	0	0%	97.00	110		--	--	
Aroclor-1232	PCB	ug/kg	13	0	0%	49.00	54.00		--	--	
Aroclor-1242	PCB	ug/kg	13	0	0%	49.00	54.00		--	--	
Aroclor-1248	PCB	ug/kg	13	0	0%	49.00	54.00		--	--	
Aroclor-1254	PCB	ug/kg	13	0	0%	49.00	54.00		--	--	
Aroclor-1260	PCB	ug/kg	13	0	0%	49.00	54.00		--	--	
Aroclor-1262	PCB	ug/kg	13	0	0%	49.00	54.00		--	--	
Aroclor-1268	PCB	ug/kg	13	0	0%	49.00	54.00		--	--	
Total petroleum hydrocarbons -diesel range	DIESEL	ug/kg	13	0	0%	3,800	4,200		--	--	
Total petroleum hydrocarbons -kerosene range	DIESEL	ug/kg	13	0	0%	3,800	4,200		--	--	
Total petroleum hydrocarbons -gasoline range	GAS	ug/kg	13	0	0%	250	250		--	--	
207-A Retention Basin Concrete											
Actinium-228	RAD	pCi/g	3	3	100%			0.384	0.448	0.448	
Americium-241	RAD	pCi/g	3	0	0%	0.008	0.029		--	--	
Antimony-125	RAD	pCi/g	3	0	0%	-0.023	0.03		--	--	
Bismuth-212	RAD	pCi/g	3	3	100%			0.200	0.350	0.350	
Bismuth-214	RAD	pCi/g	3	3	100%			0.303	0.338	0.338	
Carbon-14	RAD	pCi/g	3	0	0%	0.222	0.984		--	--	
Cerium-144	RAD	pCi/g	3	0	0%	-0.113	0.042		--	--	
Cesium-134	RAD	pCi/g	3	0	0%	0.012	0.029		--	--	
Cesium-137	RAD	pCi/g	3	1	33%	0.011	0.015	0.047	0.047	0.047	
Cobalt-60	RAD	pCi/g	3	0	0%	-0.007	0.016		--	--	
Europium-152	RAD	pCi/g	3	0	0%	-0.02	0.005		--	--	
Europium-154	RAD	pCi/g	3	0	0%	-0.049	0.015		--	--	
Europium-155	RAD	pCi/g	3	0	0%	-0.048	0.028		--	--	

Table A-1. Data Summary Table – Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Iodine-129	RAD	pCi/g	3	0	0%	-0.419	0.229		--	--	
Lead-212	RAD	pCi/g	3	3	100%			0.366	0.420	0.420	
Lead-214	RAD	pCi/g	3	3	100%			0.363	0.382	0.382	
Neptunium-237	RAD	pCi/g	3	0	0%	0	0.055		--	--	
Nickel-63	RAD	pCi/g	3	0	0%	-0.608	-0.392		--	--	
Niobium-94	RAD	pCi/g	3	0	0%	-0.006	0.013		--	--	
Plutonium-238	RAD	pCi/g	3	0	0%	0.002	0.021		--	--	
Plutonium-239/240	RAD	pCi/g	3	0	0%	0.002	0.008		--	--	
Radium-226	RAD	pCi/g	3	3	100%			0.303	0.338	0.338	
Radium-228	RAD	pCi/g	3	3	100%			0.384	0.448	0.448	
Ruthenium-103	RAD	pCi/g	3	0	0%	-0.002	0.003		--	--	
Ruthenium-106	RAD	pCi/g	3	0	0%	-0.063	0.026		--	--	
Technetium-99	RAD	pCi/g	3	0	0%	-0.073	0.702		--	--	
Thallium-208	RAD	pCi/g	3	3	100%			0.117	0.141	0.141	
Thorium-228	RAD	pCi/g	3	3	100%			0.361	0.589	0.589	
Thorium-230	RAD	pCi/g	3	3	100%			0.361	0.562	0.562	
Thorium-232	RAD	pCi/g	3	2	67%	0.246	0.246	0.262	0.662	0.662	
Thorium-234	RAD	pCi/g	3	1	33%	0.580	0.729	0.953	0.953	0.953	
Tin-113	RAD	pCi/g	3	0	0%	0.000	0.006		--	--	
Tin-126	RAD	pCi/g	3	0	0%	0.036	0.110		--	--	
Total Radioactive Strontium	RAD	pCi/g	3	1	33%	-0.079	-0.036	0.801	0.801	0.801	
Tritium	RAD	pCi/g	3	3	100%			3.940	7.020	7.020	
Uranium (mg/kg)	METAL	mg/kg	3	1	33%	0.989	0.992	7.70	7.70	7.70	
Uranium-233/234	RAD	pCi/g	3	3	100%			0.170	0.200	0.200	
Uranium-235	RAD	pCi/g	3	2	67%	0.013	0.013	0.016	0.021	0.021	
Uranium-238	RAD	pCi/g	3	3	100%			0.200	0.240	0.240	
Zinc-65	RAD	pCi/g	3	0	0%	-0.009	0.030		--	--	
Antimony	METAL	mg/kg	3	0	0%	4.90	4.96		--	--	
Arsenic	METAL	mg/kg	3	2	67%	2.98	2.98	3.73	7.50	7.50	
Barium	METAL	mg/kg	3	3	100%			118	160	160	
Beryllium	METAL	mg/kg	3	1	33%	2.97	2.98	4.72	4.72	4.72	
Bismuth	METAL	mg/kg	3	0	0%	5.07	5.09		--	--	
Boron	METAL	mg/kg	3	3	100%			12.0	16.3	16.3	
Cadmium	METAL	mg/kg	3	1	33%	0.989	0.992	4.03	4.03	4.03	
Chromium (Total)	METAL	mg/kg	3	3	100%			15.4	21.4	21.4	
Copper	METAL	mg/kg	3	3	100%			22.4	31.4	31.4	
Hexavalent Chromium	METAL	mg/kg	3	2	67%	0.350	0.350	0.393	0.457	0.457	
Lead	METAL	mg/kg	3	0	0%	11.8	11.9		--	--	
Mercury	METAL	mg/kg	3	0	0%	0.981	0.992		--	--	
Nickel	METAL	mg/kg	3	3	100%			9.55	16.2	16.2	
Selenium	METAL	mg/kg	3	1	33%	2.97	2.98	6.28	6.28	6.28	
Silver	METAL	mg/kg	3	3	100%			3.37	6.13	6.13	
Ammonium ion as N	CONV	mg/kg	3	0	0%	0.076	0.080		--	--	
Chloride	CONV	mg/kg	3	1	33%	1.37	1.39	2.57	2.57	2.57	
Cyanide	CONV	mg/kg	3	0	0%	0.2	0.2		--	--	
Fluoride	CONV	mg/kg	3	0	0%	0.679	0.693		--	--	

Table A-1. Data Summary Table -- Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Nitrate as N	CONV	mg/kg	3	0	0%	0.485	0.495		--	--	
Nitrite as N	CONV	mg/kg	3	0	0%	0.873	0.891		--	--	
Nitrate and nitrate/nitrite as N	CONV	mg/kg	3	1	33%	0.170	0.170	0.320	0.320	0.320	
Phosphate	CONV	mg/kg	3	0	0%	1.26	1.29		--	--	
Sulfate	CONV	mg/kg	3	3	100%			37.9	43.5	43.5	
pH	CONV	pH	3	3	100%			12.4	12.4	12.4	
Oil & grease	CONV	ug/kg	3	0	0%	685,000	690,000		--	--	
Diethyl ether	VOA	ug/kg	3	0	0%	5,000	5,000		--	--	
Ethylene glycol	VOA	ug/kg	3	0	0%	5,000	5,000		--	--	
Methanol	VOA	ug/kg	3	0	0%	1,000	1,000		--	--	
dichlorodiphenyldichloroethane	PEST	ug/kg	3	0	0%	3.30	3.30		--	--	
dichlorodiphenyldichloroethylene	PEST	ug/kg	3	0	0%	3.30	3.30		--	--	
dichlorodiphenyltrichloroethane	PEST	ug/kg	3	0	0%	3.30	3.30		--	--	
2,4,5-trichlorophenoxyacetic acid	HERB	ug/kg	3	0	0%	17.0	17.0		--	--	
2,4-dichlorophenoxyacetic acid	HERB	ug/kg	3	0	0%	33.0	33.0		--	--	
2-(2,4,5-trichlorophenoxy)propionic acid	HERB	ug/kg	3	0	0%	17.0	17.0		--	--	
2-secButyl-4,6-dinitrophenol (DNBP)	HERB	ug/kg	3	0	0%	17.0	17.0		--	--	
4-(2,4-Dichlorophenoxy)butanoic acid	HERB	ug/kg	3	0	0%	170.0	170.0		--	--	
Aldrin	PEST	ug/kg	3	0	0%	1.70	1.70		--	--	
Alpha-BHC	PEST	ug/kg	3	0	0%	1.70	1.70		--	--	
alpha-Chlordane	PEST	ug/kg	3	0	0%	1.70	1.70		--	--	
beta-1,2,3,4,5,6-hexachlorocyclohexane	PEST	ug/kg	3	0	0%	1.70	1.70		--	--	
Delta-BHC	PEST	ug/kg	3	0	0%	3.30	3.30		--	--	
dieldrin	PEST	ug/kg	3	0	0%	1.70	1.70		--	--	
Endosulfan I	PEST	ug/kg	3	0	0%	3.30	3.30		--	--	
Endosulfan II	PEST	ug/kg	3	0	0%	3.30	3.30		--	--	
Endosulfan sulfate	PEST	ug/kg	3	0	0%	3.30	3.30		--	--	
Endrin	PEST	ug/kg	3	0	0%	3.30	3.30		--	--	
Endrin aldehyde	PEST	ug/kg	3	0	0%	3.30	3.30		--	--	
Endrin ketone	PEST	ug/kg	3	0	0%	3.30	3.30		--	--	
Gamma-BHC (Lindane)	PEST	ug/kg	3	0	0%	1.70	1.70		--	--	
gamma-Chlordane	PEST	ug/kg	3	0	0%	1.70	1.70		--	--	
Heptachlor	PEST	ug/kg	3	0	0%	1.70	1.70		--	--	
Heptachlor epoxide	PEST	ug/kg	3	0	0%	1.70	1.70		--	--	
Methoxychlor	PEST	ug/kg	3	0	0%	17.0	17.0		--	--	
Toxaphene	PEST	ug/kg	3	0	0%	170.0	170.0		--	--	
Dalapon	HERB	ug/kg	3	0	0%	170.0	170.0		--	--	
Dicamba	HERB	ug/kg	3	0	0%	67.0	67.0		--	--	
Dichloroprop	HERB	ug/kg	3	0	0%	170.0	170.0		--	--	
1,1,1-Trichloroethane	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
1,1,2,2-Tetrachloroethane	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
1,1,2-Trichloroethane	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
1,1-Dichloroethane	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
1,1-Dichloroethene	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
1,2,3,5-tetramethylbenzene	VOA	ug/kg	3	3	100%			170	770	770	
1,2,4,5-tetramethylbenezene	VOA	ug/kg	2	2	100%			100	290	290	

Table A-1. Data Summary Table -- Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
1,2-Dichloroethane	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
1,2-Dichloroethene (Total)	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
1,2-Dichloropropane	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
1,3-dimethyl-5-(1-methylethyl)-benzene	VOA	ug/kg	1	1	100%			160	160	160	
1,3-dimethyl-5-isopropylbenzene	VOA	ug/kg	1	1	100%			170	170	170	
1-butanol	VOA	ug/kg	3	0	0%	41.0	42.0		--	--	
1-ethyl-2,3-dimethylbenzene	VOA	ug/kg	1	1	100%			390	390	390	
1-ethyl-2,4-dimethylbenzene	VOA	ug/kg	3	3	100%			170	400	400	
1-ethyl-3,5-dimethylbenzene	VOA	ug/kg	1	1	100%			59.0	59.0	59.0	
(1-methyl-1-propenyl)- (E)-benzene	VOA	ug/kg	1	1	100%			300	300	300	
2-Butanone	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
2-ethyl-1,3-dimethylbenzene	VOA	ug/kg	1	1	100%			74.0	74.0	74.0	
2-Hexanone	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
2-Pentanone	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
4-Methyl-2-Pentanone	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
Acetone	VOA	ug/kg	3	3	100%			45.0	120	120	
Benzene	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
Bromodichloromethane	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
Bromoform	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
Bromomethane	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
Carbon disulfide	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
Carbon tetrachloride	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
Chlorobenzene	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
Chloroethane	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
Chloroform	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
Chloromethane	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
cis-1,3-Dichloropropene	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
Dibromochloromethane	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
Ethylbenzene	VOA	ug/kg	3	3	100%			7.00	39.0	39.0	
Methylene chloride	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
n-Butylbenzene	VOA	ug/kg	3	3	100%			3.00	17.0	17.0	
Naphthalene	VOA	ug/kg	3	3	100%			130	350	350	
Pentamethylbenzene	VOA	ug/kg	1	1	100%			63.0	63.0	63.0	
Styrene	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
tert-amylbenzene	VOA	ug/kg	1	1	100%			140	140	140	
Tetrachloroethene	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
Toluene	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
trans-1,3-Dichloropropene	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
Trichloroethene	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
Vinyl chloride	VOA	ug/kg	3	0	0%	2.10	2.10		--	--	
Xylenes (total)	VOA	ug/kg	3	3	100%			50.0	140	140	
1,2,4-Trichlorobenzene	SVOA	ug/kg	3	0	0%	300	300		--	--	
1,2-Dichlorobenzene	SVOA	ug/kg	3	0	0%	370	370		--	--	
1,3-Dichlorobenzene	SVOA	ug/kg	3	0	0%	330	330		--	--	
1,4-Dichlorobenzene	SVOA	ug/kg	3	0	0%	320	320		--	--	
1-methylnaphthalene	SVOA	ug/kg	3	1	33%			1,300	1,300	1,300	

Table A-1. Data Summary Table -- Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
2,4,5-Trichlorophenol	SVOA	ug/kg	3	0	0%	75.0	75.0		--	--	
2,4,6-Trichlorophenol	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
2,4-Dichlorophenol	SVOA	ug/kg	3	0	0%	82.0	82.0		--	--	
2,4-Dimethylphenol	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
2,4-Dinitrophenol	SVOA	ug/kg	3	0	0%	680	690		--	--	
2,4-Dinitrotoluene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
2,6-Dinitrotoluene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
2-Butoxyethanol	SVOA	ug/kg	3	0	0%	100	100		--	--	
2-Chloronapthalene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
2-Chlorophenol	SVOA	ug/kg	3	0	0%	150	150		--	--	
2-Methylnapthalene	SVOA	ug/kg	3	2	67%	190	190	450	1,000	1,000	
2-Methylphenol (cresol, o-)	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
2-Nitroaniline	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
2-Nitrophenol	SVOA	ug/kg	3	0	0%	180	180		--	--	
2-Pentene 4,4-dimethyl	SVOA	ug/kg	1	1	100%			640,000	640,000	640,000	
3,3'-Dichlorobenzidine	SVOA	ug/kg	3	0	0%	82.0	82.0		--	--	
3,5-Dimethyl-2-cyclohexen-1-one	SVOA	ug/kg	2	2	100%			1,200	6,000	6,000	
3+4 Methylphenol (cresol m+p)	SVOA	ug/kg	3	2	67%	120	120	2,000	2,800	2,800	
3-methyl 2-cyclohexen-1-one	SVOA	ug/kg	3	3	100%			4,800	14,000	14,000	
3-Nitroaniline	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
4,6-Dinitro-2-methylphenol	SVOA	ug/kg	3	0	0%	680	690		--	--	
4-Bromophenylphenylether	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
4-Chloro-3-methylphenol	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
4-Chloroaniline	SVOA	ug/kg	3	0	0%	95.0	96.0		--	--	
4-Chlorophenylphenyl ether	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
4-Methylphenol (cresol, p-)	SVOA	ug/kg	1	1	100%			3,000	3,000	3,000	
4-Nitroaniline	SVOA	ug/kg	3	0	0%	250	250		--	--	
4-Nitrophenol	SVOA	ug/kg	3	0	0%	660	670		--	--	
Acenaphthene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Acenaphthylene	SVOA	ug/kg	3	0	0%	82.0	82.0		--	--	
Anthracene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Benzo(a)anthracene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Benzo(a)pyrene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Benzo(b)fluoranthene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Benzo(ghi)perylene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Benzo(k)fluoranthene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Benzyl alcohol	SVOA	ug/kg	3	0	0%	75.0	75.0		--	--	
Bis(2-chloro-1-methylethyl)ether	SVOA	ug/kg	3	0	0%	260	260		--	--	
Bis(2-Chloroethoxy)methane	SVOA	ug/kg	3	0	0%	120	120		--	--	
Bis(2-chloroethyl) ether	SVOA	ug/kg	3	0	0%	250	250		--	--	
Bis(2-ethylhexyl)phthalate	SVOA	ug/kg	3	0	0%	270	580		--	--	
Butylbenzylphthalate	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Carbazole	SVOA	ug/kg	3	0	0%	82.0	82.0		--	--	
Chrysene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Di-n-butylphthalate	SVOA	ug/kg	3	0	0%	89.0	89.0		--	--	
Di-n-octylphthalate	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	

Table A-1. Data Summary Table -- Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Dibenz[a,h]anthracene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Dibenzofuran	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Diethylphthalate	SVOA	ug/kg	3	2	67%	190.0	190.0	380	650	650	
Dimethylphthalate	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Fluoranthene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Fluorene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Hexachlorobenzene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Hexachlorobutadiene	SVOA	ug/kg	3	0	0%	370	380		--	--	
Hexachlorocyclopentadiene	SVOA	ug/kg	3	0	0%	320	320		--	--	
Hexachloroethane	SVOA	ug/kg	3	0	0%	480	480		--	--	
Ideno(1,2,3-cd)pyrene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Isophorone	SVOA	ug/kg	3	3	100%			2,600	11,800	11,800	
mesityl oxide	SVOA	ug/kg	2	2	100%			760,000	2,500,000	2,500,000	
N-Nitrosodi-n-dipropylamine	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
N-Nitrosodiphenylamine	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
n-Octadecane	SVOA	ug/kg	1	1	100%			5,600	5,600	5,600	
Naphthalene	SVOA	ug/kg	3	3	100%			300	4,200	4,200	
Nitrobenzene	SVOA	ug/kg	3	0	0%	270	270		--	--	
Pentachlorophenol	SVOA	ug/kg	3	0	0%	310	310		--	--	
Phenanthrene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Phenol	SVOA	ug/kg	3	0	0%	100	100		--	--	
Phorone	SVOA	ug/kg	1	1	100%			3,200	3,200	3,200	
Propane 2-methyl-2-(1-methylethoxy)	SVOA	ug/kg	1	1	100%			1,300,000	1,300,000	1,300,000	
Pyrene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Tributyl phosphate	SVOA	ug/kg	3	1	33%	68.0	69.0	370	370	370	
Aroclor-1016	PCB	ug/kg	3	0	0%	47.0	50.0		--	--	
Aroclor-1221	PCB	ug/kg	3	0	0%	94.0	100		--	--	
Aroclor-1232	PCB	ug/kg	3	0	0%	47.0	50.0		--	--	
Aroclor-1242	PCB	ug/kg	3	0	0%	47.0	50.0		--	--	
Aroclor-1248	PCB	ug/kg	3	0	0%	47.0	50.0		--	--	
Aroclor-1254	PCB	ug/kg	3	0	0%	47.0	50.0		--	--	
Aroclor-1260	PCB	ug/kg	3	0	0%	47.0	50.0		--	--	
Aroclor-1262	PCB	ug/kg	3	0	0%	47.0	50.0		--	--	
Aroclor-1268	PCB	ug/kg	3	0	0%	47.0	50.0		--	--	
Total petroleum hydrocarbons -diesel range	DIESEL	ug/kg	3	3	100%			28,000	66,000	66,000	
Total petroleum hydrocarbons -kerosene range	DIESEL	ug/kg	3	0	0%	5,100	5,200		--	--	
Total petroleum hydrocarbons -gasoline range	GAS	ug/kg	3	3	100%			1,520	4,640	4,640	
Total petroleum hydrocarbons -motor oil (high boiling)	DIESEL	ug/kg	3	3	100%			67,000	1,000,000	1,000,000	
216-A-10 Crib											
Americium-241	RAD	pCi/g	1	0	0%	-0.037	-0.037		--	--	
Carbon-14	RAD	pCi/g	1	0	0%	-0.903	-0.903		--	--	
Cesium-134	RAD	pCi/g	1	0	0%	0.080	0.080		--	--	
Cesium-137	RAD	pCi/g	1	0	0%	0.150	0.150		--	--	
Cobalt-60	RAD	pCi/g	1	0	0%	0.160	0.160		--	--	
Europium-152	RAD	pCi/g	1	0	0%	0.360	0.360		--	--	
Europium-154	RAD	pCi/g	1	0	0%	0.420	0.420		--	--	

Table A-1. Data Summary Table -- Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Europium-155	RAD	pCi/g	1	0	0%	0.310	0.310		--	--	
Iodine-129	RAD	pCi/g	1	0	0%	0.552	0.552		--	--	
Neptunium-237	RAD	pCi/g	1	1	100%			0.043	0.043	0.043	12.5 bgs
Nickel-63	RAD	pCi/g	1	0	0%	-0.581	-0.581		--	--	
Plutonium-238	RAD	pCi/g	1	0	0%	0.000	0.000		--	--	
Plutonium-239/240	RAD	pCi/g	1	0	0%	0	0		--	--	
Potassium-40	RAD	pCi/g	1	0	0%			18.7	18.7	18.7	12.5 bgs
Radium-226	RAD	pCi/g	1	1	100%			0.820	0.820	0.820	12.5 bgs
Radium-228	RAD	pCi/g	1	0	0%	1.3	1.3		--	--	12.5 bgs
Technetium-99	RAD	pCi/g	1	0	0%	0.186	0.186		--	--	
Thorium-228	RAD	pCi/g	1	1	100%			0.545	0.545	0.545	12.5 bgs
Thorium-230	RAD	pCi/g	1	1	100%			0.481	0.481	0.481	12.5 bgs
Thorium-232	RAD	pCi/g	1	1	100%			0.481	0.481	0.481	12.5 bgs
Tin-126	RAD	pCi/g	1	0	0%	0.21	0.21		--	--	
Total Radioactive Strontium	RAD	pCi/g	1	0	0%	0.002	0.002		--	--	
Tritium	RAD	pCi/g	1	0	0%	0.166	0.166		--	--	
Uranium (mg/kg)	METAL	mg/kg	1	1	100%			0.442	0.442	0.442	12.5 bgs
Uranium-233/234	RAD	pCi/g	1	1	100%			0.372	0.372	0.372	12.5 bgs
Uranium-235	RAD	pCi/g	1	0	0%	0.032	0.032				
Uranium-238	RAD	pCi/g	1	1	100%			0.338	0.338	0.338	12.5 bgs
Antimony	METAL	mg/kg	1	1	100%			0.480	0.480	0.480	12.5 bgs
Arsenic	METAL	mg/kg	1	1	100%			4.10	4.10	4.10	12.5 bgs
Barium	METAL	mg/kg	1	1	100%			53.4	53.4	53.4	12.5 bgs
Beryllium	METAL	mg/kg	1	1	100%			0.050	0.050	0.050	12.5 bgs
Bismuth	METAL	mg/kg	1	0	0%	0.530	0.530	--	--	--	
Boron	METAL	mg/kg	1	1	100%			0.890	0.890	0.890	12.5 bgs
Cadmium	METAL	mg/kg	1	1	100%			0.260	0.260	0.260	12.5 bgs
Chromium (Total)	METAL	mg/kg	1	1	100%			6.70	6.70	6.70	12.5 bgs
Copper	METAL	mg/kg	1	1	100%			11.2	11.2	11.2	12.5 bgs
Hexavalent Chromium	METAL	mg/kg	1	0	0%	0.420	0.420	--	--	--	
Lead	METAL	mg/kg	1	1	100%			4.00	4.00	4.00	12.5 bgs
Mercury	METAL	mg/kg	1	0	0%	0.020	0.020	--	--	--	
Nickel	METAL	mg/kg	1	1	100%			7.30	7.30	7.30	12.5 bgs
Selenium	METAL	mg/kg	1	0	0%	0.440	0.440	--	--	--	
Silver	METAL	mg/kg	1	0	0%	0.130	0.130	--	--	--	
Ammonium ion as N	CONV	mg/kg	1	0	0%	4.70	4.70		--	--	
Chloride	CONV	mg/kg	1	0	0%	1.30	1.30		--	--	
Cyanide	CONV	mg/kg	1	0	0%	0.480	0.480		--	--	
Fluoride	CONV	mg/kg	1	0	0%	1.30	1.30		--	--	
Nitrate as N	CONV	mg/kg	1	0	0%	0.857	0.857		--	--	
Nitrite as N	CONV	mg/kg	1	1	100%			0.404	0.404	0.404	12.5 bgs
Nitrate and nitrate/nitrite as N	CONV	mg/kg	1	1	100%			1.00	1.00	1.00	12.5 bgs
Phosphate	CONV	mg/kg	1	0	0%	1.30	1.30		--	--	
Sulfate	CONV	mg/kg	1	0	0%	1.30	1.30		--	--	
pH	CONV	pH	1	1	100%			9.20	9.20	9.20	12.5 bgs
Oil & grease	CONV	ug/kg	1	0	0%	711,000	711,000		--	--	

Table A-1. Data Summary Table -- Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Diethyl ether	VOA	ug/kg	1	0	0%	24,000	24,000		--	--	
Ethylene glycol	VOA	ug/kg	1	0	0%	24.5	24.5		--	--	
Methanol	VOA	ug/kg	1	0	0%	24,000	24,000		--	--	
dichlorodiphenyldichloroethane	PEST	ug/kg	1	0	0%	3.5	3.5		--	--	
dichlorodiphenyldichloroethylene	PEST	ug/kg	1	0	0%	3.5	3.5		--	--	
dichlorodiphenyltrichloroethane	PEST	ug/kg	1	0	0%	3.5	3.5		--	--	
1-butanol	VOA	ug/kg	1	0	0%	24,000	24,000		--	--	
2,4,5-trichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	17	17		--	--	
2,4-dichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	35	35		--	--	
2-(2,4,5-trichlorophenoxy)propionic acid	HERB	ug/kg	1	0	0%	17	17		--	--	
2-secButyl-4,6-dinitrophenol (DNBP)	HERB	ug/kg	1	0	0%	17	17		--	--	
4-(2,4-Dichlorophenoxy)butanoic acid	HERB	ug/kg	1	0	0%	170	170		--	--	
Aldrin	PEST	ug/kg	1	0	0%	1.7	1.7		--	--	
Alpha-BHC	PEST	ug/kg	1	0	0%	1.7	1.7		--	--	
alpha-Chlordane	PEST	ug/kg	1	0	0%	1.7	1.7		--	--	
beta-1,2,3,4,5,6-hexachlorocyclohexane	PEST	ug/kg	1	1	100%			7.00	7.00	7.00	0.5 bgs
Delta-BHC	PEST	ug/kg	1	0	0%	1.7	1.7		--	--	
dieldrin	PEST	ug/kg	1	0	0%	3.5	3.5		--	--	
Endosulfan I	PEST	ug/kg	1	0	0%	1.7	1.7		--	--	
Endosulfan II	PEST	ug/kg	1	0	0%	3.5	3.5		--	--	
Endosulfan sulfate	PEST	ug/kg	1	0	0%	3.5	3.5		--	--	
Endrin	PEST	ug/kg	1	0	0%	3.5	3.5		--	--	
Endrin aldehyde	PEST	ug/kg	1	0	0%	3.5	3.5		--	--	
Endrin ketone	PEST	ug/kg	1	0	0%	3.5	3.5		--	--	
Gamma-BHC (Lindane)	PEST	ug/kg	1	0	0%	1.7	1.7		--	--	
gamma-Chlordane	PEST	ug/kg	1	0	0%	1.7	1.7		--	--	
Heptachlor	PEST	ug/kg	1	0	0%	1.7	1.7		--	--	
Heptachlor epoxide	PEST	ug/kg	1	0	0%	1.7	1.7		--	--	
Methoxychlor	PEST	ug/kg	1	0	0%	17	17		--	--	
Toxaphene	PEST	ug/kg	1	0	0%	170	170		--	--	
Dalapon	HERB	ug/kg	1	0	0%	170	170		--	--	
Dicamba	HERB	ug/kg	1	0	0%	70	70		--	--	
Dichloroprop	HERB	ug/kg	1	0	0%	170	170		--	--	
1,2,4-Trichlorobenzene	SVOA	ug/kg	1	0	0%	360	360		--	--	
1,2-Dichlorobenzene	SVOA	ug/kg	1	0	0%	360	360		--	--	
1,3-Dichlorobenzene	SVOA	ug/kg	1	0	0%	360	360		--	--	
1,4-Dichlorobenzene	SVOA	ug/kg	1	0	0%	360	360		--	--	
2,4,5-Trichlorophenol	SVOA	ug/kg	1	0	0%	890	890		--	--	
2,4,6-Trichlorophenol	SVOA	ug/kg	1	0	0%	360	360		--	--	
2,4-Dichlorophenol	SVOA	ug/kg	1	0	0%	360	360		--	--	
2,4-Dimethylphenol	SVOA	ug/kg	1	0	0%	360	360		--	--	
2,4-Dinitrophenol	SVOA	ug/kg	1	0	0%	890	890		--	--	
2,4-Dinitrotoluene	SVOA	ug/kg	1	0	0%	360	360		--	--	
2,6-Dinitrotoluene	SVOA	ug/kg	1	0	0%	360	360		--	--	
2-Butoxyethanol	SVOA	ug/kg	1	0	0%	360	360		--	--	
2-Chloronapthalene	SVOA	ug/kg	1	0	0%	360	360		--	--	

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
2-Chlorophenol	SVOA	ug/kg	1	0	0%	360	360		--	--	
2-Methylnapthalene	SVOA	ug/kg	1	0	0%	360	360		--	--	
2-Methylphenol (cresol, o-)	SVOA	ug/kg	1	0	0%	360	360		--	--	
2-Nitroaniline	SVOA	ug/kg	1	0	0%	890	890		--	--	
2-Nitrophenol	SVOA	ug/kg	1	0	0%	360	360		--	--	
3,3'-Dichlorobenzidine	SVOA	ug/kg	1	0	0%	360	360		--	--	
3-Nitroaniline	SVOA	ug/kg	1	0	0%	890	890		--	--	
4,6-Dinitro-2-methylphenol	SVOA	ug/kg	1	0	0%	890	890		--	--	
4-Bromophenylphenylether	SVOA	ug/kg	1	0	0%	360	360		--	--	
4-Chloro-3-methylphenol	SVOA	ug/kg	1	0	0%	360	360		--	--	
4-Chloroaniline	SVOA	ug/kg	1	0	0%	360	360		--	--	
4-Chlorophenylphenylether	SVOA	ug/kg	1	0	0%	360	360		--	--	
4-Methylphenol (cresol, p-)	SVOA	ug/kg	1	0	0%	360	360		--	--	
4-Nitroaniline	SVOA	ug/kg	1	0	0%	890	890		--	--	
4-Nitrophenol	SVOA	ug/kg	1	0	0%	890	890		--	--	
Acenaphthene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Acenaphthylene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Anthracene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Benzo(a)anthracene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Benzo(a)pyrene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Benzo(b)fluoranthene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Benzo(ghi)perylene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Benzo(k)fluoranthene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Benzyl alcohol	SVOA	ug/kg	1	0	0%	360	360		--	--	
Bis(2-chloro-1-methylethyl)ether	SVOA	ug/kg	1	0	0%	360	360		--	--	
Bis(2-Chloroethoxy)methane	SVOA	ug/kg	1	0	0%	360	360		--	--	
Bis(2-chloroethyl) ether	SVOA	ug/kg	1	0	0%	360	360		--	--	
Bis(2-ethylhexyl)phthalate	SVOA	ug/kg	1	0	0%	360	360		--	--	
Butylbenzylphthalate	SVOA	ug/kg	1	0	0%	360	360		--	--	
Carbazole	SVOA	ug/kg	1	0	0%	360	360		--	--	
Chrysene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Di-n-butylphthalate	SVOA	ug/kg	1	0	0%	360	360		--	--	
Di-n-octylphthalate	SVOA	ug/kg	1	0	0%	360	360		--	--	
Dibenz[a,h]anthracene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Dibenzofuran	SVOA	ug/kg	1	0	0%	360	360		--	--	
Diethylphthalate	SVOA	ug/kg	1	0	0%	360	360		--	--	
Dimethylphthalate	SVOA	ug/kg	1	0	0%	360	360		--	--	
Fluoranthene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Fluorene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Hexachlorobenzene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Hexachlorobutadiene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Hexachlorocyclopentadiene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Hexachloroethane	SVOA	ug/kg	1	0	0%	360	360		--	--	
Ideno(1,2,3-cd)pyrene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Isophorone	SVOA	ug/kg	1	0	0%	360	360		--	--	
N-Nitrosodi-n-dipropylamine	SVOA	ug/kg	1	0	0%	360	360		--	--	

Table A-1. Data Summary Table – Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
N-Nitrosodiphenylamine	SVOA	ug/kg	1	0	0%	360	360		--	--	
Naphthalene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Nitrobenzene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Pentachlorophenol	SVOA	ug/kg	1	0	0%	890	890		--	--	
Phenanthrene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Phenol	SVOA	ug/kg	1	0	0%	360	360		--	--	
Pyrene	SVOA	ug/kg	1	0	0%	360	360		--	--	
Tributyl phosphate	SVOA	ug/kg	1	0	0%	360	360		--	--	
Total petroleum hydrocarbons -diesel range	DIESEL	ug/kg	1	0	0%	12,800	12,800		--	--	
Total petroleum hydrocarbons -kerosene range	DIESEL	ug/kg	1	0	0%	12,800	12,800		--	--	
Total petroleum hydrocarbons -gasoline range	GAS	ug/kg	1	0	0%	30	30		--	--	
216-A-19 Trench											
Actinium-228	RAD	pCi/g	1	1	100%			0.523	0.523	0.523	14.5 bgs
Americium-241	RAD	pCi/g	1	1	100%			0.081	0.081	0.081	14.5 bgs
Antimony-125	RAD	pCi/g	1	0	0%	-0.016	-0.016	--	--	--	
Bismuth-212	RAD	pCi/g	1	1	100%			0.343	0.343	0.343	14.5 bgs
Bismuth-214	RAD	pCi/g	1	1	100%			0.439	0.439	0.439	14.5 bgs
Carbon-14	RAD	pCi/g	1	0	0%	-1.6	-1.6	--	--	--	
Cerium-144	RAD	pCi/g	1	0	0%	-0.06	-0.06	--	--	--	
Cesium-134	RAD	pCi/g	1	0	0%	0.035	0.035	--	--	--	
Cesium-137	RAD	pCi/g	1	0	0%	0.001	0.001	--	--	--	
Cobalt-60	RAD	pCi/g	1	0	0%	0.004	0.004	--	--	--	
Europium-152	RAD	pCi/g	1	0	0%	-0.018	-0.018	--	--	--	
Europium-154	RAD	pCi/g	1	0	0%	-0.027	-0.027	--	--	--	
Europium-155	RAD	pCi/g	1	1	100%			0.066	0.066	0.066	14.5 bgs
Iodine-129	RAD	pCi/g	1	0	0%	-0.546	-0.546	--	--	--	
Lead-212	RAD	pCi/g	1	1	100%			0.536	0.536	0.536	14.5 bgs
Lead-214	RAD	pCi/g	1	1	100%			0.472	0.472	0.472	14.5 bgs
Neptunium-237	RAD	pCi/g	1	0	0%	0	0	--	--	--	
Nickel-63	RAD	pCi/g	1	1	100%			17.6	17.6	17.6	14.5 bgs
Niobium-94	RAD	pCi/g	1	0	0%	0.011	0.011	--	--	--	
Plutonium-238	RAD	pCi/g	1	0	0%	-0.026	-0.026	--	--	--	
Plutonium-239/240	RAD	pCi/g	1	1	100%			0.180	0.180	0.180	14.5 bgs
Radium-226	RAD	pCi/g	1	1	100%			0.439	0.439	0.439	14.5 bgs
Radium-228	RAD	pCi/g	1	1	100%			0.523	0.523	0.523	14.5 bgs
Ruthenium-103	RAD	pCi/g	1	0	0%	0.005	0.005	--	--	--	
Ruthenium-106	RAD	pCi/g	1	0	0%	-0.04	-0.04	--	--	--	
Technetium-99	RAD	pCi/g	1	1	100%	0.316	0.316	--	--	--	
Thallium-208	RAD	pCi/g	1	1	100%			0.171	0.171	0.171	14.5 bgs
Thorium-228	RAD	pCi/g	1	1	100%			0.470	0.470	0.470	14.5 bgs
Thorium-230	RAD	pCi/g	1	1	100%			0.507	0.507	0.507	14.5 bgs
Thorium-232	RAD	pCi/g	1	1	100%			0.429	0.429	0.429	14.5 bgs
Thorium-234	RAD	pCi/g	1	1	100%			56.8	56.8	56.8	14.5 bgs
Tin-113	RAD	pCi/g	1	0	0%	-0.006	-0.006	--	--	--	
Tin-126	RAD	pCi/g	1	0	0%	0.19	0.19	--	--	--	
Total Radioactive Strontium	RAD	pCi/g	1	1	100%			16.1	16.1	16.1	14.5 bgs

Table A-1. Data Summary Table -- Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Tritium	RAD	pCi/g	1	0	0%	0.127	0.127	--	--	--	
Uranium (mg/kg)	METAL	mg/kg	1	1	100%	0.100	0.100	129	129	129	14.5 bgs
Uranium-233/234	RAD	pCi/g	1	1	100%			6.00	6.00	6.00	14.5 bgs
Uranium-235	RAD	pCi/g	1	1	100%			0.940	0.940	0.940	14.5 bgs
Uranium-238	RAD	pCi/g	1	1	100%			51.0	51.0	51.0	14.5 bgs
Zinc-65	RAD	pCi/g	1	0	0%	0.029	0.029	--	--	--	
Aluminum	METAL	mg/kg	1	1	100%			5890	5890	5890	14.5 bgs
Antimony	METAL	mg/kg	1	0	0%	0.239	0.239	--	--	--	
Arsenic	METAL	mg/kg	1	1	100%			7.00	7.00	7.00	14.5 bgs
Barium	METAL	mg/kg	1	1	100%			98.9	98.9	98.9	14.5 bgs
Beryllium	METAL	mg/kg	1	1	100%			0.241	0.241	0.241	14.5 bgs
Bismuth	METAL	mg/kg	1	0	0%	6.77	6.77	--	--	--	
Boron	METAL	mg/kg	1	1	100%			38.9	38.9	38.9	14.5 bgs
Cadmium	METAL	mg/kg	1	1	100%			0.211	0.211	0.211	14.5 bgs
Chromium (Total)	METAL	mg/kg	1	1	100%			5.31	5.31	5.31	14.5 bgs
Cobalt	METAL	mg/kg	1	1	100%			9.7	9.7	9.7	14.5 bgs
Copper	METAL	mg/kg	1	1	100%			13.4	13.4	13.4	14.5 bgs
Hexavalent Chromium	METAL	mg/kg	1	0	0%	0.420	0.420	--	--	--	
Lead	METAL	mg/kg	1	1	100%			3.18	3.18	3.18	14.5 bgs
Manganese	METAL	mg/kg	1	1	100%			430	430	430	14.5 bgs
Mercury	METAL	mg/kg	1	0	0%	0.048	0.048	--	--	--	
Molybdenum	METAL	mg/kg	1	0	0%	1.43	1.43	--	--	--	
Nickel	METAL	mg/kg	1	1	100%			8.54	8.54	8.54	14.5 bgs
Selenium	METAL	mg/kg	1	0	0%	1.43	1.43	--	--	--	
Silver	METAL	mg/kg	1	0	0%	0.096	0.096	--	--	--	
Thallium	METAL	mg/kg	1	1	100%			0.068	0.068	0.068	14.5 bgs
Thorium	METAL	mg/kg	1	1	100%			3.49	3.49	3.49	14.5 bgs
Vanadium	METAL	mg/kg	1	1	100%			96.1	96.1	96.1	14.5 bgs
Zinc	METAL	mg/kg	1	1	100%			56.6	56.6	56.6	14.5 bgs
Ammonium ion as N	CONV	mg/kg	1	1	100%			0.470	0.470	0.470	14.5 bgs
Bromide	CONV	mg/kg	1	0	0%	0.900	0.900	--	--	--	
Chloride	CONV	mg/kg	1	1	100%			22.5	22.5	22.5	14.5 bgs
Cyanide	CONV	mg/kg	1	0	0%	0.190	0.190	--	--	--	
Fluoride	CONV	mg/kg	1	1	100%			5.62	5.62	5.62	14.5 bgs
Nitrate as N	CONV	mg/kg	1	1	100%			546	546	546	14.5 bgs
Nitrite as N	CONV	mg/kg	1	0	0%	0.180	0.180	--	--	--	
Nitrate and nitrate/nitrite as N	CONV	mg/kg	1	1	100%			544	544	544	14.5 bgs
Phosphate	CONV	mg/kg	1	1	100%			4.85	4.85	4.85	14.5 bgs
Sulfate	CONV	mg/kg	1	1	100%			113	113	113	14.5 bgs
pH	CONV	pH	1	1	100%			10.1	10.1	10.1	14.5 bgs
Oil & grease	CONV	ug/kg	1	0	0%	694,000	694,000		--	--	
Diethyl ether	VOA	ug/kg	1	0	0%	5,000	5,000		--	--	
Ethylene glycol	VOA	ug/kg	1	0	0%	5,000	5,000		--	--	
Methanol	VOA	ug/kg	1	0	0%	1,000	1,000		--	--	
Dichlorodiphenyldichloroethane	PEST	ug/kg	1	0	0%	3.4	3.4		--	--	
Dichlorodiphenyldichloroethylene	PEST	ug/kg	1	0	0%	3.4	3.4		--	--	

Table A-1. Data Summary Table -- Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Dichlorodiphenyltrichloroethane	PEST	ug/kg	1	0	0%	3.4	3.4		--	--	
2,4,5-trichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	17	17		--	--	
2,4-dichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	34	34		--	--	
2-(2,4,5-trichlorophenoxy)propionic acid	HERB	ug/kg	1	0	0%	17	17		--	--	
2-secButyl-4,6-dinitrophenol (DNBP)	HERB	ug/kg	1	0	0%	17	17		--	--	
4-(2,4-Dichlorophenoxy)butanoic acid	HERB	ug/kg	1	0	0%	170	170		--	--	
Aldrin	PEST	ug/kg	1	0	0%	1.7	1.7		--	--	
Alpha-BHC	PEST	ug/kg	1	0	0%	1.7	1.7		--	--	
alpha-Chlordane	PEST	ug/kg	1	0	0%	1.7	1.7		--	--	
beta-1,2,3,4,5,6-hexachlorocyclohexane	PEST	ug/kg	1	0	0%	1.7	1.7		--	--	
Delta-BHC	PEST	ug/kg	1	0	0%	1.7	1.7		--	--	
dieldrin	PEST	ug/kg	1	0	0%	3.4	3.4		--	--	
Endosulfan I	PEST	ug/kg	1	0	0%	1.7	1.7		--	--	
Endosulfan II	PEST	ug/kg	1	0	0%	3.4	3.4		--	--	
Endosulfan sulfate	PEST	ug/kg	1	0	0%	3.4	3.4		--	--	
Endrin	PEST	ug/kg	1	0	0%	3.4	3.4		--	--	
Endrin aldehyde	PEST	ug/kg	1	0	0%	3.4	3.4		--	--	
Endrin ketone	PEST	ug/kg	1	0	0%	3.4	3.4		--	--	
Gamma-BHC (Lindane)	PEST	ug/kg	1	0	0%	1.7	1.7		--	--	
gamma-Chlordane	PEST	ug/kg	1	0	0%	1.7	1.7		--	--	
Heptachlor	PEST	ug/kg	1	0	0%	1.7	1.7		--	--	
Heptachlor epoxide	PEST	ug/kg	1	0	0%	1.7	1.7		--	--	
Methoxychlor	PEST	ug/kg	1	0	0%	17	17		--	--	
Toxaphene	PEST	ug/kg	1	0	0%	170	170		--	--	
Dalapon	HERB	ug/kg	1	0	0%	170	170		--	--	
Dicamba	HERB	ug/kg	1	0	0%	69	69		--	--	
Dichloroprop	HERB	ug/kg	1	0	0%	170	170		--	--	
1,1-Dichloroethene	VOA	ug/kg	1	0	0%	2	2		--	--	
1-butanol	VOA	ug/kg	1	0	0%	20	20		--	--	
Benzene	VOA	ug/kg	1	0	0%	2	2		--	--	
Chlorobenzene	VOA	ug/kg	1	0	0%	2	2		--	--	
Toluene	VOA	ug/kg	1	0	0%	2	2		--	--	
Trichloroethene	VOA	ug/kg	1	0	0%	2	2		--	--	
1,2,4-Trichlorobenzene	SVOA	ug/kg	1	0	0%	300	300		--	--	
1,2-Dichlorobenzene	SVOA	ug/kg	1	0	0%	370	370		--	--	
1,3-Dichlorobenzene	SVOA	ug/kg	1	0	0%	330	330		--	--	
1,4-Dichlorobenzene	SVOA	ug/kg	1	0	0%	320	320		--	--	
2,4,5-Trichlorophenol	SVOA	ug/kg	1	0	0%	690	690		--	--	
2,4,6-Trichlorophenol	SVOA	ug/kg	1	0	0%	69	69		--	--	
2,4-Dichlorophenol	SVOA	ug/kg	1	0	0%	82	82		--	--	
2,4-Dimethylphenol	SVOA	ug/kg	1	0	0%	69	69		--	--	
2,4-Dinitrophenol	SVOA	ug/kg	1	0	0%	690	690		--	--	
2,4-Dinitrotoluene	SVOA	ug/kg	1	0	0%	69	69		--	--	
2,6-Dinitrotoluene	SVOA	ug/kg	1	0	0%	69	69		--	--	
2-Butoxyethanol	SVOA	ug/kg	1	0	0%	100	100		--	--	
2-Chloronapthalene	SVOA	ug/kg	1	0	0%	82	82		--	--	

Table A-1. Data Summary Table -- Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
2-Chlorophenol	SVOA	ug/kg	1	0	0%	150	150		--	--	
2-Methylnapthalene	SVOA	ug/kg	1	0	0%	190	190		--	--	
2-Methylphenol (cresol, o-)	SVOA	ug/kg	1	0	0%	69	69		--	--	
2-Nitroaniline	SVOA	ug/kg	1	0	0%	69	69		--	--	
2-Nitrophenol	SVOA	ug/kg	1	0	0%	180	180		--	--	
3,3'-Dichlorobenzidine	SVOA	ug/kg	1	0	0%	82	82		--	--	
3+4 Methylphenol (cresol m+p)	SVOA	ug/kg	1	0	0%	120	120		--	--	
3-Nitroaniline	SVOA	ug/kg	1	0	0%	69	69		--	--	
4,6-Dinitro-2-methylphenol	SVOA	ug/kg	1	0	0%	690	690		--	--	
4-Bromophenylphenylether	SVOA	ug/kg	1	0	0%	69	69		--	--	
4-Chloro-3-methylphenol	SVOA	ug/kg	1	0	0%	69	69		--	--	
4-Chloroaniline	SVOA	ug/kg	1	0	0%	96	96		--	--	
4-Chlorophenylphenylether	SVOA	ug/kg	1	0	0%	69	69		--	--	
4-Nitroaniline	SVOA	ug/kg	1	0	0%	250	250		--	--	
4-Nitrophenol	SVOA	ug/kg	1	0	0%	670	670		--	--	
Acenaphthene	SVOA	ug/kg	1	0	0%	69	69		--	--	
Acenaphthylene	SVOA	ug/kg	1	0	0%	82	82		--	--	
Anthracene	SVOA	ug/kg	1	0	0%	69	69		--	--	
Benzo(a)anthracene	SVOA	ug/kg	1	0	0%	69	69		--	--	
Benzo(a)pyrene	SVOA	ug/kg	1	0	0%	69	69		--	--	
Benzo(b)fluoranthene	SVOA	ug/kg	1	0	0%	69	69		--	--	
Benzo(ghi)perylene	SVOA	ug/kg	1	0	0%	69	69		--	--	
Benzo(k)fluoranthene	SVOA	ug/kg	1	0	0%	69	69		--	--	
Bis(2-Chloroethoxy)methane	SVOA	ug/kg	1	0	0%	120	120		--	--	
Bis(2-chloroethyl) ether	SVOA	ug/kg	1	0	0%	250	250		--	--	
Bis(2-ethylhexyl)phthalate	SVOA	ug/kg	1	1	100%	660	660		660	660	14.5 bgs
Carbazole	SVOA	ug/kg	1	0	0%	82	82		--	--	
Chrysene	SVOA	ug/kg	1	0	0%	69	69		--	--	
Cyclohexane 2-Butyl-1 1 3-trimethyl-	SVOA	ug/kg	1	1	100%				1,100	1,100	14.5 bgs
Decahydro-2 6-dimethyl-naphthalene	SVOA	ug/kg	1	1	100%				1,100	1,100	14.5 bgs
Di-n-butylphthalate	SVOA	ug/kg	1	0	0%	89	89		--	--	
Dibenzofuran	SVOA	ug/kg	1	0	0%	69	69		--	--	
Dimethylphthalate	SVOA	ug/kg	1	0	0%	69	69		--	--	
Fluoranthene	SVOA	ug/kg	1	0	0%	69	69		--	--	
Fluorene	SVOA	ug/kg	1	0	0%	69	69		--	--	
Hexachlorobenzene	SVOA	ug/kg	1	0	0%	69	69		--	--	
Hexachlorobutadiene	SVOA	ug/kg	1	0	0%	380	380		--	--	
Hexachlorocyclopentadiene	SVOA	ug/kg	1	0	0%	320	320		--	--	
Ideno(1,2,3-cd)pyrene	SVOA	ug/kg	1	0	0%	69	69		--	--	
Isophorone	SVOA	ug/kg	1	0	0%	69	69		--	--	
n-butyl benzenesulfonamide	SVOA	ug/kg	1	1	100%				2,900	2,900	14.5 bgs
N-Nitrosodi-n-dipropylamine	SVOA	ug/kg	1	0	0%	69	69		--	--	
N-Nitrosodiphenylamine	SVOA	ug/kg	1	0	0%	69	69		--	--	
Naphthalene	SVOA	ug/kg	1	0	0%	300	300		--	--	
Nitrobenzene	SVOA	ug/kg	1	0	0%	270	270		--	--	
Pentachlorophenol	SVOA	ug/kg	1	0	0%	310	310		--	--	

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Phenanthrene	SVOA	ug/kg	1	0	0%	69	69		--	--	
Phenol	SVOA	ug/kg	1	0	0%	100	100		--	--	
Pyrene	SVOA	ug/kg	1	0	0%	69	69		--	--	
Tributyl phosphate	SVOA	ug/kg	1	1	100%				280,000	280,000	14.5 bgs
Total petroleum hydrocarbons -diesel range	DIESEL	ug/kg	1	1	100%				230,000	230,000	14.5 bgs
Total petroleum hydrocarbons -gasoline range	GAS	ug/kg				250	250		--	--	
216-A-36B Crib											
Actinium-228	RAD	pCi/g	1	1	100%			0.652	0.652	0.652	12.5 bgs
Antimony-125	RAD	pCi/g	1	0	0%	0	0	--	--	--	
Bismuth-212	RAD	pCi/g	1	1	100%			0.367	0.367	0.367	12.5 bgs
Bismuth-214	RAD	pCi/g	1	1	100%			0.416	0.416	0.416	12.5 bgs
Carbon-14	RAD	pCi/g	1	0	0%	1.24	1.24	--	--	--	
Cerium-144	RAD	pCi/g	1	0	0%	0	0	--	--	--	
Cesium-134	RAD	pCi/g	1	0	0%	0.019	0.019	--	--	--	
Cesium-137	RAD	pCi/g	1	0	0%	-0.001	-0.001	--	--	--	
Cobalt-60	RAD	pCi/g	1	0	0%	0.009	0.009	--	--	--	
Europium-152	RAD	pCi/g	1	0	0%	0.009	0.009	--	--	--	
Europium-154	RAD	pCi/g	1	0	0%	-0.009	-0.009	--	--	--	
Europium-155	RAD	pCi/g	1	0	0%	0.003	0.003	--	--	--	
Iodine-129	RAD	pCi/g	1	0	0%	0.073	0.073	--	--	--	
Lead-212	RAD	pCi/g	1	1	100%			0.674	0.674	0.674	12.5 bgs
Lead-214	RAD	pCi/g	1	1	100%			0.528	0.528	0.528	12.5 bgs
Neptunium-237	RAD	pCi/g	1	0	0%	0.04	0.04	--	--	--	
Nickel-63	RAD	pCi/g	1	0	0%	0		--	--	--	
Niobium-94	RAD	pCi/g	1	0	0%	0.005	0.005	--	--	--	
Plutonium-238	RAD	pCi/g	1	0	0%	0.019	0.019	--	--	--	
Plutonium-239/240	RAD	pCi/g	1	0	0%	0.0042	0.0042	--	--	--	
Radium-226	RAD	pCi/g	1	1	100%			0.416	0.416	0.416	12.5 bgs
Radium-228	RAD	pCi/g	1	1	100%			0.652	0.652	0.652	12.5 bgs
Ruthenium-103	RAD	pCi/g	1	0	0%	-0.006	-0.006	--	--	--	
Ruthenium-106	RAD	pCi/g	1	0	0%	0.037	0.037	--	--	--	
Technetium-99	RAD	pCi/g	1	0	0%	0.034	0.034	--	--	--	
Thallium-208	RAD	pCi/g	1	1	100%			0.214	0.214	0.214	12.5 bgs
Thorium-228	RAD	pCi/g	1	0	0%	0.213	0.213	--	--	--	
Thorium-230	RAD	pCi/g	1	1	100%			0.935	0.935	0.935	12.5 bgs
Thorium-232	RAD	pCi/g	1	1	100%			0.425	0.425	0.425	12.5 bgs
Thorium-234	RAD	pCi/g	1	0	0%	1.04	1.04	--	--	--	
Tin-113	RAD	pCi/g	1	0	0%	0.004	0.004	--	--	--	
Tin-126	RAD	pCi/g	1	0	0%	0.157	0.157	--	--	--	
Total Radioactive Strontium	RAD	pCi/g	1	0	0%	0.052	0.052	--	--	--	
Tritium	RAD	pCi/g	1	0	0%	0.022	0.022	--	--	--	
Uranium (mg/kg)	METAL	mg/kg	1	1	100%			0.504	0.504	0.504	12.5 bgs
Uranium-234	RAD	pCi/g	1	1	100%			0.150	0.150	0.150	12.5 bgs
Uranium-235	RAD	pCi/g	1	1	100%			0.018	0.018	0.018	12.5 bgs
Uranium-238	RAD	pCi/g	1	1	100%			0.170	0.170	0.170	12.5 bgs
Zinc-65	RAD	pCi/g	1	0	0%	0.035	0.035	--	--	--	

Table A-1. Data Summary Table -- Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Aluminum	METAL	mg/kg	1	1	100%			7,600	7,600	7,600	12.5 bgs
Antimony	METAL	mg/kg	1	0	0%	2.36	2.36	--	--	--	
Arsenic	METAL	mg/kg	1	1	100%			2.60	2.60	2.60	12.5 bgs
Barium	METAL	mg/kg	1	1	100%			59.9	59.9	59.9	12.5 bgs
Beryllium	METAL	mg/kg	1	0	0%	1.42	1.42	--	--	--	
Bismuth	METAL	mg/kg	1	0	0%	4.75	4.75	--	--	--	
Boron	METAL	mg/kg	1	0	0%	4.85	4.85	--	--	--	
Cadmium	METAL	mg/kg	1	0	0%	0.472	0.472	--	--	--	
Chromium (Total)	METAL	mg/kg	1	0	0%	1.42	1.42	--	--	--	
Cobalt	METAL	mg/kg	1	1	100%			6.13	6.13	6.13	12.5 bgs
Copper	METAL	mg/kg	1	1	100%			13.8	13.8	13.8	12.5 bgs
Hexavalent Chromium	METAL	mg/kg	1	0	0%	0.430	0.430	--	--	--	
Lead	METAL	mg/kg	1	0	0%	5.66	5.66	--	--	--	
Manganese	METAL	mg/kg	1	1	100%			246	246	246	12.5 bgs
Mercury	METAL	mg/kg	1	0	0%	0.472	0.472	--	--	--	
Molybdenum	METAL	mg/kg	1	0	0%	1.42	1.42	--	--	--	
Nickel	METAL	mg/kg	1	1	100%			4.26	4.26	4.26	12.5 bgs
Selenium	METAL	mg/kg	1	0	0%	1.420	1.42	--	--	--	
Silver	METAL	mg/kg	1	1	100%			3.12	3.12	3.12	12.5 bgs
Thallium	METAL	mg/kg	1	0	0%	0.472	0.472	--	--	--	
Thorium	METAL	mg/kg	1	1	100%			3.77	3.77	3.77	12.5 bgs
Vanadium	METAL	mg/kg	1	1	100%			35.1	35.1	35.1	12.5 bgs
Zinc	METAL	mg/kg	1	1	100%			41.5	41.5	41.5	12.5 bgs
Ammonium ion as N	CONV	mg/kg	1	0	0%	0.040	0.040	--	--	--	
Bromide	CONV	mg/kg	1	0	0%	0.450	0.450	--	--	--	
Chloride	CONV	mg/kg	1	1	100%			0.239	0.239	0.239	12.5 bgs
Cyanide	CONV	mg/kg	1	0	0%	0.190	0.190	--	--	--	
Fluoride	CONV	mg/kg	1	1	100%			0.393	0.393	0.393	12.5 bgs
Nitrate as N	CONV	mg/kg	1	1	100%			0.497	0.497	0.497	12.5 bgs
Nitrite as N	CONV	mg/kg	1	0	0%	0.090	0.090	--	--	--	
Nitrate and nitrate/nitrite as N	CONV	mg/kg	1	1	100%			3	3	3	12.5 bgs
Phosphate	CONV	mg/kg	1	0	0%	0.130	0.130	--	--	--	
Sulfate	CONV	mg/kg	1	1	100%			0.918	0.918	0.918	12.5 bgs
pH	CONV	pH	1	1	100%			9.24	9.24	9.24	12.5 bgs
Oil & grease	CONV	ug/kg	1	0	0%	719,000	719,000	--	--	--	
Diethyl ether	VOA	ug/kg	1	0	0%	5,000	5,000	--	--	--	
Ethylene glycol	VOA	ug/kg	1	0	0%	5,000	5,000	--	--	--	
Methanol	VOA	ug/kg	1	0	0%	1,000	1,000	--	--	--	
dichlorodiphenyldichloroethane	PEST	ug/kg	1	0	0%	3.40	3.40	--	--	--	
dichlorodiphenyldichloroethylene	PEST	ug/kg	1	0	0%	3.40	3.40	--	--	--	
dichlorodiphenyltrichloroethane	PEST	ug/kg	1	0	0%	3.40	3.40	--	--	--	
2,4,5-trichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	17.0	17.0	--	--	--	
2,4-dichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	34.0	34.0	--	--	--	
2-(2,4,5-trichlorophenoxy)propionic acid	HERB	ug/kg	1	0	0%	17.0	17.0	--	--	--	
2-secButyl-4,6-dinitrophenol (DNBP)	HERB	ug/kg	1	0	0%	17.0	17.0	--	--	--	
4-(2,4-Dichlorophenoxy)butanoic acid	HERB	ug/kg	1	0	0%	170	170	--	--	--	

Table A-1. Data Summary Table – Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Aldrin	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
Alpha-BHC	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
alpha-Chlordane	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
beta-1,2,3,4,5,6-hexachlorocyclohexane	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
Delta-BHC	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
dieldrin	PEST	ug/kg	1	0	0%	3.40	3.40	--	--	--	
Endosulfan I	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
Endosulfan II	PEST	ug/kg	1	0	0%	3.40	3.40	--	--	--	
Endosulfan sulfate	PEST	ug/kg	1	0	0%	3.40	3.40	--	--	--	
Endrin	PEST	ug/kg	1	0	0%	3.40	3.40	--	--	--	
Endrin aldehyde	PEST	ug/kg	1	0	0%	3.40	3.40	--	--	--	
Endrin ketone	PEST	ug/kg	1	0	0%	3.40	3.40	--	--	--	
Gamma-BHC (Lindane)	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
gamma-Chlordane	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
Heptachlor	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
Heptachlor epoxide	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
Methoxychlor	PEST	ug/kg	1	0	0%	17.0	17.0	--	--	--	
Toxaphene	PEST	ug/kg	1	0	0%	170	170	--	--	--	
Dalapon	HERB	ug/kg	1	0	0%	170	170	--	--	--	
Dicamba	HERB	ug/kg	1	0	0%	68.0	68.0	--	--	--	
Dichloroprop	HERB	ug/kg	1	0	0%	170	170	--	--	--	
1,1,1-Trichloroethane	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
1,1,2,2-Tetrachloroethane	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
1,1,2-Trichloroethane	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
1,1-Dichloroethane	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
1,1-Dichloroethene	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
1,2-Dichloroethane	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
1,2-Dichloroethene (Total)	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
1,2-Dichloropropane	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
2-Butanone	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
2-Hexanone	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
2-Pentanone	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
4-Methyl-2-Pentanone	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
Acetone	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
Benzene	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
Bromodichloromethane	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
Bromoform	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
Bromomethane	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
Carbon disulfide	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
Carbon tetrachloride	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
Chlorobenzene	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
Chloroethane	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
Chloroform	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
Chloromethane	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
cis-1,3-Dichloropropene	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
Dibromochloromethane	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	

Table A-1. Data Summary Table -- Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Ethylbenzene	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
Methylene chloride	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
n-Butylbenzene	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
Styrene	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
Tetrachloroethene	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
Toluene	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
trans-1,3-Dichloropropene	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
Trichloroethene	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
Vinyl chloride	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
Xylenes (total)	VOA	ug/kg	1	0	0%	2.00	2.00	--	--	--	
1,2,4-Trichlorobenzene	SVOA	ug/kg	1	0	0%	310	310	--	--	--	
1,2-Dichlorobenzene	SVOA	ug/kg	1	0	0%	380	380	--	--	--	
1,3-Dichlorobenzene	SVOA	ug/kg	1	0	0%	340	340	--	--	--	
1,4-Dichlorobenzene	SVOA	ug/kg	1	0	0%	330	330	--	--	--	
2,4,5-Trichlorophenol	SVOA	ug/kg	1	0	0%	77.0	77.0	--	--	--	
2,4,6-Trichlorophenol	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
2,4-Dichlorophenol	SVOA	ug/kg	1	0	0%	84.0	84.0	--	--	--	
2,4-Dimethylphenol	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
2,4-Dinitrophenol	SVOA	ug/kg	1	0	0%	700	700	--	--	--	
2,4-Dinitrotoluene	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
2,6-Dinitrotoluene	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
2-Butoxyethanol	SVOA	ug/kg	1	0	0%	100	100	--	--	--	
2-Chloronapthalene	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
2-Chlorophenol	SVOA	ug/kg	1	0	0%	150	150	--	--	--	
2-Methylnapthalene	SVOA	ug/kg	1	0	0%	190	190	--	--	--	
2-Methylphenol (cresol, o-)	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
2-Nitroaniline	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
2-Nitrophenol	SVOA	ug/kg	1	0	0%	180	180	--	--	--	
3,3'-Dichlorobenzidine	SVOA	ug/kg	1	0	0%	84.0	84.0	--	--	--	
3+4 Methylphenol (cresol m+p)	SVOA	ug/kg	1	0	0%	120	120	--	--	--	
3-Nitroaniline	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
4,6-Dinitro-2-methylphenol	SVOA	ug/kg	1	0	0%	700	700	--	--	--	
4-Bromophenylphenylether	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
4-Chloro-3-methylphenol	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
4-Chloroaniline	SVOA	ug/kg	1	0	0%	98.0	98.0	--	--	--	
4-Chlorophenylphenylether	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
4-Nitroaniline	SVOA	ug/kg	1	0	0%	260	260	--	--	--	
4-Nitrophenol	SVOA	ug/kg	1	0	0%	680	680	--	--	--	
Acenaphthene	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Acenaphthylene	SVOA	ug/kg	1	0	0%	84.0	84.0	--	--	--	
Anthracene	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Benzo(a)anthracene	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Benzo(a)pyrene	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Benzo(b)fluoranthene	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Benzo(ghi)perylene	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Benzo(k)fluoranthene	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	

Table A-1. Data Summary Table – Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Benzyl alcohol	SVOA	ug/kg	1	0	0%	80.0	80.0	--	--	--	
Bis(2-chloro-1-methylethyl)ether	SVOA	ug/kg	1	0	0%	270	270	--	--	--	
Bis(2-Chloroethoxy)methane	SVOA	ug/kg	1	0	0%	120	120	--	--	--	
Bis(2-chloroethyl) ether	SVOA	ug/kg	1	0	0%	260	260	--	--	--	
Bis(2-ethylhexyl)phthalate	SVOA	ug/kg	1	0	0%	590	590	--	--	--	
Butylbenzylphthalate	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Carbazole	SVOA	ug/kg	1	0	0%	84.0	84.0	--	--	--	
Chrysene	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Di-n-butylphthalate	SVOA	ug/kg	1	0	0%	91.0	91.0	--	--	--	
Di-n-octylphthalate	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Dibenz[a,h]anthracene	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Dibenzofuran	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Diethylphthalate	SVOA	ug/kg	1	1	100%			280	280	280	12.5 bgs
Dimethylphthalate	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Fluoranthene	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Fluorene	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Hexachlorobenzene	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Hexachlorobutadiene	SVOA	ug/kg	1	0	0%	380	380	--	--	--	
Hexachlorocyclopentadiene	SVOA	ug/kg	1	0	0%	330	330	--	--	--	
Hexachloroethane	SVOA	ug/kg	1	0	0%	490	490	--	--	--	
Ideno(1,2,3-cd)pyrene	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Isophorone	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
n-butyl benzenesulfonamide	SVOA	ug/kg	1	1	100%			1,200	1,200	1,200	12.5 bgs
N-Nitrosodi-n-dipropylamine	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
N-Nitrosodiphenylamine	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Naphthalene	SVOA	ug/kg	1	0	0%	300	300	--	--	--	
Nitrobenzene	SVOA	ug/kg	1	0	0%	270	270	--	--	--	
Pentachlorophenol	SVOA	ug/kg	1	0	0%	310	310	--	--	--	
Phenanthrene	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Phenol	SVOA	ug/kg	1	0	0%	100	100	--	--	--	
Pyrene	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Tributyl phosphate	SVOA	ug/kg	1	0	0%	70.0	70.0	--	--	--	
Aroclor-1016	PCB	ug/kg	1	0	0%	52.0	52.0	--	--	--	
Aroclor-1221	PCB	ug/kg	1	0	0%	100	100	--	--	--	
Aroclor-1232	PCB	ug/kg	1	0	0%	52.0	52.0	--	--	--	
Aroclor-1242	PCB	ug/kg	1	0	0%	52.0	52.0	--	--	--	
Aroclor-1248	PCB	ug/kg	1	0	0%	52.0	52.0	--	--	--	
Aroclor-1254	PCB	ug/kg	1	0	0%	52.0	52.0	--	--	--	
Aroclor-1260	PCB	ug/kg	1	0	0%	52.0	52.0	--	--	--	
Aroclor-1262	PCB	ug/kg	1	0	0%	52.0	52.0	--	--	--	
Aroclor-1268	PCB	ug/kg	1	0	0%	52.0	52.0	--	--	--	
Total petroleum hydrocarbons -diesel range	DIESEL	ug/kg	1	0	0%	3,900	3,900	--	--	--	
Total petroleum hydrocarbons -kerosene range	DIESEL	ug/kg	1	0	0%	3,900	3,900	--	--	--	
Total petroleum hydrocarbons -gasoline range	GAS	ug/kg	1	0	0%	100	100	--	--	--	
216-A-37-1 Crib											
Actinium-228	RAD	pCi/g	1	1	100%			0.581	0.581	0.581	12.5 bgs

Table A-1. Data Summary Table -- Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Americium-241	RAD	pCi/g	1	0	0%	0.029	0.029		--	--	
Antimony-125	RAD	pCi/g	1	0	0%	0.041	0.041		--	--	
Bismuth-212	RAD	pCi/g	1	1	100%			0.366	0.366	0.366	12.5 bgs
Bismuth-214	RAD	pCi/g	1	1	100%			0.406	0.406	0.406	12.5 bgs
Carbon-14	RAD	pCi/g	1	0	0%	1.47	1.47		--	--	
Cerium-144	RAD	pCi/g	1	0	0%	0.032	0.032		--	--	
Cesium-134	RAD	pCi/g	1	0	0%	0.024	0.024		--	--	
Cesium-137	RAD	pCi/g	1	1	100%			0.113	0.113	0.113	12.5 bgs
Cobalt-60	RAD	pCi/g	1	0	0%	0.003	0.003		--	--	
Europium-152	RAD	pCi/g	1	0	0%	0.002	0.002		--	--	
Europium-154	RAD	pCi/g	1	0	0%	0.02	0.02		--	--	
Europium-155	RAD	pCi/g	1	0	0%	0.038	0.038		--	--	
Iodine-129	RAD	pCi/g	1	0	0%	0.221	0.221		--	--	
Lead-212	RAD	pCi/g	1	1	100%			0.592	0.592	0.592	12.5 bgs
Lead-214	RAD	pCi/g	1	1	100%			0.492	0.492	0.492	12.5 bgs
Neptunium-237	RAD	pCi/g	1	0	0%	0.016	0.016		--	--	
Nickel-63	RAD	pCi/g	1	0	0%	1.81	1.81		--	--	
Niobium-94	RAD	pCi/g	1	0	0%	0.009	0.009		--	--	
Plutonium-238	RAD	pCi/g	1	0	0%	-0.035	-0.035		--	--	
Plutonium-239/240	RAD	pCi/g	1	0	0%	-0.002	-0.002		--	--	
Radium-226	RAD	pCi/g	1	1	100%			0.406	0.406	0.406	12.5 bgs
Radium-228	RAD	pCi/g	1	1	100%			0.581	0.581	0.581	12.5 bgs
Ruthenium-103	RAD	pCi/g	1	0	0%	-0.002	-0.002		--	--	
Ruthenium-106	RAD	pCi/g	1	0	0%	-0.053	-0.053		--	--	
Technetium-99	RAD	pCi/g	1	0	0%	0.166	0.166		--	--	
Thallium-208	RAD	pCi/g	1	1	100%			0.164	0.164	0.164	12.5 bgs
Thorium-228	RAD	pCi/g	1	1	100%			0.572	0.572	0.572	12.5 bgs
Thorium-230	RAD	pCi/g	1	0	0%	0.143	0.143		--	--	
Thorium-232	RAD	pCi/g	1	1	100%			0.393	0.393	0.393	12.5 bgs
Thorium-234	RAD	pCi/g	1	0	0%	-0.306	-0.306		--	--	
Tin-113	RAD	pCi/g	1	0	0%	0.007	0.007		--	--	
Tin-126	RAD	pCi/g	1	0	0%	0.149	0.149		--	--	
Total Radioactive Strontium	RAD	pCi/g	1	1	100%			1.700	1.700	1.700	12.5 bgs
Tritium	RAD	pCi/g	1	1	100%			134	134	134	12.5 bgs
Uranium (mg/kg)	METAL	mg/kg	1	0	0%	0.492	0.492		--	--	
Uranium-233/234	RAD	pCi/g	1	1	100%			0.17	0.17	0.17	
Uranium-235	RAD	pCi/g	1	1	100%			0.012	0.012	0.012	12.5 bgs
Uranium-238	RAD	pCi/g	1	1	100%			0.180	0.180	0.180	12.5 bgs
Zinc-65	RAD	pCi/g	1	0	0%	0.043	0.043		--	--	
Aluminum	METAL	mg/kg	1	1	100%			8,660	8,660	8,660	12.5 bgs
Antimony	METAL	mg/kg	2	0	0%	0.230	2.46		--	--	
Arsenic	METAL	mg/kg	2	2	100%			1.56	1.70	1.70	12.5 bgs
Barium	METAL	mg/kg	2	2	100%			114	165	165	12.5 bgs
Beryllium	METAL	mg/kg	2	1	50%	1.48	1.48	0.310	0.310	0.310	12.5 bgs
Bismuth	METAL	mg/kg	2	0	0%	0.53	9.24		--	--	
Boron	METAL	mg/kg	2	1	50%	9.43	9.43	0.510	0.510	0.510	12.5 bgs

Table A-1. Data Summary Table – Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Cadmium	METAL	mg/kg	2	0	0%	0.040	0.492		--	--	
Chromium (Total)	METAL	mg/kg	2	2	100%			8.50	8.85	8.85	12.5 bgs
Cobalt	METAL	mg/kg	1	1	100%			12.6	12.6	12.6	12.5 bgs
Copper	METAL	mg/kg	2	2	100%			14.6	14.7	14.7	12.5 bgs
Hexavalent Chromium	METAL	mg/kg	1	0	0%	0.430	0.430		--	--	
Lead	METAL	mg/kg	2	1	50%	5.90	5.90	3.90	3.90	3.90	12.5 bgs
Manganese	METAL	mg/kg	1	1	100%			547	547	547	12.5 bgs
Mercury	METAL	mg/kg	2	1	50%	0.492	0.492	0.020	0.020	0.020	12.5 bgs
Molybdenum	METAL	mg/kg	1	0	0%	1.48	1.48		--	--	
Nickel	METAL	mg/kg	2	2	100%			11.0	13.0	13.0	12.5 bgs
Selenium	METAL	mg/kg	2	0	0%	0.440	1.48		--	--	
Silver	METAL	mg/kg	2	0	0%	0.130	0.984		--	--	
Thallium	METAL	mg/kg	1	1	100%			0.883	0.883	0.883	12.5 bgs
Thorium	METAL	mg/kg	1	1	100%			2.53	2.53	2.53	12.5 bgs
Vanadium	METAL	mg/kg	1	1	100%			82.7	82.7	82.7	12.5 bgs
Zinc	METAL	mg/kg	1	1	100%			56.7	56.7	56.7	12.5 bgs
Ammonia as N	CONV	mg/kg	2	1	50%	68.7	68.7	266	266	266	12.5 bgs
Bromide	CONV	mg/kg	1	0	0%	2.25	2.25	--	--	--	
Chloride	CONV	mg/kg	2	2	100%			13.8	14.3	14.3	12.5 bgs
Cyanide	CONV	mg/kg	2	0	0%	0.190	0.400	--	--	--	
Fluoride	CONV	mg/kg	2	1	50%	1.30	1.30	1.06	1.06	1.06	12.5 bgs
Nitrate as N	CONV	mg/kg	2	2	100%			382	385	385	12.5 bgs
Nitrite as N	CONV	mg/kg	2	1	50%	0.404	0.404	1.66	1.66	1.66	12.5 bgs
Nitrate and nitrate/nitrite as N	CONV	mg/kg	1	1	100%			489	489	489	12.5 bgs
Phosphate	CONV	mg/kg	2	0	0%	0.650	1.30	--	--	--	
Sulfate	CONV	mg/kg	2	2	100%			--	--	--	12.5 bgs
pH	CONV	pH	2	2	100%			7.91	7.91	7.91	12.5 bgs
Oil & grease	CONV	ug/kg	1	0	0%	710,000	710,000		--	--	
Diethyl ether	VOA	ug/kg	2	0	0%	5,000	28,000		--	--	
Ethylene glycol	VOA	ug/kg	2	0	0%	25.5	5,000		--	--	
Methanol	VOA	ug/kg	2	0	0%	1,000	28,000		--	--	
dichlorodiphenyldichloroethane	PEST	ug/kg	1	0	0%	3.60	3.60		--	--	
dichlorodiphenyldichloroethylene	PEST	ug/kg	1	0	0%	3.60	3.60		--	--	
dichlorodiphenyltrichloroethane	PEST	ug/kg	1	0	0%	3.60	3.60		--	--	
2,4,5-trichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	18.0	18.0		--	--	
2,4-dichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	36.0	36.0		--	--	
2-(2,4,5-trichlorophenoxy)propionic acid	HERB	ug/kg	1	0	0%	18.0	18.0		--	--	
2-secButyl-4,6-dinitrophenol (DNBP)	HERB	ug/kg	1	0	0%	18.0	18.0		--	--	
4-(2,4-Dichlorophenoxy)butanoic acid	HERB	ug/kg	1	0	0%	180	180		--	--	
Aldrin	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	
Alpha-BHC	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	
alpha-Chlordane	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	
beta-1,2,3,4,5,6-hexachlorocyclohexane	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	
Delta-BHC	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	
dieldrin	PEST	ug/kg	1	0	0%	3.60	3.60		--	--	
Endosulfan I	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	

Table A-1. Data Summary Table -- Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Endosulfan II	PEST	ug/kg	1	0	0%	3.60	3.60		--	--	
Endosulfan sulfate	PEST	ug/kg	1	0	0%	3.60	3.60		--	--	
Endrin	PEST	ug/kg	1	0	0%	3.60	3.60		--	--	
Endrin aldehyde	PEST	ug/kg	1	0	0%	3.60	3.60		--	--	
Endrin ketone	PEST	ug/kg	1	0	0%	3.60	3.60		--	--	
Gamma-BHC (Lindane)	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	
gamma-Chlordane	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	
Heptachlor	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	
Heptachlor epoxide	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	
Methoxychlor	PEST	ug/kg	1	0	0%	18.0	18.0		--	--	
Toxaphene	PEST	ug/kg	1	0	0%	180	180		--	--	
Dalapon	HERB	ug/kg	1	0	0%	180	180		--	--	
Dicamba	HERB	ug/kg	1	0	0%	72.0	72.0		--	--	
Dichloroprop	HERB	ug/kg	1	0	0%	180	180		--	--	
1,1,1-Trichloroethane	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
1,1,2,2-Tetrachloroethane	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
1,1,2-Trichloroethane	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
1,1-Dichloroethane	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
1,1-Dichloroethene	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
1,2-Dichloroethane	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
1,2-Dichloroethene (Total)	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
1,2-Dichloropropane	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
1-butanol	VOA	ug/kg	1	0	0%	21.0	21.0		--	--	
2-Butanone	VOA	ug/kg	2	0	0%	2.10	11.0		--	--	
2-Hexanone	VOA	ug/kg	2	0	0%	2.10	11.0		--	--	
2-Pentanone	VOA	ug/kg	1	0	0%	2.10	2.10		--	--	
4-Methyl-2-Pentanone	VOA	ug/kg	2	0	0%	2.10	11.0		--	--	
Acetone	VOA	ug/kg	2	1	50%	2.10	2.10	13.0	13.0	13.0	12.5 bgs
Benzene	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
Bromodichloromethane	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
Bromoform	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
Bromomethane	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
Carbon disulfide	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
Carbon tetrachloride	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
Chlorobenzene	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
Chloroethane	VOA	ug/kg	2	0	0%	2.10	11.0		--	--	
Chloroform	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
Chloromethane	VOA	ug/kg	2	0	0%	2.10	11.00		--	--	
cis-1,3-Dichloropropene	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
Dibromochloromethane	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
Ethylbenzene	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
Methylene chloride	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
n-Butylbenzene	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
Styrene	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
Tetrachloroethene	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
Toluene	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	

Table A-1. Data Summary Table -- Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
trans-1,3-Dichloropropene	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
Trichloroethene	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
Vinyl chloride	VOA	ug/kg	2	0	0%	2.10	11.0		--	--	
Xylenes (total)	VOA	ug/kg	2	0	0%	2.10	6.00		--	--	
1,2,4-Trichlorobenzene	SVOA	ug/kg	2	0	0%	310	360		--	--	
1,2-Dichlorobenzene	SVOA	ug/kg	2	0	0%	360	380		--	--	
1,3-Dichlorobenzene	SVOA	ug/kg	2	0	0%	340	360		--	--	
1,4-Dichlorobenzene	SVOA	ug/kg	2	0	0%	330	360		--	--	
2,4,5-Trichlorophenol	SVOA	ug/kg	2	0	0%	77.0	890		--	--	
2,4,6-Trichlorophenol	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
2,4-Dichlorophenol	SVOA	ug/kg	2	0	0%	84.0	360		--	--	
2,4-Dimethylphenol	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
2,4-Dinitrophenol	SVOA	ug/kg	2	0	0%	700	890		--	--	
2,4-Dinitrotoluene	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
2,6-Dinitrotoluene	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
2-Butoxyethanol	SVOA	ug/kg	2	0	0%	110	360		--	--	
2-Chloronapthalene	SVOA	ug/kg	2	0	0%	84.0	360		--	--	
2-Chlorophenol	SVOA	ug/kg	2	0	0%	150	360		--	--	
2-Methylnapthalene	SVOA	ug/kg	2	0	0%	190	360		--	--	
2-Methylphenol (cresol, o-)	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
2-Nitroaniline	SVOA	ug/kg	2	0	0%	70.0	890		--	--	
2-Nitrophenol	SVOA	ug/kg	2	0	0%	180	360		--	--	
3,3'-Dichlorobenzidine	SVOA	ug/kg	2	0	0%	84.0	360		--	--	
3+4 Methylphenol (cresol m+p)	SVOA	ug/kg	1	0	0%	120	120		--	--	
3-Nitroaniline	SVOA	ug/kg	2	0	0%	70.0	890		--	--	
4,6-Dinitro-2-methylphenol	SVOA	ug/kg	2	0	0%	700	890		--	--	
4-Bromophenylphenylether	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
4-Chloro-3-methylphenol	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
4-Chloroaniline	SVOA	ug/kg	2	0	0%	98.0	360		--	--	
4-Chlorophenylphenylether	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
4-Methylphenol (cresol, p-)	SVOA	ug/kg	1	0	0%	360	360		--	--	
4-Nitroaniline	SVOA	ug/kg	2	0	0%	260	890		--	--	
4-Nitrophenol	SVOA	ug/kg	2	0	0%	680	890		--	--	
Acenaphthene	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Acenaphthylene	SVOA	ug/kg	2	0	0%	84.0	360		--	--	
Anthracene	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Benzo(a)anthracene	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Benzo(a)pyrene	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Benzo(b)fluoranthene	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Benzo(ghi)perylene	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Benzo(k)fluoranthene	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Benzyl alcohol	SVOA	ug/kg	2	0	0%	77.0	360		--	--	
Bis(2-chloro-1-methylethyl)ether	SVOA	ug/kg	2	0	0%	270	360		--	--	
Bis(2-Chloroethoxy)methane	SVOA	ug/kg	2	0	0%	120	360		--	--	
Bis(2-chloroethyl) ether	SVOA	ug/kg	2	0	0%	260	360		--	--	
Bis(2-ethylhexyl)phthalate	SVOA	ug/kg	2	1	50%	590	590	21.0	21.0	21.0	12.5 bgs

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Butylbenzylphthalate	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Carbazole	SVOA	ug/kg	2	0	0%	84.0	360		--	--	
Chrysene	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Di-n-butylphthalate	SVOA	ug/kg	2	0	0%	91.0	360		--	--	
Di-n-octylphthalate	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Dibenz[a,h]anthracene	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Dibenzofuran	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Diethylphthalate	SVOA	ug/kg	2	0	0%	360	360	650	650	650	12.5 bgs
Dimethylphthalate	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Fluoranthene	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Fluorene	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Hexachlorobenzene	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Hexachlorobutadiene	SVOA	ug/kg	2	0	0%	360	390		--	--	
Hexachlorocyclopentadiene	SVOA	ug/kg	2	0	0%	330	360		--	--	
Hexachloroethane	SVOA	ug/kg	2	0	0%	360	490		--	--	
Ideno(1,2,3-cd)pyrene	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Isophorone	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
n-butyl benzenesulfonamide	SVOA	ug/kg	1	1	100%			660	660	660	12.5 bgs
N-Nitrosodi-n-dipropylamine	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
N-Nitrosodiphenylamine	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Naphthalene	SVOA	ug/kg	2	0	0%	300	360		--	--	
Nitrobenzene	SVOA	ug/kg	2	0	0%	270	360		--	--	
Pentachlorophenol	SVOA	ug/kg	2	0	0%	310	910		--	--	
Phenanthrene	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Phenol	SVOA	ug/kg	2	0	0%	110	360		--	--	
Pyrene	SVOA	ug/kg	2	0	0%	70.0	360		--	--	
Tributyl phosphate	SVOA	ug/kg	2	1	50%	70.0	70	45.0	45.0	45.0	12.5 bgs
Aroclor-1016	PCB	ug/kg	2	0	0%	16.0	50		--	--	
Aroclor-1221	PCB	ug/kg	2	0	0%	16.0	50		--	--	
Aroclor-1232	PCB	ug/kg	2	0	0%	16.0	50		--	--	
Aroclor-1242	PCB	ug/kg	2	0	0%	16.0	50		--	--	
Aroclor-1248	PCB	ug/kg	2	0	0%	16.0	50		--	--	
Aroclor-1254	PCB	ug/kg	2	0	0%	16.0	50		--	--	
Aroclor-1260	PCB	ug/kg	2	0	0%	16.0	50		--	--	
Aroclor-1262	PCB	ug/kg	1	0	0%	16.0	50		--	--	
Aroclor-1268	PCB	ug/kg	1	0	0%	16.0	50		--	--	
Total petroleum hydrocarbons -diesel range	DIESEL	ug/kg	2	0	0%	4,200	12,800		--	--	
Total petroleum hydrocarbons -kerosene range	DIESEL	ug/kg	2	0	0%	4,200	12,800		--	--	
Total petroleum hydrocarbons -gasoline range	GAS	ug/kg	2	0	0%	33.0	100		--	--	
216-B-12 Crib											
Carbon-14	RAD	pCi/g	1	0	0%	-0.02	-0.02		--	--	
Cesium-134	RAD	pCi/g	1	0	0%	0.23	0.23		--	--	
Cesium-137	RAD	pCi/g	1	0	0%	0.14	0.14		--	--	
Cobalt-60	RAD	pCi/g	1	0	0%	0.14	0.14		--	--	
Europium-152	RAD	pCi/g	1	0	0%	0.34	0.34		--	--	
Europium-154	RAD	pCi/g	1	0	0%	0.42	0.42		--	--	

Table A-1. Data Summary Table – Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Europium-155	RAD	pCi/g	1	0	0%	0.26	0.26		--	--	
Iodine-129	RAD	pCi/g	1	0	0%	-0.051	-0.051		--	--	
Neptunium-237	RAD	pCi/g	1	0	0%	0.043	0.043		--	--	
Nickel-63	RAD	pCi/g	1	0	0%	0.061	0.061		--	--	
Plutonium-238	RAD	pCi/g	1	0	0%	0	0		--	--	
Plutonium-239/240	RAD	pCi/g	1	0	0%	0	0		--	--	
Potassium-40	RAD	pCi/g	1	1	100%			14.2	14.2	14.2	14.5 bgs
Radium-226	RAD	pCi/g	1	1	100%			0.708	0.708	0.708	14.5 bgs
Radium-228	RAD	pCi/g	1	0	0%	1.10	1.10		--	--	
Technetium-99	RAD	pCi/g	1	0	0%	0.123	0.123		--	--	
Thorium-228	RAD	pCi/g	1	1	100%			0.584	0.584	0.584	14.5 bgs
Thorium-230	RAD	pCi/g	1	1	100%			1.190	1.190	1.190	14.5 bgs
Thorium-232	RAD	pCi/g	1	1	100%			0.716	0.716	0.716	14.5 bgs
Tin-126	RAD	pCi/g	1	1	100%			0.742	0.742	0.742	14.5 bgs
Total Radioactive Strontium	RAD	pCi/g	1	0	0%	0.125	0.125		--	--	
Tritium	RAD	pCi/g	1	1	100%			8.28	8.28	8.28	14.5 bgs
Uranium (mg/kg)	METAL	mg/kg	1	1	100%			0.445	0.445	0.445	14.5 bgs
Uranium-233/234	RAD	pCi/g	1	1	100%			0.605	0.605	0.605	14.5 bgs
Uranium-235	RAD	pCi/g	1	0	0%	0.027	0.027		--	--	
Uranium-238	RAD	pCi/g	1	1	100%			0.628	0.628	0.628	14.5 bgs
Antimony	METAL	mg/kg	1	1	100%			0.380	0.380	0.380	14.5 bgs
Arsenic	METAL	mg/kg	1	1	100%			7.30	7.30	7.30	14.5 bgs
Barium	METAL	mg/kg	1	1	100%			82.3	82.3	82.3	14.5 bgs
Beryllium	METAL	mg/kg	1	1	100%			0.330	0.330	0.330	14.5 bgs
Bismuth	METAL	mg/kg	1	0	0%	0.450	0.450		--	--	
Boron	METAL	mg/kg	1	1	100%			1.30	1.30	1.30	14.5 bgs
Cadmium	METAL	mg/kg	1	1	100%			0.080	0.080	0.080	14.5 bgs
Chromium (Total)	METAL	mg/kg	1	1	100%			7.10	7.10	7.10	14.5 bgs
Hexavalent Chromium	METAL	mg/kg	1	0	0%	0.421	0.421		--	--	
Copper	METAL	mg/kg	1	1	100%			14.1	14.1	14.1	14.5 bgs
Lead	METAL	mg/kg	1	1	100%			6.10	6.10	6.10	14.5 bgs
Mercury	METAL	mg/kg	1	0	0%	0.020	0.020	--	--	--	
Nickel	METAL	mg/kg	1	1	100%			8.50	8.50	8.50	14.5 bgs
Selenium	METAL	mg/kg	1	0	0%	0.370	0.370		--	--	
Silver	METAL	mg/kg	1	0	0%	0.110	0.110		--	--	
Ammonia as N	CONV	mg/kg	1	0	0%	6.50	6.50		--	--	
Chloride	CONV	mg/kg	1	1	100%			7.33	7.33	7.33	14.5 bgs
Cyanide	CONV	mg/kg	1	0	0%	0.479	0.479		--	--	
Fluoride	CONV	mg/kg	1	0	0%	1.32	1.32		--	--	
Nitrate as N	CONV	mg/kg	1	1	100%			13.0	13.0	13.0	14.5 bgs
Nitrite as N	CONV	mg/kg	1	0	0%	0.401	0.401		--	--	
Nitrate and nitrate/nitrite as N	CONV	mg/kg	1	1	100%			16.2	16.2	16.2	14.5 bgs
Phosphate	CONV	mg/kg	1	0	0%	1.32	1.32		--	--	
Sulfate	CONV	mg/kg	1	1	100%			467	467	467	14.5 bgs
pH	CONV	pH	1	1	100%			9.09	9.09	9.09	14.5 bgs
Oil & grease	CONV	ug/kg	1	0	0%	702,000	702,000		--	--	

Table A-1. Data Summary Table -- Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
Diethyl ether	VOA	ug/kg	1	0	0%	28,000	28,000		--	--	
Ethylene glycol	VOA	ug/kg	1	0	0%	23.50	23.50		--	--	
Methanol	VOA	ug/kg	1	0	0%	28,000	28,000		--	--	
dichlorodiphenyldichloroethane	PEST	ug/kg	1	0	0%	3.30	3.30		--	--	
dichlorodiphenyldichloroethylene	PEST	ug/kg	1	0	0%	3.30	3.30		--	--	
dichlorodiphenyltrichloroethane	PEST	ug/kg	1	0	0%	3.30	3.30		--	--	
1-butanol	VOA	ug/kg	1	0	0%	28,000	28,000		--	--	
2,4,5-trichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	18.0	18.0		--	--	
2,4-dichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	35.0	35.0		--	--	
2-(2,4,5-trichlorophenoxy)propionic acid	HERB	ug/kg	1	0	0%	18.0	18.0		--	--	
2-secButyl-4,6-dinitrophenol (DNBP)	HERB	ug/kg	1	0	0%	18.0	18.0		--	--	
4-(2,4-Dichlorophenoxy)butanoic acid	HERB	ug/kg	1	0	0%	180	180		--	--	
Aldrin	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Alpha-BHC	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
alpha-Chlordane	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
beta-1,2,3,4,5,6-hexachlorocyclohexane	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Delta-BHC	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
dieldrin	PEST	ug/kg	1	0	0%	3.30	3.30		--	--	
Endosulfan I	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Endosulfan II	PEST	ug/kg	1	0	0%	3.30	3.30		--	--	
Endosulfan sulfate	PEST	ug/kg	1	0	0%	3.30	3.30		--	--	
Endrin	PEST	ug/kg	1	0	0%	3.30	3.30		--	--	
Endrin aldehyde	PEST	ug/kg	1	0	0%	3.30	3.30		--	--	
Endrin ketone	PEST	ug/kg	1	0	0%	3.30	3.30		--	--	
Gamma-BHC (Lindane)	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
gamma-Chlordane	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Heptachlor	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Heptachlor epoxide	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Methoxychlor	PEST	ug/kg	1	0	0%	17.0	17.0		--	--	
Toxaphene	PEST	ug/kg	1	0	0%	170	170		--	--	
Dalapon	HERB	ug/kg	1	0	0%	180	180		--	--	
Dicamba	HERB	ug/kg	1	0	0%	71.0	71.0		--	--	
Dichloroprop	HERB	ug/kg	1	0	0%	180	180		--	--	
1,2,4-Trichlorobenzene	SVOA	ug/kg	1	0	0%	350	350		--	--	
1,2-Dichlorobenzene	SVOA	ug/kg	1	0	0%	350	350		--	--	
1,3-Dichlorobenzene	SVOA	ug/kg	1	0	0%	350	350		--	--	
1,4-Dichlorobenzene	SVOA	ug/kg	1	0	0%	350	350		--	--	
2,4,5-Trichlorophenol	SVOA	ug/kg	1	0	0%	880	880		--	--	
2,4,6-Trichlorophenol	SVOA	ug/kg	1	0	0%	350	350		--	--	
2,4-Dichlorophenol	SVOA	ug/kg	1	0	0%	350	350		--	--	
2,4-Dimethylphenol	SVOA	ug/kg	1	0	0%	350	350		--	--	
2,4-Dinitrophenol	SVOA	ug/kg	1	0	0%	880	880		--	--	
2,4-Dinitrotoluene	SVOA	ug/kg	1	0	0%	350	350		--	--	
2,6-Dinitrotoluene	SVOA	ug/kg	1	0	0%	350	350		--	--	
2-Butoxyethanol	SVOA	ug/kg	1	0	0%	350	350		--	--	
2-Chloronapthalene	SVOA	ug/kg	1	0	0%	350	350		--	--	

Table A-1. Data Summary Table – Shallow Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
2-Chlorophenol	SVOA	ug/kg	1	0	0%	350	350		--	--	
2-Methylnapthalene	SVOA	ug/kg	1	0	0%	350	350		--	--	
2-Methylphenol (cresol, o-)	SVOA	ug/kg	1	0	0%	350	350		--	--	
2-Nitroaniline	SVOA	ug/kg	1	0	0%	880	880		--	--	
2-Nitrophenol	SVOA	ug/kg	1	0	0%	350	350		--	--	
3,3'-Dichlorobenzidine	SVOA	ug/kg	1	0	0%	350	350		--	--	
3-Nitroaniline	SVOA	ug/kg	1	0	0%	880	880		--	--	
4,6-Dinitro-2-methylphenol	SVOA	ug/kg	1	0	0%	880	880		--	--	
4-Bromophenylphenylether	SVOA	ug/kg	1	0	0%	350	350		--	--	
4-Chloro-3-methylphenol	SVOA	ug/kg	1	0	0%	350	350		--	--	
4-Chloroaniline	SVOA	ug/kg	1	0	0%	350	350		--	--	
4-Chlorophenylphenylether	SVOA	ug/kg	1	0	0%	350	350		--	--	
4-Methylphenol (cresol, p-)	SVOA	ug/kg	1	0	0%	350	350		--	--	
4-Nitroaniline	SVOA	ug/kg	1	0	0%	880	880		--	--	
4-Nitrophenol	SVOA	ug/kg	1	0	0%	880	880		--	--	
Acenaphthene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Acenaphthylene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Anthracene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Benzo(a)anthracene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Benzo(a)pyrene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Benzo(b)fluoranthene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Benzo(ghi)perylene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Benzo(k)fluoranthene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Benzyl alcohol	SVOA	ug/kg	1	0	0%	350	350		--	--	
Bis(2-chloro-1-methylethyl)ether	SVOA	ug/kg	1	0	0%	350	350		--	--	
Bis(2-Chloroethoxy)methane	SVOA	ug/kg	1	0	0%	350	350		--	--	
Bis(2-chloroethyl) ether	SVOA	ug/kg	1	0	0%	350	350		--	--	
Bis(2-ethylhexyl)phthalate	SVOA	ug/kg	1	1	100%			18.0	18.0	18.0	14.5 bgs
Butylbenzylphthalate	SVOA	ug/kg	1	0	0%	350	350		--	--	
Carbazole	SVOA	ug/kg	1	0	0%	350	350		--	--	
Chrysene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Di-n-butylphthalate	SVOA	ug/kg	1	1	100%			77.0	77.0	77.0	14.5 bgs
Di-n-octylphthalate	SVOA	ug/kg	1	0	0%	350	350		--	--	
Dibenz[a,h]anthracene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Dibenzofuran	SVOA	ug/kg	1	0	0%	350	350		--	--	
Diethylphthalate	SVOA	ug/kg	1	0	0%	350	350		--	--	
Dimethylphthalate	SVOA	ug/kg	1	0	0%	350	350		--	--	
Fluoranthene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Fluorene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Hexachlorobenzene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Hexachlorobutadiene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Hexachlorocyclopentadiene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Hexachloroethane	SVOA	ug/kg	1	0	0%	350	350		--	--	
Ideno(1,2,3-cd)pyrene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Isophorone	SVOA	ug/kg	1	0	0%	350	350		--	--	
N-Nitrosodi-n-dipropylamine	SVOA	ug/kg	1	0	0%	350	350		--	--	

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Top 15 ft Depth of Max Conc
N-Nitrosodiphenylamine	SVOA	ug/kg	1	0	0%	350	350		--	--	
Naphthalene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Nitrobenzene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Pentachlorophenol	SVOA	ug/kg	1	0	0%	880	880		--	--	
Phenanthrene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Phenol	SVOA	ug/kg	1	0	0%	350	350		--	--	
Pyrene	SVOA	ug/kg	1	0	0%	350	350		--	--	
Tributyl phosphate	SVOA	ug/kg	1	0	0%	350	350		--	--	
Total petroleum hydrocarbons -diesel range	DIESEL	ug/kg	1	0	0%	12,600	12,600		--	--	
Total petroleum hydrocarbons -kerosene range	DIESEL	ug/kg	1	0	0%	12,600	12,600		--	--	
Total petroleum hydrocarbons -gasoline range	GAS	ug/kg	1	1	100%			110	110	110	14.5 bgs

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
207-A Retention Basin Soil Borings											
Actinium-228	RAD	pCi/g	13	13	100%			0.451	1.10	1.10	6-7 bgs
Americium-241	RAD	pCi/g	13	8	62%	0.011	0.022	0.019	0.049	0.049	1-2 bgs
Antimony-125	RAD	pCi/g	13	0	0%	-0.042	0.03		--	--	
Bismuth-212	RAD	pCi/g	13	13	100%			0.222	0.698	0.698	6-7 bgs
Bismuth-214	RAD	pCi/g	13	13	100%			0.290	0.859	0.859	6-7 bgs
Carbon-14	RAD	pCi/g	13	0	0%	-1.06	1.22		--	--	
Cerium-144	RAD	pCi/g	13	0	0%	-0.063	0.034		--	--	
Cesium-134	RAD	pCi/g	13	0	0%	0.008	0.072		--	--	
Cesium-137	RAD	pCi/g	13	9	69%	-0.014	0.017	0.019	1.07	1.07	1-2 bgs
Cobalt-60	RAD	pCi/g	13	0	0%	-0.008	0.009		--	--	
Europium-152	RAD	pCi/g	13	0	0%	-0.045	0.016		--	--	
Europium-154	RAD	pCi/g	13	0	0%	-0.074	0.041		--	--	
Europium-155	RAD	pCi/g	13	1	8%	-0.009	0.059	0.077	0.077	0.077	1-2 bgs
Iodine-129	RAD	pCi/g	13	0	0%	-5.00	0.513		--	--	
Lead-212	RAD	pCi/g	13	13	100%			0.470	1.18	1.18	6-7 bgs
Lead-214	RAD	pCi/g	13	13	100%			0.350	0.971	0.971	6-7 bgs
Neptunium-237	RAD	pCi/g	13	0	0%	-0.037	0.074		--	--	
Nickel-63	RAD	pCi/g	13	0	0%	-1.92	0.959		--	--	
Niobium-94	RAD	pCi/g	13	1	8%	0	0.008	0.032	0.032	0.032	2-3 bgs
Plutonium-238	RAD	pCi/g	13	0	0%	-0.021	0.024		--	--	
Plutonium-239/240	RAD	pCi/g	13	1	8%	0.002	0.012	0.012	0.012	0.012	6-7 bgs
Radium-226	RAD	pCi/g	13	13	100%			0.290	0.859	0.859	6-7 bgs
Radium-228	RAD	pCi/g	13	13	100%			0.451	1.10	1.10	6-7 bgs
Ruthenium-103	RAD	pCi/g	13	0	0%	-0.019	0.008		--	--	
Ruthenium-106	RAD	pCi/g	13	0	0%	-0.061	0.072		--	--	
Technetium-99	RAD	pCi/g	13	0	0%	-0.006	0.124		--	--	
Thallium-208	RAD	pCi/g	13	13	100%			0.127	0.358	0.358	6-7 bgs
Thorium-228	RAD	pCi/g	13	13	100%			0.120	0.737	0.737	12.5-13.5 bgs
Thorium-230	RAD	pCi/g	13	11	85%	0.225	0.28	0.252	1.26	1.26	1-2 bgs
Thorium-232	RAD	pCi/g	13	12	92%	0.18	0.18	0.327	0.722	0.722	1-2 bgs
Thorium-234	RAD	pCi/g	13	7	54%	0.258	0.908	0.734	3.16	3.16	2-3 bgs
Tin-113	RAD	pCi/g	13	0	0%	-0.010	0.015		--	--	
Tin-126	RAD	pCi/g	13	0	0%	0.079	0.283		--	--	
Total Radioactive Strontium	RAD	pCi/g	13	7	54%	-0.088	0.067	0.446	1.40	1.40	1-2 bgs
Tritium	RAD	pCi/g	13	9	69%	-0.034	0.205	0.295	16.60	16.60	6-7 bgs
Uranium (mg/kg)	METAL	mg/kg	13	2	15%	0.890	0.991	1.02	1.04	1.04	6-7 bgs
Uranium-233/234	RAD	pCi/g	13	13	100%			0.094	0.24	0.24	6-7 bgs
Uranium-235	RAD	pCi/g	13	12	92%	0.011	0.011	0.008	0.026	0.026	2-3 bgs
Uranium-238	RAD	pCi/g	13	13	100%			0.100	0.27	0.27	6-7 bgs
Zinc-65	RAD	pCi/g	13	0	0%	-0.050	0.072		--	--	
Antimony	METAL	mg/kg	13	0	0%	4.45	4.99		--	--	
Arsenic	METAL	mg/kg	13	10	77%	2.91	2.96	3.88	9.98	9.98	6-7 bgs
Barium	METAL	mg/kg	13	5	38%	1.78	1.98	15.7	65.5	65.5	6-7 bgs
Beryllium	METAL	mg/kg	13	0	0%	2.67	2.99		--	--	
Bismuth	METAL	mg/kg	13	0	0%	4.92	5.00		--	--	

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Boron	METAL	mg/kg	13	0	0%	5.01	5.10		--	--	
Cadmium	METAL	mg/kg	13	0	0%	0.890	0.998		--	--	6-7 bgs
Chromium (Total)	METAL	mg/kg	13	3	23%	2.67	2.97	7.20	15.5	15.5	
Copper	METAL	mg/kg	13	13	100%			8.40	11.0	11.0	6-7 bgs
Hexavalent Chromium	METAL	mg/kg	13	0	0%	0.41	0.45		--	--	
Lead	METAL	mg/kg	13	0	0%	10.7	12.0		--	--	
Mercury	METAL	mg/kg	13	0	0%	0.890	0.998		--	--	
Nickel	METAL	mg/kg	13	3	23%	4.45	6.50	5.26	9.80	9.80	6-7 bgs
Selenium	METAL	mg/kg	13	0	0%	2.67	2.99		--	--	
Silver	METAL	mg/kg	13	2	15%	1.78	2.00	2.04	5.01	5.01	6-7 bgs
Ammonium ion as N	CONV	mg/kg	13	3	23%	0.200	0.200	0.222	0.248	0.248	1-2 bgs
Chloride	CONV	mg/kg	13	13	100%			0.858	7.56	7.56	12.5-13.5 bgs
Cyanide	CONV	mg/kg	13	0	0%	0.200	0.200		--	--	
Fluoride	CONV	mg/kg	13	0	0%	0.350	0.350		--	--	
Nitrate as N	CONV	mg/kg	13	11	85%	0.250	0.250	0.581	21.8	21.8	2-3 bgs
Nitrite as N	CONV	mg/kg	13	0	0%	0.450	0.450		--	--	
Nitrate and nitrate/nitrite as N	CONV	mg/kg	13	13	100%			0.530	20.9	20.9	2-3 bgs
Phosphate	CONV	mg/kg	13	0	0%	0.650	0.650		--	--	
Sulfate	CONV	mg/kg	13	11	85%	1.20	1.20	5.84	53	53	12.5-13.5 bgs
% moisture (dry)	CONV	%	3	3	100%			3.2%	12.5%	12.5%	7-8 bgs
% moisture (wet)	CONV	%	3	3	100%			3.3%	14.2%	14.2%	7-8 bgs
% Solids	CONV	%	3	3	100%			87.5%	96.8%	96.8%	12.5-13.5 bgs
pH	CONV	pH	13	13	100%			8.39	9.52	9.52	6-7 bgs
Oil & grease	CONV	ug/kg	13	0	0%	680,000	748,000		--	--	
Diethyl ether	VOA	ug/kg	13	0	0%	5,000	5,000		--	--	
Ethylene glycol	VOA	ug/kg	13	0	0%	5,000	5,000		--	--	
Methanol	VOA	ug/kg	13	0	0%	1,000	1,000		--	--	
dichlorodiphenyldichloroethane	PEST	ug/kg	6	0	0%	3.50	3.70		--	--	
dichlorodiphenyldichloroethylene	PEST	ug/kg	6	0	0%	3.50	3.70		--	--	
dichlorodiphenyltrichloroethane	PEST	ug/kg	6	0	0%	3.50	3.70		--	--	
2,4,5-trichlorophenoxyacetic acid	HERB	ug/kg	6	0	0%	18.0	19.0		--	--	
2,4-dichlorophenoxyacetic acid	HERB	ug/kg	6	1	17%	35.0	37.0	7.10	7.10	7.10	1-2 bgs
2-(2,4,5-trichlorophenoxy)propionic acid	HERB	ug/kg	6	1	17%	18.0	19.0	3.30	3.30	3.30	1-2 bgs
2-secButyl-4,6-dinitrophenol (DNBP)	HERB	ug/kg	6	0	0%	18.0	19.0		--	--	
4-(2,4-Dichlorophenoxy)butanoic acid	HERB	ug/kg	6	0	0%	180	190		--	--	
Aldrin	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
Alpha-BHC	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
alpha-Chlordane	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
beta-1,2,3,4,5,6-hexachlorocyclohexane	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
Delta-BHC	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
dieldrin	PEST	ug/kg	6	0	0%	3.50	3.70		--	--	
Endosulfan I	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
Endosulfan II	PEST	ug/kg	6	0	0%	3.50	3.70		--	--	
Endosulfan sulfate	PEST	ug/kg	6	0	0%	3.50	3.70		--	--	
Endrin	PEST	ug/kg	6	0	0%	3.50	3.70		--	--	
Endrin aldehyde	PEST	ug/kg	6	0	0%	3.50	3.70		--	--	

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Endrin ketone	PEST	ug/kg	6	0	0%	3.50	3.70		--	--	
Gamma-BHC (Lindane)	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
gamma-Chlordane	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
Heptachlor	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
Heptachlor epoxide	PEST	ug/kg	6	0	0%	1.80	1.90		--	--	
Methoxychlor	PEST	ug/kg	6	0	0%	18.0	19.0		--	--	
Toxaphene	PEST	ug/kg	6	0	0%	180	190		--	--	
Dalapon	HERB	ug/kg	6	0	0%	180	190		--	--	
Dicamba	HERB	ug/kg	6	0	0%	70.0	75.0		--	--	
Dichloroprop	HERB	ug/kg	6	0	0%	180	190		--	--	
1,1,1-Trichloroethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
1,1,2,2-Tetrachloroethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
1,1,2-Trichloroethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
1,1-Dichloroethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
1,1-Dichloroethene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
1,2-Dichloroethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
1,2-Dichloroethene (Total)	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
1,2-Dichloropropane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
1-butanol	VOA	ug/kg	13	0	0%	41.0	45.0		--	--	
2-Butanone	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
2-Hexanone	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
2-Pentanone	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
4-Methyl-2-Pentanone	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Acetone	VOA	ug/kg	13	1	8%	2.00	2.20	26.0	26.0	26.0	1-2 bgs
Benzene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Bromodichloromethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Bromoform	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Bromomethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Carbon disulfide	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Carbon tetrachloride	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Chlorobenzene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Chloroethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Chloroform	VOA	ug/kg	13	1	8%	2.00	2.20	5.000	5.00	5.00	1-2 bgs
Chloromethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
cis-1,3-Dichloropropene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Dibromochloromethane	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Ethylbenzene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Methylene chloride	VOA	ug/kg	13	1	8%	2.00	2.20	5.000	5.00	5.00	1-2 bgs
n-Butylbenzene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Styrene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Tetrachloroethene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Toluene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
trans-1,3-Dichloropropene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Trichloroethene	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Vinyl chloride	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	
Xylenes (total)	VOA	ug/kg	13	0	0%	2.00	2.20		--	--	

Table A-2. Data Summary Table – Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
1,2,4-Trichlorobenzene	SVOA	ug/kg	13	0	0%	300	320		--	--	
1,2-Dichlorobenzene	SVOA	ug/kg	13	0	0%	370	400		--	--	
1,3-Dichlorobenzene	SVOA	ug/kg	13	0	0%	330	350		--	--	
1,4-Dichlorobenzene	SVOA	ug/kg	13	0	0%	320	350		--	--	
2,4,5-Trichlorophenol	SVOA	ug/kg	13	0	0%	75.0	81.0		--	--	
2,4,6-Trichlorophenol	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
2,4-Dichlorophenol	SVOA	ug/kg	13	0	0%	82.0	88.0		--	--	
2,4-Dimethylphenol	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
2,4-Dinitrophenol	SVOA	ug/kg	13	0	0%	680	740		--	--	
2,4-Dinitrotoluene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
2,6-Dinitrotoluene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
2-Butoxyethanol	SVOA	ug/kg	13	0	0%	100	110		--	--	
2-Chloronapthalene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
2-Chlorophenol	SVOA	ug/kg	13	0	0%	150	160		--	--	
2-Methylnapthalene	SVOA	ug/kg	13	0	0%	180	200		--	--	
2-Methylphenol (cresol, o-)	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
2-Nitroaniline	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
2-Nitrophenol	SVOA	ug/kg	13	0	0%	180	190		--	--	
3,3'-Dichlorobenzidine	SVOA	ug/kg	13	0	0%	82.0	88.0		--	--	
3+4 Methylphenol (cresol m+p)	SVOA	ug/kg	13	0	0%	120	120		--	--	
3-Nitroaniline	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
4,6-Dinitro-2-methylphenol	SVOA	ug/kg	13	0	0%	680	740		--	--	
4-Bromophenylphenylether	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
4-Chloro-3-methylphenol	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
4-Chloroaniline	SVOA	ug/kg	13	0	0%	95.0	100		--	--	
4-Chlorophenylphenyl ether	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
4-Nitroaniline	SVOA	ug/kg	13	0	0%	250	270		--	--	
4-Nitrophenol	SVOA	ug/kg	13	0	0%	660	710		--	--	
Acenaphthene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Acenaphthylene	SVOA	ug/kg	13	0	0%	82.0	88.0		--	--	
Anthracene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Benzo(a)anthracene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Benzo(a)pyrene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Benzo(b)fluoranthene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Benzo(ghi)perylene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Benzo(k)fluoranthene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Benzyl alcohol	SVOA	ug/kg	13	0	0%	75.0	81.0		--	--	
Bis(2-chloro-1-methylethyl)ether	SVOA	ug/kg	13	0	0%	260	280		--	--	
Bis(2-Chloroethoxy)methane	SVOA	ug/kg	13	0	0%	120	120		--	--	
Bis(2-chloroethyl) ether	SVOA	ug/kg	13	0	0%	250	270		--	--	
Bis(2-ethylhexyl)phthalate	SVOA	ug/kg	13	0	0%	570	620		--	--	
Butylbenzylphthalate	SVOA	ug/kg	13	1	8%	68.0	74.0	110	110	110	1-2 bgs
Carbazole	SVOA	ug/kg	13	0	0%	82.0	88.0		--	--	
Chrysene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Di-n-butylphthalate	SVOA	ug/kg	13	0	0%	89.0	96.0		--	--	
Di-n-octylphthalate	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Dibenz[a,h]anthracene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Dibenzofuran	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Diethylphthalate	SVOA	ug/kg	13	4	31%	190	210	210	320	320	1-2 bgs
Dimethylphthalate	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Fluoranthene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Fluorene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Hexachlorobenzene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Hexachlorobutadiene	SVOA	ug/kg	13	0	0%	370	400		--	--	
Hexachlorocyclopentadiene	SVOA	ug/kg	13	0	0%	320	350		--	--	
Hexachloroethane	SVOA	ug/kg	13	0	0%	480	510		--	--	
Ideno(1,2,3-cd)pyrene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Isophorone	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
N-Nitrosodi-n-dipropylamine	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
N-Nitrosodiphenylamine	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Naphthalene	SVOA	ug/kg	13	0	0%	290	320		--	--	
Nitrobenzene	SVOA	ug/kg	13	0	0%	270	290		--	--	
Pentachlorophenol	SVOA	ug/kg	13	0	0%	310	330		--	--	
Phenanthrene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Phenol	SVOA	ug/kg	13	0	0%	100	110		--	--	
Pyrene	SVOA	ug/kg	13	0	0%	68.0	74.0		--	--	
Aroclor-1016	PCB	ug/kg	13	0	0%	49.0	54.0		--	--	
Aroclor-1221	PCB	ug/kg	13	0	0%	97.0	110		--	--	
Aroclor-1232	PCB	ug/kg	13	0	0%	49.0	54.0		--	--	
Aroclor-1242	PCB	ug/kg	13	0	0%	49.0	54.0		--	--	
Aroclor-1248	PCB	ug/kg	13	0	0%	49.0	54.0		--	--	
Aroclor-1254	PCB	ug/kg	13	0	0%	49.0	54.0		--	--	
Aroclor-1260	PCB	ug/kg	13	0	0%	49.0	54.0		--	--	
Aroclor-1262	PCB	ug/kg	13	0	0%	49.0	54.0		--	--	
Aroclor-1268	PCB	ug/kg	13	0	0%	49.0	54.0		--	--	
Total petroleum hydrocarbons -diesel range	DIESEL	ug/kg	13	0	0%	3,800	4,200		--	--	
Total petroleum hydrocarbons -kerosene range	DIESEL	ug/kg	13	0	0%	3,800	4,200		--	--	
Total petroleum hydrocarbons -gasoline range	GAS	ug/kg	13	0	0%	250	250		--	--	
207-A Retention Basin Concrete											
Actinium-228	RAD	pCi/g	3	3	100%			0.384	0.448	0.448	
Americium-241	RAD	pCi/g	3	0	0%	0.008	0.029		--	--	
Antimony-125	RAD	pCi/g	3	0	0%	-0.023	0.03		--	--	
Bismuth-212	RAD	pCi/g	3	3	100%			0.200	0.350	0.350	
Bismuth-214	RAD	pCi/g	3	3	100%			0.303	0.338	0.338	
Carbon-14	RAD	pCi/g	3	0	0%	0.222	0.984		--	--	
Cerium-144	RAD	pCi/g	3	0	0%	-0.113	0.042		--	--	
Cesium-134	RAD	pCi/g	3	0	0%	0.012	0.029		--	--	
Cesium-137	RAD	pCi/g	3	1	33%	0.011	0.015	0.047	0.047	0.047	
Cobalt-60	RAD	pCi/g	3	0	0%	-0.007	0.016		--	--	
Europium-152	RAD	pCi/g	3	0	0%	-0.02	0.005		--	--	
Europium-154	RAD	pCi/g	3	0	0%	-0.049	0.015		--	--	
Europium-155	RAD	pCi/g	3	0	0%	-0.048	0.028		--	--	

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Iodine-129	RAD	pCi/g	3	0	0%	-0.419	0.229		--	--	
Lead-212	RAD	pCi/g	3	3	100%			0.366	0.420	0.420	
Lead-214	RAD	pCi/g	3	3	100%			0.363	0.382	0.382	
Neptunium-237	RAD	pCi/g	3	0	0%	0	0.055		--	--	
Nickel-63	RAD	pCi/g	3	0	0%	-0.608	-0.392		--	--	
Niobium-94	RAD	pCi/g	3	0	0%	-0.006	0.013		--	--	
Plutonium-238	RAD	pCi/g	3	0	0%	0.002	0.021		--	--	
Plutonium-239/240	RAD	pCi/g	3	0	0%	0.002	0.008		--	--	
Radium-226	RAD	pCi/g	3	3	100%			0.303	0.338	0.338	
Radium-228	RAD	pCi/g	3	3	100%			0.384	0.448	0.448	
Ruthenium-103	RAD	pCi/g	3	0	0%	-0.002	0.003		--	--	
Ruthenium-106	RAD	pCi/g	3	0	0%	-0.063	0.026		--	--	
Technetium-99	RAD	pCi/g	3	0	0%	-0.073	0.702		--	--	
Thallium-208	RAD	pCi/g	3	3	100%			0.117	0.141	0.141	
Thorium-228	RAD	pCi/g	3	3	100%			0.361	0.589	0.589	
Thorium-230	RAD	pCi/g	3	3	100%			0.361	0.562	0.562	
Thorium-232	RAD	pCi/g	3	2	67%	0.246	0.246	0.262	0.662	0.662	
Thorium-234	RAD	pCi/g	3	1	33%	0.580	0.729	0.953	0.953	0.953	
Tin-113	RAD	pCi/g	3	0	0%	0.000	0.006		--	--	
Tin-126	RAD	pCi/g	3	0	0%	0.036	0.110		--	--	
Total Radioactive Strontium	RAD	pCi/g	3	1	33%	-0.079	-0.036	0.801	0.801	0.801	
Tritium	RAD	pCi/g	3	3	100%			3.940	7.020	7.020	
Uranium	RAD	ug/kg	3	1	33%	989	992	7,700	7,700	7,700	
Uranium-233/234	RAD	pCi/g	3	3	100%			0.170	0.200	0.200	
Uranium-235	RAD	pCi/g	3	2	67%	0.013	0.013	0.016	0.021	0.021	
Uranium-238	RAD	pCi/g	3	3	100%			0.200	0.240	0.240	
Zinc-65	RAD	pCi/g	3	0	0%	-0.009	0.030		--	--	
Antimony	METAL	mg/kg	3	0	0%	4.90	4.96		--	--	
Arsenic	METAL	mg/kg	3	2	67%	2.98	2.98	3.73	7.50	7.50	
Barium	METAL	mg/kg	3	3	100%			118	160	160	
Beryllium	METAL	mg/kg	3	1	33%	2.97	2.98		4.72	4.72	
Bismuth	METAL	mg/kg	3	0	0%	5.07	5.09		--	--	
Boron	METAL	mg/kg	3	3	100%				16.3	16.3	
Cadmium	METAL	mg/kg	3	1	33%	0.989	0.992		4.03	4.03	
Chromium (Total)	METAL	mg/kg	3	3	100%			15.4	21.4	21.4	
Copper	METAL	mg/kg	3	3	100%			22.4	31.4	31.4	
Hexavalent Chromium	METAL	mg/kg	3	2	67%	0.350	0.350		0.457	0.457	
Lead	METAL	mg/kg	3	0	0%	11.8	11.9		--	--	
Mercury	METAL	mg/kg	3	0	0%	0.981	0.992		--	--	
Nickel	METAL	mg/kg	3	3	100%			9.55	16.2	16.2	
Selenium	METAL	mg/kg	3	1	33%	2.97	2.98	6.28	6.28	6.28	
Silver	METAL	mg/kg	3	3	100%			3.37	6.13	6.13	
Ammonium ion as N	CONV	mg/kg	3	0	0%	0.076	0.080		--	--	
Chloride	CONV	mg/kg	3	1	33%			2.57	2.57	2.57	
Cyanide	CONV	mg/kg	3	0	0%	0.200	0.200		--	--	
Fluoride	CONV	mg/kg	3	0	0%	0.679	0.693		--	--	

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Nitrate as N	CONV	mg/kg	3	0	0%	0.485	0.495		--	--	
Nitrite as N	CONV	mg/kg	3	0	0%	0.873	0.891		--	--	
Nitrate and nitrate/nitrite as N	CONV	mg/kg	3	1	33%			0.320	0.320	0.320	
Phosphate	CONV	mg/kg	3	0	0%	1.26	1.29		--	--	
Sulfate	CONV	mg/kg	3	3	100%			37.9	43.5	43.5	
pH	CONV	pH	3	3	100%			12.4	12.4	12.4	
Oil & grease	CONV	ug/kg	3	0	0%	685,000	690,000		--	--	
Diethyl ether	VOA	ug/kg	3	0	0%	5,000	5,000		--	--	
Ethylene glycol	VOA	ug/kg	3	0	0%	5,000	5,000		--	--	
Methanol	VOA	ug/kg	3	0	0%	1,000	1,000		--	--	
dichlorodiphenyldichloroethane	PEST	ug/kg	3	0	0%	3.3	3.3		--	--	
dichlorodiphenyldichloroethylene	PEST	ug/kg	3	0	0%	3.3	3.3		--	--	
dichlorodiphenyltrichloroethane	PEST	ug/kg	3	0	0%	3.3	3.3		--	--	
2,4,5-trichlorophenoxyacetic acid	HERB	ug/kg	3	0	0%	17.0	17.0		--	--	
2,4-dichlorophenoxyacetic acid	HERB	ug/kg	3	0	0%	33.0	33.0		--	--	
2-(2,4,5-trichlorophenoxy)propionic acid	HERB	ug/kg	3	0	0%	17.0	17.0		--	--	
2-secButyl-4,6-dinitrophenol (DNBP)	HERB	ug/kg	3	0	0%	17.0	17.0		--	--	
4-(2,4-Dichlorophenoxy)butanoic acid	HERB	ug/kg	3	0	0%	170.0	170.0		--	--	
Aldrin	PEST	ug/kg	3	0	0%	1.7	1.7		--	--	
Alpha-BHC	PEST	ug/kg	3	0	0%	1.7	1.7		--	--	
alpha-Chlordane	PEST	ug/kg	3	0	0%	1.7	1.7		--	--	
beta-1,2,3,4,5,6-hexachlorocyclohexane	PEST	ug/kg	3	0	0%	1.7	1.7		--	--	
Delta-BHC	PEST	ug/kg	3	0	0%	3.3	3.3		--	--	
dieldrin	PEST	ug/kg	3	0	0%	1.7	1.7		--	--	
Endosulfan I	PEST	ug/kg	3	0	0%	3.3	3.3		--	--	
Endosulfan II	PEST	ug/kg	3	0	0%	3.3	3.3		--	--	
Endosulfan sulfate	PEST	ug/kg	3	0	0%	3.3	3.3		--	--	
Endrin	PEST	ug/kg	3	0	0%	3.3	3.3		--	--	
Endrin aldehyde	PEST	ug/kg	3	0	0%	3.3	3.3		--	--	
Endrin ketone	PEST	ug/kg	3	0	0%	3.3	3.3		--	--	
Gamma-BHC (Lindane)	PEST	ug/kg	3	0	0%	1.7	1.7		--	--	
gamma-Chlordane	PEST	ug/kg	3	0	0%	1.7	1.7		--	--	
Heptachlor	PEST	ug/kg	3	0	0%	1.7	1.7		--	--	
Heptachlor epoxide	PEST	ug/kg	3	0	0%	1.7	1.7		--	--	
Methoxychlor	PEST	ug/kg	3	0	0%	17.0	17.0		--	--	
Toxaphene	PEST	ug/kg	3	0	0%	170.0	170.0		--	--	
Dalapon	HERB	ug/kg	3	0	0%	170.0	170.0		--	--	
Dicamba	HERB	ug/kg	3	0	0%	67.0	67.0		--	--	
Dichloroprop	HERB	ug/kg	3	0	0%	170.0	170.0		--	--	
1,1,1-Trichloroethane	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
1,1,2,2-Tetrachloroethane	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
1,1,2-Trichloroethane	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
1,1-Dichloroethane	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
1,1-Dichloroethene	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
1,2,3,5-tetramethylbenzene	VOA	ug/kg	3	3	100%			170	770	770	
1,2,4,5-tetramethylbenezene	VOA	ug/kg	2	2	100%			100	290	290	

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
1,2-Dichloroethane	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
1,2-Dichloroethene (Total)	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
1,2-Dichloropropane	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
1,3-dimethyl-5-(1-methylethyl)-benzene	VOA	ug/kg	1	1	100%			160	160	160	
1,3-dimethyl-5-isopropylbenzene	VOA	ug/kg	1	1	100%			170	170	170	
1-butanol	VOA	ug/kg	3	0	0%	41.0	42.0		--	--	
1-ethyl-2,3-dimethylbenzene	VOA	ug/kg	1	1	100%			390	390	390	
1-ethyl-2,4-dimethylbenzene	VOA	ug/kg	3	3	100%			170	400	400	
1-ethyl-3,5-dimethylbenzene	VOA	ug/kg	1	1	100%			59	59	59	
(1-methyl-1-propenyl)- (E)-benzene	VOA	ug/kg	1	1	100%			300	300	300	
2-Butanone	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
2-ethyl-1,3-dimethylbenzene	VOA	ug/kg	1	1	100%			74	74	74	
2-Hexanone	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
2-Pentanone	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
4-Methyl-2-Pentanone	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
Acetone	VOA	ug/kg	3	3	100%			45	120	120	
Benzene	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
Bromodichloromethane	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
Bromoform	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
Bromomethane	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
Carbon disulfide	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
Carbon tetrachloride	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
Chlorobenzene	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
Chloroethane	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
Chloroform	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
Chloromethane	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
cis-1,3-Dichloropropene	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
Dibromochloromethane	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
Ethylbenzene	VOA	ug/kg	3	3	100%			7.00	39.0	39.0	
Methylene chloride	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
n-Butylbenzene	VOA	ug/kg	3	3	100%			3.00	17.0	17.0	
Naphthalene	VOA	ug/kg	3	3	100%			130	350	350	
Pentamethylbenzene	VOA	ug/kg	1	1	100%			63.0	63.0	63.0	
Styrene	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
tert-amylbenzene	VOA	ug/kg	1	1	100%			140	140	140	
Tetrachloroethene	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
Toluene	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
trans-1,3-Dichloropropene	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
Trichloroethene	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
Vinyl chloride	VOA	ug/kg	3	0	0%	2.1	2.1		--	--	
Xylenes (total)	VOA	ug/kg	3	3	100%			50.0	140	140	
1,2,4-Trichlorobenzene	SVOA	ug/kg	3	0	0%	300	300		--	--	
1,2-Dichlorobenzene	SVOA	ug/kg	3	0	0%	370	370		--	--	
1,3-Dichlorobenzene	SVOA	ug/kg	3	0	0%	330	330		--	--	
1,4-Dichlorobenzene	SVOA	ug/kg	3	0	0%	320	320		--	--	
1-methylnaphthalene	SVOA	ug/kg	3	0	0%			1,300	1,300	1,300	

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
2,4,5-Trichlorophenol	SVOA	ug/kg	3	0	0%	75.0	75.0		--	--	
2,4,6-Trichlorophenol	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
2,4-Dichlorophenol	SVOA	ug/kg	3	0	0%	82.0	82.0		--	--	
2,4-Dimethylphenol	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
2,4-Dinitrophenol	SVOA	ug/kg	3	0	0%	680	690		--	--	
2,4-Dinitrotoluene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
2,6-Dinitrotoluene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
2-Butoxyethanol	SVOA	ug/kg	3	0	0%	100	100		--	--	
2-Chloronapthalene	SVOA	ug/kg	3	0	0%	68	69		--	--	
2-Chlorophenol	SVOA	ug/kg	3	0	0%	150	150		--	--	
2-Methylnapthalene	SVOA	ug/kg	3	2	67%	190	190	450	1,000	1,000	
2-Methylphenol (cresol, o-)	SVOA	ug/kg	3	0	0%	68	69		--	--	
2-Nitroaniline	SVOA	ug/kg	3	0	0%	68	69		--	--	
2-Nitrophenol	SVOA	ug/kg	3	0	0%	180	180		--	--	
2-Pentene 4,4-dimethyl	SVOA	ug/kg	1	1	100%			640,000	640,000	640,000	
3,3'-Dichlorobenzidine	SVOA	ug/kg	3	0	0%	82.0	82.0		--	--	
3,5-Dimethyl-2-cyclohexen-1-one	SVOA	ug/kg	2	2	100%			1,200	6,000	6,000	
3+4 Methylphenol (cresol m+p)	SVOA	ug/kg	3	2	67%	120	120	2,000	2,800	2,800	
3-methyl 2-cyclohexen-1-one	SVOA	ug/kg	3	3	100%			4,800	14,000	14,000	
3-Nitroaniline	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
4,6-Dinitro-2-methylphenol	SVOA	ug/kg	3	0	0%	680	690		--	--	
4-Bromophenylphenylether	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
4-Chloro-3-methylphenol	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
4-Chloroaniline	SVOA	ug/kg	3	0	0%	95.0	96.0		--	--	
4-Chlorophenylphenyl ether	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
4-Methylphenol (cresol, p-)	SVOA	ug/kg	1	1	100%			3,000	3,000	3,000	
4-Nitroaniline	SVOA	ug/kg	3	0	0%	250	250		--	--	
4-Nitrophenol	SVOA	ug/kg	3	0	0%	660	670		--	--	
Acenaphthene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Acenaphthylene	SVOA	ug/kg	3	0	0%	82.0	82.0		--	--	
Anthracene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Benzo(a)anthracene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Benzo(a)pyrene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Benzo(b)fluoranthene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Benzo(ghi)perylene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Benzo(k)fluoranthene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Benzyl alcohol	SVOA	ug/kg	3	0	0%	75.0	75.0		--	--	
Bis(2-chloro-1-methylethyl)ether	SVOA	ug/kg	3	0	0%	260	260		--	--	
Bis(2-Chloroethoxy)methane	SVOA	ug/kg	3	0	0%	120	120		--	--	
Bis(2-chloroethyl) ether	SVOA	ug/kg	3	0	0%	250	250		--	--	
Bis(2-ethylhexyl)phthalate	SVOA	ug/kg	3	0	0%	270	580		--	--	
Butylbenzylphthalate	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Carbazole	SVOA	ug/kg	3	0	0%	82.0	82.0		--	--	
Chrysene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Di-n-butylphthalate	SVOA	ug/kg	3	0	0%	89.0	89.0		--	--	
Di-n-octylphthalate	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Dibenz[a,h]anthracene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Dibenzofuran	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Diethylphthalate	SVOA	ug/kg	3	2	67%	190	190	380	650	650	
Dimethylphthalate	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Fluoranthene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Fluorene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Hexachlorobenzene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Hexachlorobutadiene	SVOA	ug/kg	3	0	0%	370	380		--	--	
Hexachlorocyclopentadiene	SVOA	ug/kg	3	0	0%	320	320		--	--	
Hexachloroethane	SVOA	ug/kg	3	0	0%	480	480		--	--	
Ideno(1,2,3-cd)pyrene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Isophorone	SVOA	ug/kg	3	3	100%			2,600	11,800	11,800	
mesityl oxide	SVOA	ug/kg	2	2	100%			760,000	2,500,000	2,500,000	
N-Nitrosodi-n-dipropylamine	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
N-Nitrosodiphenylamine	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
n-Octadecane	SVOA	ug/kg	1	1	100%			5,600	5,600	5,600	
Naphthalene	SVOA	ug/kg	3	3	100%			300	4,200	4,200	
Nitrobenzene	SVOA	ug/kg	3	0	0%	270	270		--	--	
Pentachlorophenol	SVOA	ug/kg	3	0	0%	310	310		--	--	
Phenanthrene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Phenol	SVOA	ug/kg	3	0	0%	100	100		--	--	
Phorone	SVOA	ug/kg	1	1	100%			3,200	3,200	3,200	
Propane 2-methyl-2-(1-methylethoxy)	SVOA	ug/kg	1	1	100%			1,300,000	1,300,000	1,300,000	
Pyrene	SVOA	ug/kg	3	0	0%	68.0	69.0		--	--	
Tributyl phosphate	SVOA	ug/kg	3	1	33%	68.0	69.0	370	370	370	
Aroclor-1016	PCB	ug/kg	3	0	0%	47.0	50.0		--	--	
Aroclor-1221	PCB	ug/kg	3	0	0%	94.0	100		--	--	
Aroclor-1232	PCB	ug/kg	3	0	0%	47.0	50.0		--	--	
Aroclor-1242	PCB	ug/kg	3	0	0%	47.0	50.0		--	--	
Aroclor-1248	PCB	ug/kg	3	0	0%	47.0	50.0		--	--	
Aroclor-1254	PCB	ug/kg	3	0	0%	47.0	50.0		--	--	
Aroclor-1260	PCB	ug/kg	3	0	0%	47.0	50.0		--	--	
Aroclor-1262	PCB	ug/kg	3	0	0%	47.0	50.0		--	--	
Aroclor-1268	PCB	ug/kg	3	0	0%	47.0	50.0		--	--	
Total petroleum hydrocarbons -diesel range	DIESEL	ug/kg	3	3	100%			28,000	66,000	66,000	
Total petroleum hydrocarbons -kerosene range	DIESEL	ug/kg	3	0	0%	5,100	5,200		--	--	
Total petroleum hydrocarbons -gasoline range	GAS	ug/kg	3	3	100%			1,520	4,640	4,640	
Total petroleum hydrocarbons -motor oil (high boiling)	DIESEL	ug/kg	3	3	100%			67,000	1,000,000	1,000,000	
216-A-10 Crib											
Actinium-228	RAD	pCi/g	4	4	100%			0.525	0.963	0.963	292 bgs
Americium-241	RAD	pCi/g	14	6	43%	-0.037	0.029	4.120	1,320	1,320	52 bgs
Antimony-125	RAD	pCi/g	4	0	0%	-0.010	0.016		--	--	
Bismuth-212	RAD	pCi/g	4	4	100%			0.359	0.605	0.605	292 bgs
Bismuth-214	RAD	pCi/g	4	4	100%			0.472	0.717	0.717	317 bgs
Carbon-14	RAD	pCi/g	14	1	7%	-0.903	1.580	7.500	7.50	7.50	62.5 bgs
Cerium-144	RAD	pCi/g	4	0	0%	-0.047	0.017		--	--	

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Cesium-134	RAD	pCi/g	14	0	0%	0.028	0.270		--	--	
Cesium-137	RAD	pCi/g	14	5	36%	-0.009	0.150	294	2,950	2,950	62.5 bgs
Cobalt-60	RAD	pCi/g	14	0	0%	-0.005	0.220		--	--	
Europium-152	RAD	pCi/g	14	0	0%	-0.011	4.600		--	--	
Europium-154	RAD	pCi/g	14	1	7%	-0.017	0.630	0.200	0.20	0.20	62.5 bgs
Europium-155	RAD	pCi/g	14	1	7%	0.013	2.700	0.054	0.054	0.054	287.5 bgs
Iodine-129	RAD	pCi/g	14	5	36%	-1.760	1.520	3.410	38.80	38.80	62.5 bgs
Lead-212	RAD	pCi/g	4	4	100%			0.528	0.97	0.97	292 bgs
Lead-214	RAD	pCi/g	4	4	100%			0.550	0.660	0.660	317 bgs
Neptunium-237	RAD	pCi/g	14	3	21%	-0.040	0.052	0.012	0.132	0.132	62.5 bgs
Nickel-63	RAD	pCi/g	14	1	7%	-1.290	1.710	2.130	2.13	2.13	127.5 bgs
Niobium-94	RAD	pCi/g	4	0	0%	0.001	0.009		--	--	
Plutonium-238	RAD	pCi/g	14	2	14%	-0.021	0.073	132	316	316	52 bgs
Plutonium-239/240	RAD	pCi/g	14	6	43%	0.000	0.976	0.006	7,110	7,110	52 bgs
Potassium-40	RAD	pCi/g	10	10	100%			18.7	27.0	27.0	52 bgs
Radium-226	RAD	pCi/g	14	10	71%	0.750	2.500	0.472	0.820	0.820	12.5 bgs
Radium-228	RAD	pCi/g	14	11	79%	1.300	1.700	0.525	1.270	1.270	62.5 bgs
Ruthenium-103	RAD	pCi/g	4	0	0%	-0.004	0.002		--	--	
Ruthenium-106	RAD	pCi/g	4	0	0%	-0.043	0.006		--	--	
Technetium-99	RAD	pCi/g	14	4	29%	-0.113	0.298	0.785	1.03	1.03	62.5 bgs
Thallium-208	RAD	pCi/g	4	4	100%			0.168	0.29	0.29	292 bgs
Thorium-228	RAD	pCi/g	14	13	93%	0.600	0.600	0.449	2.11	2.11	62.5 bgs
Thorium-230	RAD	pCi/g	14	11	79%	0.008	0.257	0.321	1.100	1.100	62.5 bgs
Thorium-232	RAD	pCi/g	14	14	100%			0.353	0.881	0.881	62.5 bgs
Thorium-234	RAD	pCi/g	4	1	25%	0.498	0.703	0.829	0.829	0.829	287.5 bgs
Tin-113	RAD	pCi/g	4	0	0%	-0.008	0.002		--	--	
Tin-126	RAD	pCi/g	14	0	0%	0.079	1.50		--	--	
Total Radioactive Strontium	RAD	pCi/g	14	9	64%	0.002	0.162	0.614	44.700	44.700	127.5 bgs
Tritium	RAD	pCi/g	14	13	93%	0.166	0.166	9.450	835	835	317 bgs
Uranium (mg/kg)	METAL	mg/kg	14	10	71%	0.943	1.02	0.442	2.78	2.78	62.5 bgs
Uranium-233/234	RAD	pCi/g	14	13	93%	0.372	0.372	0.150	1.39	1.39	62.5 bgs
Uranium-235	RAD	pCi/g	14	4	29%	0.000	0.150	0.010	0.227	0.227	52 bgs
Uranium-238	RAD	pCi/g	14	14	100%			0.110	1.22	1.22	62.5 bgs
Zinc-65	RAD	pCi/g	4	0	0%	-0.009	0.046		--	--	
Antimony	METAL	mg/kg	14	4	29%	0.226	5.08	0.297	0.480	0.480	12.5 bgs
Arsenic	METAL	mg/kg	14	13	93%	2.99	2.99	2.60	4.80	4.80	62.5 bgs
Barium	METAL	mg/kg	14	14	100%			3.50	73.7	73.7	87.5 bgs
Beryllium	METAL	mg/kg	14	10	71%	2.83	3.05	0.027	0.420	0.420	87.5 bgs
Bismuth	METAL	mg/kg	14	0	0%	0.340	5.00		--	--	
Boron	METAL	mg/kg	14	10	71%	5.04	5.20	0.400	1.00	1.00	52 bgs
Cadmium	METAL	mg/kg	14	2	14%	0.040	1.02	0.120	0.260	0.260	12.5 bgs
Chromium (Total)	METAL	mg/kg	14	14	100%			1.70	10.3	10.3	127.5 bgs
Copper	METAL	mg/kg	14	11	79%	4.72	5.08	1.30	11.2	11.2	12.5 bgs
Hexavalent Chromium	METAL	mg/kg	10	0	0%	0.410	0.468		--	--	
Lead	METAL	mg/kg	14	10	71%	11.30	12.20	0.686	7.70	7.70	127.5 bgs
Mercury	METAL	mg/kg	14	9	64%	0.020	1.02	0.020	1.25	1.25	62.5 bgs

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Nickel	METAL	mg/kg	14	14	100%			0.994	11.3	11.3	127.5 bgs
Selenium	METAL	mg/kg	14	2	14%	0.270	3.05	2.98	3.57	3.57	317 bgs
Silver	METAL	mg/kg	14	2	14%	0.080	2.03	2.17	3.08	3.08	317 bgs
Ammonium ion as N	CONV	mg/kg	14	1	7%	0.200	6.90	0.452	0.452	0.452	317 bgs
Chloride	CONV	mg/kg	14	3	21%	1.30	2.60	2.69	6.43	6.43	287.5 bgs
Cyanide	CONV	mg/kg	14	0	0%	0.200	0.541		--	--	
Fluoride	CONV	mg/kg	14	2	14%	1.15	1.46	1.39	1.90	1.90	87.5 bgs
Nitrate as N	CONV	mg/kg	14	7	50%	0.290	1.32	0.542	26.8	26.8	52 bgs
Nitrite as N	CONV	mg/kg	14	2	14%	0.386	0.950	0.389	0.404	0.404	12.5 bgs
Nitrate and nitrate/nitrite as N	CONV	mg/kg	14	11	79%	0.179	0.228	0.26	25.8	25.8	52 bgs
Phosphate	CONV	mg/kg	14	3	21%	1.30	2.70	2.79	26.9	26.9	52 bgs
Sulfate	CONV	mg/kg	14	11	79%	1.30	5.00	3.30	35.6	35.6	62.5 bgs
% moisture (dry)	CONV	%	2	2	100%			3.20%	3.80%	3.80%	72.5 bgs
% moisture (wet)	CONV	%	2	2	100%			3.30%	4.00%	4.00%	72.5 bgs
% solids	CONV	%	1	1	100%			96.2%	96.2%	96.2%	72.5 bgs
pH	CONV	pH	14	14	100%			5.49	9.30	9.30	127.5 bgs
Oil & grease	CONV	ug/kg	10	2	20%	678,000	726,000	3,620,000	59,400,000	59,400,000	62.5 bgs
Diethyl ether	VOA	ug/kg	14	0	0%	20	29,000		--	--	
Ethylene glycol	VOA	ug/kg	14	1	7%	23.5	5,000	37.0	37.0	37.0	54 bgs
Methanol	VOA	ug/kg	14	0	0%	20	29,000		--	--	
dichlorodiphenyldichloroethane	PEST	ug/kg	1	0	0%	3.5	3.5		--	--	
dichlorodiphenyldichloroethylene	PEST	ug/kg	1	0	0%	3.5	3.5		--	--	
dichlorodiphenyltrichloroethane	PEST	ug/kg	1	0	0%	3.5	3.5		--	--	
2,4,5-trichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	17.0	17.0		--	--	
2,4-dichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	35.0	35.0		--	--	
2-(2,4,5-trichlorophenoxy)propionic acid	HERB	ug/kg	1	0	0%	17.0	17.0		--	--	
2-secButyl-4,6-dinitrophenol (DNBP)	HERB	ug/kg	1	0	0%	17.0	17.0		--	--	
4-(2,4-Dichlorophenoxy)butanoic acid	HERB	ug/kg	1	0	0%	170	170		--	--	
Aldrin	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Alpha-BHC	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
alpha-Chlordane	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
beta-1,2,3,4,5,6-hexachlorocyclohexane	PEST	ug/kg	1	1	100%			7.00	7.00	7.00	0.5 bgs
Delta-BHC	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
dieldrin	PEST	ug/kg	1	0	0%	3.50	3.50		--	--	
Endosulfan I	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Endosulfan II	PEST	ug/kg	1	0	0%	3.50	3.50		--	--	
Endosulfan sulfate	PEST	ug/kg	1	0	0%	3.50	3.50		--	--	
Endrin	PEST	ug/kg	1	0	0%	3.50	3.50		--	--	
Endrin aldehyde	PEST	ug/kg	1	0	0%	3.50	3.50		--	--	
Endrin ketone	PEST	ug/kg	1	0	0%	3.50	3.50		--	--	
Gamma-BHC (Lindane)	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
gamma-Chlordane	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Heptachlor	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Heptachlor epoxide	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Methoxychlor	PEST	ug/kg	1	0	0%	17.0	17.0		--	--	
Toxaphene	PEST	ug/kg	1	0	0%	170	170		--	--	

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Dalapon	HERB	ug/kg	1	0	0%	170	170		--	--	
Dicamba	HERB	ug/kg	1	0	0%	70.0	70.0		--	--	
Dichloroprop	HERB	ug/kg	1	0	0%	170	170		--	--	
1,1,1-Trichloroethane	VOA	ug/kg	13	0	0%	2.00	660		--	--	
1,1,2,2-Tetrachloroethane	VOA	ug/kg	13	0	0%	2.00	660		--	--	
1,1,2-Trichloroethane	VOA	ug/kg	13	0	0%	2.00	660		--	--	
1,1-Dichloroethane	VOA	ug/kg	13	0	0%	2.00	660		--	--	
1,1-Dichloroethene	VOA	ug/kg	13	0	0%	2.00	660		--	--	
1,2-Dichloroethane	VOA	ug/kg	13	0	0%	2.00	660		--	--	
1,2-Dichloroethene (Total)	VOA	ug/kg	13	0	0%	2.00	660		--	--	
1,2-Dichloropropane	VOA	ug/kg	13	0	0%	2.00	660		--	--	
1-butanol	VOA	ug/kg	14	0	0%	20.0	29,000		--	--	
2-Butanone	VOA	ug/kg	13	2	15%	2.00	1,300	14.407	17.578	17.578	62.5 bgs
2-Hexanone	VOA	ug/kg	13	0	0%	2.00	1,300		--	--	
2-Pentanone	VOA	ug/kg	7	0	0%	2.00	11.0		--	--	
4-Methyl-2-Pentanone	VOA	ug/kg	13	0	0%	2.00	1,300		--	--	
Acetone	VOA	ug/kg	13	4	31%	2.00	1,300	3.000	137.92	137.92	62.5 bgs
Benzene	VOA	ug/kg	13	0	0%	2.00	660		--	--	
Bromodichloromethane	VOA	ug/kg	13	0	0%	2.00	660		--	--	
Bromoform	VOA	ug/kg	13	0	0%	2.00	660		--	--	
Bromomethane	VOA	ug/kg	13	0	0%	2.00	1,300		--	--	
Carbon disulfide	VOA	ug/kg	13	0	0%	2.00	660		--	--	
Carbon tetrachloride	VOA	ug/kg	13	0	0%	2.00	660		--	--	
Chlorobenzene	VOA	ug/kg	13	0	0%	2.00	660		--	--	
Chloroethane	VOA	ug/kg	13	0	0%	2.00	1,300		--	--	
Chloroform	VOA	ug/kg	13	0	0%	2.00	660		--	--	
Chloromethane	VOA	ug/kg	13	0	0%	2.00	1,300		--	--	
cis-1,3-Dichloropropene	VOA	ug/kg	13	0	0%	2.00	660		--	--	
Dibromochloromethane	VOA	ug/kg	13	0	0%	2.00	660		--	--	
Ethylbenzene	VOA	ug/kg	13	0	0%	2.00	660		--	--	
Methylene chloride	VOA	ug/kg	13	10	77%	2.00	660	6.000	29.074	29.074	62.5 bgs
n-Butylbenzene	VOA	ug/kg	10	0	0%	2.00	660		--	--	
Styrene	VOA	ug/kg	13	0	0%	2.00	660		--	--	
Tetrachloroethene	VOA	ug/kg	13	0	0%	2.00	660		--	--	
Toluene	VOA	ug/kg	13	4	31%	2.00	6.000	1.238	250	250	62.5 bgs
trans-1,3-Dichloropropene	VOA	ug/kg	13	0	0%	2.00	660		--	--	
Trichloroethene	VOA	ug/kg	13	0	0%	2.00	660		--	--	
Vinyl chloride	VOA	ug/kg	13	0	0%	2.00	1,300		--	--	
Xylenes (total)	VOA	ug/kg	13	0	0%	2.00	660		--	--	
1,2,4-Trichlorobenzene	SVOA	ug/kg	14	0	0%	300	78,000		--	--	
1,2-Dichlorobenzene	SVOA	ug/kg	14	0	0%	340	78,000		--	--	
1,3-Dichlorobenzene	SVOA	ug/kg	14	0	0%	320	78,000		--	--	
1,4-Dichlorobenzene	SVOA	ug/kg	14	0	0%	320	78,000		--	--	
1-chloropropane	SVOA	ug/kg	6	1	17%	340	38,000	380	380	380	52 bgs
2,4,5-Trichlorophenol	SVOA	ug/kg	14	0	0%	74.0	200,000		--	--	
2,4,6-Trichlorophenol	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
2,4-Dichlorophenol	SVOA	ug/kg	14	0	0%	81.0	78,000		--	--	
2,4-Dimethylphenol	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
2,4-Dinitrophenol	SVOA	ug/kg	14	0	0%	680	200,000		--	--	
2,4-Dinitrotoluene	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
2,6-Dinitrotoluene	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
2-Butoxyethanol	SVOA	ug/kg	14	1	7%	100	78,000	25.6	25.6	25.6	62.5 bgs
2-Chloronapthalene	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
2-Chlorophenol	SVOA	ug/kg	14	0	0%	150	78,000		--	--	
2-Methylnapthalene	SVOA	ug/kg	14	0	0%	180	78,000		--	--	
2-Methylphenol (cresol, o-)	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
2-Nitroaniline	SVOA	ug/kg	14	0	0%	68.0	200,000		--	--	
2-Nitrophenol	SVOA	ug/kg	14	0	0%	180	78,000		--	--	
3,3'-Dichlorobenzidine	SVOA	ug/kg	14	0	0%	81.0	78,000		--	--	
3+4 Methylphenol (cresol m+p)	SVOA	ug/kg	7	0	0%	110	340		--	--	
3-Nitroaniline	SVOA	ug/kg	14	0	0%	68.0	200,000		--	--	
4,6-Dinitro-2-methylphenol	SVOA	ug/kg	14	0	0%	680	200,000		--	--	
4-Bromophenylphenylether	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
4-Chloro-3-methylphenol	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
4-Chloroaniline	SVOA	ug/kg	14	0	0%	95.0	78,000		--	--	
4-Chlorophenylphenylether	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
4-Methylphenol (cresol, p-)	SVOA	ug/kg	10	0	0%	340	78,000		--	--	
4-Nitroaniline	SVOA	ug/kg	14	0	0%	250	200,000		--	--	
4-Nitrophenol	SVOA	ug/kg	14	0	0%	660	200,000		--	--	
Acenaphthene	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Acenaphthylene	SVOA	ug/kg	14	0	0%	81.0	78,000		--	--	
Anthracene	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Benzo(a)anthracene	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Benzo(a)pyrene	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Benzo(b)fluoranthene	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Benzo(ghi)perylene	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Benzo(k)fluoranthene	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Benzyl alcohol	SVOA	ug/kg	14	0	0%	74.0	78,000		--	--	
Bis(2-chloro-1-methylethyl)ether	SVOA	ug/kg	14	0	0%	260	78,000		--	--	
Bis(2-Chloroethoxy)methane	SVOA	ug/kg	14	0	0%	110	78,000		--	--	
Bis(2-chloroethyl) ether	SVOA	ug/kg	14	0	0%	250	78,000		--	--	
Bis(2-ethylhexyl)phthalate	SVOA	ug/kg	14	2	14%	340	78,000	20.000	141	141	62.5 bgs
Butylbenzylphthalate	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Carbazole	SVOA	ug/kg	14	0	0%	81.0	78,000		--	--	
Chrysene	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Di-n-butylphthalate	SVOA	ug/kg	14	0	0%	88.0	78,000		--	--	
Di-n-octylphthalate	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Dibenz[a,h]anthracene	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Dibenzofuran	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Diethylphthalate	SVOA	ug/kg	14	3	21%	190	78,000	260	390	390	317 bgs
Dimethylphthalate	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Eicosane	SVOA	ug/kg	2	2	100%		78,000	570	590	590	287.5 bgs

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Fluoranthene	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Fluorene	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Hexachlorobenzene	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Hexachlorobutadiene	SVOA	ug/kg	14	0	0%	340	78,000		--	--	
Hexachlorocyclopentadiene	SVOA	ug/kg	14	0	0%	320	78,000		--	--	
Hexachloroethane	SVOA	ug/kg	14	0	0%	340	78,000		--	--	
Ideno(1,2,3-cd)pyrene	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Isophorone	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
n-Hexanoic Acid	SVOA	ug/kg	1	1	100%			1,200	1,200	1,200	197.5 bgs
N-Nitrosodi-n-dipropylamine	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
N-Nitrosodiphenylamine	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Naphthalene	SVOA	ug/kg	14	0	0%	290	78,000		--	--	
Nitrobenzene	SVOA	ug/kg	14	0	0%	260	78,000		--	--	
Octacosane	SVOA	ug/kg	1	1	100%			570	570	570	197.50
Pentachlorophenol	SVOA	ug/kg	14	1	7%	300	200,000	20.4	20.4	20.4	62.5 bgs
Phenanthrene	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Phenol	SVOA	ug/kg	14	0	0%	100	78,000		--	--	
Pyrene	SVOA	ug/kg	14	0	0%	68.0	78,000		--	--	
Tributyl phosphate	SVOA	ug/kg	14	7	50%	68.0	360	19.0	2,000,000	2,000,000	62.5 bgs
Aroclor-1016	PCB	ug/kg	4	0	0%	48.0	50.0		--	--	
Aroclor-1221	PCB	ug/kg	4	0	0%	97.0	100		--	--	
Aroclor-1232	PCB	ug/kg	4	0	0%	48.0	50.0		--	--	
Aroclor-1242	PCB	ug/kg	4	0	0%	48.0	50.0		--	--	
Aroclor-1248	PCB	ug/kg	4	0	0%	48.0	50.0		--	--	
Aroclor-1254	PCB	ug/kg	4	0	0%	48.0	50.0		--	--	
Aroclor-1260	PCB	ug/kg	4	0	0%	48.0	50.0		--	--	
Aroclor-1262	PCB	ug/kg	4	0	0%	48.0	50.0		--	--	
Aroclor-1268	PCB	ug/kg	4	0	0%	48.0	50.0		--	--	
Total petroleum hydrocarbons -diesel range	DIESEL	ug/kg	14	1	7%	12.2	14,000,000	10,000,000	10,000,000	10,000,000	54 bgs
Total petroleum hydrocarbons -kerosene range	DIESEL	ug/kg	14	3	21%	12.2	1,370,000	700,000	24,000,000	24,000,000	62.5 bgs
Total petroleum hydrocarbons -gasoline range	GAS	ug/kg	14	1	7%	29.0	250	1,500	1,500	1,500	62.5 bgs
Total petroleum hydrocarbons -motor oil (high boiling)	DIESEL	ug/kg	2	2	100%			34,000	90,000	90,000	197.5 bgs
216-A-19 Trench											
Actinium-228	RAD	pCi/g	11	11	100%			0.476	0.592	0.592	97.5 bgs
Americium-241	RAD	pCi/g	11	2	18%	-0.007	0.021	0.006	0.081	0.081	14.5 bgs
Antimony-125	RAD	pCi/g	11	0	0%	-0.016	0.017	--	--	--	
Bismuth-212	RAD	pCi/g	11	11	100%			0.294	0.467	0.467	22.5 bgs
Bismuth-214	RAD	pCi/g	11	11	100%			0.324	0.527	0.527	97.5 bgs
Carbon-14	RAD	pCi/g	11	0	0%	-0.226	0.460	--	--	--	
Cerium-144	RAD	pCi/g	11	0	0%	-0.068	0.055	--	--	--	
Cesium-134	RAD	pCi/g	11	0	0%	0.019	0.050	--	--	--	
Cesium-137	RAD	pCi/g	11	3	27%	-0.016	0.002	0.024	0.072	0.072	32.5 bgs
Cobalt-60	RAD	pCi/g	11	0	0%	-0.008	0.004	--	--	--	
Europium-152	RAD	pCi/g	11	0	0%	-0.030	0.008	--	--	--	
Europium-154	RAD	pCi/g	11	0	0%	-0.027	0.016	--	--	--	
Europium-155	RAD	pCi/g	11	4	36%	-0.020	0.059	0.035	0.066	0.066	14.5 bgs

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Iodine-129	RAD	pCi/g	11	0	0%	-0.992	0.344	--	--	--	
Lead-212	RAD	pCi/g	11	11	100%			0.406	0.599	0.599	248 bgs
Lead-214	RAD	pCi/g	11	11	100%			0.378	0.552	0.552	97.5 bgs
Neptunium-237	RAD	pCi/g	11	0	0%	-0.019	0.077	--	--	--	
Nickel-63	RAD	pCi/g	11	2	18%	-0.817	1.590	10.100	17.6	17.6	14.5 bgs
Niobium-94	RAD	pCi/g	11	0	0%	-0.001	0.011	--	--	--	
Plutonium-238	RAD	pCi/g	11	0	0%	-0.026	0.036	--	--	--	
Plutonium-239/240	RAD	pCi/g	11	4	36%	-0.007	0.009	0.014	0.180	0.180	14.5 bgs
Radium-226	RAD	pCi/g	11	11	100%			0.324	0.527	0.527	97.5 bgs
Radium-228	RAD	pCi/g	11	11	100%			0.476	0.592	0.592	97.5 bgs
Ruthenium-103	RAD	pCi/g	11	0	0%	-0.006	0.006	--	--	--	
Ruthenium-106	RAD	pCi/g	11	0	0%	-0.062	0.041	--	--	--	
Technetium-99	RAD	pCi/g	11	0	0%	0.026	0.460	--	--	--	
Thallium-208	RAD	pCi/g	11	11	100%			0.118	0.182	0.182	17.5 bgs, 22.5 bgs
Thorium-228	RAD	pCi/g	11	10	91%	0.180	0.180	0.261	0.685	0.685	97.5 bgs
Thorium-230	RAD	pCi/g	11	7	64%	0.105	0.224	0.379	0.742	0.742	32.5 bgs
Thorium-232	RAD	pCi/g	11	11	100%			0.183	0.742	0.742	32.5 bgs
Thorium-234	RAD	pCi/g	11	8	73%	0.344	0.825	0.598	56.8	56.8	14.5 bgs
Tin-113	RAD	pCi/g	11	0	0%	-0.018	0.002	--	--	--	
Tin-126	RAD	pCi/g	11	0	0%	-0.024	0.190	--	--	--	
Total Radioactive Strontium	RAD	pCi/g	11	4	36%	-0.077	0.184	7.70	20.0	20.0	17.5 bgs
Tritium	RAD	pCi/g	11	1	9%	0.000	0.141	0.424	0.424	0.424	248 bgs
Uranium (mg/kg)	METAL	mg/kg	11	7	64%	0.437	0.495	2.76	130	130	22.5 bgs
Uranium-233/234	RAD	pCi/g	11	11	100%			0.095	6.00	6.00	14.5 bgs
Uranium-235	RAD	pCi/g	11	11	100%			0.008	0.940	0.940	14.5 bgs
Uranium-238	RAD	pCi/g	11	11	100%			0.100	51.0	51.0	14.5 bgs
Zinc-65	RAD	pCi/g	11	0	0%	-0.013	0.051	--	--	--	
Aluminum	METAL	mg/kg	11	11	100%			5,270	7,490	7,490	32.5 bgs
Antimony	METAL	mg/kg	11	0	0%	0.239	2.48		--	--	
Arsenic	METAL	mg/kg	11	7	64%	1.42	1.49	2.07	7.00	7.00	14.5 bgs
Barium	METAL	mg/kg	11	11	100%			56.3	98.9	98.9	14.5 bgs
Beryllium	METAL	mg/kg	11	4	36%	1.31	1.49	0.231	0.256	0.256	22.5 bgs
Bismuth	METAL	mg/kg	11	2	18%	0.007	8.91	8.14	36,400	36,400	97.5 bgs
Boron	METAL	mg/kg	11	4	36%	8.87	920	31.2	38.9	38.9	14.5 bgs
Cadmium	METAL	mg/kg	11	4	36%	0.437	0.496	0.186	0.211	0.211	14.5 bgs
Chromium (Total)	METAL	mg/kg	11	11	100%			3.71	14.2	14.2	207.5 bgs
Cobalt	METAL	mg/kg	11	11	100%			4.79	11.3	11.3	32.5 bgs
Copper	METAL	mg/kg	11	11	100%			9.43	15.5	15.5	207.5 bgs
Hexavalent Chromium	METAL	mg/kg	11	0	0%	0.410	0.430		--	--	
Lead	METAL	mg/kg	11	4	36%	5.24	6.0	2.34	3.18	3.18	14.5 bgs
Manganese	METAL	mg/kg	11	11	100%			237	538	538	17.5 bgs
Mercury	METAL	mg/kg	11	0	0%	0.048	0.496		--	--	
Molybdenum	METAL	mg/kg	11	2	18%	1.31	1.49	1.54	4.39	4.39	207.5 bgs
Nickel	METAL	mg/kg	11	11	100%			6.25	13.40	13.40	242.5 bgs
Selenium	METAL	mg/kg	11	0	0%	1.31	1.49		--	--	
Silver	METAL	mg/kg	11	2	18%	0.096	0.992	0.109	0.118	0.118	22.5 bgs

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Thallium	METAL	mg/kg	11	6	55%	0.437	0.495	0.068	0.580	0.580	27.5 bgs
Thorium	METAL	mg/kg	11	11	100%			1.95	3.51	3.51	242.5 bgs
Vanadium	METAL	mg/kg	11	11	100%			35.9	108	108	22.5 bgs
Zinc	METAL	mg/kg	11	11	100%			31.4	85.6	85.6	207.5 bgs
Ammonium ion as N	CONV	mg/kg	11	6	55%			0.470	6.79	6.79	22.5 bgs
Bromide	CONV	mg/kg	11	0	0%	0.450	2.25		--	--	
Chloride	CONV	mg/kg	11	11	100%			2.17	33.1	33.1	27.5 bgs
Cyanide	CONV	mg/kg	11	0	0%	0.190	0.200		--	--	
Fluoride	CONV	mg/kg	11	8	73%	0.350	0.350	0.843	5.62	5.62	14.5 bgs
Nitrate as N	CONV	mg/kg	11	11	100%			2.54	9,860	9,860	27.5 bgs
Nitrite as N	CONV	mg/kg	11	4	36%	0.090	0.450	0.406	1.120	1.120	32.5 bgs
Nitrate and nitrate/nitrite as N	CONV	mg/kg	11	11	100%			2.00	1,120	1,120	32.5 bgs
Phosphate	CONV	mg/kg	11	6	55%	0.130	0.650	1.39	5.04	5.04	22.5 bgs
Sulfate	CONV	mg/kg	11	11	100%			19.0	294	294	32.5 bgs
% moisture (wet)	CONV	%	3	3	100%	0.130	2.56		--	--	27.5 bgs
pH	CONV	pH	11	11	100%	4.68	4.73	0.918	44.6	44.6	14.5 bgs
Oil & grease	CONV	ug/kg	11	0	0%	694,000	712,000		--	--	
Diethyl ether	VOA	ug/kg	11	0	0%	5,000	5,000		--	--	
Ethylene glycol	VOA	ug/kg	11	0	0%	5,000	5,000		--	--	
Methanol	VOA	ug/kg	11	0	0%	1,000	1,000		--	--	
dichlorodiphenyldichloroethane	PEST	ug/kg	1	0	0%	3.40	3.40		--	--	
dichlorodiphenyldichloroethylene	PEST	ug/kg	1	0	0%	3.40	3.40		--	--	
dichlorodiphenyltrichloroethane	PEST	ug/kg	1	0	0%	3.40	3.40		--	--	
2,4,5-trichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	17.0	17.0		--	--	
2,4-dichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	34.0	34.0		--	--	
2-(2,4,5-trichlorophenoxy)propionic acid	HERB	ug/kg	1	0	0%	17.0	17.0		--	--	
2-secButyl-4,6-dinitrophenol (DNBP)	HERB	ug/kg	1	0	0%	17.0	17.0		--	--	
4-(2,4-Dichlorophenoxy)butanoic acid	HERB	ug/kg	1	0	0%	170	170		--	--	
Aldrin	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Alpha-BHC	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
alpha-Chlordane	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
beta-1,2,3,4,5,6-hexachlorocyclohexane	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Delta-BHC	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
dieldrin	PEST	ug/kg	1	0	0%	3.40	3.40		--	--	
Endosulfan I	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Endosulfan II	PEST	ug/kg	1	0	0%	3.40	3.40		--	--	
Endosulfan sulfate	PEST	ug/kg	1	0	0%	3.40	3.40		--	--	
Endrin	PEST	ug/kg	1	0	0%	3.40	3.40		--	--	
Endrin aldehyde	PEST	ug/kg	1	0	0%	3.40	3.40		--	--	
Endrin ketone	PEST	ug/kg	1	0	0%	3.40	3.40		--	--	
Gamma-BHC (Lindane)	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
gamma-Chlordane	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Heptachlor	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Heptachlor epoxide	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Methoxychlor	PEST	ug/kg	1	0	0%	17.0	17.0		--	--	
Toxaphene	PEST	ug/kg	1	0	0%	170	170		--	--	

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Dalapon	HERB	ug/kg	1	0	0%	170	170		--	--	
Dicamba	HERB	ug/kg	1	0	0%	69.0	69.0		--	--	
Dichloroprop	HERB	ug/kg	1	0	0%	170	170		--	--	
1,1,1-Trichloroethane	VOA,	ug/kg	1	0	0%	2.00	2.00		--	--	
1,1,2,2-Tetrachloroethane	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
1,1,2-Trichloroethane	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
1,1-Dichloroethane	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
1,1-Dichloroethene	VOA	ug/kg	11	0	0%	1.00	2.10		--	--	
1,2-Dichloroethane	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
1,2-Dichloroethene (Total)	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
1,2-Dichloropropane	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
1-butanol	VOA	ug/kg	11	0	0%	10.0	21.0		--	--	
2-Butanone	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
2-Hexanone	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
2-Pentanone	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
4-Methyl-2-Pentanone	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
Acetone	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
Benzene	VOA	ug/kg	11	0	0%	1.00	2.10		--	--	
Bromodichloromethane	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
Bromoform	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
Bromomethane	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
Carbon disulfide	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
Carbon tetrachloride	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
Chlorobenzene	VOA	ug/kg	11	0	0%	1.00	2.10		--	--	
Chloroethane	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
Chloroform	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
Chloromethane	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
cis-1,3-Dichloropropene	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
Dibromochloromethane	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
Ethylbenzene	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
Methylene chloride	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
n-Butylbenzene	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
Styrene	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
Tetrachloroethene	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
Toluene	VOA	ug/kg	11	0	0%	1.00	2.10		--	--	
trans-1,3-Dichloropropene	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
Trichloroethene	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
Vinyl chloride	VOA	ug/kg	11	0	0%	1.00	2.10		--	--	
Xylenes (total)	VOA	ug/kg	1	0	0%	2.00	2.00		--	--	
1,2,4-Trichlorobenzene	SVOA	ug/kg	11	0	0%	290	310		--	--	
1,2-Dichlorobenzene	SVOA	ug/kg	11	0	0%	360	380		--	--	
1,3-Dichlorobenzene	SVOA	ug/kg	11	0	0%	320	340		--	--	
1,4-Dichlorobenzene	SVOA	ug/kg	11	0	0%	310	330		--	--	
2,4,5-Trichlorophenol	SVOA	ug/kg	11	0	0%	73.0	710		--	--	
2,4,6-Trichlorophenol	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
2,4-Dichlorophenol	SVOA	ug/kg	11	0	0%	79.0	85.0		--	--	

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
2,4-Dimethylphenol	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
2,4-Dinitrophenol	SVOA	ug/kg	11	0	0%	230.0	710		--	--	
2,4-Dinitrotoluene	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
2,6-Dinitrotoluene	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
2-Butoxyethanol	SVOA	ug/kg	11	0	0%	99.0	110		--	--	
2-Chloronapthalene	SVOA	ug/kg	11	0	0%	79.0	85.0		--	--	
2-Chlorophenol	SVOA	ug/kg	11	0	0%	150	160		--	--	
2-Methylnapthalene	SVOA	ug/kg	11	0	0%	180	190		--	--	
2-Methylphenol (cresol, o-)	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
2-Nitroaniline	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
2-Nitrophenol	SVOA	ug/kg	11	0	0%	170	180		--	--	
3,3'-Dichlorobenzidine	SVOA	ug/kg	11	0	0%	79.0	85.0		--	--	
3+4 Methylphenol (cresol m+p)	SVOA	ug/kg	11	0	0%	110	120		--	--	
3-Nitroaniline	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
4,6-Dinitro-2-methylphenol	SVOA	ug/kg	11	0	0%	660	710		--	--	
4-Bromophenylphenylether	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
4-Chloro-3-methylphenol	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
4-Chloroaniline	SVOA	ug/kg	11	0	0%	92.0	99.0		--	--	
4-Chlorophenylphenylether	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
4-Nitroaniline	SVOA	ug/kg	11	0	0%	240	260		--	--	
4-Nitrophenol	SVOA	ug/kg	11	0	0%	640	690		--	--	
Acenaphthene	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
Acenaphthylene	SVOA	ug/kg	11	0	0%	79.0	85.0		--	--	
Anthracene	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
Benzo(a)anthracene	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
Benzo(a)pyrene	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
Benzo(b)fluoranthene	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
Benzo(ghi)perylene	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
Benzo(k)fluoranthene	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
Benzyl alcohol	SVOA	ug/kg	4	0	0%	75.0	77.0		--	--	
Bis(2-chloro-1-methylethyl)ether	SVOA	ug/kg	11	0	0%	250	270		--	--	
Bis(2-Chloroethoxy)methane	SVOA	ug/kg	11	0	0%	110	120		--	--	
Bis(2-chloroethyl) ether	SVOA	ug/kg	11	0	0%	240	260		--	--	
Bis(2-ethylhexyl) adipate	SVOA	ug/kg	1	1	100%				470	470	207.5 bgs
Bis(2-ethylhexyl)phthalate	SVOA	ug/kg	11	4	36%	550	590	620	1,100	1,100	207.5 bgs
Butylbenzylphthalate	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
Carbazole	SVOA	ug/kg	11	0	0%	79.0	85.0		--	--	
Chrysene	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
Cyclohexane 2-Butyl-1 1 3-trimethyl-	SVOA	ug/kg	2	2	100%			1,100	1,200	1,200	17.5 bgs
Decahydro-2 6-dimethyl-naphthalene	SVOA	ug/kg	2	2	100%			1,000	1,100	1,100	14.5 bgs
Di-n-butylphthalate	SVOA	ug/kg	11	0	0%	86.0	92.0		--	--	
Di-n-octylphthalate	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
Dibenz[a,h]anthracene	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
Dibenzofuran	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
Diethylphthalate	SVOA	ug/kg	11	9	82%	190	190	420	1,100	1,100	22.5 bgs
Dimethylphthalate	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Fluoranthene	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
Fluorene	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
Hexachlorobenzene	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
Hexachlorobutadiene,	SVOA	ug/kg	11	0	0%	360	390		--	--	
Hexachlorocyclopentadiene	SVOA	ug/kg	11	0	0%	310	330		--	--	
Hexachloroethane	SVOA	ug/kg	11	0	0%	460	500		--	--	
Ideno(1,2,3-cd)pyrene	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
Isophorone	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
n-butyl benzenesulfonamide	SVOA	ug/kg	9	9	100%			960	4,400	4,400	22.5 bgs
N-Nitrosodi-n-dipropylamine	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
N-Nitrosodiphenylamine	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
Naphthalene	SVOA	ug/kg	11	0	0%	280	300		--	--	
Nitrobenzene	SVOA	ug/kg	11	0	0%	260	280		--	--	
o-Terphenyl	SVOA	ug/kg	2	2	100%			200	320	320	22.5 bgs
Pentachlorophenol	SVOA	ug/kg	11	0	0%	300	320		--	--	
Phenanthrene	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
Phenol	SVOA	ug/kg	11	0	0%	99.0	110		--	--	
Propionic acid	SVOA	ug/kg	1	1	100%			130	130	130	242.5 bgs
Pyrene	SVOA	ug/kg	11	0	0%	66.0	71.0		--	--	
Tributyl phosphate	SVOA	ug/kg	11	6	55%	67.0	68.0	94	280,000	280,000	14.5 bgs
Total petroleum hydrocarbons -diesel range	DIESEL	ug/kg	11	3	27%	4,000	4,700	7,800	300,000	300,000	17.5 bgs
Total petroleum hydrocarbons -kerosene range	DIESEL	ug/kg	11	0	0%	4,000	5,000		--	--	
Total petroleum hydrocarbons -gasoline range	GAS	ug/kg	11	0	0%	50.0	250		--	--	
216-A-36B Crib											
Actinium-228	RAD	pCi/g	11	9	82%	0.882	360	0.553	0.990	0.990	287.5 bgs
Americium-241	RAD	pCi/g	21	7	33%	0.000	17.900	0.045	40,000	40,000	25 bgs
Antimony-125	RAD	pCi/g	11	2	18%	0.000	2,080	0.088	0.308	0.308	53.5 bgs
Bismuth-212	RAD	pCi/g	10	9	90%	0.533	0.533	0.320	0.924	0.924	53.5 bgs
Bismuth-214	RAD	pCi/g	10	10	100%			0.242	1.270	1.270	53.5 bgs
Carbon-14	RAD	pCi/g	12	1	8%	0.000	12.200	116	116.00	116.00	25 bgs
Cerium-144	RAD	pCi/g	10	0	0%	0.000	0.192		--	--	
Cesium-134	RAD	pCi/g	21	1	5%	-0.140	321	0.040	0.04	0.04	197.5 bgs
Cesium-137	RAD	pCi/g	21	10	48%	-0.003	0.140	0.051	2,650,000	2,650,000	25 bgs
Cobalt-60	RAD	pCi/g	21	12	57%	0.003	0.190	0.035	623	623	25 bgs
Europium-152	RAD	pCi/g	21	0	0%	-0.051	753		--	--	
Europium-154	RAD	pCi/g	21	1	5%	-0.167	15.000	1,800	1,800	1,800	25 bgs
Europium-155	RAD	pCi/g	21	1	5%	0.003	550	0.085	0.085	0.085	89.5 bgs
Iodine-129	RAD	pCi/g	12	0	0%	0.000	1.330		--	--	
Lead-212	RAD	pCi/g	10	9	90%	1.190	1.190	0.476	1.37	1.37	53.5 bgs
Lead-214	RAD	pCi/g	10	9	90%	1.210	1.210	0.349	1.23	1.23	53.5 bgs
Neptunium-237	RAD	pCi/g	12	0	0%	0.000	109		--	--	
Nickel-63	RAD	pCi/g	12	3	25%	0.000	18.100	695	181,000	181,000	25 bgs
Niobium-94	RAD	pCi/g	10	0	0%	0.000	0.043		--	--	
Plutonium-238	RAD	pCi/g	21	1	5%	-0.027	5,330	0.050	0.05	0.05	287.5 bgs
Plutonium-239/240	RAD	pCi/g	22	7	32%	-0.010	17.500	0.140	0.420	0.420	53.5 bgs
Potassium-40	RAD	pCi/g	10	7	70%	45.000	120	8.290	19.400	19.400	53.5 bgs

Table A-2. Data Summary Table – Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Radium-226	RAD	pCi/g	21	17	81%	1.240	8,980	0.215	1.270	1.270	53.5 bgs
Radium-228	RAD	pCi/g	20	15	75%	0.280	26.000	0.544	1.150	1.150	53.5 bgs
Ruthenium-103	RAD	pCi/g	10	0	0%	-0.006	0.344		--	--	
Ruthenium-106	RAD	pCi/g	10	0	0%	-2.040	0.065		--	--	
Strontium-90	RAD	pCi/g	1	1	100%			208,000	208,000	208,000	25 bgs
Technetium-99	RAD	pCi/g	12	1	8%	-0.044	3.440	41.900	41.90	41.90	25 bgs
Thallium-208	RAD	pCi/g	10	9	90%	0.124	0.124	0.157	0.447	0.447	53.5 bgs
Thorium-228	RAD	pCi/g	11	7	64%	0.213	1.010	0.293	0.822	0.822	89.5 bgs
Thorium-230	RAD	pCi/g	11	8	73%	0.237	10.600	0.362	11.40	11.40	30 bgs
Thorium-232	RAD	pCi/g	12	10	83%	0.377	0.760	0.361	4.84	4.84	25 bgs
Thorium-234	RAD	pCi/g	10	8	80%	-10.100	1.040	1.30	1.58	1.58	292 bgs
Tin-113	RAD	pCi/g	10	0	0%	-0.031	0.116		--	--	
Tin-126	RAD	pCi/g	20	0	0%	-0.731	0.320		--	--	
Total Radioactive Strontium	RAD	pCi/g	11	5	45%	-0.096	0.216	87.4	92,100	92,100	27.5 bgs
Tritium	RAD	pCi/g	9	8	89%	0.022	0.022	3.61	121	121	287.5 bgs
Uranium (mg/kg)	METAL	mg/kg	10	10	100%			0.395	36.8	36.8	30 bgs
Uranium-233/234	RAD	pCi/g	18	18	100%			0.120	41.2	41.2	30 bgs
Uranium-234	RAD	pCi/g	3	3	100%			0.130	81.2	81.2	25 bgs
Uranium-235	RAD	pCi/g	21	7	33%	0.000	1.860	0.130	3.29	3.29	25 bgs
Uranium-236	RAD	pCi/g	1	1	100%			4.54	4.54	4.54	25 bgs
Uranium-238	RAD	pCi/g	21	21	100%			0.100	70.9	70.9	25 bgs
Zinc-65	RAD	pCi/g	10	0	0%	-0.547	0.170		--	--	
Aluminum	METAL	mg/kg	2	2	100%			7,600	8,430	8,430	24 bgs
Antimony	METAL	mg/kg	13	2	15%	2.36	4.98	0.660	0.850	0.850	27.5 bgs
Arsenic	METAL	mg/kg	13	11	85%	2.98	10.7	1.92	6.20	6.20	53.5 bgs
Barium	METAL	mg/kg	13	13	100%			36.2	89.8	89.8	292 bgs
Beryllium	METAL	mg/kg	13	3	23%	1.42	2.98	0.180	0.379	0.379	25 bgs
Bismuth	METAL	mg/kg	13	2	15%	4.58	10.7	79.7	91.4	91.4	30 bgs
Boron	METAL	mg/kg	13	2	15%	4.46	10.0	5.10	5.80	5.80	30 bgs
Cadmium	METAL	mg/kg	5	1	20%	0.038	0.500	0.110	0.110	0.110	27.5 bgs
Chromium (Total)	METAL	mg/kg	13	12	92%	1.42	1.42	6.19	72.5	72.5	24 bgs
Cobalt	METAL	mg/kg	2	2	100%			6.07	6.13	6.13	12.5 bgs
Copper	METAL	mg/kg	13	13	100%			6.30	18.6	18.6	292 bgs
Hexavalent Chromium	METAL	mg/kg	11	0	0%	0.054	0.481		--	--	
Lead	METAL	mg/kg	13	3	23%	5.66	11.9	3.40	6.19	6.19	25 bgs
Manganese	METAL	mg/kg	2	2	100%			236	246	246	12.5 bgs
Mercury	METAL	mg/kg	13	7	54%	0.472	0.995	0.035	1.71	1.71	40 bgs
Molybdenum	METAL	mg/kg	2	1	50%	1.42	1.42	2.22	2.22	2.22	24 bgs
Nickel	METAL	mg/kg	13	13	100%			4.26	58.0	58.0	25 bgs
Selenium	METAL	mg/kg	5	2	40%	1.42	10.8	0.460	0.510	0.510	30 bgs
Silver	METAL	mg/kg	13	5	38%	1.14	1.99	0.110	3.54	3.54	24 bgs
Thallium	METAL	mg/kg	2	1	50%	0.472	0.472	0.815	0.815	0.815	24 bgs
Thorium	METAL	mg/kg	2	2	100%			2.85	3.77	3.77	12.5 bgs
Vanadium	METAL	mg/kg	2	2	100%			35.1	37.7	37.7	24 bgs
Zinc	METAL	mg/kg	2	2	100%			30.7	41.5	41.5	12.5 bgs
Ammonium ion as N	CONV	mg/kg	13	6	46%	0.040	21.9	0.393	58.2	58.2	53.5 bgs

Table A-2. Data Summary Table – Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Bromide	CONV	mg/kg	2	0	0%	0.450	0.450		--	--	
Chloride	CONV	mg/kg	13	11	85%	2.73	22.4	0.239	8.58	8.58	89.5 bgs
Cyanide	CONV	mg/kg	13	0	0%	0.190	0.435		--	--	
Fluoride	CONV	mg/kg	13	4	31%	0.343	1.38	0.341	0.975	0.975	197.5 bgs
Nitrate as N	CONV	mg/kg	13	13	100%			0.497	289	289	53.5 bgs
Nitrite as N	CONV	mg/kg	13	1	8%	0.074	1.77	18.8	18.8	18.8	25 bgs
Nitrate and nitrate/nitrite as N	CONV	mg/kg	11	11	100%			2.70	287	287	53.5 bgs
Phosphate	CONV	mg/kg	10	0	0%	0.130	2.56		--	--	
Sulfate	CONV	mg/kg	13	11	85%	4.68	4.73	0.918	44.6	44.6	292 bgs
% moisture (dry)	CONV	%	3	3	100%			2.90%	14.7%	14.7%	287.5 bgs
% moisture (wet)	CONV	%	3	3	100%			3.00%	17.2%	17.2%	287.5 bgs
% Solids	CONV	%	3	3	100%			85.3%	97.1%	97.1%	89.5 bgs
pH	CONV	pH	13	13	100%			7.56	9.24	9.24	12.5 bgs
Oil & grease	CONV	ug/kg	11	0	0%	200,000	802,000	90,000	90,000	90,000	27.5 bgs
Diethyl ether	VOA	ug/kg	9	0	0%	5,000	5,000	--	--	--	
Ethylene glycol	VOA	ug/kg	11	0	0%	5,000	50,000	--	--	--	
Methanol	VOA	ug/kg	11	0	0%	1,000	7,100	--	--	--	
dichlorodiphenyldichloroethane	PEST	ug/kg	1	0	0%	3.40	3.40	--	--	--	
dichlorodiphenyldichloroethylene	PEST	ug/kg	1	0	0%	3.40	3.40	--	--	--	
dichlorodiphenyltrichloroethane	PEST	ug/kg	1	0	0%	3.40	3.40	--	--	--	
2,4,5-trichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	17.0	17.0	--	--	--	
2,4-dichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	34.0	34.0	--	--	--	
2-(2,4,5-trichlorophenoxy)propionic acid	HERB	ug/kg	1	0	0%	17.0	17.0	--	--	--	
2-secButyl-4,6-dinitrophenol (DNBP)	HERB	ug/kg	1	0	0%	17.0	17.0	--	--	--	
4-(2,4-Dichlorophenoxy)butanoic acid	HERB	ug/kg	1	0	0%	170	170	--	--	--	
Aldrin	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
Alpha-BHC	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
alpha-Chlordane	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
beta-1,2,3,4,5,6-hexachlorocyclohexane	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
Delta-BHC	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
dieldrin	PEST	ug/kg	1	0	0%	3.40	3.40	--	--	--	
Endosulfan I	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
Endosulfan II	PEST	ug/kg	1	0	0%	3.40	3.40	--	--	--	
Endosulfan sulfate	PEST	ug/kg	1	0	0%	3.40	3.40	--	--	--	
Endrin	PEST	ug/kg	1	0	0%	3.40	3.40	--	--	--	
Endrin aldehyde	PEST	ug/kg	1	0	0%	3.40	3.40	--	--	--	
Endrin ketone	PEST	ug/kg	1	0	0%	3.40	3.40	--	--	--	
Gamma-BHC (Lindane)	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
gamma-Chlordane	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
Heptachlor	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
Heptachlor epoxide	PEST	ug/kg	1	0	0%	1.70	1.70	--	--	--	
Methoxychlor	PEST	ug/kg	1	0	0%	17.0	17.0	--	--	--	
Toxaphene	PEST	ug/kg	1	0	0%	170	170	--	--	--	
Dalapon	HERB	ug/kg	1	0	0%	170	170	--	--	--	
Dicamba	HERB	ug/kg	1	0	0%	68	68	--	--	--	
Dichloroprop	HERB	ug/kg	1	0	0%	170	170	--	--	--	

Table A-2. Data Summary Table – Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
1,1,1-Trichloroethane	VOA	ug/kg	3	0	0%	1.40	2.00	--	--	--	
1,1,2,2-Tetrachloroethane	VOA	ug/kg	3	0	0%	1.20	2.00	--	--	--	
1,1,2-Trichloroethane	VOA	ug/kg	3	0	0%	1.30	2.00	--	--	--	
1,1-Dichloroethane	VOA	ug/kg	3	0	0%	1.60	2.00	--	--	--	
1,1-Dichloroethene	VOA	ug/kg	3	0	0%	1.50	2.00	--	--	--	
1,2-Dichlorobenzene	VOA	ug/kg	3	0	0%	1.30	1.30	--	--	--	
1,2-Dichloroethane	VOA	ug/kg	3	0	0%	1.50	2.00	--	--	--	
1,2-Dichloroethene (Total)	VOA	ug/kg	3	0	0%	2.00	2.70	--	--	--	
1,2-Dichloropropane	VOA	ug/kg	3	0	0%	1.30	2.00	--	--	--	
1,3-Dichlorobenzene	VOA	ug/kg	1	0	0%	1.70	1.70	--	--	--	
1-butanol	VOA	ug/kg	3	0	0%	45.0	4,900	--	--	--	
2-Butanone	VOA	ug/kg	3	0	0%	1.60	2.00	--	--	--	
2-Hexanone	VOA	ug/kg	3	0	0%	1.30	2.00	--	--	--	
2-Pentanone	VOA	ug/kg	3	0	0%	2.00	4.00	--	--	--	
4-Methyl-2-Pentanone	VOA	ug/kg	3	0	0%	1.50	2.00	--	--	--	
Acetone	VOA	ug/kg	3	0	0%	1.80	2.00	--	--	--	
Benzene	VOA	ug/kg	3	0	0%	1.30	2.00	--	--	--	
Bromodichloromethane	VOA	ug/kg	3	0	0%	1.50	2.00	--	--	--	
Bromoform	VOA	ug/kg	3	0	0%	1.50	2.00	--	--	--	
Bromomethane	VOA	ug/kg	3	0	0%	2.00	3.70	--	--	--	
Carbon disulfide	VOA	ug/kg	3	0	0%	1.80	2.00	--	--	--	
Carbon tetrachloride	VOA	ug/kg	3	0	0%	2.00	2.50	--	--	--	
Chlorobenzene	VOA	ug/kg	3	0	0%	1.50	2.00	--	--	--	
Chloroethane	VOA	ug/kg	3	0	0%	2.00	3.60	--	--	--	
Chloroform	VOA	ug/kg	3	0	0%	1.40	2.00	--	--	--	
Chloromethane	VOA	ug/kg	3	0	0%	2.00	3.20	--	--	--	
cis-1,3-Dichloropropene	VOA	ug/kg	3	0	0%	1.30	2.00	--	--	--	
Dibromochloromethane	VOA	ug/kg	3	0	0%	1.30	2.00	--	--	--	
Dibromomethane	VOA	ug/kg	1	0	0%	1.30	1.30	--	--	--	
Ethylbenzene	VOA	ug/kg	3	0	0%	1.90	2.00	--	--	--	
Methylene chloride	VOA	ug/kg	3	0	0%	2.00	2.50	--	--	--	
n-Butylbenzene	VOA	ug/kg	3	0	0%	2.00	2.00	--	--	--	
Styrene	VOA	ug/kg	3	0	0%	1.50	2.00	--	--	--	
Tetrachloroethene	VOA	ug/kg	3	0	0%	1.40	2.00	--	--	--	
Tetrahydrofuran	VOA	ug/kg	1	0	0%	4.00	4.00	--	--	--	
Toluene	VOA	ug/kg	3	0	0%	1.30	2.00	--	--	--	
trans-1,3-Dichloropropene	VOA	ug/kg	3	0	0%	1.40	2.00	--	--	--	
Trichloroethene	VOA	ug/kg	3	0	0%	1.70	2.00	--	--	--	
Vinyl chloride	VOA	ug/kg	3	0	0%	2.00	3.00	--	--	--	
Xylenes (total)	VOA	ug/kg	3	0	0%	2.00	3.20	--	--	--	
1,2,4-Trichlorobenzene	SVOA	ug/kg	13	0	0%	17.0	350	--	--	--	
1,2,4-Trithiolane	SVOA	ug/kg	1	1	100%			130	130	130	53.5 bgs
1,2-Dichlorobenzene	SVOA	ug/kg	12	0	0%	12.0	410	--	--	--	
1,3-Dichlorobenzene	SVOA	ug/kg	12	0	0%	12.0	360	--	--	--	
1,4-Dichlorobenzene	SVOA	ug/kg	13	0	0%	14.0	360	--	--	--	
1-chloropropane	SVOA	ug/kg	3	0	0%	330	340,000	--	--	--	

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
2,4,5-Trichlorophenol	SVOA	ug/kg	13	0	0%	30.0	350	--	--	--	
2,4,6-Trichlorophenol	SVOA	ug/kg	13	0	0%	31.0	350	--	--	--	
2,4-Dichlorophenol	SVOA	ug/kg	13	0	0%	26.0	350	--	--	--	
2,4-Dimethylphenol	SVOA	ug/kg	13	0	0%	28.0	350	--	--	--	
2,4-Dinitrophenol	SVOA	ug/kg	13	0	0%	64.0	760	--	--	--	
2,4-Dinitrotoluene	SVOA	ug/kg	13	0	0%	18.0	350	--	--	--	
2,6-Dinitrotoluene	SVOA	ug/kg	13	0	0%	20.0	350	--	--	--	
2-Butoxyethanol	SVOA	ug/kg	10	0	0%	100	350	--	--	--	
2-Chloronapthalene	SVOA	ug/kg	13	0	0%	16.0	350	--	--	--	
2-Chlorophenol	SVOA	ug/kg	13	0	0%	14.0	350	--	--	--	
2-Methylnapthalene	SVOA	ug/kg	13	0	0%	15.0	350	--	--	--	
2-Methylphenol (cresol, o-)	SVOA	ug/kg	13	0	0%	19.0	350	--	--	--	
2-Nitroaniline	SVOA	ug/kg	13	0	0%	38.0	350	--	--	--	
2-Nitrophenol	SVOA	ug/kg	13	0	0%	19.0	350	--	--	--	
3,3'-Dichlorobenzidine	SVOA	ug/kg	12	0	0%	23.0	91.0	--	--	--	
3+4 Methylphenol (cresol m+p)	SVOA	ug/kg	10	0	0%	120	350	--	--	--	
3-methyl 2-cyclohexen-1-one	SVOA	ug/kg	1	1	100%			430	430	430	197.5 bgs
3-Nitroaniline	SVOA	ug/kg	13	0	0%	26.0	350	--	--	--	
4,6-Dinitro-2-methylphenol	SVOA	ug/kg	13	0	0%	62.0	710	--	--	--	
4-Bromophenylphenylether	SVOA	ug/kg	13	0	0%	22.0	350	--	--	--	
4-Chloro-3-methylphenol	SVOA	ug/kg	13	0	0%	27.0	350	--	--	--	
4-Chloroaniline	SVOA	ug/kg	12	0	0%	31.0	110	--	--	--	
4-Chlorophenylphenylether	SVOA	ug/kg	13	0	0%	18.0	350	--	--	--	
4-Methylphenol (cresol, p-)	SVOA	ug/kg	3	0	0%	51.0	53.0	--	--	--	
4-Nitroaniline	SVOA	ug/kg	13	0	0%	22.0	350	--	--	--	
4-Nitrophenol	SVOA	ug/kg	13	0	0%	42.0	730	--	--	--	
Acenaphthene	SVOA	ug/kg	13	0	0%	16.0	350	--	--	--	
Acenaphthylene	SVOA	ug/kg	13	0	0%	16.0	350	--	--	--	
Anthracene	SVOA	ug/kg	13	0	0%	18.0	350	--	--	--	
Benzo(a)anthracene	SVOA	ug/kg	13	0	0%	23.0	350	--	--	--	
Benzo(a)pyrene	SVOA	ug/kg	13	0	0%	19.0	350	--	--	--	
Benzo(b)fluoranthene	SVOA	ug/kg	13	0	0%	38.0	350	--	--	--	
Benzo(ghi)perylene	SVOA	ug/kg	13	0	0%	68.0	350	--	--	--	
Benzo(k)fluoranthene	SVOA	ug/kg	13	0	0%	19.0	350	--	--	--	
Benzyl alcohol	SVOA	ug/kg	2	0	0%	80.0	80.0	--	--	--	
Bis(2-chloro-1-methylethyl)ether	SVOA	ug/kg	12	0	0%	15.0	290	--	--	--	
Bis(2-Chloroethoxy)methane	SVOA	ug/kg	13	0	0%	21.0	350	--	--	--	
Bis(2-chloroethyl) ether	SVOA	ug/kg	13	0	0%	13.0	350	--	--	--	
Bis(2-ethylhexyl)phthalate	SVOA	ug/kg	13	0	0%	34.0	630	--	--	--	
Butylbenzylphthalate	SVOA	ug/kg	13	0	0%	26.0	350	--	--	--	
Carbazole	SVOA	ug/kg	12	0	0%	20.0	91.0	--	--	--	
Chrysene	SVOA	ug/kg	13	0	0%	14.0	350	--	--	--	
Di-n-butylphthalate	SVOA	ug/kg	13	1	8%	28.0	98	550	550	550	25 bgs
Di-n-octylphthalate	SVOA	ug/kg	13	0	0%	68.0	350	--	--	--	
Dibenz[a,h]anthracene	SVOA	ug/kg	13	0	0%	68.0	350	--	--	--	
Dibenzofuran	SVOA	ug/kg	13	0	0%	22.0	350	--	--	--	

Table A-2. Data Summary Table – Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Diethylphthalate	SVOA	ug/kg	13	5	38%	41.0	350	280	650	650	287.5 bgs
Dimethylphthalate	SVOA	ug/kg	13	0	0%	20.0	350	--	--	--	
Fluoranthene	SVOA	ug/kg	13	0	0%	23.0	350	--	--	--	
Fluorene	SVOA	ug/kg	13	0	0%	19.0	350	--	--	--	
Hexachlorobenzene	SVOA	ug/kg	13	0	0%	18.0	350	--	--	--	
Hexachlorobutadiene	SVOA	ug/kg	13	0	0%	12.0	420	--	--	--	
Hexachlorocyclopentadiene	SVOA	ug/kg	13	0	0%	71.0	360	--	--	--	
Hexachloroethane	SVOA	ug/kg	13	0	0%	16.0	530	--	--	--	
Ideno(1,2,3-cd)pyrene	SVOA	ug/kg	13	0	0%	17.0	350	--	--	--	
Isophorone	SVOA	ug/kg	13	2	15%	18.0	350	180	500	500	197.5 bgs
mesityl oxide	SVOA	ug/kg	1	1	100%			2,300	2,300	2,300	287.5 bgs
n-butyl benzenesulfonamide	SVOA	ug/kg	4	4	100%			460	1,200	1,200	12.5 bgs
N-Nitrosodi-n-dipropylamine	SVOA	ug/kg	13	0	0%	20.0	350	--	--	--	
N-Nitrosodiphenylamine	SVOA	ug/kg	12	0	0%	21.0	71.0	--	--	--	
Naphthalene	SVOA	ug/kg	13	0	0%	15.0	350	--	--	--	
Nitrobenzene	SVOA	ug/kg	13	0	0%	18.0	350	--	--	--	
Pentachlorophenol	SVOA	ug/kg	13	0	0%	120	350	--	--	--	
Phenanthrene	SVOA	ug/kg	13	0	0%	16.0	350	--	--	--	
Phenol	SVOA	ug/kg	13	0	0%	87.0	350	--	--	--	
Pyrene	SVOA	ug/kg	13	0	0%	22.0	350	--	--	--	
Pyridine	SVOA	ug/kg	1	0	0%	350	350	--	--	--	
Tributyl phosphate	SVOA	ug/kg	13	0	0%	68.0	350	--	--	--	
Aroclor-1016	PCB	ug/kg	11	0	0%	16.0	52.0	--	--	--	
Aroclor-1221	PCB	ug/kg	11	0	0%	5.00	100	--	--	--	
Aroclor-1232	PCB	ug/kg	11	0	0%	45.0	89.0	--	--	--	
Aroclor-1242	PCB	ug/kg	11	0	0%	16.0	52.0	--	--	--	
Aroclor-1248	PCB	ug/kg	11	0	0%	5.2	52.0	--	--	--	
Aroclor-1254	PCB	ug/kg	11	1	9%	45.0	52.0	13.0	13.0	13.0	25 bgs
Aroclor-1260	PCB	ug/kg	11	0	0%	22.0	52.0	--	--	--	
Aroclor-1262	PCB	ug/kg	10	0	0%	45.0	52.0	--	--	--	
Aroclor-1268	PCB	ug/kg	10	0	0%	45.0	52.0	--	--	--	
Total petroleum hydrocarbons -diesel range	DIESEL	ug/kg	12	0	0%	1,900	5,100	--	--	--	
Total petroleum hydrocarbons -kerosene range	DIESEL	ug/kg	12	0	0%	3,800	25,000	--	--	--	
Total petroleum hydrocarbons -gasoline range	GAS	ug/kg	12	0	0%	100	250	--	--	--	
216-A-37-1 Crib											
Actinium-228	RAD	pCi/g	10	10	100%			0.143	0.581	0.581	12.5 bgs
Americium-241	RAD	pCi/g	12	1	8%	-0.028	0.055	0.020	0.020	0.020	147.5 bgs
Antimony-125	RAD	pCi/g	12	0	0%	-0.004	0.070		--	--	
Bismuth-212	RAD	pCi/g	10	10	100%			0.102	0.467	0.467	17.5 bgs
Bismuth-214	RAD	pCi/g	10	10	100%			0.106	0.508	0.508	37.5 bgs
Carbon-14	RAD	pCi/g	11	0	0%	-0.904	1.470		--	--	
Cerium-144	RAD	pCi/g	10	0	0%	-0.044	0.054		--	--	
Cesium-134	RAD	pCi/g	12	0	0%	0.007	0.043		--	--	
Cesium-137	RAD	pCi/g	12	1	8%	-0.007	0.018	0.113	0.113	0.113	12.5 bgs
Cobalt-60	RAD	pCi/g	12	0	0%	-0.005	0.033		--	--	
Europium-152	RAD	pCi/g	12	0	0%	-0.021	0.005		--	--	

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Europium-154	RAD	pCi/g	12	0	0%	-0.024	0.020		--	--	
Europium-155	RAD	pCi/g	12	3	25%	-0.002	0.130	0.012	0.043	0.043	97.5 bgs
Iodine-129	RAD	pCi/g	11	0	0%	-0.510	0.256		--	--	
Lead-212	RAD	pCi/g	10	10	100%			0.128	0.607	0.607	37.5 bgs
Lead-214	RAD	pCi/g	10	10	100%			0.102	0.586	0.586	37.5 bgs
Neptunium-237	RAD	pCi/g	11	0	0%	0.000	0.077		--	--	
Nickel-63	RAD	pCi/g	11	2	18%	-1.750	2.050	2.640	14.40	14.40	37.5 bgs
Niobium-94	RAD	pCi/g	10	0	0%	-0.004	0.009		--	--	
Plutonium-238	RAD	pCi/g	12	0	0%	-0.035	0.037		--	--	
Plutonium-239/240	RAD	pCi/g	12	2	17%	-0.002	0.004	0.006	0.012	0.012	47.5 bgs
Potassium-40	RAD	pCi/g	2	2	100%			8.040	9.150	9.150	272.5 bgs
Radium-226	RAD	pCi/g	12	12	100%			0.106	0.508	0.508	37.5 bgs
Radium-228	RAD	pCi/g	12	12	100%			0.143	0.581	0.581	12.5 bgs
Ruthenium-103	RAD	pCi/g	10	0	0%	-0.002	0.003		--	--	
Ruthenium-106	RAD	pCi/g	10	0	0%	-0.089	0.021		--	--	
Technetium-99	RAD	pCi/g	11	0	0%	0.109	0.307		--	--	
Thallium-208	RAD	pCi/g	10	10	100%			0.043	0.194	0.194	147.5 bgs
Thorium-228	RAD	pCi/g	13	11	85%	0.187	0.348	0.277	0.664	0.664	147.5 bgs
Thorium-230	RAD	pCi/g	11	9	82%	0.075	0.143	0.299	0.799	0.799	147.5 bgs
Thorium-232	RAD	pCi/g	13	13	100%			0.299	0.553	0.553	197.5 bgs
Thorium-234	RAD	pCi/g	10	3	30%	-0.306	0.840	0.141	0.784	0.784	47.5 bgs
Tin-113	RAD	pCi/g	10	0	0%	-0.008	0.007		--	--	
Tin-126	RAD	pCi/g	12	0	0%	0.010	0.158		--	--	
Total Radioactive Strontium	RAD	pCi/g	11	1	9%	-0.060	0.119	1.700	1.700	1.700	12.5 bgs
Tritium	RAD	pCi/g	11	11	100%			44.0	267.0	267.0	47.50
Uranium (mg/kg)	METAL	mg/kg	12	6	50%	0.462	0.492	0.273	0.666	0.666	72.5 bgs
Uranium-233/234	RAD	pCi/g	12	12	100%			0.110	0.374	0.374	272.5 bgs
Uranium-235	RAD	pCi/g	12	7	58%	0.000	0.035	0.010	0.028	0.028	197.5 bgs
Uranium-238	RAD	pCi/g	12	12	100%			0.110	0.396	0.396	237 bgs
Zinc-65	RAD	pCi/g	10	0	0%	-0.001	0.044		--	--	
Aluminum	METAL	mg/kg	10	10	100%			6,390	15,000	15,000	72.5 bgs
Antimony	METAL	mg/kg	21	4	19%	0.220	2.46		--	--	237 bgs
Arsenic	METAL	mg/kg	21	17	81%	1.39	1.47	1.20	3.72	3.72	17.5 bgs
Barium	METAL	mg/kg	21	21	100%			44.9	193	193	97.5 bgs
Beryllium	METAL	mg/kg	21	10	48%	0.010	1.48	0.140	0.390	0.390	97.5 bgs
Bismuth	METAL	mg/kg	21	0	0%	0.100	9.84		--	--	
Boron	METAL	mg/kg	21	11	52%	0.102	10.0	0.360	0.940	0.940	147.5 bgs
Cadmium	METAL	mg/kg	21	1	5%	0.030	0.492	0.180	0.180	0.180	272.5 bgs
Chromium (Total)	METAL	mg/kg	21	21	100%			4.36	23.5	23.5	197.5 bgs
Cobalt	METAL	mg/kg	10	10	100%			6.33	15.9	15.9	72.5 bgs
Copper	METAL	mg/kg	21	21	100%			8.50	19.7	19.7	72.5 bgs
Hexavalent Chromium	METAL	mg/kg	11	0	0%	0.405	0.436		--	--	
Lead	METAL	mg/kg	21	11	52%	5.54	5.90	2.30	13.1	13.1	237 bgs
Manganese	METAL	mg/kg	10	10	100%			287	652	652	72.5 bgs
Mercury	METAL	mg/kg	21	3	14%	0.020	0.492	0.020	0.020	0.020	72.5 bgs, 147.5 bgs
Molybdenum	METAL	mg/kg	10	4	40%	1.40	1.48	1.58	1.95	1.95	197.5 bgs

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Nickel	METAL	mg/kg	21	21	100%			6.80	15.1	15.1	197.5 bgs
Selenium	METAL	mg/kg	21	0	0%	0.340	1.48		--	--	
Silver	METAL	mg/kg	21	6	29%	0.100	0.984	1.07	4.14	4.14	97.5 bgs
Thallium	METAL	mg/kg	10	7	70%	0.466	0.492	0.551	1.54	1.54	97.5 bgs
Thorium	METAL	mg/kg	10	10	100%			2.06	5.06	5.06	72.5 bgs
Vanadium	METAL	mg/kg	10	10	100%			48.5	122	122	72.5 bgs
Zinc	METAL	mg/kg	10	10	100%			39.1	66.3	66.3	17.5 bgs
Ammonia as N	CONV	mg/kg	21	4	19%	0.200	68.7	0.288	266	266	12.5 bgs
Bromide	CONV	mg/kg	10	0	0%	2.25	2.25		--	--	
Chloride	CONV	mg/kg	21	7	33%	0.700	1.36	1.220	14.3	14.3	12.5 bgs
Cyanide	CONV	mg/kg	21	0	0%	0.190	0.479		--	--	
Fluoride	CONV	mg/kg	21	7	33%	0.350	1.36	1.06	1.69	1.69	72.5 bgs
Nitrate as N	CONV	mg/kg	21	21	100%			1.02	385	385	12.5 bgs
Nitrite as N	CONV	mg/kg	21	1	5%	0.386	0.450	1.66	1.66	1.66	12.5 bgs
Nitrate and nitrate/nitrite as N	CONV	mg/kg	11	11	100%			1.20	489	489	12.5 bgs
Phosphate	CONV	mg/kg	21	0	0%	0.650	1.36		--	--	
Sulfate	CONV	mg/kg	21	20	95%	1.34	1.34	1.70	32.0	32.0	12.5 bgs
% moisture (wet)	CONV	%	3	3	100%						272.5 bgs
pH	CONV	pH	21	21	100%			7.91	9.18	9.18	197.5 bgs
Oil & grease	CONV	ug/kg	11	0	0%	675,000	727,000		--	--	
Diethyl ether	VOA	ug/kg	18	0	0%	5,000	28,000		--	--	
Ethylene glycol	VOA	ug/kg	17	0	0%	21.0	5,000		--	--	
Methanol	VOA	ug/kg	17	0	0%	1,000	28,000		--	--	
dichlorodiphenyldichloroethane	PEST	ug/kg	1	0	0%	3.60	3.60		--	--	
dichlorodiphenyldichloroethylene	PEST	ug/kg	1	0	0%	3.60	3.60		--	--	
dichlorodiphenyltrichloroethane	PEST	ug/kg	1	0	0%	3.60	3.60		--	--	
2,4,5-trichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	18.0	18.0		--	--	
2,4-dichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	36.0	36.0		--	--	
2-(2,4,5-trichlorophenoxy)propionic acid	HERB	ug/kg	1	0	0%	18.0	18.0		--	--	
2-secButyl-4,6-dinitrophenol (DNBP)	HERB	ug/kg	1	0	0%	18.0	18.0		--	--	
4-(2,4-Dichlorophenoxy)butanoic acid	HERB	ug/kg	1	0	0%	180	180		--	--	
Aldrin	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	
Alpha-BHC	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	
alpha-Chlordane	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	
beta-1,2,3,4,5,6-hexachlorocyclohexane	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	
Delta-BHC	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	
dieldrin	PEST	ug/kg	1	0	0%	3.60	3.60		--	--	
Endosulfan I	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	
Endosulfan II	PEST	ug/kg	1	0	0%	3.60	3.60		--	--	
Endosulfan sulfate	PEST	ug/kg	1	0	0%	3.60	3.60		--	--	
Endrin	PEST	ug/kg	1	0	0%	3.60	3.60		--	--	
Endrin aldehyde	PEST	ug/kg	1	0	0%	3.60	3.60		--	--	
Endrin ketone	PEST	ug/kg	1	0	0%	3.60	3.60		--	--	
Gamma-BHC (Lindane)	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	
gamma-Chlordane	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	
Heptachlor	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Heptachlor epoxide	PEST	ug/kg	1	0	0%	1.80	1.80		--	--	
Methoxychlor	PEST	ug/kg	1	0	0%	18.0	18.0		--	--	
Toxaphene	PEST	ug/kg	1	0	0%	180	180		--	--	
Dalapon	HERB	ug/kg	1	0	0%	180	180		--	--	
Dicamba	HERB	ug/kg	1	0	0%	72	72		--	--	
Dichloroprop	HERB	ug/kg	1	0	0%	180	180		--	--	
1,1,1-Trichloroethane	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
1,1,2,2-Tetrachloroethane	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
1,1,2-Trichloroethane	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
1,1-Dichloroethane	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
1,1-Dichloroethene	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
1,2-Dichloroethane	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
1,2-Dichloroethene (Total)	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
1,2-Dichloropropane	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
1-butanol	VOA	ug/kg	6	0	0%	19.0	21.0		--	--	
2-Butanone	VOA	ug/kg	17	0	0%	1.90	12.0		--	--	
2-Hexanone	VOA	ug/kg	17	0	0%	1.90	12.0		--	--	
2-Pentanone	VOA	ug/kg	6	0	0%	1.90	2.10		--	--	
4-Methyl-2-Pentanone	VOA	ug/kg	17	0	0%	1.90	12.0		--	--	
Acetone	VOA	ug/kg	17	11	65%	1.90	2.10	2.00	14.9	14.9	97.5 bgs
Benzene	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
Bromodichloromethane	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
Bromoform	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
Bromomethane	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
Carbon disulfide	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
Carbon tetrachloride	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
Chlorobenzene	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
Chloroethane	VOA	ug/kg	17	0	0%	1.90	12.00		--	--	
Chloroform	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
Chloromethane	VOA	ug/kg	17	0	0%	1.90	12.00		--	--	
cis-1,3-Dichloropropene	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
Dibromochloromethane	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
Ethylbenzene	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
Methylene chloride	VOA	ug/kg	17	7	41%	1.90	6.00	2.0	6.248	6.248	72.5 bgs
n-Butylbenzene	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
Styrene	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
Tetrachloroethene	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
Toluene	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
trans-1,3-Dichloropropene	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
Trichloroethene	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
Vinyl chloride	VOA	ug/kg	17	0	0%	1.90	12.00		--	--	
Xylenes (total)	VOA	ug/kg	17	0	0%	1.90	6.00		--	--	
1,2,4-Trichlorobenzene	SVOA	ug/kg	17	0	0%	300	360		--	--	
1,2-Dichlorobenzene	SVOA	ug/kg	17	0	0%	340	380		--	--	
1,3-Dichlorobenzene	SVOA	ug/kg	17	0	0%	330	360		--	--	
1,4-Dichlorobenzene	SVOA	ug/kg	17	0	0%	320	360		--	--	

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
1-chloropropane	SVOA	ug/kg	1	0	0%	350	350		--	--	
2,4,5-Trichlorophenol	SVOA	ug/kg	17	0	0%	76.0	910		--	--	
2,4,6-Trichlorophenol	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
2,4-Dichlorophenol	SVOA	ug/kg	17	0	0%	82.0	360		--	--	
2,4-Dimethylphenol	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
2,4-Dinitrophenol	SVOA	ug/kg	17	0	0%	690	910		--	--	
2,4-Dinitrotoluene	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
2,6-Dinitrotoluene	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
2-Butoxyethanol	SVOA	ug/kg	17	0	0%	100	360		--	--	
2-Chloronapthalene	SVOA	ug/kg	17	0	0%	82.0	360		--	--	
2-Chlorophenol	SVOA	ug/kg	17	0	0%	150	360		--	--	
2-Methylnapthalene	SVOA	ug/kg	17	0	0%	190	360		--	--	
2-Methylphenol (cresol, o-)	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
2-Nitroaniline	SVOA	ug/kg	17	0	0%	68.0	910		--	--	
2-Nitrophenol	SVOA	ug/kg	17	0	0%	180	360		--	--	
3,3'-Dichlorobenzidine	SVOA	ug/kg	17	0	0%	82.0	360		--	--	
3+4 Methylphenol (cresol m+p)	SVOA	ug/kg	6	0	0%	120	120		--	--	
3-Nitroaniline	SVOA	ug/kg	17	0	0%	68.0	910		--	--	
4,6-Dinitro-2-methylphenol	SVOA	ug/kg	17	0	0%	680	910		--	--	
4-Bromophenylphenylether	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
4-Chloro-3-methylphenol	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
4-Chloroaniline	SVOA	ug/kg	17	0	0%	95.0	360		--	--	
4-Chlorophenylphenylether	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
4-Methylphenol (cresol, p-)	SVOA	ug/kg	11	0	0%	340	360		--	--	
4-Nitroaniline	SVOA	ug/kg	17	0	0%	250	910		--	--	
4-Nitrophenol	SVOA	ug/kg	17	0	0%	660	910		--	--	
Acenaphthene	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
Acenaphthylene	SVOA	ug/kg	17	0	0%	82.0	360		--	--	
Anthracene	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
Benzo(a)anthracene	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
Benzo(a)pyrene	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
Benzo(b)fluoranthene	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
Benzo(ghi)perylene	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
Benzo(k)fluoranthene	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
Benzyl alcohol	SVOA	ug/kg	17	0	0%	75.0	360		--	--	
Bis(2-chloro-1-methylethyl)ether	SVOA	ug/kg	17	0	0%	260	360		--	--	
Bis(2-Chloroethoxy)methane	SVOA	ug/kg	17	0	0%	120	360		--	--	
Bis(2-chloroethyl) ether	SVOA	ug/kg	17	0	0%	250	360		--	--	
Bis(2-ethylhexyl)phthalate	SVOA	ug/kg	17	6	35%	340	590	18.194	2,100	2,100	17.5 bgs
Butylbenzylphthalate	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
Carbazole	SVOA	ug/kg	17	0	0%	82.0	360		--	--	
Chrysene	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
Cyclohexyl isocyanate	SVOA	ug/kg	1	1	100%			320	320	320	17.5 bgs
Di-n-butylphthalate	SVOA	ug/kg	17	1	6%	88.0	360	19.0	19.0	19.0	272.5 bgs
Di-n-octylphthalate	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
Dibenz[a,h]anthracene	SVOA	ug/kg	17	0	0%	68.0	360		--	--	

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Dibenzofuran	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
Diethylphthalate	SVOA	ug/kg	17	4	24%	190	360	510	760	760	37.5 bgs
Dimethylphthalate	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
Fluoranthene	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
Fluorene	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
Hexachlorobenzene	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
Hexachlorobutadiene	SVOA	ug/kg	17	0	0%	340	390		--	--	
Hexachlorocyclopentadiene	SVOA	ug/kg	17	0	0%	320	360		--	--	
Hexachloroethane	SVOA	ug/kg	17	0	0%	340	490		--	--	
Ideno(1,2,3-cd)pyrene	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
Isophorone	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
n-butyl benzenesulfonamide	SVOA	ug/kg	4	4	100%			660	18,000	18,000	17.5 bgs
N-Nitrosodi-n-dipropylamine	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
N-Nitrosodiphenylamine	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
Naphthalene	SVOA	ug/kg	17	0	0%	290	360		--	--	
Nitrobenzene	SVOA	ug/kg	17	0	0%	270	360		--	--	
Pentachlorophenol	SVOA	ug/kg	17	0	0%	310	910		--	--	
Phenanthrene	SVOA	ug/kg	17	0	0%	68	360		--	--	
Phenol	SVOA	ug/kg	17	0	0%	100	360		--	--	
Pyrene	SVOA	ug/kg	17	0	0%	68.0	360		--	--	
Tributyl phosphate	SVOA	ug/kg	17	1	6%	68.0	360	45.0	45.00	45.00	12.5 bgs
Aroclor-1016	PCB	ug/kg	17	0	0%	15.0	51.0		--	--	
Aroclor-1221	PCB	ug/kg	17	0	0%	15.0	51.0		--	--	
Aroclor-1232	PCB	ug/kg	17	0	0%	15.0	51.0		--	--	
Aroclor-1242	PCB	ug/kg	17	0	0%	15.0	51.0		--	--	
Aroclor-1248	PCB	ug/kg	17	0	0%	15.0	51.0		--	--	
Aroclor-1254	PCB	ug/kg	17	0	0%	15.0	51.0		--	--	
Aroclor-1260	PCB	ug/kg	17	0	0%	15.0	51.0		--	--	
Aroclor-1262	PCB	ug/kg	6	0	0%	48.0	51.0		--	--	
Aroclor-1268	PCB	ug/kg	6	0	0%	48.0	51.0		--	--	
Total petroleum hydrocarbons -diesel range	DIESEL	ug/kg	17	0	0%	4,100	13,100		--	--	
Total petroleum hydrocarbons -kerosene range	DIESEL	ug/kg	17	0	0%	4,100	13,100		--	--	
Total petroleum hydrocarbons -gasoline range	GAS	ug/kg	17	0	0%	29.0	33,000		--	--	
216-B-12 Crib											
Actinium-228	RAD	pCi/g	6	2	33%	1.0	4.48	0.668	1.02	1.02	94.5 bgs
Americium-241	RAD	pCi/g	9	3	33%	-0.032	0.140	0.140	2.00	2.00	35.5 bgs
Antimony-125	RAD	pCi/g	6	0	0%	-20.9	7.16		--	--	
Bismuth-212	RAD	pCi/g	6	1	17%	-6.32	11.1	0.508	0.508	0.508	94.5 bgs
Bismuth-214	RAD	pCi/g	6	2	33%	-1.52	16.6	0.433	1.05	1.05	94.5 bgs
Carbon-14	RAD	pCi/g	10	1	10%	-0.588	2.35	3.30	3.30	3.30	62.5 bgs
Cerium-144	RAD	pCi/g	6	0	0%	-2.35	49.2		--	--	
Cesium-134	RAD	pCi/g	10	0	0%	-2.33	0.224		--	--	
Cesium-137	RAD	pCi/g	10	4	40%	0.002	0.140	3,080	61,900	61,900	35.5 bgs
Cobalt-60	RAD	pCi/g	10	0	0%	-1.88	0.770		--	--	
Europium-152	RAD	pCi/g	10	0	0%	-20.2	11.6		--	--	
Europium-154	RAD	pCi/g	10	0	0%	-3.16	0.420		--	--	

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Europium-155	RAD	pCi/g	10	2	20%	-3.84	0.260	0.282	34.9	34.9	35.5 bgs
Iodine-129	RAD	pCi/g	10	0	0%	-0.361	0.544		--	--	
Lead-212	RAD	pCi/g	6	2	33%	-8.86	15.5	0.630	0.718	0.718	94.5 bgs
Lead-214	RAD	pCi/g	6	2	33%	-8.19	12.7	0.504	1.08	1.08	94.5 bgs
Neptunium-237	RAD	pCi/g	10	1	10%	0.000	0.323	0.048	0.048	0.048	40 bgs
Nickel-63	RAD	pCi/g	10	0	0%	-1.17	33.2		--	--	
Niobium-94	RAD	pCi/g	6	0	0%	-2.77	1.48		--	--	
Plutonium-238	RAD	pCi/g	10	0	0%	-0.140	0.025		--	--	
Plutonium-239/240	RAD	pCi/g	10	2	20%	0.000	0.083	0.200	3.90	3.90	35.5 bgs
Potassium-40	RAD	pCi/g	4	4	100%			14.2	15.8	15.8	197.5 bgs
Radium-226	RAD	pCi/g	10	6	60%	-1.52	16.6	0.383	1.050	1.050	94.5 bgs
Radium-228	RAD	pCi/g	10	5	50%	1.00	4.48	0.584	1.020	1.020	94.50
Ruthenium-103	RAD	pCi/g	6	0	0%	-2.03	1.77		--	--	
Ruthenium-106	RAD	pCi/g	6	0	0%	-16.1	30.9		--	--	
Technetium-99	RAD	pCi/g	10	0	0%	0.083	0.362		--	--	
Thallium-208	RAD	pCi/g	6	2	33%	-0.731	3.36	0.173	0.295	0.295	94.5 bgs
Thorium-228	RAD	pCi/g	10	10	100%			0.307	7.54	7.54	35.5 bgs
Thorium-230	RAD	pCi/g	10	6	60%	0.190	3.15	0.789	1.19	1.19	14.50
Thorium-232	RAD	pCi/g	10	7	70%	-0.243	0.453	0.409	0.716	0.716	14.5 bgs
Thorium-234	RAD	pCi/g	6	1	17%	2.02	148.000	2.01	2.01	2.01	94.5 bgs
Tin-113	RAD	pCi/g	6	0	0%	-0.179	6.99		--	--	
Tin-126	RAD	pCi/g	10	1	10%	-3.56	10.4	0.742	0.742	0.742	14.5 bgs
Total Radioactive Strontium	RAD	pCi/g	10	6	60%	-0.014	0.125	12.5	12,700	12,700	35.5 bgs
Tritium	RAD	pCi/g	10	7	70%	0.992	1.66	2.62	8.28	8.28	14.5 bgs
Uranium (mg/kg)	METAL	mg/kg	10	10	100%			0.334	28.0	28.0	35.5 bgs
Uranium-233/234	RAD	pCi/g	10	10	100%			0.308	4.90	4.90	40 bgs
Uranium-235	RAD	pCi/g	10	6	60%	0.021	0.042	0.041	0.320	0.320	40 bgs
Uranium-238	RAD	pCi/g	10	10	100%			0.430	5.10	5.10	40 bgs
Zinc-65	RAD	pCi/g	6	0	0%	-0.430	6.250		--	--	
Aluminum	METAL	mg/kg	6	6	100%			6420	11,300	11,300	40 bgs
Antimony	METAL	mg/kg	10	4	40%	2.36	2.49	0.220	0.650	0.650	302 bgs
Arsenic	METAL	mg/kg	10	10	100%			2.00	7.30	7.30	14.5 bgs
Barium	METAL	mg/kg	10	10	100%			28.2	93.8	93.8	302 bgs
Beryllium	METAL	mg/kg	10	4	40%	1.42	1.49	0.120	0.330	0.330	14.5 bgs
Bismuth	METAL	mg/kg	10	0	0%	0.340	4.92		--	--	
Boron	METAL	mg/kg	10	4	40%	4.36	5.02	0.750	1.30	1.30	14.5 bgs
Cadmium	METAL	mg/kg	10	2	20%	0.030	0.498	0.050	0.080	0.080	14.5 bgs
Chromium (Total)	METAL	mg/kg	10	10	100%			6.94	30.4	30.4	302 bgs
Cobalt	METAL	mg/kg	6	6	100%			3.80	7.24	7.24	40 bgs
Copper	METAL	mg/kg	10	10	100%			5.92	16.6	16.6	302 bgs
Hexavalent Chromium	METAL	mg/kg	16	0	0%	0.054	0.421		--	--	
Lead	METAL	mg/kg	10	4	40%	5.68	5.98	2.70	6.10	6.10	14.5 bgs
Manganese	METAL	mg/kg	6	6	100%			139	318	318	94.5 bgs
Mercury	METAL	mg/kg	10	2	20%	0.020	0.498	0.020	1.31	1.31	35.5 bgs
Molybdenum	METAL	mg/kg	6	0	0%	1.42	1.49		--	--	
Nickel	METAL	mg/kg	10	10	100%			5.480	11.2	11.2	197.5 bgs

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Selenium	METAL	mg/kg	10	0	0%	0.28	1.49		--	--	
Silver	METAL	mg/kg	10	1	10%	0.080	0.996	2.41	2.41	2.41	50 bgs
Thallium	METAL	mg/kg	6	0	0%	0.473	0.498		--	--	
Thorium	METAL	mg/kg	6	6	100%			3.46	5.43	5.43	94.5 bgs
Vanadium	METAL	mg/kg	6	6	100%			37.5	45.4	45.4	35.5 bgs
Zinc	METAL	mg/kg	6	6	100%			25.4	43.1	43.1	40 bgs
Ammonia as N	CONV	mg/kg	10	6	60%	4.80	6.50	196	404	404	94.5 bgs
Bromide	CONV	mg/kg	6	0	0%	22.5	22.5		--	--	
Chloride	CONV	mg/kg	10	5	50%	1.30	7.00	2.10	23.4	23.4	40 bgs
Cyanide	CONV	mg/kg	10	0	0%	0.190	0.490		--	--	
Fluoride	CONV	mg/kg	10	0	0%	1.30	3.50		--	--	
Nitrate as N	CONV	mg/kg	10	9	90%	2.50	2.50	6.05	165	165	35.5 bgs
Nitrite as N	CONV	mg/kg	10	0	0%	0.39	4.50		--	--	
Nitrate and nitrate/nitrite as N	CONV	mg/kg	16	16	100%			1.00	126	126	50 bgs
Phosphate	CONV	mg/kg	10	0	0%	1.30	6.50		--	--	
Sulfate	CONV	mg/kg	10	8	80%	12.0	12.0	6.80	647	647	35.5 bgs
% moisture (dry)	CONV	%	2	2	100%			2.50%	2.80%	2.80%	302 bgs
% moisture (wet)	CONV	%	2	2	100%			2.60%	2.90%	2.90%	302 bgs
% Solids	CONV	%	2	2	100%			97.20%	97.50%	97.50%	94.5 bgs
pH	CONV	pH	10	10	100%			8.42	9.11	9.11	40 bgs
Oil & grease	CONV	ug/kg	16	0	0%	200,000	702,000		--	--	
Diethyl ether	VOA	ug/kg	4	0	0%	22,000	28,000		--	--	
Ethylene glycol	VOA	ug/kg	10	0	0%	22.00	50,000		--	--	
Methanol	VOA	ug/kg	10	0	0%	8,800	28,000		--	--	
dichlorodiphenyldichloroethane	PEST	ug/kg	1	0	0%	3.30	3.30		--	--	
dichlorodiphenyldichloroethylene	PEST	ug/kg	1	0	0%	3.30	3.30		--	--	
dichlorodiphenyltrichloroethane	PEST	ug/kg	1	0	0%	3.30	3.30		--	--	
1-butanol	VOA	ug/kg	10	0	0%	22,000	50,000		--	--	
2,4,5-trichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	18.0	18.0		--	--	
2,4-dichlorophenoxyacetic acid	HERB	ug/kg	1	0	0%	35.0	35.0		--	--	
2-(2,4,5-trichlorophenoxy)propionic acid	HERB	ug/kg	1	0	0%	18.0	18.0		--	--	
2-secButyl-4,6-dinitrophenol (DNBP)	HERB	ug/kg	1	0	0%	18.0	18.0		--	--	
4-(2,4-Dichlorophenoxy)butanoic acid	HERB	ug/kg	1	0	0%	180	180		--	--	
Aldrin	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Alpha-BHC	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
alpha-Chlordane	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
beta-1,2,3,4,5,6-hexachlorocyclohexane	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Delta-BHC	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
dieldrin	PEST	ug/kg	1	0	0%	3.30	3.30		--	--	
Endosulfan I	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Endosulfan II	PEST	ug/kg	1	0	0%	3.30	3.30		--	--	
Endosulfan sulfate	PEST	ug/kg	1	0	0%	3.30	3.30		--	--	
Endrin	PEST	ug/kg	1	0	0%	3.30	3.30		--	--	
Endrin aldehyde	PEST	ug/kg	1	0	0%	3.30	3.30		--	--	
Endrin ketone	PEST	ug/kg	1	0	0%	3.30	3.30		--	--	
Gamma-BHC (Lindane)	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
gamma-Chlordane	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Heptachlor	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Heptachlor epoxide	PEST	ug/kg	1	0	0%	1.70	1.70		--	--	
Methoxychlor	PEST	ug/kg	1	0	0%	17.0	17.0		--	--	
Toxaphene	PEST	ug/kg	1	0	0%	170	170		--	--	
Dalapon	HERB	ug/kg	1	0	0%	180	180		--	--	
Dicamba	HERB	ug/kg	1	0	0%	71.0	71.0		--	--	
Dichloroprop	HERB	ug/kg	1	0	0%	180	180		--	--	
1,1,1-Trichloroethane	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
1,1,2,2-Tetrachloroethane	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
1,1,2-Trichloroethane	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
1,1-Dichloroethane	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
1,1-Dichloroethene	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
1,2-Dichloroethane	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
1,2-Dichloroethene (Total)	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
1,2-Dichloropropane	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
2-Butanone	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
2-Hexanone	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
4-Methyl-2-Pentanone	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
Acetone	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
Benzene	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
Bromodichloromethane	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
Bromoform	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
Bromomethane	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
Carbon disulfide	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
Carbon tetrachloride	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
Chlorobenzene	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
Chloroethane	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
Chloroform	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
Chloromethane	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
cis-1,3-Dichloropropene	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
Dibromochloromethane	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
Ethylbenzene	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
Methylene chloride	VOA	ug/kg	2	0	0%	20.0	20.0		--	--	
Styrene	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
Tetrachloroethene	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
Toluene	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
trans-1,3-Dichloropropene	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
Trichloroethene	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
Vinyl chloride	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
Xylenes (total)	VOA	ug/kg	2	0	0%	20.0	21.0		--	--	
1,2,4-Trichlorobenzene	SVOA	ug/kg	10	0	0%	340	1,500		--	--	
1,2-Dichlorobenzene	SVOA	ug/kg	10	0	0%	340	1,900		--	--	
1,3-Dichlorobenzene	SVOA	ug/kg	10	0	0%	340	1,700		--	--	
1,4-Dichlorobenzene	SVOA	ug/kg	10	0	0%	340	1,600		--	--	
2,4,5-Trichlorophenol	SVOA	ug/kg	10	0	0%	340	880		--	--	

Table A-2. Data Summary Table -- Deep Zone.

Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
2,4,6-Trichlorophenol	SVOA	ug/kg	10	0	0%	310	350		--	--	
2,4,6-Trimethylpyridine	SVOA	ug/kg	3	3	100%			1,300	3,500	3,500	35.5 bgs
2,4-Dichlorophenol	SVOA	ug/kg	10	0	0%	340	420		--	--	
2,4-Dimethylphenol	SVOA	ug/kg	10	0	0%	310	350		--	--	
2,4-Dinitrophenol	SVOA	ug/kg	10	0	0%	850	3,500		--	--	
2,4-Dinitrotoluene	SVOA	ug/kg	10	0	0%	310	350		--	--	
2,6-Dinitrotoluene	SVOA	ug/kg	10	0	0%	310	350		--	--	
2-Butoxyethanol	SVOA	ug/kg	8	0	0%	340	520		--	--	
2-Chloronapthalene	SVOA	ug/kg	10	0	0%	340	420		--	--	
2-Chlorophenol	SVOA	ug/kg	10	0	0%	340	760		--	--	
2-Methylnapthalene	SVOA	ug/kg	10	0	0%	340	930		--	--	
2-Methylphenol (cresol, o-)	SVOA	ug/kg	10	0	0%	310	350		--	--	
2-Nitroaniline	SVOA	ug/kg	10	0	0%	310	880		--	--	
2-Nitrophenol	SVOA	ug/kg	10	0	0%	340	900		--	--	
3,3'-Dichlorobenzidine	SVOA	ug/kg	10	0	0%	340	420		--	--	
3+4 Methylphenol (cresol m+p)	SVOA	ug/kg	6	0	0%	530	590		--	--	
3-Nitroaniline	SVOA	ug/kg	10	0	0%	310	880		--	--	
3-Penten-2-one (E)-	SVOA	ug/kg	1	1	100%			830	830	830	40 bgs
4,6-Dinitro-2-methylphenol	SVOA	ug/kg	10	0	0%	850	3,500		--	--	
4-Bromophenylphenylether	SVOA	ug/kg	10	0	0%	310	350		--	--	
4-Chloro-3-methylphenol	SVOA	ug/kg	10	0	0%	310	350		--	--	
4-Chloroaniline	SVOA	ug/kg	10	0	0%	340	480		--	--	
4-Chlorophenylphenylether	SVOA	ug/kg	10	0	0%	310	350		--	--	
4-Methylphenol (cresol, p-)	SVOA	ug/kg	4	0	0%	340	350		--	--	
4-Nitroaniline	SVOA	ug/kg	10	0	0%	850	1,300		--	--	
4-Nitrophenol	SVOA	ug/kg	10	0	0%	850	3,400		--	--	
6-Tridecene (E)-	SVOA	ug/kg	1	1	100%			5,100	5,100	5,100	35.5 bgs
Acenaphthene	SVOA	ug/kg	10	0	0%	310	350		--	--	
Acenaphthylene	SVOA	ug/kg	10	0	0%	340	420		--	--	
Anthracene	SVOA	ug/kg	10	0	0%	310	350		--	--	
Benzo(a)anthracene	SVOA	ug/kg	10	0	0%	310	350		--	--	
Benzo(a)pyrene	SVOA	ug/kg	10	0	0%	310	350		--	--	
Benzo(b)fluoranthene	SVOA	ug/kg	10	0	0%	310	350		--	--	
Benzo(ghi)perylene	SVOA	ug/kg	10	0	0%	310	350		--	--	
Benzo(k)fluoranthene	SVOA	ug/kg	10	0	0%	310	350		--	--	
Benzyl alcohol	SVOA	ug/kg	4	0	0%	340	350		--	--	
Bis(2-chloro-1-methylethyl)ether	SVOA	ug/kg	10	0	0%	340	1,300		--	--	
Bis(2-Chloroethoxy)methane	SVOA	ug/kg	10	0	0%	340	590		--	--	
Bis(2-chloroethyl) ether	SVOA	ug/kg	10	0	0%	340	1,300		--	--	
Bis(2-ethylhexyl)phthalate	SVOA	ug/kg	10	2	20%	340	2,900	18.0	20.0	20.0	247.5 bgs
Butylbenzylphthalate	SVOA	ug/kg	10	0	0%	310	350		--	--	
Carbazole	SVOA	ug/kg	10	0	0%	340	420		--	--	
Chrysene	SVOA	ug/kg	10	0	0%	310	350		--	--	
Di-n-butylphthalate	SVOA	ug/kg	10	3	30%	350	450	28.0	77.0	77.0	14.5 bgs
Di-n-octylphthalate	SVOA	ug/kg	10	0	0%	310	350		--	--	
Diacetone alcohol	SVOA	ug/kg	4	4	100%			13,000	200,000	200,000	40 bgs

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Constituent	Constituent Class	Units	Number of Samples	Number of Detects	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Result	Maximum Result	Exposure Point Concentration	Overall Maximum Depth
Dibenz[a,h]anthracene	SVOA	ug/kg	10	0	0%	310	350		--	--	
Dibenzofuran	SVOA	ug/kg	10	0	0%	310	350		--	--	
Diethylphthalate	SVOA	ug/kg	10	5	50%	340	940	1,100	8,700	8,700	40 bgs
Dimethylphthalate	SVOA	ug/kg	10	0	0%	310	350		--	--	
Fluoranthene	SVOA	ug/kg	10	0	0%	310	350		--	--	
Fluorene	SVOA	ug/kg	10	0	0%	310	350		--	--	
Hexachlorobenzene	SVOA	ug/kg	10	0	0%	310	350		--	--	
Hexachlorobutadiene	SVOA	ug/kg	10	0	0%	340	1,900		--	--	
Hexachlorocyclopentadiene	SVOA	ug/kg	10	0	0%	340	1,600		--	--	
Hexachloroethane	SVOA	ug/kg	10	0	0%	340	2,400		--	--	
Ideno(1,2,3-cd)pyrene	SVOA	ug/kg	10	0	0%	310	350		--	--	
Isophorone	SVOA	ug/kg	10	0	0%	310	350		--	--	
mesityl oxide	SVOA	ug/kg	4	4	100%			2,100	14,000	14,000	40 bgs
N-Nitrosodi-n-dipropylamine	SVOA	ug/kg	10	0	0%	310	350		--	--	
N-Nitrosodiphenylamine	SVOA	ug/kg	10	0	0%	310	350		--	--	
Naphthalene	SVOA	ug/kg	10	0	0%	340	1,500		--	--	
Nitrobenzene	SVOA	ug/kg	10	0	0%	340	1,400		--	--	
Pentachlorophenol	SVOA	ug/kg	10	0	0%	850	1,600		--	--	
Phenanthrene	SVOA	ug/kg	10	0	0%	310	350		--	--	
Phenol	SVOA	ug/kg	10	0	0%	340	520		--	--	
Pyrene	SVOA	ug/kg	10	0	0%	310	350		--	--	
Tetramethylpiperidinone	SVOA	ug/kg	4	4	100%			740	1,900	1,900	40 bgs
Tributyl phosphate	SVOA	ug/kg	10	4	40%	330	350	570	2,000	2,000	40 bgs
Aroclor-1016	PCB	ug/kg	2	0	0%	97.0	110		--	--	
Aroclor-1221	PCB	ug/kg	2	0	0%	97.0	110		--	--	
Aroclor-1232	PCB	ug/kg	2	0	0%	97.0	110		--	--	
Aroclor-1242	PCB	ug/kg	2	0	0%	97.0	110		--	--	
Aroclor-1248	PCB	ug/kg	2	0	0%	97.0	110		--	--	
Aroclor-1254	PCB	ug/kg	2	1	50%	97.0	97.0	140	140	140	35.5 bgs
Aroclor-1260	PCB	ug/kg	2	0	0%	97.0	110		--	--	
Aroclor-1262	PCB	ug/kg	2	0	0%	97.0	110		--	--	
Aroclor-1268	PCB	ug/kg	2	0	0%	97.0	110		--	--	
Total petroleum hydrocarbons -diesel range	DIESEL	ug/kg	10	0	0%	12,300	16,000		--	--	
Total petroleum hydrocarbons -kerosene range	DIESEL	ug/kg	10	0	0%	12,300	16,000		--	--	
Total petroleum hydrocarbons -gasoline range	GAS	ug/kg	10	1	10%	29.0	1,000	110	110	110	14.5 bgs