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September 24, 2001

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Rich Fallejo
U.S. Department of Energy
Oakland Operations Office
1301 Clay Street
Oakland, CA 94612

RE: Evaluation of 2001 Southwest Trenches
Overburden Soil Data
DOE LEHR Site, Davis, California
WA Job # 128-4107-610

Dear Rich:

As you requested, Weiss Associates (WA) has conducted an evaluation of 1998 Southwest Trenches (SWT) Removal Action (RA) overburden soil data to determine if on-site reuse of this material as backfill is appropriate. If deemed appropriate by the United States Department of Energy (DOE), on-site reuse of this material is consistent with DOE's waste minimization goals and eliminates the need for costly off-site disposal.

The overburden soil consists of three stockpiles stored in the former Cobalt-60 (Co-60) Field. The stockpiled soil consists of approximately 435 cubic yards (cu yd) of material removed from 0 to 3.5 feet below ground surface (ft bgs) in portions of the SWT area. During the SWT RA, the overburden soil was segregated from materials removed from disposal cells based on field screening for metals, radionuclides, pesticides and volatile organic compounds (VOCs).

The initial results of the overburden stockpile sampling were presented in Appendix A of the *Final Southwest Trenches Area 1998 Removal Action Confirmation Report* (WA, 2001b). Subsequent sampling of the stockpiles is described in the *Sampling and Analysis Addendum Southwest Trenches Overburden Stockpiles* (WA, 2001a); the results of the subsequent sampling are presented below.

EVALUATION OBJECTIVES

Below are the evaluation objectives for the overburden soil:

1. Whether reuse of the overburden soil as on-site backfill poses potentially unacceptable health risks based on the standards set forth under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), i.e., excess cumulative cancer risk to an individual from exposure to site contaminants to a

nominal range of 10^{-4} to 10^{-6}, using 10^{-6} as the point of departure; and a non-cancer hazard index of less than one.

2. Whether reuse of the overburden soil as on-site backfill will impact ground water.

3. Whether Resource Conservation and Recovery Act (RCRA)-hazardous constituents are present.

To have a statistically valid data set, the sample results from all three of the overburden stockpiles were combined for the evaluation of each objective above.

The overall objective is to reuse the overburden soil on-site as backfill after completion of the ongoing RA activities in the Laboratory for Energy-Related Health Research (LEHR) Western Dog Pens (WDP) area at a depth of zero to two feet below ground surface.

STOCKPILE SAMPLING

Below is a summary of the overburden stockpile sampling events that occurred between 1998 and 2001. The laboratory analytical results for the overburden sampling are included as Appendix A. Table 1 provides an evaluation summary for each stockpile.

Stockpile LEHR0651

In November 1998, two composite soil samples were collected from Stockpile LEHR0651. Samples CWDTC062 and CWDTC063 were analyzed for a full suite of analyses including radionuclides, VOCs, semi-volatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs), metals, hexavalent chromium (Cr), and nitrate.

In March 2001, two composite samples were collected from the stockpile. Sample CWDTC113 was analyzed for total Cr, nickel (Ni) and antimony as well as the RCRA Toxicity Characteristics Leaching Procedure (TCLP) and the California Soluble Threshold Limit Concentration (STLC) for Cr and Ni. Sample CWDTC114 was analyzed for gamma emitters.

Stockpile LEHR0652

In August 1998, four composite soil samples were collected from Stockpile LEHR0652. Samples CWDTC046 through CWDTC050 were analyzed for a full suite of analyses as listed above. The analytical results from these samples indicated that concentrations of strontium-90 (Sr-90), chlordane and cadmium (Cd) were present above background concentrations in Stockpile LEHR0652.

In September 1999, six soil samples, CWDTC075 through CWDTC080, were collected from the stockpile and analyzed for total chlordane, Sr-90, alpha emitters, and gamma emitters, to further define the extent of the contamination.

In March 2001, seven composite soil samples were collected from the stockpile. Samples CWDTC107 through CWDTC111 were analyzed for Cd. Sample CWDTC109 was also analyzed for total Cr and Ni, TCLP for Cr and STLC for Cr and Ni. Sample CWDTC115 was analyzed for gamma emitters.

Based on the analytical results, an approximately 20-cu yd section of Stockpile LEHR0652 was segregated in May 2001 to be disposed off site due to the presence of chlordane at a concentration of 2.42 milligrams per kilogram (mg/kg) which exceeds the lowest Risk-Based Action Standard (RBAS) of 0.78 mg/kg. The segregated stockpile is currently stored in the former Co-60 Field pending additional waste characterization data required by the disposal facility.

Samples CWDTC075, CWDTC078, and CWDTC112 were collected from the segregated section of the stockpile. Sample CWDTC112 was analyzed for the following parameters to obtain the data required for off-site waste disposal classification:

- Metals - total Cr and Ni, TCLP for Cr, and STLC for Cr and Ni; and,
- Herbicides, reactive cyanide, reactive sulfide, paint filter test, formaldehyde, pH, ignitability and total plate count

Stockpile LEHR0653

In August 1998, four composite soil samples including one field duplicate were collected from Stockpile LEHR0653. Samples CWDTC042 through CWDTC045 were analyzed for a full suite of analyses as listed above (see Stockpile LEHR0651).

In March 2001, five composite soil samples were collected from Stockpile LEHR0653. Samples CWDTC103 through CWDTC106 were analyzed for Cd. CWDTC104 and CWDTC105 were also analyzed for total Cr and Ni, TCLP for Cr, and STLC for Cr and Ni. Sample CWDTC116 was analyzed for gamma emitters.

Laboratory Methods Used to Analyze Stockpile Samples

All samples were collected following the procedures specified in the RA Work Plan (WA, 2000b). The overburden sample locations and the portions of the stockpiles they represent are shown in Figures 1 through 4.

The following laboratory analytical methods were used to analyze the stockpile samples:

- All samples were analyzed for radionuclides using a combination of Environmental Protection Agency (EPA) methods and laboratory standard operating procedures.
- VOCs, SVOCs, pesticides/PCBs, and metals were analyzed by EPA SW-846 Methods 8260, 8270, 8081, and 6010/7471, respectively.
- Hexavalent Cr and nitrate were analyzed by EPA SW-846 Method 3060A/7193 and EPA Method 300, respectively. Herbicides were analyzed by EPA Method 8151.

- Reactive cyanide and reactive sulfide were analyzed by EPA Methods 7.3.3.2 and 7.3.4.2, respectively.
- Paint filter was analyzed by EPA Method 9095.
- Formaldehyde was analyzed by Association of Official Agricultural Chemists Method 931.08 (AOAC 931.08).
- pH was analyzed by EPA Method 9045.
- Ignitability was analyzed by EPA Method 1010.
- Total plate count was analyzed by the Standard Method for the Examination of Water & Wastewater 9215 (SM 9215).

DATA USABILITY

Prior to conducting the overburden evaluations, the data were screened for laboratory validation and expert review qualifiers. WA validated the overburden data following the standard operating procedures developed and previously implemented for the LEHR project. Qualified data were checked to determine whether the results were useable for statistical evaluation. Data that were rejected during expert review were not used. Data that were outside of instrument calibration ranges also were not used.

Some of the samples collected from Stockpiles LEHR0652 and LEHR0653 contained the following VOCs: toluene, xylene, chloroform, ethylbenzene, methylene chloride and 2-butanone. Field screening results and operational history for the site do not indicate that significant releases of these compounds occurred in the SWT area. This suggests that these VOCs were introduced after the overburden was excavated, or that the reported presence of VOCs is an artifact of the inadvertent contamination during the sampling and/or analytical laboratory analysis.

Possible sources of these VOCs are the plastics used to contain the stockpiles, sample packaging and shipping materials, and contamination within the laboratory's analytical instruments. Blank soil results are not available to substantiate these hypothetical sources of contamination; therefore, these VOC results will be carried forward in the reuse evaluation.

All detection limits were reviewed to determine whether the necessary data comparisons could be made for the overburden evaluations. Some of the detection limits for sample analyses conducted in 1998 were above applicable standards (e.g., RCRA hazardous thresholds, RBAS values and background values). In order to be conservative, the analytical results that are above these applicable standards, but below their detection limits, were included in the overburden statistical evaluations.

RISK SCREENING

To address Objective No. 1, risk screening of the overburden soil was conducted in accordance with United States (USEPA) guidelines (e.g., USEPA Superfund Risk Assessment

Guidelines). The overburden data were evaluated according to the LEHR Remedial Project Manager (RPM)-approved method presented in Section 6 of the *Final Southwest Trenches Area 1998 Removal Action Confirmation Report*. A flowchart of the risk screening process is presented as Figure 5.

Risk Screening Procedure

The overburden data for all metal, pesticide/PCB, radionuclide, SVOC, and VOC constituents of concern (COCs) were retrieved from the LEHR database. The following statistics were determined for each COC:

- Number of samples with concentrations above the reporting limit;
- Number of detections above the background value;
- Maximum detected concentration;
- Mean, standard deviation, and the 95% upper confidence limit (UCL) on the mean of data. The 95% UCL is a statistical value that is often calculated for Superfund sites to conservatively compare the cleanup area or remediation unit data to a pre-determined limit such as the RBAS.

Three exposure scenarios were developed in 1997 to evaluate risks and generate the RBAS values:

- Scenario 1, On-Site Researcher, represents potential on-site workers that may be exposed to source area soil through external radiation from ground surface radionuclides at or near the ground surface (for radionuclides only), ingestion, inhalation and dermal exposure;
- Scenario 2, East Side Residential Farmer, represents potential off-site residential farmers that may be exposed to potentially impacted ground water, potentially impacted surface water (via recreational use), and via external radiation from radionuclides at or near the ground surface (for radionuclides only), inhalation of fugitive dust, soil ingestion, and agricultural foods potentially impacted by fugitive dust migration from the on-site source areas; and,
- Scenario 3, South Side Residential Farmer, is identical to Scenario 2 except that exposure to impacted ground water is not included, since ground water flow is generally toward the east, away from this receptor location, and ground water contamination does not impact Putah Creek.

The following procedure was used for the risk screening:

- Calculated the Reasonable Maximum Exposure (RME) concentration for each COC—USEPA recommends that the 95% UCL be used as the concentration term, or RME, in Superfund assessments. If insufficient data is available to calculate the 95% UCL, then the maximum concentration is used as the RME;
- Completed a background comparison for COCs with RBAS values less than background;

- Performed a risk analysis for carcinogens and non-carcinogens by comparing the RME to the RBAS for each COC; and,
- Compared RMEs to USEPA Preliminary Remediation Goals (PRGs).

The ratio of the RME to the RBAS was calculated for all three risk scenarios described in the RBAS report (WA, 1997). The ratio of RME to RBAS (RME/RBAS) was determined for both carcinogens and non-carcinogens. The RME/RBAS ratios were then summed across all COCs for each scenario for carcinogens and again for non-carcinogens.

The RBAS concentrations used in the evaluation correspond to a 10^{-6} excess cancer risk for carcinogens and a hazard quotient (HQ) of 1.0 for non-carcinogens. Thus, an RME/RBAS ratio greater than 1.0 indicates the RBAS was exceeded for the selected risk or HQ. In addition, if the sum of the RME/RBAS ratios for multiple COCs is greater than 1.0, then the target excess cancer risk or non-cancer HQ may be exceeded due to additive toxicological effects.

In addition to the RME/RBAS ratio calculations, the ratio of the RME to Region 9 PRGs for residential soil was determined. The RME/PRG ratio was also summed across COCs for carcinogens and again for non-carcinogens.

The sums of RME/RBAS ratios and RME/PRG ratios are presented at the bottom of Table 2.

The RME/RBAS ratio was not calculated for COCs whose RBAS value was below the background value[1]. Background is typically identified as contributing zero excess or incremental risk since the contaminants are present regionally and often naturally occurring. These COCs were compared to background data instead.

- The COCs whose RBAS value was below background values are antimony, barium, Cd, copper, lead, manganese, mercury, radium-226 (Ra-226), thorium 228 (Th-228), and thorium-232 (Th-232).
- Of these COCs, antimony, barium, copper, manganese, mercury, Ra-226, and Th-232 were screened out because all of their results were below the background level.
- The remaining COCs were compared to background using the Wilcoxon Rank Sum (WRS) test. The WRS test results are presented in Appendix B.
- Overburden lead data were determined indistinguishable from background using the WRS test. Cd and Th-228 overburden data were found to potentially be above background.

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[1]Risk assessments evaluate excess or incremental risk due to the presence of contaminants above site background. Background is typically identified as contributing zero excess or incremental risk since the contaminants are present regionally. For some of the COCs, the RBAS values are less than their background concentrations. Therefore, in the case where an RBAS value for a particular COC is less than the background concentration, the action standard is set at background. Additionally, if a COC is detected at or below background levels, it is assumed that this COC does not contribute to excess or incremental risk and is therefore removed from the risk analysis.

- It was determined that further evaluation of Cd should be completed, including calculating an area-specific RBAS that is more representative of actual site conditions/contaminant distribution than the existing site-wide RBAS. The Cd overburden data were also found to be insufficient in quantity for statistical analysis. Therefore, the maximum reported Cd concentration was conservatively used for the risk screening.
- The maximum Th-228 concentration of 0.65 picoCuries per gram (pCi/g) was reported for a sample collected in August 1998 (over two years ago). Th-228 has a half-life of 1.9 years. Since at least one half-life period has passed since the sample was collected, Th-228 has decayed to less than 0.33 pCi/g and is below the LEHR site background concentration of 0.63 pCi/g.

Area-Specific Cadmium Risk-Based Action Standard Calculation

On April 10, 2001, the RPMs verbally approved WA's request to calculate an area-specific Cd RBAS for evaluating the risks for reusing the overburden soil in the LEHR WDP area. The RPMs have previously approved calculating area-specific RBAS values on a case-by-case basis when it is clear that the DOE site-wide assumptions are overly conservative and do not apply.

The previous RBAS calculated for Cd was based on the assumption that Cd is homogeneously distributed across all DOE areas at the LEHR site between 0 and 15 ft bgs. This assumption is overly conservative for this application since the overburden soil is being evaluated for possible reuse on-site in a portion of the WDP area at a depth no greater than two feet bgs.

The lowest existing Cd RBAS, 0.38 mg/kg, applies to non-carcinogenic effects of Cd under Scenario 2 (i.e., the off-site eastside residential farmer). WA completed the necessary modeling[2] and calculations to calculate an area-specific RBAS for non-carcinogenic effects of Cd under Scenario 2. WA used the same approach that was previously done to calculate RBAS values for the site in the *Draft Determination for Risk-Based Action Standards for DOE Areas* (WA, 1997).

- The area-specific Cd RBAS calculation assumed the overburden soil would be placed between zero and two feet below ground surface in the WDP.
- Chemical properties and toxicity information were obtained from the USEPA Superfund Chemical Data Matrix (USEPA, 1996) and/or Integrated Risk Information System.
- Area-specific lithology information was obtained from previous investigations in the WDP area.

The Cd RBAS recalculation is presented as Appendix C. As shown, the area-specific Cd RBAS result is 13.7 mg/kg. The Cd RME value of 0.63 mg/kg and the maximum value of 0.81 mg/kg for the overburden soil are well below the area-specific Cd RBAS.

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[2] Using the Non-isothermal Unsaturated-Saturated Flow and Transport model used for the previous RBAS calculations.

Risk Screening Results

The risk screening results are shown in detail in Table 2.

Carcinogens

- The risk screening results indicate that RME/RBAS ratios were below 1.0 for each individual COC in all scenarios for carcinogens.
- The sum of RME/RBAS ratios for all COCs was less than 1.0 for Scenario 1 and Scenario 3 for carcinogens.
- The sum of RME/RBAS ratios for all COCs was 1.53 for Scenario 2 for carcinogens. This was still within the CERCLA acceptable risk range of 10^{-6} to 10^{-4}; therefore, the cumulative risks for this scenario are not an issue.

Non-Carcinogens

- The risk screening results indicate that RME/RBAS ratios were below 1.0 for each individual COC in all scenarios for non-carcinogens.
- The sum of RME/RBAS ratios for all COCs was less than 1.0 for all scenarios for non-carcinogens.

The risk screening indicates there are no risk issues with reusing the overburden materials on-site.

DESIGNATED-LEVEL SCREENING

To satisfy Objective No. 2, the overburden data were evaluated following the preliminary designated-level (DL) screening process presented in Section 6 of *the Draft Southwest Trenches Area 1998 Removal Action Confirmation Report*. A flowchart of the preliminary DL screening process is presented in Figure 6.

Designated-Level Screening Procedures

The preliminary DL screening process consisted of four steps. Any analyte remaining after Step 4 would be considered a potential DL COC for overburden soil. The four screening steps were:

- Step 1: Each analyte was evaluated to determine whether it was detected in any of the samples. If the analyte was not detected, then it was not considered a potential DL COC.
- Step 2: The remaining analytes were compared to 1.5 times the background value and the percent of detected concentrations was considered. If the maximum concentration of the analyte was greater than 1.5 times the background value and detected with a

frequency of more than 5%, it was carried forward to Step 3. Otherwise, the analyte was no longer considered a potential DL COC.

- Step 3: Each analyte's soil/water partitioning coefficient (K_d) was evaluated along with its radiological half-life. An analyte was carried forward to Step 4 if it was organic (pesticides/SVOCs/VOCs) and its K_d was less than 10 milliliters per gram (mL/g), or it was inorganic (metals, minerals, and radionuclides) and its K_d was less than 1,000 mL/g, or if it was a radionuclide and its half-life was greater than one year. Otherwise, the analyte was dropped from the list of potential COCs.

- Step 4: The remaining analytes were evaluated based on whether biological degradation would prevent them from migrating to ground water. Analytes that are known to undergo rapid biological decay in vadose zone soil were eliminated from the list of potential COCs. Because there are no area-specific DL modeling results for the proposed area to reuse the overburden, professional judgement was used to compare drinking water maximum contaminant levels (MCLs) and PRG values to the maximum concentrations to determine if the analytes in Step 4 should be classified as potential DL COCs.

Designated-Level Screening Results

The results of the DL screening process are shown in Tables 3 and 4. Table 3 is a summary of the results for Steps 1 through 3, and Table 4 is a summary of Step 4 results.

Over 200 analytes were evaluated; only one analyte remained after Step 4 of the screening process. All SVOCs were eliminated in Step 1 due to no detections. Nitrate, and the majority of the metals, pesticides, radionuclides, and VOCs were eliminated in Step 2 since they are within the background range. The remainder of the pesticides were eliminated in Step 3.

The only remaining analytes after Step 3 were hexavalent Cr, Cd, selenium, carbon-14 (C-14), lead-210 (Pb-210), Sr-90, tritium, 2-butanone, chloroform, methylene chloride, toluene, and xylene. These analytes, with the exception of hexavalent Cr, were eliminated in Step 4 based on their natural attenuation rates and low concentrations (Table 4).

Hexavalent Chromium and Designated-Level Modeling Results

Hexavalent Cr was retained for further DL evaluation since the overburden data exceeded the historical background values for the LEHR site. The maximum hexavalent Cr concentration detected in the overburden soil was 0.34 mg/kg. All of the overburden concentrations were significantly below the lowest hexavalent Cr RBAS value of 3.8 mg/kg for the LEHR site.

During previous investigations, hexavalent Cr has been detected at the LEHR site in concentrations that exceed the background value, 0.054 mg/kg[3]. For example, hexavalent Cr

[3] The background value is very low and slightly above the analytical laboratory's detection limit.

concentrations exceeded two times background (0.108 mg/kg) in 17 of the 20 dog pens sampled during Phase C of the WDP investigation (WA, 1998).

DL modeling was previously completed at the Eastern Dog Pens (EDP) area in February 2000 to determine if contaminants such as hexavalent Cr have the potential to impact ground water (WA, 2000a). The results of the EDP DL modeling were used to evaluate whether the overburden stockpile would have the potential to impact ground water if reused as backfill in the WDP area. The WDP and EDP areas have similar lithologies based on their proximity and data from historical investigations.

The results of the EDP DL modeling indicate that a soil concentration of hexavalent Cr could be as much as 2.56 mg/kg distributed between 0 and 2 ft bgs before it results in ground water impact above the background level of 20 micrograms per liter at the up-gradient ground water well UCD1-18. All of the overburden sample concentrations for hexavalent Cr are below 2.56 mg/kg. Therefore, reuse of the overburden in the WDP area should not impact ground water based on the DL modeling results and since the overburden soil will be placed at shallow depths between zero and two feet below ground surface.

RESOURCE CONSERVATION AND RECOVERY ACT WASTE SCREENING

To satisfy Objective No. 3, WA evaluated the overburden to determine whether it was a potential listed or characteristic hazardous waste.

There are no documented releases of listed hazardous waste that has affected the overburden soil. Therefore, the overburden soil is not considered a listed hazardous waste.

For the characteristic hazardous waste comparison, all sample results were compared to state and federal hazardous waste standards for their toxicity leaching potential. Based on the initial screening, the total concentrations of Ni and Cr in samples collected from all three stockpiles were above 20 times the allowable RCRA TCLP concentration or 10 times the California STLC. This is a standard technique used to determine whether a waste matrix could potentially exceed the leachable limit based on the total value and the dilution factor for each test method. Based on this screening, the sample locations for each of the maximum detections of Ni and Cr were targeted for resampling and analysis by the TCLP and California Waste Extraction Test (WET). Subsequently, samples CWDTC109, CWDTC113, CWDTC104 and CWDTC105 (the field duplicate of CWDTC104) were collected and analyzed accordingly.

All of the total, TCLP, and STLC analytical results were below the federal and state regulatory levels for characteristic hazardous waste. Based on the waste screening results, the overburden can be classified as non-hazardous material and RCRA and California Land Disposal Restrictions are not applicable.

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS FOR OVERBURDEN SOIL

Objective No. 1—Risk Evaluation

Finding—The initial risk screening determined that none of the COCs were above the background or RBAS values except for Cd and Th-228. Further evaluation of Cd was completed which included calculating an area-specific RBAS. The overburden Cd sample concentrations were less than the area-specific RBAS. Accounting for natural decay, the overburden data are below the historical background concentration for Th-228. The individual COCs were within the CERCLA range of USEPA's Superfund acceptable risk limits for carcinogens and non-carcinogens.

Conclusion—Reuse of the overburden soil as on-site backfill does not pose unacceptable health risks compared to the USEPA Superfund risk limits. The cumulative risk of reusing this overburden soil at the LEHR site is acceptable.

Recommendation—Based on the risk screening, the overburden soil can be reused on site with no risk limitations.

Objective No. 2—Ground Water Impact Evaluation

Finding—No analytes remained after Step 4 of the DL analysis except for hexavalent Cr. Applicable DL modeling for the LEHR site was completed in February 2000 and determined that up to 2.56 mg/kg of hexavalent Cr could be present in the soil without causing impacts to ground water above background. The maximum hexavalent Cr concentration in the overburden is 0.34 mg/kg.

Conclusion—Reuse of the overburden soil as on-site backfill will not impact ground water. No analytes are DL COCs. The overburden hexavalent Cr concentrations are below the value calculated in the subsequent DL modeling and should not negatively impact ground water. All of the overburden soil could be used as backfill in the LEHR WDP area at a depth of zero to two feet bgs without impacting ground water.

Recommendation—There are no DL-based reuse limitations for the overburden soil. Based on the DL screening, the overburden soil can be reused on site without any limitations other than those discussed in this letter as to depth and location.

Objective No. 3— Resource Conservation and Recovery Act Waste Classification

Finding—There are no documented releases of listed hazardous waste that has affected the overburden soil. All total, TCLP, and STLC results from Stockpiles LEHR0651, LEHR0652 and LEHR0653 were below the federal and state regulatory levels for characteristic hazardous waste.

Conclusion—RCRA-hazardous constituents are not present in the overburden soil. The overburden stockpiles can be classified as non-hazardous material. None of the overburden should be considered

hazardous under state or federal statutes. The RCRA and California Land Disposal Restrictions are not applicable since the material is not a hazardous waste.

Recommendation—The overburden soil can be reused on site with no hazardous waste limitations.

REFERENCES

United States Environmental Protection Agency (USEPA), 1996, Superfund Chemical Data Matrix.

Weiss Associates (WA), 1997, *Draft Final Determination of Risk-Based Action Standards for DOE Areas for the Laboratory for Energy-Related Health Research*, University of California at Davis, California, August.

WA, 1998, *Final Technical Report: Results of the Western Dog Pens, Background and Off-Site Investigations at the Laboratory for Energy-Related Health Research,* University of California, Davis, Rev. 0, June.

WA, 2000a, *Addendum to Former Dog Pens Technical Memoranda for the Laboratory for Energy-Related Health Research,* University of California, Davis, February, Rev. C.

WA, 2000b, *Work Plan for Removal Actions in the Southwest Trenches, Ra/Sr Treatment Systems, and Domestic Septic Systems Areas at the Laboratory for Energy-Related Health Research,* University of California, Davis, July, Rev. 0.

WA, 2001a, *Sampling and Analysis Plan Addendum Southwest Trenches Overburden Stockpiles at the Laboratory for Energy-Related Health Research*, University of California, Davis, March, Rev. 0.

WA, 2001b, *Final Southwest Trenches Area 1998 Removal Action Confirmation Report for the Laboratory for Energy-Related Health Research,* University of California, Davis, June, Rev. 0.

CLOSING

In summary, the evaluation determined that the overburden material can be reused as backfill in the WDP without significant environmental impacts.

Sincerely,
Weiss Associates

Dolores Lull for

Robert O. Devany
Project Manager

Enclosures:

Table 1. Evaluation Summary – LEHR0651, 0652, 0653 Stockpiles

Table 2. Risk Screening Evaluation for Southwest Trenches Overburden Stockpiles LEHR 0651, 0652, 0653

Table 3. Steps 1, 2, and 3—Designated-Level Data Evaluation for Southwest Trenches Overburden Stockpiles LEHR 0651, 0652, 0653

Table 4. Step 4—Designated-Level Data Evaluation for Southwest Trenches Overburden Stockpiles LEHR 0651, 0652, 0653

Figure 1. Stockpile LEHR0651 Sample Locations

Figure 2. Stockpile LEHR0652 Sample Locations (1998/2001)

Figure 3. Stockpile LEHR0652 Sample Locations (1999/2001)

Figure 4. Stockpile LEHR0653 Sample Locations

Figure 5. Risk Screening Analysis Flowchart

Figure 6. Preliminary Designated-Level Analysis Flowchart—Data Evaluation and Screening

Appendix A. Overburden Soil Data

Appendix B. Wilcoxon Rank Sum Test Results

Appendix C. Area-Specific Cadmium Risk-Based Action Standard Calculation

TRU/MJZ:rod

cc: S. Attiga, J. Bold, S. Kwok, G. Fred Lee, B. Oatman, S. Ross, J. Roth, K. Setian, S. Timm, J. Turner, N. de Jesus, P. Cueva

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TABLES

Table 1. Evaluation Summary—LEHR0651, 0652, 0653 Stockpiles

Constituent[A]	Total Number of Samples	Number of Detections Above Reporting Limit[B]	Range of Reporting Limits[C]	Min. and Max. of Detections[C]	Bkgd.[D]	Comparison with Background	Statistical Comparison with Bkgd.[E]	Lowest RBAS[F]	Maximum Detection Below Lowest RBAS[G]	RME[H]	RME below Lowest RBAS[I]	Overall Comparison with Site Specific Target Levels	PRG[J]
Radionuclides			**pCi/g**	**pCi/g**	**pCi/g**			**pCi/g**					**pCi/g**
Actinium-228	12	12	0.0155-0.152	0.371-0.582	0.633	**Pass**						**Pass**	NE
Americium-241	9	1	0.00667-0.0094	-0.00123-0.00739	0.014	**Pass**						**Pass**	1.9
Bismuth-212[K]	12	12	0.0322-0.33	0.254-0.439	0.388	Fail	**Pass**	NE				**Pass**	NE
Bismuth-214[L]	12	12	0.00772-0.0821	0.343-0.586	0.54	Fail	**Pass**	NE				**Pass**	NE
Carbon-14	9	4	0.0626-0.327	-0.0612-0.809	0.13	Fail	ND	4200	**Pass**			**Pass**	770
Cesium-137	12	6	0.00419-0.0481	0.0067-0.041	0.102	**Pass**						**Pass**	0.020[M]
Cobalt-60	12	0	0.00468-0.0502	-0.00422-0.0189	0.006	Fail	ND	0.022	**Pass**			**Pass**	0.0043
Lead-210	12	3	0.219-90.8	0-9.77	1.6	Fail	Fail (Q)	9.6	Fail	2.77	**Pass**	**Pass**	0.78[N]
Lead-212	12	11	0.00684-0.0761	0-0.582	0.691	**Pass**						**Pass**	NE
Lead-214[L]	12	12	0.00796-0.0756	0.394-0.722	0.55	Fail	Fail (Q)	NE				**Pass**	NE
Plutonium-241	9	1	0.291-0.455	-0.106-0.547	0.5	Fail	ND	3.2	**Pass**			**Pass**	150
Potassium-40	12	12	0.0354-0.468	9.22-13.5	14	**Pass**						**Pass**	NE
Radium-223	12	0	0.0783-0.715	-0.24-0.184	NE	**Pass**						**Pass**	NE
Radium-226	9	9	0.0217-0.0627	0.376-0.599	0.752	**Pass**						**Pass**	1.5
Radium-228	12	12	0.0155-0.152	0.371-0.582	0.63	**Pass**						**Pass**	3.2
Strontium-90	13	8	0.0306-0.109	-0.0245-0.423	0.056	Fail	Fail (Q)	10	**Pass**			**Pass**	14
Thallium-208	12	12	0.00397-0.047	0.132-0.196	0.204	**Pass**						**Pass**	NE
Thorium-228	9	9	0.067-0.298	0.374-0.652	0.627	**Pass**[O]	Fail	0.032	Fail	0.652	Fail	**Pass**	0.041[P]
Thorium-230	9	9	0.0233-0.128	0.396-0.526	1.04	**Pass**						**Pass**	20
Thorium-232	9	9	0.0189-0.102	0.242-0.507	0.63	**Pass**						**Pass**	24
Thorium-234	12	7	0.198-14	0-1.15	0.78	Fail	Pass (Q)	3.2	**Pass**			**Pass**	NE
Tritium	9	6	0.743-1.02	0.238-2.9	1.2	Fail	ND	5.4	**Pass**			**Pass**	11,000

Table 1. Evaluation Summary—LEHR0651, 0652, 0653 Stockpiles (continued)

Constituent[A]	Total Number of Samples	Number of Detections Above Reporting Limit[B]	Range of Reporting Limits[C]	Min. and Max. of Detections[C]	Bkgd.[D]	Comparison with Background	Statistical Comparison with Bkgd.[E]	Lowest RBAS[F]	Maximum Detection Below Lowest RBAS[G]	RME[H]	RME below Lowest RBAS[I]	Overall Comparison with Site Specific Target Levels	PRG[J]
Uranium-233/234	9	9	0.00704-0.0374	0.362-0.508	0.559	**Pass**						**Pass**	18[Q]
Uranium-235	9	9	0.00698-0.0229	0.0152-0.0298	0.038	**Pass**						**Pass**	0.16
Uranium-238	9	9	0.00606-0.0361	0.365-0.469	0.565	**Pass**						**Pass**	18
Pesticides/PCBs/ Herbicides			**µg/kg**	**µg/kg**	**µg/kg**			**µg/kg**					**µg/kg**
2,4,5-TP	2	1	2.2	9.5	N/A			NE					610,000
Alpha-Chlordane	13	9	1-3.44	6.2-102	N/A			800	**Pass**			**Pass**	1,600[R]
Gamma-Chlordane	13	9	1-3.44	7.4-112	N/A			810	**Pass**			**Pass**	1,600[R]
Heptachlor	9	3	1.4-34.4	3.1-9.2	N/A			169.9	**Pass**			**Pass**	110
Heptachlor Epoxide	9	0	0.71-34.4	0.41-0.47	N/A			0.57	**Pass**			**Pass**	53
Metals			**mg/kg**	**mg/kg**	**mg/kg**			**mg/kg**					**mg/kg**
Antimony	10	5	0.24-0.53	0.27-1.6	1.4	Fail	Pass (Q)	0.3	Fail	1.6	Fail	Fail	31[S]
Arsenic	9	9	0.39-0.86	6.7-7.8	8.14	**Pass**						**Pass**	22[T]
Barium	9	9	0.024-0.054	147-166	211	**Pass**						**Pass**	5,400
Beryllium	9	9	0.013-0.028	0.35-0.4	0.564	**Pass**						**Pass**	150
Cadmium[U]	17	7	0.11-0.25	0.21-0.81	0.51	Fail	Fail (Q)	13.7	**Pass**[U]	0.63	**Pass**[U]	**Pass**	9
Chromium	12	2	0.067-0.15	129-162	199	**Pass**						**Pass**	210[V]
Cobalt	9	9	0.079-0.18	20.6-23.9	31	**Pass**						**Pass**	4,700
Copper	9	9	0.071-0.16	31.2-37.1	48.8	**Pass**						**Pass**	2,900
Iron	9	9	0.24-0.54	30,800-34,600	44,000	**Pass**						**Pass**	23,000
Lead	9	9	0.15-0.32	7-10.8	9.5	Fail	**Pass**					**Pass**	400
Manganese	9	2	0.033-0.073	531-614	750	**Pass**						**Pass**	1,800
Mercury	9	9	0.015-0.035	0.51-1.6	3.94	**Pass**						**Pass**	6.1[W]

Table 1. Evaluation Summary—LEHR0651, 0652, 0653 Stockpiles (continued)

Constituent[A]	Total Number of Samples	Number of Detections Above Reporting Limit[B]	Range of Reporting Limits[C]	Min. and Max. of Detections[C]	Bkgd.[D]	Comparison with Background	Statistical Comparison with Bkgd.[E]	Lowest RBAS[F]	Maximum Detection Below Lowest RBAS[G]	RME[H]	RME below Lowest RBAS[I]	Overall Comparison with Site Specific Target Levels	PRG[J]
Nickel	12	9	0.11-0.24	249-277	334	**Pass**						**Pass**	150
Selenium	9	2	0.23-0.54	1-2.9	1.2	Fail	Fail (Q)	58	**Pass**			**Pass**	390
Silver	9	9	0.18-0.23	0.22-0.39	0.55	**Pass**						**Pass**	390
Vanadium	9	9	0.064-0.15	51.9-58.5	66.8	**Pass**						**Pass**	550
Zinc	9	9	0.25-0.56	62.8-78.5	72.4	Fail	Fail	3400	**Pass**			**Pass**	23,000
VOCs			**µg/kg**	**µg/kg**	**µg/kg**			**mg/kg**					**µg/kg**
2-Butanone	9	4	9.7-11.2	10.3-43.4	N/A			12000	**Pass**			**Pass**	7,300,000
Chloroform	9	0	4.9-11.2	0.76-1.7	N/A			721.9	**Pass**			**Pass**	240
Ethylbenzene	9	0	4.9-11.2	0.8-1	N/A			10,000	**Pass**			**Pass**	230,000
Methylene Chloride	9	1	4.9-11.2	2.7-6.05	N/A			131.6	**Pass**			**Pass**	8,900
Toluene	9	6	4.9-11.2	2.2-175	N/A			19,000	**Pass**			**Pass**	520,000
Xylenes (Total)	9	0	4.9-11.2	0.8-3.6	N/A			700,000	**Pass**			**Pass**	210,000
General Chemistry			**mg/kg**	**mg/kg**	**mg/kg**			**mg/kg**					**mg/kg**
Formaldehyde	2	2	0.153-0.157	0.501-0.65	N/A	Fail		1.7	**Pass**			**Pass**	9,200
Hexavalent Chromium	9	9	0.03-0.0448	0.0824-0.343	0.054	Fail	Fail (Q)	3.8	**Pass**			**Pass**	0.2
Nitrate	9	9	0.13-0.146	10.1-36.2	36	Fail	Fail	36	Fail	36.2	Fail	Fail	NE

Notes

[A] All constituents with concentrations/activities greater than zero.

[B] Number of Detections Above Reporting Limit represents the number of samples greater than the "detection limit" for VOCs, SVOCs, pesticides/PCBs, and herbicides; the "instrument detection limit" for metals; the "maximum detectable limit" for general chemistry; and the minimum detectable activities for radionuclides; SVOCs were not detected.

[C] Including samples above and below the reporting limit.

[D] Background concentrations are for samples collected from zero to four feet below ground surface.

[E] Using Wilcoxon Rank Sum (WRS) test with previously approved parameters; "Pass" indicates sample distribution statistically does not exceed the background distribution; "Q" indicates result is qualified due to insufficient data for WRS test based on Noether calculation.

Table 1. Evaluation Summary—LEHR0651, 0652, 0653 Stockpiles (continued)

[F] Lowest RBAS from "Draft Final Determination of Risk-Based Action Standards for DOE Areas" (Weiss Associates, 1997).

[G] "Pass" indicates maximum concentration is lower than lowest RBAS.

[H] RME = reasonable maximum exposure concentration, defined as the 95% upper confidence level on the mean for COCs with >10 detections above the reporting limit. For samples with less than 10 detections above the reporting limit, the maximum concentration was selected as the RME.

[I] "Pass" indicates the RME concentration is lower than lowest RBAS (RME is compared with lowest RBAS for all constituents).

[J] USEPA Region IX Preliminary Remediation Goals, November 2000, at 10-6 risk for residential scenario; California Modified PRGs for cadmium, hexavalent chromium and nickel; PRGs for radionuclides derived from RISKCALC+ Computer Software based on Risk Assessment Guidance for Superfund Human Health Evaluation Manual, Part B, with its Default Scenario Values and the 1997 Health Effects Assessment Summary Table.

[K] Has a half-life of approximately one hour.

[L] Daughter products of radium-226 with half lives of less than one day.

[M] PRG for cesium-137 and decay daughters.

[N] PRG for lead-210 and decay daughters.

[O] The laboratory counting errors for this constituent of concern were significant (i.e., an average of 33% of the reported result). Accounting for the laboratory counting errors, the overburden data is below the historical background concentration for thorium-228 (Th-228). Additionally, the maximum reported Th-228 concentration of 0.65 pCi/g was for a sample collected in August 1998. Since Th-228 has a half-life of 1.9 years, at least one half-life period has passed since the sample was collected. Therefore, Th-228 has decayed to less than 0.33 pCi/g and is below the LEHR site background concentration of 0.63 pCi/g.

[P] PRG for Th-228 and decay daughters.

[Q] PRG for uranium-234 only.

[R] PRG for total chlordane.

[S] PRG for antimony and compounds.

[T] PRG for arsenic (non-cancer endpoint).

[U] Re-analyzed samples were averaged with the initial analyses. On April 10, 2001, the Remedial Project Managers verbally approved Weiss Associates' request to calculate an area-specific cadmium RBAS for evaluating the risks for reusing the overburden soil in the LEHR Western Dog Pens area. The area-specific cadmium RBAS result is 13.7 mg/kg. The cadmium RME value of 0.63 mg/kg and the maximum value of 0.81 mg/kg for the overburden soil are well below the area-specific cadmium RBAS.

[V] PRG for total chromium.

[W] PRG for methyl mercury.

Additional Abbreviations

Bkgd.	Background
Max.	Maximum
mg/kg	milligrams per kilogram
Min.	Minimum
N/A	Not Applicable
ND	No data
NE	Not Established
No.	Number
PCBs	Polychlorinated biphenyls
pCi/g	picoCuries per gram
PRG	Preliminary Remediation Goals
RBAS	Risk-Based Action Standard
SVOC	Semi-volatile Organic Compound
Th-228	thorium-228
VOC	Volatile Organic Compound
µg/kg	micrograms per kilogram

Table 2. Risk Screening Evaluation for Southwest Trenches Overburden Stockpiles LEHR 0651, 0652, 0653

Constituent	Units	Number Of Samples Analyzed	Number of Samples > Detection Limit[1]	Number of Detections > Background	Background Concentration (<4 ft bgs)	Maximum Detected Concentration	95% UCL	RME[2]	Carc. RBAS Scenario 1	Carc. RBAS Scenario 2	Carc. RBAS Scenario 3	Non-Carc. RBAS Scenario 1	Non-Carc. RBAS Scenario 2	Non-Carc. RBAS Scenario 3	Carc. Scen. 1 RME/RBAS Ratio	Carc. Scen. 2 RME/RBAS Ratio	Carc. Scen. 3 RME/RBAS Ratio	Non-Carc. Scen. 1 RME/RBAS Ratio	Non-Carc. Scen. 2 RME/RBAS Ratio	Non-Carc. Scen. 3 RME/RBAS Ratio	Carc. RME/ Residential PRG Ratio	Non-Carc. RME/ Residential PRG Ratio
General																						
Chromium, Hexavalent	mg/kg	9	7	9	0.0540	0.343	n/a	0.343	105.00	120,000.00	23,000.00	8,500.0	3.8	740.0	0.00	0.00	0.00	0.00	0.09	0.00	1.72	n/a
Metals																						
Antimony	mg/kg	10	0	2	1.40	n/a	n/a	n/a	n/a	n/a	n/a	680.0	0.3	100,000.0	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4
Barium	mg/kg	9	9	0	211	166	n/a	166	n/a	n/a	n/a	110,000.0	53.0	100,000.0	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4
Cadmium[5]	mg/kg	17	15	8	0.510	0.809	0.630	0.630	4,800.00	n/a	n/a	850.0	13.7	100,000.0	0.00	n/a	n/a	0.00	0.05	0.00	0.07	0.02
Chromium	mg/kg	12	12	0	199	162	145	145	720.00	840,000.00	160,000.00	100,000.0	760.0	100,000.0	0.20	0.00	0.00	0.00	0.19	0.00	0.69	n/a
Copper	mg/kg	9	9	0	48.8	37.1	n/a	37.1	n/a	n/a	n/a	63,000.0	28.0	610,000.0	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4
Lead	mg/kg	9	9	1	9.50	10.8	n/a	10.8	3.00	0.04	19.00	n/a	n/a	n/a	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4
Manganese	mg/kg	9	9	0	750	614	n/a	614	n/a	n/a	n/a	52,000.0	36.0	100,000.0	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4
Mercury	mg/kg	9	9	0	3.94	1.60	n/a	1.60	15,898.00	15.00	540.00	510.0	0.2	6.4	0.00	0.11	0.00	0.00	Note 4	0.25	n/a	0.07
Selenium	mg/kg	9	8	4	1.20	2.90	n/a	2.90	n/a	n/a	n/a	8,500.0	58.0	100,000.0	n/a	n/a	n/a	0.00	0.05	0.00	n/a	0.01
Silver	mg/kg	9	0	0	0.550	n/a	n/a	n/a	n/a	n/a	n/a	8,500.0	3.8	100,000.0	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00
Zinc	mg/kg	9	9	2	72.4	78.5	n/a	78.5	n/a	n/a	n/a	510,000.0	3,400.0	150,000.0	n/a	n/a	n/a	0.00	0.02	0.00	n/a	0.00
Pesticides/PCBs																						
4,4'-DDD	ug/kg	9	0	0	0.00	n/a	n/a	n/a	7,900.00	9,400.00	70,000,000.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
4,4'-DDE	ug/kg	9	0	0	0.00	n/a	n/a	n/a	5,600.00	9,000.00	61,000,000.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
4,4'-DDT	ug/kg	9	0	0	0.00	n/a	n/a	n/a	5,600.00	30,000.00	23,000,000.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
alpha-BHC	ug/kg	9	0	0	0.00	n/a	n/a	n/a	300.00	7.50	8,400,000.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
alpha-Chlordane	ug/kg	13	9	0	0.00	102	n/a	102	1,500.00	800.00	5,900.00	n/a	n/a	n/a	0.07	0.13	0.02	n/a	n/a	n/a	0.06	n/a
Chlordane	ug/kg				0.00	n/a	n/a	n/a	1,500.00	780.00	5,900.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
delta-BHC	ug/kg	9	0	0	0.00	n/a	n/a	n/a	300.00	13.00	210.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
Dieldrin	ug/kg	9	0	0	0.00	n/a	n/a	n/a	120.00	15.00	4,100,000.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
Endosulfan I	ug/kg	9	0	0	0.00	n/a	n/a	n/a	n/a	n/a	n/a	4,100,000.0	29,000.0	100,000,000.0	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00
Endosulfan Sulfate	ug/kg	9	0	0	0.00	n/a	n/a	n/a	n/a	n/a	n/a	4,100,000.0	26,000.0	100,000,000.0	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a
gamma-BHC	ug/kg	9	0	0	0.00	n/a	n/a	n/a	1,500.00	30.00	35,000,000.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
gamma-Chlordane	ug/kg	13	9	0	0.00	112	n/a	112	1,500.00	810.00	6,400.00	n/a	n/a	n/a	0.07	0.14	0.02	n/a	n/a	n/a	0.07	n/a
Heptachlor	ug/kg	9	3	0	0.00	9.20	n/a	9.20	420.00	170.00	14,000,000.00	n/a	n/a	n/a	0.02	0.05	0.00	n/a	n/a	n/a	0.08	n/a
Heptachlor Epoxide	ug/kg	9	0	0	0.00	0.470	n/a	0.470	210.00	0.57	1,800,000.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.01	n/a
Methoxychlor	ug/kg	9	0	0	0.00	n/a	n/a	n/a	n/a	n/a	n/a	3,400,000.0	100,000.0	100,000,000.0	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00
PCB-1260 (Aroclor)	ug/kg	9	0	0	0.00	n/a	n/a	n/a	250.00	4,900.00	120,000.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
Radionuclides																						
Americium-241	pCi/g	9	1	0	0.0140	0.00739	n/a	0.00739	17.00	0.09	16,000.00	n/a	n/a	n/a	0.00	0.08	0.00	n/a	n/a	n/a	0.00	n/a
Carbon-14	pCi/g	9	4	3	0.130	0.809	n/a	0.809	4,200.00	9,500.00	7,000.00	n/a	n/a	n/a	0.00	0.00	0.00	n/a	n/a	n/a	0.00	n/a
Cesium-137	pCi/g	12	6	0	0.102	0.0410	0.0235	0.0235	0.10	200,000.00	25,000.00	n/a	n/a	n/a	Note1	0.00	0.00	n/a	n/a	n/a	1.18	n/a
Cobalt-60	pCi/g	12	0	3	0.00600	0.0189	0.00876	0.00876	0.02	32,000.00	5,800.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	2.04	n/a
Lead-210	pCi/g	12	3	1	1.60	9.77	2.77	2.77	9.60	40.00	40.00	n/a	n/a	n/a	0.29	0.07	0.07	n/a	n/a	n/a	3.56	n/a
Plutonium-241	pCi/g	9	1	1	0.500	0.547	n/a	0.547	600.00	3.20	2,200,000.00	n/a	n/a	n/a	0.00	0.17	0.00	n/a	n/a	n/a	0.00	n/a
Radium-226	pCi/g	9	9	0	0.752	0.599	n/a	0.599	0.00	1,100.00	1,100.00	n/a	n/a	n/a	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4
Strontium-90	pCi/g	13	8	8	0.0560	0.423	0.230	0.230	10.00	280,000.00	34,000.00	n/a	n/a	n/a	0.02	0.00	0.00	n/a	n/a	n/a	0.02	n/a
Thorium-228	pCi/g	9	9	2	0.627	0.652	n/a	0.652	0.03	2,000.00	1,600.00	n/a	n/a	n/a	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4
Thorium-232	pCi/g	9	9	0	0.630	0.507	n/a	0.507	0.02	3,800.00	2,200.00	n/a	n/a	n/a	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4
Thorium-234	pCi/g	12	7	2	0.780	1.15	0.699	0.699	3.20	88,000.00	63,000.00	n/a	n/a	n/a	0.22	0.00	0.00	n/a	n/a	n/a	n/a	n/a
Tritium	pCi/g	9	6	6	1.20	2.90	n/a	2.90	130,000.00	5.40	2,500,000.00	n/a	n/a	n/a	0.00	0.54	0.00	n/a	n/a	n/a	0.00	n/a
Uranium-235	pCi/g	9	9	0	0.0380	0.0298	n/a	0.0298	0.79	0.15	32,000.00	n/a	n/a	n/a	0.04	0.20	0.00	n/a	n/a	n/a	0.19	n/a
SVOCs																						
Acenaphthene	ug/kg	9	0	0	0.00	n/a	n/a	n/a	n/a	n/a	n/a	41,000,000.0	250,000.0	100,000,000.0	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00
Anthracene	ug/kg	9	0	0	0.00	n/a	n/a	n/a	n/a	n/a	n/a	200,000,000.0	1,400,000.0	100,000,000.0	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00
Benzo(a)anthracene	ug/kg	9	0	0	0.00	n/a	n/a	n/a	2,600.00	1,200.00	30,000,000.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
Benzo(a)pyrene	ug/kg	9	0	0	0.00	n/a	n/a	n/a	260.00	240.00	1,300,000.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
Benzo(b)fluoranthene	ug/kg	9	0	0	0.00	n/a	n/a	n/a	2,600.00	3,300.00	12,000,000.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
Benzo(g,h,i)perylene	ug/kg	9	0	0	0.00	n/a	n/a	n/a	n/a	n/a	n/a	20,000,000.0	9,100,000.0	100,000,000.0	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a

Table 2. Risk Screening Evaluation for Southwest Trenches Overburden Stockpiles LEHR 0651, 0652, 0653 (continued)

Constituent	Units	Number Of Samples Analyzed	Number of Samples > Detection Limit[1]	Number of Detections > Background	Background Concentration (<4 ft bgs)	Maximum Detected Concentration	95% UCL	RME[2]	Carc. RBAS Scenario 1	Carc. RBAS Scenario 2	Carc. RBAS Scenario 3	Non-Carc. RBAS Scenario 1	Non-Carc. RBAS Scenario 2	Non-Carc. RBAS Scenario 3	Carc. Scen. 1 RME/RBAS Ratio	Carc. Scen. 2 RME/RBAS Ratio	Carc. Scen. 3 RME/RBAS Ratio	Non-Carc. Scen. 1 RME/RBAS Ratio	Non-Carc. Scen. 2 RME/RBAS Ratio	Non-Carc. Scen. 3 RME/RBAS Ratio	Carc. RME/ Residential PRG Ratio	Non-Carc. RME/ Residential PRG Ratio
Benzo(k)fluoranthene	ug/kg	9	0	0	0.00	n/a	n/a	n/a	26,000.00	27,000.00	130,000,000.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
Bis(2-Ethylhexyl)phthalate	ug/kg	9	0	0	0.00	n/a	n/a	n/a	136,000.00	7,700.00	8,600.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
Carbazole	ug/kg	9	0	0	0.00	n/a	n/a	n/a	95,000.00	2,200.00	100,000,000.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
Chrysene	ug/kg	9	0	0	0.00	n/a	n/a	n/a	261,000.00	20,000.00	100,000,000.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
Dibenzo(a,h)anthracene	ug/kg	9	0	0	0.00	n/a	n/a	n/a	260.00	540.00	260,000.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
Dibenzofuran	ug/kg	9	0	0	0.00	n/a	n/a	n/a	n/a	n/a	n/a	2,700,000.0	14,000.0	100,000,000.0	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00
Diethyl Phthalate	ug/kg	9	0	0	0.00	n/a	n/a	n/a	n/a	n/a	n/a	550,000,000.0	220,000.0	100,000,000.0	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00
Di-n-Butylphthalate	ug/kg	9	0	0	0.00	n/a	n/a	n/a	n/a	n/a	n/a	68,000,000.0	890,000.0	3,300,000.0	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00
Di-n-Octylphthalate	ug/kg	9	0	0	0.00	n/a	n/a	n/a	n/a	n/a	n/a	14,000,000.0	28,000,000.0	4,900,000.0	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00
Fluoranthene	ug/kg	9	0	0	0.00	n/a	n/a	n/a	n/a	n/a	n/a	27,000,000.0	1,800,000.0	100,000,000.0	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00
Fluorene	ug/kg	9	0	0	0.00	n/a	n/a	n/a	n/a	n/a	n/a	27,000,000.0	170,000.0	100,000,000.0	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00
Indeno(1,2,3-cd)pyrene	ug/kg	9	0	0	0.00	n/a	n/a	n/a	2,600.00	4,900.00	4,600,000.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
Naphthalene	ug/kg	9	0	0	0.00	n/a	n/a	n/a	n/a	n/a	n/a	27,000,000.0	39,000.0	100,000,000.0	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00
Pentachlorophenol	ug/kg	9	0	0	0.00	n/a	n/a	n/a	16,000.00	13,000.00	100,000,000.00	n/a	n/a	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
Phenanthrene	ug/kg	9	0	0	0.00	n/a	n/a	n/a	n/a	n/a	n/a	20,000,000.0	1,200,000.0	100,000,000.0	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a
Pyrene	ug/kg	9	0	0	0.00	n/a	n/a	n/a	n/a	n/a	n/a	20,000,000.0	490,000.0	100,000,000.0	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00
VOCs																						
2-Butanone	ug/kg	9	4	0	0.00	43.4	n/a	43.4	n/a	n/a	n/a	710,000.0	12,000.0	n/a	n/a	n/a	n/a	0.00	0.00	n/a	n/a	0.00
Acetone	ug/kg	9	0	0	0.00	n/a	n/a	n/a	n/a	n/a	n/a	830,000.0	1,700.0	1,900,000.0	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00
Benzene	ug/kg	9	0	0	0.00	n/a	n/a	n/a	230.00	15.00	n/a	710,000.0	12,000.0	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
Carbon Tetrachloride	ug/kg	9	0	0	0.00	n/a	n/a	n/a	220.00	55.00	n/a	710,000.0	12,000.0	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a
EthylBenzene	ug/kg	9	0	0	0.00	1.00	n/a	1.00	n/a	n/a	n/a	2,400,000.0	10,000.0	n/a	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00
Methylene Chloride	ug/kg	9	1	0	0.00	6.05	n/a	6.05	7,200.00	130.00	n/a	710,000.0	12,000.0	n/a	0.00	0.05	n/a	0.00	0.00	n/a	0.00	n/a
Styrene	ug/kg	9	0	0	0.00	n/a	n/a	n/a	n/a	n/a	n/a	710,000.0	76,000.0	n/a	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00
Toluene	ug/kg	9	6	0	0.00	175	n/a	175	n/a	n/a	n/a	920,000.0	19,000.0	n/a	n/a	n/a	n/a	0.00	0.01	n/a	n/a	0.00
Xylenes (Total)	ug/kg	9	0	0	0.00	3.60	n/a	3.60	n/a	n/a	n/a	510,000,000.0	3,400,000.0	150,000,000.0	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00
														SUM OF RME/RBAS RATIO:	**0.94**	**1.53**	**0.11**	**0.01**	**0.41**	**0.25**	**9.68**	**0.10**

[1] For radionuclides, this value identifies the number of samples that exceeded the minimum detectable activity.

[2] RME is the reasonable maximum exposure. The 95% UCL on the mean was used when available If a 95% UCL was not available, the maximum detected concentration was used.

[3] Six of the constituents of concern (COCs) have log normally distributed background data sets and are therefore assumed to have log-normal confirmation data sets: barium, chromium, copper, manganese, zinc, and thorium-232

[4] The RBAS for this COC was less than the background value. Per the work plan, a background comparison was conducted.
The COC data set was determined to mirror the background data set. Therefore, the COC was not considered
a contributor to excess risk from the site, and a RME/RBAS ratio was not calculated for inclusion in the cumulative summation. The COC was removed from further risk screening.

[5] A revised RBAS for Scenario 2 was calculated for cadmium with the approval of the Remedial Project Managers based on the area-specific lithology.

Abbreviations

Carc.	carcinogenic
COC	constituent of concern
µg/kg	microgram per kilogram
mg/kg	milligram per kilogram
n/a	not applicable
pCi/gram	picoCuries per gram
RBAS	Risk-Based Action Standards
RME	reasonable maximum exposure
Scen.	Scenario
SVOCs	semi-volatile organic compounds
UCL	upper confidence level
VOCs	volatile organic compounds

Table 3. Steps 1, 2, and 3—Designated-Level Data Evaluation for Southwest Trenches Overburden Stockpiles LEHR0651, 0652, and 0653

		STEP 1			STEP 2				STEP 3				
Constituent	Units	Number of Samples Analyzed	Number of Samples w/ Detections	Background or Detection Limit Concentration [1]	Number of Detections above Background/ Detection Limit	Max. Detected Concentration	% of Detections above Background or DL	Is Max Conc. > 1.5xBKG **AND** % Detected above BKG>5%?	Partitioning Coefficient (K_d) (mL/g) [2]	Is the K_d less than 10 mL/g (organics) OR less than 1,000 mL/g (inorganics)	Half-Life (Years) [3]	Is the Half-Life greater than 1 year?	Does the Analyte Fail the K_d **OR** Half-Life Test?
General Chemistry													
Chromium, Hexavalent	mg/kg	9	9	0.054	9	0.343	100.0%	YES	1.90E+01	YES	N/A		YES
Nitrate	mg/kg	9	9	36.000	1	36.200	11.1%	NO					
Metals [5]													
Antimony	mg/kg	10	5	1.400	2	1.600	20.0%	NO					
Arsenic	mg/kg	9	9	8.140	0	7.800	0.0%	NO					
Barium	mg/kg	9	9	211.000	0	166.000	0.0%	NO					
Beryllium	mg/kg	9	9	0.564	0	0.400	0.0%	NO					
Cadmium	mg/kg	17	15	0.510	8	0.809	47.1%	YES	7.50E+01	YES	N/A		YES
Chromium	mg/kg	12	12	199.000	0	162.000	0.0%	NO					
Cobalt	mg/kg	9	9	31.000	0	23.900	0.0%	NO					
Copper	mg/kg	9	9	48.800	0	37.100	0.0%	NO					
Iron	mg/kg	9	9	44,000.000	0	34,600.000	0.0%	NO					
Lead	mg/kg	9	9	9.500	1	10.800	11.1%	NO					
Manganese	mg/kg	9	9	750.000	0	614.000	0.0%	NO					
Mercury	mg/kg	9	9	3.940	0	1.600	0.0%	NO					
Molybdenum	mg/kg	9	0	0.260	0		0.0%	NO					
Nickel	mg/kg	12	12	334.000	0	277.000	0.0%	NO					
Selenium	mg/kg	9	9	1.200	4	2.900	44.4%	YES	3.00E+02	YES	N/A		YES
Silver	mg/kg	9	4	0.550	0	0.390	0.0%	NO					
Thallium	mg/kg	9	0	1.600	0		0.0%	NO					
Vanadium	mg/kg	9	9	66.800	0	58.500	0.0%	NO					
Zinc	mg/kg	9	9	72.400	2	78.500	22.2%	NO					
Pesticides/PCBs													
4,4'-DDD	ug/kg	9	0				0.0%	NO					
4,4'-DDE	ug/kg	9	0				0.0%	NO					
4,4'-DDT	ug/kg	9	0				0.0%	NO					
Aldrin	ug/kg	9	0				0.0%	NO					
Alpha-BHC	ug/kg	9	0				0.0%	NO					
Alpha-Chlordane	ug/kg	10	10	*1.400*	10	102.000	100.0%	YES	1.40E+02	NO	N/A		NO
Arochlor-1016	ug/kg	9	0				0.0%	NO					
Arochlor-1221	ug/kg	9	0				0.0%	NO					
Arochlor-1232	ug/kg	9	0				0.0%	NO					
Arochlor-1242	ug/kg	9	0				0.0%	NO					
Arochlor-1248	ug/kg	9	0				0.0%	NO					
Arochlor-1254	ug/kg	9	0				0.0%	NO					
Arochlor-1260	ug/kg	9	0				0.0%	NO					
Beta-BHC	ug/kg	9	0				0.0%	NO					
Delta-BHC	ug/kg	9	0				0.0%	NO					

Table 3. Steps 1, 2, and 3—Designated-Level Data Evaluation for Southwest Trenches Overburden Stockpiles LEHR0651, 0652, and 0653 (continued)

		STEP 1			STEP 2				STEP 3				
Constituent	Units	Number of Samples Analyzed	Number of Samples w/ Detections	Background or Detection Limit Concentration [1]	Number of Detections above Background/ Detection Limit	Max. Detected Concentration	% of Detections above Background or DL	Is Max Conc. > 1.5xBKG **AND** % Detected above BKG>5%?	Partitioning Coefficient (K_d) (mL/g) [2]	Is the K_d less than 10 mL/g (organics) OR less than 1,000 mL/g (inorganics)	Half-Life (Years) [3]	Is the Half-Life greater than 1 year?	Does the Analyte Fail the K_d **OR** Half-Life Test?
Dieldrin	ug/kg	9	0				0.0%	NO					
Endosulfan I	ug/kg	9	0				0.0%	NO					
Endosulfan II	ug/kg	9	0				0.0%	NO					
Endosulfan Sulfate	ug/kg	9	0				0.0%	NO					
Endrin	ug/kg	9	0				0.0%	NO					
Endrin Aldehyde	ug/kg	9	0				0.0%	NO					
Endrin Ketone	ug/kg	9	0				0.0%	NO					
gamma-BHC (Lindane)	ug/kg	9	0				0.0%	NO					
gamma-Chlordane	ug/kg	10	10	*1.400*	10	112.000	100.0%	YES	2.80E+02	NO	N/A		NO
Heptachlor	ug/kg	10	4	*1.400*	4	9.200	40.0%	YES	2.90E+03	NO	N/A		NO
Heptachlor Epoxide	ug/kg	9	3	*0.710*	3	0.470	33.3%	NO					
Methoxychlor	ug/kg	9	0				0.0%	NO					
Toxaphene	ug/kg	9	0				0.0%	NO					
Radionuclides [6]													
Actinium-228	pCi/g	12	12	0.633	0	0.582	0.0%	NO					
Americium-241	pCi/g	9	1	0.014	0	0.007	0.0%	NO					
Bismuth-212	pCi/g	12	12	0.388	2	0.439	16.7%	NO					
Bismuth-214	pCi/g	12	12	0.540	3	0.586	25.0%	NO					
Carbon-14	pCi/g	9	4	0.130	3	0.809	33.3%	YES	8.00E-01	YES	5.73E+03	YES	YES
Cesium-137	pCi/g	12	6	0.102	0	0.041	0.0%	NO					
Cobalt-60	pCi/g	12	0	0.006	0	0.019	0.0%	NO					
Lead-210	pCi/g	12	3	1.600	1	9.770	8.3%	YES	9.00E+02	YES	2.23E+01	YES	YES
Lead-212	pCi/g	12	12	0.691	0	0.582	0.0%	NO					
Lead-214	pCi/g	12	12	0.550	7	0.722	58.3%	NO					
Plutonium-241	pCi/g	9	1	0.500	1	0.547	11.1%	NO					
Potassium-40	pCi/g	12	12	14.000	0	13.500	0.0%	NO					
Radium-223	pCi/g	12	0	n/a	0	0.184	0.0%	NO					
Radium-226	pCi/g	9	9	0.752	0	0.599	0.0%	NO					
Radium-228	pCi/g	12	12	0.630	0	0.582	0.0%	NO					
Strontium-90	pCi/g	13	8	0.056	7	0.423	53.8%	YES	3.50E+01	YES	2.91E+01	YES	YES
Thallium-208	pCi/g	12	12	0.204	0	0.196	0.0%	NO					
Thorium-228	pCi/g	9	9	0.627	2	0.652	22.2%	NO					
Thorium-230	pCi/g	9	9	1.040	0	0.526	0.0%	NO					
Thorium-232	pCi/g	9	9	0.630	0	0.507	0.0%	NO					
Thorium-234	pCi/g	12	7	0.780	2	1.150	16.7%	NO					
Tritium	pCi/g	9	6	1.200	6	2.900	66.7%	YES	9.90E+00	YES	1.23E+01	YES	YES
Uranium-233/234	pCi/g	9	6	0.559	0	0.508	0.0%	NO					
Uranium-235	pCi/g	9	9	0.038	0	0.030	0.0%	NO					
Uranium-238	pCi/g	9	9	0.565	0	0.469	0.0%	NO					

Table 3. Steps 1, 2, and 3—Designated-Level Data Evaluation for Southwest Trenches Overburden Stockpiles LEHR0651, 0652, and 0653 (continued)

		STEP 1			STEP 2				STEP 3				
Constituent	Units	Number of Samples Analyzed	Number of Samples w/ Detections	Background or Detection Limit Concentration [1]	Number of Detections above Background/ Detection Limit	Max. Detected Concentration	% of Detections above Background or DL	Is Max Conc. > 1.5xBKG **AND** % Detected above BKG>5%?	Partitioning Coefficient (K_d) (mL/g) [2]	Is the K_d less than 10 mL/g (organics) OR less than 1,000 mL/g (inorganics)	Half-Life (Years) [3]	Is the Half-Life greater than 1 year?	Does the Analyte Fail the K_d **OR** Half-Life Test?
SVOCs													
None													
VOCs													
2-Butanone	ug/kg	9	4	*9.700*	4	43.400	44.4%	YES	3.80E-03	YES	N/A		YES
Chloroform	ug/kg	9	6	*1.100*	6	1.700	66.7%	YES	8.00E-02	YES	N/A		YES
Ethylbenzene	ug/kg	9	2	*1.100*	2	1.000	22.2%	NO					
Methylene Chloride	ug/kg	9	6	*1.100*	6	6.050	66.7%	YES	2.40E-02	YES	N/A		YES
Toluene	ug/kg	9	7	*1.100*	7	175.000	77.8%	YES	3.60E-01	YES	N/A		YES
Xylene	ug/kg	9	4	*1.100*	4	3.600	44.4%	YES	7.30E-01	YES	N/A		YES

Notes

[1] Background values for data from less than four feet below ground surface (ft bgs) were used because the majority of the confirmation samples were collected at this depth.
For SVOCs, VOCs, pesticides, and any other constituents without a background value, the lowest reportable detection limit was used for background concentration (*in italics*).

[2] K_d values are based on the lowest reasonable value observed in literature and site-specific vadose zone modeling data that relate K_d to the time-to-peak in ground water.
Examples of references used for K_d values: "Soil Screening Guidance for Radionuclides: Technical Background Document," USEPA, EPA/540-R-00-006, Qctober 2000; and USEPA's Superfund Chemical Data Matrix (SCDM) database downloaded from the USEPA web page (http:\\www.epa.gov).

[3] Half-life values obtained from "Handbook of Environmental Degradation Rates" by Howard, Boethling, Jarvis, Meylan, and Michalenko 1991 and the USEPA SCDM database. Criteria is based on site-specific information regarding time of last waste burial and process knowledge regarding levels of radionuclide activity used at LEHR for research.

[4] A constituent is considered a designated-level (DL) constituent of concern (COC) if it is organic and its K_d is less than 10 mL/g (pesticides/SVOCs/VOCs), or it is inorganic and its K_d is less than 1,000 mL/g (metals, minerals, and radionuclides), or if it is a radionuclide and its half-life is greater than one year.

[5] Metals list does not include: aluminum, calcium, magnesium, potassium, or sodium results. No background data were available for these elements.

[6] Gross alpha and non-volatile beta results are not included in this table. These parameters were analyzed as indicators for alpha and beta emitting radionuclides.

Abbreviations

BKG	background
Conc.	concentration
DDD	dichlordiphenyl dichlor
DDE	dichlordiphenyl ethylene
DDT	dichlordiphenyl trichlor
Max.	maximum
mg/kg	milligrams/kilogram
mL/g	milliliters per gram
PCBs	polychlorinated biphenyl
pCi/g	picoCuries per gram
SVOC	semi-volatile organic compound
ug/kg	micrograms per kilogram
VOC	volatile organic compound

Table 4. Step 4—Designated-Level Data Evaluation for Southwest Trenches Overburden Stockpiles LEHR0651, 0652, and 0653

Constituent	Units	Background/ Detection Limit Concentration [1]	Number of Detections above Background/DL	Max. Detected Concentration	% Detected above Background/DL	Partitioning Coefficient (K_d) (mL/g) [2]	Half-Life (Years)	Surrogate DL (mg/kg or pCi/g) [4]	Is Constituent a Designated Level COC? [3]	Explanation
General Chemistry										
Chromium, Hexavalent	mg/kg	0.0540	9	0.3430	100.0%	1.90E+01	N/A	2.56 mg/kg	NO	No primary or secondary MCLs. The results of the EDP DL modeling indicate that a soil concentration of hexavalent chromium could be as much as 2.56 mg/kg distributed between 0 and 2 ft bgs before it results in ground water impact above the background level of 20 ug/L at the up-gradient ground water well UCD1-18. All of the overburden sample concentrations for hexavalent chromium are below 2.56 mg/kg. Therefore, reuse of the overburden in the WDP area should not impact ground water based on the DL modeling results and since the overburden soil will be placed at shallow depths between zero and two feet bgs.
Metals										
Cadmium	mg/kg	0.5100	8	0.8090	47.1%	7.50E+01	N/A	Not Avail.	NO	Max. < 2 x BKG
Selenium	mg/kg	1.2000	4	2.9000	44.4%	3.00E+02	N/A	Not Avail.	NO	Max. < 2.5 x BKG
Pesticides/PCBs										
None										
Radionuclides										
Carbon-14	pCi/g	0.1300	3	0.8090	33.3%	8.00E-01	5.73E+03	Not Avail.	NO	Primary MCL = 2,000. Drinking Water PRG = 46 pCi/L
Lead-210	pCi/g	1.6000	1	9.7700	8.3%	9.00E+02	2.23E+01	Not Avail.	NO	No primary or secondary MCLs. Drinking Water PRG = 0.047 pCi/L
Strontium-90	pCi/g	0.0560	7	0.4230	53.8%	3.50E+01	2.91E+01	1.72E+15	NO	Maximum concentration well below surrogate DL.
Tritium	pCi/g	1.2000	6	2.9000	66.7%	9.90E+00	1.23E+01	Not Avail.	NO	Max. < 2.5 x BKG; Primary MCL = 20,000 pCi/L; Drinking Water PRG = 670 pCi/L
SVOCs										
None										
VOCs										
2-Butanone	ug/kg	*9.7000*	4	43.4000	44.4%	3.80E-03	N/A	Not Avail.	NO	Low concentration and biodegradable; no primary or secondary MCLs.
Chloroform	ug/kg	*1.1000*	6	1.7000	66.7%	8.00E-02	N/A	Not Avail.	NO	Low concentration; primary MCL = 100 µg/L
Methylene Chloride	ug/kg	*1.1000*	6	6.0500	66.7%	2.40E-02	N/A	Not Avail.	NO	Low concentration; MCL = 5 µg/L
Toluene	ug/kg	*1.1000*	7	175.0000	77.8%	3.60E-01	N/A	Not Avail.	NO	Low concentration and biodegradable; primary MCL = 150 µg/L
Xylene	ug/kg	*1.1000*	4	3.6000	44.4%	7.30E-01	N/A	Not Avail.	NO	Low concentration and biodegradable; primary MCL = 1,750 µg/L

Notes

(1) Background values for data from less than 4 feet below ground surface (ft bgs) were used because the overburden was excavated from this depth.
For SVOCs, VOCs, pesticides, and any other constituents without a background value, the lowest reportable detection limit was used for background concentration (*in italics*).

(2) K_d values are based on the lowest reasonable value observed in literature and site-specific vadose zone modeling data that relate K_d to the time-to-peak in ground water.
Examples of references used for K_d values: "Soil Screening Guidance for Radionuclides: Technical Background Document,", USEPA, EPA/540-R-00-006, October 2000; and USEPA's Superfund Chemical Data Matrix (SCDM) database downloaded from the USEPA web page (http:\\www.epa.gov).

(3) A constituent is considered a designated-level (DL) constituent of concern (COC) if it is organic and its K_d is less than 10 mL/g (pesticides/SVOCs/VOCs), or it is inorganic and its K_d is less than 1,000 mL/g (metals, minerals, and radionuclides), or if it is a radionuclide and its half-life is greater than one year.

(4) Derived from other site locations with similar lithology/contaminant distribution.

Abbreviations

COC	constituent of concern	pCi/L	picoCuries per liter
EDP	Eastern Dog Pens	PRG	preliminary remediation goal
Max.	maximum	SVOC	semi-volatile organic compound
MCL	maximum contaminant level	ug/kg	micrograms per kilogram
mg/kg	milligrams per kilogram	VOC	volatile organic compound
mL/g	milliliters per gram	WDP	Western Dog Pens
pCi/g	picoCuries per gram		

FIGURES

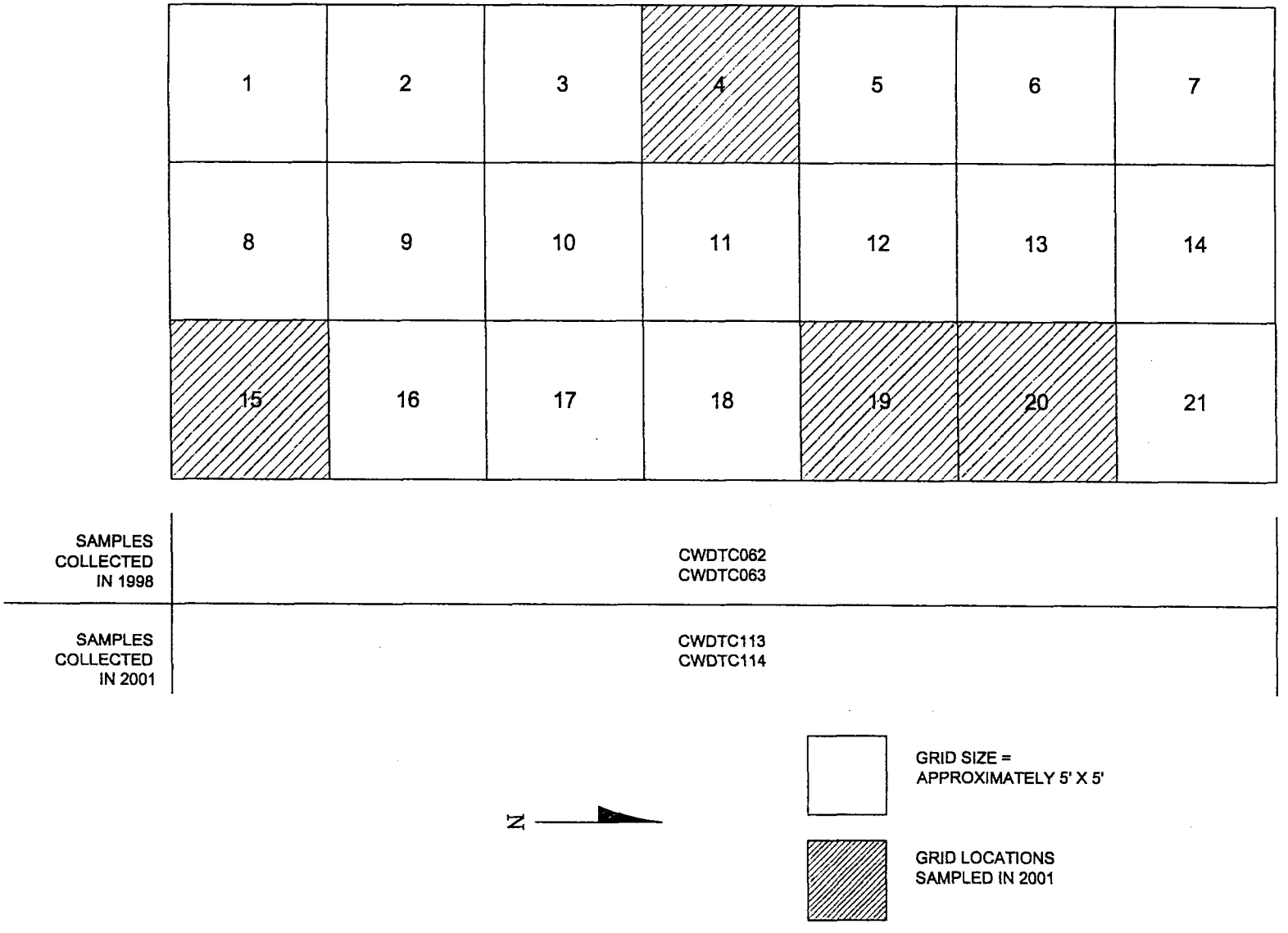

Figure 1. Stockpile LEHR0651 Sample Locations

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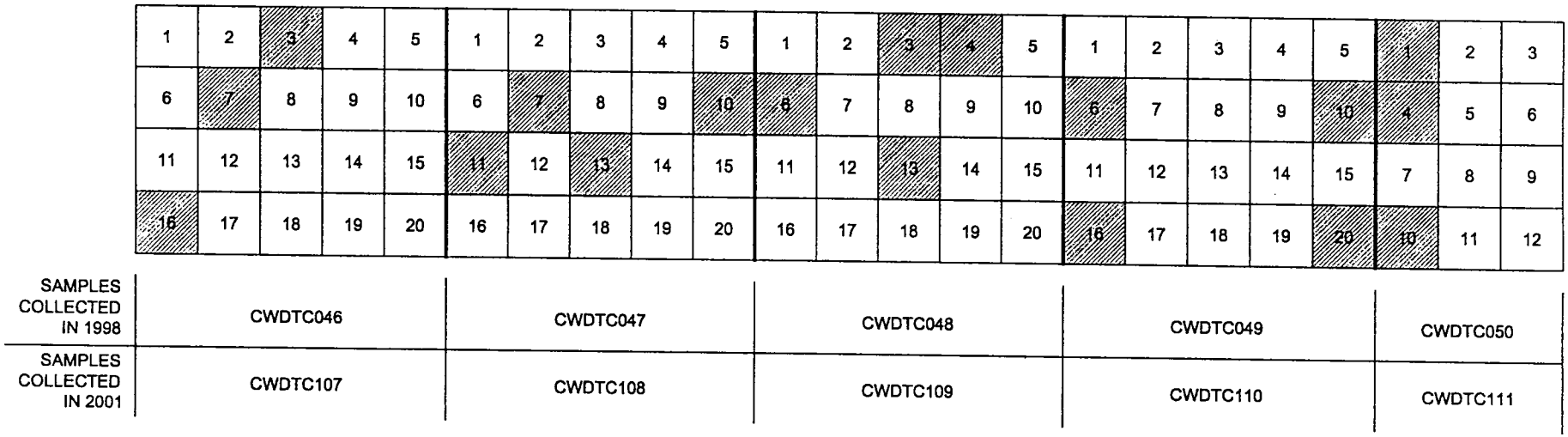

CWDTC115 = COMPOSITE OF CWDTC107, -108, -109, -110, AND -111

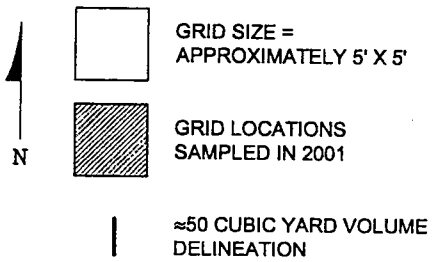

Figure 2. Stockpile LEHR0652 Sample Locations (1998/2001)

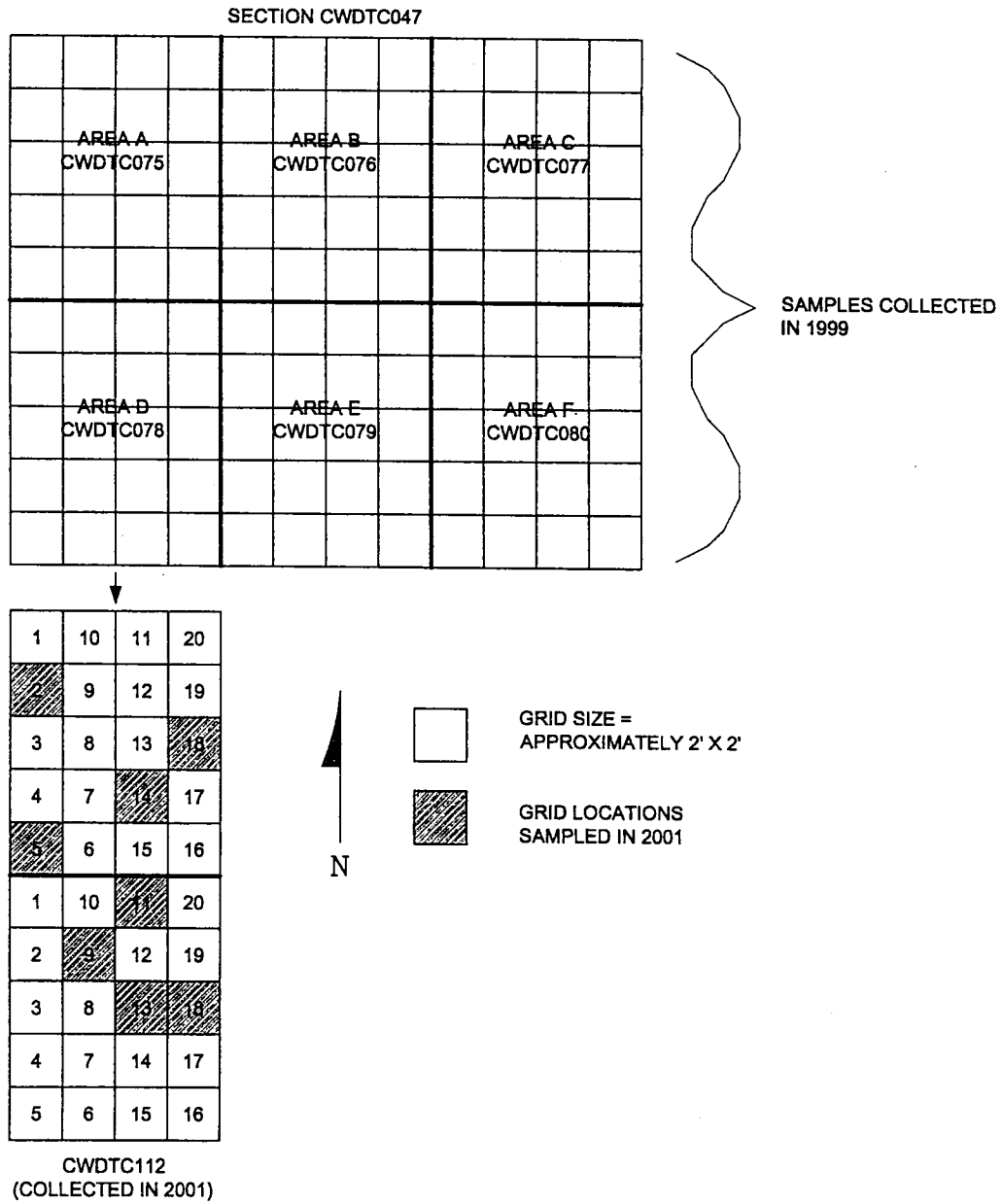

Figure 3. Stockpile LEHR 0652 Sample Locations (1999/2001)

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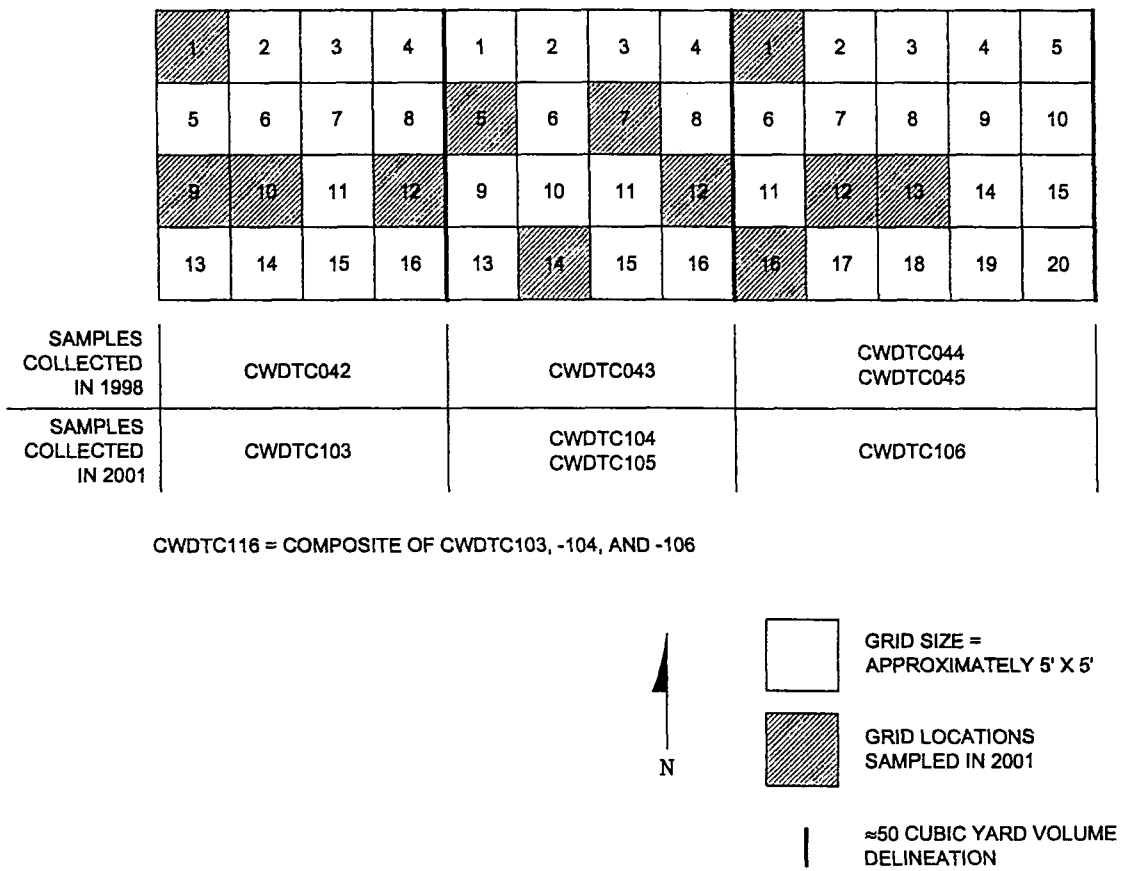

Figure 4. Stockpile LEHR0653 Sample Locations

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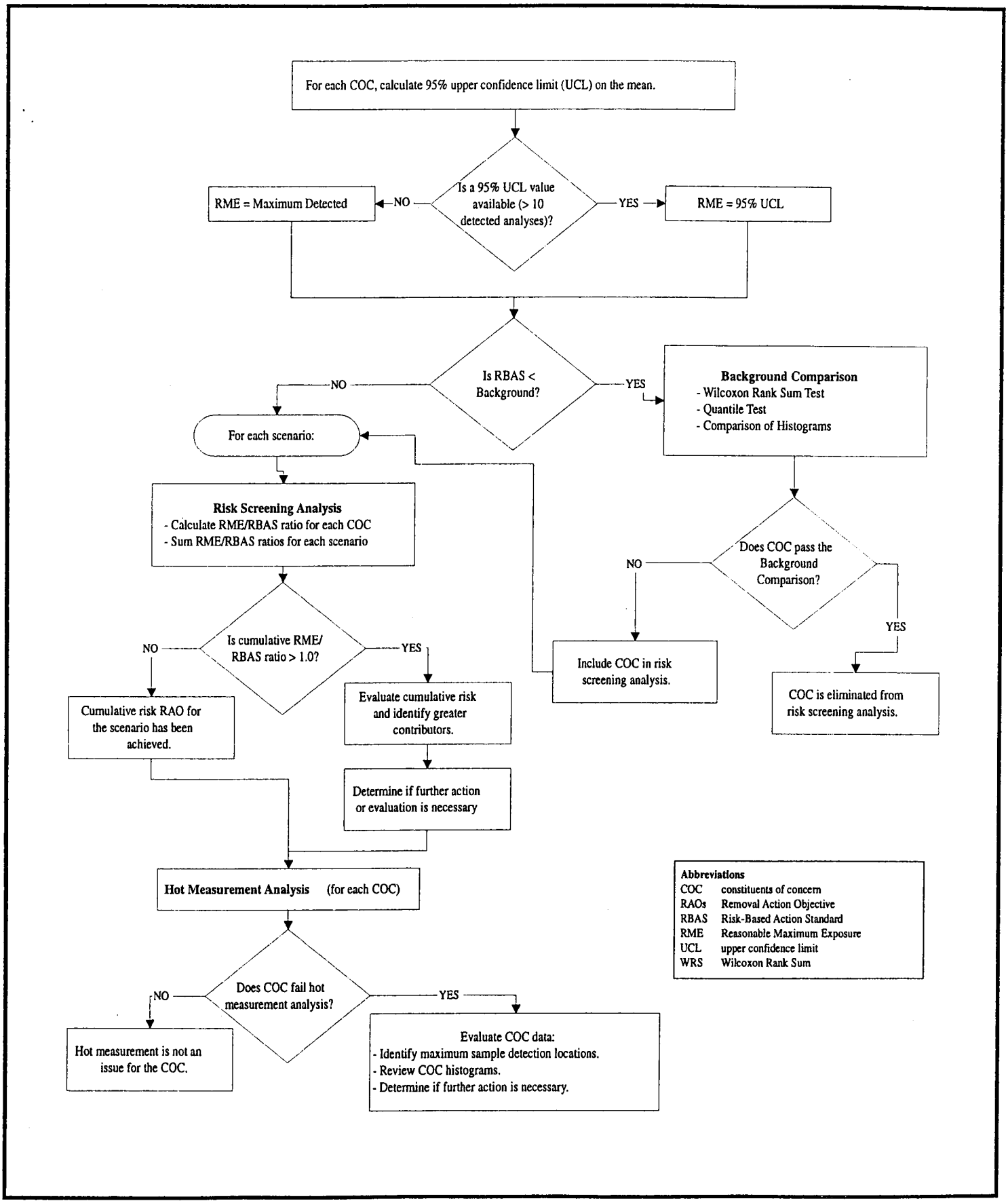

Figure 5. Risk Screening Analysis Flow Chart

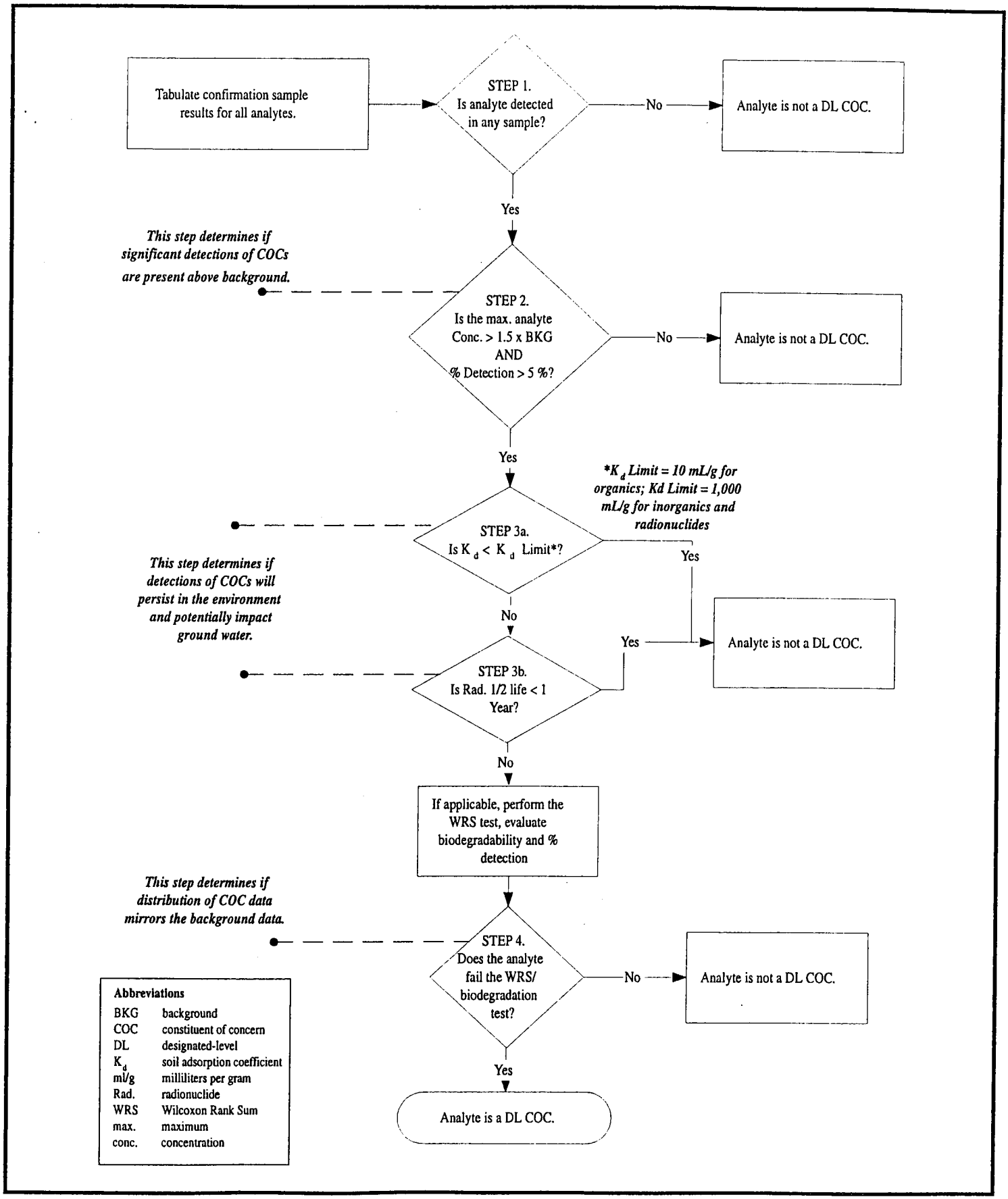

Figure 6. Preliminary Designated-Level Analysis Flow Chart Data Evaluation and Screening

APPENDIX A

OVERBURDEN SOIL DATA

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC042	1,1,1-Trichloroethane			5.1	UG/KG		
CWDTC042	1,1,2,2-Tetrachloroethane			5.1	UG/KG		
CWDTC042	1,1,2-Trichloroethane			5.1	UG/KG	UJ	c
CWDTC042	1,1-Dichloroethane			5.1	UG/KG		
CWDTC042	1,1-Dichloroethene			5.1	UG/KG		
CWDTC042	1,2,4-Trichlorobenzene			347	UG/KG		
CWDTC042	1,2-Dichlorobenzene			347	UG/KG		
CWDTC042	1,2-Dichloroethane			5.1	UG/KG		
CWDTC042	1,2-Dichloroethene (total)			5.1	UG/KG		
CWDTC042	1,2-Dichloropropane			5.1	UG/KG		
CWDTC042	1,3-Dichlorobenzene			347	UG/KG		
CWDTC042	1,4-Dichlorobenzene			347	UG/KG		
CWDTC042	2,2'-oxybis(1-Chloropropane)			347	UG/KG		
CWDTC042	2,4,5-Trichlorophenol			347	UG/KG		
CWDTC042	2,4,6-Trichlorophenol			347	UG/KG		
CWDTC042	2,4-Dichlorophenol			347	UG/KG		
CWDTC042	2,4-Dimethylphenol			347	UG/KG		
CWDTC042	2,4-Dinitrophenol			694	UG/KG		
CWDTC042	2,4-Dinitrotoluene			347	UG/KG		
CWDTC042	2,6-Dinitrotoluene			347	UG/KG		
CWDTC042	2-Butanone			10.3	UG/KG	UJ	c
CWDTC042	2-Chloronaphthalene			347	UG/KG		
CWDTC042	2-Chlorophenol			347	UG/KG		
CWDTC042	2-Hexanone			10.3	UG/KG		
CWDTC042	2-Methyl-4,6-dinitrophenol			347	UG/KG		
CWDTC042	2-Methylnaphthalene			347	UG/KG		
CWDTC042	2-Nitroaniline			347	UG/KG		
CWDTC042	2-Nitrophenol			347	UG/KG		
CWDTC042	3,3'-Dichlorobenzidine			1740	UG/KG		
CWDTC042	3-Nitroaniline			347	UG/KG		
CWDTC042	4,4'-DDD			2.8	UG/KG		
CWDTC042	4,4'-DDE			2.8	UG/KG		
CWDTC042	4,4'-DDT			2.8	UG/KG		
CWDTC042	4-Bromophenyl Phenyl Ether			347	UG/KG		
CWDTC042	4-Chloro-3-Methylphenol			347	UG/KG		
CWDTC042	4-Chloroaniline			347	UG/KG		
CWDTC042	4-Chlorophenyl Phenyl Ether			347	UG/KG		
CWDTC042	4-Methyl-2-Pentanone			10.3	UG/KG	UJ	c
CWDTC042	4-Nitroaniline			347	UG/KG		
CWDTC042	4-Nitrophenol			347	UG/KG		
CWDTC042	Acenaphthene			347	UG/KG		
CWDTC042	Acenaphthylene			347	UG/KG		
CWDTC042	Acetone			10.3	UG/KG		
CWDTC042	Actinium-228	0.489	0.139	0.0853	PCI/G		
CWDTC042	Aldrin			1.4	UG/KG		
CWDTC042	Alpha-BHC			1.4	UG/KG		
CWDTC042	Alpha-Chlordane	6.2		1.4	UG/KG		
CWDTC042	Americium-241	-0.000503	0.124	0.00716	PCI/G		
CWDTC042	Ammonia Nitrogen	9.94		0.58	MG/KG		
CWDTC042	Anthracene			347	UG/KG		
CWDTC042	Antimony			1	MG/KG	R	m
CWDTC042	Arochlor-1016			6.9	UG/KG		
CWDTC042	Arochlor-1221			6.9	UG/KG		
CWDTC042	Arochlor-1232			6.9	UG/KG		
CWDTC042	Arochlor-1242			6.9	UG/KG		
CWDTC042	Arochlor-1248			6.9	UG/KG		
CWDTC042	Arochlor-1254			6.9	UG/KG		
CWDTC042	Arochlor-1260			6.9	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC042	Arsenic	6.9		0.5	MG/KG		
CWDTC042	Barium	152		0.5	MG/KG	J	m
CWDTC042	Benzene			5.1	UG/KG		
CWDTC042	Benzo(a)anthracene			347	UG/KG		
CWDTC042	Benzo(a)pyrene			347	UG/KG		
CWDTC042	Benzo(b)fluoranthene			347	UG/KG		
CWDTC042	Benzo(g,h,i)perylene			347	UG/KG		
CWDTC042	Benzo(k)fluoranthene			347	UG/KG		
CWDTC042	Beryllium	0.36		0.5	MG/KG	J	q
CWDTC042	Beta-BHC			1.4	UG/KG		
CWDTC042	Bis(2-Chloroethoxy)methane			347	UG/KG		
CWDTC042	Bis(2-Chloroethyl)ether			347	UG/KG		
CWDTC042	Bis(2-Ethylhexyl)phthalate			347	UG/KG		
CWDTC042	Bismuth-212	0.426	0.188	0.171	PCI/G		
CWDTC042	Bismuth-214	0.537	0.0936	0.0417	PCI/G		
CWDTC042	Bromoform			5.1	UG/KG		
CWDTC042	Butyl Benzyl Phthalate			347	UG/KG		
CWDTC042	Cadmium	0.72		0.5	MG/KG		
CWDTC042R1	Cadmium			0.48	MG/KG		
CWDTC042R2	Cadmium			0.53	MG/KG		
CWDTC042	Carbazole			1740	UG/KG		
CWDTC042	Carbon Disulfide			5.1	UG/KG		
CWDTC042	Carbon Tetrachloride			5.1	UG/KG		
CWDTC042	Carbon-14	0.0313	0.0649	0.11	PCI/G		
CWDTC042	Cesium-137	0.0116	0.0142	0.0255	PCI/G		
CWDTC042	Chlorobenzene			5.1	UG/KG		
CWDTC042	Chlorodibromomethane			5.1	UG/KG		
CWDTC042	Chloroethane			10.3	UG/KG		
CWDTC042	Chloroform	1.7		5.1	UG/KG	J	q
CWDTC042	Chromium	132		0.5	MG/KG	J	m
CWDTC042	Chromium, Hexavalent	0.0824		0.0412	MG/KG		
CWDTC042	Chrysene			347	UG/KG		
CWDTC042	cis-1,3-Dichloropropylene			5.1	UG/KG		
CWDTC042	Cobalt	21.2		0.5	MG/KG		
CWDTC042	Cobalt-60	0.00142	0.0147	0.0267	PCI/G		
CWDTC042	Copper	33.7		0.5	MG/KG		
CWDTC042	Delta-BHC			1.4	UG/KG		
CWDTC042	Di-n-Butyl Phthalate			347	UG/KG		
CWDTC042	Di-n-Octyl Phthalate			347	UG/KG		
CWDTC042	Dibenzo(a,h)anthracene			347	UG/KG		
CWDTC042	Dibenzofuran			347	UG/KG		
CWDTC042	Dichlorobromomethane			5.1	UG/KG		
CWDTC042	Dieldrin			2.8	UG/KG		
CWDTC042	Diethyl Phthalate			347	UG/KG		
CWDTC042	Dimethyl Phthalate			347	UG/KG		
CWDTC042	Endosulfan I			1.4	UG/KG		
CWDTC042	Endosulfan II			2.8	UG/KG		
CWDTC042	Endosulfan Sulfate			2.8	UG/KG		
CWDTC042	Endrin			2.8	UG/KG		
CWDTC042	Endrin Aldehyde			2.8	UG/KG		
CWDTC042	Endrin Ketone			2.8	UG/KG		
CWDTC042	Ethylbenzene			5.1	UG/KG		
CWDTC042	Fluoranthene			347	UG/KG		
CWDTC042	Fluorene			347	UG/KG		
CWDTC042	gamma-BHC (Lindane)			1.4	UG/KG		
CWDTC042	gamma-Chlordane	7.4		1.4	UG/KG		
CWDTC042	Gross Alpha	4.94	2.61	3.68	PCI/G		
CWDTC042	Gross Beta	10.1	3.08	5.18	PCI/G		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC042	Heptachlor			1.4	UG/KG		
CWDTC042	Heptachlor Epoxide			1.4	UG/KG		
CWDTC042	Hexachlorobenzene			347	UG/KG		
CWDTC042	Hexachlorobutadiene			347	UG/KG		
CWDTC042	Hexachlorocyclopentadiene			347	UG/KG		
CWDTC042	Hexachloroethane			347	UG/KG		
CWDTC042	Indeno(1,2,3-cd)pyrene			347	UG/KG		
CWDTC042	Iron	31400		5	MG/KG	J	I
CWDTC042	Isophorone			347	UG/KG		
CWDTC042	Lead	7.6		0.5	MG/KG	J	
CWDTC042	Lead-210	0	68.9	90.8	PCI/G		
CWDTC042	Lead-212	0	0.0675	0.0761	PCI/G		
CWDTC042	Lead-214	0.562	0.0901	0.0445	PCI/G		
CWDTC042	m,p-Cresol			347	UG/KG		
CWDTC042	Manganese	554		1	MG/KG		
CWDTC042	Mercury	1.2		0.032	MG/KG		
CWDTC042	Methoxychlor			13.9	UG/KG		
CWDTC042	Methyl Bromide			10.3	UG/KG		
CWDTC042	Methyl Chloride			10.3	UG/KG		
CWDTC042	Methylene Chloride			5.1	UG/KG		
CWDTC042	Molybdenum			1	MG/KG		
CWDTC042	N-Nitrosodiphenylamine			347	UG/KG		
CWDTC042	N-Nitrosodipropylamine			347	UG/KG		
CWDTC042	Naphthalene			347	UG/KG		
CWDTC042	Nickel	253		0.5	MG/KG		
CWDTC042	Nitrate	17.8		0.13	MG/KG		
CWDTC042	Nitrobenzene			347	UG/KG		
CWDTC042	Nitrogen, Total Kjeldahl	120		5.8	MG/KG		
CWDTC042	O-Cresol			347	UG/KG		
CWDTC042	Pentachlorophenol			347	UG/KG		
CWDTC042	Phenanthrene			347	UG/KG		
CWDTC042	Phenol			347	UG/KG		
CWDTC042	Plutonium-241	0.172	0.207	0.4	PCI/G		
CWDTC042	Potassium-40	12.5	1.52	0.256	PCI/G		
CWDTC042	Pyrene			347	UG/KG		
CWDTC042	Radium-223	0.184	0.241	0.422	PCI/G		
CWDTC042	Radium-226	0.515	0.0773	0.0288	PCI/G		
CWDTC042	Radium-228	0.489	0.139	0.0853	PCI/G		
CWDTC042	Selenium	1.1		1	MG/KG		
CWDTC042	Silver			0.5	MG/KG		
CWDTC042	Strontium-90	-0.00461	0.0682	0.109	PCI/G		
CWDTC042	Styrene			5.1	UG/KG		
CWDTC042	Tetrachloroethylene			5.1	UG/KG		
CWDTC042	Thallium			1	MG/KG		
CWDTC042	Thallium-208	0.196	0.0393	0.0217	PCI/G		
CWDTC042	Thorium-228	0.466	0.146	0.0937	PCI/G		
CWDTC042	Thorium-230	0.467	0.14	0.0233	PCI/G		
CWDTC042	Thorium-232	0.373	0.122	0.0233	PCI/G		
CWDTC042	Thorium-234	0	13.9	14	PCI/G		
CWDTC042	Toluene	2.2		5.1	UG/KG	J	q
CWDTC042	Total Organic Carbon	5240		24.1	MG/KG		
CWDTC042	Toxaphene			69.4	UG/KG		
CWDTC042	trans-1,3-Dichloropropene			5.1	UG/KG		
CWDTC042	Trichloroethene			5.1	UG/KG		
CWDTC042	Tritium	2.13	0.67	0.976	PCI/G		
CWDTC042	Uranium-233/234	0.411	0.0802	0.0231	PCI/G		
CWDTC042	Uranium-235	0.0152	0.0136	0.00909	PCI/G		
CWDTC042	Uranium-238	0.396	0.0779	0.00907	PCI/G		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC042	Vanadium	53.1		0.5	MG/KG		
CWDTC042	Vinyl Chloride			10.3	UG/KG		
CWDTC042	Xylenes (Total)			5.1	UG/KG		
CWDTC042	Zinc	63.5		0.5	MG/KG		
CWDTC043	1,1,1-Trichloroethane			4.9	UG/KG		
CWDTC043	1,1,2,2-Tetrachloroethane			4.9	UG/KG		
CWDTC043	1,1,2-Trichloroethane			4.9	UG/KG	UJ	c
CWDTC043	1,1-Dichloroethane			4.9	UG/KG		
CWDTC043	1,1-Dichloroethene			4.9	UG/KG		
CWDTC043	1,2,4-Trichlorobenzene			355	UG/KG		
CWDTC043	1,2-Dichlorobenzene			355	UG/KG		
CWDTC043	1,2-Dichloroethane			4.9	UG/KG		
CWDTC043	1,2-Dichloroethene (total)			4.9	UG/KG		
CWDTC043	1,2-Dichloropropane			4.9	UG/KG		
CWDTC043	1,3-Dichlorobenzene			355	UG/KG		
CWDTC043	1,4-Dichlorobenzene			355	UG/KG		
CWDTC043	2,2'-oxybis(1-Chloropropane)			355	UG/KG		
CWDTC043	2,4,5-Trichlorophenol			355	UG/KG		
CWDTC043	2,4,6-Trichlorophenol			355	UG/KG		
CWDTC043	2,4-Dichlorophenol			355	UG/KG		
CWDTC043	2,4-Dimethylphenol			355	UG/KG		
CWDTC043	2,4-Dinitrophenol			709	UG/KG		
CWDTC043	2,4-Dinitrotoluene			355	UG/KG		
CWDTC043	2,6-Dinitrotoluene			355	UG/KG		
CWDTC043	2-Butanone			9.7	UG/KG	UJ	c
CWDTC043	2-Chloronaphthalene			355	UG/KG		
CWDTC043	2-Chlorophenol			355	UG/KG		
CWDTC043	2-Hexanone			9.7	UG/KG		
CWDTC043	2-Methyl-4,6-dinitrophenol			355	UG/KG		
CWDTC043	2-Methylnaphthalene			355	UG/KG		
CWDTC043	2-Nitroaniline			355	UG/KG		
CWDTC043	2-Nitrophenol			355	UG/KG		
CWDTC043	3,3'-Dichlorobenzidine			1770	UG/KG		
CWDTC043	3-Nitroaniline			355	UG/KG		
CWDTC043	4,4'-DDD			2.8	UG/KG		
CWDTC043	4,4'-DDE			2.8	UG/KG		
CWDTC043	4,4'-DDT			2.8	UG/KG		
CWDTC043	4-Bromophenyl Phenyl Ether			355	UG/KG		
CWDTC043	4-Chloro-3-Methylphenol			355	UG/KG		
CWDTC043	4-Chloroaniline			355	UG/KG		
CWDTC043	4-Chlorophenyl Phenyl Ether			355	UG/KG		
CWDTC043	4-Methyl-2-Pentanone			9.7	UG/KG	UJ	c
CWDTC043	4-Nitroaniline			355	UG/KG		
CWDTC043	4-Nitrophenol			355	UG/KG		
CWDTC043	Acenaphthene			355	UG/KG		
CWDTC043	Acenaphthylene			355	UG/KG		
CWDTC043	Acetone			9.7	UG/KG	UJ	c
CWDTC043	Actinium-228	0.58	0.139	0.0806	PCI/G		
CWDTC043	Aldrin			1.4	UG/KG		
CWDTC043	Alpha-BHC			1.4	UG/KG		
CWDTC043	Alpha-Chlordane	8.8		1.4	UG/KG		
CWDTC043	Americium-241	0.00739	0.00549	0.00725	PCI/G		
CWDTC043	Ammonia Nitrogen	9.8		0.596	MG/KG		
CWDTC043	Anthracene			355	UG/KG		
CWDTC043	Antimony			1	MG/KG	R	m
CWDTC043	Arochlor-1016			7.1	UG/KG		
CWDTC043	Arochlor-1221			7.1	UG/KG		
CWDTC043	Arochlor-1232			7.1	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC043	Arochlor-1242			7.1	UG/KG		
CWDTC043	Arochlor-1248			7.1	UG/KG		
CWDTC043	Arochlor-1254			7.1	UG/KG		
CWDTC043	Arochlor-1260			7.1	UG/KG		
CWDTC043	Arsenic	7.2		0.51	MG/KG		
CWDTC043	Barium	166		0.51	MG/KG	J	m
CWDTC043	Benzene			4.9	UG/KG		
CWDTC043	Benzo(a)anthracene			355	UG/KG		
CWDTC043	Benzo(a)pyrene			355	UG/KG		
CWDTC043	Benzo(b)fluoranthene			355	UG/KG		
CWDTC043	Benzo(g,h,i)perylene			355	UG/KG		
CWDTC043	Benzo(k)fluoranthene			355	UG/KG		
CWDTC043	Beryllium	0.39		0.51	MG/KG	J	q
CWDTC043	Beta-BHC			1.4	UG/KG		
CWDTC043	Bis(2-Chloroethoxy)methane			355	UG/KG		
CWDTC043	Bis(2-Chloroethyl)ether			355	UG/KG		
CWDTC043	Bis(2-Ethylhexyl)phthalate			355	UG/KG		
CWDTC043	Bismuth-212	0.366	0.168	0.155	PCI/G		
CWDTC043	Bismuth-214	0.555	0.0969	0.0381	PCI/G		
CWDTC043	Bromoform			4.9	UG/KG		
CWDTC043	Butyl Benzyl Phthalate			355	UG/KG		
CWDTC043	Cadmium	0.78		0.51	MG/KG		
CWDTC043R1	Cadmium			0.48	MG/KG		
CWDTC043R2	Cadmium			0.51	MG/KG		
CWDTC043	Carbazole			1770	UG/KG		
CWDTC043	Carbon Disulfide			4.9	UG/KG		
CWDTC043	Carbon Tetrachloride			4.9	UG/KG		
CWDTC043	Carbon-14	0.659	0.201	0.327	PCI/G		
CWDTC043	Cesium-137	0.0216	0.0218	0.0221	PCI/G		
CWDTC043	Chlorobenzene			4.9	UG/KG		
CWDTC043	Chlorodibromomethane			4.9	UG/KG		
CWDTC043	Chloroethane			9.7	UG/KG		
CWDTC043	Chloroform			4.9	UG/KG		
CWDTC043	Chromium	141		0.51	MG/KG	J	m
CWDTC043	Chromium, Hexavalent	0.343		0.0416	MG/KG		
CWDTC043	Chrysene			355	UG/KG		
CWDTC043	cis-1,3-Dichloropropylene			4.9	UG/KG		
CWDTC043	Cobalt	22.9		0.51	MG/KG		
CWDTC043	Cobalt-60	-0.00422	0.0135	0.0237	PCI/G		
CWDTC043	Copper	36.6		0.51	MG/KG		
CWDTC043	Delta-BHC			1.4	UG/KG		
CWDTC043	Di-n-Butyl Phthalate			355	UG/KG		
CWDTC043	Di-n-Octyl Phthalate			355	UG/KG		
CWDTC043	Dibenzo(a,h)anthracene			355	UG/KG		
CWDTC043	Dibenzofuran			355	UG/KG		
CWDTC043	Dichlorobromomethane			4.9	UG/KG		
CWDTC043	Dieldrin			2.8	UG/KG		
CWDTC043	Diethyl Phthalate			355	UG/KG		
CWDTC043	Dimethyl Phthalate			355	UG/KG		
CWDTC043	Endosulfan I			1.4	UG/KG		
CWDTC043	Endosulfan II			2.8	UG/KG		
CWDTC043	Endosulfan Sulfate			2.8	UG/KG		
CWDTC043	Endrin			2.8	UG/KG		
CWDTC043	Endrin Aldehyde			2.8	UG/KG		
CWDTC043	Endrin Ketone			2.8	UG/KG		
CWDTC043	Ethylbenzene			4.9	UG/KG		
CWDTC043	Fluoranthene			355	UG/KG		
CWDTC043	Fluorene			355	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC043	gamma-BHC (Lindane)			1.4	UG/KG		
CWDTC043	gamma-Chlordane	9.3		1.4	UG/KG		
CWDTC043	Gross Alpha	4.8	2.73	4.27	PCI/G		
CWDTC043	Gross Beta	13.4	3.4	5.53	PCI/G		
CWDTC043	Heptachlor			1.4	UG/KG		
CWDTC043	Heptachlor Epoxide			0.71	UG/KG		
CWDTC043	Hexachlorobenzene			355	UG/KG		
CWDTC043	Hexachlorobutadiene			355	UG/KG		
CWDTC043	Hexachlorocyclopentadiene			355	UG/KG		
CWDTC043	Hexachloroethane			355	UG/KG		
CWDTC043	Indeno(1,2,3-cd)pyrene			355	UG/KG		
CWDTC043	Iron	33900		5.1	MG/KG	J	I
CWDTC043	Isophorone			355	UG/KG		
CWDTC043	Lead	7.4		0.51	MG/KG	J	
CWDTC043	Lead-210	0.463	0.245	0.219	PCI/G		
CWDTC043	Lead-212	0.571	0.077	0.0302	PCI/G		
CWDTC043	Lead-214	0.591	0.0914	0.0369	PCI/G		
CWDTC043	m,p-Cresol			355	UG/KG		
CWDTC043	Manganese	578		1	MG/KG		
CWDTC043	Mercury	1.2		0.035	MG/KG		
CWDTC043	Methoxychlor			7.1	UG/KG		
CWDTC043	Methyl Bromide			9.7	UG/KG		
CWDTC043	Methyl Chloride			9.7	UG/KG		
CWDTC043	Methylene Chloride	5.7		4.9	UG/KG		
CWDTC043	Molybdenum			1	MG/KG		
CWDTC043	N-Nitrosodiphenylamine			355	UG/KG		
CWDTC043	N-Nitrosodipropylamine			355	UG/KG		
CWDTC043	Naphthalene			355	UG/KG		
CWDTC043	Nickel	275		0.51	MG/KG		
CWDTC043	Nitrate	36.2		0.135	MG/KG		
CWDTC043	Nitrobenzene			355	UG/KG		
CWDTC043	Nitrogen, Total Kjeldahl	122		5.88	MG/KG		
CWDTC043	O-Cresol			355	UG/KG		
CWDTC043	Pentachlorophenol			355	UG/KG		
CWDTC043	Phenanthrene			355	UG/KG		
CWDTC043	Phenol			355	UG/KG		
CWDTC043	Plutonium-241	0.108	0.166	0.323	PCI/G		
CWDTC043	Potassium-40	9.22	1.01	0.179	PCI/G		
CWDTC043	Pyrene			355	UG/KG		
CWDTC043	Radium-223	0.0142	0.196	0.341	PCI/G		
CWDTC043	Radium-226	0.461	0.0658	0.0287	PCI/G		
CWDTC043	Radium-228	0.58	0.139	0.0806	PCI/G		
CWDTC043	Selenium	1		1	MG/KG	J	q
CWDTC043	Silver			0.51	MG/KG		
CWDTC043	Strontium-90	0.0304	0.0252	0.0389	PCI/G		
CWDTC043	Styrene			4.9	UG/KG		
CWDTC043	Tetrachloroethylene			4.9	UG/KG		
CWDTC043	Thallium			1	MG/KG		
CWDTC043	Thallium-208	0.172	0.0356	0.0198	PCI/G		
CWDTC043	Thorium-228	0.597	0.153	0.067	PCI/G		
CWDTC043	Thorium-230	0.453	0.126	0.0483	PCI/G		
CWDTC043	Thorium-232	0.384	0.113	0.0189	PCI/G		
CWDTC043	Thorium-234	0.562	0.337	0.262	PCI/G		
CWDTC043	Toluene	19.6		4.9	UG/KG		
CWDTC043	Total Organic Carbon	4270		24.1	MG/KG		
CWDTC043	Toxaphene			70.9	UG/KG		
CWDTC043	trans-1,3-Dichloropropene			4.9	UG/KG		
CWDTC043	Trichloroethene			4.9	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC043	Tritium	1.41	0.643	0.997	PCI/G		
CWDTC043	Uranium-233/234	0.461	0.0803	0.034	PCI/G		
CWDTC043	Uranium-235	0.0254	0.0182	0.0206	PCI/G		
CWDTC043	Uranium-238	0.469	0.0796	0.0206	PCI/G		
CWDTC043	Vanadium	57.6		0.51	MG/KG		
CWDTC043	Vinyl Chloride			9.7	UG/KG		
CWDTC043	Xylenes (Total)			4.9	UG/KG		
CWDTC043	Zinc	67.2		0.51	MG/KG		
CWDTC044	1,1,1-Trichloroethane			5.1	UG/KG		
CWDTC044	1,1,2,2-Tetrachloroethane			5.1	UG/KG		
CWDTC044	1,1,2-Trichloroethane			5.1	UG/KG	UJ	c
CWDTC044	1,1-Dichloroethane			5.1	UG/KG		
CWDTC044	1,1-Dichloroethene			5.1	UG/KG		
CWDTC044	1,2,4-Trichlorobenzene			347	UG/KG		
CWDTC044	1,2-Dichlorobenzene			347	UG/KG		
CWDTC044	1,2-Dichloroethane			5.1	UG/KG		
CWDTC044	1,2-Dichloroethene (total)			5.1	UG/KG		
CWDTC044	1,2-Dichloropropane			5.1	UG/KG		
CWDTC044	1,3-Dichlorobenzene			347	UG/KG		
CWDTC044	1,4-Dichlorobenzene			347	UG/KG		
CWDTC044	2,2'-oxybis(1-Chloropropane)			347	UG/KG		
CWDTC044	2,4,5-Trichlorophenol			347	UG/KG		
CWDTC044	2,4,6-Trichlorophenol			347	UG/KG		
CWDTC044	2,4-Dichlorophenol			347	UG/KG		
CWDTC044	2,4-Dimethylphenol			347	UG/KG		
CWDTC044	2,4-Dinitrophenol			694	UG/KG		
CWDTC044	2,4-Dinitrotoluene			347	UG/KG		
CWDTC044	2,6-Dinitrotoluene			347	UG/KG		
CWDTC044	2-Butanone	10.3		10.2	UG/KG	J	c
CWDTC044	2-Chloronaphthalene			347	UG/KG		
CWDTC044	2-Chlorophenol			347	UG/KG		
CWDTC044	2-Hexanone			10.2	UG/KG		
CWDTC044	2-Methyl-4,6-dinitrophenol			347	UG/KG		
CWDTC044	2-Methylnaphthalene			347	UG/KG		
CWDTC044	2-Nitroaniline			347	UG/KG		
CWDTC044	2-Nitrophenol			347	UG/KG		
CWDTC044	3,3'-Dichlorobenzidine			1740	UG/KG		
CWDTC044	3-Nitroaniline			347	UG/KG		
CWDTC044	4,4'-DDD			5.6	UG/KG		
CWDTC044	4,4'-DDE			5.6	UG/KG		
CWDTC044	4,4'-DDT			5.6	UG/KG		
CWDTC044	4-Bromophenyl Phenyl Ether			347	UG/KG		
CWDTC044	4-Chloro-3-Methylphenol			347	UG/KG		
CWDTC044	4-Chloroaniline			347	UG/KG		
CWDTC044	4-Chlorophenyl Phenyl Ether			347	UG/KG		
CWDTC044	4-Methyl-2-Pentanone			10.2	UG/KG	UJ	c
CWDTC044	4-Nitroaniline			347	UG/KG		
CWDTC044	4-Nitrophenol			347	UG/KG		
CWDTC044	Acenaphthene			347	UG/KG		
CWDTC044	Acenaphthylene			347	UG/KG		
CWDTC044	Acetone			10.2	UG/KG		
CWDTC044	Actinium-228	0.5	0.151	0.0849	PCI/G		
CWDTC044	Aldrin			2.8	UG/KG		
CWDTC044	Alpha-BHC			2.8	UG/KG		
CWDTC044	Americium-241	0.000467	0.000938	0.00738	PCI/G		
CWDTC044	Anthracene			347	UG/KG		
CWDTC044	Antimony	0.39		1	MG/KG	J	mq
CWDTC044	Arochlor-1016			13.9	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC044	Arochlor-1221			13.9	UG/KG		
CWDTC044	Arochlor-1232			13.9	UG/KG		
CWDTC044	Arochlor-1242			13.9	UG/KG		
CWDTC044	Arochlor-1248			13.9	UG/KG		
CWDTC044	Arochlor-1254			13.9	UG/KG		
CWDTC044	Arochlor-1260			13.9	UG/KG		
CWDTC044	Arsenic	7.4		0.5	MG/KG		
CWDTC044	Benzene			5.1	UG/KG		
CWDTC044	Benzo(a)anthracene			347	UG/KG		
CWDTC044	Benzo(a)pyrene			347	UG/KG		
CWDTC044	Benzo(b)fluoranthene			347	UG/KG		
CWDTC044	Benzo(g,h,i)perylene			347	UG/KG		
CWDTC044	Benzo(k)fluoranthene			347	UG/KG		
CWDTC044	Beryllium	0.36		0.5	MG/KG	J	q
CWDTC044	Beta-BHC			2.8	UG/KG		
CWDTC044	Bis(2-Chloroethoxy)methane			347	UG/KG		
CWDTC044	Bis(2-Chloroethyl)ether			347	UG/KG		
CWDTC044	Bis(2-Ethylhexyl)phthalate			347	UG/KG		
CWDTC044	Bismuth-212	0.37	0.176	0.186	PCI/G		
CWDTC044	Bismuth-214	0.485	0.0859	0.0404	PCI/G		
CWDTC044	Bromoform			5.1	UG/KG		
CWDTC044	Butyl Benzyl Phthalate			347	UG/KG		
CWDTC044	Cadmium	0.71		0.5	MG/KG		
CWDTC044R1	Cadmium			0.47	MG/KG		
CWDTC044R2	Cadmium			0.5	MG/KG		
CWDTC044	Carbazole			1740	UG/KG		
CWDTC044	Carbon Disulfide			5.1	UG/KG		
CWDTC044	Carbon Tetrachloride			5.1	UG/KG		
CWDTC044	Chlorobenzene			5.1	UG/KG		
CWDTC044	Chlorodibromomethane			5.1	UG/KG		
CWDTC044	Chloroethane			10.2	UG/KG		
CWDTC044	Chloroform	1.5		5.1	UG/KG	J	q
CWDTC044	Chromium	129		0.5	MG/KG	J	m
CWDTC044	Chromium, Hexavalent	0.25		0.0416	MG/KG		
CWDTC044	Chrysene			347	UG/KG		
CWDTC044	cis-1,3-Dichloropropylene			5.1	UG/KG		
CWDTC044	Copper	35.4		0.5	MG/KG		
CWDTC044	Delta-BHC			2.8	UG/KG		
CWDTC044	Di-n-Butyl Phthalate			347	UG/KG		
CWDTC044	Di-n-Octyl Phthalate			347	UG/KG		
CWDTC044	Dibenzo(a,h)anthracene			347	UG/KG		
CWDTC044	Dibenzofuran			347	UG/KG		
CWDTC044	Dichlorobromomethane			5.1	UG/KG		
CWDTC044	Dieldrin			5.6	UG/KG		
CWDTC044	Diethyl Phthalate			347	UG/KG		
CWDTC044	Dimethyl Phthalate			347	UG/KG		
CWDTC044	Endosulfan I			2.8	UG/KG		
CWDTC044	Endosulfan II			5.6	UG/KG		
CWDTC044	Endosulfan Sulfate			5.6	UG/KG		
CWDTC044	Endrin			5.6	UG/KG		
CWDTC044	Endrin Aldehyde			5.6	UG/KG		
CWDTC044	Endrin Ketone			5.6	UG/KG		
CWDTC044	Ethylbenzene			5.1	UG/KG		
CWDTC044	Fluoranthene			347	UG/KG		
CWDTC044	Fluorene			347	UG/KG		
CWDTC044	gamma-BHC (Lindane)			2.8	UG/KG		
CWDTC044	Gross Beta	15	3.47	5.32	PCI/G		
CWDTC044	Heptachlor			2.8	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC044	Heptachlor Epoxide			2.8	UG/KG		
CWDTC044	Hexachlorobenzene			347	UG/KG		
CWDTC044	Hexachlorobutadiene			347	UG/KG		
CWDTC044	Hexachlorocyclopentadiene			347	UG/KG		
CWDTC044	Hexachloroethane			347	UG/KG		
CWDTC044	Indeno(1,2,3-cd)pyrene			347	UG/KG		
CWDTC044	Iron	31800		5	MG/KG	J	I
CWDTC044	Isophorone			347	UG/KG		
CWDTC044	Lead	7.5		0.5	MG/KG	J	
CWDTC044	Lead-210	9.77	8.56	6.92	PCI/G		
CWDTC044	Lead-212	0.582	0.0766	0.0344	PCI/G		
CWDTC044	Lead-214	0.591	0.0963	0.0442	PCI/G		
CWDTC044	m,p-Cresol			347	UG/KG		
CWDTC044	Mercury	1.3		0.033	MG/KG		
CWDTC044	Methoxychlor			27.8	UG/KG		
CWDTC044	Methyl Bromide			10.2	UG/KG		
CWDTC044	Methyl Chloride			10.2	UG/KG		
CWDTC044	Molybdenum			1	MG/KG		
CWDTC044	N-Nitrosodiphenylamine			347	UG/KG		
CWDTC044	N-Nitrosodipropylamine			347	UG/KG		
CWDTC044	Naphthalene			347	UG/KG		
CWDTC044	Nickel	262		0.5	MG/KG		
CWDTC044	Nitrate	15.4		0.133	MG/KG		
CWDTC044	Nitrobenzene			347	UG/KG		
CWDTC044	O-Cresol			347	UG/KG		
CWDTC044	Pentachlorophenol			347	UG/KG		
CWDTC044	Phenanthrene			347	UG/KG		
CWDTC044	Phenol			347	UG/KG		
CWDTC044	Plutonium-241	0.104	0.172	0.336	PCI/G		
CWDTC044	Potassium-40	13.5	1.79	0.222	PCI/G		
CWDTC044	Pyrene			347	UG/KG		
CWDTC044	Radium-223	0.00642	0.27	0.413	PCI/G		
CWDTC044	Radium-226	0.513	0.0996	0.0627	PCI/G		
CWDTC044	Radium-228	0.5	0.151	0.0849	PCI/G		
CWDTC044	Styrene			5.1	UG/KG		
CWDTC044	Tetrachloroethylene			5.1	UG/KG		
CWDTC044	Thallium			1	MG/KG		
CWDTC044	Thallium-208	0.154	0.0359	0.0245	PCI/G		
CWDTC044	Thorium-228	0.594	0.177	0.114	PCI/G		
CWDTC044	Thorium-230	0.492	0.151	0.0522	PCI/G		
CWDTC044	Thorium-232	0.468	0.146	0.0522	PCI/G		
CWDTC044	Toxaphene			139	UG/KG		
CWDTC044	trans-1,3-Dichloropropene			5.1	UG/KG		
CWDTC044	Trichloroethene			5.1	UG/KG		
CWDTC044	Tritium	2	0.656	0.964	PCI/G		
CWDTC044	Uranium-238	0.372	0.0639	0.00606	PCI/G		
CWDTC044	Vinyl Chloride			10.2	UG/KG		
CWDTC045	Alpha-Chlordane	24.9		7.1	UG/KG		
CWDTC045	Ammonia Nitrogen	9.75		0.594	MG/KG		
CWDTC045	Barium	161		0.49	MG/KG	J	m
CWDTC045	Carbon-14	0.042	0.0823	0.135	PCI/G		
CWDTC045	Cesium-137	0.0279	0.0233	0.0187	PCI/G		
CWDTC045	Cobalt	21.6		0.49	MG/KG		
CWDTC045	Cobalt-60	0.017	0.0166	0.0219	PCI/G		
CWDTC045	gamma-Chlordane	27.3		7.1	UG/KG		
CWDTC045	Gross Alpha	6.64	2.89	3.19	PCI/G		
CWDTC045	Iron	31700		4.9	MG/KG	J	I
CWDTC045	Manganese	570		0.98	MG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC045	Methylene Chloride	2.7		5	UG/KG	J	q
CWDTC045	Nitrogen, Total Kjeldahl	214		5.94	MG/KG		
CWDTC045	Selenium	1.4		0.98	MG/KG		
CWDTC045	Silver	0.23		0.49	MG/KG	J	q
CWDTC045	Strontium-90	0.0643	0.0416	0.064	PCI/G		
CWDTC045	Thorium-234	0.64	0.965	0.729	PCI/G		
CWDTC045	Toluene	30.5		5	UG/KG		
CWDTC045	Total Organic Carbon	4490		24.1	MG/KG		
CWDTC045	Uranium-233/234	0.392	0.0817	0.0258	PCI/G		
CWDTC045	Uranium-235	0.0271	0.0193	0.0102	PCI/G		
CWDTC045	Vanadium	54.2		0.49	MG/KG		
CWDTC045	Xylenes (Total)	0.8		5	UG/KG	J	q
CWDTC045	Zinc	67		0.49	MG/KG		
CWDTC046	1,1,1-Trichloroethane			5.2	UG/KG		
CWDTC046	1,1,2,2-Tetrachloroethane			5.2	UG/KG		
CWDTC046	1,1,2-Trichloroethane			5.2	UG/KG	UJ	c
CWDTC046	1,1-Dichloroethane			5.2	UG/KG		
CWDTC046	1,1-Dichloroethene			5.2	UG/KG		
CWDTC046	1,2,4-Trichlorobenzene			355	UG/KG		
CWDTC046	1,2-Dichlorobenzene			355	UG/KG		
CWDTC046	1,2-Dichloroethane			5.2	UG/KG		
CWDTC046	1,2-Dichloroethene (total)			5.2	UG/KG		
CWDTC046	1,2-Dichloropropane			5.2	UG/KG		
CWDTC046	1,3-Dichlorobenzene			355	UG/KG		
CWDTC046	1,4-Dichlorobenzene			355	UG/KG		
CWDTC046	2,2'-oxybis(1-Chloropropane)			355	UG/KG		
CWDTC046	2,4,5-Trichlorophenol			355	UG/KG		
CWDTC046	2,4,6-Trichlorophenol			355	UG/KG		
CWDTC046	2,4-Dichlorophenol			355	UG/KG		
CWDTC046	2,4-Dimethylphenol			355	UG/KG		
CWDTC046	2,4-Dinitrophenol			709	UG/KG		
CWDTC046	2,4-Dinitrotoluene			355	UG/KG		
CWDTC046	2,6-Dinitrotoluene			355	UG/KG		
CWDTC046	2-Butanone			10.4	UG/KG	UJ	c
CWDTC046	2-Chloronaphthalene			355	UG/KG		
CWDTC046	2-Chlorophenol			355	UG/KG		
CWDTC046	2-Hexanone			10.4	UG/KG		
CWDTC046	2-Methyl-4,6-dinitrophenol			355	UG/KG		
CWDTC046	2-Methylnaphthalene			355	UG/KG		
CWDTC046	2-Nitroaniline			355	UG/KG		
CWDTC046	2-Nitrophenol			355	UG/KG		
CWDTC046	3,3'-Dichlorobenzidine			1770	UG/KG		
CWDTC046	3-Nitroaniline			355	UG/KG		
CWDTC046	4,4'-DDD			14.2	UG/KG		
CWDTC046	4,4'-DDE			14.2	UG/KG		
CWDTC046	4,4'-DDT			14.2	UG/KG		
CWDTC046	4-Bromophenyl Phenyl Ether			355	UG/KG		
CWDTC046	4-Chloro-3-Methylphenol			355	UG/KG		
CWDTC046	4-Chloroaniline			355	UG/KG		
CWDTC046	4-Chlorophenyl Phenyl Ether			355	UG/KG		
CWDTC046	4-Methyl-2-Pentanone			10.4	UG/KG	UJ	c
CWDTC046	4-Nitroaniline			355	UG/KG		
CWDTC046	4-Nitrophenol			355	UG/KG		
CWDTC046	Acenaphthene			355	UG/KG		
CWDTC046	Acenaphthylene			355	UG/KG		
CWDTC046	Acetone			10.4	UG/KG		
CWDTC046	Actinium-228	0.562	0.214	0.152	PCI/G		
CWDTC046	Aldrin			7.1	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC046	Alpha-BHC			7.1	UG/KG		
CWDTC046	Alpha-Chlordane	45		7.1	UG/KG		
CWDTC046	Americium-241	-0.00123	0.00448	0.0079	PCI/G		
CWDTC046	Ammonia Nitrogen	8.02		0.591	MG/KG		
CWDTC046	Anthracene			355	UG/KG		
CWDTC046	Antimony	0.27		1	MG/KG	J	mq
CWDTC046	Arochlor-1016			35.5	UG/KG		
CWDTC046	Arochlor-1221			35.5	UG/KG		
CWDTC046	Arochlor-1232			35.5	UG/KG		
CWDTC046	Arochlor-1242			35.5	UG/KG		
CWDTC046	Arochlor-1248			35.5	UG/KG		
CWDTC046	Arochlor-1254			35.5	UG/KG		
CWDTC046	Arochlor-1260			35.5	UG/KG		
CWDTC046	Arsenic	7.2		0.52	MG/KG		
CWDTC046	Barium	147		0.52	MG/KG	J	m
CWDTC046	Benzene			5.2	UG/KG		
CWDTC046	Benzo(a)anthracene			355	UG/KG		
CWDTC046	Benzo(a)pyrene			355	UG/KG		
CWDTC046	Benzo(b)fluoranthene			355	UG/KG		
CWDTC046	Benzo(g,h,i)perylene			355	UG/KG		
CWDTC046	Benzo(k)fluoranthene			355	UG/KG		
CWDTC046	Beryllium	0.35		0.52	MG/KG	J	q
CWDTC046	Beta-BHC			7.1	UG/KG		
CWDTC046	Bis(2-Chloroethoxy)methane			355	UG/KG		
CWDTC046	Bis(2-Chloroethyl)ether			355	UG/KG		
CWDTC046	Bis(2-Ethylhexyl)phthalate			355	UG/KG		
CWDTC046	Bismuth-212	0.334	0.301	0.33	PCI/G		
CWDTC046	Bismuth-214	0.505	0.13	0.0821	PCI/G		
CWDTC046	Bromoform			5.2	UG/KG		
CWDTC046	Butyl Benzyl Phthalate			355	UG/KG		
CWDTC046	Cadmium	0.68		0.52	MG/KG		
CWDTC046R1	Cadmium			0.49	MG/KG		
CWDTC046R2	Cadmium			0.51	MG/KG		
CWDTC046	Carbazole			1770	UG/KG		
CWDTC046	Carbon Disulfide			5.2	UG/KG		
CWDTC046	Carbon Tetrachloride			5.2	UG/KG		
CWDTC046	Carbon-14	0.438	0.145	0.238	PCI/G		
CWDTC046	Cesium-137	0.0223	0.0264	0.0481	PCI/G		
CWDTC046	Chlorobenzene			5.2	UG/KG		
CWDTC046	Chlorodibromomethane			5.2	UG/KG		
CWDTC046	Chloroethane			10.4	UG/KG		
CWDTC046	Chloroform	1.2		5.2	UG/KG	J	q
CWDTC046	Chromium	133		0.52	MG/KG	J	m
CWDTC046	Chromium, Hexavalent	0.17		0.0424	MG/KG		
CWDTC046	Chrysene			355	UG/KG		
CWDTC046	cis-1,3-Dichloropropylene			5.2	UG/KG		
CWDTC046	Cobalt	21.2		0.52	MG/KG		
CWDTC046	Cobalt-60	0.0189	0.0268	0.0502	PCI/G		
CWDTC046	Copper	33.7		0.52	MG/KG		
CWDTC046	Delta-BHC			7.1	UG/KG		
CWDTC046	Di-n-Butyl Phthalate			355	UG/KG		
CWDTC046	Di-n-Octyl Phthalate			355	UG/KG		
CWDTC046	Dibenzo(a,h)anthracene			355	UG/KG		
CWDTC046	Dibenzofuran			355	UG/KG		
CWDTC046	Dichlorobromomethane			5.2	UG/KG		
CWDTC046	Dieldrin			14.2	UG/KG		
CWDTC046	Diethyl Phthalate			355	UG/KG		
CWDTC046	Dimethyl Phthalate			355	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC046	Endosulfan I			7.1	UG/KG		
CWDTC046	Endosulfan II			14.2	UG/KG		
CWDTC046	Endosulfan Sulfate			14.2	UG/KG		
CWDTC046	Endrin			14.2	UG/KG		
CWDTC046	Endrin Aldehyde			14.2	UG/KG		
CWDTC046	Endrin Ketone			14.2	UG/KG		
CWDTC046	Ethylbenzene	0.8		5.2	UG/KG	J	q
CWDTC046	Fluoranthene			355	UG/KG		
CWDTC046	Fluorene			355	UG/KG		
CWDTC046	gamma-BHC (Lindane)			7.1	UG/KG		
CWDTC046	gamma-Chlordane	45.5		7.1	UG/KG		
CWDTC046	Gross Alpha	10.7	3.71	4.06	PCI/G		
CWDTC046	Gross Beta	13.4	3.42	5.52	PCI/G		
CWDTC046	Heptachlor	9.2		7.1	UG/KG		
CWDTC046	Heptachlor Epoxide			7.1	UG/KG		
CWDTC046	Hexachlorobenzene			355	UG/KG		
CWDTC046	Hexachlorobutadiene			355	UG/KG		
CWDTC046	Hexachlorocyclopentadiene			355	UG/KG		
CWDTC046	Hexachloroethane			355	UG/KG		
CWDTC046	Indeno(1,2,3-cd)pyrene			355	UG/KG		
CWDTC046	Isophorone			355	UG/KG		
CWDTC046	Lead	7.9		0.52	MG/KG	J	
CWDTC046	Lead-210	1.15	2.38	2.22	PCI/G		
CWDTC046	Lead-212	0.529	0.0936	0.06	PCI/G		
CWDTC046	Lead-214	0.722	0.143	0.0756	PCI/G		
CWDTC046	m,p-Cresol			355	UG/KG		
CWDTC046	Manganese	545		1	MG/KG		
CWDTC046	Mercury	1.6		0.069	MG/KG		
CWDTC046	Methoxychlor			70.9	UG/KG		
CWDTC046	Methyl Bromide			10.4	UG/KG		
CWDTC046	Methyl Chloride			10.4	UG/KG		
CWDTC046	Methylene Chloride	2.7		5.2	UG/KG	J	q
CWDTC046	Molybdenum			1	MG/KG		
CWDTC046	N-Nitrosodiphenylamine			355	UG/KG		
CWDTC046	N-Nitrosodipropylamine			355	UG/KG		
CWDTC046	Naphthalene			355	UG/KG		
CWDTC046	Nickel	258		0.52	MG/KG		
CWDTC046	Nitrate	26.2		0.138	MG/KG		
CWDTC046	Nitrobenzene			355	UG/KG		
CWDTC046	Nitrogen, Total Kjeldahl	213		5.91	MG/KG		
CWDTC046	O-Cresol			355	UG/KG		
CWDTC046	Pentachlorophenol			355	UG/KG		
CWDTC046	Phenanthrene			355	UG/KG		
CWDTC046	Phenol			355	UG/KG		
CWDTC046	Plutonium-241	0.151	0.212	0.411	PCI/G		
CWDTC046	Potassium-40	10.1	1.28	0.468	PCI/G		
CWDTC046	Pyrene			355	UG/KG		
CWDTC046	Radium-223	0.142	0.474	0.715	PCI/G		
CWDTC046	Radium-226	0.501	0.0703	0.026	PCI/G		
CWDTC046	Radium-228	0.562	0.214	0.152	PCI/G		
CWDTC046	Selenium	1.1		1	MG/KG		
CWDTC046	Silver			0.52	MG/KG		
CWDTC046	Strontium-90	0.27	0.042	0.0568	PCI/G		
CWDTC046	Styrene			5.2	UG/KG		
CWDTC046	Tetrachloroethylene			5.2	UG/KG		
CWDTC046	Thallium			1	MG/KG		
CWDTC046	Thallium-208	0.136	0.0532	0.047	PCI/G		
CWDTC046	Thorium-228	0.374	0.122	0.0983	PCI/G		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC046	Thorium-230	0.461	0.131	0.0579	PCI/G		
CWDTC046	Thorium-232	0.242	0.0898	0.0579	PCI/G		
CWDTC046	Thorium-234	1.15	1.47	1.23	PCI/G		
CWDTC046	Toluene	106		5.2	UG/KG		
CWDTC046	Total Organic Carbon	5190		24.1	MG/KG		
CWDTC046	Toxaphene			355	UG/KG		
CWDTC046	trans-1,3-Dichloropropene			5.2	UG/KG		
CWDTC046	Trichloroethene			5.2	UG/KG		
CWDTC046	Tritium	2.21	0.694	1.01	PCI/G		
CWDTC046	Uranium-233/234	0.396	0.0713	0.0254	PCI/G		
CWDTC046	Uranium-235	0.0164	0.0124	0.00701	PCI/G		
CWDTC046	Uranium-238	0.396	0.0728	0.0361	PCI/G		
CWDTC046	Vanadium	51.9		0.52	MG/KG		
CWDTC046	Vinyl Chloride			10.4	UG/KG		
CWDTC046	Xylenes (Total)	3.4		5.2	UG/KG	J	q
CWDTC046	Zinc	65.9		0.52	MG/KG		
CWDTC048	1,1,1-Trichloroethane			5.4	UG/KG		
CWDTC048	1,1,2,2-Tetrachloroethane			5.4	UG/KG		
CWDTC048	1,1,2-Trichloroethane			5.4	UG/KG	UJ	c
CWDTC048	1,1-Dichloroethane			5.4	UG/KG		
CWDTC048	1,1-Dichloroethene			5.4	UG/KG		
CWDTC048	1,2,4-Trichlorobenzene			374	UG/KG		
CWDTC048	1,2-Dichlorobenzene			374	UG/KG		
CWDTC048	1,2-Dichloroethane			5.4	UG/KG		
CWDTC048	1,2-Dichloroethene (total)			5.4	UG/KG		
CWDTC048	1,2-Dichloropropane			5.4	UG/KG		
CWDTC048	1,3-Dichlorobenzene			374	UG/KG		
CWDTC048	1,4-Dichlorobenzene			374	UG/KG		
CWDTC048	2,2'-oxybis(1-Chloropropane)			374	UG/KG		
CWDTC048	2,4,5-Trichlorophenol			374	UG/KG		
CWDTC048	2,4,6-Trichlorophenol			374	UG/KG		
CWDTC048	2,4-Dichlorophenol			374	UG/KG		
CWDTC048	2,4-Dimethylphenol			374	UG/KG		
CWDTC048	2,4-Dinitrophenol			749	UG/KG		
CWDTC048	2,4-Dinitrotoluene			374	UG/KG		
CWDTC048	2,6-Dinitrotoluene			374	UG/KG		
CWDTC048	2-Butanone	21.8		10.7	UG/KG	J	c
CWDTC048	2-Chloronaphthalene			374	UG/KG		
CWDTC048	2-Chlorophenol			374	UG/KG		
CWDTC048	2-Hexanone			10.7	UG/KG		
CWDTC048	2-Methyl-4,6-dinitrophenol			374	UG/KG		
CWDTC048	2-Methylnaphthalene			374	UG/KG		
CWDTC048	2-Nitroaniline			374	UG/KG		
CWDTC048	2-Nitrophenol			374	UG/KG		
CWDTC048	3,3'-Dichlorobenzidine			1870	UG/KG		
CWDTC048	3-Nitroaniline			374	UG/KG		
CWDTC048	4,4'-DDD			30	UG/KG		
CWDTC048	4,4'-DDE			30	UG/KG		
CWDTC048	4,4'-DDT			30	UG/KG		
CWDTC048	4-Bromophenyl Phenyl Ether			374	UG/KG		
CWDTC048	4-Chloro-3-Methylphenol			374	UG/KG		
CWDTC048	4-Chloroaniline			374	UG/KG		
CWDTC048	4-Chlorophenyl Phenyl Ether			374	UG/KG		
CWDTC048	4-Methyl-2-Pentanone			10.7	UG/KG	UJ	c
CWDTC048	4-Nitroaniline			374	UG/KG		
CWDTC048	4-Nitrophenol			374	UG/KG		
CWDTC048	Acenaphthene			374	UG/KG		
CWDTC048	Acenaphthylene			374	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC048	Acetone			10.7	UG/KG		
CWDTC048	Actinium-228	0.371	0.0983	0.0672	PCI/G		
CWDTC048	Aldrin			15	UG/KG		
CWDTC048	Alpha-BHC			15	UG/KG		
CWDTC048	Alpha-Chlordane	61		15	UG/KG		
CWDTC048	Americium-241	0.00172	0.0032	0.00824	PCI/G		
CWDTC048	Ammonia Nitrogen	6.5		0.627	MG/KG		
CWDTC048	Anthracene			374	UG/KG		
CWDTC048	Antimony			1.1	MG/KG	R	m
CWDTC048	Arochlor-1016			74.9	UG/KG		
CWDTC048	Arochlor-1221			74.9	UG/KG		
CWDTC048	Arochlor-1232			74.9	UG/KG		
CWDTC048	Arochlor-1242			74.9	UG/KG		
CWDTC048	Arochlor-1248			74.9	UG/KG		
CWDTC048	Arochlor-1254			74.9	UG/KG		
CWDTC048	Arochlor-1260			74.9	UG/KG		
CWDTC048	Arsenic	7.7		0.56	MG/KG		
CWDTC048	Barium	160		0.56	MG/KG	J	m
CWDTC048	Benzene			5.4	UG/KG		
CWDTC048	Benzo(a)anthracene			374	UG/KG		
CWDTC048	Benzo(a)pyrene			374	UG/KG		
CWDTC048	Benzo(b)fluoranthene			374	UG/KG		
CWDTC048	Benzo(g,h,i)perylene			374	UG/KG		
CWDTC048	Benzo(k)fluoranthene			374	UG/KG		
CWDTC048	Beryllium	0.39		0.56	MG/KG	J	q
CWDTC048	Beta-BHC			15	UG/KG		
CWDTC048	Bis(2-Chloroethoxy)methane			374	UG/KG		
CWDTC048	Bis(2-Chloroethyl)ether			374	UG/KG		
CWDTC048	Bis(2-Ethylhexyl)phthalate			374	UG/KG		
CWDTC048	Bismuth-212	0.439	0.198	0.14	PCI/G		
CWDTC048	Bismuth-214	0.384	0.0762	0.0363	PCI/G		
CWDTC048	Bromoform			5.4	UG/KG		
CWDTC048	Butyl Benzyl Phthalate			374	UG/KG		
CWDTC048	Cadmium	0.96		0.56	MG/KG		
CWDTC048R1	Cadmium			0.47	MG/KG		
CWDTC048R2	Cadmium			0.52	MG/KG		
CWDTC048	Carbazole			1870	UG/KG		
CWDTC048	Carbon Disulfide			5.4	UG/KG		
CWDTC048	Carbon Tetrachloride			5.4	UG/KG		
CWDTC048	Carbon-14	-0.0612	0.0627	0.105	PCI/G		
CWDTC048	Cesium-137	0.041	0.0313	0.0194	PCI/G		
CWDTC048	Chlorobenzene			5.4	UG/KG		
CWDTC048	Chlorodibromomethane			5.4	UG/KG		
CWDTC048	Chloroethane			10.7	UG/KG		
CWDTC048	Chloroform	1		5.4	UG/KG	J	q
CWDTC048	Chromium	145		0.56	MG/KG	J	m
CWDTC048	Chromium, Hexavalent	0.202		0.0448	MG/KG		
CWDTC048	Chrysene			374	UG/KG		
CWDTC048	cis-1,3-Dichloropropylene			5.4	UG/KG		
CWDTC048	Cobalt	23.1		0.56	MG/KG		
CWDTC048	Cobalt-60	0.0139	0.0127	0.0232	PCI/G		
CWDTC048	Copper	36.1		0.56	MG/KG		
CWDTC048	Delta-BHC			15	UG/KG		
CWDTC048	Di-n-Butyl Phthalate			374	UG/KG		
CWDTC048	Di-n-Octyl Phthalate			374	UG/KG		
CWDTC048	Dibenzo(a,h)anthracene			374	UG/KG		
CWDTC048	Dibenzofuran			374	UG/KG		
CWDTC048	Dichlorobromomethane			5.4	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC048	Dieldrin			30	UG/KG		
CWDTC048	Diethyl Phthalate			374	UG/KG		
CWDTC048	Dimethyl Phthalate			374	UG/KG		
CWDTC048	Endosulfan I			15	UG/KG		
CWDTC048	Endosulfan II			30	UG/KG		
CWDTC048	Endosulfan Sulfate			30	UG/KG		
CWDTC048	Endrin			30	UG/KG		
CWDTC048	Endrin Aldehyde			30	UG/KG		
CWDTC048	Endrin Ketone			30	UG/KG		
CWDTC048	Ethylbenzene	1		5.4	UG/KG	J	q
CWDTC048	Fluoranthene			374	UG/KG		
CWDTC048	Fluorene			374	UG/KG		
CWDTC048	gamma-BHC (Lindane)			15	UG/KG		
CWDTC048	gamma-Chlordane	62.8		15	UG/KG		
CWDTC048	Gross Alpha	9.07	3.3	3.24	PCI/G		
CWDTC048	Gross Beta	17.6	3.51	4.92	PCI/G		
CWDTC048	Heptachlor			15	UG/KG		
CWDTC048	Heptachlor Epoxide			15	UG/KG		
CWDTC048	Hexachlorobenzene			374	UG/KG		
CWDTC048	Hexachlorobutadiene			374	UG/KG		
CWDTC048	Hexachlorocyclopentadiene			374	UG/KG		
CWDTC048	Hexachloroethane			374	UG/KG		
CWDTC048	Indeno(1,2,3-cd)pyrene			374	UG/KG		
CWDTC048	Iron	34100		5.6	MG/KG	J	l
CWDTC048	Isophorone			374	UG/KG		
CWDTC048	Lead	8.1		0.56	MG/KG	J	
CWDTC048	Lead-210	0.202	1.94	1.85	PCI/G		
CWDTC048	Lead-212	0.462	0.0597	0.0296	PCI/G		
CWDTC048	Lead-214	0.532	0.0819	0.0364	PCI/G		
CWDTC048	m,p-Cresol			374	UG/KG		
CWDTC048	Manganese	580		1.1	MG/KG		
CWDTC048	Mercury	0.92		0.034	MG/KG		
CWDTC048	Methoxychlor			150	UG/KG		
CWDTC048	Methyl Bromide			10.7	UG/KG		
CWDTC048	Methyl Chloride			10.7	UG/KG		
CWDTC048	Methylene Chloride			5.4	UG/KG		
CWDTC048	Molybdenum			1.1	MG/KG		
CWDTC048	N-Nitrosodiphenylamine			374	UG/KG		
CWDTC048	N-Nitrosodipropylamine			374	UG/KG		
CWDTC048	Naphthalene			374	UG/KG		
CWDTC048	Nickel	277		0.56	MG/KG		
CWDTC048	Nitrate	22		0.145	MG/KG		
CWDTC048	Nitrobenzene			374	UG/KG		
CWDTC048	Nitrogen, Total Kjeldahl	48.4		1.24	MG/KG		
CWDTC048	O-Cresol			374	UG/KG		
CWDTC048	Pentachlorophenol			374	UG/KG		
CWDTC048	Phenanthrene			374	UG/KG		
CWDTC048	Phenol			374	UG/KG		
CWDTC048	Plutonium-241	0.0855	0.149	0.291	PCI/G		
CWDTC048	Potassium-40	9.96	1.2	0.211	PCI/G		
CWDTC048	Pyrene			374	UG/KG		
CWDTC048	Radium-223	-0.0447	0.281	0.332	PCI/G		
CWDTC048	Radium-226	0.376	0.0557	0.0266	PCI/G		
CWDTC048	Radium-228	0.371	0.0983	0.0672	PCI/G		
CWDTC048	Selenium	1.4		1.1	MG/KG		
CWDTC048	Silver			0.56	MG/KG		
CWDTC048	Strontium-90	0.0412	0.0372	0.0577	PCI/G		
CWDTC048	Styrene			5.4	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC048	Tetrachloroethylene			5.4	UG/KG		
CWDTC048	Thallium			1.1	MG/KG		
CWDTC048	Thallium-208	0.132	0.0266	0.0183	PCI/G		
CWDTC048	Thorium-228	0.486	0.144	0.0931	PCI/G		
CWDTC048	Thorium-230	0.523	0.146	0.0613	PCI/G		
CWDTC048	Thorium-232	0.393	0.122	0.0539	PCI/G		
CWDTC048	Thorium-234	0.81	0.767	0.565	PCI/G		
CWDTC048	Total Organic Carbon	3530		24.1	MG/KG		
CWDTC048	Toxaphene			749	UG/KG		
CWDTC048	trans-1,3-Dichloropropene			5.4	UG/KG		
CWDTC048	Trichloroethene			5.4	UG/KG		
CWDTC048	Tritium	2.9	0.732	1.02	PCI/G		
CWDTC048	Uranium-233/234	0.401	0.071	0.00704	PCI/G		
CWDTC048	Uranium-235	0.0295	0.019	0.0202	PCI/G		
CWDTC048	Uranium-238	0.401	0.0721	0.0255	PCI/G		
CWDTC048	Vanadium	57.5		0.56	MG/KG		
CWDTC048	Vinyl Chloride			10.7	UG/KG		
CWDTC048	Xylenes (Total)	3.6		5.4	UG/KG	J	q
CWDTC048	Zinc	78.5		0.56	MG/KG		
CWDTC048DL	Toluene	175		22.3	UG/KG	J	s
CWDTC048R1	Cadmium			0.47	MG/KG		
CWDTC048R2	Cadmium			0.52	MG/KG		
CWDTC049	1,1,1-Trichloroethane			5.1	UG/KG		
CWDTC049	1,1,2,2-Tetrachloroethane			5.1	UG/KG		
CWDTC049	1,1,2-Trichloroethane			5.1	UG/KG		
CWDTC049	1,1-Dichloroethane			5.1	UG/KG		
CWDTC049	1,1-Dichloroethene			5.1	UG/KG		
CWDTC049	1,2,4-Trichlorobenzene			347	UG/KG		
CWDTC049	1,2-Dichlorobenzene			347	UG/KG		
CWDTC049	1,2-Dichloroethane			5.1	UG/KG	UJ	c
CWDTC049	1,2-Dichloroethene (total)			5.1	UG/KG		
CWDTC049	1,2-Dichloropropane			5.1	UG/KG		
CWDTC049	1,3-Dichlorobenzene			347	UG/KG		
CWDTC049	1,4-Dichlorobenzene			347	UG/KG		
CWDTC049	2,2'-oxybis(1-Chloropropane)			347	UG/KG		
CWDTC049	2,4,5-Trichlorophenol			347	UG/KG		
CWDTC049	2,4,6-Trichlorophenol			347	UG/KG		
CWDTC049	2,4-Dichlorophenol			347	UG/KG		
CWDTC049	2,4-Dimethylphenol			347	UG/KG		
CWDTC049	2,4-Dinitrophenol			694	UG/KG		
CWDTC049	2,4-Dinitrotoluene			347	UG/KG		
CWDTC049	2,6-Dinitrotoluene			347	UG/KG		
CWDTC049	2-Butanone	13.7		10.3	UG/KG	J	c
CWDTC049	2-Chloronaphthalene			347	UG/KG		
CWDTC049	2-Chlorophenol			347	UG/KG		
CWDTC049	2-Hexanone			10.3	UG/KG		
CWDTC049	2-Methyl-4,6-dinitrophenol			347	UG/KG		
CWDTC049	2-Methylnaphthalene			347	UG/KG		
CWDTC049	2-Nitroaniline			347	UG/KG		
CWDTC049	2-Nitrophenol			347	UG/KG		
CWDTC049	3,3'-Dichlorobenzidine			1740	UG/KG		
CWDTC049	3-Nitroaniline			347	UG/KG		
CWDTC049	4,4'-DDD			27.8	UG/KG		
CWDTC049	4,4'-DDE			27.8	UG/KG		
CWDTC049	4,4'-DDT			27.8	UG/KG		
CWDTC049	4-Bromophenyl Phenyl Ether			347	UG/KG		
CWDTC049	4-Chloro-3-Methylphenol			347	UG/KG		
CWDTC049	4-Chloroaniline			347	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC049	4-Chlorophenyl Phenyl Ether			347	UG/KG		
CWDTC049	4-Methyl-2-Pentanone			10.3	UG/KG	UJ	c
CWDTC049	4-Nitroaniline			347	UG/KG		
CWDTC049	4-Nitrophenol			347	UG/KG		
CWDTC049	Acenaphthene			347	UG/KG		
CWDTC049	Acenaphthylene			347	UG/KG		
CWDTC049	Acetone			10.3	UG/KG		
CWDTC049	Actinium-228	0.582	0.13	0.0707	PCI/G		
CWDTC049	Aldrin			13.9	UG/KG		
CWDTC049	Alpha-BHC			13.9	UG/KG		
CWDTC049	Alpha-Chlordane	60.5		13.9	UG/KG		
CWDTC049	Americium-241	0.00346	0.00398	0.00761	PCI/G		
CWDTC049	Ammonia Nitrogen	6.39		0.577	MG/KG		
CWDTC049	Anthracene			347	UG/KG		
CWDTC049	Antimony			0.96	MG/KG	R	m
CWDTC049	Arochlor-1016			69.4	UG/KG		
CWDTC049	Arochlor-1221			69.4	UG/KG		
CWDTC049	Arochlor-1232			69.4	UG/KG		
CWDTC049	Arochlor-1242			69.4	UG/KG		
CWDTC049	Arochlor-1248			69.4	UG/KG		
CWDTC049	Arochlor-1254			69.4	UG/KG		
CWDTC049	Arochlor-1260			69.4	UG/KG		
CWDTC049	Arsenic	6.7		0.48	MG/KG		
CWDTC049	Barium	154		0.48	MG/KG	J	m
CWDTC049	Benzene			5.1	UG/KG		
CWDTC049	Benzo(a)anthracene			347	UG/KG		
CWDTC049	Benzo(a)pyrene			347	UG/KG		
CWDTC049	Benzo(b)fluoranthene			347	UG/KG		
CWDTC049	Benzo(g,h,i)perylene			347	UG/KG		
CWDTC049	Benzo(k)fluoranthene			347	UG/KG		
CWDTC049	Beryllium	0.36		0.48	MG/KG	J	q
CWDTC049	Beta-BHC			13.9	UG/KG		
CWDTC049	Bis(2-Chloroethoxy)methane			347	UG/KG		
CWDTC049	Bis(2-Chloroethyl)ether			347	UG/KG		
CWDTC049	Bis(2-Ethylhexyl)phthalate			347	UG/KG		
CWDTC049	Bismuth-212	0.386	0.185	0.166	PCI/G		
CWDTC049	Bismuth-214	0.475	0.0783	0.0409	PCI/G		
CWDTC049	Bromoform			5.1	UG/KG		
CWDTC049	Butyl Benzyl Phthalate			347	UG/KG		
CWDTC049	Cadmium	0.66		0.48	MG/KG		
CWDTC049R1	Cadmium			0.48	MG/KG		
CWDTC049R2	Cadmium			0.51	MG/KG		
CWDTC049	Carbazole			1740	UG/KG		
CWDTC049	Carbon Disulfide			5.1	UG/KG		
CWDTC049	Carbon Tetrachloride			5.1	UG/KG		
CWDTC049	Carbon-14	0.809	0.105	0.159	PCI/G		
CWDTC049	Cesium-137	0.0067	0.0133	0.0233	PCI/G		
CWDTC049	Chlorobenzene			5.1	UG/KG		
CWDTC049	Chlorodibromomethane			5.1	UG/KG		
CWDTC049	Chloroethane			10.3	UG/KG		
CWDTC049	Chloroform	1		5.1	UG/KG	J	q
CWDTC049	Chromium	132		0.48	MG/KG	J	m
CWDTC049	Chromium, Hexavalent	0.312		0.0416	MG/KG		
CWDTC049	Chrysene			347	UG/KG		
CWDTC049	cis-1,3-Dichloropropylene			5.1	UG/KG		
CWDTC049	Cobalt	21.9		0.48	MG/KG		
CWDTC049	Cobalt-60	0.00131	0.0148	0.0258	PCI/G		
CWDTC049	Copper	33.3		0.48	MG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC049	Delta-BHC			13.9	UG/KG		
CWDTC049	Di-n-Butyl Phthalate			347	UG/KG		
CWDTC049	Di-n-Octyl Phthalate			347	UG/KG		
CWDTC049	Dibenzo(a,h)anthracene			347	UG/KG		
CWDTC049	Dibenzofuran			347	UG/KG		
CWDTC049	Dichlorobromomethane			5.1	UG/KG		
CWDTC049	Dieldrin			27.8	UG/KG		
CWDTC049	Diethyl Phthalate			347	UG/KG		
CWDTC049	Dimethyl Phthalate			347	UG/KG		
CWDTC049	Endosulfan I			13.9	UG/KG		
CWDTC049	Endosulfan II			27.8	UG/KG		
CWDTC049	Endosulfan Sulfate			27.8	UG/KG		
CWDTC049	Endrin			27.8	UG/KG		
CWDTC049	Endrin Aldehyde			27.8	UG/KG		
CWDTC049	Endrin Ketone			27.8	UG/KG		
CWDTC049	Ethylbenzene			5.1	UG/KG		
CWDTC049	Fluoranthene			347	UG/KG		
CWDTC049	Fluorene			347	UG/KG		
CWDTC049	gamma-BHC (Lindane)			13.9	UG/KG		
CWDTC049	gamma-Chlordane	62.9		13.9	UG/KG		
CWDTC049	Gross Alpha	6.85	2.28	2.39	PCI/G		
CWDTC049	Gross Beta	15.9	2.71	3.88	PCI/G		
CWDTC049	Heptachlor			13.9	UG/KG		
CWDTC049	Heptachlor Epoxide			13.9	UG/KG		
CWDTC049	Hexachlorobenzene			347	UG/KG		
CWDTC049	Hexachlorobutadiene			347	UG/KG		
CWDTC049	Hexachlorocyclopentadiene			347	UG/KG		
CWDTC049	Hexachloroethane			347	UG/KG		
CWDTC049	Indeno(1,2,3-cd)pyrene			347	UG/KG		
CWDTC049	Iron	31900		4.8	MG/KG	J	I
CWDTC049	Isophorone			347	UG/KG		
CWDTC049	Lead	7.4		0.48	MG/KG	J	
CWDTC049	Lead-210	0.768	1.89	2.33	PCI/G		
CWDTC049	Lead-212	0.532	0.071	0.0368	PCI/G		
CWDTC049	Lead-214	0.581	0.088	0.0401	PCI/G		
CWDTC049	m,p-Cresol			347	UG/KG		
CWDTC049	Manganese	564		0.96	MG/KG		
CWDTC049	Mercury	0.78		0.035	MG/KG		
CWDTC049	Methoxychlor			139	UG/KG		
CWDTC049	Methyl Bromide			10.3	UG/KG		
CWDTC049	Methyl Chloride			10.3	UG/KG		
CWDTC049	Methylene Chloride			5.1	UG/KG		
CWDTC049	Molybdenum			0.96	MG/KG		
CWDTC049	N-Nitrosodiphenylamine			347	UG/KG		
CWDTC049	N-Nitrosodipropylamine			347	UG/KG		
CWDTC049	Naphthalene			347	UG/KG		
CWDTC049	Nickel	256		0.48	MG/KG		
CWDTC049	Nitrate	30.7		0.131	MG/KG		
CWDTC049	Nitrobenzene			347	UG/KG		
CWDTC049	Nitrogen, Total Kjeldahl	118		2.91	MG/KG		
CWDTC049	O-Cresol			347	UG/KG		
CWDTC049	Pentachlorophenol			347	UG/KG		
CWDTC049	Phenanthrene			347	UG/KG		
CWDTC049	Phenol			347	UG/KG		
CWDTC049	Plutonium-241	-0.106	0.167	0.338	PCI/G		
CWDTC049	Potassium-40	12	1.47	0.2	PCI/G		
CWDTC049	Pyrene			347	UG/KG		
CWDTC049	Radium-223	0.154	0.22	0.4	PCI/G		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC049	Radium-226	0.494	0.0822	0.0304	PCI/G		
CWDTC049	Radium-228	0.582	0.13	0.0707	PCI/G		
CWDTC049	Selenium	1.2		0.96	MG/KG		
CWDTC049	Silver	0.22		0.48	MG/KG	J	q
CWDTC049	Strontium-90	0.00753	0.0225	0.0356	PCI/G		
CWDTC049	Styrene			5.1	UG/KG		
CWDTC049	Tetrachloroethylene			5.1	UG/KG		
CWDTC049	Thallium			0.96	MG/KG		
CWDTC049	Thallium-208	0.15	0.0327	0.0208	PCI/G		
CWDTC049	Thorium-228	0.652	0.181	0.0852	PCI/G		
CWDTC049	Thorium-230	0.412	0.132	0.0504	PCI/G		
CWDTC049	Thorium-232	0.344	0.118	0.024	PCI/G		
CWDTC049	Thorium-234	0.394	0.905	0.696	PCI/G		
CWDTC049	Toluene	10.4		5.1	UG/KG		
CWDTC049	Total Organic Carbon	3560		24.1	MG/KG		
CWDTC049	Toxaphene			694	UG/KG		
CWDTC049	trans-1,3-Dichloropropene			5.1	UG/KG		
CWDTC049	Trichloroethene			5.1	UG/KG		
CWDTC049	Tritium	0.74	0.591	0.969	PCI/G		
CWDTC049	Uranium-233/234	0.508	0.121	0.0374	PCI/G		
CWDTC049	Uranium-235	0.0298	0.0268	0.0179	PCI/G		
CWDTC049	Uranium-238	0.41	0.106	0.0178	PCI/G		
CWDTC049	Vanadium	54.4		0.48	MG/KG		
CWDTC049	Vinyl Chloride			10.3	UG/KG		
CWDTC049	Xylenes (Total)			5.1	UG/KG		
CWDTC049	Zinc	64.1		0.48	MG/KG		
CWDTC050	1,1,1-Trichloroethane			4.9	UG/KG		
CWDTC050	1,1,2,2-Tetrachloroethane			4.9	UG/KG		
CWDTC050	1,1,2-Trichloroethane			4.9	UG/KG	UJ	c
CWDTC050	1,1-Dichloroethane			4.9	UG/KG		
CWDTC050	1,1-Dichloroethene			4.9	UG/KG		
CWDTC050	1,2,4-Trichlorobenzene			344	UG/KG		
CWDTC050	1,2-Dichlorobenzene			344	UG/KG		
CWDTC050	1,2-Dichloroethane			4.9	UG/KG		
CWDTC050	1,2-Dichloroethene (total)			4.9	UG/KG		
CWDTC050	1,2-Dichloropropane			4.9	UG/KG		
CWDTC050	1,3-Dichlorobenzene			344	UG/KG		
CWDTC050	1,4-Dichlorobenzene			344	UG/KG		
CWDTC050	2,2'-oxybis(1-Chloropropane)			344	UG/KG		
CWDTC050	2,4,5-Trichlorophenol			344	UG/KG		
CWDTC050	2,4,6-Trichlorophenol			344	UG/KG		
CWDTC050	2,4-Dichlorophenol			344	UG/KG		
CWDTC050	2,4-Dimethylphenol			344	UG/KG		
CWDTC050	2,4-Dinitrophenol			687	UG/KG		
CWDTC050	2,4-Dinitrotoluene			344	UG/KG		
CWDTC050	2,6-Dinitrotoluene			344	UG/KG		
CWDTC050	2-Butanone	43.4		9.7	UG/KG	J	c
CWDTC050	2-Chloronaphthalene			344	UG/KG		
CWDTC050	2-Chlorophenol			344	UG/KG		
CWDTC050	2-Hexanone			9.7	UG/KG		
CWDTC050	2-Methyl-4,6-dinitrophenol			344	UG/KG		
CWDTC050	2-Methylnaphthalene			344	UG/KG		
CWDTC050	2-Nitroaniline			344	UG/KG		
CWDTC050	2-Nitrophenol			344	UG/KG		
CWDTC050	3,3'-Dichlorobenzidine			1720	UG/KG		
CWDTC050	3-Nitroaniline			344	UG/KG		
CWDTC050	4,4'-DDD			68.7	UG/KG		
CWDTC050	4,4'-DDE			68.7	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC050	4,4'-DDT			68.7	UG/KG		
CWDTC050	4-Bromophenyl Phenyl Ether			344	UG/KG		
CWDTC050	4-Chloro-3-Methylphenol			344	UG/KG		
CWDTC050	4-Chloroaniline			344	UG/KG		
CWDTC050	4-Chlorophenyl Phenyl Ether			344	UG/KG		
CWDTC050	4-Methyl-2-Pentanone			9.7	UG/KG	UJ	c
CWDTC050	4-Nitroaniline			344	UG/KG		
CWDTC050	4-Nitrophenol			344	UG/KG		
CWDTC050	Acenaphthene			344	UG/KG		
CWDTC050	Acenaphthylene			344	UG/KG		
CWDTC050	Acetone			9.7	UG/KG		
CWDTC050	Actinium-228	0.454	0.135	0.0748	PCI/G		
CWDTC050	Aldrin			34.4	UG/KG		
CWDTC050	Alpha-BHC			34.4	UG/KG		
CWDTC050	Alpha-Chlordane	102		34.4	UG/KG		
CWDTC050	Americium-241	0.00302	0.00339	0.00667	PCI/G		
CWDTC050	Ammonia Nitrogen	10.8		0.571	MG/KG		
CWDTC050	Anthracene			344	UG/KG		
CWDTC050	Antimony	0.48		0.98	MG/KG	J	mq
CWDTC050	Arochlor-1016			172	UG/KG		
CWDTC050	Arochlor-1221			172	UG/KG		
CWDTC050	Arochlor-1232			172	UG/KG		
CWDTC050	Arochlor-1242			172	UG/KG		
CWDTC050	Arochlor-1248			172	UG/KG		
CWDTC050	Arochlor-1254			172	UG/KG		
CWDTC050	Arochlor-1260			172	UG/KG		
CWDTC050	Arsenic	6.8		0.49	MG/KG		
CWDTC050	Barium	149		0.49	MG/KG	J	m
CWDTC050	Benzene			4.9	UG/KG		
CWDTC050	Benzo(a)anthracene			344	UG/KG		
CWDTC050	Benzo(a)pyrene			344	UG/KG		
CWDTC050	Benzo(b)fluoranthene			344	UG/KG		
CWDTC050	Benzo(g,h,I)perylene			344	UG/KG		
CWDTC050	Benzo(k)fluoranthene			344	UG/KG		
CWDTC050	Beryllium	0.35		0.49	MG/KG	J	q
CWDTC050	Beta-BHC			34.4	UG/KG		
CWDTC050	Bis(2-Chloroethoxy)methane			344	UG/KG		
CWDTC050	Bis(2-Chloroethyl)ether			344	UG/KG		
CWDTC050	Bis(2-Ethylhexyl)phthalate			344	UG/KG		
CWDTC050	Bismuth-212	0.374	0.145	0.171	PCI/G		
CWDTC050	Bismuth-214	0.423	0.08	0.0416	PCI/G		
CWDTC050	Bromoform			4.9	UG/KG		
CWDTC050	Butyl Benzyl Phthalate			344	UG/KG		
CWDTC050	Cadmium	0.63		0.49	MG/KG		
CWDTC050R1	Cadmium			0.5	MG/KG		
CWDTC050R2	Cadmium			0.52	MG/KG		
CWDTC050	Carbazole			1720	UG/KG		
CWDTC050	Carbon Disulfide			4.9	UG/KG		
CWDTC050	Carbon Tetrachloride			4.9	UG/KG		
CWDTC050	Carbon-14	-0.00905	0.0763	0.126	PCI/G		
CWDTC050	Cesium-137	0.0245	0.0166	0.022	PCI/G		
CWDTC050	Chlorobenzene			4.9	UG/KG		
CWDTC050	Chlorodibromomethane			4.9	UG/KG		
CWDTC050	Chloroethane			9.7	UG/KG		
CWDTC050	Chloroform	0.76		4.9	UG/KG	J	q
CWDTC050	Chromium	138		0.49	MG/KG	J	m
CWDTC050	Chromium, Hexavalent	0.288		0.0412	MG/KG		
CWDTC050	Chrysene			344	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC050	cis-1,3-Dichloropropylene			4.9	UG/KG		
CWDTC050	Cobalt	20.6		0.49	MG/KG		
CWDTC050	Cobalt-60	0.00447	0.0146	0.0266	PCI/G		
CWDTC050	Copper	31.2		0.49	MG/KG		
CWDTC050	Delta-BHC			34.4	UG/KG		
CWDTC050	Di-n-Butyl Phthalate			344	UG/KG		
CWDTC050	Di-n-Octyl Phthalate			344	UG/KG		
CWDTC050	Dibenzo(a,h)anthracene			344	UG/KG		
CWDTC050	Dibenzofuran			344	UG/KG		
CWDTC050	Dichlorobromomethane			4.9	UG/KG		
CWDTC050	Dieldrin			68.7	UG/KG		
CWDTC050	Diethyl Phthalate			344	UG/KG		
CWDTC050	Dimethyl Phthalate			344	UG/KG		
CWDTC050	Endosulfan I			34.4	UG/KG		
CWDTC050	Endosulfan II			68.7	UG/KG		
CWDTC050	Endosulfan Sulfate			68.7	UG/KG		
CWDTC050	Endrin			68.7	UG/KG		
CWDTC050	Endrin Aldehyde			68.7	UG/KG		
CWDTC050	Endrin Ketone			68.7	UG/KG		
CWDTC050	Ethylbenzene			4.9	UG/KG		
CWDTC050	Fluoranthene			344	UG/KG		
CWDTC050	Fluorene			344	UG/KG		
CWDTC050	gamma-BHC (Lindane)			34.4	UG/KG		
CWDTC050	gamma-Chlordane	112		34.4	UG/KG		
CWDTC050	Gross Alpha	4.79	2.71	3.7	PCI/G		
CWDTC050	Gross Beta	10.4	3.29	5.62	PCI/G		
CWDTC050	Heptachlor			34.4	UG/KG		
CWDTC050	Heptachlor Epoxide			34.4	UG/KG		
CWDTC050	Hexachlorobenzene			344	UG/KG		
CWDTC050	Hexachlorobutadiene			344	UG/KG		
CWDTC050	Hexachlorocyclopentadiene			344	UG/KG		
CWDTC050	Hexachloroethane			344	UG/KG		
CWDTC050	Indeno(1,2,3-cd)pyrene			344	UG/KG		
CWDTC050	Iron	30800		4.9	MG/KG	J	I
CWDTC050	Isophorone			344	UG/KG		
CWDTC050	Lead	10.8		0.49	MG/KG	J	
CWDTC050	Lead-210	0.664	2.03	2.33	PCI/G		
CWDTC050	Lead-212	0.543	0.0708	0.0332	PCI/G		
CWDTC050	Lead-214	0.533	0.0868	0.0439	PCI/G		
CWDTC050	m,p-Cresol			344	UG/KG		
CWDTC050	Manganese	531		0.98	MG/KG		
CWDTC050	Mercury	0.51		0.034	MG/KG		
CWDTC050	Methoxychlor			344	UG/KG		
CWDTC050	Methyl Bromide			9.7	UG/KG		
CWDTC050	Methyl Chloride			9.7	UG/KG		
CWDTC050	Methylene Chloride	4.3		4.9	UG/KG	J	q
CWDTC050	Molybdenum			0.98	MG/KG		
CWDTC050	N-Nitrosodiphenylamine			344	UG/KG		
CWDTC050	N-Nitrosodipropylamine			344	UG/KG		
CWDTC050	Naphthalene			344	UG/KG		
CWDTC050	Nickel	253		0.49	MG/KG		
CWDTC050	Nitrate	34		0.13	MG/KG		
CWDTC050	Nitrobenzene			344	UG/KG		
CWDTC050	Nitrogen, Total Kjeldahl	207		5.74	MG/KG		
CWDTC050	O-Cresol			344	UG/KG		
CWDTC050	Pentachlorophenol			344	UG/KG		
CWDTC050	Phenanthrene			344	UG/KG		
CWDTC050	Phenol			344	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC050	Plutonium-241	0.109	0.173	0.337	PCI/G		
CWDTC050	Potassium-40	11.9	1.48	0.2	PCI/G		
CWDTC050	Pyrene			344	UG/KG		
CWDTC050	Radium-223	0.0425	0.226	0.388	PCI/G		
CWDTC050	Radium-226	0.464	0.0684	0.0217	PCI/G		
CWDTC050	Radium-228	0.454	0.135	0.0748	PCI/G		
CWDTC050	Selenium	1		0.98	MG/KG		
CWDTC050	Silver			0.49	MG/KG		
CWDTC050	Strontium-90	-0.0245	0.0291	0.0473	PCI/G		
CWDTC050	Styrene			4.9	UG/KG		
CWDTC050	Tetrachloroethylene			4.9	UG/KG		
CWDTC050	Thallium			0.98	MG/KG		
CWDTC050	Thallium-208	0.154	0.0307	0.0216	PCI/G		
CWDTC050	Thorium-228	0.455	0.141	0.0884	PCI/G		
CWDTC050	Thorium-230	0.404	0.126	0.0563	PCI/G		
CWDTC050	Thorium-232	0.352	0.115	0.022	PCI/G		
CWDTC050	Thorium-234	0.254	0.643	0.695	PCI/G		
CWDTC050	Toluene	51.6		4.9	UG/KG		
CWDTC050	Total Organic Carbon	4090		24.1	MG/KG		
CWDTC050	Toxaphene			1720	UG/KG		
CWDTC050	trans-1,3-Dichloropropene			4.9	UG/KG		
CWDTC050	Trichloroethene			4.9	UG/KG		
CWDTC050	Tritium	1.92	0.661	0.979	PCI/G		
CWDTC050	Uranium-233/234	0.409	0.0726	0.0253	PCI/G		
CWDTC050	Uranium-235	0.0163	0.0124	0.00698	PCI/G		
CWDTC050	Uranium-238	0.409	0.0726	0.0253	PCI/G		
CWDTC050	Vanadium	52.2		0.49	MG/KG		
CWDTC050	Vinyl Chloride			9.7	UG/KG		
CWDTC050	Xylenes (Total)	1.2		4.9	UG/KG	J	q
CWDTC050	Zinc	62.8		0.49	MG/KG		
CWDTC062	1,1,1-Trichloroethane			11.2	UG/KG		
CWDTC062	1,1,2,2-Tetrachloroethane			11.2	UG/KG		
CWDTC062	1,1,2-Trichloroethane			11.2	UG/KG		
CWDTC062	1,1-Dichloroethane			11.2	UG/KG		
CWDTC062	1,1-Dichloroethene			11.2	UG/KG		
CWDTC062	1,2,4-Trichlorobenzene			374	UG/KG		
CWDTC062	1,2-Dichlorobenzene			374	UG/KG		
CWDTC062	1,2-Dichloroethane			11.2	UG/KG		
CWDTC062	1,2-Dichloroethene (total)			11.2	UG/KG		
CWDTC062	1,2-Dichloropropane			11.2	UG/KG		
CWDTC062	1,3-Dichlorobenzene			374	UG/KG		
CWDTC062	1,4-Dichlorobenzene			374	UG/KG		
CWDTC062	2(4CHLORO2METHYLPHENOXY)PROPAN			225	UG/KG	UJ	h
CWDTC062	2,2'-oxybis(1-Chloropropane)			374	UG/KG		
CWDTC062	2,4,5-T			2.2	UG/KG	UJ	h
CWDTC062	2,4,5-TP	9.5		2.2	UG/KG	J	h
CWDTC062	2,4,5-Trichlorophenol			936	UG/KG		
CWDTC062	2,4,6-Trichlorophenol			374	UG/KG		
CWDTC062	2,4-D			2.2	UG/KG	UJ	h
CWDTC062	2,4-Dichlorophenol			374	UG/KG		
CWDTC062	2,4-Dimethylphenol			374	UG/KG		
CWDTC062	2,4-Dinitrophenol			936	UG/KG		
CWDTC062	2,4-Dinitrotoluene			374	UG/KG		
CWDTC062	2,6-Dinitrotoluene			374	UG/KG		
CWDTC062	2-Butanone			11.2	UG/KG		
CWDTC062	2-Chloronaphthalene			374	UG/KG		
CWDTC062	2-Chlorophenol			374	UG/KG		
CWDTC062	2-Hexanone			11.2	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC062	2-Methyl-4,6-dinitrophenol			936	UG/KG		
CWDTC062	2-Methylnaphthalene			374	UG/KG		
CWDTC062	2-Nitroaniline			936	UG/KG		
CWDTC062	2-Nitrophenol			374	UG/KG		
CWDTC062	3,3'-Dichlorobenzidine			374	UG/KG		
CWDTC062	3-Nitroaniline			936	UG/KG		
CWDTC062	4,4'-DDD			3.7	UG/KG		
CWDTC062	4,4'-DDE			3.7	UG/KG		
CWDTC062	4,4'-DDT			3.7	UG/KG		
CWDTC062	4,6-Dinitro-2-sec-butylphenol			2.2	UG/KG	UJ	h
CWDTC062	4-(2,4-DICHLOROPHENOXY)BUTYRIC			2.2	UG/KG	UJ	h
CWDTC062	4-Bromophenyl Phenyl Ether			374	UG/KG		
CWDTC062	4-Chloro-3-Methylphenol			374	UG/KG		
CWDTC062	4-Chloroaniline			374	UG/KG		
CWDTC062	4-Chlorophenyl Phenyl Ether			374	UG/KG		
CWDTC062	4-Methyl-2-Pentanone			11.2	UG/KG		
CWDTC062	4-Nitroaniline			936	UG/KG	UJ	c
CWDTC062	4-Nitrophenol			936	UG/KG		
CWDTC062	Acenaphthene			374	UG/KG		
CWDTC062	Acenaphthylene			374	UG/KG		
CWDTC062	Acetone			11.2	UG/KG	UJ	c
CWDTC062	Actinium-228	0.576	0.144	0.0952	PCI/G		
CWDTC062	Aldrin			1.9	UG/KG		
CWDTC062	alpha-BHC			1.9	UG/KG		
CWDTC062	Aluminum	14700		41.6	MG/KG		
CWDTC062	Americium-241	0.00452	0.00524	0.0094	PCI/G		
CWDTC062	Ammonia Nitrogen			1	MG/KG		
CWDTC062	Anthracene			374	UG/KG		
CWDTC062	Antimony	1.6		12.5	MG/KG	J	mq
CWDTC062	Arochlor-1016			37.4	UG/KG		
CWDTC062	Arochlor-1221			74.9	UG/KG		
CWDTC062	Arochlor-1232			37.4	UG/KG		
CWDTC062	Arochlor-1242			37.4	UG/KG		
CWDTC062	Arochlor-1248			37.4	UG/KG		
CWDTC062	Arochlor-1254			37.4	UG/KG		
CWDTC062	Arochlor-1260			37.4	UG/KG		
CWDTC062	Arsenic	7.8		2.1	MG/KG		
CWDTC062	Barium	164		41.6	MG/KG		
CWDTC062	Benzene			11.2	UG/KG		
CWDTC062	Benzo(a)anthracene			374	UG/KG		
CWDTC062	Benzo(a)pyrene			374	UG/KG		
CWDTC062	Benzo(b)fluoranthene			374	UG/KG		
CWDTC062	Benzo(g,h,i)perylene			374	UG/KG		
CWDTC062	Benzo(k)fluoranthene			374	UG/KG	UJ	c
CWDTC062	Beryllium	0.39		1	MG/KG	J	q
CWDTC062	Beta-BHC			1.9	UG/KG		
CWDTC062	Bis(2-Chloroethoxy)methane			374	UG/KG		
CWDTC062	Bis(2-Chloroethyl)ether			374	UG/KG		
CWDTC062	Bis(2-Ethylhexyl)phthalate			374	UG/KG		
CWDTC062	Bismuth-212	0.359	0.138	0.185	PCI/G		
CWDTC062	Bismuth-214	0.586	0.0983	0.0457	PCI/G		
CWDTC062	Bromoform			11.2	UG/KG		
CWDTC062	Butyl Benzyl Phthalate			374	UG/KG		
CWDTC062	Cadmium			1	MG/KG		
CWDTC062	Calcium	4250		1040	MG/KG		
CWDTC062	Carbazole			374	UG/KG		
CWDTC062	Carbon Disulfide			11.2	UG/KG		
CWDTC062	Carbon Tetrachloride			11.2	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC062	Carbon-14	0.077	0.0401	0.0664	PCI/G		
CWDTC062	Cesium-137	0.0206	0.0283	0.0258	PCI/G		
CWDTC062	Chlorobenzene			11.2	UG/KG		
CWDTC062	Chlorodibromomethane			11.2	UG/KG		
CWDTC062	Chloroethane			11.2	UG/KG		
CWDTC062	Chloroform			11.2	UG/KG		
CWDTC062	Chromium	134		2.1	MG/KG		
CWDTC062	Chromium, Hexavalent	0.147		0.21	MG/KG		
CWDTC062	Chrysene			374	UG/KG		
CWDTC062	cis-1,3-Dichloropropylene			11.2	UG/KG		
CWDTC062	Cobalt	23.9		10.4	MG/KG		
CWDTC062	Cobalt-60	-0.00105	0.0183	0.0275	PCI/G		
CWDTC062	Copper	37.1		5.2	MG/KG		
CWDTC062	Cyanide, Reactive			250	MG/KG		
CWDTC062	Dalapon			2.2	UG/KG	UJ	h
CWDTC062	Delta-BHC			1.9	UG/KG		
CWDTC062	Di-n-Butyl Phthalate			374	UG/KG		
CWDTC062	Di-n-Octyl Phthalate			374	UG/KG		
CWDTC062	Dibenzo(a,h)anthracene			374	UG/KG		
CWDTC062	Dibenzofuran			374	UG/KG		
CWDTC062	Dicamba			2.2	UG/KG	UJ	h
CWDTC062	Dichlorobromomethane			11.2	UG/KG		
CWDTC062	Dichloroprop			2.2	UG/KG	UJ	h
CWDTC062	Dieldrin			3.7	UG/KG		
CWDTC062	Diethyl Phthalate			374	UG/KG		
CWDTC062	Dimethyl Phthalate			374	UG/KG		
CWDTC062	Endosulfan I			1.9	UG/KG		
CWDTC062	Endosulfan II			3.7	UG/KG		
CWDTC062	Endosulfan Sulfate			3.7	UG/KG		
CWDTC062	Endrin			3.7	UG/KG		
CWDTC062	Endrin Aldehyde			3.7	UG/KG		
CWDTC062	Endrin Ketone			3.7	UG/KG		
CWDTC062	Ethylbenzene			11.2	UG/KG		
CWDTC062	Fluoranthene			374	UG/KG		
CWDTC062	Fluorene			374	UG/KG		
CWDTC062	Formaldehyde	0.65		1	MG/KG		
CWDTC062	gamma-BHC (Lindane)			1.9	UG/KG		
CWDTC062	Gross Alpha	6.79	2.07	2.36	PCI/G		
CWDTC062	Heptachlor	3.1		1.9	UG/KG	UJ	z
CWDTC062	Heptachlor Epoxide	0.41		1.9	UG/KG	UJ	zq
CWDTC062	Hexachlorobenzene			374	UG/KG		
CWDTC062	Hexachlorobutadiene			374	UG/KG		
CWDTC062	Hexachlorocyclopentadiene			374	UG/KG		
CWDTC062	Hexachloroethane			374	UG/KG		
CWDTC062	Indeno(1,2,3-cd)pyrene			374	UG/KG		
CWDTC062	Iron	34600		20.8	MG/KG		
CWDTC062	Isophorone			374	UG/KG		
CWDTC062	Lead	7		0.62	MG/KG		
CWDTC062	Lead-210	1.26	1.35	2.19	PCI/G		
CWDTC062	Lead-212	0.549	0.0703	0.0362	PCI/G		
CWDTC062	Lead-214	0.684	0.107	0.0437	PCI/G		
CWDTC062	Magnesium	24600		1040	MG/KG		
CWDTC062	Manganese	614		3.1	MG/KG		
CWDTC062	MCPA			225	UG/KG	UJ	hc
CWDTC062	Mercury	0.82		0.036	MG/KG	J	m
CWDTC062	Methoxychlor			18.7	UG/KG		
CWDTC062	Methyl Bromide			11.2	UG/KG		
CWDTC062	Methyl Chloride			11.2	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC062	Methylene Chloride	6.05		11.2	UG/KG	UJ	zq
CWDTC062	Molybdenum			2.1	MG/KG		
CWDTC062	N-Nitrosodiphenylamine			374	UG/KG		
CWDTC062	N-Nitrosodipropylamine			374	UG/KG		
CWDTC062	Naphthalene			374	UG/KG		
CWDTC062	Nickel	276		8.3	MG/KG		
CWDTC062	Nitrate	10.1		1	MG/KG		
CWDTC062	Nitrobenzene			374	UG/KG		
CWDTC062	Nitrogen, Total Kjeldahl	277		28	MG/KG		
CWDTC062	Nonvolatile Beta	14.9	1.86	2.3	PCI/G		
CWDTC062	O-Cresol			374	UG/KG		
CWDTC062	P-Cresol			374	UG/KG		
CWDTC062	Paint Filter Test				Pass		
CWDTC062	Pentachlorophenol			936	UG/KG		
CWDTC062	pH	8.06		0.1	Std pH		
CWDTC062	Phenanthrene			374	UG/KG		
CWDTC062	Phenol			374	UG/KG		
CWDTC062	Plutonium-241	0.191	0.174	0.292	PCI/G		
CWDTC062	Potassium	1220		1040	MG/KG		
CWDTC062	Potassium-40	12.7	1.48	0.251	PCI/G		
CWDTC062	Pyrene			374	UG/KG		
CWDTC062	Radium-223	-0.0831	0.247	0.408	PCI/G		
CWDTC062	Radium-226	0.556	0.079	0.0295	PCI/G		
CWDTC062	Radium-228	0.576	0.144	0.0952	PCI/G		
CWDTC062	Selenium	2.9		1	MG/KG		
CWDTC062	Silver	0.38		2.1	MG/KG	J	q
CWDTC062	Sodium	183		1040	MG/KG	J	q
CWDTC062	Strontium-90	0.352	0.058	0.0722	PCI/G		
CWDTC062	Styrene			11.2	UG/KG		
CWDTC062	Sulfide			546	MG/KG		
CWDTC062	Temperature	19.4		0.1	deg C		
CWDTC062	Tetrachloroethylene			11.2	UG/KG		
CWDTC062	Thallium			2.1	MG/KG		
CWDTC062	Thallium-208	0.196	0.0434	0.0231	PCI/G		
CWDTC062	Thorium-228	0.598	0.224	0.19	PCI/G		
CWDTC062	Thorium-230	0.526	0.187	0.0609	PCI/G		
CWDTC062	Thorium-232	0.507	0.183	0.0609	PCI/G		
CWDTC062	Thorium-234	0.738	0.846	0.679	PCI/G		
CWDTC062	Toluene			11.2	UG/KG		
CWDTC062	Total Organic Carbon	3220		100	MG/KG		
CWDTC062	Toxaphene			187	UG/KG		
CWDTC062	trans-1,3-Dichloropropene			11.2	UG/KG		
CWDTC062	Trichloroethene			11.2	UG/KG		
CWDTC062	Tritium	0.238	0.815	0.743	PCI/G		
CWDTC062	Uranium-233/234	0.362	0.0667	0.0181	PCI/G		
CWDTC062	Uranium-235	0.0238	0.018	0.0229	PCI/G		
CWDTC062	Uranium-238	0.384	0.069	0.0067	PCI/G		
CWDTC062	Vanadium	58.5		10.4	MG/KG		
CWDTC062	Vinyl Chloride			11.2	UG/KG		
CWDTC062	Xylenes (Total)			11.2	UG/KG		
CWDTC062	Zinc	72.6		4.2	MG/KG		
CWDTC062DL1	Alpha-Chlordane	27.9		3.7	UG/KG		
CWDTC062DL1	gamma-Chlordane	28		3.7	UG/KG		
CWDTC063	1,1,1-Trichloroethane			11	UG/KG		
CWDTC063	1,1,2,2-Tetrachloroethane			11	UG/KG		
CWDTC063	1,1,2-Trichloroethane			11	UG/KG		
CWDTC063	1,1-Dichloroethane			11	UG/KG		
CWDTC063	1,1-Dichloroethene			11	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC063	1,2,4-Trichlorobenzene			366	UG/KG		
CWDTC063	1,2-Dichlorobenzene			366	UG/KG		
CWDTC063	1,2-Dichloroethane			11	UG/KG		
CWDTC063	1,2-Dichloroethene (total)			11	UG/KG		
CWDTC063	1,2-Dichloropropane			11	UG/KG		
CWDTC063	1,3-Dichlorobenzene			366	UG/KG		
CWDTC063	1,4-Dichlorobenzene			366	UG/KG		
CWDTC063	2(4CHLORO2METHYLPHENOXY)PROPAN			220	UG/KG	UJ	h
CWDTC063	2,2'-oxybis(1-Chloropropane)			366	UG/KG		
CWDTC063	2,4,5-T			2.2	UG/KG	UJ	h
CWDTC063	2,4,5-TP			2.2	UG/KG	UJ	h
CWDTC063	2,4,5-Trichlorophenol			916	UG/KG		
CWDTC063	2,4,6-Trichlorophenol			366	UG/KG		
CWDTC063	2,4-D			2.2	UG/KG	UJ	h
CWDTC063	2,4-Dichlorophenol			366	UG/KG		
CWDTC063	2,4-Dimethylphenol			366	UG/KG		
CWDTC063	2,4-Dinitrophenol			916	UG/KG		
CWDTC063	2,4-Dinitrotoluene			366	UG/KG		
CWDTC063	2,6-Dinitrotoluene			366	UG/KG		
CWDTC063	2-Butanone			11	UG/KG		
CWDTC063	2-Chloronaphthalene			366	UG/KG		
CWDTC063	2-Chlorophenol			366	UG/KG		
CWDTC063	2-Hexanone			11	UG/KG		
CWDTC063	2-Methyl-4,6-dinitrophenol			916	UG/KG		
CWDTC063	2-Methylnaphthalene			366	UG/KG		
CWDTC063	2-Nitroaniline			916	UG/KG		
CWDTC063	2-Nitrophenol			366	UG/KG		
CWDTC063	3,3'-Dichlorobenzidine			366	UG/KG		
CWDTC063	3-Nitroaniline			916	UG/KG		
CWDTC063	4,4'-DDD			3.7	UG/KG		
CWDTC063	4,4'-DDE			3.7	UG/KG		
CWDTC063	4,4'-DDT			3.7	UG/KG		
CWDTC063	4,6-Dinitro-2-sec-butylphenol			2.2	UG/KG	UJ	h
CWDTC063	4-(2,4-DICHLOROPHENOXY)BUTYRIC			2.2	UG/KG	UJ	h
CWDTC063	4-Bromophenyl Phenyl Ether			366	UG/KG		
CWDTC063	4-Chloro-3-Methylphenol			366	UG/KG		
CWDTC063	4-Chloroaniline			366	UG/KG		
CWDTC063	4-Chlorophenyl Phenyl Ether			366	UG/KG		
CWDTC063	4-Methyl-2-Pentanone			11	UG/KG		
CWDTC063	4-Nitroaniline			916	UG/KG	UJ	c
CWDTC063	4-Nitrophenol			916	UG/KG		
CWDTC063	Acenaphthene			366	UG/KG		
CWDTC063	Acenaphthylene			366	UG/KG		
CWDTC063	Acetone			11	UG/KG	UJ	c
CWDTC063	Actinium-228	0.563	0.127	0.0625	PCI/G		
CWDTC063	Aldrin			1.8	UG/KG		
CWDTC063	alpha-BHC			1.8	UG/KG		
CWDTC063	Alpha-Chlordane	37.4		1.8	UG/KG	J	q
CWDTC063	Aluminum	14200		42.7	MG/KG		
CWDTC063	Americium-241	0.00281	0.00326	0.00768	PCI/G		
CWDTC063	Ammonia Nitrogen			1	MG/KG		
CWDTC063	Anthracene			366	UG/KG		
CWDTC063	Antimony	1.5		12.8	MG/KG	J	mq
CWDTC063	Arochlor-1016			36.6	UG/KG		
CWDTC063	Arochlor-1221			73.3	UG/KG		
CWDTC063	Arochlor-1232			36.6	UG/KG		
CWDTC063	Arochlor-1242			36.6	UG/KG		
CWDTC063	Arochlor-1248			36.6	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC063	Arochlor-1254			36.6	UG/KG		
CWDTC063	Arochlor-1260			36.6	UG/KG		
CWDTC063	Arsenic	7.4		2.1	MG/KG		
CWDTC063	Barium	160		42.7	MG/KG		
CWDTC063	Benzene			11	UG/KG		
CWDTC063	Benzo(a)anthracene			366	UG/KG		
CWDTC063	Benzo(a)pyrene			366	UG/KG		
CWDTC063	Benzo(b)fluoranthene			366	UG/KG		
CWDTC063	Benzo(g,h,i)perylene			366	UG/KG		
CWDTC063	Benzo(k)fluoranthene			366	UG/KG	UJ	c
CWDTC063	Beryllium	0.4		1.1	MG/KG	J	q
CWDTC063	Beta-BHC			1.8	UG/KG		
CWDTC063	Bis(2-Chloroethoxy)methane			366	UG/KG		
CWDTC063	Bis(2-Chloroethyl)ether			366	UG/KG		
CWDTC063	Bis(2-Ethylhexyl)phthalate			366	UG/KG		
CWDTC063	Bismuth-212	0.285	0.132	0.135	PCI/G		
CWDTC063	Bismuth-214	0.583	0.0856	0.0327	PCI/G		
CWDTC063	Bromoform			11	UG/KG		
CWDTC063	Butyl Benzyl Phthalate			366	UG/KG		
CWDTC063	Cadmium			1.1	MG/KG		
CWDTC063	Calcium	4050		1070	MG/KG		
CWDTC063	Carbazole			366	UG/KG		
CWDTC063	Carbon Disulfide			11	UG/KG		
CWDTC063	Carbon Tetrachloride			11	UG/KG		
CWDTC063	Carbon-14	-0.00825	0.0366	0.0626	PCI/G		
CWDTC063	Cesium-137	0.00763	0.018	0.0167	PCI/G		
CWDTC063	Chlorobenzene			11	UG/KG		
CWDTC063	Chlorodibromomethane			11	UG/KG		
CWDTC063	Chloroethane			11	UG/KG		
CWDTC063	Chloroform			11	UG/KG		
CWDTC063	Chromium	132		2.1	MG/KG		
CWDTC063	Chromium, Hexavalent	0.13		0.2	MG/KG		
CWDTC063	Chrysene			366	UG/KG		
CWDTC063	cis-1,3-Dichloropropylene			11	UG/KG		
CWDTC063	Cobalt	23		10.7	MG/KG		
CWDTC063	Cobalt-60	0	0.0265	0.0214	PCI/G		
CWDTC063	Copper	36.3		5.3	MG/KG		
CWDTC063	Cyanide, Reactive			250	MG/KG		
CWDTC063	Dalapon			2.2	UG/KG	UJ	h
CWDTC063	Delta-BHC			1.8	UG/KG		
CWDTC063	Di-n-Butyl Phthalate			366	UG/KG		
CWDTC063	Di-n-Octyl Phthalate			366	UG/KG		
CWDTC063	Dibenzo(a,h)anthracene			366	UG/KG		
CWDTC063	Dibenzofuran			366	UG/KG		
CWDTC063	Dicamba			2.2	UG/KG	UJ	h
CWDTC063	Dichlorobromomethane			11	UG/KG		
CWDTC063	Dichloroprop			2.2	UG/KG	UJ	h
CWDTC063	Dieldrin			3.7	UG/KG		
CWDTC063	Diethyl Phthalate			366	UG/KG		
CWDTC063	Dimethyl Phthalate			366	UG/KG		
CWDTC063	Endosulfan I			1.8	UG/KG		
CWDTC063	Endosulfan II			3.7	UG/KG		
CWDTC063	Endosulfan Sulfate			3.7	UG/KG		
CWDTC063	Endrin			3.7	UG/KG		
CWDTC063	Endrin Aldehyde			3.7	UG/KG		
CWDTC063	Endrin Ketone			3.7	UG/KG		
CWDTC063	Ethylbenzene			11	UG/KG		
CWDTC063	Fluoranthene			366	UG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC063	Fluorene			366	UG/KG		
CWDTC063	Formaldehyde	0.501		1	MG/KG		
CWDTC063	gamma-BHC (Lindane)			1.8	UG/KG		
CWDTC063	gamma-Chlordane	37.9		1.8	UG/KG	J	q
CWDTC063	Gross Alpha	7.31	4.57	7.27	PCI/G		
CWDTC063	Heptachlor	3.6		1.8	UG/KG	UJ	z
CWDTC063	Heptachlor Epoxide	0.47		1.8	UG/KG	UJ	zq
CWDTC063	Hexachlorobenzene			366	UG/KG		
CWDTC063	Hexachlorobutadiene			366	UG/KG		
CWDTC063	Hexachlorocyclopentadiene			366	UG/KG		
CWDTC063	Hexachloroethane			366	UG/KG		
CWDTC063	Indeno(1,2,3-cd)pyrene			366	UG/KG		
CWDTC063	Iron	33600		21.3	MG/KG		
CWDTC063	Isophorone			366	UG/KG		
CWDTC063	Lead	7.3		0.64	MG/KG		
CWDTC063	Lead-210	0.597	1.08	0.83	PCI/G		
CWDTC063	Lead-212	0.552	0.0672	0.0271	PCI/G		
CWDTC063	Lead-214	0.656	0.0903	0.0319	PCI/G		
CWDTC063	Magnesium	24500		1070	MG/KG		
CWDTC063	Manganese	588		3.2	MG/KG		
CWDTC063	MCPA			220	UG/KG	UJ	hc
CWDTC063	Mercury	0.96		0.028	MG/KG	J	m
CWDTC063	Methoxychlor			18.3	UG/KG		
CWDTC063	Methyl Bromide			11	UG/KG		
CWDTC063	Methyl Chloride			11	UG/KG		
CWDTC063	Methylene Chloride	5.23		11	UG/KG	UJ	zq
CWDTC063	Molybdenum			2.1	MG/KG		
CWDTC063	N-Nitrosodiphenylamine			366	UG/KG		
CWDTC063	N-Nitrosodipropylamine			366	UG/KG		
CWDTC063	Naphthalene			366	UG/KG		
CWDTC063	Nickel	275		8.5	MG/KG		
CWDTC063	Nitrate	12.9		1	MG/KG		
CWDTC063	Nitrobenzene			366	UG/KG		
CWDTC063	Nitrogen, Total Kjeldahl	206		27.5	MG/KG		
CWDTC063	Nonvolatile Beta	9.66	3.27	5.31	PCI/G		
CWDTC063	O-Cresol			366	UG/KG		
CWDTC063	P-Cresol			366	UG/KG		
CWDTC063	Paint Filter Test				Pass		
CWDTC063	Pentachlorophenol			916	UG/KG		
CWDTC063	pH	8.14		0.1	Std pH		
CWDTC063	Phenanthrene			366	UG/KG		
CWDTC063	Phenol			366	UG/KG		
CWDTC063	Plutonium-241	0.547	0.274	0.455	PCI/G		
CWDTC063	Potassium	1200		1070	MG/KG		
CWDTC063	Potassium-40	13.4	1.4	0.151	PCI/G		
CWDTC063	Pyrene			366	UG/KG		
CWDTC063	Radium-223	-0.24	0.313	0.32	PCI/G		
CWDTC063	Radium-226	0.599	0.0995	0.0331	PCI/G		
CWDTC063	Radium-228	0.563	0.127	0.0625	PCI/G		
CWDTC063	Selenium	2.3		1.1	MG/KG		
CWDTC063	Silver	0.39		2.1	MG/KG	J	q
CWDTC063	Sodium	148		1070	MG/KG	J	q
CWDTC063	Strontium-90	0.392	0.0437	0.0518	PCI/G		
CWDTC063	Styrene			11	UG/KG		
CWDTC063	Sulfide			540	MG/KG		
CWDTC063	Temperature	19.3		0.1	deg C		
CWDTC063	Tetrachloroethylene			11	UG/KG		
CWDTC063	Thallium			2.1	MG/KG		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC063	Thallium-208	0.175	0.0345	0.0164	PCI/G		
CWDTC063	Thorium-228	0.639	0.304	0.298	PCI/G		
CWDTC063	Thorium-230	0.396	0.184	0.128	PCI/G		
CWDTC063	Thorium-232	0.396	0.182	0.102	PCI/G		
CWDTC063	Thorium-234	0.492	0.495	0.45	PCI/G		
CWDTC063	Toluene			11	UG/KG		
CWDTC063	Total Organic Carbon	3840		100	MG/KG		
CWDTC063	Toxaphene			183	UG/KG		
CWDTC063	trans-1,3-Dichloropropene			11	UG/KG		
CWDTC063	Trichloroethene			11	UG/KG		
CWDTC063	Tritium	0.247	0.817	0.745	PCI/G		
CWDTC063	Uranium-233/234	0.404	0.0728	0.0188	PCI/G		
CWDTC063	Uranium-235	0.028	0.0164	0.007	PCI/G		
CWDTC063	Uranium-238	0.365	0.0683	0.0188	PCI/G		
CWDTC063	Vanadium	56.4		10.7	MG/KG		
CWDTC063	Vinyl Chloride			11	UG/KG		
CWDTC063	Xylenes (Total)			11	UG/KG		
CWDTC063	Zinc	70.6		4.3	MG/KG		
CWDTC063DL1	Alpha-Chlordane	35.1		3.7	UG/KG		
CWDTC063DL1	gamma-Chlordane	35.4		3.7	UG/KG		
CWDTC076	Alpha-Chlordane			1	UG/L		
CWDTC076	Chlordane			12.5	UG/L		
CWDTC076	gamma-Chlordane			1	UG/L		
CWDTC076	Strontium-90	0.2	0.0256	0.035	PCI/G	J	c
CWDTC077	Alpha-Chlordane			1	UG/L		
CWDTC077	Chlordane			12.5	UG/L		
CWDTC077	gamma-Chlordane			1	UG/L		
CWDTC077	Strontium-90	0.161	0.0234	0.0306	PCI/G	J	c
CWDTC079	Alpha-Chlordane			1	UG/L		
CWDTC079	Chlordane			12.5	UG/L		
CWDTC079	gamma-Chlordane			1	UG/L		
CWDTC079	Strontium-90	0.423	0.0355	0.0307	PCI/G	J	c
CWDTC080	Alpha-Chlordane			1	UG/L		
CWDTC080	Chlordane			12.5	UG/L		
CWDTC080	gamma-Chlordane			1	UG/L		
CWDTC080	Strontium-90	0.0569	0.0194	0.034	PCI/G	J	c
CWDTC103	Cadmium	0.74		0.028	MG/KG		
CWDTC104	Cadmium	0.794		0.028	MG/KG		
CWDTC104	Chromium	162		0.061	MG/KG		
CWDTC105	Nickel	272		0.087	MG/KG		
CWDTC106	Cadmium	0.726		0.028	MG/KG		
CWDTC107	Cadmium	0.809		0.031	MG/KG		
CWDTC108	Cadmium	0.749		0.028	MG/KG		
CWDTC109	Cadmium	0.74		0.03	MG/KG		
CWDTC109	Chromium	157		0.065	MG/KG		
CWDTC109	Nickel	268		0.091	MG/KG		
CWDTC110	Cadmium	0.717		0.031	MG/KG		
CWDTC111	Cadmium	0.686		0.03	MG/KG		
CWDTC113	Antimony			0.285	MG/KG	UJ	m
CWDTC113	Chromium	144		0.063	MG/KG		
CWDTC113	Nickel	249		0.088	MG/KG		
CWDTC114	Actinium-228	0.434	0.0679	0.0159	PCI/G		
CWDTC114	Bismuth-212	0.302	0.0521	0.0335	PCI/G		
CWDTC114	Bismuth-214	0.348	0.041	0.00776	PCI/G		
CWDTC114	Cesium-137	0.00868	0.00403	0.00433	PCI/G		
CWDTC114	Cobalt-60	0.00277	0.0029	0.00511	PCI/G		
CWDTC114	Lead-210	0.709	1.33	1.42	PCI/G		
CWDTC114	Lead-212	0.462	0.0515	0.00824	PCI/G		

Sample Identification	Analyte	Concentration	Error	Detection Limit	Unit	Expert Review Qualifier	Expert Review Subqualifier
CWDTC114	Lead-214	0.41	0.0478	0.00863	PCI/G		
CWDTC114	Potassium-40	10.7	1.25	0.0387	PCI/G		
CWDTC114	Radium-223	-0.0145	0.0533	0.0833	PCI/G		
CWDTC114	Radium-228	0.434	0.0679	0.0159	PCI/G		
CWDTC114	Thallium-208	0.15	0.0172	0.00421	PCI/G		
CWDTC114	Thorium-234	0.581	0.339	0.285	PCI/G		
CWDTC115	Actinium-228	0.438	0.0215	0.0155	PCI/G		
CWDTC115	Bismuth-212	0.3	0.0384	0.0322	PCI/G		
CWDTC115	Bismuth-214	0.343	0.0128	0.00772	PCI/G		
CWDTC115	Cesium-137	0.015	0.00443	0.00419	PCI/G		
CWDTC115	Cobalt-60	-0.00213	0.0028	0.00468	PCI/G		
CWDTC115	Lead-210	0.0911	0.563	0.639	PCI/G		
CWDTC115	Lead-212	0.476	0.00971	0.00684	PCI/G		
CWDTC115	Lead-214	0.394	0.0136	0.00796	PCI/G		
CWDTC115	Potassium-40	10.5	0.158	0.0354	PCI/G		
CWDTC115	Radium-223	-0.0287	0.0465	0.0783	PCI/G		
CWDTC115	Radium-228	0.438	0.0215	0.0155	PCI/G		
CWDTC115	Thallium-208	0.141	0.00677	0.00397	PCI/G		
CWDTC115	Thorium-234	0.509	0.224	0.198	PCI/G		
CWDTC116	Actinium-228	0.46	0.0274	0.016	PCI/G		
CWDTC116	Bismuth-212	0.254	0.0471	0.0344	PCI/G		
CWDTC116	Bismuth-214	0.37	0.0133	0.00796	PCI/G		
CWDTC116	Cesium-137	0.0129	0.00405	0.0046	PCI/G		
CWDTC116	Cobalt-60	0.00549	0.00581	0.00573	PCI/G		
CWDTC116	Lead-210	1.14	0.797	0.702	PCI/G		
CWDTC116	Lead-212	0.485	0.0105	0.00747	PCI/G		
CWDTC116	Lead-214	0.44	0.0152	0.00861	PCI/G		
CWDTC116	Potassium-40	11.3	0.172	0.0426	PCI/G		
CWDTC116	Radium-223	-0.0682	0.0552	0.0812	PCI/G		
CWDTC116	Radium-228	0.46	0.0274	0.016	PCI/G		
CWDTC116	Thallium-208	0.147	0.00729	0.00434	PCI/G		
CWDTC116	Thorium-234	0.502	0.184	0.213	PCI/G		

Notes:

J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
UJ	The analyte was not detected above the reported sample quantification limit. However, the reported quantification limit is approximate and may or may not represent the actual limit of quantification necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
c	Calibration failure; poor or unstable response.
d	Matrix duplicate imprecision or MS/MSD imprecision.
m	Matrix spike/matrix spike duplicate recovery failure.
q	Below CRQL/CRDL or above calibration range.
v	Detected concentrations >25% difference between 2 GC columns (pesticides).

APPENDIX B

WILCOXON RANK SUM TEST RESULTS

Wilcoxon Rank Sum Test, Comparison of SWT data to background, Bi-212

Sample ID	CONC (ı	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$tj(tj^2-1)$	Tie Ind.
CWDTC116	0.254	SWT	1	1	1	0	0
LEHR-SS-BG-0101	0.263	BKG	2	2	0	0	0
LEHR-SS-BG-0110	0.264	BKG	3	3	0	0	0
CWDTC063	0.285	SWT	4	4	4	0	0
LEHR-SS-BG-0100	0.294	BKG	5	5	0	0	0
LEHR-SS-BG-0082	0.3	BKG	6	6.5	0	0	0
CWDTC115	0.3	SWT	7	6.5	6.5	6	1
CWDTC114	0.302	SWT	8	8	8	0	0
LEHR-SS-BG-0073	0.317	BKG	9	9.5	0	0	0
LEHR-SS-BG-0091	0.317	BKG	10	9.5	0	6	1
LEHR-SS-BG-0074	0.334	BKG	11	11.5	0	0	0
CWDTC046	0.334	SWT	12	11.5	11.5	6	1
LEHR-SS-BG-0066	0.339	BKG	13	13	0	0	0
LEHR-SS-BG-0109	0.35	BKG	14	14	0	0	0
LEHR-SS-BG-0092	0.356	BKG	15	15	0	0	0
CWDTC062	0.359	SWT	16	16	16	0	0
LEHR-SS-BG-0083	0.362	BKG	17	17	0	0	0
CWDTC043	0.366	SWT	18	18	18	0	0
CWDTC044	0.37	SWT	19	19	19	0	0
CWDTC050	0.374	SWT	20	20	20	0	0
CWDTC049	0.386	SWT	21	21	21	0	0
CWDTC042	0.426	SWT	22	22	22	0	0
CWDTC048	0.439	SWT	23	23	23	0	0
LEHR-SS-BG-0065	0.452	BKG	24	24	0	0	0

DATA SUFFICIENCY EVALUATION

Type 1 Decision Error, alpha = 0.1
Z(1-a)= 1.281551
Type 2 Decision Error, beta = 0.2
Z(1-b)= 0.841621
Total Shift, (mg/kg) or (pCi/g) = 0.1164
Standard Deviation of BKG Group, (mg/kg) or (pCi/g) = 0.050855
Standard Deviation of SWT Group, (mg/kg) or (pCi/g) = 0.05625
Allowable Relative Shift = 2.069327
Probability, Pr = 0.92987
Minimum number of samples (Background + Cleanup Unit) = 9 **Pass**
Minimum number of Background samples = 4 **Pass**
Minimum number of Cleanup Unit samples = 5 **Pass**

WILCOXON RANK SUM TEST RESULTS

n1= 12
n2= 12
m= 24
WRS= 170
g= 3
Sum[tj(tj2-1)]= 18
Zrs= 1.155454
Z0.9= 1.281551

Zrs < Z(1-a): Null Hypothesis Accepted, Data is below background.

Wilcoxon Rank Sum Test, Comparison of SWT data to background, 3I-214

Sample ID	CONC (1	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$(t(t)^2-1)$	Tie Ind.
SSBG0011	0.28	BKG	1	1	0	0	0
SSBG0002	0.32	BKG	2	2	0	0	0
CWDTC115	0.343	SWT	3	3	3	0	0
LEHR-SS-BG-0093	0.348	BKG	4	4.5	0	0	0
CWDTC114	0.348	SWT	5	4.5	4.5	6	1
SSBG0018	0.351	BKG	6	6	0	0	0
LEHR-SS-BG-0101	0.358	BKG	7	7	0	0	0
LEHR-SS-BG-0110	0.363	BKG	8	8	0	0	0
LEHR-SS-BG-0098	0.369	BKG	9	9	0	0	0
SSBG0047&48	0.37	BKG	10	10.5	0	0	0
CWDTC116	0.37	SWT	11	10.5	10.5	6	1
LEHR-SS-BG-0090	0.374	BKG	12	12	0	0	0
LEHR-SS-BG-0100	0.378	BKG	13	13	0	0	0
SSBG0046	0.378	BKG	14	14.5	0	0	0
SSBG0052	0.378	BKG	15	14.5	0	6	1
CWDTC048	0.384	SWT	16	16	16	0	0
LEHR-SS-BG-0091	0.393	BKG	17	17	0	0	0
SSBG0056	0.399	BKG	18	18	0	0	0
LEHR-SS-BG-0102	0.403	BKG	19	19	0	0	0
LEHR-SS-BG-0092	0.404	BKG	20	20	0	0	0
SSBG0039	0.413	BKG	21	21	0	0	0
LEHR-SS-BG-0071	0.415	BKG	22	22	0	0	0
LEHR-SS-BG-0073	0.416	BKG	23	23.5	0	0	0
SSBG0036	0.416	BKG	24	23.5	0	6	1
LEHR-SS-BG-0097	0.417	BKG	25	25	0	0	0
CWDTC050	0.423	SWT	26	26	26	0	0
SSBG0001	0.426	BKG	27	27	0	0	0
LEHR-SS-BG-0075	0.427	BKG	28	28	0	0	0
LEHR-SS-BG-0079	0.433	BKG	29	29.5	0	0	0
SSBG0037	0.433	BKG	30	29.5	0	6	1
LEHR-SS-BG-0116	0.434	BKG	31	31	0	0	0
LEHR-SS-BG-0066	0.435	BKG	32	33.5	0	0	0
LEHR-SS-BG-0094	0.435	BKG	33	33.5	0	0	1
LEHR-SS-BG-0096	0.435	BKG	34	33.5	0	0	2
LEHR-SS-BG-0099	0.435	BKG	35	33.5	0	60	3
LEHR-SS-BG-0108	0.438	BKG	36	36	0	0	0
SSBG0005	0.44	BKG	37	37	0	0	0
LEHR-SS-BG-0089	0.441	BKG	38	38	0	0	0
SSBG0019	0.445	BKG	39	39	0	0	0
LEHR-SS-BG-0087	0.446	BKG	40	40.5	0	0	0
SSBG0030	0.446	BKG	41	40.5	0	6	1
LEHR-SS-BG-0086	0.448	BKG	42	42	0	0	0
LEHR-SS-BG-0082	0.453	BKG	43	43	0	0	0
LEHR-SS-BG-0085	0.455	BKG	44	44	0	0	0
LEHR-SS-BG-0067	0.457	BKG	45	45	0	0	0
LEHR-SS-BG-0107	0.461	BKG	46	46.5	0	0	0
LEHR-SS-BG-0114	0.461	BKG	47	46.5	0	6	1
LEHR-SS-BG-0113	0.462	BKG	48	48	0	0	0
LEHR-SS-BG-0081	0.464	BKG	49	49	0	0	0
LEHR-SS-BG-0109	0.469	BKG	50	50	0	0	0
LEHR-SS-BG-0115	0.473	BKG	51	51	0	0	0
LEHR-SS-BG-0072	0.475	BKG	52	53	0	0	0
SSBG0028&29	0.475	BKG	53	53	0	0	1
CWDTC049	0.475	SWT	54	53	53	24	2
LEHR-SS-BG-0074	0.476	BKG	55	55	0	0	0
LEHR-SS-BG-0064	0.482	BKG	56	56	0	0	0
LEHR-SS-BG-0068	0.483	BKG	57	57	0	0	0
CWDTC044	0.485	SWT	58	58	58	0	0
LEHR-SS-BG-0070	0.486	BKG	59	59.5	0	0	0
LEHR-SS-BG-0112	0.486	BKG	60	59.5	0	6	1
LEHR-SS-BG-0077	0.488	BKG	61	61	0	0	0
SSBG0027	0.489	BKG	62	62	0	0	0
SSBG0010	0.49	BKG	63	63	0	0	0
LEHR-SS-BG-0076	0.493	BKG	64	64	0	0	0
LEHR-SS-BG-0105	0.494	BKG	65	65	0	0	0
LEHR-SS-BG-0078	0.5	BKG	66	66	0	0	0
LEHR-SS-BG-0104	0.502	BKG	67	67	0	0	0
LEHR-SS-BG-0103	0.504	BKG	68	68	0	0	0
LEHR-SS-BG-0083	0.505	BKG	69	69.5	0	0	0
CWDTC046	0.505	SWT	70	69.5	69.5	6	1
LEHR-SS-BG-0111	0.509	BKG	71	71	0	0	0
LEHR-SS-BG-0069	0.513	BKG	72	72	0	0	0
CWDTC042	0.537	SWT	73	73	73	0	0
SSBG0020	0.54	BKG	74	74	0	0	0
CWDTC043	0.555	SWT	75	75	75	0	0
SSBG0049	0.58	BKG	76	76	0	0	0
CWDTC063	0.583	SWT	77	77	77	0	0
CWDTC062	0.586	SWT	78	78	78	0	0
SSBG0014	0.61	BKG	79	79	0	0	0
SSBG0033	0.65	BKG	80	80	0	0	0
SSBG0023	0.67	BKG	81	81	0	0	0

DATA SUFFICIENCY EVALUATION

Type 1 Decision Error, alpha = 0.1
Z(1-a)= 1.281551
Type 2 Decision Error, beta = 0.2
Z(1-b)= 0.841621
Total Shift, (mg/kg) or (pCi/g) = 0.162
Standard Deviation of BKG Group, (mg/kg) or (pCi/g) = 0.08757
Standard Deviation of SWT Group, (mg/kg) or (pCi/g) = 0.090381
Allowable Relative Shift = 1.792415
Probability, Pr = 0.897842
Minimum number of samples (Background + Cleanup Unit) = 11 Pass
Minimum number of Background samples = 4 Pass
Minimum number of Cleanup Unit samples = 7 Pass

WILCOXON RANK SUM TEST RESULTS

n1= 12
n2= 69
m= 81
WRS= 543.5
g= 11
Sum(t)(t2-1)]= 138
Zrs= 0.68475
Z0.9= 1.281551

Zrs < Z(1-a): Null Hypothesis Accepted, Data is below background.

Wilcoxon Rank Sum Test, Comparison of SWT data to background, Cd

Sample ID	CONC	ti	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$t_i(t_i^2-1)$	Tie Ind.
R-SS-BG-0066	0	BKG		1	6	0	0	0
R-SS-BG-0067	0	BKG		2	6	0	0	1
R-SS-BG-0069	0	BKG		3	6	0	0	2
R-SS-BG-0070	0	BKG		4	6	0	0	3
R-SS-BG-0075	0	BKG		5	6	0	0	4
R-SS-BG-0076	0	BKG		6	6	0	0	5
R-SS-BG-0077	0	BKG		7	6	0	0	6
R-SS-BG-0078	0	BKG		8	6	0	0	7
R-SS-BG-0081	0	BKG		9	6	0	0	8
CWDTC062	0	SWT		10	6	6	0	9
CWDTC063	0	SWT		11	6	6	1320	10
R-SS-BG-0074	0.07	BKG		12	12	0	0	0
R-SS-BG-0068	0.09	BKG		13	13.5	0	0	0
R-SS-BG-0071	0.09	BKG		14	13.5	0	6	1
R-SS-BG-0065	0.1	BKG		15	15.5	0	0	0
R-SS-BG-0079&80	0.1	BKG		16	15.5	0	6	1
R-SS-BG-0073	0.11	BKG		17	17	0	0	0
R-SS-BG-0115	0.14	BKG		18	18	0	0	0
R-SS-BG-0072	0.18	BKG		19	19	0	0	0
R-SS-BG-0087&88	0.2	BKG		20	20.5	0	0	0
R-SS-BG-0097	0.2	BKG		21	20.5	0	6	1
R-SS-BG-0085	0.21	BKG		22	22.5	0	0	0
CWDTC050	0.21	SWT		23	22.5	22.5	6	1
R-SS-BG-0084	0.22	BKG		24	24.5	0	0	0
CWDTC049	0.22	SWT		25	24.5	24.5	6	1
R-SS-BG-0102	0.23	BKG		26	27.5	0	0	0
R-SS-BG-0105&106	0.23	BKG		27	27.5	0	0	1
R-SS-BG-0111	0.23	BKG		28	27.5	0	0	2
CWDTC046	0.23	SWT		29	27.5	27.5	60	3
CWDTC042	0.24	SWT		30	30.5	30.5	0	0
CWDTC044	0.24	SWT		31	30.5	30.5	6	1
R-SS-BG-0089	0.26	BKG		32	33.5	0	0	0
R-SS-BG-0096	0.26	BKG		33	33.5	0	0	1
R-SS-BG-0114	0.26	BKG		34	33.5	0	0	2
CWDTC043	0.26	SWT		35	33.5	33.5	60	3
R-SS-BG-0110	0.27	BKG		36	36	0	0	0
R-SS-BG-0104	0.28	BKG		37	37.5	0	0	0
R-SS-BG-0108	0.28	BKG		38	37.5	0	6	1
R-SS-BG-0094&95	0.285	BKG		39	39	0	0	0
R-SS-BG-0098	0.29	BKG		40	40.5	0	0	0
R-SS-BG-0101	0.29	BKG		41	40.5	0	6	1
R-SS-BG-0083	0.3	BKG		42	44	0	0	0
R-SS-BG-0086	0.3	BKG		43	44	0	0	1
R-SS-BG-0090	0.3	BKG		44	44	0	0	2
R-SS-BG-0093	0.3	BKG		45	44	0	0	3
R-SS-BG-0100	0.3	BKG		46	44	0	120	4
R-SS-BG-0099	0.32	BKG		47	48.5	0	0	0
R-SS-BG-0103	0.32	BKG		48	48.5	0	0	1
R-SS-BG-0109	0.32	BKG		49	48.5	0	0	2
CWDTC048	0.32	SWT		50	48.5	48.5	60	3
R-SS-BG-0092	0.34	BKG		51	51.5	0	0	0
R-SS-BG-0112	0.34	BKG		52	51.5	0	6	1
R-SS-BG-0082	0.37	BKG		53	53.5	0	0	0
R-SS-BG-0113	0.37	BKG		54	53.5	0	6	1
R-SS-BG-0107	0.39	BKG		55	55	0	0	0
R-SS-BG-0116	0.41	BKG		56	56	0	0	0
R-SS-BG-0091	0.42	BKG		57	57	0	0	0
CWDTC111	0.686	SWT		58	58	58	0	0
CWDTC110	0.717	SWT		59	59	59	0	0
CWDTC106	0.726	SWT		60	60	60	0	0
CWDTC103	0.74	SWT		61	61.5	61.5	0	0
CWDTC109	0.74	SWT		62	61.5	61.5	6	1
CWDTC108	0.749	SWT		63	63	63	0	0
CWDTC104	0.794	SWT		64	64	64	0	0
CWDTC107	0.809	SWT		65	65	65	0	0

DATA SUFFICIENCY EVALUATION

Type 1 Decision Error, alpha = 0.1
Z(1-a)= 1.281551
Type 2 Decision Error, beta = 0.2
Z(1-b)= 0.841621
Total Shift, (mg/kg) or (pCi/g) = 0.153
Standard Deviation of BKG Group, (mg/kg) or (pCi/g) = 0.130807
Standard Deviation of SWT Group, (mg/kg) or (pCi/g) = 0.297177
Allowable Relative Shift = 0.514845
Probability, Pr = 0.643048

Minimum number of samples (Background + Cleanup Unit) = 136 — Total existing number of samples is insufficient
Minimum number of Background samples = 22 — Pass
Minimum number of Cleanup Unit samples = 114 — Existing number of Cleanup Unit samples is insufficient

WILCOXON RANK SUM TEST RESULTS

n1= 17
n2= 48
m= 65
WRS= 721.5
g= 16
Sum{ti(ti2-1)}= 1686
Zrs= 2.403179
Z0.9= 1.281551

Zrs > Z(1-a): Null Hypothesis Rejected, Data is above background.

Wilcoxon Rank Sum Test, Comparison of SWT data to background, Cr-6

Sample ID	CONC (i	Grouping	Abs Rank	Tie-Norm Rank	:1Ranks	tj(tj²-1)	Tie Ind.
LEHR-SS-BG-006	0	BKG	1	8	0	0	0
LEHR-SS-BG-007	0	BKG	2	8	0	0	1
LEHR-SS-BG-007	0	BKG	3	8	0	0	2
LEHR-SS-BG-007	0	BKG	4	8	0	0	3
LEHR-SS-BG-008	0	BKG	5	8	0	0	4
LEHR-SS-BG-008	0	BKG	6	8	0	0	5
LEHR-SS-BG-009	0	BKG	7	8	0	0	6
LEHR-SS-BG-009	0	BKG	8	8	0	0	7
LEHR-SS-BG-010	0	BKG	9	8	0	0	8
LEHR-SS-BG-010	0	BKG	10	8	0	0	9
LEHR-SS-BG-010	0	BKG	11	8	0	0	10
LEHR-SS-BG-011	0	BKG	12	8	0	0	11
LEHR-SS-BG-011	0	BKG	13	8	0	0	12
LEHR-SS-BG-011	0	BKG	14	8	0	0	13
LEHR-SS-BG-011	0	BKG	15	8	0	3360	14
LEHR-SS-BG-007	0.011	BKG	16	16	0	0	0
LEHR-SS-BG-006	0.012	BKG	17	17.5	0	0	0
LEHR-SS-BG-007	0.012	BKG	18	17.5	0	6	1
LEHR-SS-BG-006	0.012	BKG	19	19.5	0	0	0
LEHR-SS-BG-008	0.012	BKG	20	19.5	0	6	1
LEHR-SS-BG-011	0.012	BKG	21	21	0	0	0
LEHR-SS-BG-009	0.012	BKG	22	22	0	0	0
LEHR-SS-BG-007	0.017	BKG	23	23	0	0	0
LEHR-SS-BG-010	0.017	BKG	24	24	0	0	0
LEHR-SS-BG-010	0.018	BKG	25	25	0	0	0
LEHR-SS-BG-008	0.02	BKG	26	26	0	0	0
LEHR-SS-BG-008	0.021	BKG	27	27	0	0	0
LEHR-SS-BG-010	0.021	BKG	28	28	0	0	0
LEHR-SS-BG-010	0.022	BKG	29	29	0	0	0
LEHR-SS-BG-009	0.022	BKG	30	30	0	0	0
LEHR-SS-BG-011	0.023	BKG	31	31	0	0	0
LEHR-SS-BG-010	0.024	BKG	32	32	0	0	0
LEHR-SS-BG-009	0.024	BKG	33	33	0	0	0
LEHR-SS-BG-009	0.025	BKG	34	34	0	0	0
LEHR-SS-BG-009	0.028	BKG	35	35	0	0	0
LEHR-SS-BG-008	0.029	BKG	36	36	0	0	0
LEHR-SS-BG-011	0.033	BKG	37	37	0	0	0
LEHR-SS-BG-008	0.033	BKG	38	38	0	0	0
LEHR-SS-BG-007	0.039	BKG	39	39	0	0	0
LEHR-SS-BG-007	0.041	BKG	40	40	0	0	0
LEHR-SS-BG-007	0.042	BKG	41	41	0	0	0
LEHR-SS-BG-008	0.045	BKG	42	42	0	0	0
LEHR-SS-BG-006	0.048	BKG	43	43	0	0	0
LEHR-SS-BG-007	0.049	BKG	44	44	0	0	0
LEHR-SS-BG-009	0.049	BKG	45	45	0	0	0
LEHR-SS-BG-006	0.053	BKG	46	46	0	0	0
LEHR-SS-BG-009	0.056	BKG	47	47	0	0	0
CWDTC042	0.0824	SWT	48	48	48	0	0
CWDTC063	0.13	SWT	49	49	49	0	0
CWDTC062	0.147	SWT	50	50	50	0	0
CWDTC046	0.17	SWT	51	51	51	0	0
CWDTC048	0.202	SWT	52	52	52	0	0
CWDTC044	0.25	SWT	53	53	53	0	0
CWDTC050	0.288	SWT	54	54	54	0	0
CWDTC049	0.312	SWT	55	55	55	0	0
CWDTC043	0.343	SWT	56	56	56	0	0

DATA SUFFICIENCY EVALUATION

Type 1 Decision Error, alpha = 0.1
Z(1-e)= 1.281551
Type 2 Decision Error, beta = 0.2
Z(1-b)= 0.841621
Total Shift, (mg/kg) or (pCi/g) = 0.0162
Standard Deviation of BKG Group, (mg/kg) or (pCi/g) = 0.017268
Standard Deviation of SWT Group, (mg/kg) or (pCi/g) = 0.089415
Allowable Relative Shift = 0.181178
Probability, Pr = 0.550489

Minimum number of samples (Background + Cleanup Unit) = 4243 — Total existing number of samples is insufficient
Minimum number of Background samples = 153 — Existing number of Background samples is insufficient
Minimum number of Cleanup Unit samples = 4090 — Existing number of Cleanup Unit samples is insufficient

WILCOXON RANK SUM TEST RESULTS

n1= 9
n2= 47
m= 56
WRS= 468
g= 3
Sum(tj(tj2-1)]= 3372
Zrs= 4.764362
Z0.9= 1.281551

Zrs > Z(1-a): Null Hypothesis Rejected, Data is above background.

Wilcoxon Rank Sum Test, Comparison of SWT data to background, Nitrate

Sample ID	CONC	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$t(t^2-1)$	Tie Ind.
SSBG0002	0.41	BKG	1	1	0	0	0
LEHR-SS-BG-0092	0.541	BKG	2	2	0	0	0
SSBG0039	1	BKG	3	3	0	0	0
LEHR-SS-BG-0098	1.1	BKG	4	4.5	0	0	0
SSBG0001	1.1	BKG	5	4.5	0	6	1
LEHR-SS-BG-0076	1.22	BKG	6	6	0	0	0
LEHR-SS-BG-0075	1.25	BKG	7	7.5	0	0	0
LEHR-SS-BG-0077	1.25	BKG	8	7.5	0	6	1
LEHR-SS-BG-0079&I	1.44	BKG	9	9	0	0	0
SSBG0009	1.5	BKG	10	10	0	0	0
LEHR-SS-BG-0078	1.57	BKG	11	11	0	0	0
LEHR-SS-BG-0085	1.62	BKG	12	12	0	0	0
LEHR-SS-BG-0073	1.65	BKG	13	13	0	0	0
LEHR-SS-BG-0084	1.72	BKG	14	14	0	0	0
LEHR-SS-BG-0074	1.88	BKG	15	15	0	0	0
LEHR-SS-BG-0083	2.01	BKG	16	16	0	0	0
LEHR-SS-BG-0081	2.03	BKG	17	17	0	0	0
SSBG0052	2.1	BKG	18	18	0	0	0
SSBG0046	2.3	BKG	19	19	0	0	0
SSBG0056	2.4	BKG	20	20	0	0	0
LEHR-SS-BG-0116	2.63	BKG	21	21	0	0	0
LEHR-SS-BG-0115	2.82	BKG	22	22	0	0	0
LEHR-SS-BG-0104	3	BKG	23	23.5	0	0	0
SSBG0049	3	BKG	24	23.5	0	6	1
SSBG0030	3.2	BKG	25	25.5	0	0	0
SSBG0042	3.2	BKG	26	25.5	0	6	1
LEHR-SS-BG-0093	3.31	BKG	27	27	0	0	0
SSBG0033	3.4	BKG	28	28	0	0	0
LEHR-SS-BG-0099	3.77	BKG	29	29.5	0	0	0
LEHR-SS-BG-0105&	3.77	BKG	30	29.5	0	6	1
LEHR-SS-BG-0108	4.3	BKG	31	31	0	0	0
SSBG0037	5.1	BKG	32	32	0	0	0
LEHR-SS-BG-0114	5.57	BKG	33	33	0	0	0
SSBG0018	5.6	BKG	34	34	0	0	0
LEHR-SS-BG-0091	5.88	BKG	35	35	0	0	0
LEHR-SS-BG-0103	6.09	BKG	36	36	0	0	0
LEHR-SS-BG-0107	6.44	BKG	37	37	0	0	0
LEHR-SS-BG-0069	7.11	BKG	38	38	0	0	0
LEHR-SS-BG-0102	7.22	BKG	39	39	0	0	0
LEHR-SS-BG-0113	7.31	BKG	40	40	0	0	0
SSBG0047&48	7.75	BKG	41	41	0	0	0
SSBG0014	8.5	BKG	42	42	0	0	0
SSBG0023	8.7	BKG	43	43	0	0	0
LEHR-SS-BG-0071	8.92	BKG	44	44	0	0	0
LEHR-SS-BG-0070	9.61	BKG	45	45	0	0	0
CWDTC062	10.1	SWT	46	46	46	0	0
LEHR-SS-BG-0094&I	10.175	BKG	47	47	0	0	0
LEHR-SS-BG-0072	10.8	BKG	48	48	0	0	0
SSBG0005	11	BKG	49	49	0	0	0
LEHR-SS-BG-0068	11.4	BKG	50	50	0	0	0
LEHR-SS-BG-0101	12	BKG	51	51	0	0	0
LEHR-SS-BG-0097	12.9	BKG	52	52.5	0	0	0
CWDTC063	12.9	SWT	53	52.5	52.5	6	1
SSBG0038	13	BKG	54	54	0	0	0
LEHR-SS-BG-0090	15.4	BKG	55	55.5	0	0	0
CWDTC044	15.4	SWT	56	55.5	55.5	6	1
LEHR-SS-BG-0111	15.9	BKG	57	57	0	0	0
LEHR-SS-BG-0096	16	BKG	58	58	0	0	0
SSBG0027	17	BKG	59	59	0	0	0
LEHR-SS-BG-0067	17.2	BKG	60	60	0	0	0
CWDTC042	17.8	SWT	61	61	61	0	0
LEHR-SS-BG-0066	18.1	BKG	62	62	0	0	0
LEHR-SS-BG-0089	18.4	BKG	63	63	0	0	0
SSBG0010	19	BKG	64	64	0	0	0
LEHR-SS-BG-0110	21.6	BKG	65	65	0	0	0
LEHR-SS-BG-0082	21.8	BKG	66	66	0	0	0
CWDTC048	22	SWT	67	67	67	0	0
LEHR-SS-BG-0112	22.1	BKG	68	68	0	0	0
SSBG0020	24	BKG	69	69	0	0	0
SSBG0011	25	BKG	70	70	0	0	0
CWDTC046	26.2	SWT	71	71	71	0	0
SSBG0019	28	BKG	72	72	0	0	0
LEHR-SS-BG-0100	29.3	BKG	73	73	0	0	0
CWDTC049	30.7	SWT	74	74	74	0	0
CWDTC050	34	SWT	75	75	75	0	0
SSBG0028&29	36	BKG	76	76	0	0	0
CWDTC043	36.2	SWT	77	77	77	0	0
LEHR-SS-BG-0086	46	BKG	78	78	0	0	0
LEHR-SS-BG-0087&I	51.25	BKG	79	79	0	0	0
LEHR-SS-BG-0065	68.9	BKG	80	80	0	0	0
LEHR-SS-BG-0109	108	BKG	81	81	0	0	0

DATA SUFFICIENCY EVALUATION

Type 1 Decision Error, alpha = 0.1
Z(1-a)= 1.281551
Type 2 Decision Error, beta = 0.2
Z(1-b)= 0.841621
Total Shift, (mg/kg) or (pCi/g) = 10.8
Standard Deviation of BKG Group, (mg/kg) or (pCi/g) = 16.84005
Standard Deviation of SWT Group, (mg/kg) or (pCi/g) = 9.478059
Allowable Relative Shift = 1.139474
Probability, Pr = 0.789332
Minimum number of samples (Background + Cleanup Unit) = 25 Pass
Minimum number of Background samples = 19 Pass
Minimum number of Cleanup Unit samples = 6 Pass

WILCOXON RANK SUM TEST RESULTS

n1= 9
n2= 72
m= 81
WRS= 579
g= 7
Sum(t)(t2-1)]= 42
Zrs= 3.155968
Z0.9= 1.281551

Zrs > Z(1-a): Null Hypothesis Rejected, Data is above background.

Wilcoxon Rank Sum Test, Comparison of SWT data to background, Pb

Sample ID	CONC (i	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	tj(tj^2-1)	Tie Ind.
R-SS-BG-0108	4.4	BKG	1	1	0	0	0
R-SS-BG-0110	4.8	BKG	2	2	0	0	0
R-SS-BG-0102	5.2	BKG	3	3	0	0	0
R-SS-BG-0074	5.3	BKG	4	4	0	0	0
R-SS-BG-0115	5.4	BKG	5	5	0	0	0
R-SS-BG-0092	5.6	BKG	6	6	0	0	0
R-SS-BG-0079&80	6.05	BKG	7	7	0	0	0
R-SS-BG-0098	6.2	BKG	8	8	0	0	0
R-SS-BG-0111	6.6	BKG	9	9	0	0	0
R-SS-BG-0105&106	6.9	BKG	10	10	0	0	0
R-SS-BG-0090	7	BKG	11	12	0	0	0
R-SS-BG-0100	7	BKG	12	12	0	0	1
CWDTC062	7	SWT	13	12	12	24	2
R-SS-BG-0067	7.2	BKG	14	15	0	0	0
R-SS-BG-0070	7.2	BKG	15	15	0	0	1
R-SS-BG-0116	7.2	BKG	16	15	0	24	2
CWDTC063	7.3	SWT	17	17	17	0	0
R-SS-BG-0069	7.4	BKG	18	20.5	0	0	0
R-SS-BG-0085	7.4	BKG	19	20.5	0	0	1
R-SS-BG-0093	7.4	BKG	20	20.5	0	0	2
R-SS-BG-0109	7.4	BKG	21	20.5	0	0	3
CWDTC043	7.4	SWT	22	20.5	20.5	0	4
CWDTC049	7.4	SWT	23	20.5	20.5	210	5
R-SS-BG-0089	7.5	BKG	24	24.5	0	0	0
CWDTC044	7.5	SWT	25	24.5	24.5	6	1
R-SS-BG-0065	7.6	BKG	26	28	0	0	0
R-SS-BG-0075	7.6	BKG	27	28	0	0	1
R-SS-BG-0076	7.6	BKG	28	28	0	0	2
R-SS-BG-0096	7.6	BKG	29	28	0	0	3
CWDTC042	7.6	SWT	30	28	28	120	4
R-SS-BG-0078	7.7	BKG	31	31	0	0	0
R-SS-BG-0068	7.8	BKG	32	33	0	0	0
R-SS-BG-0077	7.8	BKG	33	33	0	0	1
R-SS-BG-0083	7.8	BKG	34	33	0	24	2
R-SS-BG-0072	7.9	BKG	35	35.5	0	0	0
CWDTC046	7.9	SWT	36	35.5	35.5	6	1
R-SS-BG-0066	8	BKG	37	37	0	0	0
CWDTC048	8.1	SWT	38	38	38	0	0
R-SS-BG-0087&88	8.2	BKG	39	39.5	0	0	0
R-SS-BG-0094&95	8.2	BKG	40	39.5	0	6	1
R-SS-BG-0097	8.4	BKG	41	42	0	0	0
R-SS-BG-0112	8.4	BKG	42	42	0	0	1
R-SS-BG-0113	8.4	BKG	43	42	0	24	2
R-SS-BG-0103	8.5	BKG	44	44	0	0	0
R-SS-BG-0101	8.6	BKG	45	45	0	0	0
R-SS-BG-0084	8.7	BKG	46	46.5	0	0	0
R-SS-BG-0086	8.7	BKG	47	46.5	0	6	1
R-SS-BG-0073	9.2	BKG	48	48.5	0	0	0
R-SS-BG-0114	9.2	BKG	49	48.5	0	6	1
R-SS-BG-0099	9.3	BKG	50	50	0	0	0
R-SS-BG-0071	9.4	BKG	51	51	0	0	0
R-SS-BG-0104	9.7	BKG	52	52	0	0	0
R-SS-BG-0082	9.8	BKG	53	53	0	0	0
R-SS-BG-0107	10.1	BKG	54	54	0	0	0
CWDTC050	10.8	SWT	55	55	55	0	0

DATA SUFFICIENCY EVALUATION

Type 1 Decision Error, alpha = 0.1
Z(1-a)= 1.281551
Type 2 Decision Error, beta = 0.2
Z(1-b)= 0.841621
Total Shift, (mg/kg) or (pCi/g) = 2.85
Standard Deviation of BKG Group, (mg/kg) or (pCi/g) = 1.326576
Standard Deviation of SWT Group, (mg/kg) or (pCi/g) = 1.138469
Allowable Relative Shift = 2.503363
Probability, Pr = 0.964926

Minimum number of samples (Background + Cleanup Unit) = 8 Pass
Minimum number of Background samples = 5 Pass
Minimum number of Cleanup Unit samples = 4 Pass

WILCOXON RANK SUM TEST RESULTS

n1= 9
n2= 46
m= 55
WRS= 251
g= 11
Sum[tj(tj2-1)]= 456
Zrs= -0.022782
Z0.9= 1.281551

Zrs < Z(1-a): Null Hypothesis Accepted, Data is below background.

Wilcoxon Rank Sum Test, Comparison of SWT data to background, Pb-210

Sample ID	CONC (i	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$\Sigma(t_j^2-1)$	Tie Ind.
LEHR-SS-BG-0110	-1.26	BKG	1	1	0	0	0
LEHR-SS-BG-0083	-1.04	BKG	2	2	0	0	0
LEHR-SS-BG-0069	-1.03	BKG	3	3	0	0	0
LEHR-SS-BG-0101	-0.957	BKG	4	4	0	0	0
LEHR-SS-BG-0067	-0.72	BKG	5	5	0	0	0
LEHR-SS-BG-0107	-0.53	BKG	6	6	0	0	0
LEHR-SS-BG-0087&	-0.224	BKG	7	7	0	0	0
LEHR-SS-BG-0079&	-0.223	BKG	8	8	0	0	0
CWDTC042	0	SWT	9	9	9	0	0
CWDTC115	0.0911	SWT	10	10	10	0	0
LEHR-SS-BG-0086	0.105	BKG	11	11	0	0	0
LEHR-SS-BG-0094&	0.198	BKG	12	12	0	0	0
CWDTC048	0.202	SWT	13	13	13	0	0
LEHR-SS-BG-0073	0.227	BKG	14	14	0	0	0
LEHR-SS-BG-0070	0.244	BKG	15	15	0	0	0
LEHR-SS-BG-0082	0.27	BKG	16	16	0	0	0
LEHR-SS-BG-0116	0.292	BKG	17	17	0	0	0
LEHR-SS-BG-0108	0.295	BKG	18	18	0	0	0
LEHR-SS-BG-0114	0.306	BKG	19	19	0	0	0
LEHR-SS-BG-0089	0.326	BKG	20	20	0	0	0
LEHR-SS-BG-0091	0.363	BKG	21	21	0	0	0
LEHR-SS-BG-0103	0.379	BKG	22	22	0	0	0
LEHR-SS-BG-0090	0.385	BKG	23	23	0	0	0
LEHR-SS-BG-0076	0.404	BKG	24	24	0	0	0
LEHR-SS-BG-0066	0.408	BKG	25	25	0	0	0
LEHR-SS-BG-0074	0.414	BKG	26	26.5	0	0	0
LEHR-SS-BG-0075	0.414	BKG	27	26.5	0	6	1
LEHR-SS-BG-0081	0.439	BKG	28	28	0	0	0
CWDTC043	0.463	SWT	29	29	29	0	0
LEHR-SS-BG-0084	0.466	BKG	30	30	0	0	0
LEHR-SS-BG-0085	0.546	BKG	31	31	0	0	0
LEHR-SS-BG-0115	0.55	BKG	32	32	0	0	0
LEHR-SS-BG-0096	0.552	BKG	33	33	0	0	0
CWDTC063	0.597	SWT	34	34	34	0	0
LEHR-SS-BG-0098	0.602	BKG	35	35	0	0	0
LEHR-SS-BG-0077	0.606	BKG	36	36	0	0	0
LEHR-SS-BG-0072	0.662	BKG	37	37	0	0	0
CWDTC050	0.664	SWT	38	38	38	0	0
LEHR-SS-BG-0100	0.686	BKG	39	39	0	0	0
LEHR-SS-BG-0093	0.692	BKG	40	40	0	0	0
LEHR-SS-BG-0102	0.703	BKG	41	41	0	0	0
LEHR-SS-BG-0105&	0.7055	BKG	42	42	0	0	0
LEHR-SS-BG-0113	0.709	BKG	43	43.5	0	0	0
CWDTC114	0.709	SWT	44	43.5	43.5	6	1
CWDTC049	0.768	SWT	45	45	45	0	0
LEHR-SS-BG-0109	0.818	BKG	46	46	0	0	0
LEHR-SS-BG-0078	0.856	BKG	47	47	0	0	0
LEHR-SS-BG-0099	0.86	BKG	48	48	0	0	0
LEHR-SS-BG-0097	0.894	BKG	49	49.5	0	0	0
LEHR-SS-BG-0111	0.894	BKG	50	49.5	0	6	1
LEHR-SS-BG-0104	0.904	BKG	51	51	0	0	0
LEHR-SS-BG-0071	1	BKG	52	52	0	0	0
LEHR-SS-BG-0065	1.02	BKG	53	53.5	0	0	0
LEHR-SS-BG-0092	1.02	BKG	54	53.5	0	6	1
LEHR-SS-BG-0112	1.1	BKG	55	55	0	0	0
LEHR-SS-BG-0068	1.14	BKG	56	56.5	0	0	0
CWDTC116	1.14	SWT	57	56.5	56.5	6	1
CWDTC046	1.15	SWT	58	58	58	0	0
CWDTC062	1.26	SWT	59	59	59	0	0
CWDTC044	9.77	SWT	60	60	60	0	0

DATA SUFFICIENCY EVALUATION

Type 1 Decision Error, alpha = 0.1
Z(1-a)= 1.281551
Type 2 Decision Error, beta = 0.2
Z(1-b)= 0.841621
Total Shift, (mg/kg) or (pCi/g) = 0.48
Standard Deviation of BKG Group, (mg/kg) or (pCi/g) = 0.582797
Standard Deviation of SWT Group, (mg/kg) or (pCi/g) = 2.667249
Allowable Relative Shift = 0.179961
Probability, Pr = 0.550136

Minimum number of samples (Background + Cleanup Unit) = 3437 — **Total existing number of samples is insufficient**
Minimum number of Background samples = 157 — **Existing number of Background samples is insufficient**
Minimum number of Cleanup Unit samples = 3280 — **Existing number of Cleanup Unit samples is insufficient**

WILCOXON RANK SUM TEST RESULTS

n1= 12
n2= 48
m= 60
WRS= 455
g= 5
Sum(tj(tj2-1))= 30
Zrs= 1.644882
Z0.9= 1.281551

Zrs > Z(1-a): Null Hypothesis Rejected, Data is above background.

Wilcoxon Rank Sum Test, Comparison of SWT data to background, Pb-214

Sample ID	CONC (pGrouping	Abs Rank	Tie-Norm Rank	n1Ranks	$tj(tj^2-1)$	Tie Ind.
CWDTC115	0.394 SWT	1	1	1	0	0
CWDTC114	0.41 SWT	2	2	2	0	0
LEHR-SS-BG-0101	0.413 BKG	3	3	0	0	0
LEHR-SS-BG-0110	0.427 BKG	4	4	0	0	0
LEHR-SS-BG-0100	0.432 BKG	5	5	0	0	0
CWDTC116	0.44 SWT	6	6	6	0	0
LEHR-SS-BG-0091	0.46 BKG	7	7	0	0	0
LEHR-SS-BG-0092	0.472 BKG	8	8	0	0	0
LEHR-SS-BG-0073	0.473 BKG	9	9	0	0	0
LEHR-SS-BG-0082	0.494 BKG	10	10	0	0	0
LEHR-SS-BG-0066	0.497 BKG	11	11	0	0	0
CWDTC048	0.532 SWT	12	12	12	0	0
CWDTC050	0.533 SWT	13	13	13	0	0
LEHR-SS-BG-0074	0.548 BKG	14	14.5	0	0	0
LEHR-SS-BG-0109	0.548 BKG	15	14.5	0	6	1
CWDTC042	0.562 SWT	16	16	16	0	0
CWDTC049	0.581 SWT	17	17	17	0	0
LEHR-SS-BG-0083	0.586 BKG	18	18	0	0	0
CWDTC043	0.591 SWT	19	19.5	19.5	0	0
CWDTC044	0.591 SWT	20	19.5	19.5	6	1
CWDTC063	0.656 SWT	21	21	21	0	0
CWDTC062	0.684 SWT	22	22	22	0	0
CWDTC046	0.722 SWT	23	23	23	0	0

DATA SUFFICIENCY EVALUATION

Type 1 Decision Error, alpha = 0.1
Z(1-a)= 1.281551
Type 2 Decision Error, beta = 0.2
Z(1-b)= 0.841621
Total Shift, (mg/kg) or (pCi/g) = 0.165
Standard Deviation of BKG Group, (mg/kg) or (pCi/g) = 0.055352
Standard Deviation of SWT Group, (mg/kg) or (pCi/g) = 0.104065
Allowable Relative Shift = 1.585553
Probability, Pr = 0.868557
Minimum number of samples (Background + Cleanup Unit) = 17 **Pass**
Minimum number of Background samples = 4 **Pass**
Minimum number of Cleanup Unit samples = 13 **Existing number of Cleanup Unit samples is insufficient**

WILCOXON RANK SUM TEST RESULTS

n1= 12
n2= 11
m= 23
WRS= 172
g= 2
Sum[tj(tj2-1)]= 12
Zrs= 1.724133
Z0.9= 1.281551

Zrs > Z(1-a): Null Hypothesis Rejected, Data is above background.

Wilcoxon Rank Sum Test, Comparison of SWT data to background, Sb

Sample ID	CONC / Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	tj(tj²-1)	Tie Ind.
R-SS-BG-0082	0 BKG	1	11.5	0	0	0
R-SS-BG-0083	0 BKG	2	11.5	0	0	1
R-SS-BG-0085	0 BKG	3	11.5	0	0	2
R-SS-BG-0086	0 BKG	4	11.5	0	0	3
R-SS-BG-0089	0 BKG	5	11.5	0	0	4
R-SS-BG-0096	0 BKG	6	11.5	0	0	5
R-SS-BG-0098	0 BKG	7	11.5	0	0	6
R-SS-BG-0099	0 BKG	8	11.5	0	0	7
R-SS-BG-0102	0 BKG	9	11.5	0	0	8
R-SS-BG-0103	0 BKG	10	11.5	0	0	9
R-SS-BG-0105&1	0 BKG	11	11.5	0	0	10
R-SS-BG-0109	0 BKG	12	11.5	0	0	11
R-SS-BG-0111	0 BKG	13	11.5	0	0	12
R-SS-BG-0112	0 BKG	14	11.5	0	0	13
R-SS-BG-0113	0 BKG	15	11.5	0	0	14
R-SS-BG-0115	0 BKG	16	11.5	0	0	15
R-SS-BG-0116	0 BKG	17	11.5	0	0	16
CWDTC042	0 SWT	18	11.5	11.5	0	17
CWDTC043	0 SWT	19	11.5	11.5	0	18
CWDTC048	0 SWT	20	11.5	11.5	0	19
CWDTC049	0 SWT	21	11.5	11.5	0	20
CWDTC113	0 SWT	22	11.5	11.5	10626	21
CWDTC046	0.27 SWT	23	23	23	0	0
CWDTC044	0.39 SWT	24	24	24	0	0
R-SS-BG-0097	0.41 BKG	25	25	0	0	0
R-SS-BG-0084	0.45 BKG	26	27	0	0	0
R-SS-BG-0100	0.45 BKG	27	27	0	0	1
R-SS-BG-0104	0.45 BKG	28	27	0	24	2
CWDTC050	0.48 SWT	29	29	29	0	0
R-SS-BG-0108	0.49 BKG	30	30	0	0	0
R-SS-BG-0101	0.51 BKG	31	31	0	0	0
R-SS-BG-0092	0.57 BKG	32	32	0	0	0
R-SS-BG-0114	0.59 BKG	33	33	0	0	0
R-SS-BG-0094&9:	0.63 BKG	34	34	0	0	0
R-SS-BG-0110	0.7 BKG	35	35	0	0	0
R-SS-BG-0093	0.71 BKG	36	36	0	0	0
R-SS-BG-0087&8:	0.77 BKG	37	37	0	0	0
R-SS-BG-0066	0.79 BKG	38	38	0	0	0
R-SS-BG-0091	0.8 BKG	39	39	0	0	0
R-SS-BG-0071	0.81 BKG	40	40.5	0	0	0
R-SS-BG-0090	0.81 BKG	41	40.5	0	6	1
R-SS-BG-0081	0.83 BKG	42	42	0	0	0
R-SS-BG-0107	0.87 BKG	43	43	0	0	0
R-SS-BG-0074	0.93 BKG	44	44	0	0	0
R-SS-BG-0067	0.95 BKG	45	45	0	0	0
R-SS-BG-0069	1.1 BKG	46	47	0	0	0
R-SS-BG-0070	1.1 BKG	47	47	0	0	1
R-SS-BG-0076	1.1 BKG	48	47	0	24	2
R-SS-BG-0073	1.2 BKG	49	49	0	0	0
R-SS-BG-0068	1.4 BKG	50	51	0	0	0
R-SS-BG-0075	1.4 BKG	51	51	0	0	1
R-SS-BG-0077	1.4 BKG	52	51	0	24	2
R-SS-BG-0079&8	1.45 BKG	53	53	0	0	0
R-SS-BG-0078	1.5 BKG	54	54.5	0	0	0
CWDTC063	1.5 SWT	55	54.5	54.5	6	1
R-SS-BG-0065	1.6 BKG	56	56.5	0	0	0
CWDTC062	1.6 SWT	57	56.5	56.5	6	1
R-SS-BG-0072	1.8 BKG	58	58	0	0	0

DATA SUFFICIENCY EVALUATION

Type 1 Decision Error, alpha = 0.1
Z(1-a)= 1.281551
Type 2 Decision Error, beta = 0.2
Z(1-b)= 0.841621
Total Shift, (mg/kg) or (pCi/g) = 0.42
Standard Deviation of BKG Group, (mg/kg) or (pCi/g) = 0.542249
Standard Deviation of SWT Group, (mg/kg) or (pCi/g) = 0.62072
Allowable Relative Shift = 0.676634
Probability, Pr = 0.684598
Minimum number of samples (Background + Cleanup Unit) = 45 Pass
Minimum number of Background samples = 20 Pass
Minimum number of Cleanup Unit samples = 26 Existing number of Cleanup Unit samples is insufficient

WILCOXON RANK SUM TEST RESULTS

n1= 10
n2= 48
m= 58
WRS= 244.5
g= 7
Sum[tj(tj2-1)]= 10716
Zrs= -1.069314
Z0.9= 1.281551

Zrs < Z(1-a): Null Hypothesis Accepted, Data is below background.

Wilcoxon Rank Sum Test, Comparison of SWT data to background, Se

Sample ID	CONC (r	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	tj(tj^2-1)	Tie Ind.
SSBG0019	0.1	BKG	1	2	0	0	0
SSBG0027	0.1	BKG	2	2	0	0	1
SSBG0052	0.1	BKG	3	2	0	24	2
SSBG0009	0.21	BKG	4	4	0	0	0
SSBG0010	0.23	BKG	5	5	0	0	0
SSBG0014	0.24	BKG	6	6	0	0	0
SSBG0020	0.31	BKG	7	7	0	0	0
SSBG0018	0.38	BKG	8	8	0	0	0
SSBG0038	0.45	BKG	9	9	0	0	0
SSBG0005	0.48	BKG	10	10	0	0	0
SSBG0011	0.52	BKG	11	11	0	0	0
SSBG0037	0.58	BKG	12	12	0	0	0
SSBG0001	0.6	BKG	13	13	0	0	0
SSBG0023	0.64	BKG	14	14	0	0	0
SSBG0030	0.65	BKG	15	15.5	0	0	0
SSBG0046	0.65	BKG	16	15.5	0	6	1
SSBG0002	0.75	BKG	17	17	0	0	0
SSBG0056	0.78	BKG	18	18	0	0	0
SSBG0039	0.9	BKG	19	19	0	0	0
CWDTC043	1	SWT	20	20.5	20.5	0	0
CWDTC050	1	SWT	21	20.5	20.5	6	1
SSBG0029	1.05	BKG	22	22	0	0	0
SSBG0033	1.1	BKG	23	24	0	0	0
CWDTC042	1.1	SWT	24	24	24	0	1
CWDTC046	1.1	SWT	25	24	24	24	2
SSBG0042	1.2	BKG	26	26.5	0	0	0
CWDTC049	1.2	SWT	27	26.5	26.5	6	1
SSBG0048	1.25	BKG	28	28	0	0	0
SSBG0049	1.3	BKG	29	29	0	0	0
CWDTC045	1.4	SWT	30	30.5	30.5	0	0
CWDTC048	1.4	SWT	31	30.5	30.5	6	1
CWDTC063	2.3	SWT	32	32	32	0	0
CWDTC062	2.9	SWT	33	33	33	0	0

DATA SUFFICIENCY EVALUATION

Type 1 Decision Error, alpha = 0.1
Z(1-a)= 1.281551
Type 2 Decision Error, beta = 0.2
Z(1-b)= 0.841621
Total Shift, (mg/kg) or (pCi/g) = 0.36
Standard Deviation of BKG Group, (mg/kg) or (pCi/g) = 0.374171
Standard Deviation of SWT Group, (mg/kg) or (pCi/g) = 0.664162
Allowable Relative Shift = 0.542036
Probability, Pr = 0.650195
Minimum number of samples (Background + Cleanup Unit) = 92 **Total existing number of samples is insufficient**
Minimum number of Background samples = 22 **Pass**
Minimum number of Cleanup Unit samples = 70 **Existing number of Cleanup Unit samples is insu**

WILCOXON RANK SUM TEST RESULTS

n1= 9
n2= 24
m= 33
WRS= 241.5
g= 6
Sum[tj(tj2-1)]= 72
Zrs= 3.580993
Z0.9= 1.281551

Zrs > Z(1-a): Null Hypothesis Rejected, Data is above background.

Wilcoxon Rank Sum Test, Comparison of SWT data to background, Sr-90

Sample ID	CONC	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$t_j(t_j^2-1)$	Tie Ind.
CWDTC050	-0.025	SWT	1	1	1	0	0
CWDTC042	-0.005	SWT	2	2	2	0	0
LEHR-SS-BG-0094&	-0.004	BKG	3	3	0	0	0
LEHR-SS-BG-0090	-0.003	BKG	4	4	0	0	0
LEHR-SS-BG-0089	-6E-04	BKG	5	5	0	0	0
LEHR-SS-BG-0097	0.0029	BKG	6	6	0	0	0
LEHR-SS-BG-0107	0.005	BKG	7	7	0	0	0
LEHR-SS-BG-0100	0.0059	BKG	8	8	0	0	0
LEHR-SS-BG-0084	0.0073	BKG	9	9	0	0	0
LEHR-SS-BG-0112	0.0075	BKG	10	10	0	0	0
CWDTC049	0.0075	SWT	11	11	11	0	0
LEHR-SS-BG-0116	0.0078	BKG	12	12	0	0	0
LEHR-SS-BG-0087&	0.0082	BKG	13	13	0	0	0
LEHR-SS-BG-0096	0.0093	BKG	14	14	0	0	0
LEHR-SS-BG-0115	0.0095	BKG	15	15	0	0	0
LEHR-SS-BG-0086	0.0106	BKG	16	16	0	0	0
LEHR-SS-BG-0093	0.0108	BKG	17	17	0	0	0
LEHR-SS-BG-0111	0.0121	BKG	18	18	0	0	0
LEHR-SS-BG-0105&	0.0127	BKG	19	19	0	0	0
LEHR-SS-BG-0085	0.0134	BKG	20	20	0	0	0
LEHR-SS-BG-0103	0.0148	BKG	21	21	0	0	0
LEHR-SS-BG-0110	0.0166	BKG	22	22	0	0	0
LEHR-SS-BG-0109	0.0174	BKG	23	23	0	0	0
LEHR-SS-BG-0092	0.0177	BKG	24	24	0	0	0
LEHR-SS-BG-0099	0.0178	BKG	25	25	0	0	0
LEHR-SS-BG-0108	0.0182	BKG	26	26	0	0	0
LEHR-SS-BG-0069	0.0186	BKG	27	27	0	0	0
LEHR-SS-BG-0098	0.0188	BKG	28	28	0	0	0
LEHR-SS-BG-0114	0.0193	BKG	29	29	0	0	0
LEHR-SS-BG-0104	0.0198	BKG	30	30	0	0	0
LEHR-SS-BG-0113	0.0202	BKG	31	31	0	0	0
LEHR-SS-BG-0083	0.0208	BKG	32	32	0	0	0
LEHR-SS-BG-0101	0.0231	BKG	33	33	0	0	0
LEHR-SS-BG-0070	0.0235	BKG	34	34	0	0	0
LEHR-SS-BG-0076	0.0248	BKG	35	35	0	0	0
LEHR-SS-BG-0079&	0.0256	BKG	36	36	0	0	0
LEHR-SS-BG-0078	0.0268	BKG	37	37	0	0	0
LEHR-SS-BG-0067	0.027	BKG	38	38.5	0	0	0
LEHR-SS-BG-0091	0.027	BKG	39	38.5	0	6	1
LEHR-SS-BG-0071	0.0275	BKG	40	40	0	0	0
LEHR-SS-BG-0073	0.0297	BKG	41	41	0	0	0
LEHR-SS-BG-0074	0.0299	BKG	42	42	0	0	0
CWDTC043	0.0304	SWT	43	43	43	0	0
LEHR-SS-BG-0068	0.0363	BKG	44	44	0	0	0
LEHR-SS-BG-0082	0.0374	BKG	45	45	0	0	0
LEHR-SS-BG-0102	0.0387	BKG	46	46	0	0	0
LEHR-SS-BG-0072	0.0405	BKG	47	47	0	0	0
CWDTC048	0.0412	SWT	48	48	48	0	0
LEHR-SS-BG-0077	0.0426	BKG	49	49	0	0	0
LEHR-SS-BG-0081	0.0435	BKG	50	50	0	0	0
LEHR-SS-BG-0065	0.044	BKG	51	51	0	0	0
LEHR-SS-BG-0066	0.047	BKG	52	52	0	0	0
CWDTC080	0.0569	SWT	53	53	53	0	0
CWDTC045	0.0643	SWT	54	54	54	0	0
CWDTC077	0.161	SWT	55	55	55	0	0
CWDTC076	0.2	SWT	56	56	56	0	0
CWDTC046	0.27	SWT	57	57	57	0	0
CWDTC062	0.352	SWT	58	58	58	0	0
CWDTC063	0.392	SWT	59	59	59	0	0
CWDTC079	0.423	SWT	60	60	60	0	0

DATA SUFFICIENCY EVALUATION

Type 1 Decision Error, alpha = 0.1
Z(1-a)= 1.281551
Type 2 Decision Error, beta = 0.2
Z(1-b)= 0.841621
Total Shift, (mg/kg) or (pCi/g) = 0.0168
Standard Deviation of BKG Group, (mg/kg) or (pCi/g) = 0.012871
Standard Deviation of SWT Group, (mg/kg) or (pCi/g) = 0.160129
Allowable Relative Shift = 0.104915
Probability, Pr = 0.528213

Minimum number of samples (Background + Cleanup Unit) = 73995 — **Total existing number of samples is insufficient**
Minimum number of Background samples = 475 — **Existing number of Background samples is insufficient**
Minimum number of Cleanup Unit samples = 73520 — **Existing number of Cleanup Unit samples is insufficient**

WILCOXON RANK SUM TEST RESULTS

n1= 13
n2= 47
m= 60
WRS= 557
g= 1
Sum[tj(tj2-1)]= 6
Zrs= 2.879958
Z0.9= 1.281551

Zrs > Z(1-a): Null Hypothesis Rejected, Data is above background.

Wilcoxon Rank Sum Test, Comparison of SWT data to background, Th-228

Sample ID	CONC (t	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$t(t^2-1)$	Tie Ind.
SSBG0162	0.266	BKG	1	1	0	0	0
SSBG0143	0.311	BKG	2	2	0	0	0
SSBG0039	0.315	BKG	3	3	0	0	0
SSBG0132	0.324	BKG	4	4.5	0	0	0
SSBG0159	0.324	BKG	5	4.5	0	6	1
SSBG0145	0.336	BKG	6	6	0	0	0
SSBG0150	0.369	BKG	7	7.5	0	0	0
SSBG0152	0.369	BKG	8	7.5	0	6	1
SSBG0139	0.373	BKG	9	9	0	0	0
SSBG0158	0.374	BKG	10	10.5	0	0	0
CWDTC046	0.374	SWT	11	10.5	10.5	6	1
SSBG0157	0.382	BKG	12	12	0	0	0
SSBG0153	0.387	BKG	13	13.5	0	0	0
SSBG0154	0.387	BKG	14	13.5	0	6	1
SSBG0140&141	0.3995	BKG	15	15	0	0	0
SSBG0120	0.407	BKG	16	16	0	0	0
SSBG0129	0.413	BKG	17	17	0	0	0
SSBG0127	0.423	BKG	18	18	0	0	0
SSBG0020	0.427	BKG	19	19	0	0	0
SSBG0137	0.454	BKG	20	20	0	0	0
CWDTC050	0.455	SWT	21	21	21	0	0
SSBG0134	0.456	BKG	22	22	0	0	0
SSBG0047&48	0.461	BKG	23	23	0	0	0
SSBG0123	0.464	BKG	24	24	0	0	0
CWDTC042	0.468	SWT	25	25	25	0	0
SSBG0147	0.468	BKG	26	26	0	0	0
SSBG0138	0.469	BKG	27	27	0	0	0
SSBG0125	0.475	BKG	28	28	0	0	0
SSBG0148&149	0.477	BKG	29	29	0	0	0
SSBG0160	0.478	BKG	30	30	0	0	0
SSBG0144	0.481	BKG	31	31	0	0	0
SSBG0001	0.484	BKG	32	32.5	0	0	0
SSBG0121&122	0.484	BKG	33	32.5	0	6	1
CWDTC048	0.486	SWT	34	34	34	0	0
SSBG0002	0.489	BKG	35	35	0	0	0
SSBG0146	0.49	BKG	36	36	0	0	0
SSBG0163	0.492	BKG	37	37	0	0	0
SSBG0038	0.494	BKG	38	38	0	0	0
SSBG0136	0.499	BKG	39	39	0	0	0
SSBG0010	0.5	BKG	40	40	0	0	0
SSBG0028&29	0.5115	BKG	41	41	0	0	0
SSBG0019	0.516	BKG	42	42	0	0	0
SSBG0124	0.545	BKG	43	43	0	0	0
SSBG0126	0.569	BKG	44	44	0	0	0
SSBG0142	0.57	BKG	45	45	0	0	0
SSBG0128	0.586	BKG	46	46	0	0	0
CWDTC044	0.594	SWT	47	47	47	0	0
CWDTC043	0.597	SWT	48	48	48	0	0
CWDTC062	0.598	SWT	49	49	49	0	0
SSBG0049	0.601	BKG	50	50	0	0	0
SSBG0151	0.614	BKG	51	51	0	0	0
SSBG0161	0.628	BKG	52	52	0	0	0
SSBG0131	0.628	BKG	53	53	0	0	0
SSBG0011	0.63	BKG	54	54	0	0	0
SSBG0130	0.636	BKG	55	55	0	0	0
SSBG0155&156	0.637	BKG	56	56	0	0	0
CWDTC063	0.639	SWT	57	57	57	0	0
CWDTC049	0.652	SWT	58	58	58	0	0
SSBG0135	0.656	BKG	59	59	0	0	0
SSBG0133	0.659	BKG	60	60	0	0	0
SSBG0030	0.66	BKG	61	61	0	0	0

DATA SUFFICIENCY EVALUATION

Type 1 Decision Error, alpha = 0.1
Z(1-a)= 1.281551
Type 2 Decision Error, beta = 0.2
Z(1-b)= 0.841621
Total Shift, (mg/kg) or (pCi/g) = 0.189
Standard Deviation of BKG Group, (mg/kg) or (pCi/g) = 0.103607
Standard Deviation of SWT Group, (mg/kg) or (pCi/g) = 0.096855
Allowable Relative Shift = 1.951374
Probability, Pr = 0.917207

Minimum number of samples (Background + Cleanup Unit) = 9	Pass
Minimum number of Background samples = 5	Pass
Minimum number of Cleanup Unit samples = 5	Pass

WILCOXON RANK SUM TEST RESULTS

n1= 9
n2= 52
m= 61
WRS= 349.5
g= 5
Sum{tj(tj2-1)}= 30
Zrs= 1.433804
Z0.9= 1.281551

Zrs > Z(1-a): Null Hypothesis Rejected, Data is above background.

Wilcoxon Rank Sum Test, Comparison of SWT data to background, Th-234

Sample ID	CONC (1	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$t_j(t_j^2-1)$	Tie Ind.
CWDTC042	0	SWT	1	1	1	0	0
CWDTC050	0.254	SWT	2	2	2	0	0
LEHR-SS-BG-0100	0.276	BKG	3	3	0	0	0
LEHR-SS-BG-0097	0.307	BKG	4	4	0	0	0
CWDTC049	0.394	SWT	5	5	5	0	0
LEHR-SS-BG-0093	0.454	BKG	6	6	0	0	0
LEHR-SS-BG-0114	0.464	BKG	7	7	0	0	0
LEHR-SS-BG-0096	0.49	BKG	8	8	0	0	0
LEHR-SS-BG-0110	0.491	BKG	9	9	0	0	0
CWDTC063	0.492	SWT	10	10	10	0	0
CWDTC116	0.502	SWT	11	11	11	0	0
CWDTC115	0.509	SWT	12	12	12	0	0
LEHR-SS-BG-0073	0.514	BKG	13	13	0	0	0
LEHR-SS-BG-0085	0.521	BKG	14	14	0	0	0
LEHR-SS-BG-0078	0.535	BKG	15	15	0	0	0
LEHR-SS-BG-0067	0.537	BKG	16	16	0	0	0
LEHR-SS-BG-0077	0.547	BKG	17	17.5	0	0	0
LEHR-SS-BG-0099	0.547	BKG	18	17.5	0	6	1
LEHR-SS-BG-0091	0.551	BKG	19	19	0	0	0
LEHR-SS-BG-0113	0.552	BKG	20	20	0	0	0
LEHR-SS-BG-0084	0.562	BKG	21	21.5	0	0	0
CWDTC043	0.562	SWT	22	21.5	21.5	6	1
LEHR-SS-BG-0066	0.566	BKG	23	23	0	0	0
LEHR-SS-BG-0104	0.567	BKG	24	24	0	0	0
LEHR-SS-BG-0101	0.573	BKG	25	25	0	0	0
LEHR-SS-BG-0109	0.577	BKG	26	26	0	0	0
LEHR-SS-BG-0107	0.58	BKG	27	27	0	0	0
CWDTC114	0.581	SWT	28	28	28	0	0
LEHR-SS-BG-0069	0.582	BKG	29	29	0	0	0
LEHR-SS-BG-0090	0.591	BKG	30	30	0	0	0
LEHR-SS-BG-0098	0.606	BKG	31	31	0	0	0
LEHR-SS-BG-0086	0.613	BKG	32	32	0	0	0
LEHR-SS-BG-0075	0.614	BKG	33	33	0	0	0
LEHR-SS-BG-0102	0.62	BKG	34	34	0	0	0
LEHR-SS-BG-0108	0.624	BKG	35	35	0	0	0
LEHR-SS-BG-0068	0.626	BKG	36	37	0	0	0
LEHR-SS-BG-0070	0.626	BKG	37	37	0	0	1
LEHR-SS-BG-0103	0.626	BKG	38	37	0	24	2
LEHR-SS-BG-0081	0.632	BKG	39	39	0	0	0
LEHR-SS-BG-0076	0.634	BKG	40	40	0	0	0
LEHR-SS-BG-0082	0.636	BKG	41	41	0	0	0
CWDTC045	0.64	SWT	42	42	42	0	0
LEHR-SS-BG-0074	0.659	BKG	43	43	0	0	0
LEHR-SS-BG-0094&	0.6695	BKG	44	44	0	0	0
LEHR-SS-BG-0087&	0.683	BKG	45	45.5	0	0	0
LEHR-SS-BG-0089	0.683	BKG	46	45.5	0	6	1
LEHR-SS-BG-0111	0.685	BKG	47	47	0	0	0
LEHR-SS-BG-0092	0.7	BKG	48	48	0	0	0
LEHR-SS-BG-0115	0.701	BKG	49	49	0	0	0
LEHR-SS-BG-0079&	0.7035	BKG	50	50	0	0	0
LEHR-SS-BG-0116	0.729	BKG	51	51	0	0	0
LEHR-SS-BG-0083	0.73	BKG	52	52	0	0	0
LEHR-SS-BG-0105&	0.7325	BKG	53	53	0	0	0
CWDTC062	0.738	SWT	54	54	54	0	0
LEHR-SS-BG-0112	0.762	BKG	55	55	0	0	0
CWDTC048	0.81	SWT	56	56	56	0	0
LEHR-SS-BG-0072	0.825	BKG	57	57	0	0	0
LEHR-SS-BG-0071	0.918	BKG	58	58	0	0	0
LEHR-SS-BG-0065	1.07	BKG	59	59	0	0	0
CWDTC046	1.15	SWT	60	60	60	0	0

DATA SUFFICIENCY EVALUATION

Type 1 Decision Error, alpha = 0.1
Z(1-a)= 1.281551
Type 2 Decision Error, beta = 0.2
Z(1-b)= 0.841621
Total Shift, (mg/kg) or (pCi/g) = 0.234
Standard Deviation of BKG Group, (mg/kg) or (pCi/g) = 0.130438
Standard Deviation of SWT Group, (mg/kg) or (pCi/g) = 0.285062
Allowable Relative Shift = 0.820874
Probability, Pr = 0.719568

Minimum number of samples (Background + Cleanup Unit) = 55 **Pass**
Minimum number of Background samples = 10 **Pass**
Minimum number of Cleanup Unit samples = 46 **Existing number of Cleanup Unit samples is insufficient**

WILCOXON RANK SUM TEST RESULTS

n1= 12
n2= 48
m= 60
WRS= 302.5
g= 4
Sum{tj(tj2-1)}= 42
Zrs= -1.173628
Z0.9= 1.281551

Zrs < Z(1-a): Null Hypothesis Accepted, Data is below background.

Wilcoxon Rank Sum Test, Comparison of SWT data to background, Zn

Sample ID	CONC (i	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$tj(tj^2-1)$	Tie Ind.
SSBG0039	37.6	BKG	1	1	0	0	0
SSBG0030	43	BKG	2	2	0	0	0
SSBG0028	47.9	BKG	3	3	0	0	0
SSBG0029	49.3	BKG	4	4	0	0	0
SSBG0002	49.8	BKG	5	5	0	0	0
SSBG0049	56.4	BKG	6	6	0	0	0
SSBG0047	56.6	BKG	7	7	0	0	0
SSBG0038	57	BKG	8	8	0	0	0
SSBG0048	59.4	BKG	9	9	0	0	0
SSBG0001	60.6	BKG	10	10.5	0	0	0
SSBG0019	60.6	BKG	11	10.5	0	6	1
CWDTC050	62.8	SWT	12	12	12	0	0
CWDTC042	63.5	SWT	13	13	13	0	0
CWDTC049	64.1	SWT	14	14	14	0	0
CWDTC046	65.9	SWT	15	15	15	0	0
CWDTC045	67	SWT	16	16	16	0	0
CWDTC043	67.2	SWT	17	17	17	0	0
SSBG0020	67.8	BKG	18	18	0	0	0
SSBG0010	69.5	BKG	19	19	0	0	0
CWDTC063	70.6	SWT	20	20	20	0	0
CWDTC062	72.6	SWT	21	21	21	0	0
CWDTC048	78.5	SWT	22	22	22	0	0
SSBG0011	87.2	BKG	23	23	0	0	0

DATA SUFFICIENCY EVALUATION

Type 1 Decision Error, alpha = 0.1
Z(1-a)= 1.281551
Type 2 Decision Error, beta = 0.2
Z(1-b)= 0.841621
Total Shift, (mg/kg) or (pCi/g) = 21.72
Standard Deviation of BKG Group, (mg/kg) or (pCi/g) = 12.34707
Standard Deviation of SWT Group, (mg/kg) or (pCi/g) = 5.083251
Allowable Relative Shift = 4.272856
Probability, Pr = 1.023536
Minimum number of samples (Background + Cleanup Unit) = 12 **Pass**
Minimum number of Background samples = 10 **Pass**
Minimum number of Cleanup Unit samples = 2 **Pass**

WILCOXON RANK SUM TEST RESULTS

n1= 9
n2= 14
m= 23
WRS= 150
g= 1
Sum[tj(tj2-1)]= 6
Zrs= 2.646405
Z0.9= 1.281551

Zrs > Z(1-a): Null Hypothesis Rejected, Data is above background.

APPENDIX C

AREA-SPECIFIC CADMIUM RISK-BASED ACTION STANDARD CALCULATION

Project: **Laboratory for Energy-Related Health Research (LEHR), University of California at Davis, California**
Prepared for: U.S. Department of Energy, Oakland Operations Office, 1301 Clay Street, Oakland, CA, 95612
Prepared by: Weiss Associates, 5801 Christie Avenue, Suite 600, Emeryville, CA 94608
Account # 128-4006-226 LEHR

Task: Update to the Risk Based Action Standards (RBAS) determination for cadmium using chemical specific values, updated Southwest Trenches lithology, and updated site soil chemistry data.

Project Personnel:

Task Manager	Michael Zimmerman	Weiss Associates
Task Technical Performance	Tim R. Utterback	Weiss Associates

Approach: The updated RBAS value for cadmium was calculated by the same approach used in the Draft Determination of Risk-Based Action Standards for DOE Areas, Weiss Associates, 1997 with updates to chemical specific parameters and site specific conditions (contaminated interval and lithology).
Calculations were performed for Scenario 2.
Calculations were performed for Cadmium
Site conditions were updated for the placement of overburden soil in the Western Dog Pens between 0 and 2 feet below ground surface.
Reference doses obtained from the IRIS database for risk calculations were also updated to ensure conservatism.

Results:

	RfDo (mg/kg-day)	Kd (ml/g)	RBAS (mg/kg)
Cd	0.0005	75	137

Note: RBAS based on K_d from the USEPA Superfund Chemical Data Matrix.
RfDo from IRIS.

Scenario #2: East Residential Farmer Scenario

Source	Transport Mechanism	Exposure Route	Pathway Complete ?	Rationale
Soil contamination	Direct contact	Dermal Exposure	no	No direct access to onsite soil assumed.
		Direct Ingestion	no	Resident assumed not to cross LEHR site boundary and ingest source soil directly.
	Migration in saturated/unsaturated zone via diffusion, advection, etc.	Ground water ingestion	yes	Ground water ingestion from residential well assumed. Receptor is downgradient of DOE OUs.
	Subsurface diffusion/volatilization	Inhalation of VOCs	no	Air monitoring at perimeter stations has not shown significant levels of volatiles. Volatiles assumed to be lost from particulates prior to off-site transport.
	Dispersion and deposition of particulates in air	Inhalation of particulates	yes	Assumed off-site transport of particulates generated on-site. Not complete for volatiles.
		Deposition with dermal exposure/Direct ingestion	yes	Assumed off-site transport of particulates followed by direct exposure. Pathway not complete for volatiles.
		Deposition with impacted food ingestion	yes	Assumed off-site transport and deposition of particulates followed by food pathway uptake. Pathway not complete for volatiles.
	Precipitation and surface water runoff	Incidental ingestion of surface water	yes	Incidental ingestion while swimming assumed possible. All pathways complete only for those contaminants present in LEHR site surface soils > background, AND present in stormwater runoff from DOE OUs.
		Dermal exposure to surface water	yes	Dermal contact during swimming assumed.
		Aquatic food ingestion	yes	Residents assumed to ingest aquatic food from Putah Creek.
	Direct exposure	External radiation	yes	Assumed off-site transport of particulates containing radionuclides.

Scenario 2, RBAS value and Hazard Quotients for Cadmium.

Target HQ 1.00E+00

Analyte	Soil Conc. (mg/kg)	Ground Water Ingestion HQ	Swimming Ingestion HQ	Dermal Swimming HQ	Dermal Showering HQ	Soil Ingestion HQ	Dermal Soil HQ	Inhalation HQ	Fish Ingestion HQ	Plant Ingestion HQ	Meat Ingestion HQ	Milk Ingestion HQ	HQ Across Pathways
Cadmium (Cd)	13.7	9.95E-01	0.00E+00	0.00E+00	4.86E-03	3.81E-08	1.06E-09	0.00E+00	0.00E+00	6.73E-06	3.23E-07	9.14E-07	1.000E+00
July 2001, Back calculation		2 ft contamination thickness, RfDo = 0.0004 mg/kg-day	Closed pathway	Closed pathway	2 ft contamination thickness, RfDo = 0.0004 mg/kg-day	RfDo = 0.0004 mg/kg-day, PRGs/IRIS 2000	RfDo = 0.0004 mg/kg-day, PRGs/IRIS 2000	No RfDi published in 2000 PRGs, only Sfi, Referenced to IRIS	Closed pathway	RfDo = 0.0004 mg/kg-day, PRGs/IRIS 2000	RfDo = 0.0004 mg/kg-day, PRGs/IRIS 2000	RfDo = 0.0004 mg/kg-day, PRGs/IRIS 2000	
Cadmium (Cd) '96	0.38	9.95E-01	0.00E+00	0.00E+00	4.86E-03	8.46E-10	2.35E-11	1.16E-09	0.00E+00	2.04E-08	3.43E-09	9.65E-09	1.000E+00
1996 Back calculation		15 ft contamination thickness, RfDo = 0.0005 mg/kg-day	Closed pathway	Closed pathway	15 ft contamination thickness, RfDo = 0.0005 mg/kg-day	RfDo = 0.0005 mg/kg-day, PRGs/IRIS 1996	RfDo = 0.0005 mg/kg-day, PRGs/IRIS 1996	0.000057 mg/kg-day RfDi published in 1996 PRG's, Referenced to IRIS	Closed pathway	RfDo = 0.0005 mg/kg-day, PRGs/IRIS 1996	RfDo = 0.0005 mg/kg-day, PRGs/IRIS 1996	RfDo = 0.0005 mg/kg-day, PRGs/IRIS 1996	

Ground Water Ingestion Pathway

Scenario 2, HQ Back Calculation - Non-Carcinogens, Ground Water Concentration Conversion Factors, .

Analyte	Soil Concentration (0-15 ft bgs) (mg/kg)	Ground Water/Soil Ratio (mg/L)/(mg/kg)	Ground Water Concentration (mg/L)
Cadmium (Cd)	13.7	3.19E-04	4.36E-03

WDP Soil Profile

NUFT Results Shown on Page 15 of 17

Summary Table

Scenario 2, HQ Back Calculation - Ingestion of chemicals in drinking water.

Chemical	CW (mg/L)	Child IR (L/d)	Adult IR (L/d)	EF (d/yr)	Child ED (yr)	Adult ED (yr)	Child BW (Kg)	Adult BW (Kg)	Child AT (days)	Adult AT (days)	I (mg/kg-day)	RfDo (mg/kg-day)	HQ (unitless)
Cadmium (Cd)	4.36E-03	1.0	2	350	6	24	15	70	2190	8760	3.98E-04	0.0004	9.95E-01

CW = Chemical Concentration in Water (mg/L)
IR = Ingestion Rate (L/d)
EF = Exposure Frequency (d/yr)
ED = Exposure Duration (yr)
BW = Body Weight (Kg)
AT = Averaging Time (days)
I = Intake (mg/kg-day) = $CW \times IR_{child} \times EF \times ED_{child} / BW_{child} / AT_{child} + CW \times IR_{adult} \times EF \times ED_{adult} / BW_{adult} / AT_{adult}$
RfDo = Oral Reference Dose (mg/kg-d)
HQ = Calculated Hazard Quotient (unitless) = I / RfDo

Surface Water Concentration Calculation
Storm Water Runoff Modeling - see Attachment E (WA, 1997).
Scenario 2, HQ Back Calculation - Possible LEHR Impact of Non-Radionuclides to Putah Creek Surface Water

	OU1/OU2 Surface Soil Concentration		SWL-1/SWL-2 Storm Water Concentration		Dilution Factor		Putah Creek Conc. PCU/PCD Only		Putah Creek Conc. Contributed by LEHR		Putah Creek Conc. From LEHR/ Surface Soil Conc.	
Contaminant of Concern	MAX	AVERAGE	MAX	AVERAGE	MIN	AVERAGE	MAX	AVERAGE	MAX	AVERAGE	MAX	AVERAGE
	(mg/kg)	(mg/kg)	(mg/L)	(mg/L)	(-)	(-)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)/(mg/kg)	(mg/L)/(mg/kg)
Cd	Not Applicable	Not Applicable	Not Detected	Not Detected	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Cadmium not detected in storm water samples

Calculations:
Dilution Factor = Creek Flow/Storm Runoff Flow
Putah Creek Concentration Contributed by LEHR = Storm Water Concentration/Dilution Factor

Scenario 2, Back Calculation of Concentration Ratio, Concentration in Putah Creek/Concentration in On-site Soil

Chemical	C_{soil} mg/kg	Cew/Csoil, on-site (mg/kg(sw))/(mg/kg(soil))	Cew mg/kg
Cadmium (Cd)	13.7	0.00E+00	0.00E+00

Swimming Ingestion/Dermal Pathways
Scenario 2, HQ Back Calculation - Ingestion of Chemicals in Surface Water While Swimming.

Summary Table

Chemical	CW (mg/L)	CR (L/d)	EF (d/yr)	Child ED (yr)	Adult ED (yr)	Child BW (Kg)	Adult BW (Kg)	Child AT (days)	Adult AT (days)	I (mg/kg-day)	RfDo (mg/kg-day)	HQ (unitless)
Cadmium (Cd)	0.00E+00	0.12	90	6	24	15	70	2190	8760	0	0.0004	0.00E+00

CW = Chemical Concentration in Water (mg/L)
CR = Contact Rate (L/d)
EF = Exposure Frequency (d/yr)
ED = Exposure Duration (yr)
BW = Body Weight (Kg)
AT = Averaging Time (days)
I = Intake (mg/kg-day) = CW x CR_{child} x EF x ED_{child} / BW_{child} / AT_{child} + CW x CR_{adult} x EF x ED_{adult} / BW_{adult} / AT_{adult}
RfDo = Oral Reference Dose (mg/kg-d)
HQ = Calculated Hazard Quotient (unitless) = I / RfDo

Scenario 2, HQ Back Calculation - Dermal Contact With Chemicals in Surface Water While Swimming

Summary Table

Chemical	CW (mg/L)	SA (cm2)	PC (cm/hr)	ET (hr/d)	EF (d/yr)	Child ED (yr)	Adult ED (yr)	CF (1L/1000cm3)	Child BW (Kg)	Adult BW (Kg)	Child AT (days)	Adult AT (days)	AD (mg/kg-day)	RfDo (mg/kg-day)	HQ (unitless)
Cadmium (Cd)	0.00E+00	23,000	0.001	0.5	90	6	24	0.001	15	70	2190	8760	0	0.0004	0.00E+00

CW = Chemical Concentration in Surface Water (mg/L)
SA = Skin Surface Area Available for Contact (cm^2)
PC = Dermal Permeability Constant (cm/hr) - chemical specific. Values from Table I-1.
ET = Exposure Time (hr/d)
EF = Exposure Frequency (d/yr)
ED = Exposure Duration (yr)
CF = Volumetric Conversion Factor for Water (1L/1000cm^3)
BW = Body Weight (Kg)
AT = Averaging Time (days)
AD = Absorbed Dose (mg/kg-day) = CW x SA x PC x ET x EF x ED_{child} x CF / BW_{child} / AT_{child} + CW x SA x PC x ET x EF x ED_{adult} x CF / BW_{adult} / AT_{adult}
RfDo = Oral Reference Dose (mg/kg-d)
HQ = Calculated Hazard Quotient (unitless) = AD / RfDo

Showering - Dermal Pathway
Scenario 2, HQ Back Calculation - Dermal Contact With Chemicals in Water While Showering.

From GW Ingestion

Summary Table

Chemical	CW (mg/L)	SA (cm^2)	PC (cm/hr)	ET (hr/d)	EF (d/yr)	Child ED (yr)	Adult ED (yr)	CF ($1L/1000cm^3$)	Child BW (Kg)	Adult BW (Kg)	Child AT (days)	Adult AT (days)	AD (mg/kg-day)	RfDo (mg/kg-day)	HQ (unitless)
Cadmium (Cd)	4.36E-03	23,000	0.001	0.25	350	6	24	0.001	15	70	2190	8760	1.95E-06	0.0004	4.86E-03

CW = Chemical Concentration in Water (mg/L)
SA = Skin Surface Area Available for Contact (cm^2)
PC = Dermal Permeability Constant (cm/hr) - chemical specific. Values from Table I-1.
ET = Exposure Time (hr/d)
EF = Exposure Frequency (d/yr)
ED = Exposure Duration (yr)
CF = Volumetric Conversion Factor for Water ($1L/1000cm^3$)
BW = Body Weight (Kg)
AT = Averaging Time (days)
AD = Absorbed Dose (mg/kg-day) = $CW \times SA \times PC \times ET \times EF \times ED_{child} \times CF / BW_{child} / AT_{child} + CW \times SA \times PC \times ET \times EF \times ED_{adult} \times CF / BW_{adult} / AT_{adult}$
RfDo = Oral Reference Dose (mg/kg-d)
HQ = Calculated Hazard Quotient (unitless) = AD / RfDo

Soil Pathways

Scenario 2, On-site to Off-site Soil Concentration Calculation
ISCST3 Modeling- see Attachment D (WA 1997).

Scenario 2, On-site to Off-site Soil Concentration Conversion, Back HQ Calculation - Non Carcinogens

Analyte	On-site Soil Concentration (0-15 ft bgs) (mg/kg)	-site Soil/On-site S Concentration Ratl (mg/kg)/(mg/kg)	Off-site Soil Concentration (mg/kg)
Cadmium (Cd)	13.7	7.88E-08	1.08E-06

Summary Table

Scenario 2, Back HQ Calculation - Ingestion of Chemicals in Soil

Chemical	CS (mg/kg)	Child IR (mg/d)	Adult IR (mg/d)	CF (10^{-6} kg/mg)	FI (unitless)	EF (d/yr)	Child ED (yr)	Adult ED (yr)	Child BW (Kg)	Adult BW (Kg)	Child AT (days)	Adult AT (days)	I (mg/kg-day)	RfDo (mg/kg-day)	HQ (unitless)
Cadmium (Cd)	1.08E-06	200	100	1.00E-06	1	350	6	24	15	70	2190	8760	1.53E-11	0.0004	3.81E-08

CS = Chemical Concentration in Soil (mg/kg)
IR = Ingestion Rate (mg/d)
CF = Conversion Factor (10^{-6} kg/mg)
FI = Fraction Ingested From Contaminated Source (unitless)
EF = Exposure Frequency (d/yr)
ED = Exposure Duration (yr)
BW = Body Weight (Kg)
AT = Averaging Time (days)
I = Intake (mg/kg-day) = $CS \times IR_{child} \times CF \times FI \times EF \times ED_{child} / BW_{child} / AT_{child} + CS \times IR_{adult} \times CF \times FI \times EF \times ED_{adult} / BW_{adult} / AT_{adult}$
RfDo = Oral Reference Dose (mg/kg-d)
HQ = Calculated Hazard Quotient (unitless) = I / RfDo

Summary Table

Scenario 2, Back HQ Calculation - Dermal Contact With Chemicals in Soil

Chemical	CS (mg/kg)	CF (10^{-6} kg/mg)	Child SA (cm^2)	Adult SA (cm^2)	AF (mg/cm^2)	ABS (unitless)	EF (d/yr)	Child ED (yr)	Adult ED (yr)	Child BW (Kg)	Adult BW (Kg)	Child AT (days)	Adult AT (days)	AD (mg/kg-day)	RfDo (mg/kg-day)	HQ (unitless)
Cadmium (Cd)	1.08E-06	1.00E-06	2,000	5,000	0.2	0.01	350	6	24	15	70	2190	8760	4.23E-13	0.0004	1.06E-09

CS = Chemical Concentration in Soil (mg/kg)
CF = Conversion Factor (10^{-6} kg/mg)
SA = Skin Surface Area Available for Contact (cm^2)
AF = Soil to Skin Adherence Factor (mg/cm^2)
ABS = Absorption Factor (unitless)
EF = Exposure Frequency (d/yr)
ED = Exposure Duration (yr)
BW = Body Weight (Kg)
AT = Averaging Time (days)
AD = Absorbed Dose (mg/kg-day) = $CS \times CF \times SA_{child} \times AF \times ABS \times EF \times ED_{child} / BW_{child} / AT_{child} + CS \times CF \times SA_{adult} \times AF \times ABS \times EF \times ED_{adult} / BW_{adult} / AT_{adult}$
RfDo = Oral Reference Dose (mg/kg-d)
HQ = Calculated Hazard Quotient (unitless) = AD / RfDo

Inhalation Pathway

Scenario 2, Indoor and Outdoor Air Calculations - see Attachment C (WA, 1997).

Scenario 2, Indoor and Outdoor Air Concentration Conversion Factor Calculations, Back Risk Calculation.

Analyte	Fwd-Calc Soil Conc (mg/kg)	Indoor Air Conversion (mg/m^3)/(mg/kg)	Outdoor Air Conversion (mg/m^3)/(mg/kg)	Indoor Air Conc. (mg/m^3)	Outdoor Air Conc. (mg/m^3)
Non-Carcinogens					
Cadmium (Cd)	13.7		5.80E-13	0.000E+00	7.930E-12

Scenario 2, Back HQ Calculation -Inhalation of Airborne (Vapor Phase) Chemicals

Summary Table

Chemical	Indoor CA_i (mg/m^3)	Outdoor CA_o (mg/m^3)	Child IR (m^3/hr)	Adult IR (m^3/hr)	Indoor ET (hr/d)	Outdoor ET (hr/d)	EF (d/yr)	Child ED (yr)	Adult ED (yr)	Child BW (Kg)	Adult BW (Kg)	Child AT (days)	Adult AT (days)	Indoor I (mg/kg-day)	Outdoor I (mg/kg-day)	RfDi mg/kg-day	HQ (unitless)
Cadmium (Cd)	0.000E+00	7.930E-12	0.416666667	0.833333333	16.08	7.92	350	6	24	15	70	2190	8760	0	2.39E-12		0

CAi = Chemical Concentration in Indoor Air (mg/m^3)
CAo = Chemical Concentration in Outdoor Air (mg/m^3)
IR = Inhalation Rate (m^3/hr)
ET = Exposure Time (hr/d)
EF = Exposure Frequency (d/yr)
ED = Exposure Duration (yr)
BW = Body Weight (Kg)
AT = Averaging Time (days)
I_{indoor} = Indoor Air Intake (mg/kg-day) = $CA_{indoor} \times IR_{child} \times ET_{indoor} \times EF \times ED_{child} / BW_{child} / AT_{child} + CA_{indoor} \times IR_{adult} \times ET_{indoor} \times EF \times ED_{adult} / BW_{adult} / AT_{adult}$
$I_{outdoor}$ = Outdoor Air Intake (mg/kg-day) = $CA_{outdoor} \times IR_{child} \times ET_{outdoor} \times EF \times ED_{child} / BW_{child} / AT_{child} + CA_{outdoor} \times IR_{adult} \times ET_{outdoor} \times EF \times ED_{adult} / BW_{adult} / AT_{adult}$
RfDo = Oral Reference Dose (mg/kg-d)
HQ = Calculated Hazard Quotient (unitless) = $(I_{indoor} + I_{outdoor})$ / RfDo

Fish Ingestion

Scenario 2. Fish Calculation - see Attachment G (WA, 1997)

Surface Water

Inorganic Chemical	Csw mg/L	Bcf L/kg	Cfish mg/kg	Csoil mg/kg	Cfish/Csoil, on-site mg/kg(fish)/[mg/kg(soil)]
Non-Carcinogens					
Cadmium (Cd)	0.0E+00	3900	0.00E+00	100	0.00E+00

Kow = Octanol/water partition coefficient.
Bcf = Bioconcentration factor for fish (L/kg)
Csw = Chemical concentration in surface water contributed by the LEHR site (mg/L)
CFish = COC concentration in fish (mg/kg).

a = Values from Fetter, 1993; Lyman et al, 1990; CalEPa, 1994; Stephens, 1996; USDOE, 1996; Weiss Associates, 1997.
b = Log(Bcf) = 0.76 Log(Kow) - 1.23, Veith et al., 1980.
c = Cfish = Csw x Bcf, CalEPA, 1993.
d = Values from Aquire database, USEPA, 1996. Chromium, barium, molybdenum, thallium and vanadium from PNNL, 1996.

Scenario 2. Back Calculation of Concentration Ratio, Concentration in Off-site Fish Media/Concentration in On-site Soil

Organic Chemical	Csoil, on-site mg/kg	Cfish/Csoil, on-site mg/kg(fish)/[mg/kg(soil)]	Cfish mg/kg
Non-Carcinogens			
Cadmium (Cd)	13.7	0.00E+00	0.00E+00

Summary Table

Scenario 2, Back HQ Calculation - Ingestion of Chemicals in Fish

Chemical	CF (mg/kg)	IR (kg/day)	FI (unitless)	EF (days/yr)	Child ED (yr)	Adult ED (yr)	Child BW (Kg)	Adult BW (Kg)	Child AT (days)	Adult AT (days)	I (mg/kg-day)	RfDo (mg/kg-day)	HQ (unitless)
Cadmium (Cd)	0.00E+00	0.054	0.5	26	6	24	15	70	2190	8760	0	0.0004	0.00E+00

CF = Chemical Concentration in Fish (mg/kg)
IR = Ingestion Rate (kg/meal)
FI = Fraction Ingested From Contaminated Source (unitless)
EF = Exposure Frequency (meals/yr)
ED = Exposure Duration (yr)
BW = Body Weight (Kg)
AT = Averaging Time (days)
I = Intake (mg/kg-day) = $CF \times IR \times FI \times EF \times ED_{child} / BW_{child} / AT_{child} + CF \times IR \times FI \times EF \times ED_{adult} / BW_{adult} / AT_{adult}$
RfDo = Oral Reference Dose (mg/kg-d)
HQ = Calculated Hazard Quotient (unitless) = I / RfDo

Fruit and Vegetable Ingestion

Scenario 2. Vegetable and Fruit Media Calculation -see Attachment F (WA, 1997).

Inorganic Chemical	Csoil mg/kg	Cap mg/m3	Css mg/Kg	Kpapt m3/Kg(fm)	Kps Kg/Kg(dm) e	biodim Kg(dm)/Kg(fm) f	Cveg mg/Kg(fm) g	Cveg/Csoil [mg/kg(fm)]/[mg/kg(soil)]
Non-Carcinogens								
Cadmium (Cd)	13.7	7.92986E-12	0.00000788	3300	0.55	0.2	8.67E-07	6.34E-08

Kow = Octanol/Water partition coefficient.
Cap = COC concentration in particulate phase of ambient outdoor air at exposure location from chemical deposition calculation (ug/m3) or (pCi/m3).
Css = COC concentration in surface soil at exposure location from chemical deposition calculation (mg/kg) or (pCi/kg).
Kpapt = Plant-air partition coefficient for particle bound contamination (m3-air / kg-plant fresh mass).
Kps = Plant-soil partition coefficient ((mg/kg-plant fresh mass)/(mg/kg-soil)) = (kg-soil/kg-plant fresh mass).
biodim = Ratio of vegetable/fruit dry mass to fresh mass (kg-dry mass)/(kg-fresh mass).
Cveg = COC concentration in vegetable/fruit media (mg/kg-fresh mass) or (pCi/kg-fresh mass).

a = Values from Fetter, 1993; Lyman et al, 1990; CalEPA, 1994; Stephens, 1996; USDOE, 1996; Weiss Associates, 1997.
b = Value from McKone and Ryan, 1989.
c = Organic compounds: Kps (Kg/Kgfm) = 7.7 Kow-0.58 Travis and Arms, 1988.
d = Calculation for organic compounds: Cveg = Cap x Kpapt + Css x Kps. Cal EPA, 1993.
e = Values from Baes et al., 1984.
f = Value from Cal EPA, 1993.
g = Calculation for inorganic compounds and radionuclides: Cveg = Cap x Kpapt + Css x Kps x biodim. Cal EPA, 1993.

Scenario 2. Back Calculation of Concentration Ratio - Concentration in Off-site Vegetation/Concentration in On-site Soil

Chemical	Csoil mg/kg	Cveg/Csoil [mg/kg(fm)]/[mg/kg(soil)]	Cveg mg/kg(fm)
Non-Carcinogens			
Cadmium (Cd)	13.7	6.34E-08	8.67E-07

Summary Table

Scenario 2, Back HQ Calculation - Ingestion of Chemicals in Fruits and Vegetables

Chemical	CF (mg/kg)	IR (kg/day)	FI (unitless)	EF (days/yr)	Child ED (yr)	Adult ED (yr)	Child BW (Kg)	Adult BW (Kg)	Child AT (days)	Adult AT (days)	I (mg/kg-day)	RfDo (mg/kg-day)	HQ (unitless)
Cadmium (Cd)	8.67E-07	0.08	0.5	350	6	24	15	70	2190	8760	2.69E-09	0.0004	6.73E-06

CF = Chemical Concentration in Food (mg/kg)
IR = Ingestion Rate (kg/day)
FI = Fraction Ingested From Contaminated Source (unitless)
EF = Exposure Frequency (days/yr)
ED = Exposure Duration (yr)
BW = Body Weight (Kg)
AT = Averaging Time (days)
I = Intake (mg/kg-day) = $CF \times IR \times FI \times EF \times ED_{child} / BW_{child} / AT_{child} + CF \times IR \times FI \times EF \times ED_{adult} / BW_{adult} / AT_{adult}$
RfDo = Oral Reference Dose (mg/kg-d)
HQ = Calculated Hazard Quotient (unitless) = I / RfDo

Meat Ingestion

Scenario 2. Beef Calculation - see Attachment F (WA, 1997).

Inorganic Chemical	Bt (inorganics) d/kg f	Cap mg/m3	Css mg/kg	Inhc m3/d	Kpapt m3/kg	Ivbc kg(fm)/d	Isc kg/d	Kps kg/kg(dm) g	biodim kg(dm)/kg(fm) h	Cbeef mg/kg	Csoil, on-site mg/kg	Cbeef/Csoil, on-site (mg/kg)/(mg/kg)
Non-Carcinogens												
Cadmium (Cd)	0.00035	5.8E-11	1.07737E-06	122	3300	60	0.4	0.55	0.2	6.66143E-09	13.7	4.87E-10

Kow = Octanol/water partition coefficient.
Bt = Biotransfer factor for beef cattle (d/kg).
Cap = COC concentration in particulate phase of ambient outdoor air at exposure location from chemical deposition calculation (ug/m3).
Css = COC concentration in surface soil at exposure location from chemical deposition calculation (mg/kg).
Inhc = Daily inhalation rate of cattle (m3/d)
Kpapt = Plant-air partition coefficient for particle-bound contamination (m3-air / kg-plant fresh mass).
Ivbc = Ingestion of pasture by beef cattle (kg-fresh mass/day).
Isc = Ingestion of soil by cattle (kg/day)
Kps = Plant-soil partition coefficient ((mg/kg-plant dry mass)/(mg/kg-soil)) = (kg-soil/kg-plant dry mass).
biodim = Ratio of vegetable/fruit dry mass to fresh mass (kg-dry mass)/(kg-fresh mass).
Cbeef = COC concentration in beef media (mg/kg)

a = Values from Fetter, 1993; Lyman et al, 1990; CalEPA, 1994; Stephens, 1996; USDOE, 1996; Weiss Associates, 1997.
b = Log(Bt) = Log(Kow) - 7.6, Travis and Arms, 1988.
c = Value from McKone and Ryan, 1989.
d = Organic compounds: Kps = 7.7 Kow-0.58 (Travis and Arms, 1988).
e = Calculation: Cbeef = Cap x (Inhc + Kpapt x Ivbc) x Bt + Css x (Isc + Kps x biodim x Ivbc) x Bt. (Cal EPA, 1993)
f = Values from Ng et al., 1982. Except arsenic, beryllium, antimony, selenium, thallium and vanadium from Baes et al., 1984.
g = Values from Baes et al., 1984.
h = Value from Cal EPA, 1993.

Scenario 2. Back Calculation of Concentration Ratio - Concentration in Off-site Beef Media/Concentration in On-site Soil

Organic Chemical	Csoil, on-site mg/kg	Cbeef/Csoil, on-site (mg/kg(beef))/(mg/kg(soil))	Cbeef mg/kg(fm)
Non-Carcinogens			
Cadmium (Cd)	13.7	4.87E-10	6.66E-09

Summary Table

Scenario 2, Back HQ Calculation - Ingestion of Chemicals in Meat

Chemical	CF (mg/kg)	IR (kg/day)	FI (unitless)	EF (days/yr)	Child ED (yr)	Adult ED (yr)	Child BW (Kg)	Adult BW (Kg)	Child AT (days)	Adult AT (days)	I (mg/kg-day)	RfDo (mg/kg-day)	HQ (unitless)
Cadmium (Cd)	6.66E-09	0.25	1	350	6	24	15	70	2190	8760	1.29E-10	0.0004	3.23E-07

CF = Chemical Concentration in Food (mg/kg)
IR = Ingestion Rate (kg/day)
FI = Fraction Ingested From Contaminated Source (unitless)
EF = Exposure Frequency (days/yr)
ED = Exposure Duration (yr)
BW = Body Weight (Kg)
AT = Averaging Time (days)
I = Intake (mg/kg-day) = $CF \times IR \times FI \times EF \times ED_{child} / BW_{child} / AT_{child} + CF \times IR \times FI \times EF \times ED_{adult} / BW_{adult} / AT_{adult}$
RfDo = Oral Reference Dose (mg/kg-d)
HQ = Calculated Hazard Quotient (unitless) = I / RfDo

Scenario 2. Milk Media Calculation - see Attachment F (WA, 1997).

Inorganic Chemical	Bk d/Kg r	Cap mg/m3	Cas mg/kg	Inhc m3/d	Kpapt m3/kg(fm)	Ivdc kg(fm)/d	Isc kg/d	Kps kg/kg(dm) g	biodim kg(dm)/kg(fm) h	Cmilk mg/kg i	Csoil, on-site mg/kg	Cmilk/Csoil, on-site (mg/kg)/(mg/kg)
Non-Carcinogens												
Cadmium (Cd)	0.001	5.8E-11	1.07737E-06	122	3300	85	0.4	0.55	0.2	2.68E-08	13.7	1.96E-09

Kow = Octanol/water partition coefficient.
Bk = Biotransfer factor for dairy cattle (d/kg).
Cap = COC concentration in particulate phase of ambient outdoor air at exposure location from chemical deposition calculation (ug/m3) or (pCi/m3).
Cas = COC concentration in surface soil at exposure location from chemical deposition calculation (mg/kg) or (pCi/kg).
Inhc = Daily inhalation rate for cattle (m3/d)
Kpapt = Plant-air partition coefficient for particle-bound contamination (m3-air / kg-plant fresh mass).
Ivdc = Ingestion of pasture by dairy cattle (kg-fresh mass/day).
Isc = Ingestion of soil by cattle (kg/day)
Kps = Plant-soil partition coefficient ((mg/kg-plant fresh mass)/(mg/kg-soil)) = (kg-soil/kg-plant fresh mass).
biodim = Ratio of pasture dry mass to fresh mass (kg-dry mass)/(kg-fresh mass).
Cmilk = COC concentration in dairy milk media (mg/kg) or (pCi/kg).

a = Values from Fetter, 1993; Lyman et al, 1990; CalEPA, 1994; Stephens, 1995; USDOE, 1995; Weiss Associates, 1997.
b = Log(Bk) = Log(Kow) - 8.1, Travis and Arms 1988.
c = Value from McKone and Ryan 1989.
d = Organic compounds: Kps (Kg/Kgfm) = 7.7 Kow-0.58 Travis and Arms, 1988.
e = Calculation for organic compounds: Cmilk = Cap x (Inhc + Kpapt x Ivdc) x Bk + Cas x (Isc + Kps x Ivdc) x Bk. Cal EPA 1993.
f = Values from Baes et al., 1984.
g = Values from Baes et al., 1984.
h = Value from Cal EPA, 1993.
i = Calculation for inorganic compounds and radionuclides: Cmilk = Cap x (Inhc + Kpapt x Ivdc) x Bk + Cas x (Isc + Kps x Ivdc x biodim) x Bk. Cal EPA 1993..

Scenario 2. Back Calculation of Concentration Ratio - Concentration in Off-site Milk Media/Concentration in On-site Soil

Organic Chemical	Csoil mg/kg	Cmilk/Csoil, on-site (mg/kg(milk))/(mg/kg(soil))	Cmilk mg/kg
Non-Carcinogens			
Cadmium (Cd)	13.7	1.96E-09	2.68E-08

Summary Table

Scenario 2, Back HQ Calculation - Ingestion of Chemicals in Milk

Chemical	CF (mg/kg)	unit conv CF (mg/L)	IR (L/d)	FI (unitless)	EF (d/yr)	Child ED (yr)	Adult ED (yr)	Child BW (Kg)	Adult BW (Kg)	Child AT (days)	Adult AT (days)	I (mg/kg-day)	RfDo (mg/kg-day)	HQ (unitless)
Cadmium (Cd)	2.68E-08	2.77177E-08	0.17	1	350	6	24	15	70	2190	8760	3.65773E-10	0.0004	9.14E-07

CF = Chemical Concentration in Milk (mg/kg)
unit conv for CF = CFmg/kg(milk) x 1.035 kg(milk)/L(milk) = CF mg/L
IR = Ingestion Rate (L/d)
FI = Fraction Ingested From Contaminated Source (unitless)
EF = Exposure Frequency (d/yr)
ED = Exposure Duration (yr)
BW = Body Weight (Kg)
AT = Averaging Time (days)
I = Intake (mg/kg-day) = $CF \times IR \times FI \times EF \times ED_{child} / BW_{child} / AT_{child} + CF \times IR \times FI \times EF \times ED_{adult} / BW_{adult} / AT_{adult}$
RfDo = Oral Reference Dose (mg/kg-d)
HQ = Calculated Hazard Quotient (unitless) = I / RfDo

End of Calculations

Chemical Specific Parameters, Cadmium

PARAMETER	UNIT	
MCL	mg/L	0.005
Mol. Wt.	g/mole	112.4
RfDo	mg/kg-day	0.0004
RfDi	mg/kg-day	none
Sfo	1/(mg/kg-day)	none
Sfi	1/(mg/kg-day)	6.3
Kd	ml/g	75

References

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Superfund Chemical Data Matrix

Western Dog Pens Lithology - One Dimensional Vadose Zone Modeling, LEHR

Soil Type		NCLYSLT	NGEO6	NSAND
Parameter	Unit	Clayey Sandy Silt	Silty Clay	Sand
Solid density (ρs)	kg/m^3	2570	2700	2630
Bulk Density (ρB)	kg/m^3	1700	1700	1900
Vertical Hydraulic Conductivity (Kz)	cm/sec	7.08E-05	5.56E-06	1.27E-04
Intrinsic Permebility	m^2	7.22E-14	5.67E-15	1.29E-13
Porosity (f)	%	0.354	0.393	0.3
Van Genuchten Parameters				
n		1.4070	1.1696	1.4285
m = 1 - (1/n)		0.2893	0.1450	0.3000
α	1/cm	0.0211	0.0241	0.0639
α	1/Pa	2.150E-04	2.460E-04	6.520E-04
Residual Saturation (Sr = θr/f)	% vol	0.1800	0.1900	0.1500
Maximum Saturation (Smax = θs/f)	%vol	1.0000	1.0000	1.0000
Tortuosity Factor (ta)	%	Millington(1961)	Millington(1961)	Millington(1961)
Kd				
Cadmium	ml/g	75	75	75
Normalized Kd(all species)	-	360	324	475

References:

Superfund Chemical Data Matrix

Sources of Data include analytical samples submitted to Daniel B. Stephens & Associates, Inc.; Freeze, R.A. and Cherry, J.A. (1979); and Fetter, C.W. (1994).

Daniel B. Stephnens & Associates, Inc., Soil properties report, 7/12/1996

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Daniel B. Stephnens & Associates, Inc., Soil properties report, 9/12/1996

Notes:

1 Pa = 1.01981E-04 meter H2O

Normalized Kd = rB.kd / n

Tortuosity Factor = S^(7/3) . n ^(1/3)

Representative Soil Profile, Western Dog Pens, LEHR Site, UC Davis, California

elem#	dz(m)	depth (m)	dz (ft)	depth (ft)	node depth(ft)	Material	ElementName
33	1.00	0.00	3.28	0.00	0.00	ATM	AGS#1:1:33
32	1.00	0.00	3.28	0.00	0.00	ATM	RE#1:1:32
31	0.15	0.15	0.50	0.50	0.25	[illegible]	AB_CSS#1:1:31
30	0.15	0.31	0.50	1.00	0.75	[illegible]	AB_CSS#1:1:30
29	0.15	0.46	0.50	1.50	1.25	[illegible]	AB_CSS#1:1:29
28	0.15	0.61	0.50	2.00	1.75	SAND	AB_GF#1:1:28
27	0.15	0.76	0.50	2.50	2.25	SAND	AB_GF#1:1:27
26	0.15	0.91	0.50	3.00	2.75	SAND	AB_GF#1:1:26
25	0.31	1.22	1.00	4.00	3.50	SAND	AB_GF#1:1:25
24	0.31	1.52	1.00	5.00	4.50	SAND	AB_GF#1:1:24
23	0.31	1.83	1.00	6.00	5.50	SAND	AB_GF#1:1:23
22	0.31	2.13	1.00	7.00	6.50	SAND	AB_GF#1:1:22
21	0.31	2.44	1.00	8.00	7.50	[illegible]	AB_CSS#1:1:21
20	0.31	2.74	1.00	9.00	8.50	[illegible]	AB_CSS#1:1:20
19	0.31	3.05	1.00	10.00	9.50	[illegible]	AB_CSS#1:1:19
18	0.31	3.35	1.00	11.00	10.50	[illegible]	AB_CSS#1:1:18
17	0.31	3.66	1.00	12.00	11.50	[illegible]	AB_CSS#1:1:17
16	0.15	3.81	0.50	12.50	12.25	[illegible]	AB_CSS#1:1:16
15	0.15	3.96	0.50	13.00	12.75	[illegible]	AB_CSS#1:1:15
14	0.31	4.27	1.00	14.00	13.50	[illegible]	AB_CSS#1:1:14
13	0.31	4.57	1.00	15.00	14.50	[illegible]	AB_CSS#1:1:13
12	0.31	4.88	1.00	16.00	15.50	[illegible]	AB_CSS#1:1:12
11	0.31	5.18	1.00	17.00	16.50	[illegible]	AB_CSS#1:1:11
10	0.31	5.49	1.00	18.00	17.50	[illegible]	AB_CSS#1:1:10
9	0.31	5.79	1.00	19.00	18.50	[illegible]	AB_CSS#1:1:9
8	0.31	6.10	1.00	20.00	19.50	[illegible]	AB_CSS#1:1:8
7	0.31	[illegible]	[illegible]	21.00	[illegible]	[illegible]	AB_CSS#1:1:7
6	0.31	[illegible]	[illegible]	22.00	[illegible]	[illegible]	AB_CSS#1:1:6
5	0.31	[illegible]	[illegible]	23.00	[illegible]	[illegible]	AB_CSS#1:1:5
4	0.31	[illegible]	[illegible]	24.00	[illegible]	[illegible]	AB_CSS#1:1:4
3	0.31	[illegible]	[illegible]	25.00	[illegible]	[illegible]	AB_CSS#1:1:3
2	0.31	[illegible]	[illegible]	26.00	[illegible]	[illegible]	BW_CSS#1:1:2
1	0.31	[illegible]	[illegible]	27.00	[illegible]	NGEO6a	BB_SIC#1:1:1

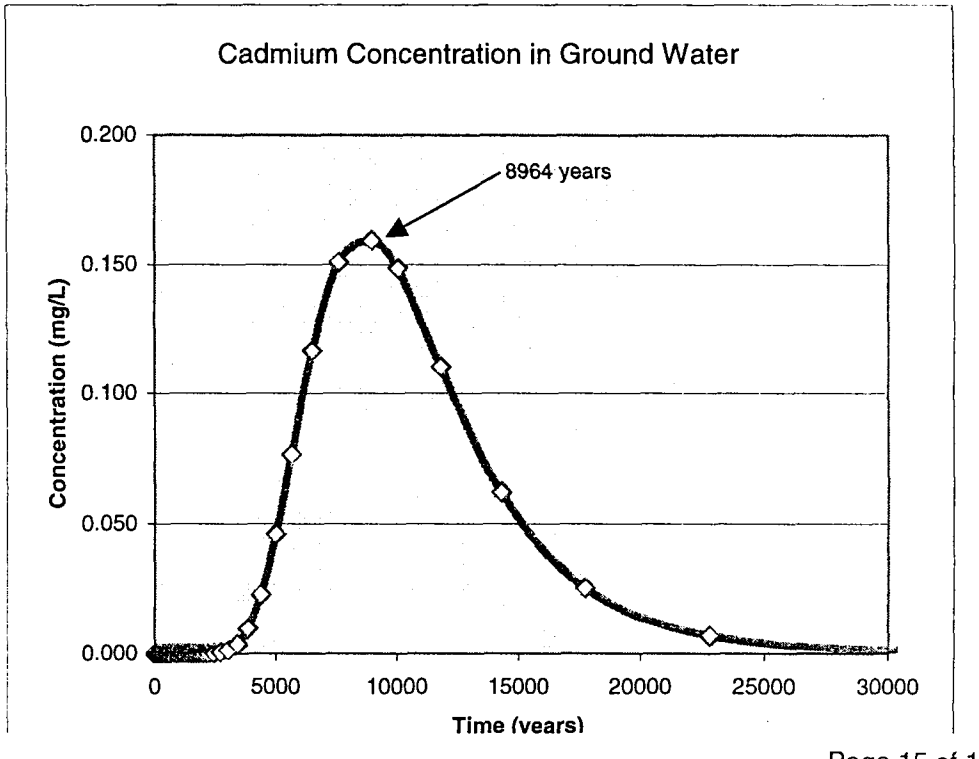
NUFT RESULTS, Western Dog Pens, Cd RBAS

Kd = 75 L/Kg

Time (sec)	Concentration (kg/L)	Time (years)	Concentration (mg/L)
0.00E+00	0.00E+00	0.00000	0.00E+00
1.00E+00	1.85E-253	3.17E-08	1.85E-247
3.25E+00	8.30E-246	1.03E-07	8.30E-240
8.31E+00	2.57E-238	2.64E-07	2.57E-232
1.97E+01	7.00E-231	6.25E-07	7.00E-225
4.53E+01	1.81E-223	0.0000014	1.81E-217
1.03E+02	4.54E-216	0.0000033	4.54E-210
2.33E+02	1.12E-208	0.0000074	1.12E-202
5.24E+02	2.69E-201	0.000017	2.69E-195
1.18E+03	6.20E-194	0.000037	6.20E-188
1.19E+03	6.36E-194	0.000038	6.36E-188
1.21E+03	6.52E-194	0.000038	6.52E-188
1.24E+03	6.89E-194	0.000039	6.89E-188
1.32E+03	7.78E-194	0.000042	7.78E-188
1.48E+03	1.04E-193	0.000047	1.04E-187
1.84E+03	2.29E-193	0.000058	2.29E-187
2.63E+03	4.88E-191	0.000084	4.88E-185
4.41E+03	1.97E-184	0.00014	1.97E-178
8.41E+03	2.91E-177	0.00027	2.91E-171
1.74E+04	5.88E-170	0.00055	5.88E-164
3.76E+04	1.33E-162	0.0012	1.33E-156
8.29E+04	3.04E-155	0.0026	3.04E-149
8.64E+04	3.30E-155	0.0027	3.30E-149
1.88E+05	6.81E-148	0.0060	6.81E-142
4.13E+05	1.25E-140	0.013	1.25E-134
9.04E+05	1.70E-133	0.029	1.70E-127
1.95E+06	1.11E-124	0.062	1.11E-118
4.12E+06	3.99E-113	0.13	3.99E-107
8.57E+06	3.08E-100	0.27	3.08E-94
8.64E+06	3.13E-100	0.27	3.13E-94
1.77E+07	2.91E-89	0.56	2.91E-83
3.16E+07	2.32E-80	1.0	2.32E-74
4.97E+07	2.61E-71	1.6	2.61E-65

Maximum Concentration in Ground Water (mg/L)
0.1594

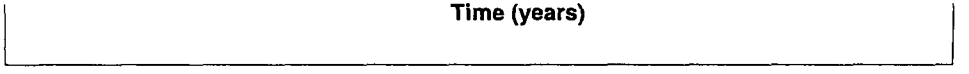
SOIL to OFFSITE GW FACTOR		
Arbitrary initial concentration in soil	100	mg/kg
Max concentration in ground water	0.1594	mg/L
Vadose zone factor	0.001594	
Lateral ground water factor	0.2	
Total factor	**0.000319**	



NUFT RESULTS, Western Dog Pens, Cd RBAS

Kd = 75 L/Kg

Time (sec)	Concentration (kg/L)	Time (years)	Concentration (mg/L)
6.31E+07	5.61E-69	2.0	5.61E-63
9.94E+07	6.16E-59	3.2	6.16E-53
1.58E+08	6.02E-54	5.0	6.02E-48
2.32E+08	3.01E-51	7.4	3.01E-45
3.16E+08	1.79E-49	10.0	1.79E-43
4.54E+08	1.37E-45	14.4	1.37E-39
4.73E+08	1.59E-45	15.0	1.59E-39
6.31E+08	1.05E-43	20.0	1.05E-37
8.60E+08	9.24E-41	27.3	9.24E-35
9.47E+08	1.49E-40	30.0	1.49E-34
1.26E+09	8.95E-38	40.0	8.95E-32
1.27E+09	9.04E-38	40.1	9.04E-32
1.58E+09	1.29E-36	50.0	1.29E-30
1.91E+09	1.44E-35	60.5	1.44E-29
2.35E+09	7.96E-34	74.4	7.96E-28
2.88E+09	4.02E-32	91.4	4.02E-26
3.16E+09	8.04E-32	100.1	8.04E-26
3.77E+09	2.12E-30	119.6	2.12E-24
4.48E+09	4.68E-29	142.1	4.68E-23
5.29E+09	8.30E-28	167.6	8.30E-22
6.19E+09	1.28E-26	196.4	1.28E-20
7.23E+09	1.84E-25	229.1	1.84E-19
8.38E+09	2.22E-24	265.7	2.22E-18
9.62E+09	1.99E-23	304.9	1.99E-17
1.09E+10	1.45E-22	346.9	1.45E-16
1.24E+10	9.32E-22	391.6	9.32E-16
1.39E+10	5.66E-21	440.1	5.66E-15
1.55E+10	3.19E-20	492.8	3.19E-14
1.58E+10	3.63E-20	500.4	3.63E-14
1.75E+10	1.78E-19	555.6	1.78E-13
1.94E+10	8.05E-19	614.5	8.05E-13
2.14E+10	3.49E-18	677.6	3.49E-12
2.35E+10	1.51E-17	746.4	1.51E-11
2.59E+10	6.05E-17	819.7	6.05E-11
2.83E+10	2.25E-16	896.8	2.25E-10



NUFT RESULTS, Western Dog Pens, Cd RBAS

Kd = 75 L/Kg

Time (sec)	Concentration (kg/L)	Time (years)	Concentration (mg/L)
3.09E+10	7.98E-16	979.2	7.98E-10
3.16E+10	9.81E-16	1000.8	9.81E-10
3.16E+10	9.82E-16	1000.8	9.82E-10
3.44E+10	3.39E-15	1090.2	3.39E-09
3.75E+10	1.20E-14	1189.1	1.20E-08
4.09E+10	4.08E-14	1296.3	4.08E-08
4.45E+10	1.35E-13	1412.4	1.35E-07
4.86E+10	4.47E-13	1541.1	4.47E-07
5.30E+10	1.42E-12	1680.9	1.42E-06
5.79E+10	4.35E-12	1834.4	4.35E-06
6.33E+10	1.35E-11	2007.5	1.35E-05
6.97E+10	4.38E-11	2209.9	4.38E-05
7.71E+10	1.43E-10	2445.5	1.43E-04
8.56E+10	4.42E-10	2715.6	4.42E-04
9.57E+10	1.34E-09	3034.9	1.34E-03
1.08E+11	3.77E-09	3408.8	3.77E-03
1.22E+11	9.80E-09	3855.9	9.80E-03
1.38E+11	2.29E-08	4385.5	2.29E-02
1.58E+11	4.62E-08	5003.8	4.62E-02
1.78E+11	7.66E-08	5650.7	7.66E-02
2.05E+11	1.17E-07	6500.5	1.17E-01
2.39E+11	1.51E-07	7581.8	1.51E-01
2.83E+11	1.59E-07	8964.4	1.59E-01
3.16E+11	1.49E-07	10007.6	1.49E-01
3.72E+11	1.10E-07	11780.2	1.10E-01
4.49E+11	6.21E-08	14247.2	6.21E-02
5.59E+11	2.53E-08	17716.3	2.53E-02
7.19E+11	7.08E-09	22783.5	7.08E-03
9.86E+11	1.18E-09	31275.4	1.18E-03
1.52E+12	9.79E-11	48040.3	9.79E-05
2.67E+12	3.59E-12	84601.7	3.59E-06
5.25E+12	5.62E-14	166603.2	5.62E-08
1.11E+13	3.74E-16	351027.4	3.74E-10
2.42E+13	1.07E-18	766108.6	1.07E-12
3.16E+13	5.17E-21	1000761.0	5.17E-15