U.S. Department of Energy

Oakland Operations Office, Oakland, California

DRAFT TECHNICAL MEMORANDUM: STATISTICAL COMPARISON OF WESTERN DOG PENS SOIL DATA WITH RISK-BASED TARGET LEVELS

for the

LABORATORY FOR ENERGY-RELATED HEALTH RESEARCH (LEHR)
UNIVERSITY OF CALIFORNIA AT DAVIS, CALIFORNIA

prepared for

United States Department of Energy
Oakland Operations Office
1301 Clay Street
Oakland, California 95612-5208

by

Weiss Associates
5801 Christie Avenue, Suite 600
Emeryville, CA 94608-1827

June 1999
Rev. A

DOE Oakland Operations Contract DE-AC03-96SF20686

Weiss Associates
Environmental and Geologic Services

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ACRONYMS

bgs	Below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPC	Constituent of potential concern
DHS	Department of Health Services (California)
DOE	U.S. Department of Energy
DTSC	Department of Toxic Substances Control (California)
GEL	General Engineering Laboratories
LAS	Lockheed Analytical Services
LEHR	Laboratory for Energy-Related Health Research
MDA	Minimum detectable activity
mg/kg	Milligrams per kilogram
pCi/g	PicoCurie(s) per gram
PRGs	Preliminary Remediation Goals
QA/QC	Quality Assurance/Quality Control
RBAS	Risk-Based Action Standards
RI/FS	Remedial Investigation/Feasibility Study
RME	Reasonable maximum exposure
RPMs	Remedial Project Managers
SVOCs	Semi-volatile organic compounds
UC Davis	University of California Davis

UCL	Upper confidence limit
USEPA	U.S. Environmental Protection Agency
VOCs	Volatile organic compounds
WDP	Western Dog Pens
WRS	Wilcoxon Rank Sum

EXECUTIVE SUMMARY

This Technical Memorandum presents results of the statistical comparison of Western Dog Pens (WDP) soil quality data with the risk-based soil target levels for the Laboratory for Energy-Related Health Research (LEHR) site at the University of California, Davis, California (UC Davis). The objective of this statistical comparison was to determine if the constituent of potential concern (COPC) levels in WDP soil exceed the lowest risk-based action standards (RBASs) previously established for the LEHR site (Weiss Associates, 1997b).

Soil investigations were conducted in the WDP in 1990, 1994, 1996 and 1997/98. Of these, the 1994 and 1997/98 investigations were conducted in accordance with CERCLA quality assurance/quality control (QA/QC) requirements. Data from these investigations, which represent over 200 soil sampling locations from 45 of the 320 WDP pens, were used in the statistical analysis. Of these sampling locations, 106 were selected at random, and 101 were selected to target possible areas of elevated COPC levels. Therefore, the data sets used in the statistical analysis are biased towards higher COPC levels and are conservative representations of COPC levels in the WDP.

All identified COPCs (Weiss Associates, 1997b) with one or more result above the detection limit were retained for statistical analysis. Although all detected COPCs were retained for analysis, those with detection frequencies of less than 5 percent (%) were noted.

The first statistical test conducted was the Wilcoxon Rank Sum (WRS) test for comparing WDP soil levels with the background soil levels established for the LEHR site. Prior to conducting this test, the Noether calculation method (Noether, 1987) was used to determine if enough WDP and background soil data points exist for making valid statistical comparisons using the WRS test.

COPCs that were above background and/or had insufficient data to conduct the WRS test were then compared with the lowest RBAS. This comparison was made in two steps: a) compare the maximum soil COPC level in the WDP with the lowest RBAS; and, b) for COPCs with maximum levels exceeding the RBASs, compare the WDP reasonable maximum exposure (RME) level with the RBAS.

The only WDP COPC that is above background levels and has a soil RME level greater than the RBAS is heptachlor epoxide. The LEHR site RBAS for this pesticide is 0.57 micrograms per kilogram (µg/kg) and the RME level is 1.91 µg/kg. However, this RBAS is almost entirely (99.7%) due to the risk associated with off-site residential exposure and the soil leaching to ground water ingestion pathway, which is considered an incomplete pathway for the WDP. Therefore, the heptachlor epoxide RBAS is considered too conservative for the WDP. Furthermore, the reporting limit specified for heptachlor epoxide by method CLP SOW OLM 03.0 is 1.8 µg/kg, which is greater than the RBAS of 0.57 µg/kg. Heptachlor epoxide was detected above this 1.8 µg/kg detection limit in only 8 of 197 (approximately 4%) WDP soil samples analyzed.

Therefore, based on these results, all COPCs in WDP soil are at or below the appropriate risk-based soil target levels. Sufficient valid data are available for the WDP area to conclude that no remedial actions are necessary for the soil. Remedial actions for the WDP curbing and gravel will be addressed separately in an Engineering Evaluation/Cost Analysis (EE/CA) to be completed in fiscal year 2000.

1. INTRODUCTION

1.1 Objectives

This Technical Memorandum presents results of statistical comparisons between the Western Dog Pens (WDP) soil quality data and the risk-based soil target levels for the Laboratory for Energy-Related Health Research (LEHR) site. The objective of these comparisons was to determine if the constituent of potential concern (COPC) levels in WDP soil exceed the lowest risk-based action standards (RBASs) established for the LEHR site. For those COPCs with background levels exceeding the lowest RBAS, the soil target levels are background levels. The results of these comparisons were then used to assess whether potential remedial actions are necessary to address the WDP soil. This analysis does not address the WDP curbing and gravel.

1.2 Data Overview

Soil samples were collected and analyzed from the WDP in 1990, 1994, 1996, and 1997/98. Details of these investigations and results are presented in the *Draft Final Remedial Investigation/Feasibility Study (RI/FS) Work Plan* (Dames and Moore, 1994), *Final Site Characterization Report* (Weiss Associates, 1997a), and *Final Technical Report: Results of Western Dog Pens, Background, and Off-site Investigations* (Weiss Associates, 1998a). The quality assurance/quality control (QA/QC) procedures followed during the 1990 and 1996 sampling events were not consistent with those required under CERCLA. The 1990 samples were collected and analyzed prior to the LEHR site's 1994 listing on the National Priorities List (NPL), and the 1996 samples were collected and analyzed for health and safety purposes rather than for NPL site characterization. These two data sets were used qualitatively in the design of the 1994 investigation and "Phase B" of the 1997/98 WDP investigations (Weiss Associates, 1998a), but were not used in the statistical comparisons described in this memorandum. The 1994 and 1997/98 data, which were collected in compliance with CERCLA QA/QC requirements, were used for the statistical comparisons documented herein. The 1994 and 1997/98 data sets are described in more detail in Section 2.1.

Three sets of background soil samples have been collected for the LEHR site (Figure 1): one comprising 26 samples from six borings drilled to 40 ft below ground surface (bgs) in 1994 (see *Draft Final Determination of Risk-Based Action Standards (RBAS) Report* (Weiss Associates, 1997b)); one comprising 52 samples from six borings drilled to 40 ft bgs in 1997 (Weiss Associates, 1998a); and, one comprising 40 samples from 20 locations at 0 and 2 ft bgs in 1999 (Weiss Associates, 1999a). The 1997 background data were collected to address deficiencies identified in the 1994 data set, while the 1999 data were collected to augment the shallow soil background data from the previous two data sets. As described in Appendix C of the *Final Work Plan for Removal*

Actions in the Ra/Sr Treatment Systems (Weiss Associates, 1999b), all three data sets were used in calculating background levels for most COPCs. In cases where the 1994 background data were statistically different from the 1997 background data, the 1994 data were not included in the background calculations. In these cases, the 1994 data were eliminated because these samples were analyzed by Lockheed Analytical Services (LAS), which has since closed, while the 1997 samples were analyzed by General Engineering Laboratories (GEL). GEL is used for most existing WDP and other LEHR soil analyses, and will likely be used for future analyses.

The soil background levels for the LEHR site are presented on Tables 1 (radionuclides) and 2 (metals and nitrate). Based on statistical analysis (see Appendix C, Weiss Associates, 1999b), the background levels for many COPCs were shown to be stratified with depth, with a statistically-significant difference between levels from 0 to 4 ft bgs ("shallow soil") and levels from greater than 4 ft bgs ("deep soil"). For these COPCs, separate background levels were calculated for soil from 0 to 4 ft bgs and for greater than 4 ft bgs. For COPCs with background levels that do not appear depth-dependent, a single background level representing all sampled depths was calculated.

1.3 Overview of Guidance Documents

The following guidance documents were used in collecting and evaluating the WDP and background data used in this statistical comparison. Details on how these documents were used are included in many of the LEHR workplans and reports referenced in this memorandum and in Sections 2 and 3 of this document.

- *Guidance for the Data Quality Objectives Process, USEPA QA/G-4S* (United States Environmental Protection Agency (USEPA), 1994a) - data collection design;
- *USEPA Requirements for Quality Assurance Project Plans for Environmental Data Operations, USEPA QA/R-5* (USEPA, 1998a) - data collection QA/QC;
- *Guidance for the Preparation of Standard Operating Procedures for Quality-Related Operations* (USEPA, 1995) - data collection QA/QC;
- *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)* (USEPA et al., 1997) - data collection and evaluation;
- *Risk Assessment Guidance for Superfund (RAGS) Part A* (USEPA, 1989a) - data collection and evaluation;
- *Guidance for Data Quality Assessment, Practical Methods for Data Analysis, USEPA QA/G-9* (USEPA, 1996) - data collection and evaluation;
- *Guidance for Data Usability in Risk Assessment* (USEPA, 1992a) - data collection and evaluation;

- *Selecting Inorganic Constituents as Chemicals of Potential Concern at Risk Assessments at Hazardous Waste Sites and Permitted Facilities, Final Policy* (DTSC, 1997) - data evaluation;

- *Methods for Evaluating the Attainment of Cleanup Standards, Volume 1: Soils and Solid Media* (USEPA, 1989b) - data evaluation; and,

- *Statistical Methods for Evaluating the Attainment of Cleanup Standards, Volume 3: Reference-Based Standards for Soils and Solid Media* (USEPA, 1994b) - data evaluation.

2. DESCRIPTION OF WESTERN DOG PENS DATA SETS

This section describes the WDP data sets used in the statistical evaluation of the WDP soil. Simple random, stratified random, or any of a variety of systematic sampling approaches may be appropriate depending on what is known about the potential site contamination (e.g., USEPA, 1989b and 1996). This section provides rationale for the selected sample distribution in the 1994 and 1997/98 WDP investigations. The adequacy of the number of WDP sample analyses used in the statistical evaluations is discussed in Section 3.

The work plans for the 1997/98 WDP investigation (Weiss Associates, 1997c and 1998b) were reviewed and accepted by the remedial project managers (RPMs) from USEPA, the Central Valley Regional Water Quality Control Board (RWQCB), the California USEPA Department of Toxic Substances Control (DTSC), and the California Department of Health Services (DHS). To the best of our knowledge, the work plan for the 1994 WDP investigation (Dames & Moore, 1994) was also approved by the RPMs. All laboratory analyses were performed using the methods specified in the approved work plans. LAS in Las Vegas, Nevada, performed the 1994 WDP (and background) analyses, and GEL in Charleston, South Carolina, performed the 1997 through 1999 WDP and (background) analyses.

Figure 2 shows all 1994 and 1997/98 WDP sampling locations. The 1994 "SBL" borings were drilled from 5 to 20 ft deep. The 1997/98 "Phase B" locations indicate dog pens where detailed surface soil sampling was conducted. The 1997/98 "Phase C" locations indicate pens where an approximately 26 ft boring was drilled and sampled. A total of over 200 soil samples were analyzed for these investigations of the approximately 2.5-acre WDP area. These samples were collected from 45 of the 320 former dog pens in the WDP.

Table 3 summarizes the number of samples analyzed for each COPC suite from each depth interval. Several 1994 soil samples were also analyzed for volatile and semi-volatile organic compounds (VOCs and SVOCs); however, these COPC suites were not included in subsequent investigations based on the lack of detectable concentrations in these 1994 and previous soil samples, and based on the operational history of the area.

2.1 1994 WDP Investigation

The 1994 WDP soil investigation consisted of seventeen soil borings, SBL-1 through SBL-16 and SBL-19 (Figure 2). Six of these borings (SBL-12 through SBL-16 and SBL-19) were located in the area of previously existing dog pens adjacent to the Cellular Biology Lab. This area had not been investigated previously. Each of these borings was approximately 5 ft deep, with samples collected and analyzed for selected COPCs from the surface, approximately 2.5 ft bgs, and in some cases

approximately 5 ft bgs (Dames & Moore, 1994). These boring were generally evenly distributed to cover the previous dog pen area outside of the Cellular Biology Lab.

The remaining 11 borings (SBL-1 through SBL-11) were located in areas previously identified as potentially impacted by chemicals or radioactivity in surface soil (Dames & Moore, 1994). Samples were collected at approximately 5 ft bgs in all of these borings. Two of these borings (SBL-6 and SBL-8), located in areas with the highest nitrate levels reported in previous investigations, were drilled to 20 ft bgs, and additional samples were collected at approximately 10 and 20 ft bgs.

The results of the 1994 investigation indicated that:

- Radium-226 was detected significantly above background in only 2 of 30 soil samples, with the maximum of 5.11 picoCuries per gram (pCi/g) detected in a sample from approximately 6 ft bgs.
- Several other radionuclides were detected slightly above background in some samples.
- Chlordane was present in surface soil at concentrations up to 0.5 milligrams per kilogram (mg/kg), but it attenuated sharply with depth and was not present at depths of 2.5 ft or greater.
- Nitrate was detected slightly above background (up to 59 mg/kg) in some samples.

2.2 1997/98 WDP "Phase B" Investigation

The primary purpose of the 1997/98 WDP investigations was to determine if contaminants are present above the soil target levels, and if so, to determine their horizontal and vertical distribution, and to determine if isolated, easily removable, and predictable "hot spots" are present. These investigations followed a three-phase (A, B, and C) approach. Phase A consisted of an information review and reconnaissance surface radiation survey. Phase B included detailed radiation surveying and surface gravel/soil interface sampling of selected dog pens. Phase C included additional gravel/soil sampling at the surface and to a depth of 26 ft bgs. Information from Phase A was used to guide the design and structure of Phase B, and results for both Phases were used in the design of the Phase C sampling program. These investigations are described in detail in two work plans (Weiss Associates, 1997c and 1998b) and in *Final Technical Report: Results of Western Dog Pens, Background, and Off-Site Investigations* (Weiss Associates, 1998a).

The Phase B soil sampling design was based on all information reviewed for Phase A. This included WDP operation records, interview transcripts, all previous soil sampling data, and a reconnaissance gamma radiation survey of the entire WDP area (Weiss Associates, 1997c and 1998a). Based on this information, the following preliminary observations were made: 1) COPCs are present at levels predominantly at or below background and/or the lowest RBAS; 2) COPCs in surface soil within a dog pen *may* show a predictable pattern of lateral distribution; and, 3) COPCs in

surface soil WDP-wide *may* show a predictable pattern of lateral distribution. Therefore, the main goal of Phase B was to conduct detailed surface soil sampling in various representative dog pens to determine if the surface soil COPC distribution within a single dog pen and/or throughout the WDP is predictable.

Because Phase A results suggested potentially predictable differences in COPC levels in surface soil from one group of dog pens to another, a stratified random sampling approach was selected for the Phase B WDP surface soil sampling. A stratified random approach ensured that areas within the WDP identified as most likely to be contaminated would be sampled, and that those areas least likely to be contaminated would also be sampled for comparison. Given the Phase B objectives, this stratified random sampling approach is consistent with USEPA guidance (e.g., USEPA, 1989b and 1996).

Based on Phase A results, chlordane and radium-226 were considered the primary COPCs for the WDP. Therefore, the WDP was divided into four sampling strata based on indications about chlordane levels and three strata based on indications about radium-226 levels (Figure 3). A random number generator (RNG) was used to select 12 dog pens from within the fenced area to represent the strata considered most likely and least likely to be impacted by chlordane and radium-226. In addition, one former dog pen east of the Cellular Biology Lab and a location at the east end of Row D with indications of elevated radium-226 were also selected for sampling (Figure 2).

The random start dog pen was determined by setting the northwestern-most pen within the stratum as the origin, generating a random number using the RNG, multiplying that number by the total number of pens within that stratum, rounding to the nearest whole number, and counting off pens to that number. Dog pens to be sampled were selected in a similar way, starting the counting from the random start pen.

As described in detail in *Technical Report: Results of Western Dog Pens, Background, and Off-site Investigations* (Weiss Associates, 1998a), a detailed gamma survey of both the gravel surface and the exposed soil surface (after gravel removal) was conducted on each of the selected Phase B pens. Four to seven surface soil sampling locations were selected from each of the pens based in part on the gamma survey results. A total of 75 surface soil samples, including 6 duplicates, were analyzed for selected radionuclides, organochlorine pesticides, mercury, hexavalent chromium, and nitrate. The radionuclide suite included gross alpha, gross beta, carbon-14, strontium-90, radium-226, and other gamma emitters.

Key results of the Phase B surface soil sampling are:

- Areas of elevated COPCs are few and of very limited lateral extent (1.2 ft radius or less), with detected levels generally less than five times soil background levels.
- There is no discernable intra-pen or inter-pen pattern to the COPC level distribution.

- As a result of the limited range of gamma emitter activities, there is no discernible correlation between field recorded gamma activities and laboratory reported radium-226, cesium-137, and/or other gamma emitter activities.

2.3 1997/98 WDP "Phase C" Investigation

Because Phase B results indicated that WDP surface soil areas with elevated COPC levels are few, of very limited extent, and show no predictable lateral distribution pattern, the Phase C sampling locations were selected primarily at random, consistent with USEPA guidance (USEPA, 1989b and 1996).

A total of 20 pens in the WDP were selected for the Phase C investigation (Figure 2). Fifteen of these were selected at random using the same method as described above for Phase B. For each of these fifteen pens, a borehole location was selected at random from one of eleven defined pen areas (Weiss Associates, 1998a, Figures 6 through 9). Two of the remaining five boring locations were selected to coincide with the previous soil sampling locations that showed the highest Ra-226 results. The remaining three borings coincided with the previous soil sampling locations that showed the highest chlordane concentrations (Weiss Associates, 1998b).

From each of the twenty Phase C borings, soil samples were collected and analyzed from the surface, 2 ft bgs, and at three other depths to approximately 26 ft bgs (the depth to first ground water). All 106 soil samples were analyzed for selected radionuclides, organochlorine pesticides, mercury, nitrate, and hexavalent chromium. In addition, 32 of the 106 samples were analyzed for total chromium, ammonia, organic nitrogen, and total organic carbon (Weiss Associates, 1998a).

Phase C soil sampling results confirmed the Phase B results for surface soil. The Phase C results also showed that the COPCs above background and/or lowest RBAS in surface soil generally attenuate sharply with depth, and very few COPC concentrations above the lowest RBAS were found below 2 ft bgs. The elevated radium-226 activities measured in two 1994 sampling locations were not confirmed by Phase C results.

2.4 WDP Spatial Sample Distribution Adequacy

The spatial distribution of WDP soil samples is adequate for making valid comparisons with risk-based soil target levels based on the following:

- Soil sample locations were chosen in an appropriate manner using USEPA guidance documents given our understanding of the COPC distribution in the WDP at the time.
- Soil sample locations comprise 45 (14 percent (%)) of the 320 WDP pens.
- The lateral locations of approximately 100 (50%) of the over 200 WDP soil sampling locations were selected at random in accordance with USEPA guidance (USEPA, 1989 and 1996).

In addition, the data used probably provide a conservatively elevated representation of COPCs in the WDP because:

- Approximately 100 non-random locations were selected to investigate previous indications of elevated COPCs.
- For the shallow soil interval (surface to 4 ft bgs, see Section 1.2 for further explanation), most of the WDP samples were collected at the surface where the highest COPC levels tend to be.

3. STATISTICAL COMPARISONS

Statistical methods were selected for comparing WDP soil quality data with background soil levels and/or the lowest RBAS to evaluate the need, if any, for further action with respect to soil in the WDP. It is assumed no remedial action is necessary if statistical analyses indicate that WDP COPC levels correlate statistically with risk-based target levels (background or lowest RBAS) with an acceptable level of certainty. The statistical approach described here was based on *Statistical Methods for Evaluating the Attainment of Cleanup Standards, Volume 3: Reference Based Standards for Soils and Solid Media* (USEPA, 1994b). This is the same approach described in Appendix A of *Sampling and Analysis Plan for Removal Actions in Southwest Trenches, Ra/Sr Treatment Systems, and Domestic Septic Tanks* (Weiss Associates, 1998c). This approach was suggested and approved by the LEHR RPMs for confirmation that cleanup standards had been reached following removal actions in the Southwest Trenches (USEPA, 1998b).

The overall approach for the statistical comparisons is shown in Figure 4. As shown in this figure, the approach entails first determining which COPCs in soil are at levels statistically above soil background levels. All COPCs identified as potentially above background are then compared with the lowest RBAS values. Each step of the process is described in detail in the following sections.

3.1 Statistical Method Basis

The Wilcoxon Rank Sum (WRS) test was selected as the primary method to determine if remedial actions are needed to address potential soil contamination in the WDP area. The WRS test is recommended in *Statistical Methods for Evaluating the Attainment of Cleanup Standards* (USEPA, 1994b). It was used for comparing the WDP COPC levels with the background levels. Data sufficiency was determined using the formula developed by Noether (1987) specifically for the WRS test. COPCs that exceed background levels based on the WRS test were then compared to the lowest RBAS.

The statistical hypothesis testing procedure begins with the statement of a null hypothesis (H_o) and alternative hypothesis (H_a). For the WDP, these are:

- H_o: WDP COPC levels do not exceed background and/or RBAS; and,
- H_a: WDP COPC levels do exceed background and/or RBAS.

Associated with H_o are Type I and Type II decision errors. A Type I decision error (α) is the probability of rejecting H_o when it is true. In the context of the WDP, α is the probability that the statistical tests will indicate the WDP levels are higher than the target levels when they actually are not. A Type II decision error (β) is the probability of accepting H_o when it is false. In the context of

the WDP, β is the probability that the statistical tests will indicate the WDP levels are the same (or lower) than the target levels when they actually are higher. The relationship between α, β, actual condition of WDP soil, and results of the statistical tests is shown below.

Result of Statistical Test, Based on Soil Data from WDP	Actual Condition of WDP Soil	
	Same/Lower than Target Levels	Higher than Target Levels
Test Indicates Same/Lower than Target Levels	Correct Test Result (Probability = $1 - \alpha$)	Incorrect Test Result Type II Error (Probability = β)
Test Indicates Higher than Target Levels	Incorrect Test Result Type I Error (Probability = α)	Correct Test Result (Probability = $1 - \beta$)

This table illustrates how often a statistical test may produce incorrect results. The test will be correct 100% of the time if α and β are equal to zero. However, the required number of test samples approaches infinity as α and β approach zero. Therefore, the test cannot be correct 100% of the time because an infinite number of samples cannot be collected.

To demonstrate achievement of the null hypothesis, H_0, a compromise must be made between the decision error rates α and β and the number of samples required to conduct the test. As approved by the RPMs for the Southwest Trenches cleanup confirmation sampling, α was set at 10% and β was set at 20% (Weiss Associates, 1998c). For the Noether calculation, a third parameter, the minimum detectable relative difference (Δ), must be set. As approved by the RPMs for the Southwest Trenches cleanup confirmation sampling, Δ was set at 30% of background for the WDP comparisons with background distributions in soil.

Details of the statistical methods used for this analysis are contained in Appendix A of *Sampling and Analysis Plan for Removal Actions in Southwest Trenches, Ra/Sr Treatment Systems, and Domestic Septic Tanks* (Weiss Associates, 1998c). The following sections summarize the methods and results for the WDP statistical tests. Appendix A of this document provides backup documentation for the statistical tests. Table 4 summarizes the results of the statistical tests.

3.2 Selection of COPCs for Statistical Tests

In general, all constituents with validated concentrations above the reporting limit in one or more WDP soil samples were included in the statistical analyses. Several general inorganic chemicals (nitrogen compounds other than nitrate, sulfate) were not included. In addition, short-lived (i.e., 10 hours or less) radionuclide daughter products (actinium-228, bismuth-212, bismuth-214, lead-212, lead-214, and thallium-208) were not included. Table 4 shows all the

constituents evaluated for the WDP. Although USEPA guidance (USEPA, 1990) allows for exclusion of COPCs detected at a frequency of less than 5%, all COPCs with one or more detection were retained (see Table 4).

The use of qualified data followed the procedures outlined in *Risk Assessment Guidance for Superfund Part A* (USEPA, 1989a), as described in *Draft Final Determination of Risk-Based Action Standards for DOE Areas* (Weiss Associates, 1997b).

3.3 Adequacy of Number of COPC Data Points for WDP and Background

As recommended in *Statistical Methods for Evaluating the Attainment of Cleanup Standards* (USEPA, 1994b), the Wilcoxon Rank Sum (WRS) test is the primary method to determine whether residual contaminant levels meet the cleanup criteria. Because the WRS test requires a minimum number of samples to be statistically valid, data sufficiency was evaluated using the formula developed by Noether (1987). For given decision errors α and β and given Δ, this number depends primarily on the variances of the COPC background and WDP distributions.

For COPCs with depth-stratified background distributions (see Section 1.2), the 0-to-4 ft bgs ("shallow") and the >4 ft bgs ("deep") background and WDP COPC distributions were compared separately using the WRS test. For non-stratified COPCs, soil data from all depths were used in the WRS tests. The results of the Noether data sufficiency calculation for each COPC are included in Appendix A. The results of the Noether calculation indicated sufficient data to conduct the WRS test for most COPCs. Those with either insufficient WDP or background data are indicated on Table 4. In most cases, these COPCs are present primarily at or below the laboratory detection limits in both background and WDP soil.

3.4 Results of Statistical Comparisons

Based on the WRS test results (Appendix A), all COPCs are at or below background levels except lead-210, strontium-90, thorium-234, uranium-235 and -238, total chromium in deep soil, iron, nickel in deep soil, and zinc in shallow soil (Table 4). Of these, strontium-90 and uranium-235 were detected above the reporting limit in less than 5% of the WDP soil samples. Most WDP and background soil levels for lead-210 and uranium-238 are also near the reporting limit. Because of this, WRS test results for these radionuclides, and also for zinc in shallow soil, are considered "qualified" due to insufficient data above the reporting limit. Therefore, these WDP COPCs may actually be present at levels representative of background.

Following the WRS test, the maximum detected WDP soil levels were compared to the corresponding lowest RBAS (Weiss Associates, 1997b) for those WDP COPCs that:

1) do not have sufficient data for a definitive comparison between background and WDP soil levels based on the Noether calculation;

2) exceed background levels based on the WRS test; or,

3) do not have an established background level.

For those COPCs with maximum WDP soil levels that exceed the lowest RBAS, the reasonable maximum exposure (RME) level, defined as the 95% upper confidence limit on the mean (UCL) (USEPA, 1992b) was calculated (Appendix A) and compared to the RBAS. As shown on Table 4, the results of these comparisons with lowest RBAS are:

- No RBASs are available for iron, nickel, and nitrate;
- Maximum WDP soil levels for uranium-235 and mercury in deep soil exceed the lowest RBAS; however, the RME levels for both of these WDP soil COPCs are below the lowest RBAS; and,
- The pesticides alpha-BHC, alpha-chlordane, gamma chlordane, and heptachlor epoxide have maximum WDP soil concentrations that exceed the lowest RBAS; however, only heptachlor epoxide has an RME level that also exceeds the lowest RBAS.

Based on these statistical analyses, only heptachlor epoxide in WDP soil exceeds the risk-based target levels for LEHR soil, as indicated by the RME level exceeding the lowest RBAS. The RME level is 1.91 micrograms per kilogram (µg/kg) (Appendix A) and the lowest RBAS is 0.57 µg/kg. However, the reporting limit specified for heptachlor epoxide by USEPA method CLP SOW OLM 03.0 is 1.8 µg/kg. Because this reporting limit is higher than the RBAS and only 8 of the 197 (i.e., 4%) WDP soil samples analyzed had detectable levels, it is difficult to establish if heptachlor epoxide levels in WDP soil truly exceed the 0.57 µg/kg RBAS.

Additionally, the 0.57 µg/kg heptachlor epoxide RBAS value is almost entirely (99.7%) due to the risk associated with off-site residential exposure and the soil leaching to ground water ingestion pathway (Table 5-5 of Weiss Associates, 1997b). As indicated in *Draft Final Determination of Risk-Based Action Standards for DOE Areas* (Weiss Associates, 1997b, page 5-7), RBAS values calculated for the soil leaching to ground water exposure pathway are based on highly conservative assumptions used in fate and transport modeling, including:

- COPCs were assumed to be present throughout the vertical and lateral extent of the area at the action standard concentration, and present both in surface soil and in soil to a depth of 15 ft bgs; and,
- No degradation (or decay) is assumed during saturated zone transport from the site to the receptor location.

In regards to these assumptions, soil data for the WDP indicate that heptachlor epoxide attenuates markedly with depth, and is not detected at all below 2.5 ft bgs. The health conservative nature of the modeling and RBAS calculations is further evident in reviewing results of ground water quality monitoring at the site. Specifically, heptachlor epoxide has never been detected in over eight

years of quarterly monitoring of wells immediately downgradient of the WDP (Dames & Moore, 1999). Therefore, residual levels of heptachlor epoxide in WDP soil have not impacted ground water and hence, are not expected to threaten ground water quality. In the absence of impact from heptachlor epoxide to soil deeper than 2.5 ft bgs and to ground water, the soil leaching to ground water ingestion exposure pathway is considered incomplete. Therefore, it appears that the heptachlor epoxide RBAS is overly conservative and not appropriate for the WDP soil.

3.5 Conclusions and Recommendations

Based on our statistical evaluation of the WDP soil data, all COPCs are at or below the appropriate soil target levels, defined as the lowest appropriate RBAS, or background for those COPCs with background levels higher than the lowest RBAS (Weiss Associates, 1997b). In addition, many of the WDP soil sampling locations were selected specifically to target areas that were suspected to have elevated COPC levels. This sampling bias has resulted in a data set that focuses on the worst-case areas of the WDP. Accordingly, use of these data in the statistical analysis and comparisons with RBASs yields results that are health-conservative.

Based on these results, no remedial action is recommended for WDP soil. The WDP curbing and gravel will be addressed in an Engineering Evaluation/Cost Analysis to be prepared in fiscal year 2000.

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FIGURES

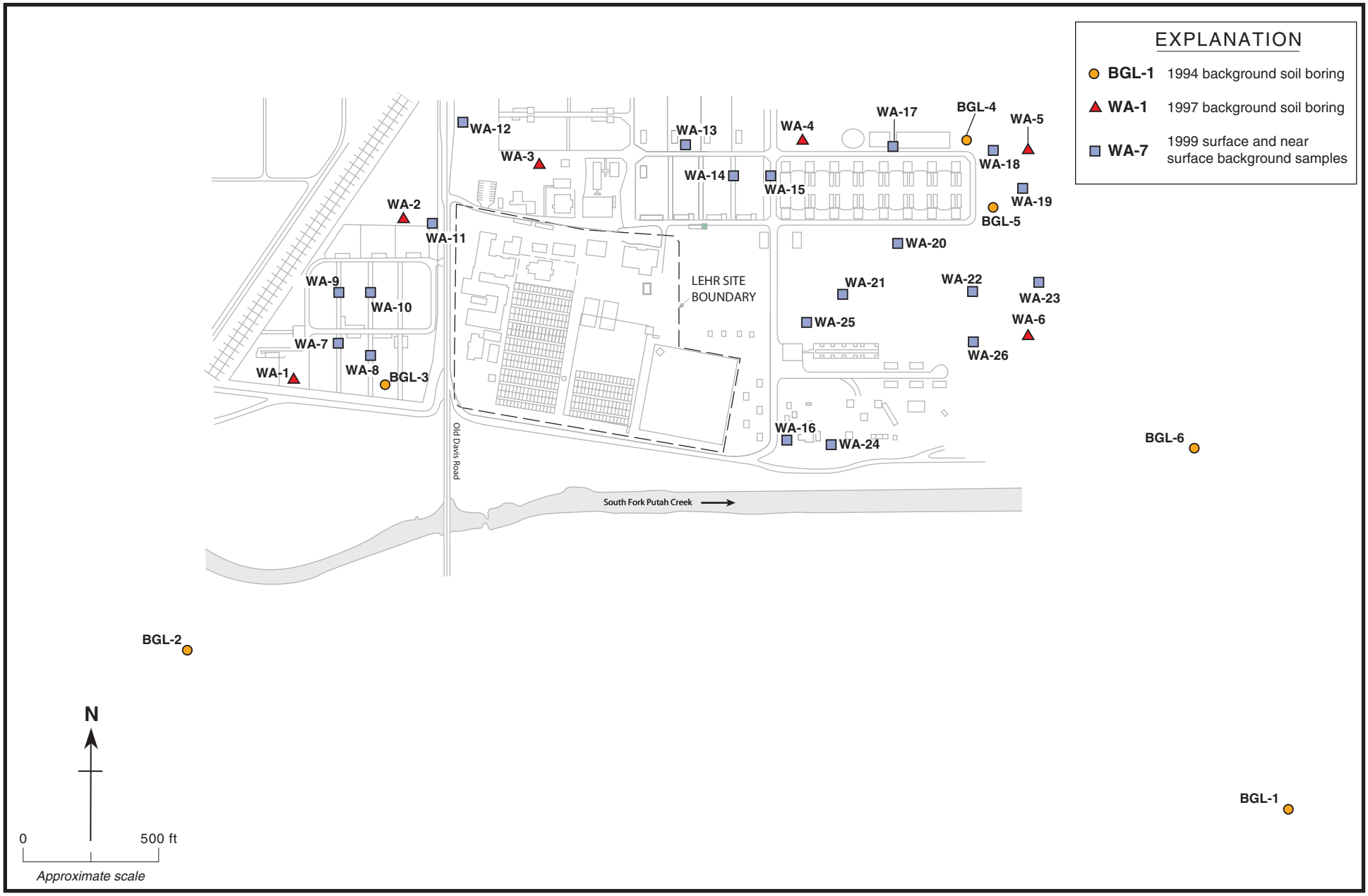


Figure 1. Soil Sampling Locations for Background Investigations, LEHR Site, UC Davis, California

Weiss Associates

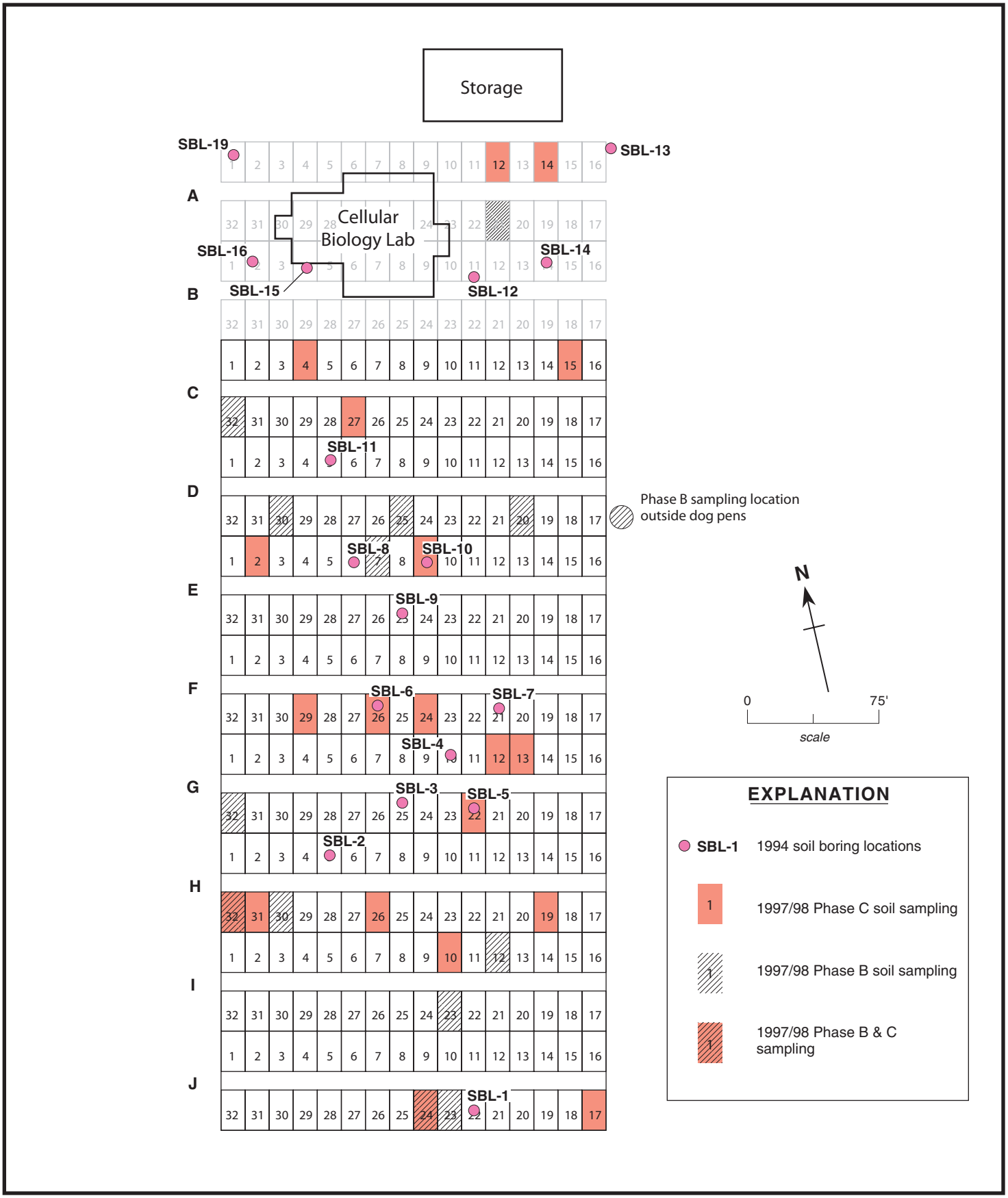
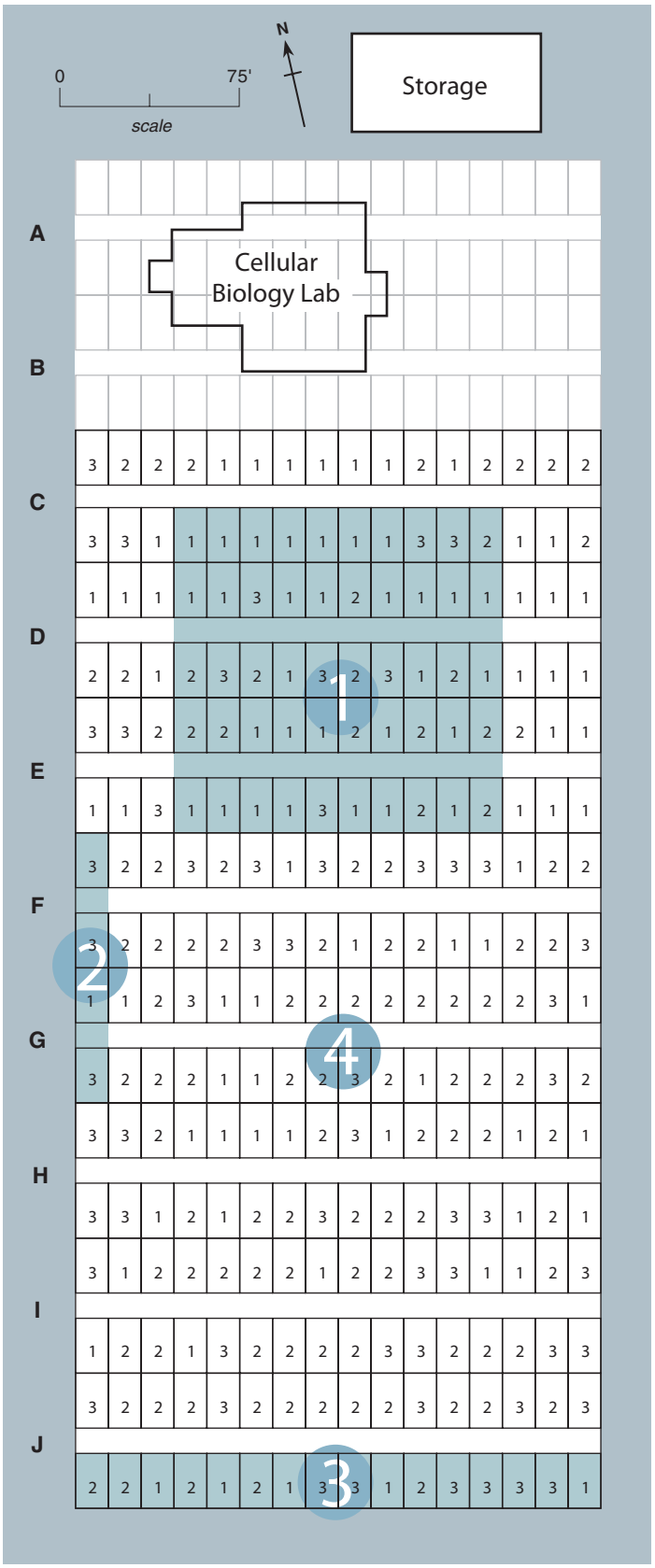


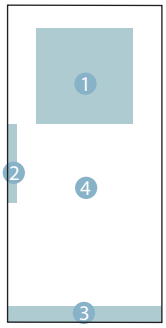
Figure 2. Western Dog Pens Soil Sampling Locations - LEHR Site, UC Davis, California

Weiss Associates



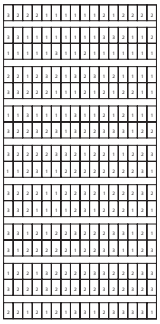
EXPLANATION

CHLORDANE STRATA



1. Potentially not impacted based on previous soil data.
2. Potentially significantly impacted based on reported dip area.
3. Potentially significantly impacted based on reported spraying along this boundary.
4. Somewhat impacted based on previous soil data.

Ra–226 STRATA



1. Not significantly impacted based on surface survey (δ<394 cpm), pedestal survey ("background"), and soil data.
2. Potentially impacted above background based on surface survey (394 cpm <δ<450 cpm) pedestal scans ("background" <δ<3,000 dpm/cm^2 and/or "background" <α <300 dpm/cm^2) or soil data (pedestal scans >300 dpm/cm^2α and/or >3,000 dpm/cm^2δ, but soil <background).
3. Probable impact above background based on surface survey (δ>450 cpm), pedestal survey (α >300 dpm/cm^2 or δ>3,000 dpm/cm^2), and/or soil data (>background).

Ra–226 Strata

Chlordane Strata	Total # of Pens: 1	2	3	# of Pens Randomly Selected: 1	2	3
1	30	13	7	2	0	1
2	1	0	3	0	0	1
3	5	5	6	1	0	1
4	56	89	41	2	0	4

Figure 3. Soil Sampling Strata for Phase B of 1997/98 Western Dog Pens Area Investigation, LEHR Site, UC Davis, California

Weiss Associates

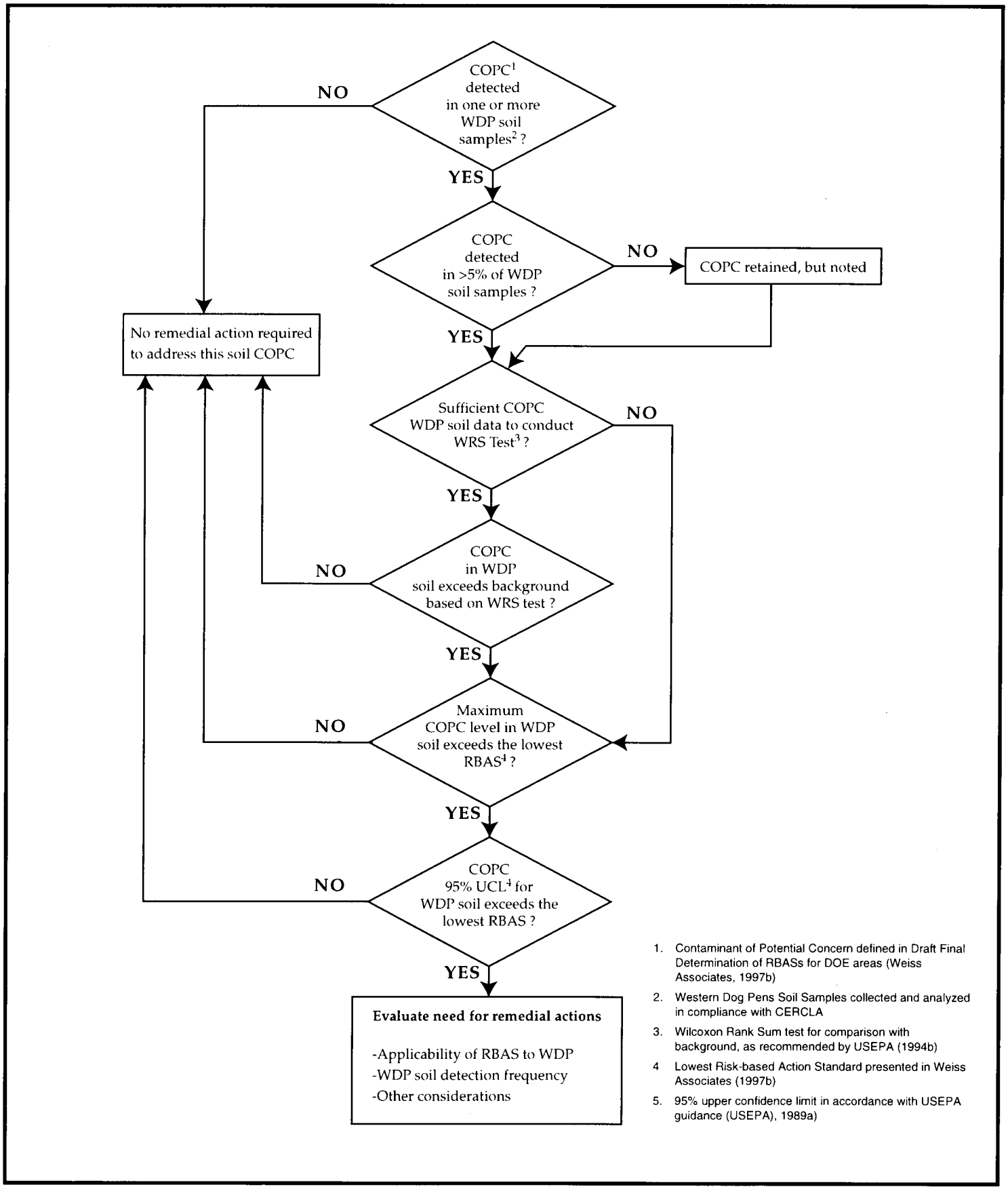


Figure 4. Data Evaluation Process for Western Dog Pens Soil, LEHR Site, UC Davis, California

Weiss Associates

TABLES

Table 1. Updated Soil Background Levels for Radionuclides, LEHR Site, UC Davis, California

Radionuclide	1998 Background Value (pCi/g)				**Updated 1999 Background Value (pCi/g)**			
	0-4 feet bgs (sand)	n	>4 feet bgs (clay)	n	**0-4 feet bgs**	**n**	**>4 feet bgs**	**n**
Actinium-228	0.66	17	0.63	31	**0.633**	**12**	**0.642**	**40**
Americium-241	ND < 0.014	NA	ND < 0.014	NA	**ND < 0.014**	**NA**	**ND < 0.014**	**NA**
Bismuth-212	0.41	17	0.43	31	**0.388**	**12**	**0.434**	**40**
Bismuth-214	0.54	69*	0.54	69*	**0.54**	**69***	**0.54**	**69***
Carbon-14	ND < 0.13	NA	ND < 0.13	NA	**ND < 0.13**	**NA**	**ND < 0.13**	**NA**
Cesium-137	0.012	48*	0.012	48*	**0.102**	**64**	**0.00695**	**48**
Cobalt-60	ND < 0.006	NA	ND < 0.006	NA	**ND < 0.006**	**NA**	**ND < 0.006**	**NA**
Gross Alpha	7.4	17	9.0	31	**7.42**	**12**	**8.85**	**40**
Gross Beta	15	47*	15	47*	**15**	**47***	**15**	**47***
Lead-210	1.6	48*	1.6	48*	**1.6**	**48***	**1.6**	**48***
Lead-212	0.69	29	0.73	40	**0.691**	**26**	**0.684**	**40**
Lead-214	0.56	16	0.58	31	**0.682**	**12**	**0.581**	**39**
Potassium-40	14	70*	14	70*	**14**	**70***	**14**	**70***
Plutonium-241	ND < 0.50	NA	ND < 0.50	NA	**ND < 0.50**	**NA**	**ND < 0.50**	**NA**
Radium-226	0.70	29	0.75	42	**0.752**	**72***	**0.752**	**72***
Radium-228	0.66	17	0.63	30	**0.63**	**12**	**0.655**	**39**
Strontium-90	0.056	47*	0.056	47*	**0.056**	**47***	**0.056**	**47***
Thallium-208	0.21	29	0.22	39	**0.204**	**26**	**0.223**	**52**
Thorium-228	0.63	13	0.76	11	**0.627**	**52**	**0.771**	**12**
Thorium-230	0.79	20*	0.79	20*	**1.04**	**64***	**1.04**	**64***
Thorium-232	0.60	13	0.80	11	**0.63**	**52**	**0.80**	**12**
Thorium-234	0.78	48*	0.78	48*	**0.78**	**48***	**0.78**	**48***
Tritium	ND < 1.2	NA	ND < 1.2	NA	**ND < 1.2**	**NA**	**ND < 1.2**	**NA**
Uranium-233/234	0.59	13	0.71	11	**0.559**	**52**	**0.706**	**12**
Uranium-235	0.039	47*	0.039	47*	**0.0638**	**112***	**0.0638**	**112***
Uranium-238	0.56	8	0.65	11	**0.565**	**52**	**0.645**	**12**

Notes:

Background values are the 80% lower confidence limit on the 95th percentile for the sample data set. shading indicates significant change from previous background level.

n = Number of samples used to calculate background cutoff value.

* = Indicates constituent is NOT STRATIFIED: n = total number of samples used in calculation.

NA = Not Applicable

ND < # = All sample concentrations were below a detection limit of #.

Table 2. Updated Soil Background Levels for Metals and Nitrate, LEHR Site, UC Davis, California

Metal	1998 Background Value (mg/kg)				**Updated 1999 Background Value (mg/kg)**			
	0-4 feet bgs (sand)	N	>4 feet bgs (clay)	n	**0-4 feet bgs**	**n**	**>4 feet bgs**	**n**
Antimony	1.4	48*	1.4	48*	**1.4**	**48***	**1.4**	**48***
Arsenic	8.5	13	10	10	**8.14**	**12**	**10.9**	**12**
Barium	210	13	290	11	**211**	**52**	**294**	**12**
Beryllium	0.62	9	0.72	10	**0.564**	**52**	**0.924**	**12**
Cadmium	0.51	48*	0.51	48*	**0.51**	**48***	**0.51**	**48***
Chromium	218	30	130	42	**199**	**64**	**125**	**48**
Hexavalent Chromium	0.054	47*	0.054	47*	**0.054**	**47***	**0.054**	**47***
Cobalt	31	24*	31	24*	**31**	**24***	**31**	**24***
Copper	52	30	62	42	**48.8**	**26**	**61.8**	**52**
Iron	44,000	24*	44,000	24*	**44,000**	**24***	**44,000**	**24***
Lead	9.5	46*	9.5	46*	**9.5**	**46***	**9.5**	**46***
Manganese	750	22*	750	22*	**750**	**22***	**750**	**22***
Mercury	0.65	26	0.23	40	**3.94**	**64**	**0.248**	**48**
Molybdenum	ND < 0.26	NA	ND < 0.26	NA	**ND < 0.26**	**NA**	**ND < 0.26**	**NA**
Nickel	370	30	250	42	**334**	**64**	**246**	**48**
Selenium	1.2	24*	1.2	24*	**1.2**	**24***	**1.2**	**24***
Silver	0.55	48*	0.55	48*	**0.55**	**48***	**0.55**	**48***
Thallium	1.6	48*	1.6	48*	**1.6**	**48***	**1.6**	**48***
Vanadium	69	13	80	11	**66.8**	**12**	**80.3**	**12**
Zinc	64	8	93	11	**72.4**	**12**	**93.1**	**12**
Nitrate	36	72*	36	72*	**36**	**72***	**36**	**72***

Notes:
Background values are the 80% lower confidence limit on the 95th percentile for the sample data set; shading indicates significant change from previous background level.
n = Number of sample concentrations used to calculate background cutoff value.
* = Indicates constituent is NOT STRATIFIED; n = total number of samples used in calculation.
NA = Not Applicable
ND < # = All sample concentrations were below a detection limit of #.

Table 3. Number of Samples per Depth Interval for 1994 and 1997/98 Western Dog Pens Soil LEHR Site, UC Davis, California

	Number of Samples Per Analytic Suite				
Depth Interval	Radionuclides[1]	Metals[1]	Chromium VI	Nitrate	Pesticides
0 - 2 ft.	126	119	124	119	122
2 - 4 ft.	4	4	9	4	4
4 - 12 ft	38	36	36	36	35
12 - 20 ft.	21	20	20	20	21
20 - 40 ft.	22	21	21	21	22

[1] For radionuclides and metals, the number of samples given is for the most frequently analyzed constituent(s) from that analytic suite for that depth interval.

Table 4. Comparison of Western Dog Pens Soil Data with Reporting Limits, Background Levels, Risk-Based Action Standards, and PRGs, LEHR Site, UC Davis, California

Constituent	Total Number of Samples	Number above Reporting Limit	Range (Minimum-Maximum)	Background[1]	Statistical Comparison with Background[2]	Lowest RBAS[3]	Maximum Detection Below Lowest RBAS[4]	RME Level below Lowest RBAS[5]	Overall Comparison with Target Levels	PRG[6]
Radionuclides			**pCi/g**	**pCi/g**		**pCi/g**				**pCi/g**
Carbon-14	200	7 (<5%)	<0.695-16.4	NA	NA	4200	**Pass**	---	**Pass**	770
Cesium-137	199	44	<0.02-0.115	0.102/0.007[7]	**Pass**/Pass(Q)	0.1	---/**Pass**	---	**Pass**	0.02
Lead-210	199	18	<0.21 - 4.96	1.6	Fail(Q)	9.6	**Pass**	---	**Pass**	0.78
Potassium-40	198	198	4.1-16.4	14	**Pass**	NE	---	---	**Pass**	0.068
Radium-226	200	183	<0.019-5.11	0.752	**Pass**	0.0042	---	---	**Pass**	0.0062
Strontium-90	200	8 (<5%)	<0.236-0.712	0.056	Fail(Q)	10	**Pass**	---	**Pass**	14
Thorium-234	199	59	<0.24-2.4	0.78	Fail	3.2[8]	**Pass**	---	**Pass**	0.69
Uranium-235	198	10 (<5%)	<0.13-0.317	0.0638	Fail(Q)	0.15	Fail	**Pass**	**Pass**	0.16
Uranium-238	169	60	<0.24-2.4	0.565/0.645	Fail(Q)/Fail(Q)	3.2[8]	**Pass**	---	**Pass**	18
Metals			**mg/kg**	**mg/kg**		**mg/kg**				**mg/kg**
Barium	30	6	<200-219	211/294	**Pass/Pass**	53	---	---	**Pass**	5200
Total Chromium	63	63	43.9-273	199/125	**Pass**/Fail	722	---/**Pass**	---	**Pass**	210
Hex. Chromium	210	39	<0.206-1.02	0.054	Pass(Q)	3.8	**Pass**	---	**Pass**	30 (0.2)
Copper	30	25	<25-46.8	48.8/61.8	**Pass/Pass**	28	---	---	**Pass**	2800
Iron	30	30	21,000-46,600	44,000	Fail	NE	(NE)	(NE)	Indeterminate	22,000
Lead	30	30	4.1-10.8	9.5	**Pass**	0.044	---	---	**Pass**	400 (130)
Manganese	30	30	379-1010	750	**Pass**	36	---	---	**Pass**	3100
Mercury	201	128	<0.03-3.7	3.94/0.248	**Pass**/Pass(Q)	0.22	---/Fail	---/**Pass**	**Pass**	22
Nickel	30	30	62.9-318	334/246	**Pass**/Fail	NE	---/(NE)	---/(NE)	Indet. for deep	1,500 (150)
Vanadium	30	30	34.7-77.5	66.8/80.3	**Pass/Pass**	NE	---	---	**Pass**	520
Zinc	30	30	42.8-130	72.4/93.1	Pass(Q)/**Pass**	3400	**Pass**/---	---	**Pass**	22,000

Table 4. Comparison of Western Dog Pens Soil Data with Detection Limits, Background Levels, Risk-Based Action Standards, and PRGs, LEHR Site, UC Davis, California (continued)

Constituent	Total Number of Samples	Number above Reporting Limit	Range (Minimum-Maximum)	Background[1]	Statistical Comparison with Background[2]	Lowest RBAS[3]	Maximum Detection Below Lowest RBAS[4]	RME Level below Lowest RBAS[5]	Overall Comparison with Target Levels	PRG[6]
Pesticides			**ug/kg**	**ug/kg**		**ug/kg**				**ug/kg**
Alpha-BHC	197	1 (<5%)	<1.9-11	NA	NA	7.5	Fail	**Pass**	**Pass**	86
Chlordane-alpha	197	84	<1.5-1210	NA	NA	800	Fail	**Pass**	**Pass**	1600
Chlordane-gamma	197	85	<1.5-976	NA	NA	810	Fail	**Pass**	**Pass**	1600
Heptachlor Epoxide	197	8 (<5%)	<1.8-13.4	NA	NA	0.57	Fail	Fail	Fail	49
Inorganics			**mg/kg**	**mg/kg**		**mg/kg**				**mg/kg**
Nitrate	200	189	<0.197-59	36	Pass (Q)	NE	(NE)	(NE)	Pass(Q)	NE

NOTES:

(1) Site-specific background levels, as presented in Appendix C from "Sampling and Analysis Plan for Removal Actions..." (Weiss Associates, 1999b); "NA" indicates not available.

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

(3) Lowest RBAS from "Draft Final Determination of Risk-Based Action Standards for DOE Areas" (Weiss Associates, 1997b); "NE" indicates none established.

(4) "Pass" indicates maximum Western Dog Pens level is lower than lowest RBAS; "---" indicates comparison not made because constituent passes comparison with background.

(5) "Pass" indicates reasonable maximum exposure (RME) level, defined as the 95% upper confidence limit (UCL) on the mean, of Western Dog Pens data is lower than lowest RBAS; "---" indicates comparison not made because constituent passed previous comparison.

(6) USEPA Region IX Preliminary Remediation Goals, August and December, 1996, at 10-6 Risk for residential scenario; California Modified Preliminary Remediation Goals in parentheses; "NE" indicates none established.

(7) Where two background values are given, first is for surface to 4 ft bgs soil, second is for >4 ft bgs soil.

(8) RBAS for U-238 + Th-234.

APPENDIX A

STATISTICAL TESTS AND BACKUP CALCULATIONS COMPARING WESTERN DOG PENS SOIL DATA TO RISK-BASED TARGET LEVELS

APPENDIX A-1

RADIONUCLIDE WILCOXON RANK SUM TEST RESULTS

Wilcoxon Rank Sum Test, Comparison of DP data to background, Cesium-137
(shallow samples)

Sample ID	CONC	Grouping	Abs Rank	Tie-Norm Ran	n1Ranks	$t_j(t_j^2-1)$	Tie Ind
SSBG0011	-0 036	BG	1	1	0	0	0
LEHR-SS-DP-0122	-0 024	DP	2	2	2	0	0
LEHR-SS-DP-0119	-0 024	DP	3	3	3	0	0
SSBG0029	-0 017	BG	4	4	0	0	0
SSDP0043	-0 016	DP	5	5	5	0	0
SSDP0064	-0 013	DP	6	6	6	0	0
LEHR-SS-DP-0121	-0 013	DP	7	7	7	0	0
SSBG0030	-0 011	BG	8	8	0	0	0
SSDP0208	-0 011	DP	9	9	9	0	0
LEHR-SS-DP-0193	-0 01	DP	10	10	10	0	0
SSDP0281	-0 009	DP	11	11	11	0	0
LEHR-SS-DP-0163	-0 008	DP	12	12	12	0	0
SSDP0239	-0 007	DP	13	13	13	0	0
SSDP0045	-0 007	DP	14	14	14	0	0
SSDP0249	-0 006	DP	15	15	15	0	0
SSDP0228	-0 006	DP	16	16	16	0	0
SSDP0069	-0 005	DP	17	17	17	0	0
SSDP0260	-0 005	DP	18	18	18	0	0
SSDP0244	-0 004	DP	19	19	19	0	0
SSDP0238	-0 004	DP	20	20	20	0	0
SSBG0049	-0 003	BG	21	22	0	0	0
SSDP0046	-0 003	DP	22	22	22	0	1
SSDP0050	-0 003	DP	23	22	22	24	2
SSDP0068	-0 002	DP	24	24	24	0	0
SSBG0039	-0 001	BG	25	25	0	0	0
LEHR-SS-DP-0117	-5E-04	DP	26	26	26	0	0
LEHR-SS-DP-0162	-4E-04	DP	27	27	27	0	0
SSBG0147	-4E-04	BG	28	28	0	0	0
SSDP0234	-4E-04	DP	29	29	29	0	0
SSBG0144	-3E-04	BG	30	30	0	0	0
LEHR-SS-DP-0118	-2E-04	DP	31	31	31	0	0
LEHR-SS-DP-0169	-2E-04	DP	32	32	32	0	0
SSDP0197	0	DP	33	35	35	0	0
SSDP0248	0	DP	34	35	35	0	1
SSDP0255	0	DP	35	35	35	0	2
SSDP0265	0	DP	36	35	35	0	3
SSDP0285	0	DP	37	35	35	120	4
LEHR-SS-DP-0189	0 0001	DP	38	38	38	0	0
LEHR-SS-BG-0101	0 0003	BG	39	39	0	0	0
LEHR-SS-DP-0187	0 0003	DP	40	40	40	0	0
SSDP0223	0 0004	DP	41	41	41	0	0
SSBG0145	0 0005	BG	42	42	0	0	0
LEHR-SS-DP-0136	0 0005	DP	43	43	43	0	0
SSBG0138	0 0006	BG	44	44	0	0	0
SSBG0150	0 0008	BG	45	45	0	0	0
SSDP0058	0 001	DP	46	46	46	0	0
SSBG0128	0 0014	BG	47	47	0	0	0
LEHR-SS-BG-0092	0 0016	BG	48	48	0	0	0
LEHR-SS-DP-0178	0 0017	DP	49	49	49	0	0
SSDP0061	0 002	DP	50	50	50	0	0
LEHR-SS-BG-0110	0 002	BG	51	51	0	0	0
SSDP0288	0 0022	DP	52	52	52	0	0
SSDP0224	0 0022	DP	53	53	53	0	0
SSBG0152	0 0026	BG	54	54	0	0	0
SSDP0229	0 0028	DP	55	55	55	0	0
SSBG0124	0 003	BG	56	56	0	0	0
SSDP0219	0 0031	DP	57	57	57	0	0
SSDP0233	0 0037	DP	58	58	58	0	0
SSBG0154	0 0038	BG	59	59	0	0	0
LEHR-SS-DP-0183	0 0039	DP	60	60	60	0	0
LEHR-SS-DP-0173	0 0039	DP	61	61	61	0	0
LEHR-SS-DP-0143	0 0042	DP	62	62	62	0	0
LEHR-SS-DP-0151	0 0049	DP	63	63	63	0	0
SSDP0264	0 0049	DP	64	64	64	0	0
SSBG0163	0 0053	BG	65	65 5	0	0	0
SSDP0209	0 0053	DP	66	65 5	65 5	6	1
LEHR-SS-BG-0074	0 0053	BG	67	67	0	0	0
LEHR-SS-DP-0170	0 0058	DP	68	68	68	0	0
LEHR-SS-BG-0083	0 0059	BG	69	69	0	0	0
SSDP0042	0 006	DP	70	70	70	0	0
SSDP0275	0 0064	DP	71	71	71	0	0
LEHR-SS-DP-0137	0 0067	DP	72	72	72	0	0
SSBG0159	0 0068	BG	73	73	0	0	0
SSBG0002	0 007	BG	74	74	0	0	0
SSBG0143	0 0072	BG	75	75	0	0	0
LEHR-SS-BG-0066	0 0078	BG	76	76	0	0	0
SSDP0293	0 008	DP	77	77	77	0	0
SSBG0122	0 0082	BG	78	78	0	0	0
SSDP0202	0 0085	DP	79	79	79	0	0
SSBG0126	0 0089	BG	80	80	0	0	0
LEHR-SS-DP-0149	0 01	DP	81	81	81	0	0
LEHR-SS-DP-0168	0 0103	DP	82	82	82	0	0
SSDP0280	0 0118	DP	83	83	83	0	0
LEHR-SS-DP-0135	0 0121	DP	84	84	84	0	0
SSBG0001	0 013	BG	85	85 5	0	0	0
SSDP0049	0 013	DP	86	85 5	85 5	6	1
SSBG0137	0 0136	BG	87	87	0	0	0
SSDP0052	0 014	DP	88	88	88	0	0
LEHR-SS-DP-0154	0 0146	DP	89	89	89	0	0
SSDP0243	0 015	DP	90	90	90	0	0
SSBG0132	0 0152	BG	91	91	0	0	0
LEHR-SS-DP-0153	0 016	DP	92	92 5	92 5	0	0
SSDP0270	0 016	DP	93	92 5	92 5	6	1
LEHR-SS-BG-0109	0 0161	BG	94	94	0	0	0
LEHR-SS-DP-0192	0 0167	DP	95	95	95	0	0
SSBG0130	0 0182	BG	96	96	0	0	0
LEHR-SS-BG-0100	0 0183	BG	97	97	0	0	0
SSDP0203	0 0184	DP	98	98	98	0	0
LEHR-SS-DP-0142	0 0185	DP	99	99	99	0	0
SSDP0218	0 0186	DP	100	100	100	0	0
SSBG0125	0 0188	BG	101	101	0	0	0
SSBG0140	0 019	BG	102	102	0	0	0
SSDP0287	0 0191	DP	103	103	103	0	0
LEHR-SS-DP-0184	0 0202	DP	104	104	104	0	0
SSBG0129	0 0203	BG	105	105	0	0	0
LEHR-SS-DP-0125	0 0213	DP	106	106	106	0	0
LEHR-SS-DP-0120	0 0215	DP	107	107	107	0	0
LEHR-SS-DP-0156	0 022	DP	108	108	108	0	0

Wilcoxon Rank Sum Test, Comparison of DP data to background, Cesium-137
(shallow samples)

SSDP0213	0 0223	DP	109	109	109	0	0
LEHR-SS-DP-0150	0 0225	DP	110	110	110	0	0
LEHR-SS-DP-0127	0 0226	DP	111	111	111	0	0
LEHR-SS-DP-0140	0 0228	DP	112	112	112	0	0
SSBG0020	0 023	BG	113	113	0	0	0
SSDP0198	0 0237	DP	114	114	114	0	0
LEHR-SS-DP-0131	0 0241	DP	115	115	115	0	0
LEHR-SS-DP-0129	0 0255	DP	116	116	116	0	0
LEHR-SS-DP-0128	0 0278	DP	117	117	117	0	0
SSDP0214	0 028	DP	118	118	118	0	0
SSDP0286	0 0281	DP	119	119	119	0	0
LEHR-SS-DP-0177	0 0284	DP	120	120	120	0	0
SSBG0157	0 0288	BG	121	121	0	0	0
LEHR-SS-DP-0145	0 0296	DP	122	122	122	0	0
LEHR-SS-DP-0190	0 0298	DP	123	123	123	0	0
SSDP0274	0 0329	DP	124	124	124	0	0
LEHR-SS-DP-0188	0 0331	DP	125	125	125	0	0
LEHR-SS-DP-0181	0 0342	DP	126	126	126	0	0
LEHR-SS-DP-0139	0 0359	DP	127	127	127	0	0
LEHR-SS-BG-0065	0 0376	BG	128	128	0	0	0
SSBG0134	0 0387	BG	129	129 5	0	0	0
SSBG0149	0 0387	BG	130	129 5	0	6	1
SSBG0019	0 039	BG	131	131	0	0	0
LEHR-SS-DP-0167	0 0396	DP	132	132 5	132 5	0	0
SSDP0292	0 0396	DP	133	132 5	132 5	6	1
SSDP0047	0 04	DP	134	134	134	0	0
LEHR-SS-DP-0157	0 0402	DP	135	135	135	0	0
SSBG0133	0 0405	BG	136	136	0	0	0
LEHR-SS-DP-0152	0 0412	DP	137	137	137	0	0
SSBG0151	0 0419	BG	138	138 5	0	0	0
SSDP0269	0 0419	DP	139	138 5	138 5	6	1
LEHR-SS-BG-0082	0 0422	BG	140	140	0	0	0
SSBG0155	0 0424	BG	141	141 5	0	0	0
LEHR-SS-DP-0138	0 0424	DP	142	141 5	141 5	6	1
SSBG0161	0 0431	BG	143	143	0	0	0
LEHR-SS-DP-0160	0 0436	DP	144	144	144	0	0
LEHR-SS-DP-0144	0 0445	DP	145	145	145	0	0
SSDP0056	0 045	DP	146	146	146	0	0
LEHR-SS-DP-0191	0 0458	DP	147	147	147	0	0
LEHR-SS-BG-0073	0 0468	BG	148	148	0	0	0
SSBG0142	0 0473	BG	149	149	0	0	0
SSDP0254	0 0478	DP	150	150	150	0	0
LEHR-SS-DP-0148	0 0518	DP	151	151	151	0	0
LEHR-SS-DP-0179	0 0528	DP	152	152	152	0	0
SSBG0162	0 0547	BG	153	153	0	0	0
LEHR-SS-DP-0159	0 0551	DP	154	154	154	0	0
LEHR-SS-DP-0186	0 0553	DP	155	155	155	0	0
LEHR-SS-DP-0175	0 0584	DP	156	156	156	0	0
LEHR-SS-DP-0130	0 0591	DP	157	157	157	0	0
SSBG0160	0 0594	BG	158	158	0	0	0
SSBG0131	0 0606	BG	159	159	0	0	0
LEHR-SS-DP-0182	0 0617	DP	160	160	160	0	0
SSBG0047	0 062	BG	161	161	0	0	0
SSBG0127	0 0622	BG	162	162	0	0	0
LEHR-SS-BG-0091	0 0638	BG	163	163	0	0	0
SSBG0153	0 0663	BG	164	164	0	0	0
LEHR-SS-DP-0172	0 0675	DP	165	165	165	0	0
LEHR-SS-DP-0141	0 072	DP	166	167	167	0	0
LEHR-SS-DP-0185	0 072	DP	167	167	167	0	1
SSDP0259	0 072	DP	168	167	167	24	2
LEHR-SS-DP-0164	0 073	DP	169	169	169	0	0
LEHR-SS-DP-0166	0 0756	DP	170	170	170	0	0
LEHR-SS-DP-0158	0 076	DP	171	171	171	0	0
LEHR-SS-DP-0176	0 0788	DP	172	172	172	0	0
LEHR-SS-DP-0146	0 0832	DP	173	173	173	0	0
SSBG0010	0 084	BG	174	174 5	0	0	0
LEHR-SS-DP-0123	0 084	DP	175	174 5	174 5	6	1
LEHR-SS-DP-0174	0 0865	DP	176	176	176	0	0
SSBG0135	0 088	BG	177	177	0	0	0
LEHR-SS-DP-0155	0 0918	DP	178	178	178	0	0
SSBG0158	0 0924	BG	179	179	0	0	0
LEHR-SS-DP-0165	0 0946	DP	180	180	180	0	0
SSBG0146	0 0971	BG	181	181	0	0	0
LEHR-SS-DP-0133	0 0993	DP	182	182	182	0	0
SSBG0120	0 101	BG	183	183	0	0	0
SSBG0038	0 106	BG	184	184	0	0	0
LEHR-SS-DP-0147	0 113	DP	185	185	185	0	0
SSBG0139	0 114	BG	186	186	0	0	0
LEHR-SS-DP-0132	0 115	DP	187	187	187	0	0
SSBG0123	0 132	BG	188	188	0	0	0
SSBG0136	0 275	BG	189	189	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 0306
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 0 046628
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 0 030312
Allowable Relative Shift = 1 009508
Probability, Pr = 0 762159
Minimum number of samples (Background + Cleanup Unit) = 27 **Pass**
Minimum number of Background samples = 19 **Pass**
Minimum number of Cleanup Unit samples = 8 **Pass**

WILCOXON RANK SUM TEST RESULTS

n1= 125
n2= 64
m= 189
WRS= 11326 5
g= 11
Sum[tj(tj2-1)]= 216
Zrs= -1 54118
Z0 9= 1 281551

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Cesium-137
(deep samples)

Sample ID	CONC	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$t(t^2-1)$	Tie Ind
SSBG0042	-0 12	BG	1	1	0	0	0
SSBG0009	-0.063	BG	2	2	0	0	0
SSBG0033	-0.045	BG	3	3	0	0	0
SSDP0054	-0 031	DP	4	4	4	0	0
SSDP0040	-0 026	DP	5	5	5	0	0
SSDP0031	-0 024	DP	6	6	6	0	0
SSDP0009	-0 023	DP	7	7	7	0	0
SSDP0018	-0 022	DP	8	8	8	0	0
SSBG0027	-0 021	BG	9	9	0	0	0
SSBG0037	-0 02	BG	10	10 5	0	0	0
SSDP0059	-0 02	DP	11	10 5	10 5	6	1
SSBG0005	-0 019	BG	12	12	0	0	0
SSDP0289	-0 019	DP	13	13	13	0	0
SSDP0006	-0 018	DP	14	14	14	0	0
SSDP0251	-0 018	DP	15	15	15	0	0
SSDP0043	-0 016	DP	16	16	16	0	0
SSDP0272	-0 016	DP	17	17	17	0	0
SSBG0046	-0 015	BG	18	18 5	0	0	0
SSBG0056	-0 015	BG	19	18 5	0	6	1
SSDP0217	-0 015	DP	20	20	20	0	0
SSDP0062	-0 014	DP	21	21 5	21 5	0	0
SSDP0065	-0 014	DP	22	21 5	21 5	6	1
SSDP0064	-0 013	DP	23	23	23	0	0
SSDP0246	-0 012	DP	24	24	24	0	0
SSDP0236	-0 012	DP	25	25	25	0	0
SSDP0247	-0 011	DP	26	26 5	26 5	0	0
SSDP0257	-0 011	DP	27	26 5	26 5	6	1
SSDP0029	-0 011	DP	28	28	28	0	0
SSDP0210	-0 011	DP	29	29	29	0	0
SSDP0211	-0 01	DP	30	30	30	0	0
SSDP0291	-0 01	DP	31	31	31	0	0
SSBG0023	-0 009	BG	32	32 5	0	0	0
SSDP0021	-0 009	DP	33	32 5	32 5	6	1
SSDP0207	-0 008	DP	34	34	34	0	0
SSDP0231	-0 007	DP	35	35	35	0	0
SSDP0216	-0 007	DP	36	36	36	0	0
SSDP0199	-0 006	DP	37	37	37	0	0
SSDP0015	-0 006	DP	38	38	38	0	0
SSDP0276	-0 006	DP	39	39	39	0	0
SSDP0003	-0 005	DP	40	40 5	40 5	0	0
SSDP0069	-0 005	DP	41	40 5	40 5	6	1
SSDP0258	-0 005	DP	42	42	42	0	0
LEHR-SS-BG-0086	-0 005	BG	43	43	0	0	0
SSDP0262	-0 004	DP	44	44	44	0	0
SSDP0273	-0 004	DP	45	45	45	0	0
LEHR-SS-BG-0076	-0 004	BG	46	46	0	0	0
SSDP0034	-0 003	DP	47	48	48	0	0
SSDP0046	-0 003	DP	48	48	48	0	1
SSDP0050	-0 003	DP	49	48	48	24	2
SSDP0283	-0 003	DP	50	50	50	0	0
SSDP0227	-0 003	DP	51	51	51	0	0
SSDP0268	-0 003	DP	52	52	52	0	0
SSDP0241	-0 003	DP	53	53	53	0	0
SSDP0242	-0 002	DP	54	54	54	0	0
LEHR-SS-DP-0195	-0 002	DP	55	55	55	0	0
LEHR-SS-BG-0071	-0 002	BG	56	56	0	0	0
LEHR-SS-BG-0107	-0 002	BG	57	57	0	0	0
SSDP0253	-0 001	DP	58	58	58	0	0
LEHR-SS-BG-0098	-0 001	BG	59	59	0	0	0
LEHR-SS-BG-0075	-0 001	BG	60	60	0	0	0
SSDP0235	-0 001	DP	61	61	61	0	0
LEHR-SS-BG-0084	-0 001	BG	62	62	0	0	0
LEHR-SS-BG-0085	-0 001	BG	63	63	0	0	0
LEHR-SS-BG-0111	-8E-04	BG	64	64	0	0	0
LEHR-SS-BG-0077	-6E-04	BG	65	65	0	0	0
LEHR-SS-BG-0115	-6E-04	BG	66	66	0	0	0
LEHR-SS-BG-0067	-5E-04	BG	67	67	0	0	0
LEHR-SS-BG-0080	-5E-04	BG	68	68	0	0	0
SSDP0263	-4E-04	DP	69	69	69	0	0
LEHR-SS-BG-0113	-4E-04	BG	70	70	0	0	0
SSBG0147	-4E-04	BG	71	71	0	0	0
LEHR-SS-BG-0094	-3E-04	BG	72	72	0	0	0
SSBG0144	-3E-04	BG	73	73	0	0	0
LEHR-SS-BG-0068	-2E-04	BG	74	74	0	0	0
LEHR-SS-BG-0104	-9E-05	BG	75	75	0	0	0
LEHR-SS-DP-0194	-1E-05	DP	76	76	76	0	0
SSDP0200	0	DP	77	77 5	77 5	0	0
SSDP0294	0	DP	78	77 5	77 5	6	1
LEHR-SS-BG-0069	6E-05	BG	79	79	0	0	0
LEHR-SS-BG-0096	0 0001	BG	80	80	0	0	0
LEHR-SS-BG-0116	0 0003	BG	81	81	0	0	0
LEHR-SS-BG-0097	0 0003	BG	82	82	0	0	0
LEHR-SS-BG-0112	0 0004	BG	83	83	0	0	0
LEHR-SS-BG-0102	0 0004	BG	84	84	0	0	0
LEHR-SS-BG-0105	0 0004	BG	85	85	0	0	0
SSBG0145	0 0005	BG	86	86	0	0	0
LEHR-SS-BG-0114	0 0006	BG	87	87	0	0	0
LEHR-SS-BG-0108	0 0006	BG	88	88	0	0	0
SSBG0138	0 0006	BG	89	89	0	0	0
LEHR-SS-BG-0072	0 0007	BG	90	90	0	0	0
SSDP0230	0 0007	DP	91	91	91	0	0
SSBG0150	0 0008	BG	92	92	0	0	0
LEHR-SS-BG-0070	0 0008	BG	93	93	0	0	0
SSDP0215	0 0011	DP	94	94	94	0	0
LEHR-SS-BG-0103	0 0013	BG	95	95	0	0	0
LEHR-SS-BG-0099	0 0013	BG	96	96	0	0	0
SSBG0128	0 0014	BG	97	97	0	0	0
LEHR-SS-BG-0078	0 0015	BG	98	98	0	0	0
LEHR-SS-BG-0088	0 0016	BG	99	99	0	0	0
SSDP0061	0 002	DP	100	100	100	0	0
LEHR-SS-DP-0196	0 0021	DP	101	101	101	0	0
SSDP0295	0 0024	DP	102	102	102	0	0
SSDP0267	0 0025	DP	103	103	103	0	0

Wilcoxon Rank Sum Test, Comparison of DP data to background, Cesium-137
(deep samples)

SSDP0220	0 0025	DP	104	104	104	0	0
SSBG0152	0 0026	BG	105	105	0	0	0
SSBG0124	0 003	BG	106	106	0	0	0
SSDP0019	0 003	DP	107	107	107	0	0
LEHR-SS-BG-0090	0 0033	BG	108	108	0	0	0
LEHR-SS-BG-0089	0 0034	BG	109	109	0	0	0
LEHR-SS-BG-0081	0 0035	BG	110	110	0	0	0
SSDP0252	0 0035	DP	111	111	111	0	0
SSDP0284	0 0036	DP	112	112	112	0	0
SSDP0245	0 0037	DP	113	113	113	0	0
SSDP0212	0 0038	DP	114	114	114	0	0
SSBG0154	0 0038	BG	115	115	0	0	0
SSDP0012	0 004	DP	116	116	116	0	0
SSDP0290	0 0043	DP	117	117	117	0	0
SSBG0052	0 005	BG	118	118 5	0	0	0
SSDP0025	0 005	DP	119	118 5	118 5	6	1
SSDP0221	0 0052	DP	120	120	120	0	0
SSBG0163	0 0053	BG	121	121	0	0	0
SSDP0271	0 0055	DP	122	122	122	0	0
SSDP0240	0 0065	DP	123	123	123	0	0
SSBG0159	0 0068	BG	124	124	0	0	0
SSDP0232	0 0071	DP	125	125	125	0	0
SSBG0143	0 0072	BG	126	126	0	0	0
SSDP0282	0 0076	DP	127	127	127	0	0
SSDP0266	0 008	DP	128	128	128	0	0
SSDP0028	0 008	DP	129	129	129	0	0
SSDP0261	0 008	DP	130	130	130	0	0
SSBG0122	0 0082	BG	131	131	0	0	0
SSBG0126	0 0089	BG	132	132	0	0	0
SSDP0037	0 009	DP	133	133	133	0	0
SSDP0278	0 0099	DP	134	134	134	0	0
SSBG0014	0 012	BG	135	135	0	0	0
SSDP0297	0 0126	DP	136	136	136	0	0
SSBG0018	0 013	BG	137	137	0	0	0
SSBG0137	0 0136	BG	138	138 5	0	0	0
SSDP0225	0 0136	DP	139	138 5	138 5	6	1
SSDP0222	0 0144	DP	140	140	140	0	0
SSDP0237	0 0147	DP	141	141	141	0	0
SSDP0201	0 0149	DP	142	142	142	0	0
SSDP0204	0 015	DP	143	143	143	0	0
SSBG0132	0 0152	BG	144	144	0	0	0
SSBG0130	0 0182	BG	145	145	0	0	0
SSBG0125	0 0188	BG	146	146	0	0	0
SSBG0140	0 019	BG	147	147	0	0	0
SSDP0256	0 0194	DP	148	148	148	0	0
SSBG0129	0 0203	BG	149	149	0	0	0
LEHR-SS-BG-0093	0 0249	BG	150	150	0	0	0
SSDP0055	0 025	DP	151	151	151	0	0
SSDP0277	0 027	DP	152	152	152	0	0
SSBG0157	0 0288	BG	153	153	0	0	0
SSBG0134	0 0387	BG	154	154 5	0	0	0
SSBG0149	0 0387	BG	155	154 5	0	6	1
SSDP0206	0 0394	DP	156	156	156	0	0
SSBG0133	0 0405	BG	157	157	0	0	0
SSBG0151	0 0419	BG	158	158	0	0	0
SSBG0155	0 0424	BG	159	159	0	0	0
SSBG0161	0 0431	BG	160	160	0	0	0
SSBG0142	0 0473	BG	161	161	0	0	0
SSBG0162	0 0547	BG	162	162	0	0	0
SSBG0160	0 0594	BG	163	163	0	0	0
SSBG0131	0 0606	BG	164	164	0	0	0
SSBG0127	0 0622	BG	165	165	0	0	0
SSBG0153	0 0663	BG	166	166	0	0	0
SSBG0135	0 088	BG	167	167	0	0	0
SSBG0158	0 0924	BG	168	168	0	0	0
SSBG0146	0 0971	BG	169	169	0	0	0
SSBG0120	0 101	BG	170	170	0	0	0
SSBG0139	0 114	BG	171	171	0	0	0
SSBG0123	0 132	BG	172	172	0	0	0
SSBG0136	0 275	BG	173	173	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 002085
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 0 045038
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 0 012105
Allowable Relative Shift = 0 172242
Probability, Pr = 0 547898
Minimum number of samples (Background + Cleanup Unit) = 2606 **Total existing number of samples is insufficient**
Minimum number of Background samples = 2431 **Existing number of Background samples is insufficient**
Minimum number of Cleanup Unit samples = 176 **Existing number of Cleanup Unit samples is insufficient**

WILCOXON RANK SUM TEST RESULTS

n1= 85
n2= 88
m= 173
WRS= 6085
g= 11
Sum[tj(tj2-1)]= 84
Zrs= -3 977773
Z0 9= 1 281551

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Lead-210
(all depths)

Sample ID	CONC (	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$tj(tj^2-1)$	Tie Ind
LEHR-SS-BG-0110	-1.26	BG	1	1	0	0	0
LEHR-SS-BG-0083	-1.04	BG	2	2	0	0	0
LEHR-SS-BG-0101	-0.957	BG	3	3	0	0	0
LEHR-SS-DP-0144	-0.4	DP	4	4	4	0	0
LEHR-SS-DP-0145	-0.328	DP	5	5	5	0	0
LEHR-SS-DP-0163	-0.322	DP	6	6	6	0	0
SSDP0281	-0.239	DP	7	7	7	0	0
LEHR-SS-DP-0156	-0.14	DP	8	8.5	8.5	0	0
SSDP0286	-0.14	DP	9	8.5	8.5	6	1
SSDP0285	-0.095	DP	10	10	10	0	0
LEHR-SS-DP-0139	0	DP	11	12	12	0	0
LEHR-SS-DP-0153	0	DP	12	12	12	0	1
SSDP0255	0	DP	13	12	12	24	2
LEHR-SS-DP-0191	0.0123	DP	14	14	14	0	0
LEHR-SS-DP-0117	0.028	DP	15	15	15	0	0
LEHR-SS-DP-0140	0.0386	DP	16	16	16	0	0
SSDP0228	0.0424	DP	17	17	17	0	0
LEHR-SS-DP-0173	0.0621	DP	18	18	18	0	0
LEHR-SS-DP-0152	0.13	DP	19	19	19	0	0
SSDP0198	0.148	DP	20	20	20	0	0
LEHR-SS-DP-0167	0.164	DP	21	21	21	0	0
LEHR-SS-DP-0183	0.166	DP	22	22	22	0	0
LEHR-SS-DP-0135	0.18	DP	23	23	23	0	0
LEHR-SS-BG-0073	0.227	BG	24	24	0	0	0
SSDP0260	0.264	DP	25	25	25	0	0
SSDP0270	0.265	DP	26	26	26	0	0
SSDP0223	0.269	DP	27	27	27	0	0
LEHR-SS-BG-0082	0.27	BG	28	28	0	0	0
SSDP0239	0.284	DP	29	29	29	0	0
SSDP0288	0.296	DP	30	30	30	0	0
LEHR-SS-DP-0121	0.308	DP	31	31	31	0	0
SSDP0233	0.311	DP	32	32	32	0	0
LEHR-SS-DP-0159	0.341	DP	33	33	33	0	0
SSDP0274	0.352	DP	34	34	34	0	0
LEHR-SS-BG-0091	0.363	BG	35	35	0	0	0
LEHR-SS-DP-0131	0.394	DP	36	36	36	0	0
LEHR-SS-BG-0066	0.408	BG	37	37	0	0	0
LEHR-SS-BG-0074	0.414	BG	38	38	0	0	0
SSDP0203	0.454	DP	39	39	39	0	0
SSDP0049	0.46	DP	40	40	40	0	0
SSDP0265	0.476	DP	41	41	41	0	0
SSDP0045	0.53	DP	42	42	42	0	0
SSDP0238	0.543	DP	43	43	43	0	0
LEHR-SS-DP-0123	0.544	DP	44	44	44	0	0
LEHR-SS-DP-0193	0.548	DP	45	45	45	0	0
SSDP0052	0.56	DP	46	46	46	0	0
LEHR-SS-DP-0149	0.566	DP	47	47	47	0	0
SSDP0218	0.567	DP	48	48	48	0	0
SSDP0292	0.575	DP	49	49	49	0	0
SSDP0068	0.6	DP	50	50	50	0	0
SSDP0056	0.61	DP	51	51	51	0	0
SSDP0209	0.638	DP	52	52	52	0	0
LEHR-SS-DP-0174	0.673	DP	53	53	53	0	0
LEHR-SS-DP-0118	0.68	DP	54	54	54	0	0
LEHR-SS-DP-0189	0.682	DP	55	55	55	0	0
LEHR-SS-BG-0100	0.686	BG	56	56	0	0	0
SSDP0042	0.69	DP	57	57	57	0	0
SSDP0249	0.722	DP	58	58	58	0	0
SSDP0287	0.731	DP	59	59	59	0	0
LEHR-SS-DP-0160	0.735	DP	60	60	60	0	0
LEHR-SS-DP-0141	0.778	DP	61	61	61	0	0
LEHR-SS-DP-0150	0.785	DP	62	62	62	0	0
LEHR-SS-DP-0192	0.79	DP	63	63	63	0	0
LEHR-SS-BG-0109	0.818	BG	64	64	0	0	0
LEHR-SS-DP-0154	0.835	DP	65	65.5	65.5	0	0
SSDP0280	0.835	DP	66	65.5	65.5	6	1
LEHR-SS-DP-0136	0.848	DP	67	67	67	0	0
SSDP0248	0.852	DP	68	68	68	0	0
LEHR-SS-DP-0190	0.919	DP	69	69	69	0	0
LEHR-SS-DP-0187	0.926	DP	70	70	70	0	0
LEHR-SS-DP-0158	0.942	DP	71	71	71	0	0
SSDP0058	0.96	DP	72	72	72	0	0
LEHR-SS-DP-0164	1.01	DP	73	73	73	0	0
LEHR-SS-BG-0065	1.02	BG	74	74.5	0	0	0
LEHR-SS-BG-0092	1.02	BG	75	74.5	0	6	1
SSDP0229	1.03	DP	76	76	76	0	0
LEHR-SS-DP-0120	1.09	DP	77	77	77	0	0
LEHR-SS-DP-0181	1.1	DP	78	78.5	78.5	0	0
SSDP0243	1.1	DP	79	78.5	78.5	6	1
SSDP0224	1.13	DP	80	80	80	0	0
SSDP0219	1.15	DP	81	81	81	0	0

Wilcoxon Rank Sum Test, Comparison of DP data to background, Lead-210
(all depths)

LEHR-SS-DP-0177	1.16	DP	82	82	82	0	0
LEHR-SS-DP-0169	1.25	DP	83	83	83	0	0
SSDP0244	1.27	DP	84	84	84	0	0
LEHR-SS-DP-0184	1.29	DP	85	85	85	0	0
LEHR-SS-DP-0166	1.31	DP	86	86	86	0	0
LEHR-SS-DP-0143	1.34	DP	87	87	87	0	0
LEHR-SS-DP-0125	1.36	DP	88	88.5	88.5	0	0
SSDP0214	1.36	DP	89	88.5	88.5	6	1
LEHR-SS-DP-0185	1.4	DP	90	90	90	0	0
LEHR-SS-DP-0130	1.48	DP	91	91	91	0	0
LEHR-SS-DP-0171	1.49	DP	92	92	92	0	0
SSDP0208	1.53	DP	93	93	93	0	0
LEHR-SS-DP-0175	1.57	DP	94	94	94	0	0
LEHR-SS-DP-0170	1.58	DP	95	95	95	0	0
LEHR-SS-DP-0147	1.6	DP	96	96	96	0	0
LEHR-SS-DP-0148	1.61	DP	97	97	97	0	0
LEHR-SS-DP-0182	1.62	DP	98	98	98	0	0
SSDP0047	1.63	DP	99	99.5	99.5	0	0
SSDP0213	1.63	DP	100	99.5	99.5	6	1
LEHR-SS-DP-0165	1.76	DP	101	101	101	0	0
LEHR-SS-DP-0178	1.78	DP	102	102	102	0	0
LEHR-SS-DP-0176	1.79	DP	103	103.5	103.5	0	0
SSDP0234	1.79	DP	104	103.5	103.5	6	1
LEHR-SS-DP-0137	1.85	DP	105	105	105	0	0
LEHR-SS-DP-0151	1.87	DP	106	106	106	0	0
LEHR-SS-DP-0146	1.9	DP	107	107	107	0	0
LEHR-SS-DP-0126	1.91	DP	108	108	108	0	0
LEHR-SS-DP-0119	1.92	DP	109	109	109	0	0
LEHR-SS-DP-0132	1.98	DP	110	110.5	110.5	0	0
LEHR-SS-DP-0138	1.98	DP	111	110.5	110.5	6	1
LEHR-SS-DP-0142	1.99	DP	112	112	112	0	0
LEHR-SS-DP-0133	2.04	DP	113	113	113	0	0
SSDP0197	2.06	DP	114	114	114	0	0
LEHR-SS-DP-0155	2.11	DP	115	115.5	115.5	0	0
LEHR-SS-DP-0157	2.11	DP	116	115.5	115.5	6	1
LEHR-SS-DP-0168	2.17	DP	117	117	117	0	0
SSDP0254	2.18	DP	118	118	118	0	0
SSDP0259	2.24	DP	119	119	119	0	0
SSDP0275	2.27	DP	120	120	120	0	0
SSDP0293	2.35	DP	121	121	121	0	0
SSDP0269	2.37	DP	122	122	122	0	0
LEHR-SS-DP-0188	2.54	DP	123	123.5	123.5	0	0
SSDP0264	2.54	DP	124	123.5	123.5	6	1
LEHR-SS-DP-0179	2.67	DP	125	125	125	0	0
LEHR-SS-DP-0161	2.69	DP	126	126	126	0	0
LEHR-SS-DP-0162	2.74	DP	127	127	127	0	0
LEHR-SS-DP-0129	3.02	DP	128	128	128	0	0
SSDP0202	3.26	DP	129	129	129	0	0
LEHR-SS-DP-0122	3.84	DP	130	130	130	0	0
LEHR-SS-DP-0128	4.96	DP	131	131	131	0	0

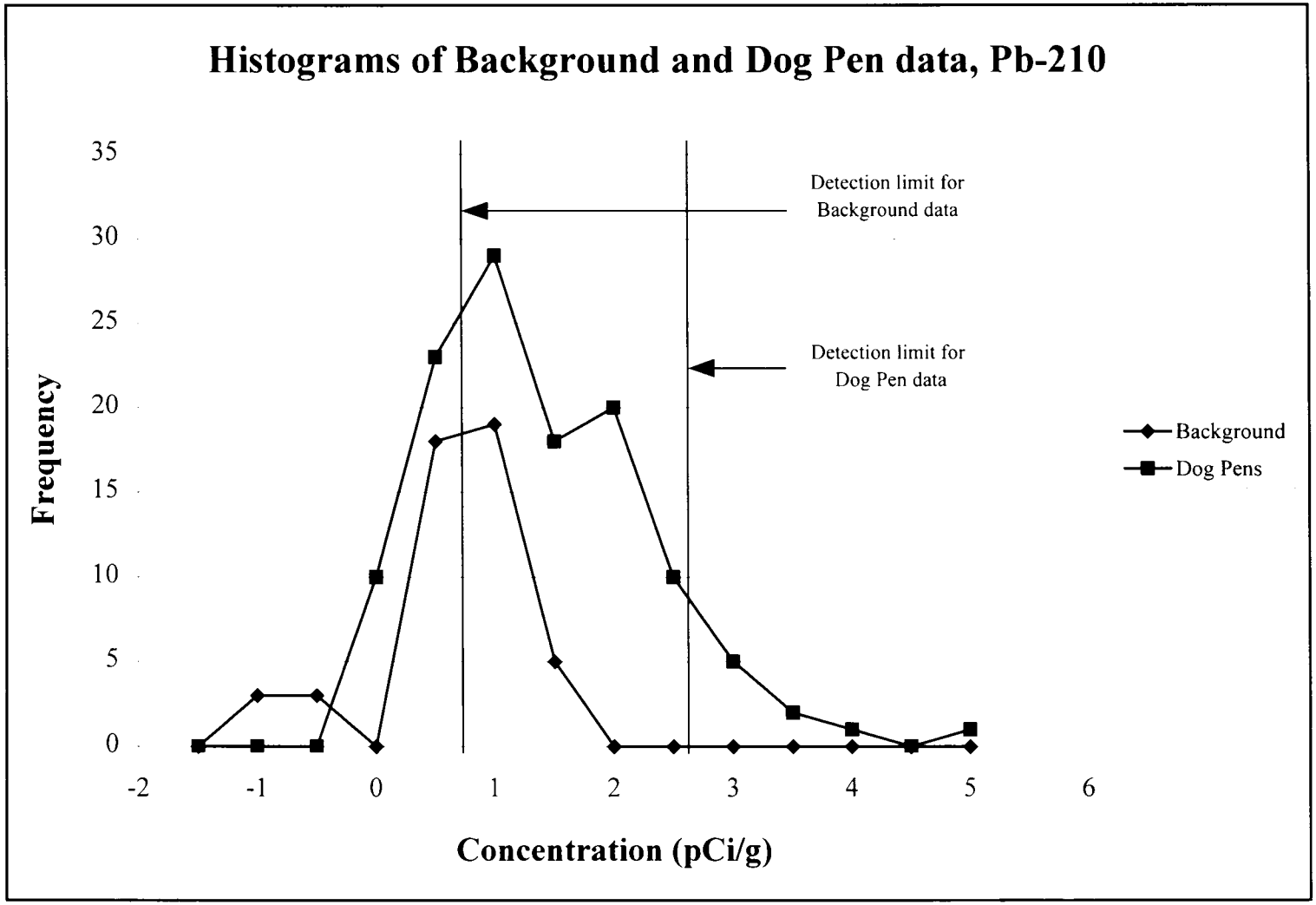
DATA SUFFICIENCY EVALUATION

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 BG Group, (mg/kg) or (pCi/g) = 0.802074
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 0.93567
Allowable Relative Shift = 0.513002
Probability, Pr = 0.642561
Minimum number of samples (Background + Cleanup Unit) = 76 **Pass**
Minimum number of Background samples = 33 **Existing number of Background samples is insufficient**
Minimum number of Cleanup Unit samples = 44 **Pass**

WILCOXON RANK SUM TEST RESULTS

n1= 119
n2= 12
m= 131
WRS= 8209
g= 11
Sum[tj(tj2-1)]= 84
Zrs= 2.83254
Z0.9= 1.281551

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


Histograms of Background and Dog Pen data, Pb-210
Frequency
35
30
25
20
15
10
5
0
-2
-1
0
1
2
3
4
5
6
Concentration (pCi/g)
Detection limit for Background data
Detection limit for Dog Pen data
Background
Dog Pens

Wilcoxon Rank Sum Test: Comparison of DP data to background, Potassium 40
(all depths)

Sample ID	CLINC	Grouping	Abs Rank	Tie Norm Rank	n1Ranks	W	Tj	Trend
SSBG0009	0.26	BG	1	1	0	0		0
LEHR-SS-DP-0184	0.844	DP	2	2	2	0		0
LEHR-SS-DP-0150	4.1	DP	3	3	3	0		0
LEHR-SS-DP-0151	5.39	DP	4	4	4	0		0
SSDP0234	7.54	DP	5	5	5	0		0
LEHR-SS-DP-0189	7.62	DP	6	6	6	0		0
SSDP0239	7.74	DP	7	7	7	0		0
SSDP0201	7.77	DP	8	8	8	0		0
LEHR-SS-DP-0183	8.12	DP	9	9	9	0		0
SSBG0002	8.3	BG	10	10	0	0		0
SSBG0039	8.4	BG	11	11	0	0		0
SSDP0286	8.41	DP	12	12	12	0		0
SSDP0224	8.46	DP	13	13	13	0		0
SSDP0207	8.48	DP	14	14	14	0		0
LEHR-SS-DP-0178	8.71	DP	15	15	15	0		0
LEHR-SS-DP-0173	8.82	DP	16	16	16	0		0
LEHR-SS-DP-0147	9.09	DP	17	17	17	0		0
SSDP0028	9.2	DP	18	18	18	0		0
SSDP0263	9.24	DP	19	19	19	0		0
LEHR-SS-BG-0101	9.52	BG	20	20	0	0		0
SSDP0270	9.55	DP	21	21	21	0		0
LEHR-SS-BG-0081	9.61	BG	22	22	0	0		0
SSDP0287	9.91	DP	23	23	23	0		0
SSDP0222	9.96	DP	24	24	24	0		0
LEHR-SS-BG-0098	10	BG	25	26	0	0		0
SSDP0244	10	DP	26	26	26	0		1
SSDP0246	10	DP	27	26	26	24		2
LEHR-SS-DP-0158	10.1	DP	28	30.5	30.5	0		0
LEHR-SS-DP-0191	10.1	DP	29	30.5	30.5	0		1
SSDP0006	10.1	DP	30	30.5	30.5	0		2
SSDP0015	10.1	DP	31	30.5	30.5	0		3
SSDP0021	10.1	DP	32	30.5	30.5	0		4
SSDP0045	10.1	DP	33	30.5	30.5	210		5
SSBG0037	10.2	BG	34	34.5	0	0		0
LEHR-SS-DP-0183	10.2	DP	35	34.5	34.5	6		1
SSBG0011	10.3	BG	36	37.5	0	0		0
LEHR-SS-DP-0117	10.3	DP	37	37.5	37.5	0		1
SSDP0043	10.3	DP	38	37.5	37.5	0		2
SSDP0212	10.3	DP	39	37.5	37.5	60		3
LEHR-SS-BG-0093	10.4	BG	40	41	0	0		0
LEHR-SS-DP-0190	10.4	DP	41	41	41	0		1
SSDP0293	10.4	DP	42	41	41	24		2
SSDP0258	10.5	DP	43	43.5	43.5	0		0
SSDP0284	10.5	DP	44	43.5	43.5	6		1
SSBG0001	10.6	BG	45	47.5	0	0		0
LEHR-SS-DP-0126	10.6	DP	46	47.5	47.5	0		1
SSDP0042	10.6	DP	47	47.5	47.5	0		2
SSDP0050	10.6	DP	48	47.5	47.5	0		3
SSDP0209	10.6	DP	49	47.5	47.5	0		4
SSDP0255	10.6	DP	50	47.5	47.5	210		5
LEHR-SS-BG-0102	10.7	BG	51	52	0	0		0
LEHR-SS-BG-0110	10.7	BG	52	52	0	0		1
SSDP0018	10.7	DP	53	52	52	24		2
LEHR-SS-BG-0092	10.8	BG	54	56	0	0		0
LEHR-SS-DP-0153	10.8	DP	55	56	56	0		1
SSDP0048	10.8	DP	56	56	56	0		2
SSDP0052	10.8	DP	57	56	56	0		3
SSDP0204	10.8	DP	58	56	56	120		4
LEHR-SS-BG-0090	10.9	BG	59	60.5	0	0		0
SSDP0047	10.9	DP	60	60.5	60.5	0		1
SSDP0049	10.9	DP	61	60.5	60.5	0		2
SSDP0062	10.9	DP	62	60.5	60.5	60		3
LEHR-SS-BG-0077	11	BG	63	65.5	0	0		0
LEHR-SS-DP-0159	11	DP	64	65.5	65.5	0		1
LEHR-SS-DP-0167	11	DP	65	65.5	65.5	0		2
SSDP0029	11	DP	66	65.5	65.5	0		3
SSDP0227	11	DP	67	65.5	65.5	0		4
SSDP0236	11	DP	68	65.5	65.5	210		5
LEHR-SS-BG-0073	11.1	BG	69	73	0	0		0
LEHR-SS-DP-0144	11.1	DP	70	73	73	0		1
LEHR-SS-DP-0192	11.1	DP	71	73	73	0		2
LEHR-SS-DP-0198	11.1	DP	72	73	73	0		3
SSDP0040	11.1	DP	73	73	73	0		4
SSDP0081	11.1	DP	74	73	73	0		5
SSDP0285	11.1	DP	75	73	73	0		6
SSDP0292	11.1	DP	76	73	73	0		7
SSDP0294	11.1	DP	77	73	73	720		8
LEHR-SS-DP-0143	11.2	DP	78	83	83	0		0
LEHR-SS-DP-0185	11.2	DP	79	83	83	0		1
LEHR-SS-DP-0172	11.2	DP	80	83	83	0		2
LEHR-SS-DP-0191	11.2	DP	81	83	83	0		3
SSDP0012	11.2	DP	82	83	83	0		4
SSDP0019	11.2	DP	83	83	83	0		5
SSDP0219	11.2	DP	84	83	83	0		6
SSDP0230	11.2	DP	85	83	83	0		7
SSDP0240	11.2	DP	86	83	83	0		8
SSDP0273	11.2	DP	87	83	83	0		9
SSDP0288	11.2	DP	88	83	83	1320		10
LEHR-SS-BG-0075	11.3	BG	89	94	0	0		0
LEHR-SS-BG-0100	11.3	BG	90	94	0	0		1
LEHR-SS-BG-0113	11.3	BG	91	94	0	0		2
SSBG0033	11.3	BG	92	94	0	0		3
SSBG0038	11.3	BG	93	94	0	0		4
LEHR-SS-DP-0146	11.3	DP	94	94	94	0		5
LEHR-SS-DP-0155	11.3	DP	95	94	94	0		6
SSDP0037	11.3	DP	96	94	94	0		7
SSDP0196	11.3	DP	97	94	94	0		8
SSDP0203	11.3	DP	98	94	94	0		9
SSDP0235	11.3	DP	99	94	94	1320		10
LEHR-SS-BG-0071	11.4	BG	100	104.5	0	0		0
LEHR-SS-BG-0064	11.4	BG	101	104.5	0	0		1
LEHR-SS-BG-0114	11.4	BG	102	104.5	0	0		2
SSBG0018	11.4	BG	103	104.5	0	0		3
SSBG0019	11.4	BG	104	104.5	0	0		4
LEHR-SS-DP-0181	11.4	DP	105	104.5	104.5	0		5
LEHR-SS-DP-0170	11.4	DP	106	104.5	104.5	0		6
SSDP0064	11.4	DP	107	104.5	104.5	0		7
SSDP0199	11.4	DP	108	104.5	104.5	0		8
SSDP0237	11.4	DP	109	104.5	104.5	960		9
LEHR-SS-DP-0180	11.5	DP	110	113	113	0		0
LEHR-SS-DP-0174	11.5	DP	111	113	113	0		1
SSDP0034	11.5	DP	112	113	113	0		2
SSDP0231	11.5	DP	113	113	113	0		3
SSDP0242	11.5	DP	114	113	113	0		4
SSDP0247	11.5	DP	115	113	113	0		5
SSDP0279	11.5	DP	116	113	113	336		6
LEHR-SS-BG-0068	11.6	BG	117	122	0	0		0
LEHR-SS-BG-0070	11.6	BG	118	122	0	0		1
LEHR-SS-BG-0065	11.6	BG	119	122	0	0		2
LEHR-SS-BG-0088	11.6	BG	120	122	0	0		3
LEHR-SS-DP-0188	11.6	DP	121	122	122	0		4
SSDP0003	11.6	DP	122	122	122	0		5
SSDP0225	11.6	DP	123	122	122	0		6
SSDP0262	11.6	DP	124	122	122	0		7
SSDP0265	11.6	DP	125	122	122	0		8
SSDP0268	11.6	DP	126	122	122	0		9
SSDP0283	11.6	DP	127	122	122	1320		10
LEHR-SS-BG-0079	11.7	BG	128	130	0	0		0
LEHR-SS-BG-0112	11.7	BG	129	130	0	0		1
LEHR-SS-DP-0152	11.7	DP	130	130	130	0		2
SSDP0218	11.7	DP	131	130	130	0		3
SSDP0278	11.7	DP	132	130	130	120		4
LEHR-SS-BG-0076	11.8	BG	133	138.5	0	0		0
LEHR-SS-BG-0087	11.8	BG	134	138.5	0	0		1
LEHR-SS-BG-0099	11.8	BG	135	138.5	0	0		2
SSBG0020	11.8	BG	136	138.5	0	0		3
LEHR-SS-DP-0136	11.8	DP	137	138.5	138.5	0		4
LEHR-SS-DP-0164	11.8	DP	138	138.5	138.5	0		5
LEHR-SS-DP-0176	11.8	DP	139	138.5	138.5	0		6
LEHR-SS-DP-0187	11.8	DP	140	138.5	138.5	0		7
SSDP0056	11.8	DP	141	138.5	138.5	0		8
SSDP0064	11.8	DP	142	138.5	138.5	0		9
SSDP0233	11.8	DP	143	138.5	138.5	0		10
SSDP0243	11.8	DP	144	138.5	138.5	1716		11
LEHR-SS-BG-0074	11.9	BG	145	151	0	0		0
LEHR-SS-BG-0078	11.9	BG	146	151	0	0		1
LEHR-SS-BG-0082	11.9	BG	147	151	0	0		2
LEHR-SS-BG-0091	11.9	BG	148	151	0	0		3
LEHR-SS-BG-0095	11.9	BG	149	151	0	0		4
LEHR-SS-BG-0116	11.9	BG	150	151	0	0		5
LEHR-SS-DP-0121	11.9	DP	151	151	151	0		6
LEHR-SS-DP-0158	11.9	DP	152	151	151	0		7
LEHR-SS-DP-0182	11.9	DP	153	151	151	0		8
SSDP0215	11.9	DP	154	151	151	0		9
SSDP0249	11.9	DP	155	151	151	0		10
SSDP0253	11.9	DP	156	151	151	0		11
SSDP0274	11.9	DP	157	151	151	2184		12
LEHR-SS-BG-0072	12	BG	158	162.5	0	0		0
LEHR-SS-BG-0108	12	BG	159	162.5	0	0		1

Wilcoxon Rank Sum Test, Comparison of DP data to background, Potassium-40
(all depths)

SSBG0046	12	BG	160	162.5	0	0	2
SSBG0047	12	BG	161	162.5	0	0	3
LEHR-SS-DP-0125	12	DP	162	162.5	162.5	0	4
LEHR-SS-DP-0152	12	DP	163	162.5	162.5	0	5
SSDP0025	12	DP	164	162.5	162.5	0	6
SSDP0055	12	DP	165	162.5	162.5	0	7
SSDP0228	12	DP	166	162.5	162.5	0	8
SSDP0282	12	DP	167	162.5	162.5	990	9
LEHR-SS-BG-0083	12.1	BG	168	170.5	0	0	0
LEHR-SS-DP-0118	12.1	DP	169	170.5	170.5	0	1
LEHR-SS-DP-0131	12.1	DP	170	170.5	170.5	0	2
LEHR-SS-DP-0157	12.1	DP	171	170.5	170.5	0	3
SSDP0214	12.1	DP	172	170.5	170.5	0	4
SSDP0269	12.1	DP	173	170.5	170.5	210	5
LEHR-SS-BG-0109	12.2	BG	174	178	0	0	0
LEHR-SS-BG-0115	12.2	BG	175	178	0	0	1
LEHR-SS-DP-0181	12.2	DP	176	178	178	0	2
SSDP0009	12.2	DP	177	178	178	0	3
SSDP0049	12.2	DP	178	178	178	0	4
SSDP0217	12.2	DP	179	178	178	0	5
SSDP0229	12.2	DP	180	178	178	0	6
SSDP0257	12.2	DP	181	178	178	0	7
SSDP0277	12.2	DP	182	178	178	720	8
LEHR-SS-BG-0087	12.3	BG	183	187.5	0	0	0
LEHR-SS-BG-0089	12.3	BG	184	187.5	0	0	1
LEHR-SS-DP-0119	12.3	DP	185	187.5	187.5	0	2
LEHR-SS-DP-0129	12.3	DP	186	187.5	187.5	0	3
LEHR-SS-DP-0182	12.3	DP	187	187.5	187.5	0	4
SSDP0202	12.3	DP	188	187.5	187.5	0	5
SSDP0248	12.3	DP	189	187.5	187.5	0	6
SSDP0254	12.3	DP	190	187.5	187.5	0	7
SSDP0267	12.3	DP	191	187.5	187.5	0	8
SSDP0271	12.3	DP	192	187.5	187.5	990	9
LEHR-SS-BG-0084	12.4	BG	193	195.5	0	0	0
LEHR-SS-BG-0111	12.4	BG	194	195.5	0	0	1
LEHR-SS-DP-0133	12.4	DP	195	195.5	195.5	0	2
LEHR-SS-DP-0185	12.4	DP	196	195.5	195.5	0	3
SSDP0059	12.4	DP	197	195.5	195.5	0	4
SSLA5264	12.4	SA	198	[illegible]	[illegible]	[illegible]	[illegible]
LEHR-SS-BG-0088	12.5	BG	199	201	0	0	0
LEHR-SS-BG-0107	12.5	BG	200	201	0	0	1
SSDP0088	12.5	DP	201	201	201	0	2
SSDP0200	12.5	DP	202	201	201	0	3
SSDP0218	12.5	DP	203	201	201	120	4
SSBG0005	12.6	BG	204	207.5	0	0	0
SSBG0030	12.6	BG	205	207.5	0	0	1
SSBG0049	12.6	BG	206	207.5	0	0	2
LEHR-SS-DP-0120	12.6	DP	207	207.5	207.5	0	3
LEHR-SS-DP-0141	12.6	DP	208	207.5	207.5	0	4
LEHR-SS-DP-0188	12.6	DP	209	207.5	207.5	0	5
SSDP0245	12.6	DP	210	207.5	207.5	0	6
SSDP0278	12.6	DP	211	207.5	207.5	504	7
SSBG0010	12.7	BG	212	213.5	0	0	0
SSBG0056	12.7	BG	213	213.5	0	0	1
LEHR-SS-DP-0135	12.7	DP	214	213.5	213.5	0	2
SSDP0038	12.7	DP	215	213.5	213.5	80	3
LEHR-SS-BG-0086	12.8	BG	216	217	0	0	0
SSBG0052	12.8	BG	217	217	0	0	1
LEHR-SS-DP-0177	12.8	DP	218	217	217	24	2
LEHR-SS-DP-0128	12.9	DP	219	221.5	221.5	0	0
LEHR-SS-DP-0168	12.9	DP	220	221.5	221.5	0	1
LEHR-SS-DP-0184	12.9	DP	221	221.5	221.5	0	2
SSDP0206	12.9	DP	222	221.5	221.5	0	3
SSDP0241	12.9	DP	223	221.5	221.5	0	4
SSDP0275	12.9	DP	224	221.5	221.5	210	5
LEHR-SS-BG-0104	13	BG	225	228	0	0	0
LEHR-SS-DP-0130	13	DP	226	228	228	0	1
LEHR-SS-DP-0142	13	DP	227	228	228	0	2
LEHR-SS-DP-0145	13	DP	228	228	228	0	3
SSDP0085	13	DP	229	228	228	0	4
SSDP0213	13	DP	230	228	228	0	5
SSDP0272	13	DP	231	228	228	336	6
LEHR-SS-DP-0117	13.1	DP	232	234	234	0	0
LEHR-SS-DP-0139	13.1	DP	233	234	234	0	1
SSDP0210	13.1	DP	234	234	234	0	2
SSDP0223	13.1	DP	235	234	234	[illegible]	[illegible]
SSDP0259	13.1	DP	236	234	234	[illegible]	3
LEHR-SS-DP-0175	13.2	DP	237	239	239	0	0
SSDP0197	13.2	DP	238	239	239	0	1
SSDP0208	13.2	DP	239	239	239	0	2
SSDP0251	13.2	DP	240	239	239	0	3
SSDP0252	13.2	DP	241	239	239	120	4
LEHR-SS-DP-0154	13.3	DP	242	242.5	242.5	0	0
SSDP0232	13.3	DP	243	242.5	242.5	8	1
LEHR-SS-BG-0103	13.4	BG	244	246.5	0	0	0
SSBG0014	13.4	BG	245	246.5	0	0	1
LEHR-SS-DP-0122	13.4	DP	246	246.5	246.5	0	2
LEHR-SS-DP-0180	13.4	DP	247	246.5	246.5	0	3
SSDP0221	13.4	DP	248	246.5	246.5	0	4
SSDP0281	13.4	DP	249	246.5	246.5	210	5
LEHR-SS-BG-0097	13.5	BG	250	252.5	0	0	0
LEHR-SS-DP-0138	13.5	DP	251	252.5	252.5	0	1
LEHR-SS-DP-0140	13.5	DP	252	252.5	252.5	0	2
LEHR-SS-DP-0148	13.5	DP	253	252.5	252.5	0	3
SSDP0256	13.5	DP	254	252.5	252.5	0	4
SSDP0268	13.5	DP	255	252.5	252.5	210	5
LEHR-SS-BG-0108	13.6	BG	256	257.5	0	0	0
SSBG0029	13.6	BG	257	257.5	0	0	1
LEHR-SS-DP-0169	13.6	DP	258	257.5	257.5	0	[illegible]
SSDP0290	13.6	DP	259	257.5	257.5	80	3
LEHR-SS-DP-0123	13.7	DP	260	260	260	0	0
SSDP0280	14	DP	261	261.5	261.5	0	0
SSDP0295	14	DP	262	261.5	261.5	8	1
LEHR-SS-DP-0149	14.1	DP	263	263.5	263.5	0	0
SSDP0211	14.1	DP	264	263.5	263.5	8	1
SSDP0289	14.2	DP	265	265	265	0	0
SSBG0023	14.3	BG	266	266.5	0	0	0
SSDP0281	14.3	DP	267	266.5	266.5	8	1
SSBG0027	14.9	BG	268	268	0	0	0
LEHR-SS-DP-0195	15	DP	269	268	268	0	0
SSDP0206	15.1	DP	270	270	270	0	0
SSDP0220	15.3	DP	271	271	271	0	0
LEHR-SS-BG-0085	15.4	BG	272	272	0	0	0
SSDP0291	15.9	DP	273	273	273	0	0
SSDP0031	16.4	DP	274	274	274	0	0
SSBG0042	18.1	BG	275	275	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) = 4.2
Standard Deviation of BG Group (mg/kg) or (pCi/g) = 3.716604
Standard Deviation of DP Group (mg/kg) or (pCi/g) = 1.77781
Allowable Relative Shift = 2.362723
Probability, Pr = 0.955435

Minimum number of samples (Background + Cleanup Unit) =	12	Pass
Minimum number of Background samples =	10	Pass
Minimum number of Cleanup Unit samples =	3	Pass

WILCOXON RANK SUM TEST RESULTS

n1= 203
n2= 72
n= 275
WRS= 27742
q= 40
Sum(tj(tj-1))= 16094
Zrs= 0.48931
Z0.9= 1.281551

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Radium-226
(all depths)

Sample ID	CONC	Grouping	Abs Rank	Tie Norm Ran	n1Ranks	t(j)	tj	Tie Ind
SSBG0039	0	BG	1	1	0	0	0	0
SSBG0042	0.046	BG	2	2	0	0	0	0
LEHR-SS-DP-0187	0.0854	DP	3	3	3	0	0	0
LEHR-SS-DP-0188	0.116	DP	4	4	4	0	0	0
SSDP0049	0.12	DP	5	5	5	0	0	0
LEHR-SS-DP-0184	0.138	DP	6	6	6	0	0	0
LEHR-SS-DP-0150	0.144	DP	7	7	7	0	0	0
LEHR-SS-DP-0142	0.171	DP	8	8	8	0	0	0
SSDP0043	0.18	DP	9	9	9	0	0	0
SSDP0046	0.21	DP	10	10.5	10.5	0	0	0
SSDP0068	0.21	DP	11	10.5	10.5	6	1	
SSDP0064	0.23	DP	12	12	12	0	0	
SSDP0045	0.25	DP	13	13	13	0	0	0
LEHR-SS-DP-0186	0.253	DP	14	14	14	0	0	0
SSBG0001	0.26	BG	15	15	0	0	0	0
LEHR-SS-DP-0191	0.262	DP	16	16	16	0	0	0
SSDP0069	0.27	DP	17	17	17	0	0	0
LEHR-SS-DP-0144	0.28	DP	18	18	18	0	0	0
LEHR-SS-DP-0137	0.281	DP	19	19	19	0	0	0
LEHR-SS-DP-0153	0.283	DP	20	20	20	0	0	0
LEHR-SS-DP-0143	0.286	DP	21	21	21	0	0	0
LEHR-SS-DP-0176	0.288	DP	22	22	22	0	0	0
LEHR-SS-DP-0156	0.29	DP	23	23.5	23.5	0	0	0
SSDP0058	0.29	DP	24	23.5	23.5	6	1	
LEHR-SS-DP-0173	0.298	DP	25	25	25	0	0	0
SSBG0030	0.3	BG	26	26	0	0	0	0
SSDP0234	0.314	DP	27	27	27	0	0	0
LEHR-SS-DP-0122	0.321	DP	28	28	28	0	0	0
LEHR-SS-DP-0188	0.325	DP	29	29	29	0	0	0
SSDP0240	0.326	DP	30	30.5	30.5	0	0	0
SSDP0286	0.326	DP	31	30.5	30.5	6	1	
SSDP0065	0.33	DP	32	32	32	0	0	0
LEHR-SS-DP-0190	0.336	DP	33	33	33	0	0	0
SSDP0244	0.345	DP	34	34	34	0	0	0
LEHR-SS-BG-0091	0.347	BG	35	35	0	0	0	0
SSBG0009	0.35	BG	36	36	0	0	0	0
SSDP0275	0.353	DP	37	37	37	0	0	0
SSBG0052	0.36	BG	38	38	0	0	0	0
SSDP0224	0.361	DP	39	39	39	0	0	0
LEHR-SS-BG-0101	0.363	BG	40	40.5	0	0	0	0
LEHR-SS-DP-0193	0.363	DP	41	40.5	40.5	6	1	
LEHR-SS-DP-0128	0.369	DP	42	42.5	42.5	0	0	0
LEHR-SS-DP-0131	0.369	DP	43	42.5	42.5	6	1	
LEHR-SS-DP-0130	0.371	DP	44	44	44	0	0	0
SSDP0239	0.375	DP	45	45	45	0	0	0
SSDP0238	0.378	DP	46	46	46	0	0	0
LEHR-SS-DP-0145	0.379	DP	47	47	47	0	0	0
SSDP0061	0.38	DP	48	48	48	0	0	0
SSBG0029	0.39	BG	49	50	0	0	0	0
SSDP0037	0.39	DP	50	50	50	0	0	1
SSDP0047	0.39	DP	51	50	50	24	2	
LEHR-SS-DP-0141	0.392	DP	52	52	52	0	0	0
LEHR-SS-DP-0147	0.394	DP	53	53	53	0	0	0
SSDP0248	0.399	DP	54	54	54	0	0	0
SSBG0019	0.4	BG	55	58	0	0	0	0
SSDP0062	0.4	DP	56	58	58	0	1	
SSDP0222	0.4	DP	57	58	58	24	2	
SSDP0255	0.403	DP	58	58	58	0	0	
LEHR-SS-DP-0127	0.406	DP	59	59	59	0	0	
LEHR-SS-BG-0100	0.407	BG	60	60	0	0	0	0
SSBG0005	0.41	BG	61	61	0	0	0	0
LEHR-SS-DP-0180	0.412	DP	62	62	62	0	0	0
LEHR-SS-DP-0192	0.415	DP	63	63.5	63.5	0	0	
SSDP0287	0.415	DP	64	63.5	63.5	6	1	
SSDP0196	0.417	DP	65	65.5	65.5	0	0	
SSDP0219	0.417	DP	66	65.5	65.5	6	1	
LEHR-SS-DP-0138	0.42	DP	67	67	67	0	0	0
SSDP0209	0.425	DP	68	68	68	0	0	0
SSDP0201	0.428	DP	69	69	69	0	0	0
SSDP0197	0.432	DP	70	70	70	0	0	0
LEHR-SS-DP-0146	0.435	DP	71	71	71	0	0	0
LEHR-SS-BG-0073	0.438	BG	72	72	0	0	0	0
SSDP0292	0.44	DP	73	73	73	0	0	0
SSDP0233	0.442	DP	74	74	74	0	0	0
LEHR-SS-DP-0181	0.446	DP	75	75.5	75.5	0	0	
SSDP0285	0.446	DP	76	75.5	75.5	6	1	
SSDP0245	0.449	DP	77	77	77	0	0	0
SSDP0052	0.45	DP	78	78	78	0	0	0
SSDP0293	0.455	DP	79	79	79	0	0	0
LEHR-SS-DP-0139	0.456	DP	80	80.5	80.5	0	0	0
SSDP0249	0.456	DP	81	80.5	80.5	6	1	
LEHR-SS-DP-0183	0.457	DP	82	82	82	0	0	0
SSDP0279	0.458	DP	83	83	83	0	0	0
LEHR-SS-DP-0135	0.459	DP	84	84	84	0	0	0
SSBG0037	0.46	BG	85	86	0	0	0	0
SSDP0056	0.46	DP	86	86	86	0	1	
SSDP0288	0.46	DP	87	86	86	24	2	
SSDP0206	0.461	DP	88	88	88	0	0	
SSDP0237	0.463	DP	89	90.5	90.5	0	0	
SSDP0285	0.463	DP	90	90.5	90.5	0	1	
SSDP0289	0.463	DP	91	90.5	90.5	0	2	
SSDP0271	0.463	DP	92	90.5	90.5	60	3	
LEHR-SS-DP-0154	0.464	DP	93	93	93	0	0	0
SSDP0215	0.465	DP	94	94	94	0	0	0
LEHR-SS-DP-0117	0.466	DP	95	95	95	0	0	0
LEHR-SS-DP-0182	0.467	DP	96	96.5	96.5	0	0	
SSDP0254	0.467	DP	97	96.5	96.5	6	1	
SSDP0259	0.469	DP	98	98	98	0	0	0
SSDP0203	0.471	DP	99	99	99	0	0	0
LEHR-SS-BG-0098	0.472	BG	100	100.5	0	0	0	0
LEHR-SS-DP-0123	0.472	DP	101	100.5	100.5	6	1	
LEHR-SS-BG-0090	0.474	BG	102	102	0	0	0	0
LEHR-SS-DP-0177	0.476	DP	103	103.5	103.5	0	0	
SSDP0270	0.476	DP	104	103.5	103.5	6	1	
SSDP0264	0.479	DP	105	105	105	0	0	0
LEHR-SS-BG-0086	0.48	BG	106	106.5	0	0	0	0
SSDP0200	0.48	DP	107	106.5	106.5	6	1	
SSDP0199	0.482	DP	108	108	108	0	0	0
LEHR-SS-BG-0081	0.483	BG	109	109.5	0	0	0	0
SSDP0290	0.483	DP	110	109.5	109.5	6	1	
SSDP0214	0.487	DP	111	111	111	0	0	0
SSDP0226	0.49	DP	112	112	112	0	0	0
SSDP0204	0.493	DP	113	113	113	0	0	0
LEHR-SS-BG-0085	0.496	BG	114	114	0	0	0	0
LEHR-SS-BG-0110	0.496	BG	115	116	0	0	0	0
SSDP0268	0.496	DP	116	116	116	0	1	
SSDP0274	0.496	DP	117	116	116	24	2	
LEHR-SS-DP-0155	0.5	DP	118	118	118	0	0	0
SSDP0212	0.503	DP	119	119	119	0	0	0
SSDP0258	0.503	DP	120	120	120	0	0	0
SSDP0242	0.504	DP	121	121	121	0	0	0
SSDP0231	0.507	DP	122	122	122	0	0	0
LEHR-SS-BG-0111	0.508	BG	123	123	0	0	0	0
SSBG0002	0.51	BG	124	125.5	0	0	0	0
LEHR-SS-DP-0198	0.51	DP	125	125.5	125.5	0	1	
SSDP0050	0.51	DP	126	125.5	125.5	0	2	
SSDP0223	0.51	DP	127	125.5	125.5	60	3	
LEHR-SS-BG-0091	0.512	BG	128	128	0	0	0	0
SSDP0218	0.514	DP	129	129	129	0	0	0
SSDP0034	0.52	DP	130	130	130	0	0	0
LEHR-SS-BG-0102	0.522	BG	131	131.5	0	0	0	0
LEHR-SS-DP-0125	0.522	DP	132	131.5	131.5	6	1	
LEHR-SS-DP-0189	0.523	DP	133	133	133	0	0	0
SSDP0263	0.525	DP	134	134	134	0	0	0
LEHR-SS-BG-0071	0.526	BG	135	135.5	0	0	0	0
SSDP0202	0.526	DP	136	135.5	135.5	6	1	
SSDP0294	0.527	DP	137	137	137	0	0	0
LEHR-SS-BG-0080	0.528	BG	138	138	0	0	0	0
SSDP0281	0.53	DP	139	139	139	0	0	0
LEHR-SS-DP-0175	0.532	DP	140	140	140	0	0	0
LEHR-SS-DP-0132	0.535	DP	141	141.5	141.5	0	0	0
SSDP0284	0.535	DP	142	141.5	141.5	6	1	
LEHR-SS-BG-0082	0.536	BG	143	143	0	0	0	0
LEHR-SS-DP-0148	0.537	DP	144	144.5	144.5	0	0	
SSDP0291	0.537	DP	145	144.5	144.5	6	1	
SSBG0031	0.54	BG	146	146	0	0	0	0
SSDP0228	0.541	DP	147	148	148	0	0	0
SSDP0247	0.541	DP	148	148	148	0	1	
SSDP0278	0.541	DP	149	148	148	24	2	
LEHR-SS-BG-0085	0.542	BG	150	150	0	0	0	0
SSDP0230	0.545	DP	151	151	151	0	0	0
LEHR-SS-BG-0072	0.546	BG	152	153	0	0	0	0
LEHR-SS-BG-0075	0.546	BG	153	153	0	0	1	
LEHR-SS-BG-0096	0.546	BG	154	153	0	24	2	
LEHR-SS-BG-0074	0.548	BG	155	155	0	0	0	0
SSDP0235	0.549	DP	156	156	156	0	0	0
SSDP0012	0.55	DP	157	158	158	0	0	0
SSDP0246	0.55	DP	158	158	158	0	1	
SSDP0273	0.55	DP	159	158	158	24	2	

Wilcoxon Rank Sum Test, Comparison of DP data to background, Radium-226
(all depths)

SSDP0210	0.551	DP	180	180	180	0	0
SSDP0213	0.552	DP	181	181	181	0	0
LEHR SS DP 0149	0.553	DP	182	182.5	182.5	0	0
SSDP0207	0.553	DP	183	182.5	182.5	6	1
SSDP0216	0.554	DP	184	185	185	0	0
SSDP0232	0.554	DP	185	185	185	0	1
SSDP0278	0.554	DP	186	185	185	24	2
SSDP0227	0.556	DP	187	187	187	0	0
LEHR SS BG 0114	0.559	BG	188	188.5	0	0	0
SSDP0211	0.559	DP	189	188.5	189.5	6	1
LEHR SS BG 0092	0.56	BG	170	171	0	0	0
LEHR SS BG 0115	0.56	BG	171	171	0	0	1
SSBG0020	0.56	BG	172	171	0	24	2
LEHR SS BG 0064	0.564	BG	173	173	0	0	0
LEHR SS BG 0106	0.566	BG	174	174.5	0	0	0
SSDP0285	0.566	DP	175	174.5	174.5	6	1
SSDP0272	0.568	DP	176	176	176	0	0
LEHR SS DP 0140	0.569	DP	177	177.5	177.5	0	0
SSDP0229	0.569	DP	178	177.5	177.5	6	1
SSBG0038	0.57	BG	179	180	0	0	0
SSDP0042	0.57	DP	180	180	180	0	1
SSDP0065	0.57	DP	181	180	180	24	2
LEHR SS BG 0104	0.571	BG	182	182.5	0	0	0
LEHR SS BG 0113	0.571	BG	183	182.5	0	6	1
LEHR SS BG 0109	0.572	BG	184	184.5	0	0	0
LEHR SS DP 0131	0.572	DP	185	184.5	184.5	6	1
LEHR SS BG 0078	0.574	BG	186	187.5	0	0	0
LEHR SS BG 0116	0.574	BG	187	187.5	0	0	1
LEHR SS DP 0170	0.574	DP	188	187.5	187.5	0	2
LEHR SS DP 0195	0.574	DP	189	187.5	187.5	60	3
SSDP0205	0.577	DP	190	190	190	0	0
LEHR SS BG 0084	0.578	BG	191	191.5	0	0	0
LEHR SS DP 0185	0.578	DP	192	191.5	191.5	6	1
LEHR SS BG 0107	0.579	BG	193	193.5	0	0	0
SSDP0286	0.579	DP	194	193.5	193.5	6	1
SSDP0241	0.581	DP	195	195.5	195.5	0	0
SSDP0243	0.581	DP	196	195.5	195.5	6	1
SSDP0298	0.582	DP	197	197	197	0	0
LEHR SS DP 0138	0.583	DP	198	199	199	0	0
LEHR SS DP 0179	0.583	DP	199	199	199	0	1
SSDP0262	0.583	DP	200	199	199	24	2
LEHR SS BG 0089	0.584	BG	201	201.5	0	0	0
SSDP0236	0.584	DP	202	201.5	201.5	6	1
SSDP0251	0.587	DP	203	203	203	0	0
SSDP0217	0.588	DP	204	204	204	0	0
SSDP0221	0.588	DP	205	205	205	0	0
SSBG0014	0.59	BG	206	206.5	0	0	0
SSDP0028	0.59	DP	207	206.5	206.5	6	1
LEHR SS BG 0103	0.593	BG	208	208	0	0	0
LEHR SS BG 0066	0.594	BG	209	209	0	0	0
LEHR SS BG 0087	0.596	BG	210	211	0	0	0
SSDP0287	0.596	DP	211	211	211	0	1
SSDP0281	0.596	DP	212	211	211	24	2
SSDP0250	0.598	DP	213	213	213	0	0
SSBG0056	0.6	BG	214	215	0	0	0
LEHR SS DP 0194	0.6	DP	215	215	215	0	1
SSDP0262	0.6	DP	216	215	215	24	2
LEHR SS BG 0099	0.603	BG	217	217	0	0	0
LEHR SS DP 0129	0.607	DP	218	218	218	0	0
SSDP0289	0.608	DP	219	219	219	0	0
LEHR SS BG 0095	0.612	BG	220	220.5	0	0	0
SSDP0220	0.612	DP	221	220.5	220.5	6	1
LEHR SS BG 0081	0.614	BG	222	222	0	0	0
LEHR SS DP 0171	0.617	DP	223	223	223	0	0
SSBG0010	0.62	BG	224	224	0	0	0
LEHR SS BG 0069	0.622	BG	225	225.5	0	0	0
LEHR SS DP 0187	0.622	DP	226	225.5	225.5	6	1
LEHR SS DP 0120	0.623	DP	227	227	227	0	0
LEHR SS DP 0121	0.625	DP	228	228	228	0	0
SSDP0277	0.626	DP	229	229	229	0	0
LEHR SS DP 0159	0.627	DP	230	230	230	0	0
LEHR SS BG 0105	0.628	BG	231	231	0	0	0
SSDP0290	0.631	DP	232	232	232	0	0
LEHR SS BG 0087	0.636	BG	233	233	0	0	0
SSDP0257	0.637	DP	234	234	234	0	0
LEHR SS BG 0078	0.638	BG	235	235	0	0	0
SSDP0256	0.639	DP	236	236	236	0	0
LEHR SS BG 0087	0.645	BG	237	237	0	0	0
SSBG0018	0.65	BG	238	238.5	0	0	0
LEHR SS DP 0157	0.65	DP	239	238.5	238.5	6	1
LEHR SS DP 0174	0.654	DP	240	240	240	0	0
LEHR SS BG 0077	0.659	BG	241	241	0	0	0
LEHR SS BG 0070	0.662	BG	242	242	0	0	0
LEHR SS DP 0152	0.668	DP	243	243	243	0	0
SSDP0252	0.685	DP	244	244	244	0	0
SSDP0263	0.687	DP	245	245	245	0	0
LEHR SS DP 0182	0.694	DP	246	246	246	0	0
LEHR SS DP 0119	0.695	DP	247	247	247	0	0
SSBG0011	0.72	BG	248	248	0	0	0
SSDP0025	0.73	DP	249	249	249	0	0
LEHR SS DP 0178	0.731	DP	250	250	250	0	0
SSDP0059	0.74	DP	251	251	251	0	0
SSBG0027	0.75	BG	252	252	0	0	0
LEHR SS BG 0112	0.753	BG	253	253	0	0	0
SSBG0049	0.78	BG	254	254	0	0	0
LEHR SS DP 0124	0.782	DP	255	255	255	0	0
SSBG0023	0.77	BG	256	256	0	0	0
LEHR SS DP 0189	0.778	DP	257	257	257	0	0
LEHR SS DP 0183	0.792	DP	258	258	258	0	0
SSDP0018	0.82	DP	259	259	259	0	
SSBG0047	0.83	BG	260	260	0	0	0
SSBG0046	0.84	BG	261	261	0	0	0
LEHR SS DP 0151	0.886	DP	262	262	262	0	0
SSDP0009	0.9	DP	263	263	263	0	0
SSDP0003	0.93	DP	264	264	264	0	0
SSDP0019	0.94	DP	265	265	265	0	0
SSDP0054	0.97	DP	266	266	266	0	0
SSDP0040	0.98	DP	267	267	267	0	0
LEHR SS DP 0118	0.984	DP	268	268	268	0	0
SSDP0008	0.99	DP	269	269	269	0	0
SSDP0029	1	DP	270	270	270	0	0
LEHR SS DP 0181	1.07	DP	271	271	271	0	0
SSDP0031	1.08	DP	272	272	272	0	0
LEHR SS DP 0184	1.12	DP	273	273	273	0	0
SSDP0021	1.82	DP	274	274	274	0	0
LEHR SS DP 0158	1.88	DP	275	275	275	0	0
SSDP0015	5.11	DP	276	276	276	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) = 0.2265
Standard Deviation of BG Group (mg/kg) or (pCi/g) = 0.143286
Standard Deviation of DP Group (mg/kg) or (pCi/g) = 0.380242
Allowable Relative Shift = 0.580409
Probability (P) = 0.66017
Minimum number of samples (Background + Cleanup Unit) = 140 **Pass**
Minimum number of Background samples = 17 **Pass**
Minimum number of Cleanup Unit samples = 124 **Pass**

WILCOXON RANK SUM TEST RESULTS

n1 = 204
n2 = 72
m = 276
WRS = 28444.5
g = 48
Sum(tdcv_t)= 684
Zrs = 2.4267
Z0.9= 1.281551

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Strontium-90
(all depths)

Sample ID	CONC	Grouping	Abs Rank	Tie-Norm Ran	n1Ranks	$tj(tj^2-1)$	Tie Ind.
SSDP0049	-0.8	DP	1	1	1	0	0
SSBG0048	-0.43	BG	2	2	0	0	0
SSBG0049	-0.39	BG	3	3	0	0	0
SSBG0030	-0.28	BG	4	4	0	0	0
SSDP0045	-0.24	DP	5	5.5	5.5	0	0
SSDP0052	-0.24	DP	6	5.5	5.5	6	1
SSDP0042	-0.22	DP	7	7	7	0	0
SSDP0203	-0.204	DP	8	8	8	0	0
SSDP0255	-0.186	DP	9	9	9	0	0
SSDP0224	-0.183	DP	10	10	10	0	0
LEHR-SS-DP-0182	-0.182	DP	11	11	11	0	0
SSDP0198	-0.178	DP	12	12	12	0	0
SSDP0056	-0.17	DP	13	13	13	0	0
SSDP0202	-0.156	DP	14	14	14	0	0
LEHR-SS-DP-0129	-0.154	DP	15	15	15	0	0
LEHR-SS-DP-0193	-0.151	DP	16	16	16	0	0
SSDP0047	-0.15	DP	17	17.5	17.5	0	0
SSDP0058	-0.15	DP	18	17.5	17.5	6	1
LEHR-SS-DP-0126	-0.141	DP	19	19.5	19.5	0	0
LEHR-SS-DP-0192	-0.141	DP	20	19.5	19.5	6	1
LEHR-SS-DP-0119	-0.137	DP	21	21	21	0	0
LEHR-SS-DP-0168	-0.128	DP	22	22	22	0	0
SSBG0002	-0.11	BG	23	23.5	0	0	0
SSBG0038	-0.11	BG	24	23.5	0	6	1
LEHR-SS-DP-0177	-0.107	DP	25	25	25	0	0
SSBG0010	-0.1	BG	26	26	0	0	0
LEHR-SS-DP-0152	-0.081	DP	27	27	27	0	0
LEHR-SS-DP-0188	-0.078	DP	28	28	28	0	0
SSDP0292	-0.078	DP	29	29	29	0	0
SSDP0209	-0.065	DP	30	30	30	0	0
LEHR-SS-DP-0181	-0.061	DP	31	31	31	0	0
LEHR-SS-DP-0143	-0.06	DP	32	32	32	0	0
LEHR-SS-DP-0151	-0.04	DP	33	33	33	0	0
LEHR-SS-DP-0155	-0.037	DP	34	34	34	0	0
LEHR-SS-DP-0165	-0.034	DP	35	35	35	0	0
LEHR-SS-DP-0178	-0.027	DP	36	36	36	0	0
LEHR-SS-DP-0150	-0.025	DP	37	37	37	0	0
LEHR-SS-DP-0170	-0.02	DP	38	38	38	0	0
SSDP0233	-0.018	DP	39	39	39	0	0
LEHR-SS-DP-0176	-0.016	DP	40	40	40	0	0
LEHR-SS-DP-0139	-0.014	DP	41	41	41	0	0
SSDP0214	-0.007	DP	42	42	42	0	0
SSDP0293	-0.005	DP	43	43	43	0	0
LEHR-SS-DP-0163	0.002	DP	44	44	44	0	0
LEHR-SS-BG-0100	0.0059	BG	45	45	0	0	0
SSDP0275	0.0083	DP	46	46	46	0	0
SSDP0228	0.0105	DP	47	47	47	0	0
LEHR-SS-BG-0110	0.0166	BG	48	48	0	0	0
LEHR-SS-BG-0109	0.0174	BG	49	49	0	0	0
LEHR-SS-BG-0092	0.0177	BG	50	50	0	0	0
LEHR-SS-DP-0173	0.0206	DP	51	51	51	0	0
LEHR-SS-BG-0083	0.0208	BG	52	52	0	0	0
LEHR-SS-BG-0101	0.0231	BG	53	53	0	0	0
LEHR-SS-DP-0120	0.0235	DP	54	54	54	0	0
LEHR-SS-BG-0091	0.027	BG	55	55	0	0	0
LEHR-SS-BG-0073	0.0297	BG	56	56	0	0	0
LEHR-SS-BG-0074	0.0299	BG	57	57	0	0	0
SSDP0218	0.0316	DP	58	58	58	0	0
LEHR-SS-BG-0082	0.0374	BG	59	59	0	0	0
LEHR-SS-DP-0117	0.0383	DP	60	60	60	0	0
LEHR-SS-BG-0065	0.044	BG	61	61	0	0	0
LEHR-SS-DP-0162	0.0442	DP	62	62	62	0	0
LEHR-SS-DP-0159	0.0447	DP	63	63	63	0	0
LEHR-SS-DP-0174	0.0459	DP	64	64	64	0	0
LEHR-SS-BG-0066	0.047	BG	65	65	0	0	0
LEHR-SS-DP-0185	0.0487	DP	66	66	66	0	0
LEHR-SS-DP-0121	0.053	DP	67	67	67	0	0
LEHR-SS-DP-0169	0.0559	DP	68	68	68	0	0
LEHR-SS-DP-0122	0.0598	DP	69	69	69	0	0
SSBG0028	0.06	BG	70	70	0	0	0
SSDP0259	0.0635	DP	71	71	71	0	0
SSDP0280	0.0641	DP	72	72	72	0	0
LEHR-SS-DP-0190	0.0703	DP	73	73	73	0	0
LEHR-SS-DP-0160	0.0752	DP	74	74	74	0	0
SSDP0229	0.0865	DP	75	75	75	0	0
SSBG0011	0.09	BG	76	76	0	0	0
SSDP0219	0.0923	DP	77	77	77	0	0
SSDP0249	0.108	DP	78	78	78	0	0
LEHR-SS-DP-0166	0.126	DP	79	79	79	0	0
LEHR-SS-DP-0118	0.127	DP	80	80.5	80.5	0	0
SSDP0288	0.127	DP	81	80.5	80.5	6	1
SSDP0269	0.129	DP	82	82	82	0	0
LEHR-SS-DP-0132	0.14	DP	83	83	83	0	0
SSDP0287	0.144	DP	84	84	84	0	0
LEHR-SS-DP-0135	0.145	DP	85	85	85	0	0
LEHR-SS-DP-0141	0.149	DP	86	86.5	86.5	0	0
SSDP0208	0.149	DP	87	86.5	86.5	6	1

Wilcoxon Rank Sum Test, Comparison of DP data to background, Strontium-90
(all depths)

SSDP0274	0.155	DP	88	88	88	0	0
LEHR-SS-DP-0142	0.163	DP	89	89	89	0	0
LEHR-SS-DP-0158	0.168	DP	90	90.5	90.5	0	0
LEHR-SS-DP-0180	0.168	DP	91	90.5	90.5	6	1
LEHR-SS-DP-0145	0.171	DP	92	92	92	0	0
LEHR-SS-DP-0131	0.179	DP	93	93	93	0	0
SSDP0068	0.18	DP	94	94	94	0	0
SSDP0281	0.185	DP	95	95	95	0	0
SSDP0223	0.189	DP	96	96	96	0	0
LEHR-SS-DP-0125	0.191	DP	97	97.5	97.5	0	0
SSDP0254	0.191	DP	98	97.5	97.5	6	1
LEHR-SS-DP-0140	0.196	DP	99	99	99	0	0
LEHR-SS-DP-0172	0.198	DP	100	100	100	0	0
LEHR-SS-DP-0156	0.206	DP	101	101	101	0	0
LEHR-SS-DP-0123	0.213	DP	102	102	102	0	0
LEHR-SS-DP-0191	0.214	DP	103	103	103	0	0
SSDP0265	0.215	DP	104	104	104	0	0
SSDP0244	0.228	DP	105	105	105	0	0
SSBG0001	0.24	BG	106	106	0	0	0
LEHR-SS-DP-0157	0.245	DP	107	107	107	0	0
LEHR-SS-DP-0128	0.263	DP	108	109	109	0	0
LEHR-SS-DP-0175	0.263	DP	109	109	109	0	1
SSDP0248	0.263	DP	110	109	109	24	2
SSDP0234	0.268	DP	111	111	111	0	0
SSDP0197	0.272	DP	112	112	112	0	0
LEHR-SS-DP-0189	0.273	DP	113	113	113	0	0
LEHR-SS-DP-0137	0.275	DP	114	114	114	0	0
SSBG0020	0.29	BG	115	115	0	0	0
LEHR-SS-DP-0186	0.304	DP	116	116	116	0	0
LEHR-SS-DP-0187	0.311	DP	117	117	117	0	0
LEHR-SS-DP-0167	0.312	DP	118	118	118	0	0
SSDP0286	0.314	DP	119	119	119	0	0
SSBG0039	0.32	BG	120	120	0	0	0
SSDP0270	0.322	DP	121	121	121	0	0
SSDP0238	0.337	DP	122	122	122	0	0
SSDP0285	0.349	DP	123	123	123	0	0
LEHR-SS-DP-0136	0.352	DP	124	124	124	0	0
LEHR-SS-DP-0146	0.361	DP	125	125	125	0	0
LEHR-SS-DP-0134	0.374	DP	126	126	126	0	0
LEHR-SS-DP-0138	0.379	DP	127	127	127	0	0
LEHR-SS-DP-0130	0.396	DP	128	128	128	0	0
SSBG0019	0.41	BG	129	129	0	0	0
SSDP0243	0.418	DP	130	130	130	0	0
LEHR-SS-DP-0183	0.421	DP	131	131	131	0	0
LEHR-SS-DP-0154	0.424	DP	132	132	132	0	0
LEHR-SS-DP-0147	0.427	DP	133	133	133	0	0
SSDP0213	0.473	DP	134	134	134	0	0
LEHR-SS-DP-0164	0.502	DP	135	135	135	0	0
SSDP0264	0.518	DP	136	136	136	0	0
SSDP0260	0.544	DP	137	137	137	0	0
LEHR-SS-DP-0149	0.567	DP	138	138	138	0	0
LEHR-SS-DP-0148	0.584	DP	139	139	139	0	0
LEHR-SS-DP-0133	0.593	DP	140	140	140	0	0
SSDP0239	0.594	DP	141	141	141	0	0
LEHR-SS-DP-0144	0.656	DP	142	142	142	0	0
LEHR-SS-DP-0153	0.675	DP	143	143	143	0	0

DATA SUFFICIENCY EVALUATION

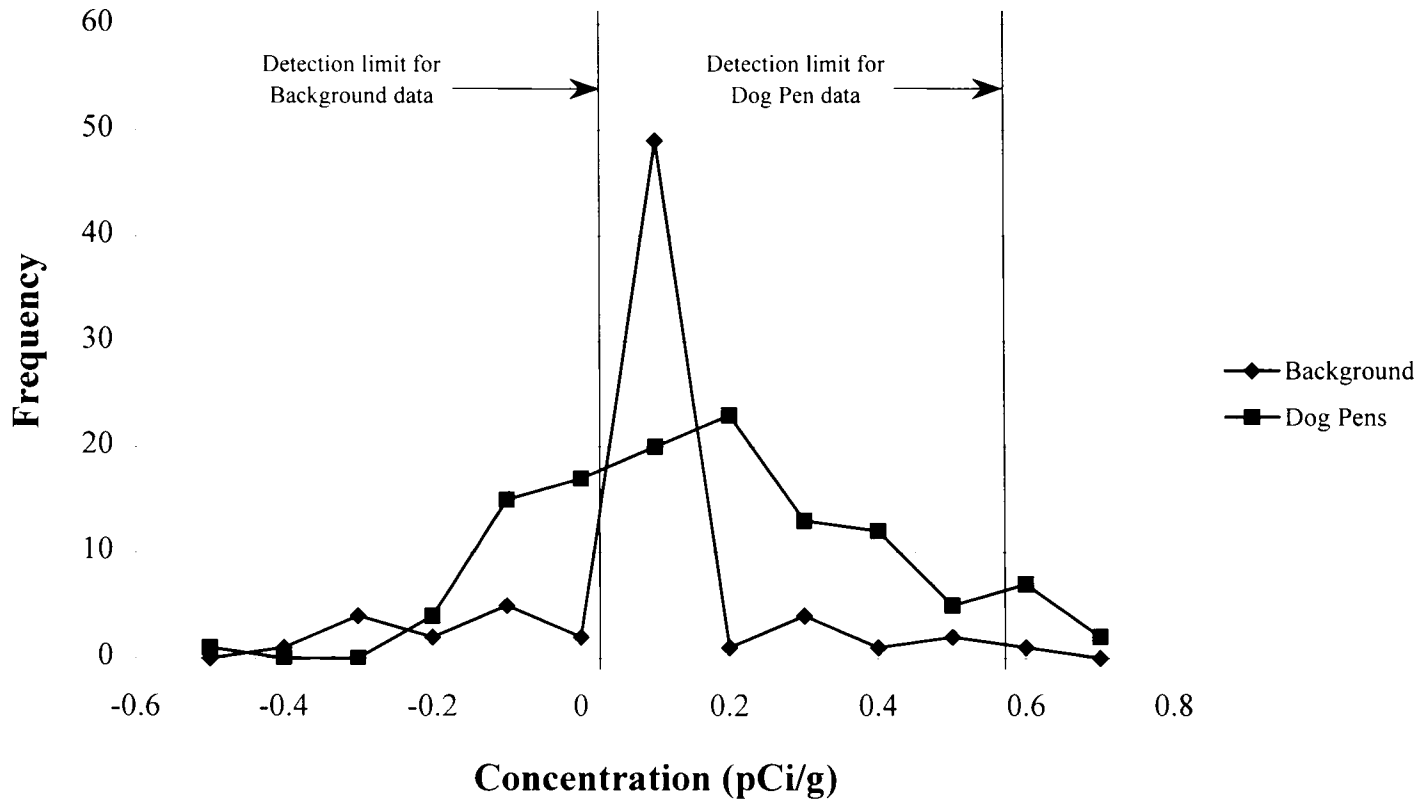
Type 1 Decision Error, alpha = 0.1
Z(1-a)= 1.281551
Type 2 Decision Error, beta = 0.2
Z(1-b)= 0.841621
Total Shift, (mg/kg) or (pCi/g) = 0.0168
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 0.195551
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 0.23154
Allowable Relative Shift = 0.072558
Probability, Pr = 0.518653
Minimum number of samples (Background + Cleanup Unit) = 4443 **Total existing number of samples is insufficient**
Minimum number of Background samples = 1850 **Existing number of Background samples is insufficient**
Minimum number of Cleanup Unit samples = 2594 **Existing number of Cleanup Unit samples is insufficient**

WILCOXON RANK SUM TEST RESULTS

n1= 119
n2= 24
m= 143
WRS= 8948
g= 9
Sum[tj(tj2-1)]= 72
Zrs= 2.05267
Z0.9= 1.281551

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

Histograms of Background and Dog Pens Data, Sr-90



Wilcoxon Rank Sum Test, Comparison of DP data to background, Thorium-234
(all depths)

Sample ID	CONC (	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	t(t)^2-1)	Tie Ind
LEHR-SS-DP-0165	0	DP	1	1	1	0	0
LEHR-SS-DP-0132	0.0291	DP	2	2	2	0	0
SSDP0256	0.0548	DP	3	3	3	0	0
SSDP0263	0.0659	DP	4	4	4	0	0
SSDP0287	0.0844	DP	5	5	5	0	0
SSDP0242	0.0996	DP	6	6	6	0	0
LEHR-SS-DP-0140	0.124	DP	7	7	7	0	0
SSDP0212	0.134	DP	8	8	8	0	0
LEHR-SS-DP-0175	0.141	DP	9	9	9	0	0
LEHR-SS-DP-0129	0.148	DP	10	10	10	0	0
SSDP0206	0.149	DP	11	11.5	11.5	0	0
SSDP0288	0.149	DP	12	11.5	11.5	6	1
LEHR-SS-DP-0162	0.204	DP	13	13	13	0	0
LEHR-SS-DP-0174	0.205	DP	14	14	14	0	0
SSDP0239	0.215	DP	15	15	15	0	0
SSDP0264	0.217	DP	16	16	16	0	0
LEHR-SS-DP-0117	0.248	DP	17	17	17	0	0
SSDP0257	0.258	DP	18	18	18	0	0
LEHR-SS-DP-0158	0.262	DP	19	19	19	0	0
SSDP0224	0.263	DP	20	20	20	0	0
SSDP0217	0.27	DP	21	21	21	0	0
LEHR-SS-DP-0142	0.273	DP	22	22	22	0	0
LEHR-SS-DP-0153	0.275	DP	23	23	23	0	0
LEHR-SS-BG-0100	0.276	BG	24	24	0	0	0
LEHR-SS-DP-0181	0.285	DP	25	25	25	0	0
LEHR-SS-DP-0177	0.294	DP	26	26	26	0	0
LEHR-SS-BG-0097	0.307	BG	27	27	0	0	0
SSDP0269	0.308	DP	28	28	28	0	0
SSDP0285	0.31	DP	29	29	29	0	0
SSDP0209	0.311	DP	30	30	30	0	0
SSDP0218	0.312	DP	31	31	31	0	0
LEHR-SS-DP-0191	0.32	DP	32	32	32	0	0
LEHR-SS-DP-0163	0.322	DP	33	33	33	0	0
SSDP0286	0.324	DP	34	34	34	0	0
LEHR-SS-DP-0173	0.333	DP	35	35	35	0	0
SSDP0214	0.346	DP	36	36	36	0	0
SSDP0210	0.367	DP	37	37	37	0	0
LEHR-SS-DP-0137	0.37	DP	38	38	38	0	0
LEHR-SS-DP-0119	0.374	DP	39	39	39	0	0
SSDP0220	0.381	DP	40	40	40	0	0
LEHR-SS-DP-0176	0.382	DP	41	41	41	0	0
SSDP0267	0.391	DP	42	42	42	0	0
LEHR-SS-DP-0172	0.41	DP	43	43.5	43.5	0	0
SSDP0064	0.41	DP	44	43.5	43.5	6	1
SSDP0261	0.414	DP	45	45	45	0	0
SSDP0270	0.438	DP	46	46	46	0	0
SSDP0199	0.439	DP	47	47.5	47.5	0	0
SSDP0221	0.439	DP	48	47.5	47.5	6	1
LEHR-SS-DP-0138	0.448	DP	49	49	49	0	0
LEHR-SS-DP-0180	0.45	DP	50	50.5	50.5	0	0
SSDP0028	0.45	DP	51	50.5	50.5	6	1
LEHR-SS-BG-0093	0.454	BG	52	52	0	0	0
SSDP0050	0.46	DP	53	53	53	0	0
SSDP0200	0.461	DP	54	54	54	0	0
LEHR-SS-BG-0114	0.464	BG	55	55	0	0	0
SSDP0235	0.467	DP	56	56	56	0	0
SSDP0006	0.47	DP	57	57	57	0	0
SSDP0211	0.475	DP	58	58	58	0	0
SSDP0274	0.479	DP	59	59	59	0	0
SSDP0295	0.483	DP	60	60	60	0	0
LEHR-SS-BG-0096	0.49	BG	61	61	0	0	0
LEHR-SS-BG-0110	0.491	BG	62	62.5	0	0	0
SSDP0284	0.491	DP	63	62.5	62.5	6	1
SSDP0292	0.497	DP	64	64	64	0	0
SSDP0232	0.5	DP	65	65	65	0	0
LEHR-SS-DP-0154	0.508	DP	66	66	66	0	0
LEHR-SS-DP-0192	0.509	DP	67	67	67	0	0
SSDP0215	0.511	DP	68	68	68	0	0
SSDP0228	0.513	DP	69	69	69	0	0
LEHR-SS-BG-0073	0.514	BG	70	70	0	0	0
SSDP0031	0.52	DP	71	71	71	0	0
LEHR-SS-BG-0085	0.521	BG	72	72	0	0	0
LEHR-SS-DP-0170	0.522	DP	73	73	73	0	0
SSDP0275	0.523	DP	74	74	74	0	0
SSDP0244	0.524	DP	75	75	75	0	0
LEHR-SS-DP-0122	0.529	DP	76	77	77	0	0
LEHR-SS-DP-0146	0.529	DP	77	77	77	0	1
LEHR-SS-DP-0182	0.529	DP	78	77	77	24	2
SSDP0037	0.53	DP	79	79.5	79.5	0	0
SSDP0069	0.53	DP	80	79.5	79.5	6	1
LEHR-SS-BG-0078	0.535	BG	81	81	0	0	0
LEHR-SS-BG-0067	0.537	BG	82	82	0	0	0
SSDP0203	0.54	DP	83	83	83	0	0
LEHR-SS-DP-0141	0.544	DP	84	84	84	0	0
LEHR-SS-BG-0077	0.547	BG	85	85.5	0	0	0
LEHR-SS-BG-0099	0.547	BG	86	85.5	0	6	1
LEHR-SS-BG-0091	0.551	BG	87	87	0	0	0
LEHR-SS-BG-0113	0.552	BG	88	88	0	0	0
LEHR-SS-BG-0084	0.560	BG	89	89	0	0	0
LEHR-SS-BG-0096	0.566	BG	90	90	0	0	0
LEHR-SS-BG-0104	0.567	BG	91	91	0	0	0
SSDP0207	0.57	DP	92	92	92	0	0
LEHR-SS-BG-0101	0.573	BG	93	93	0	0	0
LEHR-SS-BG-0109	0.577	BG	94	94	0	0	0
LEHR-SS-DP-0139	0.579	DP	95	95	95	0	0
LEHR-SS-BG-0107	0.58	BG	96	96.5	0	0	0
SSDP0056	0.58	DP	97	96.5	96.5	6	1
SSDP0253	0.581	DP	98	98	98	0	0
LEHR-SS-BG-0069	0.582	BG	99	99	0	0	0
SSDP0229	0.584	DP	100	100	100	0	0
SSDP0021	0.59	DP	101	101	101	0	0
LEHR-SS-BG-0090	0.591	BG	102	102	0	0	0
SSDP0216	0.593	DP	103	103	103	0	0
LEHR-SS-DP-0150	0.594	DP	104	104	104	0	0
LEHR-SS-DP-0193	0.595	DP	105	105	105	0	0
LEHR-SS-DP-0143	0.596	DP	106	106	106	0	0
SSDP0015	0.6	DP	107	108	108	0	0
SSDP0055	0.6	DP	108	108	108	0	1
SSDP0061	0.6	DP	109	108	108	24	2
LEHR-SS-BG-0088	0.606	BG	110	110	0	0	0
SSDP0281	0.608	DP	111	111	111	0	0
LEHR-SS-DP-0166	0.611	DP	112	112	112	0	0
LEHR-SS-BG-0086	0.613	BG	113	113	0	0	0
LEHR-SS-BG-0075	0.614	BG	114	114	0	0	0
SSDP0223	0.618	DP	115	115	115	0	0
LEHR-SS-BG-0102	0.62	BG	116	116	0	0	0
LEHR-SS-BG-0108	0.624	BG	117	117	0	0	0
LEHR-SS-BG-0094	0.626	BG	118	119	0	0	0
LEHR-SS-BG-0070	0.626	BG	119	119	0	0	1
LEHR-SS-BG-0103	0.626	BG	120	119	0	24	2
SSDP0046	0.63	DP	121	121.5	121.5	0	0
SSDP0294	0.63	DP	122	121.5	121.5	6	1
LEHR-SS-BG-0081	0.632	BG	123	123	0	0	0
LEHR-SS-BG-0076	0.634	BG	124	124	0	0	0
LEHR-SS-BG-0082	0.636	BG	125	125	0	0	0
LEHR-SS-DP-0188	0.644	DP	126	126	126	0	0
LEHR-SS-DP-0159	0.649	DP	127	127	127	0	0
SSDP0059	0.65	DP	128	128	128	0	0
LEHR-SS-DP-0183	0.656	DP	129	129	129	0	0
LEHR-SS-DP-0124	0.657	DP	130	130	130	0	0
LEHR-SS-BG-0074	0.659	BG	131	131	0	0	0
SSDP0236	0.666	DP	132	132	132	0	0
LEHR-SS-DP-0149	0.672	DP	133	133	133	0	0
LEHR-SS-DP-0157	0.68	DP	134	134	134	0	0
LEHR-SS-DP-0121	0.682	DP	135	135	135	0	0
LEHR-SS-BG-0089	0.683	BG	136	136	0	0	0
LEHR-SS-BG-0111	0.685	BG	137	137	0	0	0
LEHR-SS-DP-0184	0.687	DP	138	138	138	0	0
SSDP0278	0.688	DP	139	139	139	0	0
SSDP0043	0.69	DP	140	140.5	140.5	0	0
SSDP0068	0.69	DP	141	140.5	140.5	6	1

Wilcoxon Rank Sum Test, Comparison of DP data to background, Thorium-234
(all depths)

LEHR-SS-BG-0092	0.7	BG	142	143	0	0	0
SSDP0018	0.7	DP	143	143	143	0	1
SSDP0042	0.7	DP	144	143	143	24	2
LEHR-SS-BG-0115	0.701	BG	145	145	0	0	0
SSDP0273	0.702	DP	146	146	146	0	0
LEHR-SS-DP-0152	0.708	DP	147	147	147	0	0
SSDP0222	0.718	DP	148	148	148	0	0
LEHR-SS-BG-0079	0.719	BG	149	149	0	0	0
LEHR-SS-DP-0118	0.72	DP	150	150	150	0	0
LEHR-SS-DP-0156	0.722	DP	151	151	151	0	0
SSDP0233	0.726	DP	152	152	152	0	0
LEHR-SS-BG-0116	0.729	BG	153	154.5	0	0	0
SSDP0227	0.729	DP	154	154.5	154.5	0	1
SSDP0258	0.729	DP	155	154.5	154.5	0	2
SSDP0260	0.729	DP	156	154.5	154.5	60	3
LEHR-SS-BG-0083	0.73	BG	157	157	0	0	0
LEHR-SS-DP-0195	0.735	DP	158	158	158	0	0
SSDP0245	0.738	DP	159	159	159	0	0
SSDP0062	0.74	DP	160	160	160	0	0
LEHR-SS-DP-0167	0.743	DP	161	161	161	0	0
LEHR-SS-DP-0196	0.746	DP	162	162	162	0	0
LEHR-SS-DP-0131	0.747	DP	163	163	163	0	0
LEHR-SS-DP-0126	0.75	DP	164	164	164	0	0
LEHR-SS-BG-0094	0.753	BG	165	165	0	0	0
SSDP0272	0.755	DP	166	166	166	0	0
SSDP0257	0.757	DP	167	167	167	0	0
SSDP0255	0.759	DP	168	168	168	6	0
SSDP0034	0.76	DP	169	169.5	169.5	0	0
SSDP0049	0.76	DP	170	169.5	169.5	6	1
LEHR-SS-BG-0112	0.762	BG	171	171	0	0	0
SSDP0291	0.763	DP	172	172	172	0	0
SSDP0297	0.772	DP	173	173	173	0	0
LEHR-SS-DP-0123	0.777	DP	174	174	174	0	0
LEHR-SS-BG-0105	0.778	BG	175	175	0	0	0
SSDP0045	0.78	DP	176	176	176	0	0
LEHR-SS-BG-0087	0.786	BG	177	177.5	0	0	0
SSDP0265	0.786	DP	178	177.5	177.5	6	1
SSDP0280	0.79	DP	179	179	179	0	0
SSDP0054	0.8	DP	180	180	180	0	0
SSDP0246	0.805	DP	181	181	181	0	0
SSDP0254	0.808	DP	182	182	182	0	0
SSDP0052	0.81	DP	183	183	183	0	0
LEHR-SS-DP-0144	0.815	DP	184	184	184	0	0
LEHR-SS-BG-0072	0.825	BG	185	185	0	0	0
SSDP0198	0.826	DP	186	186.5	186.5	0	0
SSDP0247	0.826	DP	187	186.5	186.5	6	1
LEHR-SS-DP-0148	0.84	DP	188	188.5	188.5	0	0
SSDP0290	0.84	DP	189	188.5	188.5	6	1
SSDP0293	0.845	DP	190	190	190	0	0
LEHR-SS-DP-0151	0.849	DP	191	191	191	0	0
SSDP0248	0.867	DP	192	193	193	0	0
SSDP0250	0.867	DP	193	193	193	0	1
SSDP0277	0.867	DP	194	193	193	24	2
SSDP0012	0.87	DP	195	195	195	0	0
SSDP0238	0.871	DP	196	196	196	0	0
SSDP0009	0.88	DP	197	197.5	197.5	0	0
SSDP0047	0.88	DP	198	197.5	197.5	6	1
SSDP0271	0.884	DP	199	199	199	0	0
SSDP0249	0.891	DP	200	200	200	0	0
LEHR-SS-DP-0164	0.904	DP	201	201	201	0	0
LEHR-SS-BG-0071	0.918	BG	202	202	0	0	0
SSDP0208	0.923	DP	203	203	203	0	0
LEHR-SS-DP-0147	0.927	DP	204	204	204	0	0
SSDP0025	0.93	DP	205	205.5	205.5	0	0
SSDP0058	0.93	DP	206	205.5	205.5	6	1
SSDP0019	0.94	DP	207	207	207	0	0
LEHR-SS-DP-0190	0.946	DP	208	208	208	0	0
SSDP0065	0.95	DP	209	209	209	0	0
LEHR-SS-DP-0135	0.961	DP	210	210	210	0	0
LEHR-SS-DP-0128	0.977	DP	211	211	211	0	0
LEHR-SS-DP-0168	0.981	DP	212	212	212	0	0
LEHR-SS-DP-0125	0.982	DP	213	213	213	0	0
SSDP0213	0.984	DP	214	214	214	0	0
LEHR-SS-DP-0155	0.994	DP	215	215	215	0	0
SSDP0283	0.999	DP	216	216	216	0	0
SSDP0219	1	DP	217	217	217	0	0
SSDP0003	1.04	DP	218	218.5	218.5	0	0
SSDP0234	1.04	DP	219	218.5	218.5	6	1
SSDP0237	1.05	DP	220	220	220	0	0
LEHR-SS-BG-0065	1.07	BG	221	221.5	0	0	0
LEHR-SS-DP-0187	1.07	DP	222	221.5	221.5	6	1
LEHR-SS-DP-0120	1.09	DP	223	223.5	223.5	0	0
LEHR-SS-DP-0133	1.09	DP	224	223.5	223.5	6	1
SSDP0243	1.1	DP	225	225	225	0	0
SSDP0240	1.13	DP	226	226	226	0	0
SSDP0107	1.14	DP	227	227	227	0	0
SSDP0230	1.15	DP	228	228	228	0	0
LEHR-SS-DP-0179	1.16	DP	229	229	229	0	0
LEHR-SS-DP-0189	1.18	DP	230	230	230	0	0
SSDP0040	1.21	DP	231	231	231	0	0
SSDP0207	1.22	DP	232	232	232	0	0
SSDP0029	1.24	DP	233	233	233	0	0
SSDP0266	1.27	DP	234	234.5	234.5	0	0
SSDP0289	1.27	DP	235	234.5	234.5	6	1
SSDP0259	1.28	DP	236	236	236	0	0
SSDP0241	1.32	DP	237	237	237	0	0
LEHR-SS-DP-0169	1.34	DP	238	238.5	238.5	0	0
SSDP0276	1.34	DP	239	238.5	238.5	6	1
LEHR-SS-DP-0136	1.36	DP	240	240	240	0	0
LEHR-SS-DP-0130	1.45	DP	241	241	241	0	0
LEHR-SS-DP-0178	1.46	DP	242	242	242	0	0
SSDP0225	1.48	DP	243	243	243	0	0
LEHR-SS-DP-0145	1.54	DP	244	244	244	0	0
LEHR-SS-DP-0161	1.6	DP	245	245	245	0	0
SSDP0268	1.61	DP	246	246	246	0	0
LEHR-SS-DP-0184	1.62	DP	247	247.5	247.5	0	0
SSDP0204	1.62	DP	248	247.5	247.5	6	1
SSDP0231	1.65	DP	249	249	249	0	0
SSDP0282	1.67	DP	250	250	250	0	0
SSDP0262	2.04	DP	251	251	251	0	0
SSDP0201	2.4	DP	252	252	252	0	0

DATA SUFFICIENCY EVALUATION

Type 1 Decision Error (alpha) = 0.1
Z(1-a)= 1.2815508
Type 2 Decision Error (beta) = 0.2
Z(1-b)= 0.8416214
Total Shift (mg/kg) or (pCi/g) = 0.234
Standard Deviation of BG Group (mg/kg) or (pCi/g) = 0.134485
Standard Deviation of DP Group (mg/kg) or (pCi/g) = 0.3846374
Allowable Relative Shift = 0.6083651
Probability Pr = 0.667364
Minimum number of samples (Background + Cleanup Unit) = 138 **Pass**
Minimum number of Background samples = 16 **Pass**
Minimum number of Cleanup Unit samples = 123 **Pass**

WILCOXON RANK SUM TEST RESULTS

n1= 204
n2= 48
m= 252
W/RS= 26442.5
p= 28
Sum[t(t)(t-1)]= 312
Zrs= 1.4008683
Z(1-a)= 1.2815508

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Uranium-236
(all depths)

Sample ID	CONC (	Grouping	Abs Rank	Tie Norm Rank	n1Ranks	$t(t)^2-1)$	Tie Ind
SSDP0042	0.126	DP	1	1	1	0	0
LEHR-SS-DP-0183	0.0218	DP	2	2	2	0	0
SSDP0045	0.02	DP	3	3.5	3.5	0	0
SSDP0056	0.02	DP	4	3.5	3.5	6	1
LEHR-SS-DP-0193	0.0137	DP	5	5	5	0	0
LEHR-SS-DP-0152	0.0112	DP	6	6	6	0	0
SSDP0243	0.0105	DP	7	7	7	0	0
SSDP0269	0.01	DP	8	8	8	0	0
LEHR-SS-DP-0145	0.0026	DP	9	9	9	0	0
LEHR-SS-BG-0098	0	BG	10	12	0	0	0
LEHR-SS-DP-0117	0	DP	11	12	12	0	1
LEHR-SS-DP-0130	0	DP	12	12	12	0	2
LEHR-SS-DP-0140	0	DP	13	12	12	0	3
SSDP0049	0	DP	14	12	12	120	4
SSDP0284	0.0089	DP	15	15	15	0	0
LEHR-SS-DP-0163	0.0104	DP	16	16	16	0	0
SSBG0159	0.014	BG	17	17	0	0	0
SSBG0133	0.0141	BG	18	18	0	0	0
SSBG0161	0.0143	BG	19	19	0	0	0
SSBG0142	0.0145	BG	20	20	0	0	0
LEHR-SS-BG-0099	0.0157	BG	21	21	0	0	0
SSBG0138	0.0158	BG	22	22	0	0	0
LEHR-SS-BG-0085	0.0165	BG	23	23	0	0	0
SSBG0150	0.0168	BG	24	24	0	0	0
SSBG0120	0.0174	BG	25	25	0	0	0
LEHR-SS-BG-0089	0.0178	BG	26	26	0	0	0
LEHR-SS-BG-0092	0.0184	BG	27	27.5	0	0	0
SSBG0160	0.0184	BG	28	27.5	0	6	1
SSBG0153	0.0188	BG	29	29	0	0	0
LEHR-SS-BG-0066	0.0193	BG	30	31	0	0	0
LEHR-SS-BG-0072	0.0193	BG	31	31	0	0	1
LEHR-SS-BG-0077	0.0193	BG	32	31	0	24	2
LEHR-SS-BG-0081	0.0195	BG	33	33	0	0	0
LEHR-SS-BG-0071	0.02	BG	34	34.5	0	0	0
LEHR-SS-BG-0110	0.02	BG	35	34.5	0	6	1
LEHR-SS-BG-0096	0.0204	BG	36	36	0	0	0
SSBG0146	0.0205	BG	37	37	0	0	0
LEHR-SS-BG-0070	0.0206	BG	38	38	0	0	0
LEHR-SS-BG-0079	0.0209	BG	39	39.5	0	0	0
LEHR-SS-BG-0091	0.0209	BG	40	39.5	0	6	1
LEHR-SS-DP-0175	0.021	DP	41	41	41	0	0
LEHR-SS-BG-0064	0.0211	BG	42	42	0	0	0
LEHR-SS-DP-0168	0.0212	DP	43	43	43	0	0
SSBG0137	0.0213	BG	44	44	0	0	0
SSBG0162	0.0214	BG	45	45	0	0	0
SSBG0129	0.0215	BG	46	46	0	0	0
LEHR-SS-BG-0078	0.0216	BG	47	47	0	0	0
SSBG0147	0.0217	BG	48	48	0	0	0
LEHR-SS-DP-0182	0.0219	DP	49	49	49	0	0
LEHR-SS-BG-0073	0.0221	BG	50	50	0	0	0
LEHR-SS-BG-0113	0.0227	BG	51	51	0	0	0
LEHR-SS-BG-0112	0.023	BG	52	52	0	0	0
LEHR-SS-BG-0085	0.0231	BG	53	53.5	0	0	0
SSBG0123	0.0231	BG	54	53.5	0	6	1
LEHR-SS-BG-0069	0.0232	BG	55	55	0	0	0
LEHR-SS-BG-0097	0.0233	BG	56	56.5	0	0	0
SSBG0141	0.0233	BG	57	56.5	0	6	1
SSBG0145	0.0234	BG	58	59	0	0	0
SSBG0151	0.0234	BG	59	59	0	0	1
LEHR-SS-DP-0180	0.0234	DP	60	59	59	24	2
SSBG0154	0.0238	BG	61	61.5	0	0	0
LEHR-SS-DP-0120	0.0238	DP	62	61.5	61.5	6	1
LEHR-SS-BG-0100	0.0239	BG	63	63	0	0	0
SSDP0281	0.024	DP	64	64	64	0	0
LEHR-SS-BG-0075	0.0241	BG	65	66	0	0	0
LEHR-SS-BG-0082	0.0241	BG	66	66	0	0	1
SSBG0139	0.0241	BG	67	66	0	24	2
LEHR-SS-BG-0108	0.0242	BG	68	68	0	0	0
LEHR-SS-BG-0087	0.0243	BG	69	69	0	0	0
LEHR-SS-BG-0084	0.0248	BG	70	70	0	0	0
LEHR-SS-BG-0103	0.025	BG	71	71.5	0	0	0
SSBG0144	0.025	BG	72	71.5	0	6	1
LEHR-SS-BG-0076	0.0251	BG	73	73.5	0	0	0
SSDP0254	0.0251	DP	74	73.5	73.5	6	1
SSBG0126	0.0253	BG	75	75	0	0	0
LEHR-SS-BG-0068	0.0255	BG	76	76	0	0	0
SSDP0218	0.026	DP	77	77	77	0	0
LEHR-SS-BG-0083	0.0261	BG	78	78	0	0	0
SSBG0127	0.0263	BG	79	79	0	0	0
SSBG0121	0.0264	BG	80	80.5	0	0	0
LEHR-SS-DP-0154	0.0264	DP	81	80.5	80.5	6	1
SSBG0152	0.0267	BG	82	82	0	0	0
LEHR-SS-BG-0074	0.0271	BG	83	83	0	0	0
SSDP0255	0.0273	DP	84	84	84	0	0
SSBG0131	0.0276	BG	85	85	0	0	0
LEHR-SS-BG-0067	0.0284	BG	86	86.5	0	0	0
SSDP0292	0.0284	DP	87	86.5	86.5	6	1
SSBG0155	0.0286	BG	88	88.5	0	0	0
SSDP0270	0.0286	DP	89	88.5	88.5	6	1
LEHR-SS-BG-0086	0.0287	BG	90	90	0	0	0
LEHR-SS-BG-0093	0.0288	BG	91	91	0	0	0
SSBG0158	0.0289	BG	92	92	0	0	0
SSBG0023	0.029	BG	93	93.5	0	0	0
SSBG0130	0.029	BG	94	93.5	0	6	1
SSBG0132	0.0291	BG	95	95	0	0	0
SSBG0149	0.0295	BG	96	96	0	0	0
SSBG0138	0.0296	BG	97	97	0	0	0
SSBG0135	0.0297	BG	98	98	0	0	0
SSBG0019	0.03	BG	99	100	0	0	0
SSBG0134	0.03	BG	100	100	0	0	1
SSBG0143	0.03	BG	101	100	0	24	2
LEHR-SS-DP-0164	0.0302	DP	102	102	102	0	0
LEHR-SS-DP-0157	0.0306	DP	103	103	103	0	0
LEHR-SS-BG-0090	0.0309	BG	104	104	0	0	0
LEHR-SS-BG-0116	0.0311	BG	105	105	0	0	0
LEHR-SS-DP-0134	0.0314	DP	106	106	106	0	0
SSBG0014	0.032	BG	107	107	0	0	0
LEHR-SS-BG-0105	0.0324	BG	108	108.5	0	0	0
SSBG0163	0.0324	BG	109	108.5	0	6	1
SSBG0039	0.034	BG	110	110	0	0	0
SSBG0125	0.0342	BG	111	111	0	0	0
SSDP0249	0.0349	DP	112	112	112	0	0
LEHR-SS-BG-0111	0.035	BG	113	113	0	0	0
SSBG0157	0.0358	BG	114	114	0	0	0
LEHR-SS-BG-0109	0.0361	BG	115	115	0	0	0
LEHR-SS-BG-0115	0.0365	BG	116	116	0	0	0
LEHR-SS-DP-0131	0.0366	DP	117	117	117	0	0
LEHR-SS-DP-0147	0.0367	DP	118	118	118	0	0
LEHR-SS-BG-0102	0.0372	BG	119	119	0	0	0
LEHR-SS-DP-0191	0.0374	DP	120	120	120	0	0
SSDP0228	0.0377	DP	121	121	121	0	0
LEHR-SS-DP-0186	0.0378	DP	122	122	122	0	0
LEHR-SS-BG-0114	0.0387	BG	123	123	0	0	0
LEHR-SS-DP-0128	0.0388	DP	124	124	124	0	0
LEHR-SS-BG-0104	0.0392	BG	125	125	0	0	0
LEHR-SS-DP-0146	0.0396	DP	126	126	126	0	0
SSDP0058	0.04	DP	127	127	127	0	0
LEHR-SS-DP-0173	0.0414	DP	128	128	128	0	0
SSBG0018	0.043	BG	129	129	0	0	0
LEHR-SS-BG-0101	0.0431	BG	130	130	0	0	0
LEHR-SS-DP-0177	0.0434	DP	131	131	131	0	0
SSDP0288	0.0435	DP	132	132	132	0	0
SSBG0124	0.044	BG	133	133	0	0	0
SSDP0224	0.0445	DP	134	134	134	0	0

Wilcoxon Rank Sum Test, Comparison of DP data to background, Uranium-236
(all depths)

SSBG0001	0.045	BG	135	135	0	0	0
LEHR:SS:DP:0150	0.0455	DP	136	136	136	0	0
LEHR:SS:DP:0151	0.0456	DP	137	137	137	0	0
SSDP0223	0.0459	DP	138	138	138	0	0
SSBG0033	0.047	BG	139	139	0	0	0
LEHR:SS:DP:0159	0.0478	DP	140	140	140	0	0
SSBG0046	0.05	BG	141	142.5	0	0	0
SSDP0047	0.05	DP	142	142.5	142.5	0	1
SSDP0052	0.05	DP	143	142.5	142.5	0	2
SSDP0066	0.05	DP	144	142.5	142.5	80	3
LEHR:SS:DP:0136	0.0503	DP	145	145	145	0	0
LEHR:SS:DP:0171	0.0504	DP	146	146	146	0	0
SSBG0128	0.0507	BG	147	147	0	0	0
SSBG0037	0.051	BG	148	148	0	0	0
SSDP0198	0.0524	DP	149	149	149	0	0
SSDP0209	0.0547	DP	150	150	150	0	0
SSBG0010	0.055	BG	151	151.5	0	0	0
SSBG0029	0.055	BG	152	151.5	0	6	1
SSDP0287	0.0551	DP	153	153	153	0	0
LEHR:SS:DP:0124	0.0552	DP	154	154	154	0	0
SSDP0229	0.0558	DP	155	155	155	0	0
SSDP0233	0.0582	DP	156	156	156	0	0
SSBG0009	0.059	BG	157	157	0	0	0
LEHR:SS:BG-0107	0.0595	BG	158	158.5	0	0	0
SSDP0202	0.0595	DP	159	158.5	158.5	6	1
SSBG0027	0.06	BG	160	160.5	0	0	0
SSBG0048	0.06	BG	161	160.5	0	6	1
SSDP0265	0.0608	DP	162	162	162	0	0
SSBG0049	0.061	BG	163	163	0	0	0
LEHR:SS:DP:0133	0.0617	DP	164	164	164	0	0
LEHR:SS:DP:0141	0.0621	DP	165	165	165	0	0
LEHR:SS:DP:0148	0.0623	DP	166	166	166	0	0
SSBG0011	0.063	BG	167	167.5	0	0	0
SSBG0038	0.063	BG	168	167.5	0	6	1
SSBG0005	0.065	BG	169	170	0	0	0
LEHR:SS:DP:0142	0.065	DP	170	170	170	0	1
LEHR:SS:DP:0187	0.065	DP	171	170	170	24	2
LEHR:SS:DP:0167	0.0664	DP	172	172	172	0	0
LEHR:SS:DP:0155	0.0675	DP	173	173	173	0	0
SSBG0042	0.068	BG	174	174	0	0	0
LEHR:SS:DP:0125	0.0682	DP	175	175.5	175.5	0	0
LEHR:SS:DP:0135	0.0682	DP	176	175.5	175.5	6	1
SSBG0030	0.07	BG	177	177	0	0	0
SSDP0286	0.0701	DP	178	178	178	0	0
SSDP0203	0.0705	DP	179	179	179	0	0
LEHR:SS:DP:0170	0.0706	DP	180	180	180	0	0
LEHR:SS:DP:0166	0.0711	DP	181	181	181	0	0
LEHR:SS:DP:0137	0.0721	DP	182	182	182	0	0
LEHR:SS:DP:0138	0.0725	DP	183	183	183	0	0
LEHR:SS:DP:0162	0.0726	DP	184	184	184	0	0
LEHR:SS:DP:0153	0.0727	DP	185	185	185	0	0
SSDP0244	0.0728	DP	186	186	186	0	0
SSDP0238	0.0774	DP	187	187	187	0	0
SSDP0285	0.0789	DP	188	188	188	0	0
SSBG0020	0.079	BG	189	189	0	0	0
LEHR:SS:DP:0132	0.0799	DP	190	190	190	0	0
LEHR:SS:DP:0123	0.0826	DP	191	191	191	0	0
LEHR:SS:DP:0176	0.0827	DP	192	192	192	0	0
LEHR:SS:DP:0143	0.0836	DP	193	193	193	0	0
SSDP0248	0.0847	DP	194	194	194	0	0
LEHR:SS:DP:0156	0.0858	DP	195	195	195	0	0
LEHR:SS:DP:0118	0.0872	DP	196	196	196	0	0
SSBG0002	0.088	BG	197	197	0	0	0
SSDP0214	0.0885	DP	198	198	198	0	0
LEHR:SS:DP:0178	0.0886	DP	199	199	199	0	0
LEHR:SS:DP:0188	0.0888	DP	200	200	200	0	0
SSDP0280	0.0895	DP	201	201	201	0	0
SSDP0219	0.0912	DP	202	202	202	0	0
LEHR:SS:DP:0122	0.0933	DP	203	203	203	0	0
LEHR:SS:DP:0158	0.0963	DP	204	204	204	0	0
LEHR:SS:DP:0129	0.0969	DP	205	205	205	0	0
LEHR:SS:DP:0144	0.0989	DP	206	206	206	0	0
SSDP0280	0.0998	DP	207	207	207	0	0
LEHR:SS:DP:0189	0.0999	DP	208	208	208	0	0
LEHR:SS:DP:0165	0.101	DP	209	209	209	0	0
SSBG0052	0.103	BG	210	210	0	0	0
SSDP0197	0.104	DP	211	211	211	0	0
SSDP0239	0.107	DP	212	212	212	0	0
LEHR:SS:DP:0174	0.11	DP	213	213	213	0	0
LEHR:SS:DP:0180	0.113	DP	214	214	214	0	0
SSDP0208	0.12	DP	215	215.5	215.5	0	0
SSDP0274	0.12	DP	216	215.5	215.5	6	1
LEHR:SS:DP:0149	0.123	DP	217	217	217	0	0
LEHR:SS:DP:0139	0.128	DP	218	218	218	0	0
LEHR:SS:DP:0121	0.129	DP	219	219.5	219.5	0	0
LEHR:SS:DP:0169	0.129	DP	220	219.5	219.5	6	1
SSBG0056	0.13	BG	221	221	0	0	0
SSDP0259	0.133	DP	222	222	222	0	0
SSDP0275	0.134	DP	223	223	223	0	0
SSDP0234	0.136	DP	224	224	224	0	0
SSDP0293	0.154	DP	225	225	225	0	0
SSDP0213	0.159	DP	226	226	226	0	0
LEHR:SS:DP:0119	0.165	DP	227	227	227	0	0
LEHR:SS:DP:0181	0.166	DP	228	228	228	0	0
LEHR:SS:DP:0192	0.182	DP	229	229	229	0	0
LEHR:SS:DP:0127	0.196	DP	230	230	230	0	0
LEHR:SS:DP:0190	0.232	DP	231	231	231	0	0

DATA SUFFICIENCY EVALUATION

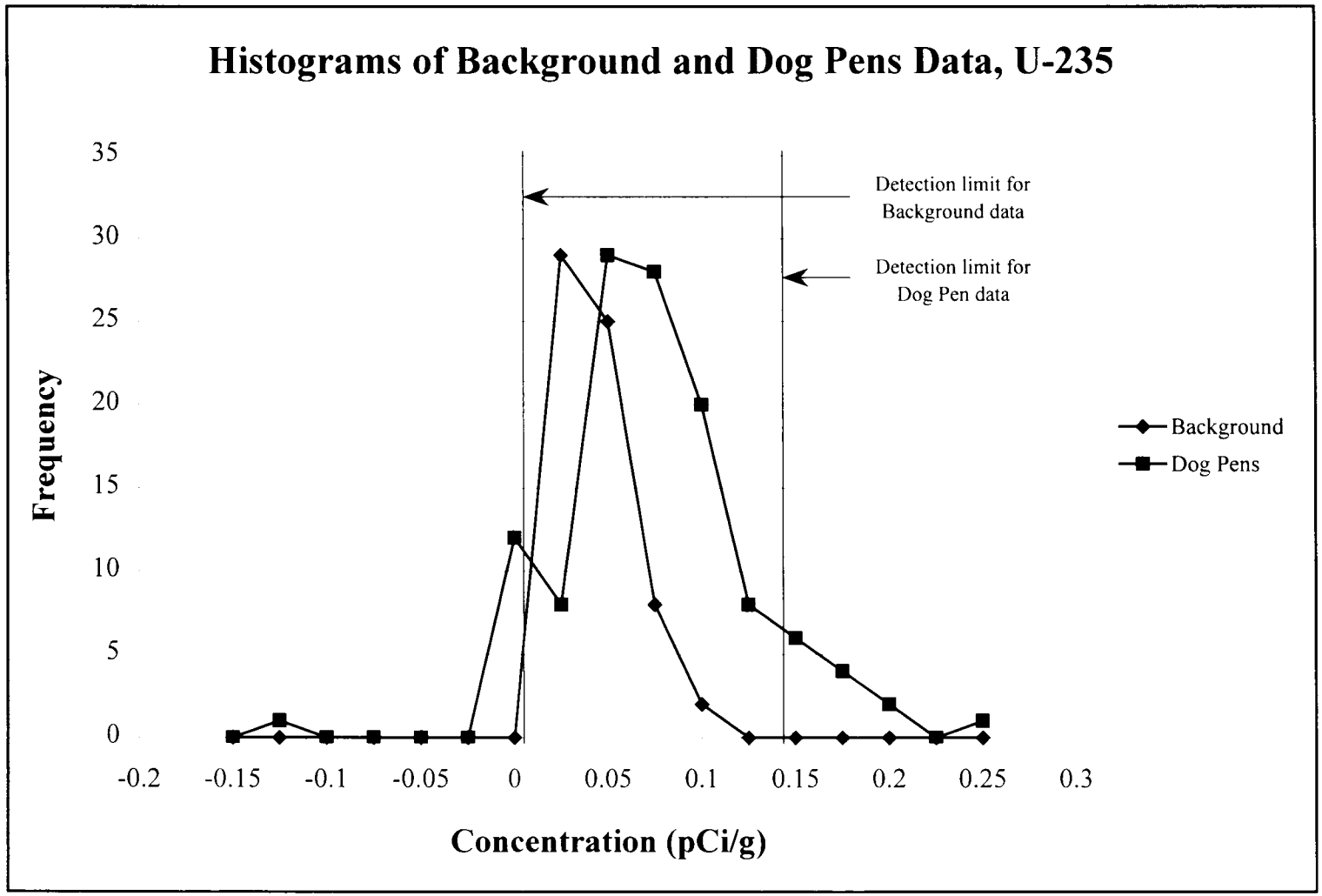
Type 1 Decision Error, alpha = 0.1
Z(1-a)= 1.2815508
Type 2 Decision Error, beta = 0.2
Z(1-b)= 0.8416214
Total Shift, (mg/kg) or (pCi/g) = 0.0189
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 0.0192001
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 0.0501725
Allowable Relative Shift = 0.3767006
Probability, Pr = 0.605773

Minimum number of samples (Background + Cleanup Unit) = 302 **Total existing number of samples is insufficient**
Minimum number of Background samples = 39 **Pass**
Minimum number of Cleanup Unit samples = 263 **Existing number of Cleanup Unit samples is insufficient**

WILCOXON RANK SUM TEST RESULTS

n1= 119
n2= 112
m= 231
WRS= 17118.5
g= 28
Sum(tj(tj2-1))= 426
Zrs= 6.5296464
Z0.9= 1.2815508

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


Histograms of Background and Dog Pens Data, U-235
Frequency
35
30
25
20
15
10
5
0
-0.2
-0.15
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Concentration (pCi/g)
Detection limit for Background data
Detection limit for Dog Pen data
Background
Dog Pens

Wilcoxon Rank Sum Test, Comparison of DP data to background, Uranium-238
(shallow samples)

Sample ID	CONC	Grouping	Abs Rank	Tie-Norm Ran	n1Ranks	$t_j(t_j^2-1)$	Tie Ind.
LEHR-SS-DP-0165	0	DP	1	1	1	0	0
LEHR-SS-DP-0132	0.0291	DP	2	2	2	0	0
SSDP0287	0.0844	DP	3	3	3	0	0
LEHR-SS-DP-0140	0.124	DP	4	4	4	0	0
LEHR-SS-DP-0175	0.141	DP	5	5	5	0	0
LEHR-SS-DP-0129	0.148	DP	6	6	6	0	0
SSDP0288	0.149	DP	7	7	7	0	0
LEHR-SS-DP-0162	0.204	DP	8	8	8	0	0
LEHR-SS-DP-0174	0.205	DP	9	9	9	0	0
SSDP0239	0.215	DP	10	10	10	0	0
SSDP0264	0.217	DP	11	11	11	0	0
LEHR-SS-DP-0117	0.248	DP	12	12	12	0	0
LEHR-SS-DP-0158	0.262	DP	13	13	13	0	0
SSDP0224	0.263	DP	14	14	14	0	0
LEHR-SS-DP-0142	0.273	DP	15	15	15	0	0
LEHR-SS-DP-0153	0.275	DP	16	16	16	0	0
LEHR-SS-DP-0181	0.285	DP	17	17	17	0	0
LEHR-SS-DP-0177	0.294	DP	18	18	18	0	0
SSDP0269	0.308	DP	19	19	19	0	0
SSDP0285	0.31	DP	20	20	20	0	0
SSDP0209	0.311	DP	21	21	21	0	0
SSDP0218	0.312	DP	22	22	22	0	0
LEHR-SS-DP-0191	0.32	DP	23	23	23	0	0
LEHR-SS-DP-0163	0.322	DP	24	24	24	0	0
SSDP0286	0.324	DP	25	25	25	0	0
SSBG0039	0.327	BG	26	26	0	0	0
SSBG0152	0.332	BG	27	27	0	0	0
LEHR-SS-DP-0173	0.333	DP	28	28	28	0	0
SSBG0159	0.344	BG	29	29	0	0	0
SSDP0214	0.346	DP	30	30	30	0	0
SSBG0147	0.365	BG	31	31	0	0	0
SSBG0145	0.367	BG	32	32	0	0	0
LEHR-SS-DP-0137	0.37	DP	33	33	33	0	0
LEHR-SS-DP-0119	0.374	DP	34	34	34	0	0
LEHR-SS-DP-0176	0.382	DP	35	35	35	0	0
SSBG0154	0.391	BG	36	36	0	0	0
SSBG0120	0.395	BG	37	37	0	0	0
SSBG0161	0.401	BG	38	38	0	0	0
SSBG0157	0.402	BG	39	39	0	0	0
SSBG0028	0.405	BG	40	40	0	0	0
SSBG0150	0.406	BG	41	41	0	0	0
SSBG0139	0.41	BG	42	42.5	0	0	0
LEHR-SS-DP-0172	0.41	DP	43	42.5	42.5	6	1
SSBG0132	0.414	BG	44	44	0	0	0
SSBG0141	0.417	BG	45	45	0	0	0
SSBG0142	0.428	BG	46	46	0	0	0
SSBG0149	0.431	BG	47	47.5	0	0	0
SSBG0151	0.431	BG	48	47.5	0	6	1
SSBG0137	0.435	BG	49	49	0	0	0
SSDP0270	0.438	DP	50	50	50	0	0
SSBG0163	0.444	BG	51	51	0	0	0
LEHR-SS-DP-0138	0.448	DP	52	52	52	0	0
LEHR-SS-DP-0160	0.45	DP	53	53	53	0	0
SSBG0146	0.452	BG	54	55	0	0	0
SSBG0153	0.452	BG	55	55	0	0	1
SSBG0162	0.452	BG	56	55	0	24	2
SSBG0138	0.457	BG	57	57	0	0	0
SSBG0049	0.46	BG	58	58	0	0	0
SSBG0144	0.462	BG	59	59	0	0	0
SSBG0136	0.468	BG	60	60	0	0	0
SSBG0160	0.475	BG	61	61	0	0	0
SSBG0143	0.478	BG	62	62	0	0	0
SSDP0274	0.479	DP	63	63	63	0	0
SSBG0127	0.488	BG	64	64	0	0	0
SSBG0001	0.491	BG	65	65	0	0	0
SSBG0125	0.492	BG	66	66.5	0	0	0
SSBG0133	0.492	BG	67	66.5	0	6	1
SSBG0158	0.493	BG	68	68	0	0	0
SSBG0019	0.497	BG	69	69.5	0	0	0
SSDP0292	0.497	DP	70	69.5	69.5	6	1
SSBG0126	0.498	BG	71	71	0	0	0
SSBG0128	0.508	BG	72	72.5	0	0	0
LEHR-SS-DP-0154	0.508	DP	73	72.5	72.5	6	1
SSBG0123	0.509	BG	74	74.5	0	0	0
LEHR-SS-DP-0192	0.509	DP	75	74.5	74.5	6	1
SSBG0129	0.51	BG	76	76	0	0	0
SSBG0124	0.512	BG	77	77	0	0	0
SSDP0228	0.513	DP	78	78	78	0	0
SSBG0038	0.518	BG	79	79	0	0	0
SSBG0048	0.52	BG	80	80	0	0	0
SSBG0156	0.522	BG	81	81.5	0	0	0
LEHR-SS-DP-0170	0.522	DP	82	81.5	81.5	6	1
SSDP0275	0.523	DP	83	83	83	0	0
SSDP0244	0.524	DP	84	84	84	0	0
SSBG0121	0.527	BG	85	85	0	0	0
SSBG0134	0.528	BG	86	86	0	0	0
LEHR-SS-DP-0122	0.529	DP	87	88	88	0	0
LEHR-SS-DP-0146	0.529	DP	88	88	88	0	1
LEHR-SS-DP-0182	0.529	DP	89	88	88	24	2
SSDP0203	0.54	DP	90	90	90	0	0
SSBG0130	0.543	BG	91	91	0	0	0
LEHR-SS-DP-0141	0.544	DP	92	92	92	0	0
SSBG0020	0.552	BG	93	93	0	0	0
SSBG0135	0.561	BG	94	94	0	0	0
SSBG0002	0.562	BG	95	95	0	0	0
SSBG0131	0.57	BG	96	96	0	0	0
LEHR-SS-DP-0139	0.579	DP	97	97	97	0	0

Wilcoxon Rank Sum Test, Comparison of DP data to background, Uranium-238
(shallow samples)

SSBG0030	0.58 BG	98	98	0	0	0
SSDP0229	0.584 DP	99	99	99	0	0
LEHR-SS-DP-0150	0.594 DP	100	100	100	0	0
LEHR-SS-DP-0193	0.595 DP	101	101	101	0	0
LEHR-SS-DP-0143	0.596 DP	102	102	102	0	0
SSBG0010	0.598 BG	103	103	0	0	0
SSDP0281	0.608 DP	104	104	104	0	0
LEHR-SS-DP-0166	0.611 DP	105	105	105	0	0
SSDP0223	0.618 DP	106	106	106	0	0
SSBG0011	0.631 BG	107	107	0	0	0
LEHR-SS-DP-0188	0.644 DP	108	108	108	0	0
LEHR-SS-DP-0159	0.649 DP	109	109	109	0	0
LEHR-SS-DP-0183	0.656 DP	110	110	110	0	0
LEHR-SS-DP-0124	0.657 DP	111	111	111	0	0
LEHR-SS-DP-0149	0.672 DP	112	112	112	0	0
LEHR-SS-DP-0157	0.68 DP	113	113	113	0	0
LEHR-SS-DP-0121	0.682 DP	114	114	114	0	0
LEHR-SS-DP-0152	0.708 DP	115	115	115	0	0
LEHR-SS-DP-0118	0.72 DP	116	116	116	0	0
LEHR-SS-DP-0156	0.722 DP	117	117	117	0	0
SSDP0233	0.726 DP	118	118	118	0	0
SSDP0260	0.729 DP	119	119	119	0	0
LEHR-SS-DP-0167	0.743 DP	120	120	120	0	0
LEHR-SS-DP-0131	0.747 DP	121	121	121	0	0
LEHR-SS-DP-0126	0.75 DP	122	122	122	0	0
SSDP0255	0.759 DP	123	123	123	0	0
LEHR-SS-DP-0123	0.777 DP	124	124	124	0	0
SSDP0265	0.786 DP	125	125	125	0	0
SSDP0280	0.79 DP	126	126	126	0	0
SSDP0254	0.808 DP	127	127	127	0	0
LEHR-SS-DP-0144	0.815 DP	128	128	128	0	0
SSDP0198	0.826 DP	129	129	129	0	0
LEHR-SS-DP-0148	0.84 DP	130	130	130	0	0
SSDP0293	0.845 DP	131	131	131	0	0
LEHR-SS-DP-0151	0.849 DP	132	132	132	0	0
SSDP0248	0.867 DP	133	133	133	0	0
SSDP0238	0.871 DP	134	134	134	0	0
SSDP0249	0.891 DP	135	135	135	0	0
LEHR-SS-DP-0164	0.904 DP	136	136	136	0	0
SSDP0208	0.923 DP	137	137	137	0	0
LEHR-SS-DP-0147	0.927 DP	138	138	138	0	0
LEHR-SS-DP-0190	0.948 DP	139	139	139	0	0
LEHR-SS-DP-0135	0.961 DP	140	140	140	0	0
LEHR-SS-DP-0128	0.977 DP	141	141	141	0	0
LEHR-SS-DP-0168	0.981 DP	142	142	142	0	0
LEHR-SS-DP-0125	0.982 DP	143	143	143	0	0
SSDP0213	0.984 DP	144	144	144	0	0
LEHR-SS-DP-0155	0.994 DP	145	145	145	0	0
SSDP0219	1 DP	146	146	146	0	0
SSDP0234	1.04 DP	147	147	147	0	0
LEHR-SS-DP-0187	1.07 DP	148	148	148	0	0
LEHR-SS-DP-0120	1.09 DP	149	149.5	149.5	0	0
LEHR-SS-DP-0133	1.09 DP	150	149.5	149.5	6	1
SSDP0243	1.1 DP	151	151	151	0	0
SSDP0197	1.14 DP	152	152	152	0	0
LEHR-SS-DP-0179	1.16 DP	153	153	153	0	0
LEHR-SS-DP-0189	1.18 DP	154	154	154	0	0
SSDP0202	1.22 DP	155	155	155	0	0
SSDP0259	1.28 DP	156	156	156	0	0
LEHR-SS-DP-0169	1.34 DP	157	157	157	0	0
LEHR-SS-DP-0136	1.36 DP	158	158	158	0	0
LEHR-SS-DP-0130	1.45 DP	159	159	159	0	0
LEHR-SS-DP-0178	1.46 DP	160	160	160	0	0
LEHR-SS-DP-0145	1.54 DP	161	161	161	0	0
LEHR-SS-DP-0161	1.6 DP	162	162	162	0	0
LEHR-SS-DP-0184	1.62 DP	163	163	163	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) = 0.1695
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 0.068832
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 0.36218
Allowable Relative Shift = 0.467999
Probability, Pr = 0.630585
Minimum number of samples (Background = Cleanup Unit) = 655 **Total existing number of samples is insufficient**
Minimum number of Background samples = 23 **Pass**
Minimum number of Cleanup Unit samples = 632 **Existing number of Cleanup Unit samples is insufficient**

WILCOXON RANK SUM TEST RESULTS

n1= 111
n2= 52
m= 163
WRS= 10136.5
g= 10
Sum[t(t)2-1)]= 96
Zrs= 3.683332
Z0.9= 1.281551

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Uranium-238
(deep samples)

Sample ID	CONC (	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$tj(tj^2-1)$	Tie Ind
SSDP0256	0.0548	DP	1	1	1	0	0
SSDP0263	0.0659	DP	2	2	2	0	0
SSDP0242	0.0996	DP	3	3	3	0	0
SSDP0212	0.134	DP	4	4	4	0	0
SSDP0252	0.258	DP	5	5	5	0	0
SSDP0217	0.27	DP	6	6	6	0	0
SSBG0152	0.332	BG	7	7	0	0	0
SSBG0159	0.344	BG	8	8	0	0	0
SSBG0147	0.365	BG	9	9	0	0	0
SSBG0145	0.367	BG	10	10.5	0	0	0
SSDP0210	0.367	DP	11	10.5	10.5	6	1
SSDP0220	0.381	DP	12	12	12	0	0
SSBG0154	0.391	BG	13	13.5	0	0	0
SSDP0267	0.391	DP	14	13.5	13.5	6	1
SSBG0120	0.395	BG	15	15	0	0	0
SSBG0161	0.401	BG	16	16	0	0	0
SSBG0157	0.402	BG	17	17	0	0	0
SSBG0150	0.406	BG	18	18	0	0	0
SSBG0139	0.41	BG	19	19	0	0	0
SSBG0132	0.414	BG	20	20.5	0	0	0
SSDP0261	0.414	DP	21	20.5	20.5	6	1
SSBG0141	0.417	BG	22	22	0	0	0
SSBG0142	0.428	BG	23	23	0	0	0
SSBG0149	0.431	BG	24	24.5	0	0	0
SSBG0151	0.431	BG	25	24.5	0	6	1
SSBG0137	0.435	BG	26	26	0	0	0
SSDP0199	0.439	DP	27	27.5	27.5	0	0
SSDP0221	0.439	DP	28	27.5	27.5	6	1
SSBG0163	0.444	BG	29	29	0	0	0
SSBG0146	0.452	BG	30	31	0	0	0
SSBG0153	0.452	BG	31	31	0	0	1
SSBG0162	0.452	BG	32	31	0	24	2
SSBG0138	0.457	BG	33	33	0	0	0
SSDP0200	0.461	DP	34	34	34	0	0
SSBG0144	0.462	BG	35	35	0	0	0
SSDP0235	0.467	DP	36	36	36	0	0
SSBG0136	0.468	BG	37	37	0	0	0
SSBG0160	0.475	BG	38	38.5	0	0	0
SSDP0211	0.475	DP	39	38.5	38.5	6	1
SSBG0143	0.478	BG	40	40	0	0	0
SSDP0295	0.483	DP	41	41	41	0	0
SSBG0127	0.488	BG	42	42	0	0	0
SSBG0018	0.491	BG	43	43.5	0	0	0
SSDP0284	0.491	DP	44	43.5	43.5	6	1
SSBG0125	0.492	BG	45	45.5	0	0	0
SSBG0133	0.492	BG	46	45.5	0	6	1
SSBG0158	0.493	BG	47	47	0	0	0
SSBG0126	0.498	BG	48	48	0	0	0
SSDP0232	0.5	DP	49	49	49	0	0
SSBG0033	0.507	BG	50	50	0	0	0
SSBG0128	0.508	BG	51	51	0	0	0
SSBG0123	0.509	BG	52	52	0	0	0
SSBG0129	0.51	BG	53	53	0	0	0
SSDP0215	0.511	DP	54	54	54	0	0
SSBG0124	0.512	BG	55	55	0	0	0
SSBG0156	0.522	BG	56	56	0	0	0
SSBG0042	0.523	BG	57	57	0	0	0
SSBG0121	0.527	BG	58	58	0	0	0
SSBG0134	0.528	BG	59	59	0	0	0
SSBG0037	0.53	BG	60	60	0	0	0
SSBG0023	0.533	BG	61	61	0	0	0
SSBG0009	0.538	BG	62	62	0	0	0
SSBG0130	0.543	BG	63	63	0	0	0
SSBG0135	0.561	BG	64	64	0	0	0
SSBG0014	0.563	BG	65	65	0	0	0
SSBG0131	0.57	BG	66	66.5	0	0	0
SSDP0207	0.57	DP	67	66.5	66.5	6	1
SSDP0253	0.581	DP	68	68	68	0	0
SSBG0027	0.583	BG	69	69	0	0	0
SSBG0056	0.59	BG	70	70	0	0	0

Wilcoxon Rank Sum Test, Comparison of DP data to background, Uranium-238
(deep samples)

SSDP0216	0.593	DP	71	71	71	0	0
SSBG0005	0.619	BG	72	72	0	0	0
SSDP0294	0.63	DP	73	73	73	0	0
SSDP0236	0.666	DP	74	74	74	0	0
SSBG0052	0.67	BG	75	75	0	0	0
LEHR-SS-DP-0194	0.687	DP	76	76	76	0	0
SSDP0278	0.688	DP	77	77	77	0	0
SSBG0046	0.69	BG	78	78	0	0	0
SSDP0273	0.702	DP	79	79	79	0	0
SSDP0222	0.718	DP	80	80	80	0	0
SSDP0227	0.729	DP	81	81.5	81.5	0	0
SSDP0258	0.729	DP	82	81.5	81.5	6	1
LEHR-SS-DP-0195	0.735	DP	83	83	83	0	0
SSDP0245	0.738	DP	84	84	84	0	0
LEHR-SS-DP-0196	0.746	DP	85	85	85	0	0
SSDP0272	0.755	DP	86	86	86	0	0
SSDP0257	0.757	DP	87	87	87	0	0
SSDP0291	0.763	DP	88	88	88	0	0
SSDP0297	0.772	DP	89	89	89	0	0
SSDP0246	0.805	DP	90	90	90	0	0
SSDP0247	0.826	DP	91	91	91	0	0
SSDP0290	0.84	DP	92	92	92	0	0
SSDP0250	0.867	DP	93	93.5	93.5	0	0
SSDP0277	0.867	DP	94	93.5	93.5	6	1
SSDP0271	0.884	DP	95	95	95	0	0
SSDP0283	0.999	DP	96	96	96	0	0
SSDP0237	1.05	DP	97	97	97	0	0
SSDP0240	1.13	DP	98	98	98	0	0
SSDP0230	1.15	DP	99	99	99	0	0
SSDP0266	1.27	DP	100	100.5	100.5	0	0
SSDP0289	1.27	DP	101	100.5	100.5	6	1
SSDP0241	1.32	DP	102	102	102	0	0
SSDP0276	1.34	DP	103	103	103	0	0
SSDP0205	1.42	DP	104	104	104	0	0
SSDP0225	1.48	DP	105	105	105	0	0
SSDP0268	1.61	DP	106	106	106	0	0
SSDP0204	1.62	DP	107	107	107	0	0
SSDP0231	1.65	DP	108	108	108	0	0
SSDP0282	1.67	DP	109	109	109	0	0
SSDP0262	2.04	DP	110	110	110	0	0
SSDP0201	2.4	DP	111	111	111	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) = 0.1935
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 0.076208
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 0.484335
Allowable Relative Shift = 0.399517
Probability, Pr = 0.612037
Minimum number of samples (Background + Cleanup Unit) = 1270 **Total existing number of samples is insufficient**
Minimum number of Background samples = 31 **Pass**
Minimum number of Cleanup Unit samples = 1239 **Existing number of Cleanup Unit samples is insufficient**

WILCOXON RANK SUM TEST RESULTS

n1= 59
n2= 52
m= 111
WRS= 4069
g= 13
Sum[tj(tj2-1)]= 96
Zrs= 4.520959
Z0.9= 1.281551

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

APPENDIX A-2

METALS AND NITRATE WILCOXON RANK SUM TEST RESULTS

Wilcoxon Rank Sum Test, Comparison of DP data to background, Barium, Shallow

Sample ID	CONC (u	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	tj(tj²-1)	Tie Ind.
SSDP0043	75.6	DP	1	1	1	0	0
SSDP0068	89.6	DP	2	2	2	0	0
SSDP0045	91.6	DP	3	3	3	0	0
SSDP0061	104	DP	4	4	4	0	0
SSBG0030	107	BG	5	5	0	0	0
SSBG0002	116	BG	6	6.5	0	0	0
SSBG0133	116	BG	7	6.5	0	6	1
SSBG0039	117	BG	8	8	0	0	0
SSDP0049	127	DP	9	9	9	0	0
SSDP0052	132	DP	10	10	10	0	0
SSBG0028	136	BG	11	11	0	0	0
SSBG0120	137	BG	12	12	0	0	0
SSBG0147	140	BG	13	14	0	0	0
SSBG0159	140	BG	14	14	0	0	1
SSDP0064	140	DP	15	14	14	24	2
SSDP0042	141	DP	16	16	16	0	0
SSBG0019	143	BG	17	17	0	0	0
SSBG0001	146	BG	18	18	0	0	0
SSDP0069	151	DP	19	19	19	0	0
SSBG0145	154	BG	20	20.5	0	0	0
SSDP0050	154	DP	21	20.5	20.5	6	1
SSDP0058	155	DP	22	22	22	0	0
SSBG0161	156	BG	23	23	0	0	0
SSBG0163	157	BG	24	24	0	0	0
SSBG0151	158	BG	25	25.5	0	0	0
SSBG0162	158	BG	26	25.5	0	6	1
SSBG0121	159	BG	27	27	0	0	0
SSBG0125	160	BG	28	28.5	0	0	0
SSBG0139	160	BG	29	28.5	0	6	1
SSBG0141	161	BG	30	30.5	0	0	0
SSBG0160	161	BG	31	30.5	0	6	1
SSBG0010	162	BG	32	32	0	0	0
SSDP0047	163	DP	33	33	33	0	0
SSBG0123	165	BG	34	34.5	0	0	0
SSBG0127	165	BG	35	34.5	0	6	1
SSBG0126	166	BG	36	36	0	0	0
SSBG0137	167	BG	37	37	0	0	0
SSBG0157	168	BG	38	38.5	0	0	0
SSDP0056	168	DP	39	38.5	38.5	6	1
SSBG0142	170	BG	40	40	0	0	0
SSBG0049	171	BG	41	42	0	0	0
SSBG0128	171	BG	42	42	0	0	1
SSBG0153	171	BG	43	42	0	24	2
SSBG0124	174	BG	44	44	0	0	0
SSBG0150	175	BG	45	45.5	0	0	0
SSBG0152	175	BG	46	45.5	0	6	1
SSBG0136	177	BG	47	47	0	0	0
SSBG0038	180	BG	48	48	0	0	0
SSBG0048	181	BG	49	49	0	0	0
SSBG0146	182	BG	50	51	0	0	0
SSBG0154	182	BG	51	51	0	0	1
SSBG0158	182	BG	52	51	0	24	2
SSBG0132	183	BG	53	53	0	0	0
SSBG0129	184	BG	54	54	0	0	0
SSBG0130	187	BG	55	55	0	0	0
SSBG0149	190	BG	56	56	0	0	0
SSBG0020	193	BG	57	57.5	0	0	0
SSBG0138	193	BG	58	57.5	0	6	1
SSBG0143	195	BG	59	59	0	0	0
SSBG0144	196	BG	60	60	0	0	0
SSDP0046	205	DP	61	61	61	0	0
SSBG0131	206	BG	62	62	0	0	0
SSBG0155	210	BG	63	63	0	0	0
SSBG0134	217	BG	64	64	0	0	0
SSBG0135	221	BG	65	65	0	0	0
SSBG0011	233	BG	66	66	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) = 63.3
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 26.29778
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 35.46914
Allowable Relative Shift = 1.78465
Probability, Pr = 0.896827
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= 14
n2= 52
m= 66
WRS= 253
g= 12
Sum[tj(tj2-1)]= 126
Zrs= -3.388726
Z0.9= 1.281551

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Barium, Deep

Sample ID	CONC (	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$tj(tj^2-1)$	Tie Ind.
SSBG0009	73.1	BG	1	1	0	0	0
SSDP0015	98.8	DP	2	2	2	0	0
SSDP0021	106	DP	3	3	3	0	0
SSDP0009	124	DP	4	4	4	0	0
SSDP0034	125	DP	5	5	5	0	0
SSDP0031	136	DP	6	6	6	0	0
SSBG0005	147	BG	7	7	0	0	0
SSDP0055	149	DP	8	8	8	0	0
SSDP0062	150	DP	9	9	9	0	0
SSBG0023	155	BG	10	10	0	0	0
SSDP0003	159	DP	11	11	11	0	0
SSDP0040	168	DP	12	12	12	0	0
SSDP0018	170	DP	13	13	13	0	0
SSBG0042	177	BG	14	14	0	0	0
SSDP0059	184	DP	15	15	15	0	0
SSBG0033	191	BG	16	16.5	0	0	0
SSDP0054	191	DP	17	16.5	16.5	6	1
SSDP0029	193	DP	18	18	18	0	0
SSBG0052	199	BG	19	19.5	0	0	0
SSDP0019	199	DP	20	19.5	19.5	6	1
SSDP0065	201	DP	21	21	21	0	0
SSBG0027	207	BG	22	22	0	0	0
SSBG0046	209	BG	23	23	0	0	0
SSDP0025	210	DP	24	24.5	24.5	0	0
SSDP0028	210	DP	25	24.5	24.5	6	1
SSDP0037	214	DP	26	26	26	0	0
SSBG0014	215	BG	27	27.5	0	0	0
SSDP0006	215	DP	28	27.5	27.5	6	1
SSDP0012	219	DP	29	29	29	0	0
SSBG0018	255	BG	30	30	0	0	0
SSBG0037	285	BG	31	31	0	0	0
SSBG0056	308	BG	32	32	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) = 88.2
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 63.08761
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 38.34379
Allowable Relative Shift = 2.300242
Probability, Pr = 0.950667
Minimum number of samples (Background + Cleanup Unit) = 10 **Pass**
Minimum number of Background samples = 7 **Pass**
Minimum number of Cleanup Unit samples = 3 **Pass**

WILCOXON RANK SUM TEST RESULTS

n1= 20
n2= 12
m= 32
WRS= 294.5
g= 4
Sum[tj(tj2-1)]= 24
Zrs= -1.382342
Z0.9= 1.281551

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Chromium (shallow samples)

Sample ID	CONC	Grouping	Abs Rank	Tie-Norm Ran	n1Ranks	$t_j(t_j^2-1)$	Tie Ind
SSBG0133	68 8	BG	1	1	0	0	0
SSDP0068	72	DP	2	2	2	0	0
LEHR-SS-BG-0074	93	BG	3	3	0	0	0
SSDP0046	107	DP	4	4	4	0	0
LEHR-SS-BG-0109	109	BG	5	5	0	0	0
LEHR-SS-BG-0083	112	BG	6	6 5	0	0	0
SSDP0049	112	DP	7	6 5	6 5	6	1
SSDP0064	113	DP	8	8	8	0	0
SSDP0069	115	DP	9	9	9	0	0
SSDP0042	117	DP	10	10	10	0	0
SSDP0056	118	DP	11	11	11	0	0
SSBG0049	119	BG	12	12	0	0	0
SSBG0163	120	BG	13	13	0	0	0
SSDP0058	121	DP	14	14	14	0	0
LEHR-SS-BG-0082	122	BG	15	16	0	0	0
SSBG0120	122	BG	16	16	0	0	1
SSDP0219	122	DP	17	16	16	24	2
SSBG0038	123	BG	18	19	0	0	0
SSDP0047	123	DP	19	19	19	0	1
SSDP0287	123	DP	20	19	19	24	2
LEHR-SS-BG-0101	125	BG	21	22	0	0	0
SSBG0135	125	BG	22	22	0	0	1
SSBG0138	125	BG	23	22	0	24	2
SSBG0131	126	BG	24	24	0	0	0
SSBG0011	127	BG	25	26	0	0	0
SSBG0124	127	BG	26	26	0	0	1
SSBG0160	127	BG	27	26	0	24	2
SSBG0126	128	BG	28	28	0	0	0
LEHR-SS-BG-0066	129	BG	29	30	0	0	0
SSBG0129	129	BG	30	30	0	0	1
SSBG0130	129	BG	31	30	0	24	2
SSBG0134	130	BG	32	32	0	0	0
SSBG0144	132	BG	33	33	0	0	0
SSDP0197	133	DP	34	34	34	0	0
SSBG0123	134	BG	35	35	0	0	0
SSBG0010	135	BG	36	37	0	0	0
SSBG0125	135	BG	37	37	0	0	1
SSBG0151	135	BG	38	37	0	24	2
LEHR-SS-BG-0100	136	BG	39	39 5	0	0	0
SSBG0161	136	BG	40	39 5	0	6	1
SSBG0137	137	BG	41	41	0	0	0
SSBG0128	140	BG	42	42 5	0	0	0
SSBG0162	140	BG	43	42 5	0	6	1
SSBG0145	143	BG	44	44 5	0	0	0
SSDP0288	143	DP	45	44 5	44 5	6	1
SSDP0259	145	DP	46	46	46	0	0
SSBG0127	146	BG	47	47	0	0	0
SSBG0020	147	BG	48	48	0	0	0
SSBG0136	149	BG	49	50	0	0	0
SSDP0050	149	DP	50	50	50	0	1
SSDP0218	149	DP	51	50	50	24	2
SSBG0121	150	BG	52	52	0	0	0
SSBG0047	151	BG	53	54	0	0	0
SSBG0149	151	BG	54	54	0	0	1
SSBG0154	151	BG	55	54	0	24	2
SSBG0143	152	BG	56	56 5	0	0	0
SSBG0153	152	BG	57	56 5	0	6	1
SSBG0146	153	BG	58	58	0	0	0
SSDP0244	154	DP	59	59	59	0	0
LEHR-SS-BG-0110	156	BG	60	61	0	0	0
SSBG0132	156	BG	61	61	0	0	1
SSBG0158	156	BG	62	61	0	24	2
SSDP0243	159	DP	63	63	63	0	0
SSBG0019	160	BG	64	64	0	0	0
SSBG0157	162	BG	65	65	0	0	0
LEHR-SS-BG-0091	163	BG	66	67	0	0	0
SSBG0139	163	BG	67	67	0	0	1
SSBG0142	163	BG	68	67	0	24	2
SSBG0001	165	BG	69	69 5	0	0	0
SSDP0052	165	DP	70	69 5	69 5	6	1
SSBG0140	167	BG	71	71	0	0	0
SSBG0150	168	BG	72	72	0	0	0
LEHR-SS-BG-0073	171	BG	73	73 5	0	0	0
SSDP0274	171	DP	74	73 5	73 5	6	1
SSBG0155	172	BG	75	75	0	0	0
SSBG0152	173	BG	76	76	0	0	0
SSBG0147	175	BG	77	77	0	0	0
LEHR-SS-BG-0065	181	BG	78	78	0	0	0
SSBG0029	184	BG	79	79	0	0	0
SSDP0260	187	DP	80	80	80	0	0
SSBG0159	190	BG	81	81	0	0	0
SSDP0275	195	DP	82	82	82	0	0
SSBG0039	199	BG	83	83	0	0	0
SSDP0285	206	DP	84	84	84	0	0
SSDP0198	208	DP	85	85	85	0	0
SSDP0045	212	DP	86	86	86	0	0
SSBG0002	214	BG	87	87	0	0	0
SSDP0061	218	DP	88	88	88	0	0
SSBG0030	251	BG	89	89	0	0	0
SSDP0043	262	DP	90	90	90	0	0
SSDP0286	273	DP	91	91	91	0	0
LEHR-SS-BG-0092	306	BG	92	92	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) =	59 7	
Standard Deviation of BG Group, (mg/kg) or (pCi/g) =	34 24878	
Standard Deviation of DP Group, (mg/kg) or (pCi/g) =	48 4093	
Allowable Relative Shift =	1 233234	
Probability, Pr =	0 807804	
Minimum number of samples (Background + Cleanup Unit) =	18	**Pass**
Minimum number of Background samples =	6	**Pass**
Minimum number of Cleanup Unit samples =	12	**Pass**

WILCOXON RANK SUM TEST RESULTS

n1=	28
n2=	64
m=	92
WRS=	1294
g=	17
Sum(tj(tj2-1))=	282
Zrs=	-0 067897
Z0 9=	1 281551

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Chromium (deep samples)

Sample ID	CONC (	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	tj(tj^2-1)	Tie Ind
LEHR-SS-BG-0097	39 9	BG	1	1	0	0	0
SSDP0291	43 9	DP	2	2	2	0	0
LEHR-SS-BG-0087	52 7	BG	3	3	0	0	0
SSDP0021	53 7	DP	4	4	4	0	0
LEHR-SS-BG-0104	54	BG	5	5	0	0	0
LEHR-SS-BG-0081	57.5	BG	6	6	0	0	0
LEHR-SS-BG-0078	57 8	BG	7	7	0	0	0
SSDP0222	58	DP	8	8	8	0	0
LEHR-SS-BG-0106	58 7	BG	9	9	0	0	0
SSBG0023	59 6	BG	10	10	0	0	0
SSBG0052	60	BG	11	11	0	0	0
SSDP0290	60 5	DP	12	12	12	0	0
LEHR-SS-BG-0108	61	BG	13	13	0	0	0
SSDP0031	64 9	DP	14	14	14	0	0
LEHR-SS-BG-0089	65 4	BG	15	15	0	0	0
LEHR-SS-BG-0096	67 7	BG	16	16	0	0	0
SSBG0009	69 4	BG	17	17	0	0	0
LEHR-SS-BG-0114	72 3	BG	18	18	0	0	0
LEHR-SS-BG-0070	73 8	BG	19	19	0	0	0
SSDP0263	74	DP	20	20	20	0	0
SSBG0042	74 4	BG	21	21	0	0	0
LEHR-SS-BG-0115	75.2	BG	22	22	0	0	0
LEHR-SS-BG-0107	76 5	BG	23	23	0	0	0
SSDP0200	78 3	DP	24	24	24	0	0
SSDP0247	80 3	DP	25	25	25	0	0
LEHR-SS-BG-0085	80 4	BG	26	26	0	0	0
SSDP0221	80 9	DP	27	27	27	0	0
SSBG0027	83 9	BG	28	28	0	0	0
LEHR-SS-BG-0102	84 3	BG	29	29	0	0	0
SSBG0037	86 4	BG	30	30	0	0	0
SSBG0046	86 8	BG	31	31	0	0	0
SSBG0018	87.2	BG	32	32	0	0	0
SSBG0033	87 7	BG	33	33	0	0	0
LEHR-SS-BG-0069	88 5	BG	34	34	0	0	0
LEHR-SS-BG-0090	88 9	BG	35	35	0	0	0
SSDP0246	89 3	DP	36	36	36	0	0
LEHR-SS-BG-0116	91 6	BG	37	37	0	0	0
SSDP0278	93 5	DP	38	38	38	0	0
LEHR-SS-BG-0071	96 7	BG	39	39	0	0	0
SSDP0062	97 3	DP	40	40	40	0	0
SSDP0019	99 1	DP	41	41	41	0	0
LEHR-SS-BG-0094	100	BG	42	42	0	0	0
LEHR-SS-BG-0111	102	BG	43	43	0	0	0
LEHR-SS-BG-0086	103	BG	44	45 5	0	0	0
LEHR-SS-BG-0099	103	BG	45	45 5	0	0	1
SSDP0037	103	DP	46	45 5	45 5	0	2
SSDP0029	103	DP	47	45 5	45 5	60	3
SSDP0201	104	DP	48	48	48	0	0
LEHR-SS-BG-0067	105	BG	49	49.5	0	0	0
LEHR-SS-BG-0112	105	BG	50	49 5	0	6	1
LEHR-SS-BG-0076	106	BG	51	52	0	0	0
LEHR-SS-BG-0098	106	BG	52	52	0	0	1
SSDP0065	106	DP	53	52	52	24	2
LEHR-SS-BG-0103	107	BG	54	55	0	0	0
SSDP0018	107	DP	55	55	55	0	1
SSDP0262	107	DP	56	55	55	24	2
LEHR-SS-BG-0080	108	BG	57	59	0	0	0
SSBG0056	108	BG	58	59	0	0	1
SSDP0059	108	DP	59	59	59	0	2
SSDP0199	108	DP	60	59	59	0	3
SSDP0277	108	DP	61	59	59	120	4
SSDP0054	109	DP	62	62	62	0	0
SSBG0005	110	BG	63	63 5	0	0	0
SSBG0014	110	BG	64	63 5	0	6	1
LEHR-SS-BG-0084	111	BG	65	65 5	0	0	0
SSDP0025	111	DP	66	65 5	65 5	6	1
LEHR-SS-BG-0068	112	BG	67	67	0	0	0
SSDP0028	113	DP	68	68	68	0	0
SSDP0040	114	DP	69	69	69	0	0
LEHR-SS-BG-0113	115	BG	70	70 5	0	0	0
SSDP0006	115	DP	71	70 5	70 5	6	1
LEHR-SS-BG-0075	116	BG	72	72 5	0	0	0
LEHR-SS-BG-0093	116	BG	73	72 5	0	6	1
LEHR-SS-BG-0077	117	BG	74	74 5	0	0	0
SSDP0276	117	DP	75	74 5	74 5	6	1
SSDP0012	119	DP	76	76 5	76 5	0	0
SSDP0220	119	DP	77	76 5	76 5	6	1
LEHR-SS-BG-0072	120	BG	78	78 5	0	0	0
SSDP0003	120	DP	79	78 5	78 5	6	1
SSDP0289	129	DP	80	80	80	0	0
SSDP0034	131	DP	81	81	81	0	0
SSDP0245	139	DP	82	82	82	0	0
SSDP0055	142	DP	83	83	83	0	0
SSDP0261	150	DP	84	84	84	0	0
SSDP0015	183	DP	85	85	85	0	0
SSDP0009	195	DP	86	86	86	0	0

DATA SUFFICIENCY EVALUATION

Type 1 Decision Error alpha = 0 1
Z(1-a)= 1 2815508
Type 2 Decision Error, beta = 0 2
Z(1-b)= 0 8416214
Total Shift, (mg/kg) or (pCi/g) = 37 5
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 21 401955
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 31 424958
Allowable Relative Shift = 1 193319
Probability, Pr = 0 8000573
Minimum number of samples (Background + Cleanup Unit) = 20 **Pass**
Minimum number of Background samples = 7 **Pass**
Minimum number of Cleanup Unit samples = 14 **Pass**

WILCOXON RANK SUM TEST RESULTS

n1= 38
n2= 48
m= 86
WRS= 1991
g= 12
Sum(tj(tj2-1))= 276
Zrs= 2 9398796
Z0 9= 1 2815508

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Chromium, Hexavalent (all depths)

Sample ID	CONC	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$t_j(t_j^2-1)$	Tie Ind
LEHR-SS-BG-0066	0	BG	1	43	0	0	0
LEHR-SS-BG-0067	0	BG	2	43	0	0	1
LEHR-SS-BG-0068	0	BG	3	43	0	0	2
LEHR-SS-BG-0070	0	BG	4	43	0	0	3
LEHR-SS-BG-0071	0	BG	5	43	0	0	4
LEHR-SS-BG-0072	0	BG	6	43	0	0	5
LEHR-SS-BG-0074	0	BG	7	43	0	0	6
LEHR-SS-BG-0079	0	BG	8	43	0	0	7
LEHR-SS-BG-0085	0	BG	9	43	0	0	8
LEHR-SS-BG-0087	0	BG	10	43	0	0	9
LEHR-SS-BG-0089	0	BG	11	43	0	0	10
LEHR-SS-BG-0092	0	BG	12	43	0	0	11
LEHR-SS-BG-0096	0	BG	13	43	0	0	12
LEHR-SS-BG-0098	0	BG	14	43	0	0	13
LEHR-SS-BG-0103	0	BG	15	43	0	0	14
LEHR-SS-BG-0107	0	BG	16	43	0	0	15
LEHR-SS-BG-0108	0	BG	17	43	0	0	16
LEHR-SS-BG-0110	0	BG	18	43	0	0	17
LEHR-SS-BG-0111	0	BG	19	43	0	0	18
LEHR-SS-BG-0113	0	BG	20	43	0	0	19
LEHR-SS-BG-0114	0	BG	21	43	0	0	20
* LEHR-SS-BG-0115	0	BG	22	43	0	0	21
LEHR-SS-DP-0117	0	DP	23	43	43	0	22
LEHR-SS-DP-0119	0	DP	24	43	43	0	23
LEHR-SS-DP-0120	0	DP	25	43	43	0	24
LEHR-SS-DP-0121	0	DP	26	43	43	0	25
LEHR-SS-DP-0122	0	DP	27	43	43	0	26
LEHR-SS-DP-0123	0	DP	28	43	43	0	27
LEHR-SS-DP-0125	0	DP	29	43	43	0	28
LEHR-SS-DP-0126	0	DP	30	43	43	0	29
LEHR-SS-DP-0128	0	DP	31	43	43	0	30
LEHR-SS-DP-0129	0	DP	32	43	43	0	31
LEHR-SS-DP-0130	0	DP	33	43	43	0	32
LEHR-SS-DP-0131	0	DP	34	43	43	0	33
LEHR-SS-DP-0132	0	DP	35	43	43	0	34
LEHR-SS-DP-0133	0	DP	36	43	43	0	35
LEHR-SS-DP-0134	0	DP	37	43	43	0	36
LEHR-SS-DP-0135	0	DP	38	43	43	0	37
LEHR-SS-DP-0136	0	DP	39	43	43	0	38
LEHR-SS-DP-0137	0	DP	40	43	43	0	39
LEHR-SS-DP-0138	0	DP	41	43	43	0	40
LEHR-SS-DP-0139	0	DP	42	43	43	0	41
LEHR-SS-DP-0140	0	DP	43	43	43	0	42
LEHR-SS-DP-0141	0	DP	44	43	43	0	43
LEHR-SS-DP-0142	0	DP	45	43	43	0	44
LEHR-SS-DP-0143	0	DP	46	43	43	0	45
LEHR-SS-DP-0144	0	DP	47	43	43	0	46
LEHR-SS-DP-0145	0	DP	48	43	43	0	47
LEHR-SS-DP-0146	0	DP	49	43	43	0	48
LEHR-SS-DP-0147	0	DP	50	43	43	0	49
LEHR-SS-DP-0148	0	DP	51	43	43	0	50
LEHR-SS-DP-0149	0	DP	52	43	43	0	51
LEHR-SS-DP-0150	0	DP	53	43	43	0	52
LEHR-SS-DP-0151	0	DP	54	43	43	0	53
LEHR-SS-DP-0152	0	DP	55	43	43	0	54
LEHR-SS-DP-0153	0	DP	56	43	43	0	55
LEHR-SS-DP-0159	0	DP	57	43	43	0	56
LEHR-SS-DP-0161	0	DP	58	43	43	0	57
LEHR-SS-DP-0162	0	DP	59	43	43	0	58
LEHR-SS-DP-0163	0	DP	60	43	43	0	59
LEHR-SS-DP-0164	0	DP	61	43	43	0	60
LEHR-SS-DP-0165	0	DP	62	43	43	0	61
LEHR-SS-DP-0167	0	DP	63	43	43	0	62
LEHR-SS-DP-0168	0	DP	64	43	43	0	63
LEHR-SS-DP-0169	0	DP	65	43	43	0	64
LEHR-SS-DP-0170	0	DP	66	43	43	0	65
LEHR-SS-DP-0171	0	DP	67	43	43	0	66
LEHR-SS-DP-0173	0	DP	68	43	43	0	67
LEHR-SS-DP-0174	0	DP	69	43	43	0	68
LEHR-SS-DP-0175	0	DP	70	43	43	0	69
LEHR-SS-DP-0176	0	DP	71	43	43	0	70
LEHR-SS-DP-0177	0	DP	72	43	43	0	71
LEHR-SS-DP-0178	0	DP	73	43	43	0	72
LEHR-SS-DP-0179	0	DP	74	43	43	0	73
LEHR-SS-DP-0181	0	DP	75	43	43	0	74
LEHR-SS-DP-0182	0	DP	76	43	43	0	75
LEHR-SS-DP-0187	0	DP	77	43	43	0	76
LEHR-SS-DP-0188	0	DP	78	43	43	0	77
SSDP0049	0	DP	79	43	43	0	78
SSDP0198	0	DP	80	43	43	0	79
SSDP0202	0	DP	81	43	43	0	80
SSDP0229	0	DP	82	43	43	0	81
SSDP0243	0	DP	83	43	43	0	82
SSDP0249	0	DP	84	43	43	0	83
SSDP0254	0	DP	85	43	43	614040	84
LEHR-SS-BG-0075	0.0167	BG	86	86	0	0	0
LEHR-SS-BG-0104	0.0173	BG	87	87	0	0	0
LEHR-SS-BG-0106	0.0176	BG	88	88	0	0	0
LEHR-SS-BG-0083	0.0195	BG	89	89	0	0	0
LEHR-SS-BG-0084	0.0209	BG	90	90	0	0	0
LEHR-SS-BG-0102	0.021	BG	91	91	0	0	0
LEHR-SS-BG-0100	0.0216	BG	92	92	0	0	0
LEHR-SS-BG-0097	0.0224	BG	93	93	0	0	0
LEHR-SS-BG-0116	0.0233	BG	94	94	0	0	0
LEHR-SS-BG-0101	0.024	BG	95	95	0	0	0
LEHR-SS-BG-0090	0.0244	BG	96	96	0	0	0
LEHR-SS-BG-0093	0.0249	BG	97	97	0	0	0
SSBG0020	0.025	BG	98	98	0	0	0
SSBG0037	0.028	BG	99	99	0	0	0
LEHR-SS-BG-0094	0.0281	BG	100	100	0	0	0
LEHR-SS-BG-0081	0.0287	BG	101	101	0	0	0
LEHR-SS-BG-0112	0.0332	BG	102	102	0	0	0
LEHR-SS-BG-0086	0.0333	BG	103	103	0	0	0
SSBG0009	0.036	BG	104	104	0	0	0
SSBG0002	0.037	BG	105	105.5	0	0	0
SSBG0028	0.037	BG	106	105.5	0	6	1
SSBG0010	0.038	BG	107	107.5	0	0	0
SSBG0019	0.038	BG	108	107.5	0	6	1
LEHR-SS-BG-0078	0.0387	BG	109	109	0	0	0
SSBG0018	0.04	BG	110	110	0	0	0
LEHR-SS-BG-0073	0.0406	BG	111	111	0	0	0
SSBG0005	0.041	BG	112	112.5	0	0	0
SSBG0011	0.041	BG	113	112.5	0	6	1

Wilcoxon Rank Sum Test, Comparison of DP data to background, Chromium, Hexavalent (all depths)

SSBG0027	0.042	BG	114	114	0	0	0
LEHR-SS-BG-0077	0.0423	BG	115	115	0	0	0
LEHR-SS-BG-0082	0.0447	BG	116	116	0	0	0
LEHR-SS-BG-0069	0.0482	BG	117	117	0	0	0
SSDP0047	0.049	DP	118	118	118	0	0
LEHR-SS-BG-0076	0.0493	BG	119	119	0	0	0
LEHR-SS-BG-0091	0.0494	BG	120	120	0	0	0
LEHR-SS-BG-0065	0.0525	BG	121	121	0	0	0
SSBG0033	0.053	BG	122	122	0	0	0
SSBG0014	0.055	BG	123	124	0	0	0
SSBG0023	0.055	BG	124	124	0	0	1
SSBG0042	0.055	BG	125	124	0	24	2
LEHR-SS-BG-0099	0.0559	BG	126	126	0	0	0
SSBG0030	0.061	BG	127	127.5	0	0	0
SSDP0056	0.061	DP	128	127.5	127.5	6	1
SSBG0039	0.062	BG	129	129	0	0	0
SSDP0004	0.064	DP	130	130.5	130.5	0	0
SSDP0013	0.064	DP	131	130.5	130.5	6	1
LEHR-SS-DP-0190	0.0645	DP	132	132	132	0	0
LEHR-SS-DP-0160	0.067	DP	133	133	133	0	0
LEHR-SS-DP-0191	0.069	DP	134	134.5	134.5	0	0
SSDP0045	0.069	DP	135	134.5	134.5	6	1
LEHR-SS-DP-0118	0.0695	DP	136	136	136	0	0
SSBG0056	0.071	BG	137	137	0	0	0
SSDP0001	0.072	DP	138	138	138	0	0
LEHR-SS-DP-0155	0.073	DP	139	139	139	0	0
SSDP0007	0.076	DP	140	140.5	140.5	0	0
SSDP0052	0.076	DP	141	140.5	140.5	6	1
SSBG0001	0.077	BG	142	142	0	0	0
SSBG0038	0.08	BG	143	143	0	0	0
SSDP0192	0.0819	DP	144	144	144	0	0
LEHR-SS-BG-0109	0.0822	BG	145	145	0	0	0
LEHR-SS-DP-0156	0.0828	DP	146	146	146	0	0
SSBG0046	0.083	BG	147	147	0	0	0
SSDP0010	0.088	DP	148	148	148	0	0
SSDP0239	0.0959	DP	149	149	149	0	0
SSBG0052	0.096	BG	150	150	0	0	0
SSDP0265	0.0976	DP	151	151	151	0	0
SSDP0233	0.0984	DP	152	152	152	0	0
SSDP0197	0.099	DP	153	153	153	0	0
SSDP0255	0.0999	DP	154	154	154	0	0
SSDP0042	0.1	DP	155	155	155	0	0
LEHR-SS-DP-0185	0.102	DP	156	156	156	0	0
SSDP0274	0.104	DP	157	157	157	0	0
SSDP0058	0.11	DP	158	158	158	0	0
SSDP0068	0.12	DP	159	159	159	0	0
LEHR-SS-DP-0158	0.125	DP	160	160	160	0	0
SSDP0275	0.126	DP	161	161	161	0	0
SSDP0270	0.139	DP	162	162	162	0	0
SSDP0286	0.147	DP	163	163	163	0	0
SSBG0049	0.15	BG	164	165	0	0	0
SSDP0234	0.15	DP	165	165	165	0	1
SSDP0281	0.15	DP	166	165	165	24	2
LEHR-SS-DP-0166	0.152	DP	167	167	167	0	0
SSDP0260	0.16	DP	168	168	168	0	0
SSDP0228	0.163	DP	169	169	169	0	0
SSDP0287	0.166	DP	170	170	170	0	0
SSDP0269	0.17	DP	171	171	171	0	0
LEHR-SS-DP-0183	0.172	DP	172	172	172	0	0
SSDP0292	0.178	DP	173	173	173	0	0
LEHR-SS-DP-0189	0.182	DP	174	174	174	0	0
SSDP0193	0.193	DP	175	175	175	0	0
SSDP0280	0.203	DP	176	176	176	0	0
SSDP0248	0.205	DP	177	177	177	0	0
SSDP0219	0.221	DP	178	178	178	0	0
SSDP0288	0.244	DP	179	179	179	0	0
SSBG0047	0.25	BG	180	180	0	0	0
SSDP0223	0.295	DP	181	181	181	0	0
SSDP0213	0.297	DP	182	182	182	0	0
SSDP0238	0.302	DP	183	183	183	0	0
SSDP0224	0.309	DP	184	184	184	0	0
SSDP0218	0.314	DP	185	185	185	0	0
LEHR-SS-DP-0154	0.325	DP	186	186	186	0	0
SSDP0203	0.333	DP	187	187	187	0	0
SSDP0209	0.407	DP	188	188	188	0	0
SSDP0208	0.418	DP	189	189	189	0	0
SSDP0244	0.54	DP	190	190	190	0	0
SSDP0264	0.573	DP	191	191	191	0	0
SSDP0293	0.654	DP	192	192	192	0	0
SSDP0214	0.659	DP	193	193	193	0	0
SSDP0259	0.812	DP	194	194	194	0	0
LEHR-SS-DP-0157	0.837	DP	195	195	195	0	0
SSDP0285	1.02	DP	196	196	196	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) = 0.0297
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 0.038801
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 0.184569
Allowable Relative Shift = 0.160915
Probability, Pr = 0.544606
Minimum number of samples (Background +Cleanup Unit) = 4658 **Total existing number of samples is insufficient**
Minimum number of Background samples = 198 **Existing number of Background samples is insufficient**
Minimum number of Cleanup Unit samples = 4461 **Existing number of Cleanup Unit samples is insufficient**

WILCOXON RANK SUM TEST RESULTS

n1= 124
n2= 72
m= 196
WRS= 12666.5
g= 10
Sum(t(t2-1))= 614130
Zrs= 1.233317
Z0.9= 1.281551

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Copper, Shallow

Sample ID	CONC (pCi/g)	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$tj(tj^2-1)$	Tie Ind.
SSDP0068	18	DP	1	1	1	0	0
SSDP0043	19.3	DP	2	2	2	0	0
SSBG0039	20.1	BG	3	3	0	0	0
SSBG0030	21	BG	4	4	0	0	0
SSDP0045	21.8	DP	5	5	5	0	0
SSDP0061	23.2	DP	6	6	6	0	0
LEHR-SS-BG-0110	23.5	BG	7	7	0	0	0
LEHR-SS-BG-0092	25.7	BG	8	8	0	0	0
SSBG0029	25.8	BG	9	9	0	0	0
SSBG0002	25.9	BG	10	10	0	0	0
LEHR-SS-BG-0100	30.1	BG	11	11	0	0	0
SSDP0052	30.6	DP	12	12	12	0	0
LEHR-SS-BG-0074	31.3	BG	13	13	0	0	0
SSDP0049	31.4	DP	14	14	14	0	0
SSDP0064	31.7	DP	15	15	15	0	0
SSBG0049	31.9	BG	16	16.5	0	0	0
SSDP0056	31.9	DP	17	16.5	16.5	6	1
SSDP0069	32.1	DP	18	18	18	0	0
SSBG0001	32.7	BG	19	19	0	0	0
SSBG0038	33.5	BG	20	20.5	0	0	0
SSDP0042	33.5	DP	21	20.5	20.5	6	1
SSDP0050	33.8	DP	22	22	22	0	0
LEHR-SS-BG-0073	35.2	BG	23	23.5	0	0	0
SSDP0058	35.2	DP	24	23.5	23.5	6	1
SSBG0019	35.5	BG	25	25	0	0	0
SSBG0048	35.8	BG	26	26	0	0	0
SSBG0010	37.3	BG	27	27	0	0	0
LEHR-SS-BG-0109	39.3	BG	28	28	0	0	0
SSDP0047	39.8	DP	29	29	29	0	0
LEHR-SS-BG-0065	41.5	BG	30	30	0	0	0
LEHR-SS-BG-0091	42.3	BG	31	31	0	0	0
SSBG0020	42.5	BG	32	32	0	0	0
LEHR-SS-BG-0083	44	BG	33	33	0	0	0
SSDP0046	44.1	DP	34	34	34	0	0
LEHR-SS-BG-0082	45.8	BG	35	35	0	0	0
LEHR-SS-BG-0066	49.1	BG	36	36	0	0	0
LEHR-SS-BG-0101	49.7	BG	37	37	0	0	0
SSBG0011	56.6	BG	38	38	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) = 14.64
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 9.564085
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 7.49797
Allowable Relative Shift = 1.952528
Probability, Pr = 0.917338
Minimum number of samples (Background + Cleanup Unit) = 10 **Pass**
Minimum number of Background samples = 6 **Pass**
Minimum number of Cleanup Unit samples = 4 **Pass**

WILCOXON RANK SUM TEST RESULTS

n1= 14
n2= 24
m= 38
WRS= 218.5
g= 3
Sum[tj(tj2-1)]= 18
Zrs= -1.649516
Z0.9= 1.281551

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Copper, Deep

Sample ID	CONC ((	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	tj(tj'-1)	Tie Ind.
SSBG0009	21.2	BG	1	1	0	0	0
SSDP0015	22.3	DP	2	2	2	0	0
LEHR-SS-BG-0081	22.6	BG	3	3	0	0	0
SSDP0021	23.1	DP	4	4	4	0	0
SSDP0031	25.4	DP	5	5	5	0	0
LEHR-SS-BG-0097	26.3	BG	6	6	0	0	0
SSDP0034	27.1	DP	7	7	7	0	0
LEHR-SS-BG-0108	27.3	BG	8	8	0	0	0
SSDP0009	29.2	DP	9	9	9	0	0
LEHR-SS-BG-0102	30.7	BG	10	10	0	0	0
SSBG0052	31.9	BG	11	11	0	0	0
LEHR-SS-BG-0115	32.4	BG	12	12	0	0	0
SSDP0055	32.5	DP	13	13	13	0	0
LEHR-SS-BG-0098	34.2	BG	14	14	0	0	0
LEHR-SS-BG-0087	35.1	BG	15	15.5	0	0	0
LEHR-SS-BG-0105	35.1	BG	16	15.5	0	6	1
LEHR-SS-BG-0096	36.4	BG	17	17	0	0	0
SSBG0042	36.5	BG	18	18	0	0	0
LEHR-SS-BG-0114	36.6	BG	19	19	0	0	0
LEHR-SS-BG-0085	37.5	BG	20	20	0	0	0
LEHR-SS-BG-0070	37.6	BG	21	21	0	0	0
LEHR-SS-BG-0111	38.4	BG	22	22	0	0	0
SSBG0033	39.2	BG	23	23	0	0	0
LEHR-SS-BG-0104	39.4	BG	24	24	0	0	0
SSBG0023	39.8	BG	25	25	0	0	0
SSDP0029	40	DP	26	26	26	0	0
LEHR-SS-BG-0078	40.1	BG	27	27	0	0	0
SSDP0062	40.8	DP	28	28	28	0	0
LEHR-SS-BG-0089	40.9	BG	29	29	0	0	0
SSDP0003	41.7	DP	30	30	30	0	0
SSDP0037	42	DP	31	31	31	0	0
SSDP0054	42.5	DP	32	32	32	0	0
SSBG0005	42.7	BG	33	33.5	0	0	0
SSDP0019	42.7	DP	34	33.5	33.5	6	1
LEHR-SS-BG-0093	43	BG	35	35.5	0	0	0
SSDP0059	43	DP	36	35.5	35.5	6	1
SSBG0046	43.3	BG	37	37	0	0	0
SSDP0065	43.7	DP	38	38	38	0	0
SSDP0025	43.9	DP	39	39.5	39.5	0	0
SSDP0028	43.9	DP	40	39.5	39.5	6	1
LEHR-SS-BG-0067	44.2	BG	41	41	0	0	0
SSBG0018	44.5	BG	42	42	0	0	0
SSDP0040	44.6	DP	43	43	43	0	0
SSBG0037	45	BG	44	44	0	0	0
LEHR-SS-BG-0076	45.7	BG	45	45	0	0	0
LEHR-SS-BG-0116	46.1	BG	46	46.5	0	0	0
SSDP0006	46.1	DP	47	46.5	46.5	6	1
LEHR-SS-BG-0072	46.3	BG	48	48	0	0	0
SSDP0018	46.6	DP	49	49	49	0	0
SSDP0012	46.8	DP	50	50	50	0	0
LEHR-SS-BG-0103	46.9	BG	51	51	0	0	0
LEHR-SS-BG-0090	47.3	BG	52	52	0	0	0
LEHR-SS-BG-0084	49.1	BG	53	53	0	0	0
LEHR-SS-BG-0099	49.2	BG	54	54	0	0	0
LEHR-SS-BG-0094	50.1	BG	55	55	0	0	0
LEHR-SS-BG-0107	50.3	BG	56	56	0	0	0
LEHR-SS-BG-0112	51.8	BG	57	57	0	0	0
LEHR-SS-BG-0113	51.9	BG	58	58	0	0	0
LEHR-SS-BG-0080	52.8	BG	59	59	0	0	0
LEHR-SS-BG-0086	53.2	BG	60	60	0	0	0
LEHR-SS-BG-0069	56.7	BG	61	61	0	0	0
SSBG0014	57	BG	62	62	0	0	0
SSBG0027	57.1	BG	63	63	0	0	0
SSBG0056	59.5	BG	64	64	0	0	0
LEHR-SS-BG-0068	59.8	BG	65	65	0	0	0
LEHR-SS-BG-0075	63.8	BG	66	66	0	0	0
LEHR-SS-BG-0077	63.9	BG	67	67	0	0	0
LEHR-SS-BG-0071	72.3	BG	68	68	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) = 18.54
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 10.99774
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 8.341997
Allowable Relative Shift = 2.222489
Probability, Pr = 0.944234
Minimum number of samples (Background + Cleanup Unit) = 9 **Pass**
Minimum number of Background samples = 6 **Pass**
Minimum number of Cleanup Unit samples = 3 **Pass**

WILCOXON RANK SUM TEST RESULTS

n1= 20
n2= 48
m= 68
WRS= 561.5
g= 5
Sum[tj(tj2-1)]= 30
Zrs= -1.729634
Z0.9= 1.281551

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Iron
(all depths)

Sample ID	CONC	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$tj(tj^2-1)$	Tie Ind.
SSBG0009	20600	BG	1	1	0	0	0
SSDP0068	21000	DP	2	2	2	0	0
SSDP0021	22600	DP	3	3	3	0	0
SSDP0031	27400	DP	4	4	4	0	0
SSDP0043	29000	DP	5	5	5	0	0
SSBG0052	30400	BG	6	6	0	0	0
SSBG0039	30500	BG	7	7	0	0	0
SSBG0029	31300	BG	8	8	0	0	0
SSBG0030	32000	BG	9	9	0	0	0
SSBG0042	32100	BG	10	10	0	0	0
SSBG0023	32200	BG	11	11	0	0	0
SSDP0015	32500	DP	12	12	12	0	0
SSBG0049	33100	BG	13	13	0	0	0
SSBG0033	33400	BG	14	14	0	0	0
SSBG0002	33500	BG	15	15	0	0	0
SSBG0038	33600	BG	16	16	0	0	0
SSDP0034	34000	DP	17	17	17	0	0
SSDP0061	34100	DP	18	18	18	0	0
SSBG0001	34500	BG	19	19	0	0	0
SSDP0064	34700	DP	20	20	20	0	0
SSBG0019	34800	BG	21	21	0	0	0
SSDP0056	35300	DP	22	22	22	0	0
SSBG0010	35700	BG	23	23.5	0	0	0
SSDP0049	35700	DP	24	23.5	23.5	6	1
SSDP0045	35800	DP	25	25	25	0	0
SSDP0069	36400	DP	26	26	26	0	0
SSBG0048	36600	BG	27	27	0	0	0
SSBG0018	36700	BG	28	28	0	0	0
SSBG0005	37100	BG	29	29	0	0	0
SSDP0042	37200	DP	30	30	30	0	0
SSDP0052	37700	DP	31	31	31	0	0
SSDP0055	37800	DP	32	32	32	0	0
SSDP0009	38000	DP	33	33.5	33.5	0	0
SSDP0062	38000	DP	34	33.5	33.5	6	1
SSDP0018	38300	DP	35	35	35	0	0
SSBG0020	38400	BG	36	36.5	0	0	0
SSBG0037	38400	BG	37	36.5	0	6	1
SSDP0058	38800	DP	38	38	38	0	0
SSBG0046	39000	BG	39	39	0	0	0
SSDP0050	39800	DP	40	40	40	0	0
SSDP0029	40700	DP	41	41.5	41.5	0	0
SSDP0037	40700	DP	42	41.5	41.5	6	1
SSDP0019	41000	DP	43	43	43	0	0
SSDP0065	41200	DP	44	44	44	0	0
SSDP0047	41700	DP	45	45	45	0	0
SSDP0046	42200	DP	46	46	46	0	0
SSDP0040	42300	DP	47	47	47	0	0
SSBG0027	42600	BG	48	48	0	0	0
SSDP0025	43600	DP	49	49	49	0	0
SSBG0056	44000	BG	50	50.5	0	0	0
SSDP0054	44000	DP	51	50.5	50.5	6	1
SSDP0028	44400	DP	52	52	52	0	0
SSBG0014	44500	BG	53	53.5	0	0	0
SSDP0003	44500	DP	54	53.5	53.5	6	1
SSDP0006	44900	DP	55	55	55	0	0
SSDP0059	45200	DP	56	56	56	0	0
SSBG0011	46300	BG	57	57	0	0	0
SSDP0012	46600	DP	58	58	58	0	0

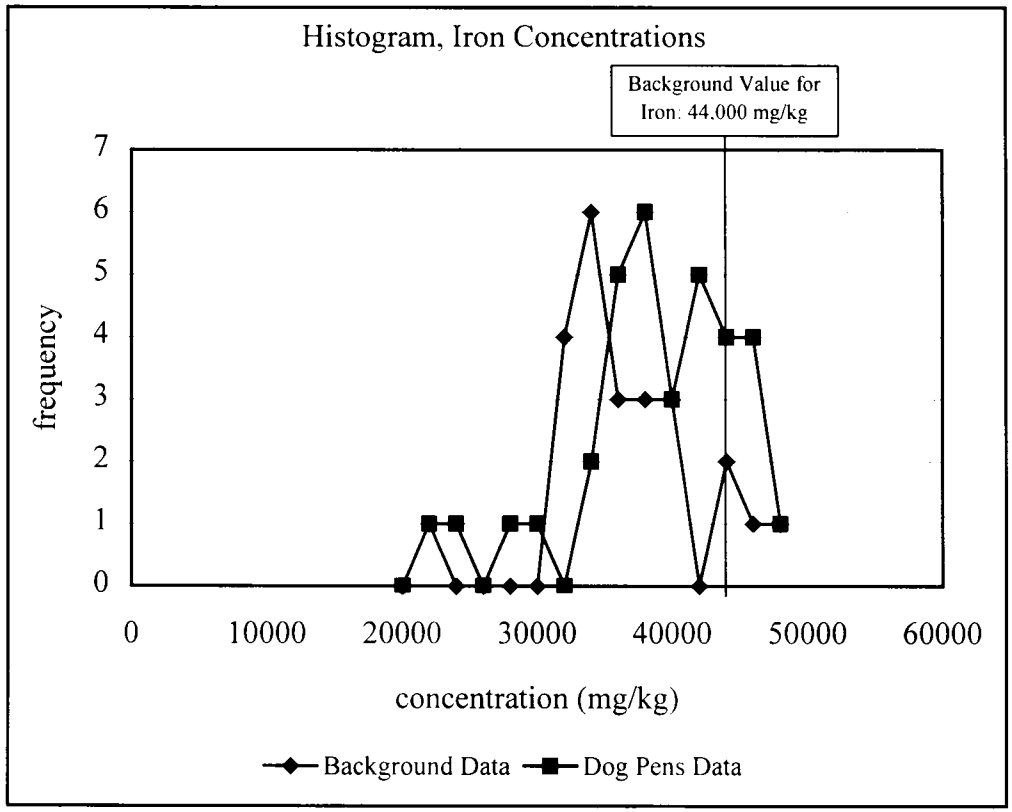
DATA SUFFICIENCY EVALUATION

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) = 13200
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 5513.736
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 6088.996
Allowable Relative Shift = 2.167845
Probability, Pr = 0.939372
Minimum number of samples (Background + Cleanup Unit) = 8 **Pass**
Minimum number of Background samples = 4 **Pass**
Minimum number of Cleanup Unit samples = 5 **Pass**

WILCOXON RANK SUM TEST RESULTS

n1= 34
n2= 24
m= 58
WRS= 1132.5
g= 6
Sum[tj(tj2-1)]= 36
Zrs= 2.044699
Z0.9= 1.281551

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


Histogram, Iron Concentrations
Background Value for Iron: 44,000 mg/kg
frequency
7
6
5
4
3
2
1
0
0
10000
20000
30000
40000
50000
60000
concentration (mg/kg)
Background Data
Dog Pens Data

Wilcoxon Rank Sum Test, Comparison of DP data to background, Lead
(all depths)

Sample ID	CONC (Groupeng		Abs Rank	Tie Norm Rank	n1Ranks	$t(t^2-1)$	Tie Ind
LEHR-SS-BG-0081	3.2	BG	1	1	0	0	0
SSBG0009	3.4	BG	2	2	0	0	0
SSDP0068	4.1	DP	3	3	3	0	0
LEHR-SS-BG-0108	4.4	BG	4	4	0	0	0
LEHR-SS-BG-0110	4.8	BG	5	5	0	0	0
SSDP0043	5.1	DP	6	6	6	0	0
LEHR-SS-BG-0102	5.2	BG	7	7	0	0	0
LEHR-SS-BG-0074	5.3	BG	8	8.5	0	0	0
SSDP0045	5.3	DP	9	8.5	8.5	6	1
LEHR-SS-BG-0115	5.4	BG	10	10.5	0	0	0
SSBG0030	5.4	BG	11	10.5	0	6	1
SSDP0061	5.5	DP	12	12	12	0	0
LEHR-SS-BG-0092	5.6	BG	13	13.5	0	0	0
SSDP0015	5.6	DP	14	13.5	13.5	6	1
SSBG0002	6.1	BG	15	15	0	0	0
LEHR-SS-BG-0098	6.2	BG	16	16.5	0	0	0
SSBG0039	6.2	BG	17	16.5	0	6	1
LEHR-SS-BG-0079	6.3	BG	18	18.5	0	0	0
SSDP0021	6.3	DP	19	18.5	18.5	6	1
LEHR-SS-BG-0111	6.6	BG	20	20.5	0	0	0
SSDP0008	6.6	DP	21	20.5	20.5	6	1
SSBG0029	6.7	BG	22	22.5	0	0	0
SSDP0064	6.7	DP	23	22.5	22.5	6	1
SSBG0018	6.8	BG	24	24.5	0	0	0
SSDP0034	6.8	DP	25	24.5	24.5	6	1
LEHR-SS-BG-0090	7	BG	26	27	0	0	0
LEHR-SS-BG-0100	7	BG	27	27	0	0	1
SSBG0049	7	BG	28	27	0	24	2
SSDP0069	7.1	DP	29	29	29	0	0
LEHR-SS-BG-0067	7.2	BG	30	31	0	0	0
LEHR-SS-BG-0070	7.2	BG	31	31	0	0	1
LEHR-SS-BG-0116	7.2	BG	32	31	0	24	2
SSDP0050	7.3	DP	33	33	33	0	0
LEHR-SS-BG-0069	7.4	BG	34	35.5	0	0	0
LEHR-SS-BG-0085	7.4	BG	35	35.5	0	0	1
LEHR-SS-BG-0093	7.4	BG	36	35.5	0	0	2
LEHR-SS-BG-0109	7.4	BG	37	35.5	0	60	3
LEHR-SS-BG-0089	7.5	BG	38	39	0	0	0
LEHR-SS-BG-0105	7.5	BG	39	39	0	0	1
SSBG0020	7.5	BG	40	39	0	24	2
LEHR-SS-BG-0065	7.6	BG	41	43	0	0	0
LEHR-SS-BG-0075	7.6	BG	42	43	0	0	1
LEHR-SS-BG-0076	7.6	BG	43	43	0	0	2
LEHR-SS-BG-0096	7.6	BG	44	43	0	0	3
SSBG0019	7.6	BG	45	43	0	120	4
LEHR-SS-BG-0078	7.7	BG	46	46	0	0	0
LEHR-SS-BG-0068	7.8	BG	47	48	0	0	0
LEHR-SS-BG-0077	7.8	BG	48	48	0	0	1
LEHR-SS-BG-0083	7.8	BG	49	48	0	24	2
LEHR-SS-BG-0072	7.9	BG	50	51	0	0	0
SSBG0001	7.9	BG	51	51	0	0	1
SSDP0052	7.9	DP	52	51	51	24	2
LEHR-SS-BG-0066	8	BG	53	55	0	0	0
SSBG0005	8	BG	54	55	0	0	1
SSDP0029	8	DP	55	55	55	0	2
SSDP0031	8	DP	56	55	55	0	3
SSDP0062	8	DP	57	55	55	120	4
SSBG0047	8.1	BG	58	58.5	0	0	0
SSDP0003	8.1	DP	59	58.5	58.5	6	1
SSBG0042	8.2	BG	60	60.5	0	0	0
SSDP0037	8.2	DP	61	60.5	60.5	6	1
SSDP0028	8.3	DP	62	64	64	0	0
SSDP0040	8.3	DP	63	64	64	0	1
SSDP0046	8.3	DP	64	64	64	0	2
SSDP0054	8.3	DP	65	64	64	0	3
SSDP0065	8.3	DP	66	64	64	120	4
LEHR-SS-BG-0097	8.4	BG	67	70	0	0	0
LEHR-SS-BG-0112	8.4	BG	68	70	0	0	1
LEHR-SS-BG-0113	8.4	BG	69	70	0	0	2
SSBG0033	8.4	BG	70	70	0	0	3
SSDP0018	8.4	DP	71	70	70	0	4
SSDP0019	8.4	DP	72	70	70	0	5
SSDP0059	8.4	DP	73	70	70	336	6
LEHR-SS-BG-0087	8.5	BG	74	75.5	0	0	0
LEHR-SS-BG-0094	8.5	BG	75	75.5	0	0	1
LEHR-SS-BG-0103	8.5	BG	76	75.5	0	0	2
SSBG0038	8.5	BG	77	75.5	0	60	3
LEHR-SS-BG-0101	8.6	BG	78	79	0	0	0
SSDP0056	8.6	DP	79	79	79	0	1
SSDP0058	8.6	DP	80	79	79	24	2
LEHR-SS-BG-0084	8.7	BG	81	82.5	0	0	0
LEHR-SS-BG-0086	8.7	BG	82	82.5	0	0	1
SSBG0046	8.7	BG	83	82.5	0	0	2
SSDP0025	8.7	DP	84	82.5	82.5	60	3
SSBG0023	8.8	BG	85	86.5	0	0	0
SSDP0006	8.8	DP	86	86.5	86.5	0	1
SSDP0012	8.8	DP	87	86.5	86.5	0	2
SSDP0049	8.8	DP	88	86.5	86.5	60	3
SSBG0037	8.9	BG	89	89.5	0	0	0
SSDP0055	8.9	DP	90	89.5	89.5	6	1
SSBG0052	9	BG	91	91	0	0	0
SSBG0014	9.1	BG	92	92	0	0	0
LEHR-SS-BG-0073	9.2	BG	93	94	0	0	0
LEHR-SS-BG-0114	9.2	BG	94	94	0	0	1
SSDP0042	9.2	DP	95	94	94	24	2
LEHR-SS-BG-0099	9.3	BG	96	96.5	0	0	0
SSBG0011	9.3	BG	97	96.5	0	6	1
LEHR-SS-BG-0071	9.4	BG	98	98	0	0	0
LEHR-SS-BG-0104	9.7	BG	99	99	0	0	0
LEHR-SS-BG-0082	9.8	BG	100	100	0	0	0
LEHR-SS-BG-0107	10.1	BG	101	101.5	0	0	0
SSBG0010	10.1	BG	102	101.5	0	6	1
SSBG0027	10.4	BG	103	103	0	0	0
SSDP0047	10.8	DP	104	104	104	0	0
SSBG0056	11.9	BG	105	105	0	0	0
LEHR-SS-BG-0091	14.9	BG	106	106	0	0	0

DATA SUFFICIENCY EVALUATION

Type 1 Decision Error, alpha = 0.1
Z(1-a)= 1.2815508
Type 2 Decision Error, beta = 0.2
Z(1-b)= 0.8416214
Total Shift, (mg/kg) or (pCi/g) = 2.85
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 1.7753524
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 1.3899595
Allowable Relative Shift = 2.0504194
Probability, Pr = 0.9279355
Minimum number of samples (Background + Cleanup Unit) = 9 **Pass**
Minimum number of Background samples = 8 **Pass**
Minimum number of Cleanup Unit samples = 4 **Pass**

WILCOXON RANK SUM TEST RESULTS

n1= 34
n2= 72
m= 106
WRS= 1843.5
g= 28
Sum(t(t^2-1))= 1182
Zrs= 0.1659108
Z0.9= 1.2815508

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Manganese
(all depths)

Sample ID	CONC	Grouping	Abs Rank	Tie-Norm Ran	n1Ranks	$tj(tj^2-1)$	Tie Ind.
SSDP0021	379	DP	1	1	1	0	0
SSDP0043	426	DP	2	2	2	0	0
SSBG0009	437	BG	3	3	0	0	0
SSDP0055	475	DP	4	4	4	0	0
SSBG0029	479	BG	5	5	0	0	0
SSDP0015	482	DP	6	6	6	0	0
SSDP0061	499	DP	7	7	7	0	0
SSDP0058	510	DP	8	8	8	0	0
SSDP0045	512	DP	9	9	9	0	0
SSDP0031	522	DP	10	10.5	10.5	0	0
SSDP0040	522	DP	11	10.5	10.5	6	1
SSBG0030	527	BG	12	12.5	0	0	0
SSBG0052	527	BG	13	12.5	0	6	1
SSDP0009	543	DP	14	14	14	0	0
SSDP0034	550	DP	15	15	15	0	0
SSBG0049	562	BG	16	16	0	0	0
SSBG0038	567	BG	17	17	0	0	0
SSDP0064	578	DP	18	18	18	0	0
SSBG0019	579	BG	19	19	0	0	0
SSBG0042	587	BG	20	20	0	0	0
SSDP0069	590	DP	21	21	21	0	0
SSBG0001	592	BG	22	22.5	0	0	0
SSBG0002	592	BG	23	22.5	0	6	1
SSDP0052	594	DP	24	24	24	0	0
SSDP0050	598	DP	25	25	25	0	0
SSDP0003	599	DP	26	26	26	0	0
SSDP0042	602	DP	27	27	27	0	0
SSBG0048	606	BG	28	28	0	0	0
SSDP0062	609	DP	29	29	29	0	0
SSDP0049	616	DP	30	30	30	0	0
SSDP0068	617	DP	31	31	31	0	0
SSBG0046	628	BG	32	32	0	0	0
SSBG0023	634	BG	33	33	0	0	0
SSBG0010	638	BG	34	34	0	0	0
SSDP0019	648	DP	35	35	35	0	0
SSDP0018	653	DP	36	36	36	0	0
SSBG0039	654	BG	37	37	0	0	0
SSBG0005	661	BG	38	38	0	0	0
SSDP0047	681	DP	39	39	39	0	0
SSBG0033	683	BG	40	40	0	0	0
SSBG0027	687	BG	41	41	0	0	0
SSDP0006	692	DP	42	42	42	0	0
SSBG0020	699	BG	43	43	0	0	0
SSDP0059	730	DP	44	44	44	0	0
SSBG0014	731	BG	45	45	0	0	0
SSDP0054	733	DP	46	46	46	0	0
SSDP0065	737	DP	47	47	47	0	0
SSBG0011	744	BG	48	48	0	0	0
SSDP0029	761	DP	49	49	49	0	0
SSDP0025	809	DP	50	50	50	0	0
SSDP0046	814	DP	51	51	51	0	0
SSDP0012	839	DP	52	52	52	0	0
SSDP0037	848	DP	53	53	53	0	0
SSBG0018	870	BG	54	54	0	0	0
SSDP0056	882	DP	55	55	55	0	0
SSDP0028	1010	DP	56	56	56	0	0
SSBG0037	1390	BG	57	57.5	0	0	0
SSBG0056	1390	BG	58	57.5	0	6	1

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) = 225
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 235.0715
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 141.671
Allowable Relative Shift = 1.588187
Probability, Pr = 0.86896
Minimum number of samples (Background + Cleanup Unit) = 15 **Pass**
Minimum number of Background samples = 11 **Pass**
Minimum number of Cleanup Unit samples = 4 **Pass**

WILCOXON RANK SUM TEST RESULTS

n1= 34
n2= 24
m= 58
WRS= 973
g= 4
Sum[tj(tj2-1)]= 24
Zrs= -0.47366
Z0.9= 1.281551

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Mercury (shallow samples)

Sample ID	CONC	Grouping	Abs Rank	Tie-Norm Ran	n1Ranks	$t_j(t_j^2-1)$	Tie Ind
SSBG0011	0 025	BG	1	5 5	0	0	0
LEHR-SS-DP-0122	0 025	DP	2	5.5	5 5	0	1
LEHR-SS-DP-0150	0 025	DP	3	5 5	5 5	0	2
LEHR-SS-DP-0174	0 025	DP	4	5 5	5 5	0	3
SSDP0233	0 025	DP	5	5 5	5 5	0	4
SSDP0042	0 025	DP	6	5 5	5 5	0	5
SSDP0043	0 025	DP	7	5 5	5 5	0	6
SSDP0046	0 025	DP	8	5 5	5 5	0	7
SSDP0061	0 025	DP	9	5 5	5 5	0	8
SSDP0069	0 025	DP	10	5 5	5 5	990	9
SSDP0275	0 05	DP	11	11	11	0	0
SSDP0193	0 06	DP	12	12	12	0	0
SSDP0244	0 07	DP	13	13	13	0	0
SSDP0293	0 1	DP	14	14 5	14 5	0	0
SSDP0052	0 1	DP	15	14.5	14 5	6	1
LEHR-SS-BG-0101	0 14	BG	16	17	0	0	0
LEHR-SS-DP-0137	0 14	DP	17	17	17	0	1
SSDP0058	0 14	DP	18	17	17	24	2
SSBG0002	0 16	BG	19	20 5	0	0	0
SSBG0030	0 16	BG	20	20 5	0	0	1
LEHR-SS-DP-0156	0 16	DP	21	20 5	20 5	0	2
SSDP0045	0 16	DP	22	20 5	20 5	60	3
LEHR-SS-DP-0188	0 17	DP	23	23	23	0	0
LEHR-SS-BG-0083	0 18	BG	24	24 5	0	0	0
SSDP0255	0 18	DP	25	24 5	24 5	6	1
LEHR-SS-BG-0074	0 19	BG	26	26	0	0	0
SSBG0039	0 2	BG	27	27	0	0	0
LEHR-SS-BG-0066	0 21	BG	28	29	0	0	0
LEHR-SS-BG-0092	0 21	BG	29	29	0	0	1
SSDP0287	0 21	DP	30	29	29	24	2
LEHR-SS-BG-0110	0 22	BG	31	31	0	0	0
LEHR-SS-DP-0163	0 23	DP	32	32	32	0	0
LEHR-SS-DP-0127	0 28	DP	33	34 5	34 5	0	0
LEHR-SS-DP-0173	0 28	DP	34	34 5	34 5	0	1
LEHR-SS-DP-0178	0 28	DP	35	34 5	34 5	0	2
SSDP0229	0 28	DP	36	34 5	34 5	60	3
SSDP0286	0 29	DP	37	37	37	0	0
SSBG0145	0 3	BG	38	38 5	0	0	0
SSDP0280	0 3	DP	39	38 5	38 5	6	1
LEHR-SS-BG-0082	0 31	BG	40	42	0	0	0
LEHR-SS-BG-0109	0 31	BG	41	42	0	0	1
SSDP0209	0 31	DP	42	42	42	0	2
SSDP0249	0 31	DP	43	42	42	0	3
SSDP0047	0 31	DP	44	42	42	120	4
SSBG0131	0 32	BG	45	45 5	0	0	0
SSBG0134	0 32	BG	46	45 5	0	6	1
SSBG0049	0 33	BG	47	47 5	0	0	0
LEHR-SS-DP-0187	0 33	DP	48	47 5	47 5	6	1
LEHR-SS-DP-0170	0 35	DP	49	49 5	49 5	0	0
SSDP0064	0 35	DP	50	49 5	49 5	6	1
LEHR-SS-DP-0189	0 36	DP	51	51 5	51 5	0	0
SSDP0049	0 36	DP	52	51 5	51 5	6	1
SSDP0288	0 38	DP	53	53	53	0	0
LEHR-SS-DP-0183	0 39	DP	54	54	54	0	0
SSDP0234	0 42	DP	55	55 5	55 5	0	0
SSDP0056	0 42	DP	56	55 5	55 5	6	1
SSBG0010	0 43	BG	57	57 5	0	0	0
SSDP0068	0 43	DP	58	57 5	57 5	6	1
LEHR-SS-DP-0151	0 46	DP	59	59	59	0	0
SSBG0019	0 48	BG	60	61	0	0	0
LEHR-SS-DP-0160	0 48	DP	61	61	61	0	1
SSDP0238	0 48	DP	62	61	61	24	2
SSBG0001	0 49	BG	63	63 5	0	0	0
LEHR-SS-DP-0177	0 49	DP	64	63 5	63 5	6	1
LEHR-SS-DP-0128	0 5	DP	65	65 5	65 5	0	0
SSDP0265	0 5	DP	66	65 5	65 5	6	1
LEHR-SS-DP-0191	0 52	DP	67	67	67	0	0
SSDP0285	0 53	DP	68	68	68	0	0
LEHR-SS-DP-0186	0 54	DP	69	69	69	0	0
SSDP0203	0 55	DP	70	70	70	0	0
SSDP0270	0 57	DP	71	71	71	0	0
LEHR-SS-DP-0141	0 58	DP	72	73	73	0	0
LEHR-SS-DP-0144	0 58	DP	73	73	73	0	1
LEHR-SS-DP-0147	0 58	DP	74	73	73	24	2
LEHR-SS-BG-0100	0 59	BG	75	75 5	0	0	0
SSDP0260	0 59	DP	76	75 5	75 5	6	1
SSBG0147	0 6	BG	77	78 5	0	0	0
LEHR-SS-DP-0158	0 6	DP	78	78 5	78 5	0	1
LEHR-SS-DP-0164	0 6	DP	79	78 5	78 5	0	2
SSDP0224	0 6	DP	80	78 5	78 5	60	3
LEHR-SS-BG-0073	0 62	BG	81	81	0	0	0
LEHR-SS-DP-0182	0 64	DP	82	82	82	0	0
SSBG0154	0 65	BG	83	83 5	0	0	0
LEHR-SS-DP-0146	0 65	DP	84	83 5	83 5	6	1
SSBG0135	0 66	BG	85	87	0	0	0
SSBG0029	0 66	BG	86	87	0	0	1
LEHR-SS-DP-0130	0 66	DP	87	87	87	0	2
LEHR-SS-DP-0143	0 66	DP	88	87	87	0	3
SSDP0269	0 66	DP	89	87	87	120	4
SSBG0151	0 67	BG	90	91	0	0	0
SSBG0038	0 67	BG	91	91	0	0	1
LEHR-SS-DP-0133	0 67	DP	92	91	91	24	2
LEHR-SS-DP-0167	0 68	DP	93	93 5	93 5	0	0
SSDP0197	0 68	DP	94	93 5	93 5	6	1
LEHR-SS-DP-0135	0 69	DP	95	95	95	0	0
SSDP0281	0 7	DP	96	96	96	0	0
SSBG0155	0 72	BG	97	97	0	0	0
SSDP0213	0 73	DP	98	98	98	0	0
LEHR-SS-DP-0136	0 74	DP	99	99 5	99 5	0	0
LEHR-SS-DP-0165	0 74	DP	100	99 5	99 5	6	1
SSBG0020	0 75	BG	101	102	0	0	0
LEHR-SS-DP-0154	0 75	DP	102	102	102	0	1
LEHR-SS-DP-0157	0 75	DP	103	102	102	24	2
LEHR-SS-DP-0149	0 77	DP	104	104	104	0	0
LEHR-SS-DP-0153	0 78	DP	105	106 5	106 5	0	0
LEHR-SS-DP-0175	0 78	DP	106	106 5	106 5	0	1
LEHR-SS-DP-0181	0 78	DP	107	106 5	106 5	0	2
SSDP0292	0 78	DP	108	106 5	106 5	60	3

Wilcoxon Rank Sum Test, Comparison of DP data to background, Mercury
(shallow samples)

SSBG0159	0.79	BG	109	109	0	0	0
LEHR-SS-DP-0132	0.8	DP	110	110	110	0	0
LEHR-SS-DP-0117	0.81	DP	111	111.5	111.5	0	0
LEHR-SS-DP-0155	0.81	DP	112	111.5	111.5	6	1
LEHR-SS-DP-0145	0.83	DP	113	113	113	0	0
SSBG0133	0.84	BG	114	115	0	0	0
LEHR-SS-DP-0123	0.84	DP	115	115	115	0	1
LEHR-SS-DP-0142	0.84	DP	116	115	115	24	2
LEHR-SS-DP-0120	0.86	DP	117	117	117	0	0
LEHR-SS-DP-0169	0.9	DP	118	118	118	0	0
LEHR-SS-DP-0131	0.91	DP	119	119.5	119.5	0	0
LEHR-SS-DP-0190	0.91	DP	120	119.5	119.5	6	1
LEHR-SS-DP-0184	0.93	DP	121	121.5	121.5	0	0
SSDP0218	0.93	DP	122	121.5	121.5	6	1
LEHR-SS-DP-0162	0.94	DP	123	123	123	0	0
SSDP0214	0.96	DP	124	124	124	0	0
LEHR-SS-DP-0139	0.99	DP	125	125.5	125.5	0	0
SSDP0239	0.99	DP	126	125.5	125.5	6	1
LEHR-SS-BG-0065	1	BG	127	129	0	0	0
LEHR-SS-DP-0121	1	DP	128	129	129	0	1
LEHR-SS-DP-0166	1	DP	129	129	129	0	2
LEHR-SS-DP-0179	1	DP	130	129	129	0	3
SSDP0050	1	DP	131	129	129	120	4
LEHR-SS-BG-0091	1.1	BG	132	137.5	0	0	0
SSBG0160	1.1	BG	133	137.5	0	0	1
LEHR-SS-DP-0124	1.1	DP	134	137.5	137.5	0	2
LEHR-SS-DP-0125	1.1	DP	135	137.5	137.5	0	3
LEHR-SS-DP-0138	1.1	DP	136	137.5	137.5	0	4
LEHR-SS-DP-0140	1.1	DP	137	137.5	137.5	0	5
LEHR-SS-DP-0152	1.1	DP	138	137.5	137.5	0	6
LEHR-SS-DP-0159	1.1	DP	139	137.5	137.5	0	7
LEHR-SS-DP-0172	1.1	DP	140	137.5	137.5	0	8
LEHR-SS-DP-0176	1.1	DP	141	137.5	137.5	0	9
SSDP0202	1.1	DP	142	137.5	137.5	0	10
SSDP0208	1.1	DP	143	137.5	137.5	1716	11
SSBG0120	1.2	BG	144	145.5	0	0	0
LEHR-SS-DP-0119	1.2	DP	145	145.5	145.5	0	1
LEHR-SS-DP-0129	1.2	DP	146	145.5	145.5	0	2
SSDP0219	1.2	DP	147	145.5	145.5	60	3
SSBG0136	1.3	BG	148	150.5	0	0	0
SSBG0150	1.3	BG	149	150.5	0	0	1
LEHR-SS-DP-0118	1.3	DP	150	150.5	150.5	0	2
SSDP0192	1.3	DP	151	150.5	150.5	0	3
SSDP0198	1.3	DP	152	150.5	150.5	0	4
SSDP0274	1.3	DP	153	150.5	150.5	210	5
SSBG0129	1.4	BG	154	157.5	0	0	0
SSBG0138	1.4	BG	155	157.5	0	0	1
SSBG0142	1.4	BG	156	157.5	0	0	2
SSBG0144	1.4	BG	157	157.5	0	0	3
SSBG0148	1.4	BG	158	157.5	0	0	4
SSBG0152	1.4	BG	159	157.5	0	0	5
SSBG0161	1.4	BG	160	157.5	0	0	6
LEHR-SS-DP-0168	1.4	DP	161	157.5	157.5	504	7
SSBG0130	1.5	BG	162	163.5	0	0	0
SSBG0137	1.5	BG	163	163.5	0	0	1
SSBG0139	1.5	BG	164	163.5	0	0	2
SSBG0153	1.5	BG	165	163.5	0	0	3
SSBG0125	1.6	BG	166	167	0	0	0
SSBG0048	1.6	BG	167	167	0	0	1
SSDP0223	1.6	DP	168	167	167	24	2
SSBG0132	1.7	BG	169	169	0	0	0
SSBG0121	1.8	BG	170	170	0	0	0
SSBG0123	1.9	BG	171	172	0	0	0
SSBG0126	1.9	BG	172	172	0	0	1
SSDP0228	1.9	DP	173	172	172	24	2
LEHR-SS-DP-0148	2	DP	174	174.5	174.5	0	0
SSDP0248	2	DP	175	174.5	174.5	6	1
SSBG0157	2.2	BG	176	176	0	0	0
SSDP0243	2.3	DP	177	177	177	0	0
SSBG0158	2.5	BG	178	178	0	0	0
SSDP0259	2.6	DP	179	179	179	0	0
SSBG0124	2.7	BG	180	180.5	0	0	0
SSDP0254	2.7	DP	181	180.5	180.5	6	1
SSBG0143	3	BG	182	182	0	0	0
SSBG0128	3.5	BG	183	183	0	0	0
SSBG0162	3.6	BG	184	184	0	0	0
SSDP0264	3.7	DP	185	185	185	0	0
SSBG0163	4.8	BG	186	186	0	0	0
SSBG0140	4.9	BG	187	187	0	0	0
SSBG0127	5	BG	188	188	0	0	0
SSBG0146	5.1	BG	189	189	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) =	1.182	
Standard Deviation of BG Group, (mg/kg) or (pCi/g) =	1.244695	
Standard Deviation of DP Group, (mg/kg) or (pCi/g) =	0.577443	
Allowable Relative Shift =	2.046955	
Probability, Pr =	0.927577	
Minimum number of samples (Background + Cleanup Unit) =	15	**Pass**
Minimum number of Background samples =	12	**Pass**
Minimum number of Cleanup Unit samples =	3	**Pass**

WILCOXON RANK SUM TEST RESULTS

n1=	125
n2=	64
m=	189
WRS=	10727
g=	43
Sum{tj(tj2-1)}=	4482
Zrs=	-3.22667
Z0.9=	1.281551

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Mercury
(deep samples)

Sample ID	CONC (	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$tj(tj^2-1)$	Tie Ind
SSBG0023	0.025	BG	1	16.5	0	0	0
SSBG0027	0.025	BG	2	16.5	0	0	1
SSBG0052	0.025	BG	3	16.5	0	0	2
SSDP0194	0.025	DP	4	16.5	16.5	0	3
SSDP0195	0.025	DP	5	16.5	16.5	0	4
SSDP0201	0.025	DP	6	16.5	16.5	0	5
SSDP0206	0.025	DP	7	16.5	16.5	0	6
SSDP0216	0.025	DP	8	16.5	16.5	0	7
SSDP0225	0.025	DP	9	16.5	16.5	0	8
SSDP0231	0.025	DP	10	16.5	16.5	0	9
SSDP0232	0.025	DP	11	16.5	16.5	0	10
SSDP0236	0.025	DP	12	16.5	16.5	0	11
SSDP0237	0.025	DP	13	16.5	16.5	0	12
SSDP0242	0.025	DP	14	16.5	16.5	0	13
SSDP0278	0.025	DP	15	16.5	16.5	0	14
SSDP0283	0.025	DP	16	16.5	16.5	0	15
SSDP0284	0.025	DP	17	16.5	16.5	0	16
SSDP0295	0.025	DP	18	16.5	16.5	0	17
SSDP0296	0.025	DP	19	16.5	16.5	0	18
SSDP0003	0.025	DP	20	16.5	16.5	0	19
SSDP0006	0.025	DP	21	16.5	16.5	0	20
SSDP0012	0.025	DP	22	16.5	16.5	0	21
SSDP0021	0.025	DP	23	16.5	16.5	0	22
SSDP0025	0.025	DP	24	16.5	16.5	0	23
SSDP0028	0.025	DP	25	16.5	16.5	0	24
SSDP0029	0.025	DP	26	16.5	16.5	0	25
SSDP0031	0.025	DP	27	16.5	16.5	0	26
SSDP0037	0.025	DP	28	16.5	16.5	0	27
SSDP0040	0.025	DP	29	16.5	16.5	0	28
SSDP0054	0.025	DP	30	16.5	16.5	0	29
SSDP0062	0.025	DP	31	16.5	16.5	0	30
SSDP0065	0.025	DP	32	16.5	16.5	32736	31
LEHR-SS-BG-0097	0.05	BG	33	35	0	0	0
SSDP0196	0.05	DP	34	35	35	0	1
SSDP0221	0.05	DP	35	35	35	0	2
SSDP0241	0.05	DP	36	35	35	0	3
SSDP0290	0.05	DP	37	35	35	120	4
SSDP0200	0.06	DP	38	41.5	41.5	0	0
SSDP0204	0.06	DP	39	41.5	41.5	0	1
SSDP0210	0.06	DP	40	41.5	41.5	0	2
SSDP0222	0.06	DP	41	41.5	41.5	0	3
SSDP0247	0.06	DP	42	41.5	41.5	0	4
SSDP0263	0.06	DP	43	41.5	41.5	0	5
SSDP0277	0.06	DP	44	41.5	41.5	0	6
SSDP0291	0.06	DP	45	41.5	41.5	504	7
SSDP0220	0.07	DP	46	46.5	46.5	0	0
SSDP0267	0.07	DP	47	46.5	46.5	6	1
LEHR-SS-BG-0088	0.08	BG	48	50	0	0	0
SSDP0207	0.08	DP	49	50	50	0	1
SSDP0211	0.08	DP	50	50	50	0	2
SSDP0253	0.08	DP	51	50	50	0	3
SSDP0282	0.08	DP	52	50	50	120	4
LEHR-SS-BG-0078	0.09	BG	53	56	0	0	0
LEHR-SS-BG-0099	0.09	BG	54	56	0	0	1
SSDP0217	0.09	DP	55	56	56	0	2
SSDP0230	0.09	DP	56	56	56	0	3
SSDP0235	0.09	DP	57	56	56	0	4
SSDP0252	0.09	DP	58	56	56	0	5
SSDP0272	0.09	DP	59	56	56	336	6
LEHR-SS-BG-0103	0.1	BG	60	60.5	0	0	0
LEHR-SS-BG-0104	0.1	BG	61	60.5	0	6	1
LEHR-SS-BG-0070	0.11	BG	62	64	0	0	0
LEHR-SS-BG-0096	0.11	BG	63	64	0	0	1
LEHR-SS-BG-0106	0.11	BG	64	64	0	0	2
SSDP0199	0.11	DP	65	64	64	0	3
SSDP0276	0.11	DP	66	64	64	120	4
SSBG0033	0.12	BG	67	70	0	0	0
SSDP0212	0.12	DP	68	70	70	0	1
SSDP0215	0.12	DP	69	70	70	0	2
SSDP0257	0.12	DP	70	70	70	0	3
SSDP0268	0.12	DP	71	70	70	0	4
SSDP0273	0.12	DP	72	70	70	0	5
SSDP0059	0.12	DP	73	70	70	336	6
LEHR-SS-BG-0089	0.13	BG	74	76.5	0	0	0
LEHR-SS-BG-0113	0.13	BG	75	76.5	0	0	1
LEHR-SS-BG-0115	0.13	BG	76	76.5	0	0	2
SSBG0042	0.13	BG	77	76.5	0	0	3
SSDP0245	0.13	DP	78	76.5	76.5	0	4

Wilcoxon Rank Sum Test, Comparison of DP data to background, Mercury
(deep samples)

SSDP0247	0.13	DP	79	76.5	76.5	210	5
LEHR-SS-BG-0067	0.14	BG	80	84	0	0	0
LEHR-SS-BG-0071	0.14	BG	81	84	0	0	1
LEHR-SS-BG-0077	0.14	BG	82	84	0	0	2
LEHR-SS-BG-0085	0.14	BG	83	84	0	0	3
SSDP0246	0.14	DP	84	84	84	0	4
SSDP0256	0.14	DP	85	84	84	0	5
SSDP0258	0.14	DP	86	84	84	0	6
SSDP0009	0.14	DP	87	84	84	0	7
SSDP0015	0.14	DP	88	84	84	720	8
LEHR-SS-BG-0076	0.15	BG	89	90	0	0	0
LEHR-SS-BG-0094	0.15	BG	90	90	0	0	1
LEHR-SS-BG-0111	0.15	BG	91	90	0	24	2
LEHR-SS-BG-0069	0.16	BG	92	94	0	0	0
LEHR-SS-BG-0079	0.16	BG	93	94	0	0	1
LEHR-SS-BG-0098	0.16	BG	94	94	0	0	2
LEHR-SS-BG-0102	0.16	BG	95	94	0	0	3
LEHR-SS-BG-0116	0.16	BG	96	94	0	120	4
LEHR-SS-BG-0084	0.17	BG	97	99.5	0	0	0
LEHR-SS-BG-0090	0.17	BG	98	99.5	0	0	1
LEHR-SS-BG-0107	0.17	BG	99	99.5	0	0	2
LEHR-SS-BG-0112	0.17	BG	100	99.5	0	0	3
LEHR-SS-BG-0114	0.17	BG	101	99.5	0	0	4
SSBG0037	0.17	BG	102	99.5	0	210	5
LEHR-SS-BG-0093	0.18	BG	103	104	0	0	0
SSBG0046	0.18	BG	104	104	0	0	1
SSDP0019	0.18	DP	105	104	104	24	2
LEHR-SS-BG-0081	0.19	BG	106	106.5	0	0	0
SSDP0294	0.19	DP	107	106.5	106.5	6	1
LEHR-SS-BG-0072	0.21	BG	108	110	0	0	0
LEHR-SS-BG-0075	0.21	BG	109	110	0	0	1
SSBG0056	0.21	BG	110	110	0	0	2
SSDP0034	0.21	DP	111	110	110	0	3
SSDP0055	0.21	DP	112	110	110	120	4
SSBG0005	0.22	BG	113	113	0	0	0
LEHR-SS-BG-0086	0.23	BG	114	115.5	0	0	0
SSBG0009	0.23	BG	115	115.5	0	0	1
SSDP0261	0.23	DP	116	115.5	115.5	0	2
SSDP0289	0.23	DP	117	115.5	115.5	60	3
SSBG0014	0.24	BG	118	118	0	0	0
SSDP0018	0.26	DP	119	119	119	0	0
SSBG0018	0.27	BG	120	120	0	0	0
SSDP0240	0.3	DP	121	121	121	0	0
SSDP0251	0.31	DP	122	122	122	0	0
SSDP0266	0.36	DP	123	123	123	0	0
SSDP0262	0.37	DP	124	124	124	0	0
SSDP0271	0.38	DP	125	125	125	0	0
LEHR-SS-BG-0108	0.49	BG	126	126	0	0	0
LEHR-SS-BG-0068	0.69	BG	127	127	0	0	0
SSDP0227	1.7	DP	128	128	128	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) = 0.0744
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 0.106683
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 0.199586
Allowable Relative Shift = 0.372771
Probability, Pr = 0.60469
Minimum number of samples (Background + Cleanup Unit) = 199 **Total existing number of samples is insufficient**
Minimum number of Background samples = 45 **Pass**
Minimum number of Cleanup Unit samples = 155 **Existing number of Cleanup Unit samples is insufficient**

WILCOXON RANK SUM TEST RESULTS

n1= 80
n2= 48
m= 128
WRS= 4168
g= 18
Sum[tj(tj2-1)]= 35778
Zrs= -4.924687
Z0.9= 1.281551

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Nickel
(shallow samples)

Sample ID	CONC	Grouping	Abs Rank	Tie-Norm Ran	n1Ranks	$t_j(t_j^2-1)$	Tie Ind
SSDP0068	109	DP	1	1	1	0	0
SSBG0133	143	BG	2	2	0	0	0
LEHR-SS-BG-0074	184	BG	3	3	0	0	0
SSDP0049	194	DP	4	4	4	0	0
SSDP0043	214	DP	5	5	5	0	0
SSDP0056	215	DP	6	6	6	0	0
SSDP0046	216	DP	7	7	7	0	0
SSDP0042	219	DP	8	8	8	0	0
LEHR-SS-BG-0109	220	BG	9	9	0	0	0
SSBG0120	221	BG	10	10	0	0	0
SSDP0047	222	DP	11	11	11	0	0
SSDP0058	223	DP	12	12	12	0	0
SSBG0049	227	BG	13	13	0	0	0
SSDP0064	*228*	*DP*	*14*	14.5	14.5	0	0
SSDP0069	228	DP	15	14.5	14.5	6	1
SSBG0038	231	BG	16	16	0	0	0
LEHR-SS-BG-0083	235	BG	17	17	0	0	0
LEHR-SS-BG-0101	242	BG	18	18	0	0	0
LEHR-SS-BG-0110	245	BG	19	19	0	0	0
LEHR-SS-BG-0100	246	BG	20	20	0	0	0
SSBG0160	247	BG	21	21	0	0	0
SSBG0151	251	BG	22	22	0	0	0
LEHR-SS-BG-0066	252	BG	23	24.5	0	0	0
SSBG0124	252	BG	24	24.5	0	0	1
SSBG0126	252	BG	25	24.5	0	0	2
SSBG0163	252	BG	26	24.5	0	60	3
SSDP0052	253	DP	27	27	27	0	0
SSBG0145	254	BG	28	28	0	0	0
LEHR-SS-BG-0082	*258*	*BG*	*29*	*29*	0	0	0
SSBG0123	260	BG	30	30.5	0	0	0
SSBG0129	260	BG	31	30.5	0	6	1
SSBG0135	263	BG	32	32	0	0	0
SSBG0130	265	BG	33	33	0	0	0
SSBG0010	266	BG	34	35	0	0	0
SSBG0131	266	BG	35	35	0	0	1
SSBG0162	266	BG	36	35	0	24	2
SSBG0142	267	BG	37	37.5	0	0	0
SSBG0144	267	BG	38	37.5	0	6	1
SSBG0128	268	BG	39	40	0	0	0
SSBG0138	268	BG	40	40	0	0	1
SSBG0154	268	BG	41	40	0	24	2
SSBG0125	269	BG	42	42.5	0	0	0
SSBG0161	269	BG	43	42.5	0	6	1
SSBG0127	*270*	*BG*	*44*	44	0	0	0
SSBG0011	271	BG	45	45.5	0	0	0
SSBG0029	271	BG	46	45.5	0	6	1
SSBG0136	273	BG	47	47.5	0	0	0
SSBG0158	273	BG	48	47.5	0	6	1
SSBG0134	275	BG	49	49	0	0	0
SSDP0050	277	DP	50	50	50	0	0
SSBG0153	279	BG	51	51	0	0	0
SSBG0156	281	BG	52	52	0	0	0
SSBG0121	283	BG	53	53	0	0	0
SSBG0137	284	BG	54	54	0	0	0
SSBG0048	286	BG	55	55	0	0	0
LEHR-SS-BG-0073	287	BG	56	56	0	0	0
SSBG0019	289	BG	57	57	0	0	0
LEHR-SS-BG-0091	290	BG	58	58	0	0	0
SSBG0157	293	BG	59	59	0	0	0
SSBG0139	294	BG	60	60.5	0	0	0
SSBG0146	294	BG	61	60.5	0	6	1
SSBG0132	300	BG	62	62	0	0	0
SSDP0061	301	DP	63	63	63	0	0
SSBG0143	303	BG	64	64	0	0	0
SSBG0140	304	BG	65	65	0	0	0
SSBG0148	310	BG	66	66.5	0	0	0
SSBG0152	310	BG	67	66.5	0	6	1
SSBG0001	313	BG	68	68.5	0	0	0
SSBG0147	313	BG	69	68.5	0	6	1
SSBG0030	315	BG	70	70	0	0	0
SSDP0045	318	DP	71	71	71	0	0
SSBG0150	319	BG	72	72	0	0	0
SSBG0159	326	BG	73	73	0	0	0
SSBG0039	333	BG	74	74	0	0	0
SSBG0020	337	BG	75	75	0	0	0
LEHR-SS-BG-0065	339	BG	76	76	0	0	0
SSBG0002	404	BG	77	77	0	0	0
LEHR-SS-BG-0092	503	BG	78	78	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) = 100.2
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 47.32088
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 49.90634
Allowable Relative Shift = 2.007761
Probability, Pr = 0.923438
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= 14
n2= 64
m= 78
WRS= 294
g= 12
Sum{$t_j(t_j2-1)$}= 162
Zrs= -3.37285
Z0.9= 1.281551

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Nickel
(deep samples)

Sample ID	CONC	Grouping	Abs Rank	Tie-Norm Ran	n1Ranks	$t_j(t_j^2-1)$	Tie Ind.
LEHR-SS-BG-0097	60.7	BG	1	1	0	0	0
SSDP0031	62.9	DP	2	2	2	0	0
LEHR-SS-BG-0104	66.9	BG	3	3	0	0	0
LEHR-SS-BG-0105	67.9	BG	4	4	0	0	0
SSDP0021	71.4	DP	5	5	5	0	0
SSBG0052	78.6	BG	6	6	0	0	0
LEHR-SS-BG-0087	84	BG	7	7	0	0	0
LEHR-SS-BG-0078	85.5	BG	8	8	0	0	0
LEHR-SS-BG-0108	94.9	BG	9	9	0	0	0
LEHR-SS-BG-0115	95.7	BG	10	10	0	0	0
LEHR-SS-BG-0081	102	BG	11	11	0	0	0
SSBG0023	104	BG	12	12	0	0	0
SSBG0042	106	BG	13	13	0	0	0
LEHR-SS-BG-0096	109	BG	14	14	0	0	0
SSBG0009	114	BG	15	15	0	0	0
LEHR-SS-BG-0070	120	BG	16	16	0	0	0
SSBG0033	122	BG	17	17	0	0	0
LEHR-SS-BG-0089	140	BG	18	18	0	0	0
SSBG0046	141	BG	19	19	0	0	0
LEHR-SS-BG-0116	143	BG	20	20	0	0	0
LEHR-SS-BG-0107	145	BG	21	21	0	0	0
LEHR-SS-BG-0114	149	BG	22	22	0	0	0
SSBG0018	153	BG	23	23	0	0	0
LEHR-SS-BG-0103	162	BG	24	24.5	0	0	0
SSBG0027	162	BG	25	24.5	0	6	1
LEHR-SS-BG-0098	165	BG	26	26	0	0	0
LEHR-SS-BG-0102	166	BG	27	27	0	0	0
SSDP0018	173	DP	28	28	28	0	0
SSBG0037	183	BG	29	29	0	0	0
LEHR-SS-BG-0080	184	BG	30	30.5	0	0	0
SSDP0062	184	DP	31	30.5	30.5	6	1
SSBG0014	189	BG	32	32	0	0	0
LEHR-SS-BG-0099	190	BG	33	33	0	0	0
LEHR-SS-BG-0090	194	BG	34	34	0	0	0
SSDP0019	195	DP	35	35	35	0	0
LEHR-SS-BG-0111	199	BG	36	36	0	0	0
LEHR-SS-BG-0085	200	BG	37	37	0	0	0
SSDP0054	205	DP	38	38	38	0	0
LEHR-SS-BG-0067	206	BG	39	39.5	0	0	0
LEHR-SS-BG-0076	206	BG	40	39.5	0	6	1
LEHR-SS-BG-0094	209	BG	41	41.5	0	0	0
SSDP0037	209	DP	42	41.5	41.5	6	1
SSDP0006	211	DP	43	43.5	43.5	0	0
SSDP0059	211	DP	44	43.5	43.5	6	1
SSDP0065	213	DP	45	45	45	0	0
LEHR-SS-BG-0069	214	BG	46	46.5	0	0	0
SSDP0040	214	DP	47	46.5	46.5	6	1
LEHR-SS-BG-0071	218	BG	48	49	0	0	0
LEHR-SS-BG-0077	218	BG	49	49	0	0	1
SSDP0029	218	DP	50	49	49	24	2
SSDP0028	219	DP	51	51	51	0	0
LEHR-SS-BG-0112	220	BG	52	52	0	0	0
SSDP0025	223	DP	53	53	53	0	0
LEHR-SS-BG-0113	225	BG	54	54	0	0	0
LEHR-SS-BG-0084	226	BG	55	55	0	0	0
SSDP0012	228	DP	56	56	56	0	0
LEHR-SS-BG-0086	229	BG	57	57.5	0	0	0
SSDP0003	229	DP	58	57.5	57.5	6	1
SSDP0055	230	DP	59	59	59	0	0
SSBG0056	231	BG	60	60	0	0	0
LEHR-SS-BG-0068	237	BG	61	61	0	0	0
SSDP0034	238	DP	62	62	62	0	0
LEHR-SS-BG-0093	245	BG	63	63	0	0	0
LEHR-SS-BG-0075	248	BG	64	64	0	0	0
LEHR-SS-BG-0072	251	BG	65	65.5	0	0	0
SSBG0005	251	BG	66	65.5	0	6	1
SSDP0015	262	DP	67	67	67	0	0
SSDP0009	280	DP	68	68	68	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) = 73.8
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 57.19791
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 52.41197
Allowable Relative Shift = 1.408075
Probability, Pr = 0.839671
Minimum number of samples (Background ◄ Cleanup Unit) = 14 **Pass**
Minimum number of Background samples = 8 **Pass**
Minimum number of Cleanup Unit samples = 6 **Pass**

WILCOXON RANK SUM TEST RESULTS

n1= 20
n2= 48
m= 68
WRS= 881
g= 9
Sum[tj(tj2-1)]= 72
Zrs= 2.571068
Z0.9= 1.281551

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Vanadium, Shallow

Sample ID	CONC (I	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$tj(tj^2-1)$	Tie Ind.
SSDP0068	34.7	DP	1	1	1	0	0
SSBG0039	38.9	BG	2	2	0	0	0
SSBG0030	45.7	BG	3	3	0	0	0
SSBG0002	45.9	BG	4	4	0	0	0
SSDP0061	48.1	DP	5	5	5	0	0
SSDP0045	48.5	DP	6	6	6	0	0
SSBG0028	49.3	BG	7	7	0	0	0
SSDP0064	50.8	DP	8	8	8	0	0
SSDP0043	53.4	DP	9	9	9	0	0
SSDP0069	53.5	DP	10	10	10	0	0
SSBG0001	54.5	BG	11	11	0	0	0
SSDP0049	55.7	DP	12	12	12	0	0
SSBG0049	56	BG	13	13	0	0	0
SSDP0042	56.3	DP	14	14	14	0	0
SSDP0052	56.5	DP	15	15.5	15.5	0	0
SSDP0056	56.5	DP	16	15.5	15.5	6	1
SSDP0050	57.6	DP	17	17	17	0	0
SSBG0019	58	BG	18	18	0	0	0
SSBG0038	58.7	BG	19	19	0	0	0
SSDP0058	60	DP	20	20	20	0	0
SSBG0010	60.1	BG	21	21	0	0	0
SSBG0048	62.2	BG	22	22	0	0	0
SSBG0020	62.9	BG	23	23	0	0	0
SSDP0047	63.1	DP	24	24	24	0	0
SSDP0046	64.9	DP	25	25	25	0	0
SSBG0011	76.9	BG	26	26	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) = 20.04
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 9.990492
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 7.43554
Allowable Relative Shift = 2.695164
Probability, Pr = 0.975333
Minimum number of samples (Background + Cleanup Unit) = 8 **Pass**
Minimum number of Background samples = 5 **Pass**
Minimum number of Cleanup Unit samples = 3 **Pass**

WILCOXON RANK SUM TEST RESULTS

n1= 14
n2= 12
m= 26
WRS= 182
g= 1
Sum[tj(tj2-1)]= 6
Zrs= -0.360103
Z0.9= 1.281551

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Vanadium, Deep

Sample ID	CONC (	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$tj(tj^2-1)$	Tie Ind.
SSBG0009	37.1	BG	1	1	0	0	0
SSDP0015	48.8	DP	2	2	2	0	0
SSDP0034	49.1	DP	3	3	3	0	0
SSDP0031	49.4	DP	4	4	4	0	0
SSDP0021	51.1	DP	5	5	5	0	0
SSDP0055	57.7	DP	6	6	6	0	0
SSDP0062	57.8	DP	7	7	7	0	0
SSDP0009	57.9	DP	8	8	8	0	0
SSBG0052	58.1	BG	9	9	0	0	0
SSBG0023	58.5	BG	10	10	0	0	0
SSBG0005	59.9	BG	11	11	0	0	0
SSBG0042	61.6	BG	12	12.5	0	0	0
SSDP0018	61.6	DP	13	12.5	12.5	6	1
SSDP0037	62.6	DP	14	14	14	0	0
SSDP0065	63.9	DP	15	15	15	0	0
SSDP0019	64.9	DP	16	16	16	0	0
SSDP0040	65.4	DP	17	17	17	0	0
SSBG0033	66.2	BG	18	18	0	0	0
SSDP0029	66.4	DP	19	19	19	0	0
SSDP0059	66.6	DP	20	20	20	0	0
SSDP0054	66.9	DP	21	21	21	0	0
SSDP0028	67.3	DP	22	22	22	0	0
SSDP0025	67.5	DP	23	23	23	0	0
SSBG0018	67.7	BG	24	24	0	0	0
SSDP0003	68.1	DP	25	25	25	0	0
SSBG0046	70.7	BG	26	26	0	0	0
SSBG0027	71.8	BG	27	27	0	0	0
SSBG0037	72	BG	28	28	0	0	0
SSDP0006	72.7	DP	29	29	29	0	0
SSBG0014	76.1	BG	30	30	0	0	0
SSDP0012	77.5	DP	31	31	31	0	0
SSBG0056	78.7	BG	32	32	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) = 24.09
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 11.09048
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 7.978814
Allowable Relative Shift = 3.019246
Probability, Pr = 0.987465
Minimum number of samples (Background + Cleanup Unit) = 8 **Pass**
Minimum number of Background samples = 5 **Pass**
Minimum number of Cleanup Unit samples = 3 **Pass**

WILCOXON RANK SUM TEST RESULTS

n1= 20
n2= 12
m= 32
WRS= 299.5
g= 1
Sum[tj(tj2-1)]= 6
Zrs= -1.18732
Z0.9= 1.281551

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Zinc, Shallow

Sample ID	CONC ((	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$tj(tj^2-1)$	Tie Ind.
SSBG0039	37.6	BG	1	1	0	0	0
SSDP0043	42.8	DP	2	2	2	0	0
SSBG0030	43	BG	3	3	0	0	0
SSDP0045	45.9	DP	4	4	4	0	0
SSBG0029	49.3	BG	5	5.5	0	0	0
SSDP0061	49.3	DP	6	5.5	5.5	6	1
SSBG0002	49.8	BG	7	7	0	0	0
SSDP0068	54.3	DP	8	8	8	0	0
SSBG0049	56.4	BG	9	9	0	0	0
SSBG0038	57	BG	10	10	0	0	0
SSBG0048	59.4	BG	11	11	0	0	0
SSBG0001	60.6	BG	12	13	0	0	0
SSBG0019	60.6	BG	13	13	0	0	1
SSDP0052	60.6	DP	14	13	13	24	2
SSDP0064	60.9	DP	15	15	15	0	0
SSDP0050	62.5	DP	16	16	16	0	0
SSDP0056	62.8	DP	17	17.5	17.5	0	0
SSDP0069	62.8	DP	18	17.5	17.5	6	1
SSDP0058	65.7	DP	19	19	19	0	0
SSBG0020	67.8	BG	20	20	0	0	0
SSDP0042	68.9	DP	21	21	21	0	0
SSBG0010	69.5	BG	22	22	0	0	0
SSDP0047	77	DP	23	23	23	0	0
SSDP0046	83.4	DP	24	24	24	0	0
SSBG0011	87.2	BG	25	25	0	0	0
SSDP0049	130	DP	26	26	26	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 BG Group, (mg/kg) or (pCi/g) = 13.08593
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 21.43611
Allowable Relative Shift = 1.013243
Probability, Pr = 0.762965
Minimum number of samples (Background + Cleanup Unit) = 28 **Total existing number of samples is insufficient**
Minimum number of Background samples = 8 **Pass**
Minimum number of Cleanup Unit samples = 21 **Existing number of Cleanup Unit samples is insufficient**

WILCOXON RANK SUM TEST RESULTS

n1= 14
n2= 12
m= 26
WRS= 211.5
g= 3
Sum[tj(tj2-1)]= 36
Zrs= 1.158464
Z0.9= 1.281551

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

Wilcoxon Rank Sum Test, Comparison of DP data to background, Zinc, Deep

Sample ID	CONC (	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$tj(tj^2-1)$	Tie Ind.
SSBG0009	39.6	BG	1	1	0	0	0
SSDP0015	48	DP	2	2	2	0	0
SSDP0021	49.5	DP	3	3	3	0	0
SSDP0031	50.4	DP	4	4	4	0	0
SSBG0052	53.2	BG	5	5	0	0	0
SSDP0009	56.2	DP	6	6	6	0	0
SSDP0034	57.1	DP	7	7	7	0	0
SSBG0042	58.3	BG	8	8	0	0	0
SSBG0046	64	BG	9	9	0	0	0
SSBG0033	66.1	BG	10	10	0	0	0
SSDP0055	67.3	DP	11	11	11	0	0
SSDP0062	67.4	DP	12	12	12	0	0
SSBG0037	69.6	BG	13	13	0	0	0
SSDP0029	71.5	DP	14	14	14	0	0
SSBG0005	73	BG	15	15	0	0	0
SSDP0028	73.1	DP	16	16	16	0	0
SSDP0037	73.6	DP	17	17	17	0	0
SSDP0025	73.7	DP	18	18	18	0	0
SSDP0018	74.7	DP	19	19	19	0	0
SSDP0019	76.7	DP	20	20	20	0	0
SSDP0059	76.9	DP	21	21	21	0	0
SSDP0054	77.4	DP	22	22	22	0	0
SSBG0018	78.8	BG	23	23	0	0	0
SSBG0023	79	BG	24	24	0	0	0
SSDP0040	79.4	DP	25	25	25	0	0
SSDP0006	79.9	DP	26	26	26	0	0
SSDP0012	80.5	DP	27	27	27	0	0
SSDP0065	83.4	DP	28	28	28	0	0
SSBG0014	84.2	BG	29	29	0	0	0
SSBG0027	90.4	BG	30	30	0	0	0
SSDP0003	100	DP	31	31	31	0	0
SSBG0056	101	BG	32	32	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) = 27.93
Standard Deviation of BG Group, (mg/kg) or (pCi/g) = 16.83137
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 13.0372
Allowable Relative Shift = 2.14233
Probability, Pr = 0.937003
Minimum number of samples (Background + Cleanup Unit) = 9 **Pass**
Minimum number of Background samples = 6 **Pass**
Minimum number of Cleanup Unit samples = 4 **Pass**

WILCOXON RANK SUM TEST RESULTS

n1= 20
n2= 12
m= 32
WRS= 329
g= 0
Sum[tj(tj2-1)]= 0
Zrs= -0.038925
Z0.9= 1.281551

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

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

Sample ID	CONC (ı	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$tj(tj^2-1)$	Tie Ind.
SSDP0221	0	DP	1	1	1	0	0
SSDP0069	0.11	DP	2	2	2	0	0
SSDP0293	0.111	DP	3	3	3	0	0
SSDP0288	0.127	DP	4	4	4	0	0
SSDP0286	0.128	DP	5	5	5	0	0
SSDP0003	0.14	DP	6	6	6	0	0
SSDP0209	0.181	DP	7	7	7	0	0
SSDP0052	0.21	DP	8	8	8	0	0
LEHR-SS-DP-0150	0.213	DP	9	9	9	0	0
SSDP0059	0.22	DP	10	10	10	0	0
SSDP0244	0.224	DP	11	11	11	0	0
SSDP0208	0.234	DP	12	12	12	0	0
SSDP0240	0.236	DP	13	13	13	0	0
SSDP0265	0.251	DP	14	14	14	0	0
SSDP0193	0.267	DP	15	15	15	0	0
SSDP0289	0.282	DP	16	16	16	0	0
SSDP0292	0.289	DP	17	17	17	0	0
SSDP0210	0.297	DP	18	18	18	0	0
SSDP0279	0.299	DP	19	19	19	0	0
SSDP0238	0.305	DP	20	20	20	0	0
SSDP0234	0.316	DP	21	21	21	0	0
SSDP0271	0.351	DP	22	22	22	0	0
SSDP0224	0.382	DP	23	23	23	0	0
SSDP0233	0.39	DP	24	24	24	0	0
SSDP0285	0.406	DP	25	25	25	0	0
SSBG0002	0.41	BG	26	26	0	0	0
SSDP0239	0.416	DP	27	27	27	0	0
SSDP0198	0.433	DP	28	28	28	0	0
SSDP0218	0.444	DP	29	29	29	0	0
SSDP0219	0.446	DP	30	30	30	0	0
SSDP0266	0.449	DP	31	31	31	0	0
SSDP0229	0.45	DP	32	32.5	32.5	0	0
SSDP0262	0.45	DP	33	32.5	32.5	6	1
SSDP0269	0.469	DP	34	34	34	0	0
SSDP0275	0.483	DP	35	35	35	0	0
SSDP0192	0.509	DP	36	36	36	0	0
SSDP0255	0.514	DP	37	37	37	0	0
SSDP0282	0.519	DP	38	38	38	0	0
SSDP0291	0.525	DP	39	39	39	0	0
LEHR-SS-BG-0092	0.541	BG	40	40	0	0	0
SSDP0294	0.549	DP	41	41	41	0	0
SSDP0270	0.56	DP	42	42	42	0	0
SSDP0204	0.571	DP	43	43	43	0	0
SSDP0213	0.573	DP	44	44	44	0	0
SSDP0260	0.587	DP	45	45	45	0	0
LEHR-SS-DP-0151	0.595	DP	46	46.5	46.5	0	0
SSDP0287	0.595	DP	47	46.5	46.5	6	1
SSDP0290	0.607	DP	48	48	48	0	0
SSDP0056	0.62	DP	49	49	49	0	0
LEHR-SS-DP-0183	0.632	DP	50	50	50	0	0
LEHR-SS-DP-0156	0.637	DP	51	51	51	0	0
SSDP0281	0.666	DP	52	52	52	0	0
SSDP0274	0.674	DP	53	53	53	0	0
SSDP0296	0.702	DP	54	54	54	0	0
SSDP0295	0.714	DP	55	55	55	0	0
LEHR-SS-DP-0120	0.717	DP	56	56	56	0	0
SSDP0245	0.725	DP	57	57	57	0	0
SSDP0235	0.737	DP	58	58	58	0	0
LEHR-SS-DP-0178	0.831	DP	59	59	59	0	0
SSDP0258	0.872	DP	60	60	60	0	0
SSDP0202	0.874	DP	61	61	61	0	0

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

Sample ID	CONC ((	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$tj(tj^2-1)$	Tie Ind.
LEHR-SS-DP-0153	0.882	DP	62	62	62	0	0
SSDP0068	0.89	DP	63	63	63	0	0
SSDP0272	0.894	DP	64	64	64	0	0
SSDP0197	0.898	DP	65	65	65	0	0
SSDP0243	0.921	DP	66	66	66	0	0
LEHR-SS-DP-0189	0.933	DP	67	67	67	0	0
SSDP0267	0.939	DP	68	68	68	0	0
SSDP0276	0.974	DP	69	69	69	0	0
LEHR-SS-DP-0160	0.986	DP	70	70	70	0	0
SSBG0039	1	BG	71	71.5	0	0	0
LEHR-SS-DP-0163	1	DP	72	71.5	71.5	6	1
SSDP0249	1.03	DP	73	73	73	0	0
LEHR-SS-BG-0098	1.1	BG	74	74.5	0	0	0
SSBG0001	1.1	BG	75	74.5	0	6	1
SSDP0259	1.11	DP	76	76	76	0	0
SSDP0200	1.12	DP	77	78	78	0	0
SSDP0214	1.12	DP	78	78	78	0	1
SSDP0261	1.12	DP	79	78	78	24	2
SSDP0207	1.14	DP	80	80	80	0	0
LEHR-SS-DP-0162	1.15	DP	81	81	81	0	0
SSDP0220	1.17	DP	82	82	82	0	0
SSDP0206	1.21	DP	83	83	83	0	0
LEHR-SS-BG-0076	1.22	BG	84	84	0	0	0
LEHR-SS-DP-0167	1.24	DP	85	85.5	85.5	0	0
SSDP0199	1.24	DP	86	85.5	85.5	6	1
LEHR-SS-BG-0075	1.25	BG	87	87.5	0	0	0
LEHR-SS-BG-0077	1.25	BG	88	87.5	0	6	1
SSDP0211	1.3	DP	89	89.5	89.5	0	0
SSDP0254	1.3	DP	90	89.5	89.5	6	1
LEHR-SS-DP-0133	1.37	DP	91	91	91	0	0
LEHR-SS-DP-0186	1.46	DP	92	92	.92	0	0
SSBG0009	1.5	BG	93	93	0	0	0
LEHR-SS-BG-0079	1.52	BG	94	94	0	0	0
LEHR-SS-BG-0078	1.57	BG	95	95	0	0	0
SSDP0246	1.6	DP	96	96	96	0	0
LEHR-SS-BG-0085	1.62	BG	97	97	0	0	0
LEHR-SS-BG-0073	1.65	BG	98	98	0	0	0
SSDP0203	1.67	DP	99	99	99	0	0
LEHR-SS-BG-0084	1.73	BG	100	100	0	0	0
SSDP0257	1.74	DP	101	101	101	0	0
SSDP0043	1.8	DP	102	102	102	0	0
SSDP0215	1.83	DP	103	103	103	0	0
SSDP0248	1.84	DP	104	104	104	0	0
SSDP0268	1.87	DP	105	105	105	0	0
LEHR-SS-BG-0074	1.88	BG	106	106.5	0	0	0
SSDP0228	1.88	DP	107	106.5	106.5	6	1
LEHR-SS-DP-0157	1.89	DP	108	108	108	0	0
SSDP0045	1.9	DP	109	109	109	0	0
SSDP0264	1.91	DP	110	110	110	0	0
SSDP0236	1.93	DP	111	111	111	0	0
LEHR-SS-BG-0083	2.01	BG	112	112	0	0	0
LEHR-SS-BG-0081	2.03	BG	113	113	0	0	0
SSDP0241	2.05	DP	114	114.5	114.5	0	0
SSDP0284	2.05	DP	115	114.5	114.5	6	1
SSBG0052	2.1	BG	116	116	0	0	0
LEHR-SS-DP-0168	2.15	DP	117	117	117	0	0
SSDP0273	2.18	DP	118	118	118	0	0
SSDP0058	2.2	DP	119	119	119	0	0
LEHR-SS-DP-0140	2.26	DP	120	120.5	120.5	0	0
LEHR-SS-DP-0174	2.26	DP	121	120.5	120.5	6	1

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

Sample ID	CONC (i	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$tj(tj^2-1)$	Tie Ind.
LEHR-SS-DP-0184	2.28	DP	122	122	122	0	0
SSBG0046	2.3	BG	123	123	0	0	0
SSDP0196	2.32	DP	124	124.5	124.5	0	0
SSDP0247	2.32	DP	125	124.5	124.5	6	1
SSDP0212	2.36	DP	126	126.5	126.5	0	0
SSDP0263	2.36	DP	127	126.5	126.5	6	1
SSBG0056	2.4	BG	128	128	0	0	0
SSDP0283	2.45	DP	129	129	129	0	0
LEHR-SS-DP-0136	2.57	DP	130	130.5	130.5	0	0
LEHR-SS-DP-0144	2.57	DP	131	130.5	130.5	6	1
SSDP0256	2.58	DP	132	132	132	0	0
LEHR-SS-BG-0116	2.63	BG	133	133	0	0	0
LEHR-SS-DP-0182	2.7	DP	134	134	134	0	0
SSDP0201	2.72	DP	135	135	135	0	0
LEHR-SS-BG-0115	2.82	BG	136	136	0	0	0
LEHR-SS-DP-0125	2.84	DP	137	137	137	0	0
SSDP0195	2.86	DP	138	138	138	0	0
LEHR-SS-DP-0190	2.95	DP	139	139	139	0	0
LEHR-SS-DP-0135	2.99	DP	140	140.5	140.5	0	0
LEHR-SS-DP-0155	2.99	DP	141	140.5	140.5	6	1
LEHR-SS-BG-0104	3	BG	142	142.5	0	0	0
SSBG0049	3	BG	143	142.5	0	6	1
LEHR-SS-DP-0173	3.13	DP	144	144	144	0	0
SSBG0030	3.2	BG	145	145.5	0	0	0
SSBG0042	3.2	BG	146	145.5	0	6	1
LEHR-SS-DP-0137	3.26	DP	147	147	147	0	0
LEHR-SS-DP-0141	3.28	DP	148	148	148	0	0
LEHR-SS-DP-0138	3.29	DP	149	149.5	149.5	0	0
LEHR-SS-DP-0170	3.29	DP	150	149.5	149.5	6	1
LEHR-SS-BG-0093	3.31	BG	151	151	0	0	0
LEHR-SS-DP-0118	3.35	DP	152	152	152	0	0
SSBG0033	3.4	BG	153	153.5	0	0	0
LEHR-SS-DP-0171	3.4	DP	154	153.5	153.5	6	1
LEHR-SS-DP-0147	3.49	DP	155	155	155	0	0
LEHR-SS-DP-0126	3.53	DP	156	156.5	156.5	0	0
LEHR-SS-DP-0143	3.53	DP	157	156.5	156.5	6	1
SSDP0046	3.6	DP	158	158.5	158.5	0	0
SSDP0216	3.6	DP	159	158.5	158.5	6	1
LEHR-SS-DP-0119	3.65	DP	160	160.5	160.5	0	0
SSDP0230	3.65	DP	161	160.5	160.5	6	1
LEHR-SS-DP-0117	3.76	DP	162	162	162	0	0
LEHR-SS-BG-0099	3.77	BG	163	163	0	0	0
LEHR-SS-DP-0149	3.83	DP	164	164	164	0	0
LEHR-SS-DP-0159	3.92	DP	165	165	165	0	0
SSDP0252	3.97	DP	166	166	166	0	0
SSDP0006	4	DP	167	167	167	0	0
LEHR-SS-DP-0121	4.03	DP	168	168	168	0	0
LEHR-SS-BG-0106	4.12	BG	169	169.5	0	0	0
LEHR-SS-DP-0181	4.12	DP	170	169.5	169.5	6	1
LEHR-SS-DP-0177	4.18	DP	171	171	171	0	0
LEHR-SS-DP-0122	4.19	DP	172	172	172	0	0
LEHR-SS-DP-0129	4.26	DP	173	173	173	0	0
LEHR-SS-BG-0108	4.3	BG	174	174	0	0	0
SSDP0222	4.32	DP	175	175	175	0	0
LEHR-SS-DP-0148	4.43	DP	176	176	176	0	0
LEHR-SS-DP-0175	4.44	DP	177	177	177	0	0
LEHR-SS-DP-0142	4.52	DP	178	178.5	178.5	0	0
LEHR-SS-DP-0169	4.52	DP	179	178.5	178.5	6	1
LEHR-SS-DP-0158	4.53	DP	180	180	180	0	0
LEHR-SS-DP-0123	4.65	DP	181	181	181	0	0

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

Sample ID	CONC (	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$tj(tj^2-1)$	Tie Ind.
SSDP0278	4.66	DP	182	182	182	0	0
SSDP0231	4.68	DP	183	183	183	0	0
LEHR-SS-DP-0165	4.7	DP	184	184	184	0	0
LEHR-SS-DP-0176	4.72	DP	185	185	185	0	0
LEHR-SS-DP-0146	4.87	DP	186	186	186	0	0
SSDP0232	4.94	DP	187	187	187	0	0
LEHR-SS-DP-0191	5.02	DP	188	188	188	0	0
SSDP0223	5.03	DP	189	189	189	0	0
SSBG0037	5.1	BG	190	190	0	0	0
LEHR-SS-DP-0131	5.3	DP	191	191	191	0	0
SSDP0277	5.51	DP	192	192	192	0	0
SSDP0253	5.56	DP	193	193	193	0	0
LEHR-SS-BG-0114	5.57	BG	194	194	0	0	0
SSBG0018	5.6	BG	195	195	0	0	0
LEHR-SS-DP-0139	5.7	DP	196	196.5	196.5	0	0
SSDP0055	5.7	DP	197	196.5	196.5	6	1
LEHR-SS-DP-0130	5.77	DP	198	198	198	0	0
LEHR-SS-BG-0091	5.88	BG	199	199	0	0	0
LEHR-SS-DP-0152	5.95	DP	200	200	200	0	0
SSDP0054	6	DP	201	201	201	0	0
LEHR-SS-DP-0132	6.04	DP	202	202	202	0	0
SSDP0194	6.06	DP	203	203	203	0	0
LEHR-SS-BG-0103	6.09	BG	204	204	0	0	0
SSDP0237	6.26	DP	205	205	205	0	0
LEHR-SS-BG-0107	6.44	BG	206	206	0	0	0
SSDP0012	6.6	DP	207	207	207	0	0
SSDP0226	6.83	DP	208	208	208	0	0
SSDP0251	6.89	DP	209	209	209	0	0
LEHR-SS-DP-0145	7.06	DP	210	210	210	0	0
LEHR-SS-DP-0179	7.08	DP	211	211	211	0	0
SSDP0040	7.1	DP	212	212	212	0	0
LEHR-SS-BG-0069	7.11	BG	213	213	0	0	0
LEHR-SS-BG-0102	7.22	BG	214	214.5	0	0	0
LEHR-SS-DP-0164	7.22	DP	215	214.5	214.5	6	1
LEHR-SS-DP-0154	7.28	DP	216	216	216	0	0
LEHR-SS-BG-0113	7.31	BG	217	217	0	0	0
SSDP0217	7.38	DP	218	218	218	0	0
SSDP0042	7.4	DP	219	219	219	0	0
SSDP0028	7.5	DP	220	220	220	0	0
LEHR-SS-DP-0128	7.95	DP	221	221	221	0	0
SSDP0242	8	DP	222	222	222	0	0
LEHR-SS-DP-0188	8.07	DP	223	223	223	0	0
SSDP0031	8.1	DP	224	224	224	0	0
LEHR-SS-DP-0124	8.22	DP	225	225	225	0	0
SSBG0014	8.5	BG	226	226	0	0	0
SSBG0023	8.7	BG	227	227	0	0	0
LEHR-SS-BG-0071	8.93	BG	228	228	0	0	0
SSDP0019	9.4	DP	229	229	229	0	0
SSBG0048	9.5	BG	230	230	0	0	0
LEHR-SS-BG-0070	9.61	BG	231	231	0	0	0
SSDP0029	10	DP	232	232	232	0	0
LEHR-SS-BG-0095	10.5	BG	233	233	0	0	0
LEHR-SS-BG-0072	10.8	BG	234	234	0	0	0
SSBG0005	11	BG	235	236	0	0	0
SSDP0009	11	DP	236	236	236	0	1
SSDP0015	11	DP	237	236	236	24	2
LEHR-SS-BG-0068	11.5	BG	238	238	0	0	0
LEHR-SS-DP-0166	11.9	DP	239	239	239	0	0
LEHR-SS-BG-0101	12	BG	240	241	0	0	0
SSDP0021	12	DP	241	241	241	0	1

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

Sample ID	CONC ((	Grouping	Abs Rank	Tie-Norm Rank	n1Ranks	$tj(tj^2-1)$	Tie Ind.
SSDP0034	12	DP	242	241	241	24	2
LEHR-SS-DP-0187	12.2	DP	243	243	243	0	0
LEHR-SS-BG-0097	12.9	BG	244	244	0	0	0
SSBG0038	13	BG	245	245.5	0	0	0
SSDP0037	13	DP	246	245.5	245.5	6	1
SSDP0047	14	DP	247	247	247	0	0
LEHR-SS-BG-0090	15.4	BG	248	248	0	0	0
LEHR-SS-BG-0111	15.9	BG	249	249	0	0	0
LEHR-SS-BG-0096	16	BG	250	250	0	0	0
SSBG0027	17	BG	251	251	0	0	0
LEHR-SS-BG-0067	17.2	BG	252	252	0	0	0
LEHR-SS-BG-0066	18.1	BG	253	253	0	0	0
LEHR-SS-BG-0089	18.4	BG	254	254	0	0	0
SSBG0010	19	BG	255	255	0	0	0
LEHR-SS-BG-0110	21.6	BG	256	256	0	0	0
LEHR-SS-BG-0082	21.8	BG	257	257	0	0	0
LEHR-SS-BG-0112	22.1	BG	258	258	0	0	0
SSDP0025	23	DP	259	259	259	0	0
SSBG0020	24	BG	260	260	0	0	0
SSBG0011	25	BG	261	261	0	0	0
SSBG0019	28	BG	262	262	0	0	0
LEHR-SS-BG-0100	29.3	BG	263	263	0	0	0
SSDP0018	33	DP	264	264	264	0	0
SSDP0049	34	DP	265	265	265	0	0
SSDP0227	43.5	DP	266	266	266	0	0
SSBG0029	45	BG	267	267	0	0	0
LEHR-SS-BG-0086	46	BG	268	268	0	0	0
SSDP0050	59	DP	269	269	269	0	0
LEHR-SS-BG-0087	66.5	BG	270	270	0	0	0
LEHR-SS-BG-0065	68.9	BG	271	271	0	0	0
LEHR-SS-BG-0109	106	BG	272	272	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 BG Group, (mg/kg) or (pCi/g) = 17.62136
Standard Deviation of DP Group, (mg/kg) or (pCi/g) = 6.574028
Allowable Relative Shift = 1.642828
Probability, Pr = 0.877135
Minimum number of samples (Background + Cleanup Unit) = 25 **Pass**
Minimum number of Background samples = 22 **Pass**
Minimum number of Cleanup Unit samples = 4 **Pass**

WILCOXON RANK SUM TEST RESULTS

n1= 200
n2= 72
m= 272
WRS= 23828
g= 29
Sum[tj(tj2-1)]= 228
Zrs= -6.066109
Z0.9= 1.281551

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

APPENDIX A-3

REASONABLE MAXIMUM EXPOSURE LEVEL CALCULATIONS

Calculation of 95% UCL, Dog Pen Data, Deep Mercury

LAB_CHEM	SAMP_ID	CONC	Data	Samp_Depth	DET_LIMIT
Mercury	SSDP0003	0	0.1	5.5	0.2
Mercury	SSDP0006	0	0.1	5.75	0.2
Mercury	SSDP0009	0.14	0.14	5.75	0.2
Mercury	SSDP0012	0	0.1	6	0.2
Mercury	SSDP0015	0.14	0.14	5.75	0.2
Mercury	SSDP0018	0.26	0.26	5.5	0.2
Mercury	SSDP0019	0.18	0.18	10.5	0.2
Mercury	SSDP0021	0	0.1	20.5	0.2
Mercury	SSDP0025	0	0.1	5.75	0.2
Mercury	SSDP0028	0	0.1	5.75	0.2
Mercury	SSDP0029	0	0.1	10.75	0.2
Mercury	SSDP0031	0	0.1	20.75	0.2
Mercury	SSDP0034	0.21	0.21	5.75	0.2
Mercury	SSDP0037	0	0.1	5.75	0.2
Mercury	SSDP0040	0	0.1	6	0.2
Mercury	SSDP0054	0	0.1	5	0.2
Mercury	SSDP0055	0.21	0.21	6.5	0.2
Mercury	SSDP0059	0.12	0.12	5	0.2
Mercury	SSDP0062	0	0.1	5	0.2
Mercury	SSDP0065	0	0.1	5	0.2
MERCURY	SSDP0194	0	0.055	8	0.11
MERCURY	SSDP0195	0	0.048	15	0.096
MERCURY	SSDP0196	0.05	0.05	25	0.081
MERCURY	SSDP0199	0.11	0.11	10	0.073
MERCURY	SSDP0200	0.06	0.06	20	0.079
MERCURY	SSDP0201	0	0.06	25	0.12
MERCURY	SSDP0204	0.06	0.06	8	0.088
MERCURY	SSDP0206	0	0.05	21	0.1
MERCURY	SSDP0207	0.08	0.08	25	0.091
MERCURY	SSDP0210	0.06	0.06	5	0.062
MERCURY	SSDP0211	0.08	0.08	15	0.092
MERCURY	SSDP0212	0.12	0.12	25	0.074
MERCURY	SSDP0215	0.12	0.12	10	0.11
MERCURY	SSDP0216	0	0.0385	20	0.077
MERCURY	SSDP0217	0.09	0.09	25	0.11
MERCURY	SSDP0220	0.07	0.07	8	0.086
MERCURY	SSDP0221	0.05	0.05	15	0.081
MERCURY	SSDP0222	0.06	0.06	20	0.089
MERCURY	SSDP0225	0	0.05	10	0.1
MERCURY	SSDP0227	1.7	1.7	20	0.12
MERCURY	SSDP0230	0.09	0.09	8	0.1
MERCURY	SSDP0231	0	0.055	20	0.11
MERCURY	SSDP0232	0	0.041	25	0.082
MERCURY	SSDP0235	0.09	0.09	8	0.066
MERCURY	SSDP0236	0	0.0455	15	0.091
MERCURY	SSDP0237	0	0.0405	25	0.081
MERCURY	SSDP0240	0.3	0.3	5	0.069
MERCURY	SSDP0241	0.05	0.05	15	0.085
MERCURY	SSDP0242	0	0.05	25	0.1

Calculation of 95% UCL, Dog Pen Data, Deep Mercury

LAB_CHEM	SAMP_ID	CONC	Data	Samp_Depth	DET_LIMIT
MERCURY	SSDP0245	0.13	0.13	10	0.094
MERCURY	SSDP0246	0.14	0.14	20	0.11
MERCURY	SSDP0247	0.06	0.06	25	0.09
MERCURY	SSDP0247	0.13	0.13	25	0.1
MERCURY	SSDP0251	0.31	0.31	6	0.1
MERCURY	SSDP0252	0.09	0.09	15	0.11
MERCURY	SSDP0253	0.08	0.08	25	0.11
MERCURY	SSDP0256	0.14	0.14	5	0.07
MERCURY	SSDP0257	0.12	0.12	15	0.091
MERCURY	SSDP0258	0.14	0.14	25	0.066
MERCURY	SSDP0261	0.23	0.23	5	0.099
MERCURY	SSDP0262	0.37	0.37	15	0.07
MERCURY	SSDP0263	0.06	0.06	25	0.094
MERCURY	SSDP0266	0.36	0.36	5	0.12
MERCURY	SSDP0267	0.07	0.07	15	0.089
MERCURY	SSDP0268	0.12	0.12	25	0.089
MERCURY	SSDP0271	0.38	0.38	8	0.11
MERCURY	SSDP0272	0.09	0.09	15	0.09
MERCURY	SSDP0273	0.12	0.12	25	0.069
MERCURY	SSDP0276	0.11	0.11	5	0.11
MERCURY	SSDP0277	0.06	0.06	15	0.12
MERCURY	SSDP0278	0	0.05	25	0.1
MERCURY	SSDP0282	0.08	0.08	10	0.1
MERCURY	SSDP0283	0	0.041	20	0.082
MERCURY	SSDP0284	0	0.041	25	0.082
MERCURY	SSDP0289	0.23	0.23	5	0.13
MERCURY	SSDP0290	0.05	0.05	15	0.078
MERCURY	SSDP0291	0.06	0.06	25	0.071
MERCURY	SSDP0294	0.19	0.19	10	0.12
MERCURY	SSDP0295	0	0.0495	20	0.099
MERCURY	SSDP0296	0	0.055	25	0.11
		n	80		
		mean	0.131125		
		Stdev	0.193775407		
		Z	1.645		
		95% UCL (pCi/g)	0.17		

Calculation of 95% UCL, Dog Pen Data, Uranium-235

LAB_CHEM	SAMP_ID	CONC	MDL
URANIUM-235	LEHR-SS-DP-0117	0	0.138
URANIUM-235	LEHR-SS-DP-0118	0.0872	0.153
URANIUM-235	LEHR-SS-DP-0119	0.165	0.168
URANIUM-235	LEHR-SS-DP-0120	0.0238	0.154
URANIUM-235	LEHR-SS-DP-0121	0.129	0.148
URANIUM-235	LEHR-SS-DP-0122	0.0933	0.163
URANIUM-235	LEHR-SS-DP-0123	0.0826	0.156
URANIUM-235	LEHR-SS-DP-0124	0.0552	0.145
URANIUM-235	LEHR-SS-DP-0125	0.0682	0.167
URANIUM-235	LEHR-SS-DP-0127	0.196	0.201
URANIUM-235	LEHR-SS-DP-0128	0.0388	0.141
URANIUM-235	LEHR-SS-DP-0129	0.0969	0.105
URANIUM-235	LEHR-SS-DP-0130	0	0.158
URANIUM-235	LEHR-SS-DP-0131	0.0366	0.143
URANIUM-235	LEHR-SS-DP-0132	0.0799	0.147
URANIUM-235	LEHR-SS-DP-0133	0.0617	0.164
URANIUM-235	LEHR-SS-DP-0134	0.0314	0.141
URANIUM-235	LEHR-SS-DP-0135	0.0682	0.149
URANIUM-235	LEHR-SS-DP-0136	0.0503	0.172
URANIUM-235	LEHR-SS-DP-0137	0.0721	0.0953
URANIUM-235	LEHR-SS-DP-0138	0.0725	0.132
URANIUM-235	LEHR-SS-DP-0139	0.128	0.147
URANIUM-235	LEHR-SS-DP-0140	0	0.142
URANIUM-235	LEHR-SS-DP-0141	0.0621	0.131
URANIUM-235	LEHR-SS-DP-0142	0.065	0.137
URANIUM-235	LEHR-SS-DP-0143	0.0836	0.116
URANIUM-235	LEHR-SS-DP-0144	0.0989	0.18
URANIUM-235	LEHR-SS-DP-0145	-0.00264	0.167
URANIUM-235	LEHR-SS-DP-0146	0.0398	0.134
URANIUM-235	LEHR-SS-DP-0147	0.0367	0.111
URANIUM-235	LEHR-SS-DP-0148	0.0623	0.139
URANIUM-235	LEHR-SS-DP-0149	0.123	0.166
URANIUM-235	LEHR-SS-DP-0150	0.0455	0.179
URANIUM-235	LEHR-SS-DP-0151	0.0456	0.145
URANIUM-235	LEHR-SS-DP-0152	-0.0112	0.189
URANIUM-235	LEHR-SS-DP-0153	0.0727	0.181
URANIUM-235	LEHR-SS-DP-0154	0.0264	0.15
URANIUM-235	LEHR-SS-DP-0155	0.0675	0.115
URANIUM-235	LEHR-SS-DP-0156	0.0858	0.156
URANIUM-235	LEHR-SS-DP-0157	0.0306	0.132
URANIUM-235	LEHR-SS-DP-0158	0.0963	0.156
URANIUM-235	LEHR-SS-DP-0159	0.0478	0.17
URANIUM-235	LEHR-SS-DP-0160	0.0234	0.169
URANIUM-235	LEHR-SS-DP-0162	0.0726	0.0941
URANIUM-235	LEHR-SS-DP-0163	0.0104	0.155
URANIUM-235	LEHR-SS-DP-0164	0.0302	0.176
URANIUM-235	LEHR-SS-DP-0165	0.101	0.184
URANIUM-235	LEHR-SS-DP-0166	0.0711	0.177
URANIUM-235	LEHR-SS-DP-0167	0.0664	0.102
URANIUM-235	LEHR-SS-DP-0168	0.0212	0.14
URANIUM-235	LEHR-SS-DP-0169	0.129	0.159
URANIUM-235	LEHR-SS-DP-0170	0.0706	0.152
URANIUM-235	LEHR-SS-DP-0171	0.0504	0.12
URANIUM-235	LEHR-SS-DP-0173	0.0414	0.0841
URANIUM-235	LEHR-SS-DP-0174	0.11	0.154
URANIUM-235	LEHR-SS-DP-0175	0.021	0.142
URANIUM-235	LEHR-SS-DP-0176	0.0827	0.152
URANIUM-235	LEHR-SS-DP-0177	0.0434	0.134

Calculation of 95% UCL, Dog Pen Data, Uranium-235

LAB_CHEM	SAMP_ID	CONC	MDL
URANIUM-235	LEHR-SS-DP-0178	0.0886	0.113
URANIUM-235	LEHR-SS-DP-0180	0.113	0.158
URANIUM-235	LEHR-SS-DP-0181	0.166	0.155
URANIUM-235	LEHR-SS-DP-0182	0.0219	0.154
URANIUM-235	LEHR-SS-DP-0183	-0.0216	0.108
URANIUM-235	LEHR-SS-DP-0186	0.0378	0.143
URANIUM-235	LEHR-SS-DP-0187	0.065	0.149
URANIUM-235	LEHR-SS-DP-0188	0.0888	0.133
URANIUM-235	LEHR-SS-DP-0189	0.0999	0.135
URANIUM-235	LEHR-SS-DP-0190	0.232	0.177
URANIUM-235	LEHR-SS-DP-0191	0.0374	0.165
URANIUM-235	LEHR-SS-DP-0192	0.182	0.183
URANIUM-235	LEHR-SS-DP-0193	-0.0137	0.167
URANIUM-235	LEHR-SS-DP-0194	0.0000482	0.00349
URANIUM-235	LEHR-SS-DP-0195	0.101	0.204
URANIUM-235	LEHR-SS-DP-0196	0.116	0.175
Uranium-235	SSDP0003	0.029	
Uranium-235	SSDP0006	0.01	
Uranium-235	SSDP0009	0.05	
Uranium-235	SSDP0012	0.046	
Uranium-235	SSDP0015	-0.039	
Uranium-235	SSDP0018	-0.03	
Uranium-235	SSDP0019	0.07	
Uranium-235	SSDP0021	-0.06	
Uranium-235	SSDP0025	0.019	
Uranium-235	SSDP0028	0	
Uranium-235	SSDP0029	-0.02	
Uranium-235	SSDP0031	-0.1	
Uranium-235	SSDP0034	0.12	
Uranium-235	SSDP0037	0	
Uranium-235	SSDP0040	0.11	
Uranium-235	SSDP0042	-0.126	
Uranium-235	SSDP0043	0	
Uranium-235	SSDP0045	-0.02	
Uranium-235	SSDP0046	0.02	
Uranium-235	SSDP0047	0.05	
Uranium-235	SSDP0049	0	
Uranium-235	SSDP0050	0.04	
Uranium-235	SSDP0052	0.05	
Uranium-235	SSDP0055	0.02	
Uranium-235	SSDP0056	-0.02	
Uranium-235	SSDP0058	0.04	
Uranium-235	SSDP0059	0.08	
Uranium-235	SSDP0061	0	
Uranium-235	SSDP0062	0.02	
Uranium-235	SSDP0064	-0.01	
Uranium-235	SSDP0065	0	
Uranium-235	SSDP0068	0.05	
Uranium-235	SSDP0069	0.05	
URANIUM-235	SSDP0197	0.104	0.178
URANIUM-235	SSDP0198	0.0524	0.132
URANIUM-235	SSDP0199	0.0839	0.17
URANIUM-235	SSDP0200	0.0354	0.148
URANIUM-235	SSDP0201	0.15	0.277
URANIUM-235	SSDP0202	0.0595	0.18
URANIUM-235	SSDP0203	0.0705	0.149
URANIUM-235	SSDP0204	0.226	0.366
URANIUM-235	SSDP0205	0.0442	0.16

Calculation of 95% UCL, Dog Pen Data, Uranium-235

LAB_CHEM	SAMP_ID	CONC	MDL
URANIUM-235	SSDP0207	0.191	0.179
URANIUM-235	SSDP0208	0.12	0.189
URANIUM-235	SSDP0209	0.0547	0.149
URANIUM-235	SSDP0210	0.0132	0.251
URANIUM-235	SSDP0211	0.0399	0.171
URANIUM-235	SSDP0212	0.0551	0.167
URANIUM-235	SSDP0213	0.159	0.155
URANIUM-235	SSDP0214	0.0885	0.159
URANIUM-235	SSDP0215	0.0659	0.151
URANIUM-235	SSDP0216	0.09	0.161
URANIUM-235	SSDP0217	0.257	0.155
URANIUM-235	SSDP0218	0.026	0.119
URANIUM-235	SSDP0219	0.0912	0.113
URANIUM-235	SSDP0220	0.0541	0.117
URANIUM-235	SSDP0221	0.0327	0.128
URANIUM-235	SSDP0222	0.0312	0.199
URANIUM-235	SSDP0223	0.0459	0.0939
URANIUM-235	SSDP0224	0.0445	0.115
URANIUM-235	SSDP0225	0.103	0.176
URANIUM-235	SSDP0227	0.0996	0.159
URANIUM-235	SSDP0228	0.0377	0.136
URANIUM-235	SSDP0229	0.0558	0.14
URANIUM-235	SSDP0230	0.317	0.155
URANIUM-235	SSDP0231	0.0161	0.165
URANIUM-235	SSDP0232	0.000211	0.138
URANIUM-235	SSDP0233	0.0582	0.116
URANIUM-235	SSDP0234	0.136	0.217
URANIUM-235	SSDP0235	0.0266	0.196
URANIUM-235	SSDP0236	0.0388	0.198
URANIUM-235	SSDP0237	0.0138	0.215
URANIUM-235	SSDP0238	0.0774	0.152
URANIUM-235	SSDP0239	0.107	0.145
URANIUM-235	SSDP0240	-0.0179	0.151
URANIUM-235	SSDP0241	0.00649	0.182
URANIUM-235	SSDP0242	0.0979	0.153
URANIUM-235	SSDP0243	-0.0105	0.146
URANIUM-235	SSDP0244	0.0728	0.109
URANIUM-235	SSDP0245	0.034	0.115
URANIUM-235	SSDP0246	0.0785	0.234
URANIUM-235	SSDP0247	0.0887	0.152
URANIUM-235	SSDP0248	0.0847	0.15
URANIUM-235	SSDP0249	0.0349	0.146
URANIUM-235	SSDP0251	0.127	0.198
URANIUM-235	SSDP0252	0.0844	0.186
URANIUM-235	SSDP0253	0.0678	0.146
URANIUM-235	SSDP0254	0.0251	0.17
URANIUM-235	SSDP0255	0.0273	0.107
URANIUM-235	SSDP0256	0.153	0.22
URANIUM-235	SSDP0257	0.185	0.239
URANIUM-235	SSDP0258	0.00408	0.203
URANIUM-235	SSDP0259	0.133	0.142
URANIUM-235	SSDP0260	0.0895	0.168
URANIUM-235	SSDP0261	0.00892	0.141
URANIUM-235	SSDP0262	0.0262	0.196
URANIUM-235	SSDP0263	-0.0307	0.173
URANIUM-235	SSDP0264	0.0089	0.165
URANIUM-235	SSDP0265	0.0606	0.153
URANIUM-235	SSDP0266	0.196	0.225

Calculation of 95% UCL, Dog Pen Data, Uranium-235

LAB_CHEM	SAMP_ID	CONC	MDL
URANIUM-235	SSDP0267	0.259	0.218
URANIUM-235	SSDP0268	0.0541	0.181
URANIUM-235	SSDP0269	-0.01	0.169
URANIUM-235	SSDP0270	0.0286	0.123
URANIUM-235	SSDP0271	0.102	0.216
URANIUM-235	SSDP0272	0.169	0.213
URANIUM-235	SSDP0273	0.0572	0.216
URANIUM-235	SSDP0274	0.12	0.176
URANIUM-235	SSDP0275	0.134	0.151
URANIUM-235	SSDP0276	0.109	0.17
URANIUM-235	SSDP0277	0.0338	0.157
URANIUM-235	SSDP0278	0.0428	0.153
URANIUM-235	SSDP0280	0.0998	0.164
URANIUM-235	SSDP0281	0.024	0.185
URANIUM-235	SSDP0282	0.0788	0.177
URANIUM-235	SSDP0283	0.0466	0.165
URANIUM-235	SSDP0284	0.0387	0.145
URANIUM-235	SSDP0285	0.0789	0.174
URANIUM-235	SSDP0286	0.0701	0.151
URANIUM-235	SSDP0287	0.0551	0.174
URANIUM-235	SSDP0288	0.0435	0.168
URANIUM-235	SSDP0289	-0.011	0.194
URANIUM-235	SSDP0290	0.115	0.19
URANIUM-235	SSDP0291	0.118	0.17
URANIUM-235	SSDP0292	0.0284	0.138
URANIUM-235	SSDP0293	0.154	0.259
URANIUM-235	SSDP0294	0.136	0.129
URANIUM-235	SSDP0295	0.212	0.186
URANIUM-235	SSDP0297	0.169	0.154
		n	
		mean	
		Stdev	
		Z	
		95% UCL (pCi/g)	

Calculation of 95% UCL, Dog Pen Data, Heptachlor Epoxide

SAMP_ID	CONC	DL_FLAG	DET_LIMIT	Combined Data	Ln(Combined Data)
SSDP0254	0.65		2	0.65	-0.430782916
SSDP0224	0.68		2	0.68	-0.385662481
SSDP0208	0.71		2	0.71	-0.342490309
LEHR-SS-DP-0135	0 <		1.5	0.75	-0.287682072
LEHR-SS-DP-0137	0 <		1.5	0.75	-0.287682072
LEHR-SS-DP-0129	0 <		1.6	0.8	-0.223143551
LEHR-SS-DP-0131	0 <		1.6	0.8	-0.223143551
LEHR-SS-DP-0134	0 <		1.6	0.8	-0.223143551
LEHR-SS-DP-0136	0 <		1.6	0.8	-0.223143551
LEHR-SS-DP-0138	0 <		1.6	0.8	-0.223143551
LEHR-SS-DP-0144	0 <		1.6	0.8	-0.223143551
LEHR-SS-DP-0150	0 <		1.6	0.8	-0.223143551
LEHR-SS-DP-0128	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0130	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0132	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0142	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0146	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0147	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0156	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0160	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0161	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0163	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0183	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0188	0 <		1.7	0.85	-0.162518929
SSDP0275	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0117	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0118	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0120	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0153	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0154	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0155	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0157	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0159	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0162	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0164	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0174	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0177	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0178	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0181	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0182	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0187	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0191	0 <		1.8	0.9	-0.105360516
SSDP0045	0 <		1.8	0.9	-0.105360516
SSDP0068	0 <		1.8	0.9	-0.105360516
SSDP0193	0 <		1.8	0.9	-0.105360516
SSDP0197	0 <		1.8	0.9	-0.105360516
SSDP0209	0 <		1.8	0.9	-0.105360516
SSDP0244	0 <		1.8	0.9	-0.105360516
SSDP0287	0 <		1.8	0.9	-0.105360516
SSDP0292	0 <		1.8	0.9	-0.105360516
SSDP0293	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0165	0 <		1.9	0.95	-0.051293294
LEHR-SS-DP-0169	0 <		1.9	0.95	-0.051293294
LEHR-SS-DP-0170	0 <		1.9	0.95	-0.051293294
LEHR-SS-DP-0171	0 <		1.9	0.95	-0.051293294
LEHR-SS-DP-0173	0 <		1.9	0.95	-0.051293294
LEHR-SS-DP-0175	0 <		1.9	0.95	-0.051293294
LEHR-SS-DP-0176	0 <		1.9	0.95	-0.051293294
LEHR-SS-DP-0190	0 <		1.9	0.95	-0.051293294
SSDP0049	0 <		1.9	0.95	-0.051293294
SSDP0052	0 <		1.9	0.95	-0.051293294
SSDP0056	0 <		1.9	0.95	-0.051293294
SSDP0202	0 <		1.9	0.95	-0.051293294
SSDP0243	0 <		1.9	0.95	-0.051293294
SSDP0248	0 <		1.9	0.95	-0.051293294
SSDP0260	0 <		1.9	0.95	-0.051293294
SSDP0274	0 <		1.9	0.95	-0.051293294

Calculation of 95% UCL, Dog Pen Data, Heptachlor Epoxide

SAMP_ID	CONC	DL_FLAG	DET_LIMIT	Combined Data	Ln(Combined Data)
SSDP0279	0	<	1.9	0.95	-0.051293294
SSDP0259	0.96		1.9	0.96	-0.040821995
LEHR-SS-DP-0145	0	<	2	1	0
SSDP0042	0	<	2	1	0
SSDP0047	0	<	2	1	0
SSDP0058	0	<	2	1	0
SSDP0198	0	<	2	1	0
SSDP0213	0	<	2	1	0
SSDP0214	0	<	2	1	0
SSDP0223	0	<	2	1	0
SSDP0233	0	<	2	1	0
SSDP0265	0	<	2	1	0
SSDP0288	0	<	2	1	0
LEHR-SS-DP-0143	0	<	2.1	1.05	0.048790164
SSDP0203	0	<	2.1	1.05	0.048790164
SSDP0228	0	<	2.1	1.05	0.048790164
SSDP0249	0	<	2.1	1.05	0.048790164
SSDP0281	0	<	2.1	1.05	0.048790164
LEHR-SS-DP-0140	0	<	2.2	1.1	0.09531018
LEHR-SS-DP-0148	0	<	2.2	1.1	0.09531018
LEHR-SS-DP-0189	0	<	2.2	1.1	0.09531018
SSDP0270	0	<	2.2	1.1	0.09531018
SSDP0229	0	<	2.3	1.15	0.139761942
SSDP0239	0	<	2.3	1.15	0.139761942
LEHR-SS-DP-0166	0	<	2.4	1.2	0.182321557
LEHR-SS-DP-0167	0	<	2.4	1.2	0.182321557
LEHR-SS-DP-0168	0	<	2.4	1.2	0.182321557
LEHR-SS-DP-0119	0	<	2.5	1.25	0.223143551
LEHR-SS-DP-0121	0	<	2.5	1.25	0.223143551
LEHR-SS-DP-0179	0	<	2.6	1.3	0.262364264
SSDP0234	1.3		2	1.3	0.262364264
SSDP0192	1.6		2	1.6	0.470003629
LEHR-SS-DP-0125	1.7		2.4	1.7	0.530628251
LEHR-SS-DP-0122	1.8		2.5	1.8	0.587786665
LEHR-SS-DP-0158	0	<	3.6	1.8	0.587786665
LEHR-SS-DP-0124	2.1		2.3	2.1	0.741937345
SSDP0238	2.2		2	2.2	0.78845736
SSDP0286	2.9		1.8	2.9	1.064710737
SSDP0255	3.3		1.9	3.3	1.193922468
LEHR-SS-DP-0151DL1	0	<	8.2	4.1	1.410986974
LEHR-SS-DP-0139	4.3		3.3	4.3	1.458615023
LEHR-SS-DP-0152DL1	0	<	9.7	4.85	1.578978705
SSDP0285	5.5		1.9	5.5	1.704748092
SSDP0264	7.4		2	7.4	2.00148
SSDP0219	9		2.2	9	2.197224577
LEHR-SS-DP-0149DL1	0	<	22.2	11.1	2.406945108
SSDP0218	13.4		2	13.4	2.595254707
LEHR-SS-DP-0147DL1	0	<	33.7	16.85	2.824350657
LEHR-SS-DP-0141	0	<	79.4	39.7	3.681351188
LEHR-SS-DP-0133	0	<	79.7	39.85	3.685122405
				n	117
				mean	0.212579095
				Stdev	0.763924998
				H	2.007943748
				95 UCL (ug/Kg)	1.91

Interpolation			
Stdev	0.7	0.763924998	0.8
H	1.96	2.007943748	2.035

Calculation of 95% UCL, Dog Pen Data, Gamma Chlordane

SAMP_ID	SP_ID	CONC	Ln(Data)	DET_LIMIT
LEHR-SS-DP-0117	97DogPens	1.5	0.405465108	1.8
LEHR-SS-DP-0118	97DogPens	1.2	0.182321557	1.8
LEHR-SS-DP-0119	97DogPens	1.6	0.470003629	2.5
LEHR-SS-DP-0120	97DogPens	3	1.098612289	1.8
LEHR-SS-DP-0121	97DogPens	1.7	0.530628251	2.5
LEHR-SS-DP-0122	97DogPens	16.1	2.778819272	2.5
LEHR-SS-DP-0125	97DogPens	16.1	2.778819272	2.4
LEHR-SS-DP-0126DL1	97DogPens	50.8	3.927896355	8.5
LEHR-SS-DP-0127DL1	97DogPens	53.7	3.983413002	8.6
LEHR-SS-DP-0128	97DogPens	12	2.48490665	1.7
LEHR-SS-DP-0129	97DogPens	13	2.564949357	1.6
LEHR-SS-DP-0130	97DogPens	17	2.833213344	1.7
LEHR-SS-DP-0131	97DogPens	3.4	1.223775432	1.6
LEHR-SS-DP-0132	97DogPens	1.8	0.587786665	1.7
LEHR-SS-DP-0133	97DogPens	429	6.061456919	79.7
LEHR-SS-DP-0135	97DogPens	3.8	1.335001067	1.5
LEHR-SS-DP-0136	97DogPens	1.8	0.587786665	1.6
LEHR-SS-DP-0137	97DogPens	8.2	2.104134154	1.5
LEHR-SS-DP-0138	97DogPens	11	2.397895273	1.6
LEHR-SS-DP-0139	97DogPens	37.1	3.61361697	3.3
LEHR-SS-DP-0140	97DogPens	30.2	3.407841924	2.2
LEHR-SS-DP-0141	97DogPens	976	6.883462586	79.4
LEHR-SS-DP-0142	97DogPens	1.3	0.262364264	1.7
LEHR-SS-DP-0143	97DogPens	7.4	2.00148	2.1
LEHR-SS-DP-0144	97DogPens	6.6	1.887069649	1.6
LEHR-SS-DP-0145	97DogPens	12	2.48490665	2
LEHR-SS-DP-0146	97DogPens	15.6	2.747270914	1.7
LEHR-SS-DP-0147DL1	97DogPens	260	5.560681631	33.7
LEHR-SS-DP-0148	97DogPens	3.8	1.335001067	2.2
LEHR-SS-DP-0149DL1	97DogPens	136	4.912654886	22.2
LEHR-SS-DP-0150	97DogPens	9.8	2.282382386	1.6
LEHR-SS-DP-0151DL1	97DogPens	98.4	4.589040804	8.2
LEHR-SS-DP-0152DL1	97DogPens	103	4.634728988	9.7
LEHR-SS-DP-0153	97DogPens	4.6	1.526056303	1.8
LEHR-SS-DP-0154	97DogPens	6.8	1.916922612	1.8
LEHR-SS-DP-0155	97DogPens	17.9	2.884800713	1.8
LEHR-SS-DP-0156	97DogPens	16.5	2.803360381	1.7
LEHR-SS-DP-0157	97DogPens	0.65	-0.43078292	1.8
LEHR-SS-DP-0158	97DogPens	26.1	3.261935314	3.6
LEHR-SS-DP-0159	97DogPens	10.4	2.341805806	1.8
LEHR-SS-DP-0160	97DogPens	21	3.044522438	1.7
LEHR-SS-DP-0161DL1	97DogPens	57.8	4.056988776	8.4
LEHR-SS-DP-0162	97DogPens	3.6	1.280933845	1.8
LEHR-SS-DP-0163	97DogPens	4.5	1.504077397	1.7
LEHR-SS-DP-0164	97DogPens	12.2	2.501435952	1.8
LEHR-SS-DP-0165	97DogPens	2.5	0.916290732	1.9
LEHR-SS-DP-0166	97DogPens	1.7	0.530628251	2.4
LEHR-SS-DP-0167	97DogPens	27.5	3.314186005	2.4
LEHR-SS-DP-0168	97DogPens	35.2	3.561046083	2.4
LEHR-SS-DP-0168DL1	97DogPens	39.5	3.676300672	4.9
LEHR-SS-DP-0169	97DogPens	5.4	1.686398954	1.9
LEHR-SS-DP-0170	97DogPens	0	-0.05129329	1.9
LEHR-SS-DP-0171DL1	97DogPens	71.2	4.265492818	9.3
LEHR-SS-DP-0172DL1	97DogPens	62.5	4.135166557	9.3
LEHR-SS-DP-0173	97DogPens	24.8	3.210843653	1.9
LEHR-SS-DP-0174	97DogPens	8.1	2.091864062	1.8
LEHR-SS-DP-0175	97DogPens	9	2.197224577	1.9
LEHR-SS-DP-0176	97DogPens	5.5	1.704748092	1.9
LEHR-SS-DP-0177	97DogPens	4.5	1.504077397	1.8
LEHR-SS-DP-0178DL1	97DogPens	148	4.997212274	17.6
LEHR-SS-DP-0179DL1	97DogPens	78.1	4.357990057	10.5
LEHR-SS-DP-0181	97DogPens	10.1	2.312535424	1.8
LEHR-SS-DP-0182DL1	97DogPens	44.5	3.795489189	7.3
LEHR-SS-DP-0183DL1	97DogPens	142	4.955827058	17.2

Calculation of 95% UCL, Dog Pen Data, Gamma Chlordane

SAMP_ID	SP_ID	CONC	Ln(Data)	DET_LIMIT
LEHR-SS-DP-0184	97DogPens	16.6	2.809402695	1.9
LEHR-SS-DP-0185	97DogPens	14.2	2.653241965	1.8
LEHR-SS-DP-0187	97DogPens	13.5	2.602689685	1.8
LEHR-SS-DP-0188DL1	97DogPens	40.9	3.711130063	3.5
LEHR-SS-DP-0189	97DogPens	1.8	0.587786665	2.2
LEHR-SS-DP-0190	97DogPens	5.3	1.667706821	1.9
LEHR-SS-DP-0191	97DogPens	3.8	1.335001067	1.8
SSDP0003	DOGPN94	0	-0.05129329	1.9
SSDP0006	DOGPN94	0	0	2
SSDP0009	DOGPN94	0	-0.10536052	1.8
SSDP0012	DOGPN94	0	0	2
SSDP0015	DOGPN94	0	-0.10536052	1.8
SSDP0018	DOGPN94	0	0.09531018	2.2
SSDP0019	DOGPN94	0	0	2
SSDP0021	DOGPN94	0	-0.05129329	1.9
SSDP0025	DOGPN94	0	0	2
SSDP0028	DOGPN94	0	0	2
SSDP0029	DOGPN94	0	0	2
SSDP0031	DOGPN94	0	0	2
SSDP0034	DOGPN94	0	0.048790164	2.1
SSDP0037	DOGPN94	0	0.048790164	2.1
SSDP0040	DOGPN94	0	0.09531018	2.2
SSDP0042	DOGPN94	57	4.043051268	9.8
SSDP0043	DOGPN94	0	-0.16251893	1.7
SSDP0045	DOGPN94	2.4	0.875468737	1.8
SSDP0046	DOGPN94	0	0.09531018	2.2
SSDP0047	DOGPN94	100	4.605170186	10
SSDP0049	DOGPN94	37	3.610917913	9.3
SSDP0050	DOGPN94	0	0	2
SSDP0052	DOGPN94	0	-0.05129329	1.9
SSDP0054	DOGPN94	0	0	2
SSDP0055	DOGPN94	0	-0.10536052	1.8
SSDP0056	DOGPN94	0	-0.05129329	1.9
SSDP0058	DOGPN94	0	0	2
SSDP0059	DOGPN94	0	-0.05129329	1.9
SSDP0061	DOGPN94	0	-0.10536052	1.8
SSDP0062	DOGPN94	0	-0.05129329	1.9
SSDP0064	DOGPN94	0	0	2
SSDP0065	DOGPN94	0	0.048790164	2.1
SSDP0068	DOGPN94	260	5.560681631	1.8
SSDP0069	DOGPN94	0	-0.10536052	1.8
SSDP0192	98DogPens	14.3	2.660259537	2
SSDP0193	98DogPens	0	-0.10536052	1.8
SSDP0194	98DogPens	0	0	2
SSDP0195	98DogPens	0	0	2
SSDP0196	98DogPens	0	0	2
SSDP0197	98DogPens	6.1	1.808288771	1.8
SSDP0198	98DogPens	0	0	2
SSDP0199	98DogPens	0	0	2
SSDP0200	98DogPens	0	-0.05129329	1.9
SSDP0201	98DogPens	0	0.048790164	2.1
SSDP0202	98DogPens	1.3	0.262364264	1.9
SSDP0203	98DogPens	0	0.048790164	2.1
SSDP0204	98DogPens	0	0	2
SSDP0205	98DogPens	0	0	2
SSDP0207	98DogPens	0	0	2
SSDP0208	98DogPens	6.5	1.871802177	2
SSDP0209	98DogPens	12.4	2.517696473	1.8
SSDP0210	98DogPens	0	0	2
SSDP0211	98DogPens	0	0.048790164	2.1
SSDP0212	98DogPens	0	0.048790164	2.1
SSDP0213	98DogPens	14.8	2.694627181	2
SSDP0214	98DogPens	0	0	2
SSDP0215	98DogPens	0	0	2

Calculation of 95% UCL, Dog Pen Data, Gamma Chlordane

SAMP_ID	SP_ID	CONC	Ln(Data)	DET_LIMIT
SSDP0216	98DogPens	0	0	2
SSDP0217	98DogPens	0	0	2
SSDP0219	98DogPens	3.3	1.193922468	2.2
SSDP0220	98DogPens	0	0	2
SSDP0221	98DogPens	0	0	2
SSDP0222	98DogPens	0	-0.05129329	1.9
SSDP0223	98DogPens	6.6	1.887069649	2
SSDP0224	98DogPens	0.84	-0.17435339	2
SSDP0225	98DogPens	0	0	2
SSDP0227	98DogPens	0	0	2
SSDP0228	98DogPens	0	0.048790164	2.1
SSDP0229	98DogPens	0	0.139761942	2.3
SSDP0230	98DogPens	0	0	2
SSDP0231	98DogPens	0	-0.05129329	1.9
SSDP0232	98DogPens	0	0	2
SSDP0233	98DogPens	0.5	-0.69314718	2
SSDP0234	98DogPens	26.7	3.284663565	2
SSDP0235	98DogPens	0	0	2
SSDP0236	98DogPens	0	0	2
SSDP0237	98DogPens	0	0.048790164	2.1
SSDP0238	98DogPens	3.2	1.16315081	2
SSDP0239	98DogPens	0	0.139761942	2.3
SSDP0240	98DogPens	0	0	2
SSDP0241	98DogPens	0	0	2
SSDP0242	98DogPens	0	0.048790164	2.1
SSDP0243	98DogPens	0.39	-0.94160854	1.9
SSDP0244	98DogPens	0	-0.10536052	1.8
SSDP0245	98DogPens	0	0	2
SSDP0246	98DogPens	0	0	2
SSDP0247	98DogPens	0	0	2
SSDP0248	98DogPens	1.6	0.470003629	1.9
SSDP0249	98DogPens	0	0.048790164	2.1
SSDP0250	98DogPens	0	0	2
SSDP0252	98DogPens	0	0	2
SSDP0253	98DogPens	0	0	2
SSDP0254	98DogPens	7.3	1.987874348	2
SSDP0256	98DogPens	0	0	2
SSDP0257	98DogPens	0	0	2
SSDP0258	98DogPens	0	0	2
SSDP0259	98DogPens	8.2	2.104134154	1.9
SSDP0260	98DogPens	0	-0.05129329	1.9
SSDP0261	98DogPens	0	0	2
SSDP0262	98DogPens	0	0	2
SSDP0263	98DogPens	0	0	2
SSDP0264DL1	98DogPens	100	4.605170186	20.3
SSDP0265	98DogPens	0	0	2
SSDP0266	98DogPens	0	0	2
SSDP0267	98DogPens	0	0	2
SSDP0268	98DogPens	0	0	2
SSDP0270	98DogPens	13.9	2.63188884	2.2
SSDP0271	98DogPens	0.3	-1.2039728	2
SSDP0272	98DogPens	0	0	2
SSDP0273	98DogPens	0	0.048790164	2.1
SSDP0274	98DogPens	20	2.995732274	1.9
SSDP0275	98DogPens	1.4	0.336472237	1.7
SSDP0276	98DogPens	0	0	2
SSDP0277	98DogPens	0	0	2
SSDP0278	98DogPens	0	0	2
SSDP0279	98DogPens	2.7	0.993251773	1.9
SSDP0281	98DogPens	1.1	0.09531018	2.1
SSDP0283	98DogPens	0	-0.05129329	1.9
SSDP0284	98DogPens	0	0	2
SSDP0285DL1	98DogPens	401	5.993961427	38.8
SSDP0286DL1	98DogPens	76.5	4.337290741	9

Calculation of 95% UCL, Dog Pen Data, Gamma Chlordane

SAMP_ID	SP_ID	CONC	Ln(Data)	DET_LIMIT
SSDP0287DL1	98DogPens	37.5	3.624340933	7.3
SSDP0288	98DogPens	0	0	2
SSDP0289	98DogPens	0	0.048790164	2.1
SSDP0290	98DogPens	0	0	2
SSDP0291	98DogPens	0	0	2
SSDP0292	98DogPens	2.4	0.875468737	1.8
SSDP0293	98DogPens	0.32	-1.13943428	1.8
SSDP0294	98DogPens	0	0	2
SSDP0295	98DogPens	0.39	-0.94160854	2
SSDP0297	98DogPens	0.78	-0.24846136	1.9
		n	202	
		mean	1.206155133	
		Stdev	1.69331026	
		H	2.932600455	
		95 UCL (ug/Kg)	19.89	

Interpolation			
Stdev	1.5	1.69331026	1.75
H	2.713	2.932600455	2.997

Calculation of 95% UCL, Dog Pen Data, Alpha Chlordane

SAMP_ID	SP_ID	CONC	Ln(Data)	DET_LIMIT
LEHR-SS-DP-0117	97DogPens	1.4	0.33647	1.8
LEHR-SS-DP-0118	97DogPens	0.71	-0.3425	1.8
LEHR-SS-DP-0119	97DogPens	2.3	0.83291	2.5
LEHR-SS-DP-0120	97DogPens	3.5	1.25276	1.8
LEHR-SS-DP-0121	97DogPens	2.4	0.87547	2.5
LEHR-SS-DP-0122	97DogPens	18.4	2.91235	2.5
LEHR-SS-DP-0125	97DogPens	15.2	2.7213	2.4
LEHR-SS-DP-0126DL1	97DogPens	55.1	4.00915	8.5
LEHR-SS-DP-0127DL1	97DogPens	56.6	4.03601	8.6
LEHR-SS-DP-0128	97DogPens	7.6	2.02815	1.7
LEHR-SS-DP-0129	97DogPens	8.6	2.15176	1.6
LEHR-SS-DP-0130	97DogPens	18.4	2.91235	1.7
LEHR-SS-DP-0131	97DogPens	4.1	1.41099	1.6
LEHR-SS-DP-0132	97DogPens	0.67	-0.4005	1.7
LEHR-SS-DP-0133	97DogPens	339	5.826	79.7
LEHR-SS-DP-0135	97DogPens	1.5	0.40547	1.5
LEHR-SS-DP-0136	97DogPens	0	-0.2231	1.6
LEHR-SS-DP-0137	97DogPens	4.4	1.4816	1.5
LEHR-SS-DP-0138	97DogPens	11	2.3979	1.6
LEHR-SS-DP-0139	97DogPens	41.7	3.7305	3.3
LEHR-SS-DP-0140	97DogPens	27.1	3.29953	2.2
LEHR-SS-DP-0141	97DogPens	1210	7.09838	79.4
LEHR-SS-DP-0142	97DogPens	1.2	0.18232	1.7
LEHR-SS-DP-0143	97DogPens	6	1.79176	2.1
LEHR-SS-DP-0144	97DogPens	3	1.09861	1.6
LEHR-SS-DP-0145	97DogPens	7	1.94591	2
LEHR-SS-DP-0146	97DogPens	13.5	2.60269	1.7
LEHR-SS-DP-0147DL1	97DogPens	229	5.43372	33.7
LEHR-SS-DP-0148	97DogPens	3.5	1.25276	2.2
LEHR-SS-DP-0149DL1	97DogPens	134	4.89784	22.2
LEHR-SS-DP-0150	97DogPens	10.8	2.37955	1.6
LEHR-SS-DP-0151DL1	97DogPens	115	4.74493	8.2
LEHR-SS-DP-0152DL1	97DogPens	122	4.80402	9.7
LEHR-SS-DP-0153	97DogPens	4.9	1.58924	1.8
LEHR-SS-DP-0154	97DogPens	8	2.07944	1.8
LEHR-SS-DP-0155	97DogPens	20.5	3.02042	1.8
LEHR-SS-DP-0156	97DogPens	18.3	2.9069	1.7
LEHR-SS-DP-0157	97DogPens	0.72	-0.3285	1.8
LEHR-SS-DP-0158	97DogPens	31.7	3.45632	3.6
LEHR-SS-DP-0159	97DogPens	11.9	2.47654	1.8
LEHR-SS-DP-0160	97DogPens	25.1	3.22287	1.7
LEHR-SS-DP-0161DL1	97DogPens	67.6	4.21361	8.4
LEHR-SS-DP-0162	97DogPens	3.2	1.16315	1.8
LEHR-SS-DP-0163	97DogPens	5.8	1.75786	1.7
LEHR-SS-DP-0164	97DogPens	14.3	2.66026	1.8
LEHR-SS-DP-0165	97DogPens	3.4	1.22378	1.9
LEHR-SS-DP-0166	97DogPens	2.6	0.95551	2.4
LEHR-SS-DP-0167	97DogPens	26.2	3.26576	2.4
LEHR-SS-DP-0168DL1	97DogPens	44	3.78419	4.9
LEHR-SS-DP-0169	97DogPens	6.6	1.88707	1.9
LEHR-SS-DP-0170	97DogPens	0	-0.0513	1.9
LEHR-SS-DP-0171DL1	97DogPens	65.7	4.1851	9.3
LEHR-SS-DP-0172DL1	97DogPens	62.1	4.12875	9.3
LEHR-SS-DP-0173	97DogPens	26.3	3.26957	1.9
LEHR-SS-DP-0174	97DogPens	8.6	2.15176	1.8
LEHR-SS-DP-0175	97DogPens	9.2	2.2192	1.9
LEHR-SS-DP-0176	97DogPens	6.7	1.90211	1.9
LEHR-SS-DP-0177	97DogPens	6.2	1.82455	1.8
LEHR-SS-DP-0178DL1	97DogPens	156	5.04986	17.6
LEHR-SS-DP-0179DL1	97DogPens	99.3	4.59815	10.5
LEHR-SS-DP-0181	97DogPens	12.5	2.52573	1.8
LEHR-SS-DP-0182DL1	97DogPens	51.1	3.93378	7.3
LEHR-SS-DP-0183DL1	97DogPens	148	4.99721	17.2
LEHR-SS-DP-0184	97DogPens	16.9	2.82731	1.9

Calculation of 95% UCL, Dog Pen Data, Alpha Chlordane

SAMP_ID	SP_ID	CONC	Ln(Data)	DET_LIMIT
LEHR-SS-DP-0185	97DogPens	17.8	2.8792	1.8
LEHR-SS-DP-0187	97DogPens	15.5	2.74084	1.8
LEHR-SS-DP-0188DL1	97DogPens	45.1	3.80888	3.5
LEHR-SS-DP-0189	97DogPens	1.5	0.40547	2.2
LEHR-SS-DP-0190	97DogPens	6.7	1.90211	1.9
LEHR-SS-DP-0191	97DogPens	2.9	1.06471	1.8
SSDP0003	DOGPN94	0	-0.0513	1.9
SSDP0006	DOGPN94	0	0	2
SSDP0009	DOGPN94	0	-0.1054	1.8
SSDP0012	DOGPN94	0	0	2
SSDP0015	DOGPN94	0	-0.1054	1.8
SSDP0018	DOGPN94	0	0.09531	2.2
SSDP0019	DOGPN94	0	0	2
SSDP0021	DOGPN94	0	-0.0513	1.9
SSDP0025	DOGPN94	0	0	2
SSDP0028	DOGPN94	0	0	2
SSDP0029	DOGPN94	0	0	2
SSDP0031	DOGPN94	0	0	2
SSDP0034	DOGPN94	0	0.04879	2.1
SSDP0037	DOGPN94	0	0.04879	2.1
SSDP0040	DOGPN94	0	0.09531	2.2
SSDP0042	DOGPN94	53	3.97029	9.8
SSDP0043	DOGPN94	0	-0.1625	1.7
SSDP0045	DOGPN94	2.5	0.91629	1.8
SSDP0046	DOGPN94	0	0.09531	2.2
SSDP0047	DOGPN94	94	4.54329	10
SSDP0049	DOGPN94	40	3.68888	9.3
SSDP0050	DOGPN94	0	0	2
SSDP0052	DOGPN94	0	-0.0513	1.9
SSDP0054	DOGPN94	0	0	2
SSDP0055	DOGPN94	0	-0.1054	1.8
SSDP0056	DOGPN94	0	-0.0513	1.9
SSDP0058	DOGPN94	0	0	2
SSDP0059	DOGPN94	0	-0.0513	1.9
SSDP0061	DOGPN94	0	-0.1054	1.8
SSDP0062	DOGPN94	0	-0.0513	1.9
SSDP0064	DOGPN94	0	0	2
SSDP0065	DOGPN94	0	0.04879	2.1
SSDP0068	DOGPN94	230	5.43808	1.8
SSDP0069	DOGPN94	0	-0.1054	1.8
SSDP0192	98DogPens	14.8	2.69463	2
SSDP0193	98DogPens	0	-0.1054	1.8
SSDP0194	98DogPens	0	0	2
SSDP0195	98DogPens	0	0	2
SSDP0196	98DogPens	0	0	2
SSDP0197	98DogPens	5.6	1.72277	1.8
SSDP0198	98DogPens	0	0	2
SSDP0199	98DogPens	0	0	2
SSDP0200	98DogPens	0	-0.0513	1.9
SSDP0201	98DogPens	0	0.04879	2.1
SSDP0202	98DogPens	0.96	-0.0408	1.9
SSDP0203	98DogPens	0	0.04879	2.1
SSDP0204	98DogPens	0	0	2
SSDP0206	98DogPens	0	0	2
SSDP0207	98DogPens	0	0	2
SSDP0208	98DogPens	7.2	1.97408	2
SSDP0209	98DogPens	13.7	2.6174	1.8
SSDP0210	98DogPens	0	0	2
SSDP0211	98DogPens	0	0.04879	2.1
SSDP0212	98DogPens	0	0.04879	2.1
SSDP0213	98DogPens	15	2.70805	2
SSDP0214	98DogPens	0	0	2
SSDP0215	98DogPens	0	0	2
SSDP0216	98DogPens	0	0	2

Calculation of 95% UCL, Dog Pen Data, Alpha Chlordane

SAMP_ID	SP_ID	CONC	Ln(Data)	DET_LIMIT
SSDP0217	98DogPens	0	0	2
SSDP0219	98DogPens	6.5	1.8718	2.2
SSDP0220	98DogPens	0	0	2
SSDP0221	98DogPens	0	0	2
SSDP0222	98DogPens	0	-0.0513	1.9
SSDP0223	98DogPens	8.1	2.09186	2
SSDP0224	98DogPens	1.2	0.18232	2
SSDP0225	98DogPens	0	0	2
SSDP0227	98DogPens	0	0	2
SSDP0228	98DogPens	0	0.04879	2.1
SSDP0229	98DogPens	0	0.13976	2.3
SSDP0230	98DogPens	0	0	2
SSDP0231	98DogPens	0	-0.0513	1.9
SSDP0232	98DogPens	0	0	2
SSDP0233	98DogPens	0.55	-0.5978	2
SSDP0234	98DogPens	25.2	3.22684	2
SSDP0235	98DogPens	0	0	2
SSDP0236	98DogPens	0	0	2
SSDP0237	98DogPens	0	0.04879	2.1
SSDP0238	98DogPens	3.7	1.30833	2
SSDP0239	98DogPens	0	0.13976	2.3
SSDP0240	98DogPens	0	0	2
SSDP0241	98DogPens	0	0	2
SSDP0242	98DogPens	0	0.04879	2.1
SSDP0243	98DogPens	0.88	-0.1278	1.9
SSDP0244	98DogPens	0	-0.1054	1.8
SSDP0245	98DogPens	0	0	2
SSDP0246	98DogPens	0	0	2
SSDP0247	98DogPens	0	0	2
SSDP0248	98DogPens	2.5	0.91629	1.9
SSDP0249	98DogPens	0	0.04879	2.1
SSDP0250	98DogPens	0	0	2
SSDP0252	98DogPens	0	0	2
SSDP0253	98DogPens	0	0	2
SSDP0254	98DogPens	6.5	1.8718	2
SSDP0256	98DogPens	0	0	2
SSDP0257	98DogPens	0	0	2
SSDP0258	98DogPens	0	0	2
SSDP0259	98DogPens	7.1	1.96009	1.9
SSDP0260	98DogPens	0	-0.0513	1.9
SSDP0261	98DogPens	0	0	2
SSDP0262	98DogPens	0	0	2
SSDP0263	98DogPens	0	0	2
SSDP0264DL1	98DogPens	100	4.60517	20.3
SSDP0265	98DogPens	0	0	2
SSDP0266	98DogPens	0	0	2
SSDP0267	98DogPens	0	0	2
SSDP0268	98DogPens	0	0	2
SSDP0270	98DogPens	18.8	2.93386	2.2
SSDP0271	98DogPens	0.47	-0.755	2
SSDP0272	98DogPens	0	0	2
SSDP0273	98DogPens	0	0.04879	2.1
SSDP0274	98DogPens	18.4	2.91235	1.9
SSDP0275	98DogPens	1.4	0.33647	1.7
SSDP0276	98DogPens	0	0	2
SSDP0277	98DogPens	0	0	2
SSDP0278	98DogPens	0	0	2
SSDP0279	98DogPens	2.7	0.99325	1.9
SSDP0281	98DogPens	1	0	2.1
SSDP0283	98DogPens	0	-0.0513	1.9
SSDP0284	98DogPens	0.38	-0.9676	2
SSDP0285DL1	98DogPens	410	6.01616	38.8
SSDP0286DL1	98DogPens	83.6	4.42604	9
SSDP0287DL1	98DogPens	45.6	3.81991	7.3

Calculation of 95% UCL, Dog Pen Data, Alpha Chlordane

SAMP_ID	SP_ID	CONC	Ln(Data)	DET_LIMIT
SSDP0288	98DogPens	0.6	-0.5108	2
SSDP0289	98DogPens	0	0.04879	2.1
SSDP0290	98DogPens	0	0	2
SSDP0291	98DogPens	0	0	2
SSDP0292	98DogPens	3.5	1.25276	1.8
SSDP0293	98DogPens	0.67	-0.4005	1.8
SSDP0294	98DogPens	0	0	2
SSDP0295	98DogPens	0.49	-0.7133	2
SSDP0297	98DogPens	0.71	-0.3425	1.9
		n	201	
		mean	1.2033	
		Stdev	1.70533	
		H	2.94625	
		95 UCL (ug/Kg)	20.34	

Interpolation			
Stdev	1.5	1.70533	1.75
H	2.713	2.94625	2.997

Calculation of 95% UCL, Dog Pen Data, Alpha BHC

SAMP_ID	SP_ID	CONC	_FLA	DET_LIMIT	Combined Data	Ln(Combined Data)
LEHR-SS-DP-0121	97DogPens	0.37		2.5	0.37	-0.994252273
LEHR-SS-DP-0135	97DogPens	0 <		1.5	0.75	-0.287682072
LEHR-SS-DP-0137	97DogPens	0 <		1.5	0.75	-0.287682072
LEHR-SS-DP-0172	97DogPens	0.75		1.9	0.75	-0.287682072
LEHR-SS-DP-0129	97DogPens	0 <		1.6	0.8	-0.223143551
LEHR-SS-DP-0131	97DogPens	0 <		1.6	0.8	-0.223143551
LEHR-SS-DP-0134	97DogPens	0 <		1.6	0.8	-0.223143551
LEHR-SS-DP-0136	97DogPens	0 <		1.6	0.8	-0.223143551
LEHR-SS-DP-0138	97DogPens	0 <		1.6	0.8	-0.223143551
LEHR-SS-DP-0144	97DogPens	0 <		1.6	0.8	-0.223143551
LEHR-SS-DP-0150	97DogPens	0 <		1.6	0.8	-0.223143551
LEHR-SS-DP-0126	97DogPens	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0128	97DogPens	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0130	97DogPens	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0132	97DogPens	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0142	97DogPens	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0146	97DogPens	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0147	97DogPens	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0156	97DogPens	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0160	97DogPens	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0161	97DogPens	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0163	97DogPens	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0183	97DogPens	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0188	97DogPens	0 <		1.7	0.85	-0.162518929
SSDP0275	98DogPens	0 <		1.7	0.85	-0.162518929
LEHR-SS-DP-0117	97DogPens	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0118	97DogPens	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0120	97DogPens	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0153	97DogPens	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0154	97DogPens	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0155	97DogPens	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0157	97DogPens	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0159	97DogPens	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0162	97DogPens	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0164	97DogPens	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0174	97DogPens	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0177	97DogPens	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0178	97DogPens	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0181	97DogPens	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0182	97DogPens	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0187	97DogPens	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0191	97DogPens	0 <		1.8	0.9	-0.105360516
SSDP0045	DOGPN94	0 <		1.8	0.9	-0.105360516
SSDP0068	DOGPN94	0 <		1.8	0.9	-0.105360516
SSDP0193	98DogPens	0 <		1.8	0.9	-0.105360516
SSDP0197	98DogPens	0 <		1.8	0.9	-0.105360516
SSDP0209	98DogPens	0 <		1.8	0.9	-0.105360516
SSDP0244	98DogPens	0 <		1.8	0.9	-0.105360516
SSDP0286	98DogPens	0 <		1.8	0.9	-0.105360516
SSDP0287	98DogPens	0 <		1.8	0.9	-0.105360516
SSDP0292	98DogPens	0 <		1.8	0.9	-0.105360516
SSDP0293	98DogPens	0 <		1.8	0.9	-0.105360516
LEHR-SS-DP-0165	97DogPens	0 <		1.9	0.95	-0.051293294
LEHR-SS-DP-0169	97DogPens	0 <		1.9	0.95	-0.051293294
LEHR-SS-DP-0170	97DogPens	0 <		1.9	0.95	-0.051293294
LEHR-SS-DP-0173	97DogPens	0 <		1.9	0.95	-0.051293294
LEHR-SS-DP-0175	97DogPens	0 <		1.9	0.95	-0.051293294
LEHR-SS-DP-0176	97DogPens	0 <		1.9	0.95	-0.051293294
LEHR-SS-DP-0190	97DogPens	0 <		1.9	0.95	-0.051293294
SSDP0049	DOGPN94	0 <		1.9	0.95	-0.051293294
SSDP0056	DOGPN94	0 <		1.9	0.95	-0.051293294
SSDP0202	98DogPens	0 <		1.9	0.95	-0.051293294
SSDP0243	98DogPens	0 <		1.9	0.95	-0.051293294
SSDP0248	98DogPens	0 <		1.9	0.95	-0.051293294

Calculation of 95% UCL, Dog Pen Data, Alpha BHC

SAMP_ID	SP_ID	CONC	_FLA	DET_LIMIT	Combined Data	Ln(Combined Data)
SSDP0255	98DogPens	0	<	1.9	0.95	-0.051293294
SSDP0259	98DogPens	0	<	1.9	0.95	-0.051293294
SSDP0260	98DogPens	0	<	1.9	0.95	-0.051293294
SSDP0274	98DogPens	0	<	1.9	0.95	-0.051293294
SSDP0279	98DogPens	0	<	1.9	0.95	-0.051293294
SSDP0285	98DogPens	0	<	1.9	0.95	-0.051293294
LEHR-SS-DP-0145	97DogPens	0	<	2	1	0
SSDP0042	DOGPN94	0	<	2	1	0
SSDP0047	DOGPN94	0	<	2	1	0
SSDP0058	DOGPN94	0	<	2	1	0
SSDP0192	98DogPens	0	<	2	1	0
SSDP0198	98DogPens	0	<	2	1	0
SSDP0208	98DogPens	0	<	2	1	0
SSDP0213	98DogPens	0	<	2	1	0
SSDP0214	98DogPens	0	<	2	1	0
SSDP0218	98DogPens	0	<	2	1	0
SSDP0223	98DogPens	0	<	2	1	0
SSDP0224	98DogPens	0	<	2	1	0
SSDP0233	98DogPens	0	<	2	1	0
SSDP0234	98DogPens	0	<	2	1	0
SSDP0238	98DogPens	0	<	2	1	0
SSDP0254	98DogPens	0	<	2	1	0
SSDP0264	98DogPens	0	<	2	1	0
SSDP0265	98DogPens	0	<	2	1	0
SSDP0288	98DogPens	0	<	2	1	0
LEHR-SS-DP-0143	97DogPens	0	<	2.1	1.05	0.048790164
SSDP0203	98DogPens	0	<	2.1	1.05	0.048790164
SSDP0228	98DogPens	0	<	2.1	1.05	0.048790164
SSDP0249	98DogPens	0	<	2.1	1.05	0.048790164
SSDP0281	98DogPens	0	<	2.1	1.05	0.048790164
LEHR-SS-DP-0140	97DogPens	0	<	2.2	1.1	0.09531018
LEHR-SS-DP-0148	97DogPens	0	<	2.2	1.1	0.09531018
LEHR-SS-DP-0189	97DogPens	0	<	2.2	1.1	0.09531018
SSDP0219	98DogPens	0	<	2.2	1.1	0.09531018
SSDP0270	98DogPens	0	<	2.2	1.1	0.09531018
LEHR-SS-DP-0124	97DogPens	0	<	2.3	1.15	0.139761942
SSDP0229	98DogPens	0	<	2.3	1.15	0.139761942
SSDP0239	98DogPens	0	<	2.3	1.15	0.139761942
LEHR-SS-DP-0125	97DogPens	0	<	2.4	1.2	0.182321557
LEHR-SS-DP-0166	97DogPens	0	<	2.4	1.2	0.182321557
LEHR-SS-DP-0167	97DogPens	0	<	2.4	1.2	0.182321557
LEHR-SS-DP-0168	97DogPens	0	<	2.4	1.2	0.182321557
LEHR-SS-DP-0119	97DogPens	0	<	2.5	1.25	0.223143551
LEHR-SS-DP-0122	97DogPens	0	<	2.5	1.25	0.223143551
LEHR-SS-DP-0179	97DogPens	0	<	2.6	1.3	0.262364264
LEHR-SS-DP-0139	97DogPens	0	<	3.3	1.65	0.500775288
LEHR-SS-DP-0158	97DogPens	0	<	3.6	1.8	0.587786665
LEHR-SS-DP-0151DL1	97DogPens	0	<	8.2	4.1	1.410986974
LEHR-SS-DP-0152DL1	97DogPens	0	<	9.7	4.85	1.578978705
SSDP0052	DOGPN94	11		1.9	11	2.397895273
LEHR-SS-DP-0149DL1	97DogPens	0	<	22.2	11.1	2.406945108
LEHR-SS-DP-0147DL1	97DogPens	0	<	33.7	16.85	2.824350657
LEHR-SS-DP-0141	97DogPens	0	<	79.4	39.7	3.681351188
LEHR-SS-DP-0133	97DogPens	0	<	79.7	39.85	3.685122405
					n	118
					mean	0.103299456
					Stdev	0.674273441
					H	1.942248674
					95 UCL (ug/Kg)	1.57

Interpolation			
Stdev	0.6	0.674273441	0.7
H	1.891	1.942248674	1.96