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Human Health and Ecological Evaluation for Confirmation Sampling at the 489-D Coal Pile Runoff Basin (U)

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EXECUTIVE SUMMARY

A total of 23 confirmation sample results were evaluated to demonstrate that the coal has been successfully removed from the 489-D Coal Pile Runoff Basin and the remaining soils are below human health and ecological risk-based threshold levels. Twenty-four metals, six radionuclides and one organic compound were analyzed and evaluated. The residual concentrations of all of these analytes met the pre-established cleanup levels documented in the *Confirmation Sampling and Analysis Plan for Coal and/or Ash Removal at the Savannah River Site* for unrestricted land use.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

LIST OF ABREVIATIONS AND ACRONYMS

BAL	Brooks Applied Laboratories
COC	constituent of concern
COPC	constituent of potential concern
CRPB	Coal Pile Runoff Basin
ECO	ecological
FSP	field sampling plan
GEL	General Engineering Laboratories
HH	human health
IC-ICP-MS	ion chromatography-inductively coupled plasma-mass spectrometry
LANL	Los Alamos National Laboratory
mg/kg	milligram per kilogram
ND	nondetect
pCi/g	picocuries per gram
PRG	preliminary remediation goal
QA	quality assurance
QC	quality control
RCOC	refined constituent of concern
RGO	remedial goal option
RSL	regional screening level
RSV	refinement screening value
SAP	sampling and analysis plan
SCDHEC	South Carolina Department of Health and Environmental Control
SRS	Savannah River Site
TCLP	toxicity characteristic leaching procedure
TL	threshold level
UCL	upper confidence limit
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
WSR	Wilcoxon Signed Rank
WSRC	Washington Savannah River Company LLC (October 2005-present)
yd^3	cubic yard

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1.0 INTRODUCTION

The purpose of this document is to provide an evaluation of the confirmation sampling results from the 489-D Coal Pile Runoff Basin (CPRB) as a means of validation that the coal fines have been successfully removed. The confirmation sampling was conducted in accordance with the *Confirmation Sampling and Analysis Plan* (SAP) *for Coal and/or Ash Removal at the Savannah River Site* (SRS) (SRNS 2014) and the *Field Sampling Plan* (FSP) *for the 489-D Coal Pile Runoff Basin (*SRNS 2015).

In addition, a field visit by United States Department of Energy (USDOE), South Carolina Department of Health and Environmental Control (SCDHEC), and United States Environmental Protection Agency (USEPA) personnel was conducted on November 3, 2016. The personnel observed and discussed the construction activities associated with the D-Area Ash Project. This field visit resulted in a request to perform additional sampling to confirm the absence of the coal residue in the areas of previously stockpiled soil/coal fines within the 489-D CPRB. The additional confirmation sample results are included in this evaluation.

Confirmation sample results are used as evidence that the coal residue has been successfully removed. Residual concentrations/activities of selected coal-related hazardous/radioactive constituents in the remaining soils are below the human health (HH) risk-based threshold levels (TLs) identified in the Confirmation SAP document (SRNS 2014). In addition, an ecological (ECO) assessment is presented in this evaluation. The analytical approach and acceptance criteria that are outlined in the Confirmation SAP document for the HH evaluation are also used for the ECO evaluation. This evaluation will be used to support the *Removal Action Report for the 488-1D Ash Basin and 489-D Coal Pile Runoff Basin* currently scheduled to be completed in September 2019. A *Data Usability Report for Confirmation Sampling at the 489-D Coal Pile Runoff Basin* will also be generated upon completion of sampling activities and submitted with the Removal Action Report.

2.0 ANALYTICAL APPROACH

The confirmation sampling data used in this evaluation is provided in Appendix A. The requirement to obtain a total of 11 samples (1 sample per acre) to demonstrate coal residue removal is outlined in the FSP (SRNS 2015). The samples were collected in a progressive fashion on three separate dates (9/22/16, 9/29/16, and 11/02/16) to allow construction activities to proceed. A map of the sampling grid locations is provided in Figure 1. Sample identification numbers that were outlined in the FSP were assigned a different set of numbers to avoid confusion with previous characterization samples with the same prefix (DCRB-xx) as identified below:

Sample Grid Number Assignment	Sampling Grid Station										
FSP DCRB-xx	-01	-02	-03	-04	-05	-06	-07	-08	-09	-10	-11
Confirmation Report DCRB-xx	-56	-57	-58	-59	-60	-61	-62	-63	-64	-65	-66

xx = sampling grid station number

In addition to the 11 confirmation sampling locations collected per the FSP, 12 samples were collected on 11/16/16 at locations where soil/coal fines were previously stockpiled for toxicity characteristic leaching procedure (TCLP) sampling prior to placement in 488-1D Ash Basin. (Note that no samples exceeded TCLP limits, indicating that the waste is non-hazardous. The TCLP results will be presented in the *Removal Action Report for the 488-1D Ash Basin and 489-D Coal Pile Runoff Basin*). The locations of these additional samples in relation to the (removed) stockpiles are shown in Figure 2. The sample identification numbers for these samples are DCRB-67 through DCRB-78.

Based on a screening evaluation of the preliminary sample results, areas with results that exceeded background-based TLs were re-excavated followed by collection of a new sample from that area. The area associated with sample DCRB-67 that was collected on 11/16/16 required additional excavation and re-sampling due to a lead concentration (30.3 mg/kg) that was above the maximum SRS background level of 26.6 mg/kg. The lead concentration associated with the re-sampled result at DCRB-67 (add) is 17.6 mg/kg.

This evaluation considers only the final confirmation sample results from all stations, i.e., the results from the earlier sampling event associated with sample DCRB-67 were not included in this assessment. The confirmation sampling events are summarized below:

Collection Date	Sampling Grid or Pile Station (DCRB-xx)	Comment
9/22/16	-56, -57, -58	Confirmation samples associated with FSP grids -01, -02, -03, respectively
9/29/16	-59, -60, -61, -66	Confirmation samples associated with FSP grids -04, -05, -06, -11, respectively
11/02/16	-62, -63, -64, -65	Confirmation samples associated with FSP grids -07, -08, -09, -10, respectively
11/16/16	-67, -68, -69, -70, -71, -72, -73, -74, -75, -76, -77, -78	Confirmation samples per USEPA request (location of piles w/in CPRB); DCRB-67 collected on this date not included in assessment
1/17/17	-67 (add)	Additional confirmation sample location DCRB-67 (associated with pile); DCRB-67(add) included in assessment

xx = sampling grid station number

Quality Assurance/Quality Control (QA/QC) samples were also collected and analyzed in accordance with the Confirmation SAP (SRNS 2014) and the FSP (SRNS 2015). These samples (e.g., field duplicates, split samples, laboratory duplicates, etc.) are used to assess the precision, variability and comparability of the data. The *Data Usability Report for Confirmation Sampling at the 489-D Coal Pile Runoff Basin* will present the data verification, validation and usability assessment results for confirmation sampling for the project. Appendix A provides the field duplicate (FD) results for all three samples taken at DCRB-62, -65, and -67.

2.1 Human Health

The HH TLs established in the Confirmation SAP (SRNS 2014) are presented in Table 1. For constituents of concern (COCs) that have a TL based on the residential USEPA Regional Screening Level (RSL) or Preliminary Remediation Goal (PRG), the excavation/removal activities are considered successful if the mean concentration/activity from the samples collected within the excavated zone is less than the HH TL concentration/activity. For constituents that have a HH TL based on the SRS background 95th percentile concentration/activity (i.e., arsenic,

thallium, potassium-40, radium-226, radium-228, thorium-228, and uranium-238), the excavation/removal activities are considered successful if the mean concentration/activity is less than the HH TL concentration/activity, and no individual sample result is greater than the maximum SRS background concentration/activity. SRS background concentrations/activities are provided in Appendix B.

2.2 Ecological

The FSP (SRNS 2015) committed to performing an ECO evaluation for aquatic/semi-aquatic receptors because this area will be used as a storm water retention structure. Because of the intermittent nature of the surface water in this end-state condition, an ECO evaluation for terrestrial receptors is also presented.

The primary source for the ECO TLs used in this document is the *Region 4 Ecological Risk Assessment Supplemental Guidance Interim Draft* (USEPA 2015a). More specifically, for the evaluation of aquatic/semi-aquatic receptors (i.e., assessed as sediment media), the refinement screening value (RSV) identified in Table 2, Region 4 Sediment Screening Values for Hazardous Waste Sites (USEPA 2015a) was used. For the nonradiological constituents that do not have values published in this reference (i.e., beryllium, boron, hexavalent chromium, molybdenum, strontium, thallium and vanadium), as well as the radiological constituents, the Los Alamos National Laboratory (LANL) ECO Risk Database low-effects screening level for sediment media was used (LANL 2015).

For the evaluation of terrestrial receptors (i.e., assessed as soil media), the lesser (most conservative) of the soil invertebrate, mammalian and avian screening values identified in Table 3, Region 4 Soil Screening Values for Hazardous Waste Sites (USEPA 2015a) was used. Terrestrial plant screening values were not considered in this evaluation since the 489-D CPRB will be managed as a storm water retention structure and the aquatic environment of this small basin does not represent a significant area of terrestrial plant habitat for population-level effects to occur. For the radiological constituents, the screening value was obtained from the LANL ECO Risk Database low-effects screening level for soil media (LANL 2015).

A comparison of the sediment and soil risk-based screening values described above to the SRS background 95th percentile concentration is provided in Tables 2 and 3. The ECO TL is identified as the screening value if it is greater than the SRS 95th percentile concentration. If the screening value is less than the SRS 95th percentile concentration, then the SRS background is identified as the ECO TL. The ecological threshold levels for aquatic receptors (ECO_{aq} TLs) are presented in Table 2, and Table 3 for terrestrial receptors (ECO_{ter} TLs).

The same decision rule that was established for the HH evaluation is used for the ECO evaluation. For the constituents that have an ECO TL based on the risk-based screening value (i.e., USEPA Region 4 or LANL), the excavation/removal activities are considered successful if the mean concentration/activity from the samples collected within the excavated zone is less than the ECO TL concentration/activity. For the constituents that have an ECO_{aq} TL based on the SRS background 95th percentile concentration (vanadium only), the excavation/removal activities are considered successful if the mean concentration is less than the ECO_{aq} TL concentration, and no individual sample result is greater than the maximum SRS background concentration. For the constituents that have an ECO_{ter} TL based on the SRS 95th percentile concentration (i.e., antimony, cadmium, chromium, lead, mercury, selenium, thallium, vanadium), the excavation/removal activities are considered successful if the mean concentration is less than the ECO_{ter} TL concentration, and no individual sample result is greater than the maximum SRS background concentration.

In addition, an analysis for 2-methylnaphthalene was performed since it was identified as a refined constituent of concern (RCOC) in the *RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan and RFI/RI Report with Baseline Risk Assessment for the D-Area Operable Unit* (SRNS 2009) for sediment media. A remedial goal option (RGO) concentration of 0.07 mg/kg was established in the baseline risk assessment for 2-methylnaphthalene.

2.3 Background

The *Background Soils Statistical Summary Report for the Savannah River Site* (WSRC 2006) is a comprehensive soils data set based on information compiled from SRS site-wide inorganic and radionuclide data. In 2005, both the USEPA and SCDHEC agreed that it would be beneficial to develop an SRS site-wide background data report consisting of data from approved environmental restoration projects. The sample location, sample collection, and laboratory analysis for the background data was previously approved under the environmental restoration program. Consequently, there is a high level of confidence that the data are representative of SRS background soils and would be appropriate for initial screening of constituents of potential concern (COPCs), aid in the establishment of unit-related RGOs, and in eliminating or reducing the need to collect waste unit-specific background data. The study presents summary statistics for the 0- to 1-ft and 0 to total depth intervals of the vadose zone. Protocols have been developed to perform COPC screening and identify RGOs utilizing the approved soil background datasets as appropriate. SRS background maximum and 95th percentile concentrations are shown in Appendix B.

3.0 ACCEPTANCE CRITERIA

The USEPA ProUCL software package, *Statistical Software ProUCL 5.1 for Environmental Applications for Data Sets With and Without Nondetect Observations* (USEPA 2015b), contains statistical methods that can be used to evaluate and address various environmental issues. Single sample hypothesis tests are useful when the environmental parameters such as the clean standard, TL, or compliance limits are known, and the objective is to compare site concentrations with these known threshold values. Specifically, a t-Test or a Wilcoxon Signed Rank (WSR) Test (for datasets with nondetects) can be used to verify the attainment of cleanup levels within the area of contamination after removal activities.

The decision rule for this confirmation sampling is expressed as a statistical hypothesis test. To test the hypothesis that TLs are achieved following removal activities, the null hypothesis (H_0) of interest is established as follows: COC mean concentration/activity is less than or equal to the

TL. The alternative hypothesis (H_A) would then be that the COC mean concentration/activity is greater than the TL. These are considered typical statements when the cleanup level has been pre-established. The statistical test for coal removal confirmation sampling is as follows:

Null hypothesis (H_0): COC mean concentration/activity $\leq$ threshold limit
Alternative hypothesis (H_A): COC mean concentration/activity > threshold limit

For H_A: COC mean concentration/activity > threshold limit, if

$t > t_{a(1),v}$, then reject H_0

where
a = 0.05 is the level of significance (i.e., 95% confidence level)
1 = one-tail t test
v = degrees of freedom = n-1, where n = number of sample results

With regard to the constituents that have a TL based on the SRS 95th percentile concentration/ activity, the SRS maximum background concentration/activity is established as the upper limit for any individual sample (i.e., no single sample result > SRS background maximum concentration/activity).

Note: If the confirmation dataset has a large proportion of nondetects or the data distribution is indeterminate, then a nonparametric WSR test may be more appropriate than the t-Test to perform the hypothesis testing. In this evaluation, the WSR test was used for the hexavalent chromium and boron analysis.

4.0 RESULTS

Table 4 is a comparison of the confirmation sampling maximum detected concentrations/ activities to the HH, ECO_{aq}, and ECO_{ter} TLs. If the maximum detected concentration/activity is less than the TL, then formal statistical hypothesis testing is not necessary since the TL is based on mean concentration/activity (i.e., the mean will also be less than the TL). For the HH screening comparison, the maximum detected concentration/activity of the following constituents is greater than the TL (five total): hexavalent chromium, potassium-40, radium-226, radium-228, and uranium-238. For the ECO_{aq} screening comparison, the maximum detected concentration of one constituent, barium, is greater than the TL. For the ECO_{ter} screening

comparison, the maximum detected concentrations of four constituents are greater than the TL (barium, boron, lead, and strontium).

4.1 Human Health

Formal statistical hypothesis testing using the ProUCL software is required only for the constituents that the maximum detected concentration/activity exceeds the HH TL. The maximum detected concentration/activity for hexavalent chromium, potassium-40, radium-226, radium-228, and uranium-238 exceed the HH TL. Table 5 is a Summary of the Statistical Hypothesis Testing for HH for all constituents. The ProUCL output for this portion of the evaluation is provided in Appendix C. All constituents had the following output result, indicating cleanup levels have been met (i.e., passing result):

Do not reject H_0; Conclude site mean $\leq$ TL

For the constituents that have a TL based on the SRS 95thpercentile concentration/activity, a comparison of the maximum detected concentration/activity to the SRS maximum concentration/activity is presented in Table 6. The maximum detected concentration/activity of all of these constituents is less than the SRS maximum background value.

4.2 Ecological – Aquatic Receptors

The maximum detected concentration of barium exceeds the ECO_{aq} TL. Table 7 is a Summary of the Statistical Hypothesis Testing for ECO_{aq} for all constituents. The ProUCL output for this portion of the evaluation is provided in Appendix D. Barium had the following output result, indicating cleanup levels have been met:

Do not reject H_0; Conclude site mean $\leq$ TL

For the constituents that have a TL based on the SRS 95thpercentile concentration/activity, a comparison of the maximum detected concentration/activity to the SRS maximum concentration is presented in Table 6. The maximum detected concentration of vanadium is less than the SRS maximum background value.

4.3 Ecological – Terrestrial Receptors

The maximum detected concentrations of barium, boron, lead, and strontium exceed the ECO_{ter} TL. Table 8 is a Summary of the Statistical Hypothesis Testing for ECO_{ter} for all constituents. The ProUCL output for this portion of the evaluation is provided in Appendix D. Barium, boron, lead and strontium had the following output result, indicating cleanup levels have been met:

Do not reject H_0; Conclude site mean $\leq$ TL

For the constituents that have a TL based on the SRS 95thpercentile concentration/activity, a comparison of the maximum detected concentration/activity to the SRS maximum concentration is presented in Table 6. The maximum detected concentration/activity of all constituents is less the SRS maximum background value.

5.0 ADDITIONAL EVALUATIONS

An additional evaluation is provided for uranium and hexavalent chromium.

5.1 Uranium

Uranium-233/234 was not identified as a potential COC (with corresponding HH TLs) in the SAP (SRNS 2014), but samples were analyzed for it in order to perform isotopic comparisons to other analyzed uranium species (i.e., U-238). Uranium-238 (U-238), uranium-235 (U-235), and uranium-233/234 (U-233/234) were used in reactor processes, but there is no history of use or disposal of reactor uranium in D Area. Uranium also occurs naturally and can be easily distinguished from reactor uranium by comparing activity ratios. In reactor fuel (enriched uranium), the U-233/234 to U-238 activity ratio will be very high, often exceeding 1,000. In reactor target (depleted uranium), that ratio will be <0.2. Natural uranium will have a U-233/234 to U-238 ratio very close to unity (i.e., one). Table 9 shows that for every sample, the U-233/234 to U-238 ratio is very close to one. The 489-D CPRB soil samples clearly show a natural signature. Uranium isotopic considerations conclusively demonstrate that U-233/234, U-235, and U-238 in the 488-2D confirmation soils samples are natural uranium. The U-233/234 to U-238 ratios of all samples are consistent with naturally-occurring radioactive material.

5.2 Hexavalent Chromium

The statistical hypothesis testing for hexavalent chromium using the standard USEPA method 7196A (colorimetric) as described in the FSP indicates that cleanup levels have been met:

Do not reject H_0; Conclude site mean $\leq$ TL

The *Human Health and Ecological Evaluation for Confirmation Sampling at the 488-2D Ash Basin* (SRNS 2016) outlined several uncertainties with regards to the following: 1) toxicity values used in the evaluation; 2) known interferences associated with (and identified within) the USEPA Method 7196A that may result in false-positive results; 3) use of alternative analytical methodologies (USEPA Methods 7199 and 6800); and 4) history of use and/or presence in background. The statistical hypothesis testing results and residual risk levels varied, depending on the analytical method used. Consideration of these uncertainties in their entirety leads to the conclusion that the evaluation of confirmation sample results from the 488-2D Ash Basin was indeterminate with regard to meeting the acceptance criteria for unrestricted (residential) land use.

To further address potential issues associated with the colorimetric USEPA Method 7196A, confirmation samples that were collected per the FSP were split in the field and an aliquot was also sent to Brooks Applied Laboratory (BAL) for an additional analysis using the USEPA Method 7199 ion chromatography-inductively coupled plasma-mass spectrometry (IC-ICP-MS). The results of this alternate analysis are compared to the colorimetric method by sample location in Table 10. Table 11 is a data summary comparison of the two analytical methods, including minimum, maximum and mean concentrations. Mean values reported in this table use a surrogate of one-half the detection limit for nondetects; mean values reported in Appendix E (Additional Hexavalent Chromium Evaluation) using ProUCL software are based on detected results only.

The two analytical methods yielded very similar results. Method 7196A (colorimetric) mean concentration was 0.35 mg/kg; Method 7199 (IC-ICP-MS) mean concentration was 0.34 mg/kg.

Similarly, the maximum concentrations of the two methods are essentially the same (1.53 mg/kg and 1.52 mg/kg, respectively) although they did not come from the same sample.

The ProUCL statistical output for the Method 7199 (IC-ICP-MS) from BAL are also provided in Appendix E. The output result indicates that cleanup levels have been met:

Do not reject H_0; Conclude site mean ≤ TL

In order to better understand the significance of the hexavalent chromium data results, the residential risk calculation for the two analytical methods using the 95% upper confidence limit (UCL) and RSL = 0.29 mg/kg are provided below.

1. Hexavalent chromium confirmation samples analyzed by Method 7196A (colorimetric): 95%UCL = 0.47 mg/kg; residential risk = 1.6E-06
2. Hexavalent chromium confirmation samples analyzed by Method 7199 (IC-ICP-MS): 95%UCL = 0.44 mg/kg; residential risk = 1.5E-06

The maximum detected concentrations of 1.52 mg/kg (DCRB-71) and 1.53 mg/kg (DCRB-76) from two different locations and from different test methods give evidence that these two results may be outliers. The Dixon's Outlier Test can be used to identify data outliers when the sample size is ≤ 25. The USEPA ProUCL software was used to perform this statistical test for outliers in both datasets; the ProUCL result is that these maximum concentrations are considered outliers and can be removed from the dataset for each method. Accordingly, the maximum, the mean and the risk calculation for each dataset are reduced as indicated below. This information provides further evidence to support the conclusion that the concentrations of hexavalent chromium do not pose an unacceptable risk.

1. Method 7196A: maximum = 0.746 mg/kg, mean = 0.291 mg/kg, 95%UCL = 0.377 mg/kg, risk = 1.3E-06
2. Method 7199: maximum = 0.625 mg/kg, mean = 0.283 mg/kg, 95%UCL = 0.335 mg/kg, risk = 1.2E-06

Residential risk results for both methods are very close to the lower end of the USEPA risk range and therefore it is unlikely that concentrations of hexavalent chromium present at 489-D CPRB will pose an unacceptable risk to human receptors.

Hexavalent chromium occurs naturally in the environment from the erosion of natural chromium deposits found in rock and soil. Depending on conditions, hexavalent and trivalent forms of chromium can convert back and forth in the environment and the human body. The occurrence of non-anthropogenic hexavalent chromium in soil and groundwater is a documented phenomenon recognized in scientific literature (SRNS 2016). The transformation of chromium in the environment involves complicated geochemical processes that are dependent on a variety of factors/conditions.

6.0 CONCLUSION

A total of 23 confirmation sample results were evaluated to demonstrate that the coal has been successfully removed from the 489-D CPRB and the remaining soils are below HH and ECO risk-based TLs. Twenty-four metals, six radionuclides and one organic compound were analyzed and evaluated. The residual concentrations of all of these analytes met the pre-established cleanup levels documented in the *Confirmation Sampling and Analysis Plan for Coal and/or Ash Removal at the Savannah River Site* for unrestricted land use.

The 489-D CPRB will be used as a storm water retention structure to support the overall early action removal strategy for D-Area. In this end state condition, surface water within the basin will be present as a result of receiving stormwater runoff that is channeled from other portions of D Area as well as rainfall in the basin proper. The fluctuating water table may also periodically rise into the section of the basin with the lowest elevation. The low pH/metals groundwater plume, which is part of the D-Area Groundwater Operable Unit, will decrease in size and water quality will improve over time as a result of the source removal of the coal fines and contaminated sediment from the 489-D CPRB (and subsequent liming and backfilling) achieved through this completed removal action; and through the investigation, assessment, and (if needed) remediation of groundwater in the vicinity of the 489-D Basin, which are scheduled to

begin in Fiscal Year 2020. Changes in the plume will be evaluated through groundwater monitoring and documented in future D-Area Groundwater Operable Unit reporting efforts.

7.0 REFERENCE

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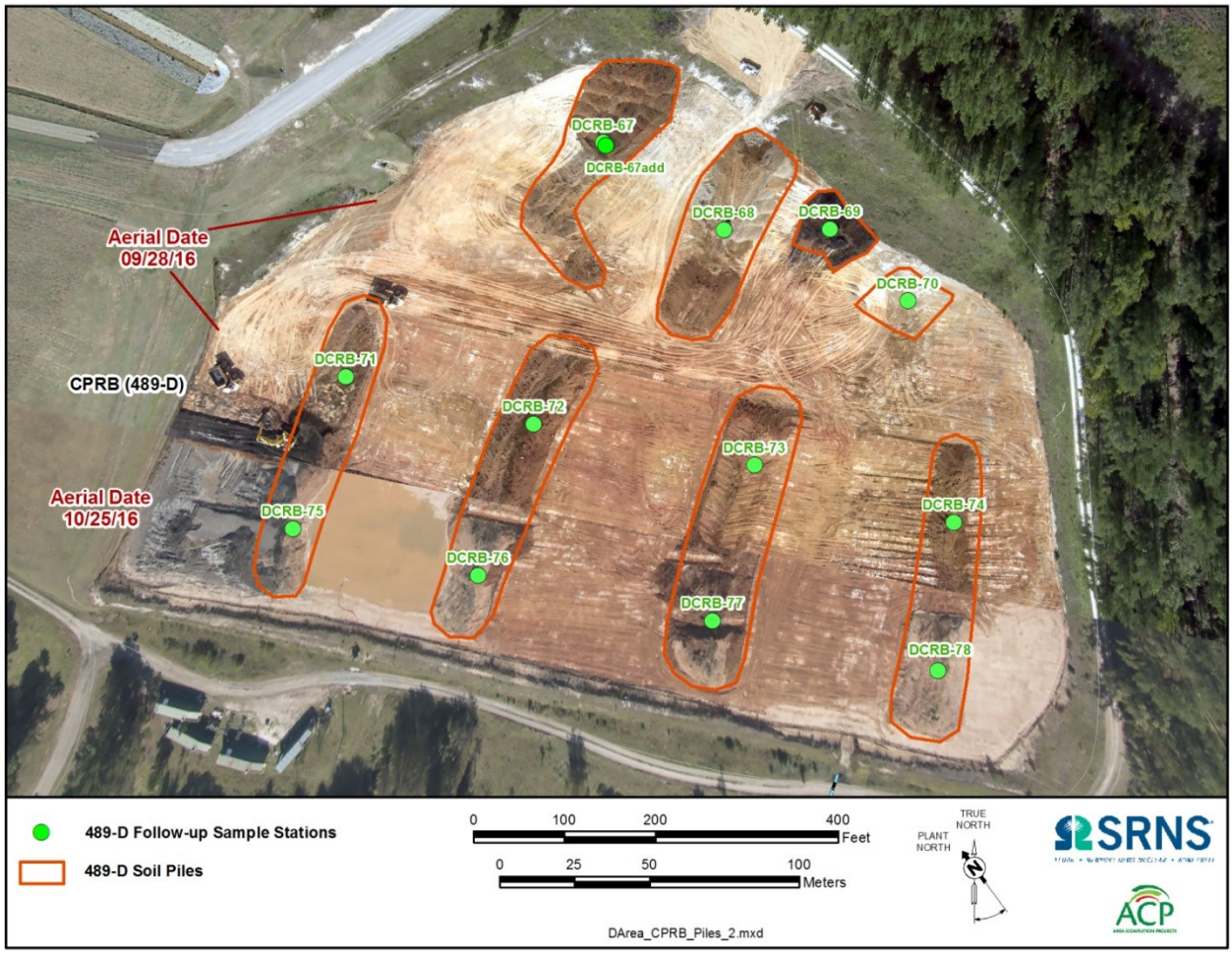
Analytical results from all sampling locations meet acceptance criteria for unrestricted land use.

Figure 1. 489-D CPRB Confirmation Sampling Locations



Analytical results from all sampling locations meet acceptance criteria for unrestricted land use.

Figure 2. Additional 489-D CPRB Confirmation Sampling Locations

Table 1. Human Health Threshold Levels

Analyte	Units	Residential RSL/PRG	SRS 95th%-tile Bkgd	HH Threshold Level[1]
Al	mg/kg	*77,000*	15,700	77,000
Sb	mg/kg	*31*	3.3	31
As	mg/kg	0.61	*8.2*	8.2
Ba	mg/kg	*15,000*	49.9	15,000
Be	mg/kg	*160*	0.4	160
B	mg/kg	*16,000*	NA	16,000
Cd	mg/kg	*70*	1.4	70
Cr	mg/kg	*120,000*	29.9	120,000
Cr^{+6}	mg/kg	*0.29*	NA	0.29
Co	mg/kg	*23*	2.2	23
Cu	mg/kg	*3,100*	7.7	3,100
Fe	mg/kg	*55,000*	28,675	55,000
Pb	mg/kg	*400*	13.6	400
Mg	mg/kg	*NA*	334	None
Mn	mg/kg	*1,800*	134	1,800
Hg	mg/kg	*10*	0.10	10
Mo	mg/kg	*390*	NA	390
Ni	mg/kg	*1,500*	5.1	1,500
Se	mg/kg	*390*	7.8	390
Ag	mg/kg	*390*	1.4	390
Sr	mg/kg	*47,000*	NA	47,000
Tl	mg/kg	0.78	*6.3*	6.3
V	mg/kg	*390*	69.9	390
Zn	mg/kg	*23,000*	11.3	23,000
K-40	pCi/g	0.15	*3.3*	3.3
Ra-228 (+D)	pCi/g	0.0319	*2.22*	2.2
Th-228 (+D)	pCi/g	0.154	*2.25*	2.3
U-238 (+D)	pCi/g	0.725	*1.22*	1.2
Ra-226 (+D)	pCi/g	0.0127	*1.20*	1.2
U-235 (+D)	pCi/g	*0.194*	0.11	0.194

[1] Threshold levels (TLs) per the *Confirmation SAP for Coal and/or Ash Removal at SRS* (SRNS 2014). The HH TL is the residential RSL/PRG if it is greater than the background concentration. If the residential RSL/PRG is less than the SRS 95th %-tile background concentration, then the TL defaults to the background value. Sources of the TL are highlighted in italics in the table. There is no TL if a screening value is not available.

NA = not available

Table 2. Ecological Threshold Levels – Aquatic Receptors

Analyte	Units	Screening Value[1]	SRS 95th%-tile Bkgd[2]	ECO_{aq} Threshold Level[3]
Al	mg/kg	*58,000*	15,700	58,000
Sb	mg/kg	*25*	3.3	25
As	mg/kg	*33*	8.2	33
Ba	mg/kg	*60*	49.9	60
Be	mg/kg	*730*	0.4	730
B	mg/kg	*54*	NA	54
Cd	mg/kg	*5*	1.4	5
Cr	mg/kg	*111*	29.9	111
Cr^{+6}	mg/kg	*6,800*	NA	6,800
Co	mg/kg	*50*[4]	2.2	50
Cu	mg/kg	*149*	7.7	149
Fe	mg/kg	*40,000*	28,675	40,000
Pb	mg/kg	*128*	13.6	128
Mg	mg/kg	*NA*	334	None
Mn	mg/kg	*1,100*	134	1,100
Hg	mg/kg	*1.1*	0.10	1.1
Mo	mg/kg	*270*	NA	270
Ni	mg/kg	*48.6*	5.1	48.6
Se	mg/kg	*20*	7.8	20
Ag	mg/kg	*2.2*	1.4	2.2
Sr	mg/kg	*17,000*	NA	17,000
Tl	mg/kg	*8.2*	6.3	8.2
V	mg/kg	61	*69.9*	69.9
Zn	mg/kg	*459*	11.3	459
K-40	pCi/g	*NA*	3.3	None
Ra-226 (+D)	pCi/g	*2.1*	1.20	2.1
Ra-228 (+D)	pCi/g	*2.6*	2.22	2.6
Th-228 (+D)	pCi/g	*2,900*	2.25	2,900
U-235 (+D)	pCi/g	*6,700*	0.11	6,700
U-238 (+D)	pCi/g	*6,900*	1.22	6,900
2-methylnapthalene[5]	mg/kg	*0.07*	NA	0.07

[1] Screening Value = For the nonradiological constituents, the Screening Value is the RSV identified in Table 2a, Region 4 Sediment Screening Values for Hazardous Waste Sites from the *Region 4 Ecological Risk Assessment Supplemental Guidance Interim Draft (*USEPA 2015). For the nonradiological constituents that do not have values published in this reference (i.e., Be, B, Cr+6, Mo, Sr, Tl and V), as well as the radiological constituents, the Los Alamos National Laboratory ECO Risk Database low-effects screening level for sediment media was used (LANL 2015).

[2] SRS 95th%-tile background concentration from the *Background Soils Statistical Summary Report for the Savannah River Site* (WSRC 2006).

[3] ECO Threshold Level is the screening value if it is greater than the background concentration. If the screening value is less than the background concentration, then the TL defaults to the background value. Sources of the TL are highlighted in italics in the table. There is no TL if a screening value is not available.

[4] RSV for cobalt is not available; ESV from USEPA R4 Table 2a used (USEPA 2015).

[5] 2-methylnaphthalene identified as a RCOC for sediment media with a RGO = 0.07 mg/kg in the RFI/RI/BRA (SRNS 2009).

NA = not available

Table 3. Ecological Threshold Levels – Terrestrial Receptors

Analyte	Units	Screening Value[1]	SRS 95th%-tile Bkgd[2]	ECO_{ter} Threshold Level[3]
Al	mg/kg	*NA*	15,700	None
Sb	mg/kg	0.27	*3.3*	3.3
As	mg/kg	*43*	8.2	43
Ba	mg/kg	*330*	49.9	330
Be	mg/kg	*18*	0.4	18
B	mg/kg	*7.5*	NA	7.5
Cd	mg/kg	0.36	*1.4*	1.4
Cr	mg/kg	28	*29.9*	29.9
Cr^{+6}	mg/kg	*7.8*	NA	7.8
Co	mg/kg	*120*	2.2	120
Cu	mg/kg	*28*	7.7	28
Fe	mg/kg	*NA*	28,675	None
Pb	mg/kg	11	*13.6*	13.6
Mg	mg/kg	*NA*	334	None
Mn	mg/kg	*450*	134	450
Hg	mg/kg	0.013	*0.10*	0.1
Mo	mg/kg	*4.8*	NA	4.8
Ni	mg/kg	*130*	5.1	130
Se	mg/kg	0.63	*7.8*	7.8
Ag	mg/kg	*4.2*	1.4	4.2
Sr	mg/kg	*96*	NA	96
Tl	mg/kg	0.22	*6.3*	6.3
V	mg/kg	7.8	*69.9*	69.9
Zn	mg/kg	*46*	11.3	46
K-40	pCi/g	*NA*	3.3	None
Ra-226 (+D)	pCi/g	*15*	1.20	15
Ra-228 (+D)	pCi/g	*12*	2.22	12
Th-228 (+D)	pCi/g	*430*	2.25	430
U-235 (+D)	pCi/g	*4,400*	0.11	4,400
U-238 (+D)	pCi/g	*4,000*	1.22	4,000

[1] Screening Value = For the nonradiological constituents, the Screening Value is the lesser (most conservative) of the soil invertebrate, mammalian and avian screening values identified in Table 3, Region 4 Soil Screening Values for Hazardous Waste Sites from the *Region 4 Ecological Risk Assessment Supplemental Guidance Interim Draft* (USEPA 2015). For the radiological constituents, the screening value is from the Los Alamos National Laboratory ECO Risk Database low-effects screening level for soil media (LANL 2015).

[2] SRS 95th%-tile background concentration from the *Background Soils Statistical Summary Report for the Savannah River Site* (WSRC 2006).

[3] ECO Threshold Level is the screening value if it is greater than the background concentration. If the screening value is less than the background concentration, then the TL defaults to the background value. Sources of the TL are highlighted in italics in the table. There is no TL if a screening value is not available.

NA = not available

Table 4. Maximum Detected Concentration Compared to Threshold Levels

Analyte	Units	Maximum Detect	HH TL[1]	Max Det > HH TL?	ECO_{aq} TL[2]	Max Det > ECO_{aq} TL?	ECO_{ter} TL[3]	Max Det > ECO_{ter} TL?
Aluminum	mg/kg	17,900	7.70E+04	No	5.80E+04	No	None	No
Antimony	mg/kg	0.425	3.10E+01	No	2.50E+01	No	3.30E+00	No
Arsenic	mg/kg	4.71	8.20E+00	No	3.30E+01	No	4.30E+01	No
Barium	**mg/kg**	**472**	1.50E+04	No	**6.00E+01**	**YES**	**3.30E+02**	**YES**
Beryllium	mg/kg	1.25	1.60E+02	No	7.30E+02	No	1.80E+01	No
Boron	**mg/kg**	**9.34**	1.60E+04	No	5.40E+01	No	**7.50E+00**	**YES**
Cadmium	mg/kg	ND	7.00E+01	No	5.00E+00	No	1.40E+00	No
Chromium	mg/kg	25.7	1.20E+05	No	1.11E+02	No	2.99E+01	No
Hexavalent Chromium	**mg/kg**	**1.53**	**2.90E-01**	**YES**	6.80E+03	No	7.80E+00	No
Cobalt	mg/kg	1.1	2.30E+01	No	5.00E+01	No	1.20E+02	No
Copper	mg/kg	7.21	3.10E+03	No	1.49E+02	No	2.80E+01	No
Iron	mg/kg	15,500	5.50E+04	No	4.00E+04	No	None	No
Lead	**mg/kg**	**17.6**	4.00E+02	No	1.28E+02	No	**1.36E+01**	**YES**
Magnesium	mg/kg	1,580	None	No	None	No	None	No
Manganese	mg/kg	12.2	1.80E+03	No	1.10E+03	No	4.50E+02	No
Mercury	mg/kg	0.0784	1.00E+01	No	1.10E+00	No	1.00E-01	No
Molybdenum	mg/kg	0.37	3.90E+02	No	2.70E+02	No	4.80E+00	No
Nickel	mg/kg	4.79	1.50E+03	No	4.86E+01	No	1.30E+02	No
Selenium	mg/kg	3.74	3.90E+02	No	2.00E+01	No	7.80E+00	No
Silver	mg/kg	0.395	3.90E+02	No	2.20E+00	No	4.20E+00	No
Strontium	**mg/kg**	**180**	4.70E+04	No	1.70E+04	No	**9.60E+01**	**YES**
Thallium	mg/kg	ND	6.30E+00	No	8.20E+00	No	6.30E+00	No
Vanadium	mg/kg	38.7	3.90E+02	No	6.99E+01	No	6.99E+01	No
Zinc	mg/kg	14.3	2.30E+04	No	4.59E+02	No	4.60E+01	No
Potassium-40	**pCi/g**	**6.72**	**3.30E+00**	**YES**	None	No	None	No
Radium-226 (+D)	**pCi/g**	**1.71**	**1.20E+00**	**YES**	2.10E+00	No	1.50E+01	No
Pb-214								
Radium-228 (+D)	**pCi/g**	**2.49**	**2.20E+00**	**YES**	2.60E+00	No	1.20E+01	No
Ac-228								
Thorium-228 (+D)	pCi/g	2.28	2.30E+00	No	2.90E+03	No	4.30E+02	No
Pb-212								
Uranium-235 (+D)	pCi/g	0.112	1.94E-01	No	6.70E+03	No	4.40E+03	No
Uranium-238 (+D)	**pCi/g**	**1.4**	**1.20E+00**	**YES**	6.90E+03	No	4.00E+03	No
2-Methylnaphthalene[4]	mg/kg	0.0227	NA	NA	7.00E-02	No	NA	NA

[1] HH TL = Human Health Threshold Level from Table 1.
[2] ECO_{aq} TL = Ecological Threshold Level for aquatic receptors from Table 2.
[3] ECO_{ter} TL = Ecological Threshold Level for terrestrial receptors from Table 3.
[4] 2-methylnaphthalene identified as a RCOC for sediment media with a RGO = 0.07 mg/kg in the RFI/RI/BRA (SRNS 2009).

ND = Not detected NA = Not applicable

Table 5. Summary of Statistical Hypothesis Testing for Human Health

Analyte	Units	HH TL	Hypothesis Test Result
Al	mg/kg	77,000	Statistical testing not required, site max < TL
Sb	mg/kg	31	Statistical testing not required, site max < TL
As	mg/kg	8.2	Statistical testing not required, site max < TL
Ba	mg/kg	15,000	Statistical testing not required, site max < TL
Be	mg/kg	160	Statistical testing not required, site max < TL
B	mg/kg	16,000	Statistical testing not required, site max < TL
Cd	mg/kg	70	Statistical testing not required, site max < TL
Cr	mg/kg	120,000	Statistical testing not required, site max < TL
Cr^{+6}	mg/kg	0.29	Do not reject H_0; Conclude site mean $\leq$ TL
Co	mg/kg	23	Statistical testing not required, site max < TL
Cu	mg/kg	3,100	Statistical testing not required, site max < TL
Fe	mg/kg	55,000	Statistical testing not required, site max < TL
Pb	mg/kg	400	Statistical testing not required, site max < TL
Mg	mg/kg	None	NA
Mn	mg/kg	1,800	Statistical testing not required, site max < TL
Hg	mg/kg	10	Statistical testing not required, site max < TL
Mo	mg/kg	390	Statistical testing not required, site max < TL
Ni	mg/kg	1,500	Statistical testing not required, site max < TL
Se	mg/kg	390	Statistical testing not required, site max < TL
Ag	mg/kg	390	Statistical testing not required, site max < TL
Sr	mg/kg	47,000	Statistical testing not required, site max < TL
Tl	mg/kg	6.3	Statistical testing not required, site max < TL
V	mg/kg	390	Statistical testing not required, site max < TL
Zn	mg/kg	23,000	Statistical testing not required, site max < TL
K-40	pCi/g	3.3	Do not reject H_0; Conclude site mean $\leq$ TL
Ra-226 (+D)	pCi/g	1.2	Do not reject H_0; Conclude site mean $\leq$ TL
Ra-228 (+D)	pCi/g	2.2	Do not reject H_0; Conclude site mean $\leq$ TL
Th-228 (+D)	pCi/g	2.3	Statistical testing not required, site max < TL
U-235 (+D)	pCi/g	0.194	Statistical testing not required, site max < TL
U-238 (+D)	pCi/g	1.2	Do not reject H_0; Conclude site mean $\leq$ TL

NA = Not applicable

Table 6. Unit Maximum Detection Compared to SRS Background Maximum

Analyte	Units	Maximum Detect	SRS Background Maximum	Unit Max > SRS Max?
Human Health Constituents				
Arsenic	mg/kg	4.71	22.9	no
Thallium	mg/kg	ND	8.13	no
Potassium-40	pCi/g	6.72	8.53	no
Radium-226	pCi/g	1.71	1.74	no
Radium-228	pCi/g	2.49	6.75	no
Thorium-228	pCi/g	2.28	4.17	no
Uranium-238	pCi/g	1.4	1.90	no
Ecological Constituents - Aquatic Receptors				
Vanadium	mg/kg	38.7	104	no
Ecological Constituents - Terrestrial Receptors				
Antimony	mg/kg	0.425	8.83	no
Cadmium	mg/kg	ND	2.01	no
Chromium	mg/kg	25.7	54.3	no
Lead	mg/kg	17.6	26.6	no
Mercury	mg/kg	0.0784	0.3	no
Selenium	mg/kg	3.74	12.2	no
Thallium	mg/kg	ND	8.13	no
Vanadium	mg/kg	38.7	104	no

ND = not detected

Table 7. Summary of Statistical Hypothesis Testing for Aquatic Ecological Receptors

Analyte	Units	ECO_{aq} TL	Hypothesis Test Result
Al	mg/kg	58,000	Statistical testing not required, site max < TL
Sb	mg/kg	25	Statistical testing not required, site max < TL
As	mg/kg	33	Statistical testing not required, site max < TL
Ba	mg/kg	60	Do not reject H_0; Conclude site mean ≤ TL
Be	mg/kg	730	Statistical testing not required, site max < TL
B	mg/kg	54	Statistical testing not required, site max < TL
Cd	mg/kg	5	Statistical testing not required, site max < TL
Cr	mg/kg	111	Statistical testing not required, site max < TL
Cr^{+6}	mg/kg	6,800	Statistical testing not required, site max < TL
Co	mg/kg	50	Statistical testing not required, site max < TL
Cu	mg/kg	149	Statistical testing not required, site max < TL
Fe	mg/kg	40,000	Statistical testing not required, site max < TL
Pb	mg/kg	128	Statistical testing not required, site max < TL
Mg	mg/kg	None	NA
Mn	mg/kg	1,100	Statistical testing not required, site max < TL
Hg	mg/kg	1.1	Statistical testing not required, site max < TL
Mo	mg/kg	270	Statistical testing not required, site max < TL
Ni	mg/kg	48.6	Statistical testing not required, site max < TL
Se	mg/kg	20	Statistical testing not required, site max < TL
Ag	mg/kg	2.2	Statistical testing not required, site max < TL
Sr	mg/kg	17,000	Statistical testing not required, site max < TL
Tl	mg/kg	8.2	Statistical testing not required, site max < TL
V	mg/kg	69.9	Statistical testing not required, site max < TL
Zn	mg/kg	459	Statistical testing not required, site max < TL
K-40	pCi/g	None	NA
Ra-226 (+D)	pCi/g	2.1	Statistical testing not required, site max < TL
Ra-228 (+D)	pCi/g	2.6	Statistical testing not required, site max < TL
Th-228 (+D)	pCi/g	2,900	Statistical testing not required, site max < TL
U-235 (+D)	pCi/g	6,700	Statistical testing not required, site max < TL
U-238 (+D)	pCi/g	6,900	Statistical testing not required, site max < TL
2-methylnaphthalene	mg/kg	0.07	Statistical testing not required, site max < TL

NA = Not applicable

Table 8. Summary of Statistical Hypothesis Testing for Terrestrial Ecological Receptors

Analyte	Units	ECO_{ter} TL	Hypothesis Test Result
Al	mg/kg	None	NA
Sb	mg/kg	3.3	Statistical testing not required, site max < TL
As	mg/kg	43	Statistical testing not required, site max < TL
Ba	mg/kg	330	Do not reject H_0; Conclude site mean ≤ TL
Be	mg/kg	18	Statistical testing not required, site max < TL
B	mg/kg	7.5	Do not reject H_0; Conclude site mean ≤ TL
Cd	mg/kg	1.4	Statistical testing not required, site max < TL
Cr	mg/kg	29.9	Statistical testing not required, site max < TL
Cr^{+6}	mg/kg	7.8	Statistical testing not required, site max < TL
Co	mg/kg	120	Statistical testing not required, site max < TL
Cu	mg/kg	28	Statistical testing not required, site max < TL
Fe	mg/kg	None	NA
Pb	mg/kg	13.6	Do not reject H_0; Conclude site mean ≤ TL
Mg	mg/kg	None	NA
Mn	mg/kg	450	Statistical testing not required, site max < TL
Hg	mg/kg	0.1	Statistical testing not required, site max < TL
Mo	mg/kg	4.8	Statistical testing not required, site max < TL
Ni	mg/kg	130	Statistical testing not required, site max < TL
Se	mg/kg	7.8	Statistical testing not required, site max < TL
Ag	mg/kg	4.2	Statistical testing not required, site max < TL
Sr	mg/kg	96	Do not reject H_0; Conclude site mean ≤ TL
Tl	mg/kg	6.3	Statistical testing not required, site max < TL
V	mg/kg	69.9	Statistical testing not required, site max < TL
Zn	mg/kg	46	Statistical testing not required, site max < TL
K-40	pCi/g	None	NA
Ra-226 (+D)	pCi/g	15	Statistical testing not required, site max < TL
Ra-228 (+D)	pCi/g	12	Statistical testing not required, site max < TL
Th-228 (+D)	pCi/g	430	Statistical testing not required, site max < TL
U-235 (+D)	pCi/g	4,400	Statistical testing not required, site max < TL
U-238 (+D)	pCi/g	4,000	Statistical testing not required, site max < TL

NA = Not applicable

Table 9. Uranium-233/234: Uranium-238 Activity Ratios

Station ID	Analyte	Result	Result Units	Review Qualifier
DCRB-56	Uranium-233/234	0.483	pCi/g	J
DCRB-56	Uranium-238	0.497	pCi/g	
DCRB-57	Uranium-233/234	1.07	pCi/g	J
DCRB-57	Uranium-238	1.3	pCi/g	
DCRB-58	Uranium-233/234	1.36	pCi/g	J
DCRB-58	Uranium-238	1.4	pCi/g	
DCRB-59	Uranium-233/234	0.451	pCi/g	
DCRB-59	Uranium-238	0.462	pCi/g	
DCRB-60	Uranium-233/234	0.329	pCi/g	
DCRB-60	Uranium-238	0.27	pCi/g	
DCRB-61	Uranium-233/234	0.386	pCi/g	
DCRB-61	Uranium-238	0.328	pCi/g	
DCRB-62	Uranium-233/234	0.433	pCi/g	
DCRB-62	Uranium-238	0.457	pCi/g	
DCRB-63	Uranium-233/234	0.511	pCi/g	
DCRB-63	Uranium-238	0.442	pCi/g	
DCRB-64	Uranium-233/234	0.503	pCi/g	
DCRB-64	Uranium-238	0.429	pCi/g	
DCRB-65	Uranium-233/234	0.369	pCi/g	
DCRB-65	Uranium-238	0.484	pCi/g	
DCRB-66	Uranium-233/234	0.607	pCi/g	
DCRB-66	Uranium-238	0.59	pCi/g	
DCRB-67	Uranium-233/234	0.734	pCi/g	
DCRB-67	Uranium-238	0.598	pCi/g	J
DCRB-68	Uranium-233/234	0.57	pCi/g	
DCRB-68	Uranium-238	0.362	pCi/g	
DCRB-69	Uranium-233/234	0.726	pCi/g	
DCRB-69	Uranium-238	0.718	pCi/g	
DCRB-70	Uranium-233/234	0.664	pCi/g	
DCRB-70	Uranium-238	0.709	pCi/g	

Table 9. Uranium-233/234: Uranium-238 Activity Ratios *(Continued/End)*

Station ID	Analyte	Result	Result Units	Review Qualifier
DCRB-71	Uranium-233/234	0.428	pCi/g	
DCRB-71	Uranium-238	0.32	pCi/g	
DCRB-72	Uranium-233/234	0.685	pCi/g	
DCRB-72	Uranium-238	0.616	pCi/g	
DCRB-73	Uranium-233/234	0.685	pCi/g	
DCRB-73	Uranium-238	0.718	pCi/g	
DCRB-74	Uranium-233/234	1.02	pCi/g	
DCRB-74	Uranium-238	0.869	pCi/g	
DCRB-75	Uranium-233/234	0.299	pCi/g	
DCRB-75	Uranium-238	0.34	pCi/g	
DCRB-76	Uranium-233/234	0.451	pCi/g	
DCRB-76	Uranium-238	0.496	pCi/g	
DCRB-77	Uranium-233/234	0.366	pCi/g	
DCRB-77	Uranium-238	0.395	pCi/g	
DCRB-78	Uranium-233/234	0.348	pCi/g	
DCRB-78	Uranium-238	0.331	pCi/g	

Table 10. 489-D CPRB Hexavalent Chromium Results Comparison

Sample Grid	Sample Identification DCRP-xx	GEL Cr+6		BAL Cr+6	
		EPA Method 7196A (Colorimetric) *(mg/kg)*	Qual	EPA Method 7199 (IC-ICP-MS) *(mg/kg)*	Qual
1	-56	ND (0.179)	U	0.127	
2	-57	ND (0.186)	U	0.11	
3	-58	0.746		0.14	
4	-59	ND (0.115)	U	0.19	
5	-60	0.59	J	0.36	
6	-61	ND (0.127)	U	0.333	
7	-62	0.317	J	0.282	
8	-63	0.251	J	0.196	
9	-64	0.656		0.315	
10	-65	0.306	J	0.459	
11	-66	0.417	J	0.174	
NA	-67	0.24	J	0.357	
NA	-68	0.212	J	0.111	
NA	-69	ND (0.136)	U	0.394	
NA	-70	ND (0.101)	U	0.229	
NA	-71	ND (0.137)	U	1.52	
NA	-72	0.348	J	0.23	
NA	-73	0.56		0.488	
NA	-74	0.394	J	0.625	
NA	-75	0.323	J	0.258	
NA	-76	1.53		0.492	
NA	-77	ND (0.169)	U	0.181	
NA	-78	0.47		0.168	J

NA = not applicable, samples associated with former pile locations
ND = nondetect (detection limit in parenthesis)

Table 11. 489-D CPRB Hexavalent Chromium Results Summary Comparison

Analytical Method	Number of Samples	Number of Nondetects	Number J Qualified	Minimum	Maximum	Mean	Statistical Test HH TL = 0.29 *mg/kg*
				(mg/kg)			
GEL Sample Results EPA Methods 7196A (Colorimetric)	23	8	10	ND	1.53	0.35[1]	Pass
BAL Sample Results EPA Method 7199 Mod (IC-ICP-MS)	23	0	1	0.11	1.52	0.34	Pass

ND = nondetect
1- Mean calculated using surrogate value of the 1/2 sample specific detection limit for nondetects. Data provided in Appendix E.

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APPENDIX A

489-D CPRB Final Confirmation Sample Data

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489-D CPRB FINAL CONFIRMATION DATA					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Most Conservative Threshold Level**
DCRB-70	Aluminum	17,900	mg/kg		<58,000 (ECO)
DCRB-67	Aluminum	17,200	mg/kg		
DCRB-63	Aluminum	16,600	mg/kg		
DCRB-56	Aluminum	15,800	mg/kg		
DCRB-57	Aluminum	14,400	mg/kg		
DCRB-69	Aluminum	13,300	mg/kg		
DCRB-71	Aluminum	12,600	mg/kg		
DCRB-61	Aluminum	12,500	mg/kg		
DCRB-59	Aluminum	12,200	mg/kg		
DCRB-72	Aluminum	11,800	mg/kg		
DCRB-75	Aluminum	11,300	mg/kg		
DCRB-73	Aluminum	11,000	mg/kg		
DCRB-74	Aluminum	10,800	mg/kg		
DCRB-76	Aluminum	10,700	mg/kg		
DCRB-68	Aluminum	10,600	mg/kg		
DCRB-66	Aluminum	10,100	mg/kg		
DCRB-78	Aluminum	9,270	mg/kg		
DCRB-65	Aluminum	8,420	mg/kg		
DCRB-62	Aluminum	8,360	mg/kg		
DCRB-77	Aluminum	8,280	mg/kg		
DCRB-64	Aluminum	7,410	mg/kg		
DCRB-60	Aluminum	7,220	mg/kg		
DCRB-58	Aluminum	5,800	mg/kg		
DCRB-61	Antimony	0.425	mg/kg	J	<3.3 (ECO)
DCRB-67	Antimony	1.24	mg/kg	U	
DCRB-66	Antimony	1.2	mg/kg	U	
DCRB-63	Antimony	1.19	mg/kg	U	
DCRB-72	Antimony	1.18	mg/kg	U	
DCRB-68	Antimony	1.17	mg/kg	U	
DCRB-64	Antimony	1.16	mg/kg	U	
DCRB-74	Antimony	1.14	mg/kg	U	
DCRB-56	Antimony	1.13	mg/kg	U	
DCRB-73	Antimony	1.13	mg/kg	U	
DCRB-78	Antimony	1.13	mg/kg	U	
DCRB-62	Antimony	1.12	mg/kg	U	
DCRB-77	Antimony	1.12	mg/kg	U	
DCRB-69	Antimony	1.11	mg/kg	U	
DCRB-70	Antimony	1.1	mg/kg	U	
DCRB-59	Antimony	1.09	mg/kg	U	
DCRB-60	Antimony	1.09	mg/kg	U	
DCRB-71	Antimony	1.09	mg/kg	U	
DCRB-75	Antimony	1.09	mg/kg	U	
DCRB-76	Antimony	1.09	mg/kg	U	

489-D CPRB FINAL CONFIRMATION DATA					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Most Conservative Threshold Level**
DCRB-57	Antimony	1.08	mg/kg	U	
DCRB-58	Antimony	1.06	mg/kg	U	
DCRB-65	Antimony	1.04	mg/kg	U	
DCRB-58	Arsenic	4.71	mg/kg		<8.2 (HH)
DCRB-73	Arsenic	3.96	mg/kg		
DCRB-57	Arsenic	3.28	mg/kg		
DCRB-67	Arsenic	2.76	mg/kg	J	
DCRB-76	Arsenic	2.7	mg/kg		
DCRB-74	Arsenic	2.48	mg/kg		
DCRB-65	Arsenic	2.1	mg/kg		
DCRB-69	Arsenic	1.95	mg/kg		
DCRB-61	Arsenic	1.9	mg/kg		
DCRB-75	Arsenic	1.86	mg/kg		
DCRB-77	Arsenic	1.78	mg/kg		
DCRB-71	Arsenic	1.75	mg/kg		
DCRB-59	Arsenic	1.47	mg/kg		
DCRB-70	Arsenic	1.34	mg/kg		
DCRB-62	Arsenic	1.17	mg/kg		
DCRB-64	Arsenic	1.15	mg/kg		
DCRB-66	Arsenic	1.12	mg/kg	J	
DCRB-60	Arsenic	0.901	mg/kg	J	
DCRB-78	Arsenic	0.82	mg/kg	J	
DCRB-72	Arsenic	0.603	mg/kg	J	
DCRB-63	Arsenic	0.594	mg/kg	J	
DCRB-56	Arsenic	0.506	mg/kg	J	
DCRB-68	Arsenic	0.485	mg/kg	J	
DCRB-67	Barium	**472**	**mg/kg**		**60 (ECO)**
DCRB-62	Barium	**230**	**mg/kg**		
DCRB-57	Barium	**158**	**mg/kg**		
DCRB-74	Barium	**151**	**mg/kg**		
DCRB-65	Barium	**143**	**mg/kg**		
DCRB-63	Barium	**114**	**mg/kg**		
DCRB-73	Barium	**86.6**	**mg/kg**		
DCRB-71	Barium	**82.9**	**mg/kg**		
DCRB-70	Barium	**82.1**	**mg/kg**		
DCRB-69	Barium	**70**	**mg/kg**		
DCRB-60	Barium	59.9	mg/kg		
DCRB-76	Barium	59.5	mg/kg		
DCRB-59	Barium	51.7	mg/kg		
DCRB-61	Barium	49.2	mg/kg		
DCRB-78	Barium	38.2	mg/kg		
DCRB-68	Barium	29.2	mg/kg		

489-D CPRB FINAL CONFIRMATION DATA					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Most Conservative Threshold Level**
DCRB-77	Barium	28.6	mg/kg		
DCRB-56	Barium	23.8	mg/kg		
DCRB-72	Barium	22.7	mg/kg		
DCRB-75	Barium	21.8	mg/kg		
DCRB-66	Barium	20.6	mg/kg		
DCRB-58	Barium	13	mg/kg		
DCRB-64	Barium	10.7	mg/kg		
DCRB-67	Beryllium	1.25	mg/kg	J	<18 (ECO)
DCRB-57	Beryllium	0.859	mg/kg		
DCRB-62	Beryllium	0.637	mg/kg		
DCRB-74	Beryllium	0.589	mg/kg		
DCRB-73	Beryllium	0.583	mg/kg		
DCRB-59	Beryllium	0.565	mg/kg		
DCRB-71	Beryllium	0.562	mg/kg		
DCRB-69	Beryllium	0.506	mg/kg		
DCRB-61	Beryllium	0.489	mg/kg		
DCRB-65	Beryllium	0.448	mg/kg		
DCRB-72	Beryllium	0.429	mg/kg		
DCRB-63	Beryllium	0.428	mg/kg		
DCRB-76	Beryllium	0.394	mg/kg		
DCRB-70	Beryllium	0.365	mg/kg		
DCRB-58	Beryllium	0.279	mg/kg		
DCRB-60	Beryllium	0.228	mg/kg		
DCRB-66	Beryllium	0.226	mg/kg		
DCRB-77	Beryllium	0.224	mg/kg		
DCRB-68	Beryllium	0.209	mg/kg		
DCRB-75	Beryllium	0.18	mg/kg		
DCRB-78	Beryllium	0.149	mg/kg		
DCRB-56	Beryllium	0.138	mg/kg		
DCRB-64	Beryllium	0.11	mg/kg		
DCRB-57	Boron	**9.34**	**mg/kg**		**7.5 (ECO)**
DCRB-67	Boron	7.47	mg/kg		
DCRB-71	Boron	5.37	mg/kg		
DCRB-72	Boron	5.29	mg/kg		
DCRB-74	Boron	4.74	mg/kg		
DCRB-76	Boron	4.61	mg/kg		
DCRB-73	Boron	4.12	mg/kg		
DCRB-66	Boron	4.1	mg/kg		
DCRB-59	Boron	3.05	mg/kg	J	
DCRB-69	Boron	2.72	mg/kg	J	
DCRB-61	Boron	2.57	mg/kg	J	
DCRB-60	Boron	2.43	mg/kg	J	

489-D CPRB FINAL CONFIRMATION DATA					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Most Conservative Threshold Level**
DCRB-77	Boron	2.3	mg/kg	J	
DCRB-70	Boron	2.28	mg/kg	J	
DCRB-68	Boron	1.67	mg/kg	J	
DCRB-78	Boron	1.55	mg/kg	J	
DCRB-75	Boron	1.38	mg/kg	J	
DCRB-63	Boron	1.3	mg/kg	J	
DCRB-58	Boron	1.06	mg/kg	J	
DCRB-62	Boron	0.931	mg/kg	J	
DCRB-65	Boron	3.35	mg/kg	U	
DCRB-56	Boron	3.3	mg/kg	U	
DCRB-64	Boron	3.27	mg/kg	U	
DCRB-72	Cadmium	0.242	mg/kg	U	<1.4 (ECO)
DCRB-67	Cadmium	0.242	mg/kg	U	
DCRB-68	Cadmium	0.237	mg/kg	U	
DCRB-63	Cadmium	0.235	mg/kg	U	
DCRB-61	Cadmium	0.234	mg/kg	U	
DCRB-77	Cadmium	0.234	mg/kg	U	
DCRB-57	Cadmium	0.233	mg/kg	U	
DCRB-76	Cadmium	0.233	mg/kg	U	
DCRB-73	Cadmium	0.232	mg/kg	U	
DCRB-66	Cadmium	0.231	mg/kg	U	
DCRB-75	Cadmium	0.23	mg/kg	U	
DCRB-74	Cadmium	0.228	mg/kg	U	
DCRB-59	Cadmium	0.226	mg/kg	U	
DCRB-60	Cadmium	0.225	mg/kg	U	
DCRB-70	Cadmium	0.225	mg/kg	U	
DCRB-78	Cadmium	0.225	mg/kg	U	
DCRB-65	Cadmium	0.224	mg/kg	U	
DCRB-56	Cadmium	0.22	mg/kg	U	
DCRB-69	Cadmium	0.219	mg/kg	U	
DCRB-64	Cadmium	0.218	mg/kg	U	
DCRB-58	Cadmium	0.217	mg/kg	U	
DCRB-62	Cadmium	0.215	mg/kg	U	
DCRB-71	Cadmium	0.212	mg/kg	U	
DCRB-67	Chromium	25.7	mg/kg		<29.9 (ECO)
DCRB-76	Chromium	22.5	mg/kg		
DCRB-74	Chromium	21.6	mg/kg		
DCRB-61	Chromium	21	mg/kg		
DCRB-57	Chromium	20.6	mg/kg		
DCRB-71	Chromium	19.8	mg/kg		
DCRB-63	Chromium	18.5	mg/kg		
DCRB-73	Chromium	16.4	mg/kg		

489-D CPRB FINAL CONFIRMATION DATA					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Most Conservative Threshold Level**
DCRB-75	Chromium	16.3	mg/kg		
DCRB-72	Chromium	15.8	mg/kg		
DCRB-66	Chromium	15.6	mg/kg		
DCRB-60	Chromium	14.3	mg/kg	J	
DCRB-65	Chromium	14	mg/kg	J	
DCRB-59	Chromium	12.5	mg/kg		
DCRB-69	Chromium	11.9	mg/kg		
DCRB-70	Chromium	11.5	mg/kg	J	
DCRB-78	Chromium	10.4	mg/kg		
DCRB-77	Chromium	10.3	mg/kg		
DCRB-62	Chromium	10.2	mg/kg		
DCRB-58	Chromium	9.46	mg/kg		
DCRB-64	Chromium	9.38	mg/kg		
DCRB-68	Chromium	7.84	mg/kg		
DCRB-56	Chromium	7.39	mg/kg		
DCRB-76	Chromium, Hexavalent	**1.53**	**mg/kg**		**0.29 (HH)**
DCRB-58	Chromium, Hexavalent	**0.746**	**mg/kg**		
DCRB-64	Chromium, Hexavalent	**0.656**	**mg/kg**		
DCRB-60	Chromium, Hexavalent	**0.59**	**mg/kg**	J	
DCRB-73	Chromium, Hexavalent	**0.56**	**mg/kg**		
DCRB-78	Chromium, Hexavalent	**0.47**	**mg/kg**		
DCRB-66	Chromium, Hexavalent	**0.417**	**mg/kg**	J	
DCRB-74	Chromium, Hexavalent	**0.394**	**mg/kg**	J	
DCRB-72	Chromium, Hexavalent	**0.348**	**mg/kg**	J	
DCRB-75	Chromium, Hexavalent	**0.323**	**mg/kg**	J	
DCRB-62	Chromium, Hexavalent	**0.317**	**mg/kg**	J	
DCRB-65	Chromium, Hexavalent	**0.306**	**mg/kg**	J	
DCRB-63	Chromium, Hexavalent	0.251	mg/kg	J	
DCRB-67	Chromium, Hexavalent	0.24	mg/kg	J	
DCRB-68	Chromium, Hexavalent	0.212	mg/kg	J	
DCRB-59	Chromium, Hexavalent	0.145	mg/kg	U	
DCRB-61	Chromium, Hexavalent	0.246	mg/kg	U	
DCRB-70	Chromium, Hexavalent	0.253	mg/kg	U	
DCRB-69	Chromium, Hexavalent	0.341	mg/kg	U	
DCRB-71	Chromium, Hexavalent	0.342	mg/kg	U	
DCRB-77	Chromium, Hexavalent	0.422	mg/kg	U	
DCRB-56	Chromium, Hexavalent	0.448	mg/kg	U	
DCRB-57	Chromium, Hexavalent	0.464	mg/kg	U	
DCRB-70	Cobalt	1.1	mg/kg		<23 (HH)
DCRB-57	Cobalt	0.906	mg/kg		
DCRB-69	Cobalt	0.891	mg/kg		
DCRB-56	Cobalt	0.843	mg/kg		

489-D CPRB FINAL CONFIRMATION DATA					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Most Conservative Threshold Level**
DCRB-72	Cobalt	0.818	mg/kg		
DCRB-76	Cobalt	0.751	mg/kg		
DCRB-71	Cobalt	0.714	mg/kg		
DCRB-59	Cobalt	0.682	mg/kg		
DCRB-74	Cobalt	0.673	mg/kg		
DCRB-63	Cobalt	0.663	mg/kg		
DCRB-58	Cobalt	0.632	mg/kg		
DCRB-68	Cobalt	0.609	mg/kg		
DCRB-73	Cobalt	0.605	mg/kg		
DCRB-61	Cobalt	0.53	mg/kg		
DCRB-67	Cobalt	0.517	mg/kg		
DCRB-75	Cobalt	0.503	mg/kg		
DCRB-66	Cobalt	0.49	mg/kg		
DCRB-77	Cobalt	0.409	mg/kg		
DCRB-65	Cobalt	0.369	mg/kg		
DCRB-62	Cobalt	0.335	mg/kg		
DCRB-64	Cobalt	0.331	mg/kg		
DCRB-78	Cobalt	0.308	mg/kg		
DCRB-60	Cobalt	0.3	mg/kg		
DCRB-67	Copper	7.21	mg/kg	J	<28 (ECO)
DCRB-70	Copper	4.21	mg/kg	J	
DCRB-73	Copper	4.2	mg/kg		
DCRB-58	Copper	3.36	mg/kg		
DCRB-69	Copper	3.17	mg/kg		
DCRB-74	Copper	2.93	mg/kg		
DCRB-76	Copper	2.78	mg/kg		
DCRB-66	Copper	2.71	mg/kg		
DCRB-61	Copper	2.68	mg/kg		
DCRB-71	Copper	2.56	mg/kg		
DCRB-65	Copper	2.55	mg/kg		
DCRB-68	Copper	2.54	mg/kg		
DCRB-57	Copper	2.49	mg/kg		
DCRB-75	Copper	2.29	mg/kg		
DCRB-59	Copper	2.26	mg/kg		
DCRB-72	Copper	2.15	mg/kg		
DCRB-63	Copper	2.13	mg/kg		
DCRB-77	Copper	2.09	mg/kg		
DCRB-64	Copper	2.04	mg/kg		
DCRB-62	Copper	1.98	mg/kg		
DCRB-78	Copper	1.95	mg/kg		
DCRB-56	Copper	1.91	mg/kg		
DCRB-60	Copper	1.72	mg/kg		

489-D CPRB FINAL CONFIRMATION DATA					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Most Conservative Threshold Level**
DCRB-74	Iron	15,500	mg/kg		<40000 (ECO)
DCRB-73	Iron	15,300	mg/kg		
DCRB-66	Iron	14,500	mg/kg		
DCRB-57	Iron	12,700	mg/kg		
DCRB-76	Iron	11,400	mg/kg		
DCRB-61	Iron	11,000	mg/kg		
DCRB-70	Iron	10,900	mg/kg		
DCRB-65	Iron	10,300	mg/kg		
DCRB-71	Iron	9,880	mg/kg		
DCRB-59	Iron	8,960	mg/kg		
DCRB-75	Iron	8,160	mg/kg		
DCRB-58	Iron	7,570	mg/kg		
DCRB-77	Iron	7,540	mg/kg		
DCRB-72	Iron	7,420	mg/kg		
DCRB-67	Iron	7,070	mg/kg		
DCRB-69	Iron	6,980	mg/kg		
DCRB-60	Iron	6,380	mg/kg		
DCRB-62	Iron	5,350	mg/kg		
DCRB-64	Iron	5,200	mg/kg		
DCRB-56	Iron	4,250	mg/kg		
DCRB-78	Iron	3,200	mg/kg		
DCRB-63	Iron	2,590	mg/kg		
DCRB-68	Iron	2,520	mg/kg		
DCRB-67	Lead	**17.6**	**mg/kg**	J	**13.6 (ECO)**
DCRB-56	Lead	13.4	mg/kg	J	
DCRB-78	Lead	10.5	mg/kg		
DCRB-75	Lead	8.52	mg/kg		
DCRB-57	Lead	8.34	mg/kg		
DCRB-70	Lead	8.06	mg/kg	J	
DCRB-60	Lead	7.94	mg/kg		
DCRB-69	Lead	6.78	mg/kg		
DCRB-74	Lead	6.55	mg/kg		
DCRB-71	Lead	6.46	mg/kg		
DCRB-63	Lead	6.37	mg/kg		
DCRB-77	Lead	5.99	mg/kg		
DCRB-66	Lead	5.84	mg/kg		
DCRB-73	Lead	5.7	mg/kg		
DCRB-59	Lead	5.68	mg/kg		
DCRB-61	Lead	5.66	mg/kg		
DCRB-65	Lead	5.15	mg/kg		
DCRB-68	Lead	4.95	mg/kg		
DCRB-76	Lead	4.38	mg/kg		
DCRB-62	Lead	4.28	mg/kg		

489-D CPRB FINAL CONFIRMATION DATA					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Most Conservative Threshold Level**
DCRB-58	Lead	4.18	mg/kg		
DCRB-64	Lead	2.84	mg/kg		
DCRB-72	Lead	2.4	mg/kg		
DCRB-67	Magnesium	1580	mg/kg		None
DCRB-72	Magnesium	1230	mg/kg		
DCRB-57	Magnesium	1130	mg/kg		
DCRB-71	Magnesium	763	mg/kg		
DCRB-74	Magnesium	730	mg/kg		
DCRB-76	Magnesium	680	mg/kg		
DCRB-73	Magnesium	534	mg/kg		
DCRB-66	Magnesium	527	mg/kg		
DCRB-63	Magnesium	494	mg/kg		
DCRB-59	Magnesium	488	mg/kg		
DCRB-69	Magnesium	433	mg/kg		
DCRB-61	Magnesium	427	mg/kg		
DCRB-60	Magnesium	379	mg/kg	J	
DCRB-70	Magnesium	340	mg/kg	J	
DCRB-68	Magnesium	284	mg/kg		
DCRB-77	Magnesium	254	mg/kg		
DCRB-65	Magnesium	190	mg/kg	J	
DCRB-62	Magnesium	188	mg/kg		
DCRB-75	Magnesium	188	mg/kg		
DCRB-78	Magnesium	187	mg/kg		
DCRB-64	Magnesium	162	mg/kg		
DCRB-56	Magnesium	127	mg/kg		
DCRB-58	Magnesium	84.6	mg/kg		
DCRB-72	Manganese	12.2	mg/kg		<450 (ECO)
DCRB-74	Manganese	11	mg/kg		
DCRB-57	Manganese	10.9	mg/kg		
DCRB-69	Manganese	10.7	mg/kg		
DCRB-59	Manganese	9.15	mg/kg		
DCRB-73	Manganese	7.64	mg/kg		
DCRB-70	Manganese	7.48	mg/kg	J	
DCRB-71	Manganese	7.33	mg/kg		
DCRB-63	Manganese	6.89	mg/kg		
DCRB-61	Manganese	6.87	mg/kg		
DCRB-76	Manganese	6.4	mg/kg		
DCRB-75	Manganese	6.03	mg/kg		
DCRB-56	Manganese	5.48	mg/kg		
DCRB-67	Manganese	5.45	mg/kg		
DCRB-65	Manganese	5.37	mg/kg		
DCRB-64	Manganese	5.07	mg/kg		

489-D CPRB FINAL CONFIRMATION DATA					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Most Conservative Threshold Level**
DCRB-66	Manganese	5.07	mg/kg		
DCRB-68	Manganese	5.03	mg/kg		
DCRB-60	Manganese	4.76	mg/kg		
DCRB-58	Manganese	4.59	mg/kg		
DCRB-62	Manganese	4.2	mg/kg		
DCRB-77	Manganese	4.14	mg/kg		
DCRB-78	Manganese	3.77	mg/kg		
DCRB-73	Mercury	0.0784	mg/kg		<0.1 (ECO)
DCRB-70	Mercury	0.0428	mg/kg		
DCRB-66	Mercury	0.0252	mg/kg		
DCRB-71	Mercury	0.0252	mg/kg		
DCRB-75	Mercury	0.0246	mg/kg		
DCRB-68	Mercury	0.0235	mg/kg		
DCRB-74	Mercury	0.0221	mg/kg		
DCRB-57	Mercury	0.0216	mg/kg		
DCRB-69	Mercury	0.0214	mg/kg		
DCRB-72	Mercury	0.0208	mg/kg		
DCRB-59	Mercury	0.0207	mg/kg		
DCRB-60	Mercury	0.0186	mg/kg		
DCRB-63	Mercury	0.018	mg/kg		
DCRB-77	Mercury	0.018	mg/kg		
DCRB-78	Mercury	0.0163	mg/kg		
DCRB-76	Mercury	0.016	mg/kg		
DCRB-61	Mercury	0.0158	mg/kg		
DCRB-65	Mercury	0.0134	mg/kg		
DCRB-58	Mercury	0.013	mg/kg	U	
DCRB-67	Mercury	0.0115	mg/kg	J	
DCRB-64	Mercury	0.0111	mg/kg	J	
DCRB-62	Mercury	0.00799	mg/kg	J	
DCRB-56	Mercury	0.00439	mg/kg	J	
DCRB-70	Molybdenum	0.37	mg/kg		<4.8 (ECO)
DCRB-73	Molybdenum	0.221	mg/kg	J	
DCRB-75	Molybdenum	0.18	mg/kg	J	
DCRB-58	Molybdenum	0.166	mg/kg	J	
DCRB-69	Molybdenum	0.166	mg/kg	J	
DCRB-74	Molybdenum	0.161	mg/kg	J	
DCRB-77	Molybdenum	0.157	mg/kg	J	
DCRB-57	Molybdenum	0.153	mg/kg	J	
DCRB-71	Molybdenum	0.132	mg/kg	J	
DCRB-76	Molybdenum	0.115	mg/kg	J	
DCRB-61	Molybdenum	0.111	mg/kg	J	
DCRB-72	Molybdenum	0.242	mg/kg	U	

489-D CPRB FINAL CONFIRMATION DATA					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Most Conservative Threshold Level**
DCRB-67	Molybdenum	0.242	mg/kg	U	
DCRB-68	Molybdenum	0.237	mg/kg	U	
DCRB-63	Molybdenum	0.235	mg/kg	U	
DCRB-66	Molybdenum	0.231	mg/kg	U	
DCRB-59	Molybdenum	0.226	mg/kg	U	
DCRB-60	Molybdenum	0.225	mg/kg	UJ	
DCRB-78	Molybdenum	0.225	mg/kg	U	
DCRB-56	Molybdenum	0.22	mg/kg	U	
DCRB-62	Molybdenum	0.215	mg/kg	U	
DCRB-65	Molybdenum	0.191	mg/kg	U	
DCRB-64	Molybdenum	0.175	mg/kg	U	
DCRB-63	Nickel	4.79	mg/kg		<48.6 (ECO)
DCRB-70	Nickel	4.01	mg/kg	J	
DCRB-69	Nickel	2.66	mg/kg		
DCRB-71	Nickel	2.61	mg/kg		
DCRB-56	Nickel	2.53	mg/kg		
DCRB-57	Nickel	2.41	mg/kg		
DCRB-59	Nickel	2.26	mg/kg		
DCRB-73	Nickel	2.25	mg/kg		
DCRB-72	Nickel	2.14	mg/kg		
DCRB-74	Nickel	2.14	mg/kg		
DCRB-61	Nickel	2.04	mg/kg		
DCRB-76	Nickel	2.03	mg/kg		
DCRB-67	Nickel	2.02	mg/kg		
DCRB-75	Nickel	1.95	mg/kg		
DCRB-68	Nickel	1.92	mg/kg		
DCRB-66	Nickel	1.77	mg/kg		
DCRB-64	Nickel	1.71	mg/kg		
DCRB-65	Nickel	1.63	mg/kg	J	
DCRB-77	Nickel	1.55	mg/kg		
DCRB-78	Nickel	1.41	mg/kg		
DCRB-62	Nickel	1.34	mg/kg		
DCRB-60	Nickel	1.19	mg/kg		
DCRB-58	Nickel	1.09	mg/kg		
DCRB-67	Selenium	3.74	mg/kg	J	<7.8 (ECO)
DCRB-74	Selenium	1.69	mg/kg		
DCRB-57	Selenium	1.17	mg/kg		
DCRB-78	Selenium	0.877	mg/kg	J	
DCRB-70	Selenium	0.817	mg/kg	J	
DCRB-71	Selenium	0.663	mg/kg	J	
DCRB-69	Selenium	0.633	mg/kg	J	
DCRB-73	Selenium	0.523	mg/kg	J	

489-D CPRB FINAL CONFIRMATION DATA					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Most Conservative Threshold Level**
DCRB-61	Selenium	0.504	mg/kg	J	
DCRB-65	Selenium	0.477	mg/kg	J	
DCRB-62	Selenium	0.472	mg/kg	J	
DCRB-76	Selenium	0.425	mg/kg	J	
DCRB-72	Selenium	1.21	mg/kg	U	
DCRB-68	Selenium	1.19	mg/kg	U	
DCRB-63	Selenium	1.18	mg/kg	U	
DCRB-77	Selenium	1.17	mg/kg	U	
DCRB-66	Selenium	1.16	mg/kg	U	
DCRB-75	Selenium	1.15	mg/kg	U	
DCRB-59	Selenium	1.13	mg/kg	U	
DCRB-60	Selenium	1.13	mg/kg	U	
DCRB-56	Selenium	1.1	mg/kg	U	
DCRB-58	Selenium	1.09	mg/kg	U	
DCRB-64	Selenium	1.09	mg/kg	U	
DCRB-59	Silver	0.395	mg/kg	J	<2.2 (ECO)
DCRB-66	Silver	0.384	mg/kg	J	
DCRB-61	Silver	0.364	mg/kg	J	
DCRB-74	Silver	0.359	mg/kg	J	
DCRB-65	Silver	0.352	mg/kg	J	
DCRB-73	Silver	0.328	mg/kg	J	
DCRB-60	Silver	0.265	mg/kg	J	
DCRB-70	Silver	0.215	mg/kg	J	
DCRB-76	Silver	0.173	mg/kg	J	
DCRB-64	Silver	0.161	mg/kg	J	
DCRB-72	Silver	0.153	mg/kg	J	
DCRB-77	Silver	0.14	mg/kg	J	
DCRB-62	Silver	0.136	mg/kg	J	
DCRB-71	Silver	0.128	mg/kg	J	
DCRB-67	Silver	0.62	mg/kg	U	
DCRB-63	Silver	0.597	mg/kg	U	
DCRB-68	Silver	0.586	mg/kg	U	
DCRB-56	Silver	0.563	mg/kg	U	
DCRB-78	Silver	0.563	mg/kg	U	
DCRB-69	Silver	0.553	mg/kg	U	
DCRB-75	Silver	0.545	mg/kg	U	
DCRB-57	Silver	0.542	mg/kg	U	
DCRB-58	Silver	0.53	mg/kg	U	
DCRB-67	Strontium	**180**	**mg/kg**		**96 (ECO)**
DCRB-57	Strontium	50.6	mg/kg		
DCRB-65	Strontium	45.7	mg/kg		
DCRB-74	Strontium	42.3	mg/kg		

489-D CPRB FINAL CONFIRMATION DATA					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Most Conservative Threshold Level**
DCRB-62	Strontium	39.9	mg/kg		
DCRB-73	Strontium	33.6	mg/kg		
DCRB-71	Strontium	24.5	mg/kg		
DCRB-69	Strontium	21.4	mg/kg		
DCRB-70	Strontium	20.9	mg/kg	J	
DCRB-63	Strontium	19.9	mg/kg		
DCRB-78	Strontium	19.6	mg/kg		
DCRB-76	Strontium	16.2	mg/kg		
DCRB-59	Strontium	14.7	mg/kg		
DCRB-60	Strontium	14.7	mg/kg	J	
DCRB-61	Strontium	12.9	mg/kg		
DCRB-77	Strontium	8.83	mg/kg		
DCRB-68	Strontium	7.54	mg/kg		
DCRB-66	Strontium	4.99	mg/kg		
DCRB-75	Strontium	4.97	mg/kg		
DCRB-72	Strontium	4.55	mg/kg		
DCRB-56	Strontium	3.56	mg/kg		
DCRB-58	Strontium	2.67	mg/kg		
DCRB-64	Strontium	1.98	mg/kg	J	
DCRB-72	Thallium	0.484	mg/kg	U	<6.3 (HH and ECO)
DCRB-67	Thallium	0.483	mg/kg	U	
DCRB-68	Thallium	0.474	mg/kg	U	
DCRB-63	Thallium	0.47	mg/kg	U	
DCRB-61	Thallium	0.469	mg/kg	U	
DCRB-77	Thallium	0.468	mg/kg	U	
DCRB-57	Thallium	0.466	mg/kg	U	
DCRB-76	Thallium	0.465	mg/kg	U	
DCRB-73	Thallium	0.464	mg/kg	U	
DCRB-66	Thallium	0.462	mg/kg	U	
DCRB-75	Thallium	0.46	mg/kg	U	
DCRB-74	Thallium	0.456	mg/kg	U	
DCRB-59	Thallium	0.451	mg/kg	U	
DCRB-60	Thallium	0.45	mg/kg	U	
DCRB-70	Thallium	0.45	mg/kg	U	
DCRB-78	Thallium	0.45	mg/kg	U	
DCRB-65	Thallium	0.447	mg/kg	U	
DCRB-56	Thallium	0.44	mg/kg	U	
DCRB-69	Thallium	0.437	mg/kg	U	
DCRB-64	Thallium	0.436	mg/kg	U	
DCRB-58	Thallium	0.435	mg/kg	U	
DCRB-62	Thallium	0.431	mg/kg	U	
DCRB-71	Thallium	0.423	mg/kg	U	

489-D CPRB FINAL CONFIRMATION DATA					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Most Conservative Threshold Level**
DCRB-57	Vanadium	38.7	mg/kg		<69.9 (ECO)
DCRB-70	Vanadium	31.4	mg/kg		
DCRB-75	Vanadium	28.6	mg/kg		
DCRB-74	Vanadium	24.7	mg/kg		
DCRB-61	Vanadium	23.9	mg/kg		
DCRB-73	Vanadium	23.2	mg/kg		
DCRB-76	Vanadium	23.2	mg/kg		
DCRB-58	Vanadium	22.3	mg/kg		
DCRB-71	Vanadium	21.4	mg/kg		
DCRB-66	Vanadium	21.2	mg/kg		
DCRB-69	Vanadium	20.5	mg/kg		
DCRB-65	Vanadium	19.8	mg/kg	J	
DCRB-72	Vanadium	19.2	mg/kg		
DCRB-59	Vanadium	18.6	mg/kg		
DCRB-77	Vanadium	17.8	mg/kg		
DCRB-67	Vanadium	17.6	mg/kg	J	
DCRB-60	Vanadium	15.7	mg/kg	J	
DCRB-78	Vanadium	15.5	mg/kg		
DCRB-64	Vanadium	13.9	mg/kg		
DCRB-62	Vanadium	13.7	mg/kg		
DCRB-68	Vanadium	11.2	mg/kg		
DCRB-63	Vanadium	9.78	mg/kg		
DCRB-56	Vanadium	7.95	mg/kg		
DCRB-72	Zinc	14.3	mg/kg		<46 (ECO)
DCRB-57	Zinc	10.4	mg/kg		
DCRB-71	Zinc	9.91	mg/kg		
DCRB-70	Zinc	9.74	mg/kg	J	
DCRB-74	Zinc	9.55	mg/kg		
DCRB-67	Zinc	9.47	mg/kg		
DCRB-76	Zinc	9.03	mg/kg	J	
DCRB-73	Zinc	8.75	mg/kg	J	
DCRB-63	Zinc	8.56	mg/kg		
DCRB-59	Zinc	8.06	mg/kg		
DCRB-69	Zinc	7.72	mg/kg	J	
DCRB-61	Zinc	7.22	mg/kg		
DCRB-56	Zinc	7.07	mg/kg	J	
DCRB-75	Zinc	6.59	mg/kg	J	
DCRB-66	Zinc	6.45	mg/kg		
DCRB-65	Zinc	5.7	mg/kg	J	
DCRB-78	Zinc	5.63	mg/kg	J	
DCRB-77	Zinc	5.42	mg/kg	J	
DCRB-68	Zinc	5.37	mg/kg	J	
DCRB-60	Zinc	5.23	mg/kg		

489-D CPRB FINAL CONFIRMATION DATA					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Most Conservative Threshold Level**
DCRB-64	Zinc	4.84	mg/kg		
DCRB-62	Zinc	4.8	mg/kg		
DCRB-58	Zinc	3.27	mg/kg	J	
DCRB-69	2-Methylnaphthalene	0.0227	mg/kg	J	<0.07 (ECO)
DCRB-76	2-Methylnaphthalene	0.0185	mg/kg	J	
DCRB-71	2-Methylnaphthalene	0.0152	mg/kg	J	
DCRB-72	2-Methylnaphthalene	0.0406	mg/kg	U	
DCRB-63	2-Methylnaphthalene	0.0393	mg/kg	U	
DCRB-70	2-Methylnaphthalene	0.0393	mg/kg	UJ	
DCRB-73	2-Methylnaphthalene	0.039	mg/kg	U	
DCRB-77	2-Methylnaphthalene	0.039	mg/kg	U	
DCRB-62	2-Methylnaphthalene	0.0388	mg/kg	U	
DCRB-64	2-Methylnaphthalene	0.0387	mg/kg	U	
DCRB-75	2-Methylnaphthalene	0.0387	mg/kg	U	
DCRB-68	2-Methylnaphthalene	0.0385	mg/kg	U	
DCRB-78	2-Methylnaphthalene	0.0385	mg/kg	U	
DCRB-74	2-Methylnaphthalene	0.0383	mg/kg	U	
DCRB-65	2-Methylnaphthalene	0.0373	mg/kg	U	
DCRB-57	Actinium-228 (Radium-228+D)	**2.49**	**pCi/g**		**2.2 (HH)**
DCRB-63	Actinium-228 (Radium-228+D)	1.73	pCi/g		
DCRB-69	Actinium-228 (Radium-228+D)	1.61	pCi/g		
DCRB-66	Actinium-228 (Radium-228+D)	1.58	pCi/g		
DCRB-76	Actinium-228 (Radium-228+D)	1.43	pCi/g		
DCRB-74	Actinium-228 (Radium-228+D)	1.37	pCi/g		
DCRB-56	Actinium-228 (Radium-228+D)	1.26	pCi/g		
DCRB-70	Actinium-228 (Radium-228+D)	1.17	pCi/g		
DCRB-78	Actinium-228 (Radium-228+D)	1.15	pCi/g		
DCRB-77	Actinium-228 (Radium-228+D)	1.13	pCi/g		
DCRB-61	Actinium-228 (Radium-228+D)	1.06	pCi/g		
DCRB-58	Actinium-228 (Radium-228+D)	1.04	pCi/g		
DCRB-71	Actinium-228 (Radium-228+D)	1	pCi/g		
DCRB-67	Actinium-228 (Radium-228+D)	1	pCi/g		
DCRB-73	Actinium-228 (Radium-228+D)	0.913	pCi/g		
DCRB-72	Actinium-228 (Radium-228+D)	0.881	pCi/g		
DCRB-62	Actinium-228 (Radium-228+D)	0.829	pCi/g	J	
DCRB-65	Actinium-228 (Radium-228+D)	0.696	pCi/g		
DCRB-64	Actinium-228 (Radium-228+D)	0.689	pCi/g	J	
DCRB-75	Actinium-228 (Radium-228+D)	0.639	pCi/g	J	
DCRB-59	Actinium-228 (Radium-228+D)	0.623	pCi/g		
DCRB-68	Actinium-228 (Radium-228+D)	0.573	pCi/g	J	
DCRB-60	Actinium-228 (Radium-228+D)	0.488	pCi/g	J	

489-D CPRB FINAL CONFIRMATION DATA					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Most Conservative Threshold Level**
DCRB-57	Lead-212 (Thorium-228+D)	2.28	pCi/g		<2.3 (HH)
DCRB-66	Lead-212 (Thorium-228+D)	1.71	pCi/g		
DCRB-69	Lead-212 (Thorium-228+D)	1.61	pCi/g		
DCRB-63	Lead-212 (Thorium-228+D)	1.39	pCi/g		
DCRB-74	Lead-212 (Thorium-228+D)	1.36	pCi/g		
DCRB-78	Lead-212 (Thorium-228+D)	1.26	pCi/g		
DCRB-76	Lead-212 (Thorium-228+D)	1.21	pCi/g		
DCRB-56	Lead-212 (Thorium-228+D)	1.19	pCi/g		
DCRB-70	Lead-212 (Thorium-228+D)	1.09	pCi/g		
DCRB-71	Lead-212 (Thorium-228+D)	1.09	pCi/g		
DCRB-77	Lead-212 (Thorium-228+D)	1.09	pCi/g		
DCRB-61	Lead-212 (Thorium-228+D)	1.06	pCi/g		
DCRB-67	Lead-212 (Thorium-228+D)	1.04	pCi/g		
DCRB-73	Lead-212 (Thorium-228+D)	1.03	pCi/g		
DCRB-72	Lead-212 (Thorium-228+D)	0.946	pCi/g		
DCRB-64	Lead-212 (Thorium-228+D)	0.85	pCi/g		
DCRB-62	Lead-212 (Thorium-228+D)	0.828	pCi/g		
DCRB-58	Lead-212 (Thorium-228+D)	0.825	pCi/g		
DCRB-59	Lead-212 (Thorium-228+D)	0.732	pCi/g		
DCRB-75	Lead-212 (Thorium-228+D)	0.708	pCi/g		
DCRB-60	Lead-212 (Thorium-228+D)	0.659	pCi/g		
DCRB-68	Lead-212 (Thorium-228+D)	0.582	pCi/g		
DCRB-65	Lead-212 (Thorium-228+D)	0.564	pCi/g		
DCRB-57	Lead-214 (Radium-226+D)	**1.71**	**pCi/g**		**1.2 (HH)**
DCRB-69	Lead-214 (Radium-226+D)	**1.21**	**pCi/g**		
DCRB-66	Lead-214 (Radium-226+D)	1.05	pCi/g		
DCRB-73	Lead-214 (Radium-226+D)	0.841	pCi/g		
DCRB-56	Lead-214 (Radium-226+D)	0.837	pCi/g		
DCRB-78	Lead-214 (Radium-226+D)	0.792	pCi/g		
DCRB-71	Lead-214 (Radium-226+D)	0.78	pCi/g		
DCRB-74	Lead-214 (Radium-226+D)	0.768	pCi/g		
DCRB-76	Lead-214 (Radium-226+D)	0.76	pCi/g		
DCRB-70	Lead-214 (Radium-226+D)	0.744	pCi/g		
DCRB-72	Lead-214 (Radium-226+D)	0.738	pCi/g		
DCRB-67	Lead-214 (Radium-226+D)	0.662	pCi/g		
DCRB-61	Lead-214 (Radium-226+D)	0.656	pCi/g		
DCRB-58	Lead-214 (Radium-226+D)	0.652	pCi/g		
DCRB-77	Lead-214 (Radium-226+D)	0.623	pCi/g		
DCRB-63	Lead-214 (Radium-226+D)	0.595	pCi/g	J	
DCRB-60	Lead-214 (Radium-226+D)	0.587	pCi/g		
DCRB-59	Lead-214 (Radium-226+D)	0.585	pCi/g		
DCRB-68	Lead-214 (Radium-226+D)	0.541	pCi/g		
DCRB-62	Lead-214 (Radium-226+D)	0.504	pCi/g	J	

489-D CPRB FINAL CONFIRMATION DATA					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Most Conservative Threshold Level**
DCRB-75	Lead-214 (Radium-226+D)	0.429	pCi/g		
DCRB-65	Lead-214 (Radium-226+D)	0.392	pCi/g		
DCRB-64	Lead-214 (Radium-226+D)	0.38	pCi/g	J	
DCRB-56	Potassium-40	**6.72**	**pCi/g**		**3.3 (HH)**
DCRB-69	Potassium-40	**4.31**	**pCi/g**		
DCRB-57	Potassium-40	**3.73**	**pCi/g**		
DCRB-76	Potassium-40	2.85	pCi/g		
DCRB-67	Potassium-40	2.43	pCi/g	J	
DCRB-68	Potassium-40	2.41	pCi/g		
DCRB-63	Potassium-40	2.38	pCi/g	J	
DCRB-73	Potassium-40	2.2	pCi/g		
DCRB-70	Potassium-40	2.12	pCi/g	J	
DCRB-72	Potassium-40	2.12	pCi/g		
DCRB-74	Potassium-40	1.97	pCi/g		
DCRB-64	Potassium-40	1.95	pCi/g		
DCRB-58	Potassium-40	1.93	pCi/g		
DCRB-78	Potassium-40	1.93	pCi/g		
DCRB-61	Potassium-40	1.7	pCi/g	J	
DCRB-66	Potassium-40	1.66	pCi/g	J	
DCRB-71	Potassium-40	1.65	pCi/g	J	
DCRB-77	Potassium-40	1.53	pCi/g		
DCRB-59	Potassium-40	1.52	pCi/g	J	
DCRB-62	Potassium-40	1.51	pCi/g	J	
DCRB-75	Potassium-40	1.45	pCi/g	J	
DCRB-60	Potassium-40	1.44	pCi/g	J	
DCRB-65	Potassium-40	0.725	pCi/g	R	
DCRB-56	Uranium-235	0.112	pCi/g	J	<0.194 (HH)
DCRB-58	Uranium-235	0.109	pCi/g	J	
DCRB-57	Uranium-235	0.102	pCi/g	J	
DCRB-65	Uranium-235	0.0796	pCi/g	J	
DCRB-59	Uranium-235	0.0762	pCi/g	J	
DCRB-66	Uranium-235	0.0597	pCi/g	J	
DCRB-70	Uranium-235	0.0738	pCi/g	U	
DCRB-73	Uranium-235	0.0628	pCi/g	U	
DCRB-64	Uranium-235	0.0561	pCi/g	U	
DCRB-62	Uranium-235	0.0545	pCi/g	U	
DCRB-72	Uranium-235	0.0507	pCi/g	U	
DCRB-68	Uranium-235	0.0477	pCi/g	U	
DCRB-63	Uranium-235	0.047	pCi/g	U	
DCRB-60	Uranium-235	0.046	pCi/g	U	
DCRB-74	Uranium-235	0.0436	pCi/g	U	
DCRB-75	Uranium-235	0.0409	pCi/g	U	

489-D CPRB FINAL CONFIRMATION DATA					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Most Conservative Threshold Level**
DCRB-77	Uranium-235	0.0396	pCi/g	U	
DCRB-67	Uranium-235	0.0386	pCi/g	U	
DCRB-76	Uranium-235	0.0363	pCi/g	U	
DCRB-69	Uranium-235	0.031	pCi/g	U	
DCRB-61	Uranium-235	0.0178	pCi/g	U	
DCRB-78	Uranium-235	0.00778	pCi/g	U	
DCRB-71	Uranium-235	0.006	pCi/g	U	
DCRB-58	Uranium-238	**1.4**	**pCi/g**		1.2 (HH)
DCRB-57	Uranium-238	**1.3**	**pCi/g**		
DCRB-74	Uranium-238	0.869	pCi/g		
DCRB-69	Uranium-238	0.718	pCi/g		
DCRB-73	Uranium-238	0.718	pCi/g		
DCRB-70	Uranium-238	0.709	pCi/g		
DCRB-72	Uranium-238	0.616	pCi/g		
DCRB-67	Uranium-238	0.598	pCi/g	J	
DCRB-66	Uranium-238	0.59	pCi/g		
DCRB-56	Uranium-238	0.497	pCi/g		
DCRB-76	Uranium-238	0.496	pCi/g		
DCRB-65	Uranium-239	0.484	pCi/g		
DCRB-59	Uranium-238	0.462	pCi/g		
DCRB-62	Uranium-238	0.457	pCi/g		
DCRB-63	Uranium-238	0.442	pCi/g		
DCRB-64	Uranium-238	0.429	pCi/g		
DCRB-77	Uranium-238	0.395	pCi/g		
DCRB-68	Uranium-238	0.362	pCi/g		
DCRB-75	Uranium-238	0.34	pCi/g		
DCRB-78	Uranium-238	0.331	pCi/g		
DCRB-61	Uranium-238	0.328	pCi/g		
DCRB-71	Uranium-238	0.32	pCi/g		
DCRB-60	Uranium-238	0.27	pCi/g		

Reported result for U qualified data (nondetect) is the practical quantitation limit.
Bolded numbers indicate exceedance of Threshold Level.
HH = human health
ECO = ecological

FIELD DUPLICATE SAMPLE RESULTS					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Field QC Code**
DCRB-62	Aluminum	8,150	mg/kg		FD
DCRB-62	Antimony	1.16	mg/kg	U	FD
DCRB-62	Arsenic	1.27	mg/kg		FD
DCRB-62	Barium	312	mg/kg		FD
DCRB-62	Beryllium	0.816	mg/kg		FD
DCRB-62	Boron	1.08	mg/kg	J	FD
DCRB-62	Cadmium	0.217	mg/kg	U	FD
DCRB-62	Chromium	9.89	mg/kg		FD
DCRB-62	Chromium, Hexavalent	0.443	mg/kg	U	FD
DCRB-62	Cobalt	0.341	mg/kg		FD
DCRB-62	Copper	2.09	mg/kg		FD
DCRB-62	Iron	5,640	mg/kg		FD
DCRB-62	Lead	5.27	mg/kg		FD
DCRB-62	Magnesium	203	mg/kg		FD
DCRB-62	Manganese	4.16	mg/kg		FD
DCRB-62	Mercury	0.397	mg/kg	J	FD
DCRB-62	Molybdenum	0.217	mg/kg	U	FD
DCRB-62	Nickel	1.32	mg/kg		FD
DCRB-62	Selenium	0.606	mg/kg	J	FD
DCRB-62	Silver	0.186	mg/kg	J	FD
DCRB-62	Strontium	53.5	mg/kg		FD
DCRB-62	Thallium	0.434	mg/kg	U	FD
DCRB-62	Vanadium	13.7	mg/kg		FD
DCRB-62	Zinc	4.59	mg/kg		FD
DCRB-62	2-Methylnaphthalene	0.0387	mg/kg	U	FD
DCRB-62	Actinium-228	0.931	pCi/g		FD
DCRB-62	Lead-212	1.05	pCi/g		FD
DCRB-62	Lead-214	0.637	pCi/g		FD
DCRB-62	Potassium-40	1.33	pCi/g	J	FD
DCRB-62	Uranium-233/234	0.746	pCi/g		FD
DCRB-62	Uranium-235	0.0481	pCi/g	U	FD
DCRB-62	Uranium-238	0.855	pCi/g		FD
DCRB-65	Aluminum	10,100	mg/kg		FD
DCRB-65	Antimony	1.13	mg/kg	U	FD
DCRB-65	Arsenic	1.86	mg/kg		FD
DCRB-65	Barium	131	mg/kg		FD
DCRB-65	Beryllium	0.454	mg/kg		FD
DCRB-65	Boron	1.06	mg/kg	J	FD
DCRB-65	Cadmium	0.228	mg/kg	U	FD
DCRB-65	Chromium	14.3	mg/kg	J	FD
DCRB-65	Chromium, Hexavalent	0.437	mg/kg	U	FD
DCRB-65	Cobalt	0.435	mg/kg		FD
DCRB-65	Copper	2.78	mg/kg		FD
DCRB-65	Iron	9,060	mg/kg		FD
DCRB-65	Lead	5.67	mg/kg		FD

FIELD DUPLICATE SAMPLE RESULTS					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Field QC Code**
DCRB-65	Magnesium	247	mg/kg	J	FD
DCRB-65	Manganese	5.38	mg/kg		FD
DCRB-65	Mercury	0.0214	mg/kg		FD
DCRB-65	Molybdenum	0.165	mg/kg	U	FD
DCRB-65	Nickel	2.77	mg/kg	J	FD
DCRB-65	Selenium	1.14	mg/kg	U	FD
DCRB-65	Silver	0.386	mg/kg	J	FD
DCRB-65	Strontium	41.6	mg/kg		FD
DCRB-65	Thallium	0.456	mg/kg	U	FD
DCRB-65	Vanadium	17.8	mg/kg	J	FD
DCRB-65	Zinc	6.8	mg/kg	J	FD
DCRB-65	2-Methylnaphthalene	0.0392	mg/kg	U	FD
DCRB-65	Actinium-228	0.8	pCi/g		FD
DCRB-65	Lead-212	0.859	pCi/g		FD
DCRB-65	Lead-214	0.546	pCi/g		FD
DCRB-65	Potassium-40	1.31	pCi/g	J	FD
DCRB-65	Uranium-233/234	0.596	pCi/g		FD
DCRB-65	Uranium-235	0.115	pCi/g	J	FD
DCRB-65	Uranium-238	0.462	pCi/g		FD
DCRB-67	Aluminum	18,700	mg/kg		FD
DCRB-67	Antimony	6.16	mg/kg	U	FD
DCRB-67	Arsenic	2.88	mg/kg	J	FD
DCRB-67	Barium	447	mg/kg		FD
DCRB-67	Beryllium	1.24	mg/kg	J	FD
DCRB-67	Boron	8.15	mg/kg		FD
DCRB-67	Cadmium	0.232	mg/kg	U	FD
DCRB-67	Chromium	27.6	mg/kg		FD
DCRB-67	Chromium, Hexavalent	0.762	mg/kg		FD
DCRB-67	Cobalt	0.519	mg/kg		FD
DCRB-67	Copper	1.68	mg/kg	J	FD
DCRB-67	Iron	7,550	mg/kg		FD
DCRB-67	Lead	14.8	mg/kg	J	FD
DCRB-67	Magnesium	1,670	mg/kg		FD
DCRB-67	Manganese	6.07	mg/kg		FD
DCRB-67	Mercury	0.019	mg/kg		FD
DCRB-67	Molybdenum	0.232	mg/kg	U	FD
DCRB-67	Nickel	2.08	mg/kg		FD
DCRB-67	Selenium	3.85	mg/kg	J	FD
DCRB-67	Silver	0.616	mg/kg	U	FD
DCRB-67	Strontium	187	mg/kg		FD
DCRB-67	Thallium	0.463	mg/kg	U	FD
DCRB-67	Vanadium	19.2	mg/kg	J	FD
DCRB-67	Zinc	9.96	mg/kg		FD
DCRB-67	Actinium-228	0.92	pCi/g		FD
DCRB-67	Lead-212	1.12	pCi/g		FD

FIELD DUPLICATE SAMPLE RESULTS					
Station ID	**Analyte**	**Result**	**Result Units**	**Review Qualifier**	**Field QC Code**
DCRB-67	Lead-214	0.731	pCi/g		FD
DCRB-67	Potassium-40	3.5	pCi/g		FD
DCRB-67	Uranium-233/234	0.701	pCi/g		FD
DCRB-67	Uranium-235	0.0628	pCi/g	J	FD
DCRB-67	Uranium-238	0.673	pCi/g	J	FD

FD = field duplicate
Reported result for U qualified data (nondetect) is the practical quantitation limit.

APPENDIX B

SRS Soil Background Concentrations

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SRS Soil Background Concentrations[1]

Analyte	Units	SRS 95th %-tile Bkgd	SRS Maximum Bkgd
Al	mg/kg	15,700	23,700
Sb	mg/kg	3.3	8.8
As	mg/kg	*8.2*	22.9
Ba	mg/kg	49.9	252
Be	mg/kg	0.4	1.2
B	mg/kg	NA	NA
Cd	mg/kg	1.4	2.0
Cr	mg/kg	29.9	54.3
Cr^{+6}	mg/kg	NA	NA
Co	mg/kg	2.2	5.0
Cu	mg/kg	7.7	74.2
Fe	mg/kg	28,675	44,300
Pb	mg/kg	13.6	26.6
Mg	mg/kg	334	1040
Mn	mg/kg	134	346
Hg	mg/kg	0.10	0.30
Mo	mg/kg	NA	NA
Ni	mg/kg	5.1	27.0
Se	mg/kg	7.8	12.2
Ag	mg/kg	1.4	2.0
Sr	mg/kg	NA	NA
Tl	mg/kg	*6.3*	8.1
V	mg/kg	69.9	104
Zn	mg/kg	11.3	20.7
K-40	pCi/g	*3.3*	8.53
Ra-226 (+D)	pCi/g	*1.20*	1.74
Ra-228 (+D)	pCi/g	*2.22*	6.75
Th-228 (+D)	pCi/g	*2.25*	4.17
U-235 (+D)	pCi/g	0.11	0.17
U-238 (+D)	pCi/g	*1.22*	1.9

1 = Maximum detected concentration from Appendix B-2 in the *Background Soils Statistical Summary Report for the Savannah River Site* (WSRC 2006).
NA = not available

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APPENDIX C

ProUCL Output for Human Health Statistical Hypothesis Testing

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One Sample Wilcoxon Signed Rank Test for Data Sets with Non-Detects — Cr+6

User Selected Options	
Date/Time of Computation	ProUCL 5.13/16/2017 3:16:36 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Action Level	**0.29**
Selected Null Hypothesis	Mean/Median <= Action Level (Form 1)
Alternative Hypothesis	Mean/Median > the Action Level

Cr+6

One Sample Wilcoxon Signed Rank Test

Raw Statistics	
Number of Valid Data	23
Number of Distinct Data	23
Number of Non-Detects	8
Number of Detects	15
Percent Non-Detects	34.78%
Minimum Non-detect	0.101
Maximum Non-detect	0.186
Minimum Detect	0.212
Maximum Detect	1.53
Mean of Detects	0.491
Median of Detects	0.394
SD of Detects	0.329
Median of Processed Data used in WSR	0.306
Number Above Action Level	12
Number Equal Action Level	0
Number Below Action Level	11
T-plus	144
T-minus	132

H0: Sample Median <= 0.29 (Form 1)

Large Sample z-Test Statistic	0.198
Critical Value (0.05)	1.645
P-Value	0.422

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Mean/Median <= 0.29
P-Value > Alpha (0.05)

Dataset contains multiple Non-Detect values!
All NDs are replaced by their respective DL/2

One Sample t-Test for Uncensored Full Data Sets without NDs — Ra-228

User Selected Options	
Date/Time of Computation	ProUCL 5.13/16/2017 3:19:28 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Action Level	**2.2**
Selected Null Hypothesis	Mean <= Action Level (Form 1)
Alternative Hypothesis	Mean > the Action Level

Ra-228

One Sample t-Test

Raw Statistics	
Number of Valid Observations	23
Number of Distinct Observations	22
Minimum	0.488
Maximum	2.49
Mean	1.102
Median	1.04
SD	0.459
SE of Mean	0.0958

H0: Sample Mean <= 2.2 (Form 1)

Test Value	-11.46
Degrees of Freedom	22
Critical Value (0.05)	1.717
P-Value	1

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Mean <= 2.2
P-Value > Alpha (0.05)

One Sample t-Test for Uncensored Full Data Sets without NDs — Ra-226

User Selected Options	
Date/Time of Computation	ProUCL 5.13/16/2017 3:20:24 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Action Level	**1.2**
Selected Null Hypothesis	Mean <= Action Level (Form 1)
Alternative Hypothesis	Mean > the Action Level

Ra-226

One Sample t-Test

Raw Statistics	
Number of Valid Observations	23
Number of Distinct Observations	23
Minimum	0.38
Maximum	1.71
Mean	0.732
Median	0.662
SD	0.288
SE of Mean	0.0601

H0: Sample Mean <= 1.2 (Form 1)

Test Value	-7.788
Degrees of Freedom	22
Critical Value (0.05)	1.717
P-Value	1

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Mean <= 1.2
P-Value > Alpha (0.05)

One Sample t-Test for Uncensored Full Data Sets without NDs — K-40

User Selected Options	
Date/Time of Computation	ProUCL 5.13/16/2017 3:21:27 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Action Level	**3.3**
Selected Null Hypothesis	Mean <= Action Level (Form 1)
Alternative Hypothesis	Mean > the Action Level

K-40

One Sample t-Test

Raw Statistics	
Number of Valid Observations	22
Number of Distinct Observations	20
Minimum	1.44
Maximum	6.72
Mean	2.341
Median	1.96
SD	1.215
SE of Mean	0.259

H0: Sample Mean <= 3.3 (Form 1)

Test Value	-3.702
Degrees of Freedom	21
Critical Value (0.05)	1.721
P-Value	0.999

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Mean <= 3.3
P-Value > Alpha (0.05)

One Sample t-Test for Uncensored Full Data Sets without NDs — U-238

User Selected Options	
Date/Time of Computation	ProUCL 5.13/16/2017 3:22:44 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Action Level	**1.2**
Selected Null Hypothesis	Mean <= Action Level (Form 1)
Alternative Hypothesis	Mean > the Action Level

U-238

One Sample t-Test

Raw Statistics	
Number of Valid Observations	23
Number of Distinct Observations	22
Minimum	0.27
Maximum	1.4
Mean	0.571
Median	0.484
SD	0.29
SE of Mean	0.0605

H0: Sample Mean <= 1.2 (Form 1)

Test Value	-10.4
Degrees of Freedom	22
Critical Value (0.05)	1.717
P-Value	1

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Mean <= 1.2
P-Value > Alpha (0.05)

ProUCL Inputs					
Cr+6	d_Cr+6	Ra-228	Ra-226	K-40	U-238
1.53	1	2.49	1.71	6.72	1.4
0.746	1	1.73	1.21	4.31	1.3
0.656	1	1.61	1.05	3.73	0.869
0.59	1	1.58	0.841	2.85	0.718
0.56	1	1.43	0.837	2.43	0.718
0.47	1	1.37	0.792	2.41	0.709
0.417	1	1.26	0.78	2.38	0.616
0.394	1	1.17	0.768	2.2	0.598
0.348	1	1.15	0.76	2.12	0.59
0.323	1	1.13	0.744	2.12	0.497
0.317	1	1.06	0.738	1.97	0.496
0.306	1	1.04	0.662	1.95	0.484
0.251	1	1	0.656	1.93	0.462
0.24	1	1	0.652	1.93	0.457
0.212	1	0.913	0.623	1.7	0.442
0.115	0	0.881	0.595	1.66	0.429
0.127	0	0.829	0.587	1.65	0.395
0.101	0	0.696	0.585	1.53	0.362
0.136	0	0.689	0.541	1.52	0.34
0.137	0	0.639	0.504	1.51	0.331
0.169	0	0.623	0.429	1.45	0.328
0.179	0	0.573	0.392	1.44	0.32
0.186	0	0.488	0.38		0.27

APPENDIX D

ProUCL Output for Ecological Statistical Hypothesis Testing

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One Sample t-Test for Uncensored Full Data Sets without NDs – Ba (Aquatic Receptors)

User Selected Options	
Date/Time of Computation	ProUCL 5.13/16/2017 3:07:49 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Action Level	**60**
Selected Null Hypothesis	Mean <= Action Level (Form 1)
Alternative Hypothesis	Mean > the Action Level

Ba

One Sample t-Test

Raw Statistics	
Number of Valid Observations	23
Number of Distinct Observations	23
Minimum	10.7
Maximum	472
Mean	87.76
Median	59.5
SD	100.8
SE of Mean	21.01

H0: Sample Mean <= 60 (Form 1)

Test Value	1.321
Degrees of Freedom	22
Critical Value (0.05)	1.717
P-Value	0.1

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Mean <= 60
P-Value > Alpha (0.05)

One Sample t-Test for Uncensored Full Data Sets without NDs – Ba (Terrestrial Receptors)

User Selected Options	
Date/Time of Computation	ProUCL 5.13/16/2017 3:14:26 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Action Level	**330**
Selected Null Hypothesis	Mean <= Action Level (Form 1)
Alternative Hypothesis	Mean > the Action Level

Ba

One Sample t-Test

Raw Statistics	
Number of Valid Observations	23
Number of Distinct Observations	23
Minimum	10.7
Maximum	472
Mean	87.76
Median	59.5
SD	100.8
SE of Mean	21.01

H0: Sample Mean <= 330 (Form 1)

Test Value	-11.53
Degrees of Freedom	22
Critical Value (0.05)	1.717
P-Value	1

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Mean <= 330
P-Value > Alpha (0.05)

One Sample Wilcoxon Signed Rank Test for Data Sets with Non-Detects — B

User Selected Options	
Date/Time of Computation	ProUCL 5.13/16/2017 3:15:23 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Action Level	**7.5**
Selected Null Hypothesis	Mean/Median <= Action Level (Form 1)
Alternative Hypothesis	Mean/Median > the Action Level

B

One Sample Wilcoxon Signed Rank Test

Raw Statistics	
Number of Valid Data	23
Number of Distinct Data	23
Number of Non-Detects	3
Number of Detects	20
Percent Non-Detects	13.04%
Minimum Non-detect	0.871
Maximum Non-detect	0.894
Minimum Detect	0.931
Maximum Detect	9.34
Mean of Detects	3.414
Median of Detects	2.645
SD of Detects	2.233
Median of Processed Data used in WSR	2.43
Number Above Action Level	1
Number Equal Action Level	0
Number Below Action Level	22
T-plus	2
T-minus	274

H0: Sample Median <= 7.5 (Form 1)

Large Sample z-Test Statistic	-4.121
Critical Value (0.05)	1.645
P-Value	1

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Mean/Median <= 7.5
P-Value > Alpha (0.05)

Dataset contains multiple Non-Detect values!
All NDs are replaced by their respective DL/2

One Sample t-Test for Uncensored Full Data Sets without NDs — Pb

User Selected Options	
Date/Time of Computation	ProUCL 5.13/16/2017 3:17:29 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Action Level	**13.6**
Selected Null Hypothesis	Mean <= Action Level (Form 1)
Alternative Hypothesis	Mean > the Action Level

Pb

One Sample t-Test

Raw Statistics	
Number of Valid Observations	23
Number of Distinct Observations	23
Minimum	2.4
Maximum	17.6
Mean	6.851
Median	5.99
SD	3.358
SE of Mean	0.7

H0: Sample Mean <= 13.6 (Form 1)

Test Value	-9.64
Degrees of Freedom	22
Critical Value (0.05)	1.717
P-Value	1

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Mean <= 13.6
P-Value > Alpha (0.05)

One Sample t-Test for Uncensored Full Data Sets without NDs — Sr

User Selected Options	
Date/Time of Computation	ProUCL 5.13/16/2017 3:18:28 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Action Level	**96**
Selected Null Hypothesis	Mean <= Action Level (Form 1)
Alternative Hypothesis	Mean > the Action Level

Sr

One Sample t-Test

Raw Statistics	
Number of Valid Observations	23
Number of Distinct Observations	22
Minimum	1.98
Maximum	180
Mean	25.91
Median	16.2
SD	36.61
SE of Mean	7.633

H0: Sample Mean <= 96 (Form 1)

Test Value	-9.182
Degrees of Freedom	22
Critical Value (0.05)	1.717
P-Value	1

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Mean <= 96
P-Value > Alpha (0.05)

Pro UCL Inputs				
Ba	B	d_B	Pb	Sr
472	9.34	1	17.6	180
230	7.47	1	13.4	50.6
158	5.37	1	10.5	45.7
151	5.29	1	8.52	42.3
143	4.74	1	8.34	39.9
114	4.61	1	8.06	33.6
86.6	4.12	1	7.94	24.5
82.9	4.1	1	6.78	21.4
82.1	3.05	1	6.55	20.9
70	2.72	1	6.46	19.9
59.9	2.57	1	6.37	19.6
59.5	2.43	1	5.99	16.2
51.7	2.3	1	5.84	14.7
49.2	2.28	1	5.7	14.7
38.2	1.67	1	5.68	12.9
29.2	1.55	1	5.66	8.83
28.6	1.38	1	5.15	7.54
23.8	1.3	1	4.95	4.99
22.7	1.06	1	4.38	4.97
21.8	0.931	1	4.28	4.55
20.6	0.894	0	4.18	3.56
13	0.879	0	2.84	2.67
10.7	0.871	0	2.4	1.98

APPENDIX E

Additional Hexavalent Chromium Data Evaluation

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One Sample t-Test for Uncensored Full Data Sets without NDs — BAL Cr6 (IC-ICP-MS)

User Selected Options	
Date/Time of Computation	ProUCL 5.13/16/2017 3:26:43 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Action Level	**0.29**
Selected Null Hypothesis	Mean <= Action Level (Form 1)
Alternative Hypothesis	Mean > the Action Level

BAL Cr6 (IC-ICP-MS)

One Sample t-Test

Raw Statistics	
Number of Valid Observations	23
Number of Distinct Observations	23
Minimum	0.11
Maximum	1.52
Mean	0.336
Median	0.258
SD	0.293
SE of Mean	0.0611

H0: Sample Mean <= 0.29 (Form 1)

Test Value	0.761
Degrees of Freedom	22
Critical Value (0.05)	1.717
P-Value	0.227

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Mean <= 0.29
P-Value > Alpha (0.05)

Pro UCL Inputs
BAL Cr6
0.127
0.11
0.14
0.19
0.36
0.333
0.282
0.196
0.315
0.459
0.174
0.357
0.111
0.394
0.229
1.52
0.23
0.488
0.625
0.258
0.492
0.181
0.168

Mean Calculation for EPA Method 7196A (colorimetric)

Sample Grid	Sample Identification DCRP-xx	ProUCL Input		Qual	Excel Input	
		Cr+6	d_Cr+6		Mean Calculation	Comment
1	-56	0.179	0	U	0.0895	1/2 DL used as surrogate
2	-57	0.186	0	U	0.093	1/2 DL used as surrogate
3	-58	0.746	1		0.746	
4	-59	0.115	0	U	0.0575	1/2 DL used as surrogate
5	-60	0.59	1	J	0.59	
6	-61	0.127	0	U	0.0635	1/2 DL used as surrogate
7	-62	0.317	1	J	0.317	
8	-63	0.251	1	J	0.251	
9	-64	0.656	1		0.656	
10	-65	0.306	1	J	0.306	
11	-66	0.417	1	J	0.417	
NA	-67	0.24	1		0.24	
NA	-68	0.212	1	J	0.212	
NA	-69	0.136	0	U	0.068	1/2 DL used as surrogate
NA	-70	0.101	0	U	0.0505	1/2 DL used as surrogate
NA	-71	0.137	0	U	0.0685	1/2 DL used as surrogate
NA	-72	0.348	1	J	0.348	
NA	-73	0.56	1		0.56	
NA	-74	0.394	1	J	0.394	
NA	-75	0.323	1	J	0.323	
NA	-76	1.53	1		1.53	
NA	-77	0.169	0	U	0.0845	1/2 DL used as surrogate
NA	-78	0.47	1		0.47	
				mean =	**0.345**	

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