APPENDIX F

Data Usability Analysis

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Data Usability Analysis

Criterion I - Availability of Information Associated with Site Data

Sufficient information needs to be available to evaluate the usability of the site characterization data. The required information should be available from documentation associated with the data and data collection effort. Table F-1 identifies the required information sources, as identified by USEPA and NDEP, and the availability of such information for the DU process associated with the WRF risk assessment.

TABLE F-1
Availability of Information Sources Used in the Data Usability Process

Information Source	Available?	Comment
Detailed site description	Yes	A site description provided in Section I.A and Section III.B of this report identifies the location and features of the site, the characteristics of the site vicinity, and contaminant transport mechanisms.
Site map with sample locations	Yes	Figures 1 – 5 of this report
Sampling design, procedures, and rationale.	Yes	These sources of information are provided in Chapter II and Appendix A of this report and as part of the work plan (ENVIRON 2001).
Analytical methods and detection limits	Yes	This information is provided in Table 1 of this report and as part of the laboratory data package.
Analytical data results, with qualifiers and detection limits, for compounds and TICs	Yes	A summary of this data is provided in Tables 4 and 5. A complete data set is provided in Appendix D to this report.
Field physical parameter data	Yes	Physical parameter data collected during site characterization activities are summarized in Tables 2 and 3 and Appendix D.
Narrative of qualified data	Yes	With each analytical data package, the laboratory provided a narrative of QA/QC procedures and results. These narratives are included as part of Appendix D.
Quality Control (QC) data results	Yes	The laboratory provided ENVIRON with the results of its QC analysis, including blanks, replicates, and spikes. The laboratory QC results are provided in Appendix D.
Definitions of flagged data	Yes	Data flags used by the laboratory were defined adequately
Raw data	Yes	Hard copies of the data and electronic files containing the data were made available to ENVIRON by the laboratory. A copy of the data in electronic form is provided as Appendix D.

Criterion II - Documentation Review

The objective of the documentation review is to confirm that the analytical results provided are associated with a specific sample location and collection procedure, using available documentation, including chain-of-custody forms, standard operating procedures, and field/analytical records. For the purposes of the DU analysis, the chain-of-custody forms prepared in the field were reviewed and compared to the analytical data results provided by the

laboratory. In addition, boring logs prepared from notes collected in field log books were reviewed to ensure that the recorded sampling activities and locations were appropriate. In several instances, the laboratory noted discrepancies between the contents of the coolers received and the accompanying chain-of-custody forms. In each case, the laboratory group leader contacted ENVIRON's field personnel to resolve the discrepancy before laboratory analysis proceeded. Each discrepancy is identified by the laboratory in its narratives (provided with each data package). For the purposes of this review, ENVIRON reviewed each of the discrepancies noted in the laboratory narratives, the chain-of-custody forms, and field notes to confirm that the discrepancies were resolved correctly.

Based on ENVIRON's review, all samples analyzed by the laboratory were correlated to the correct geographic location at the site. It should be noted, however, that the proposed ground water monitoring well B2-11 (identified in the workplan; ENVIRON 2001) could not be found in the field at the specified location; therefore, the nearest ground water monitoring well to the proposed location (well B2-14) was sampled. Use of data from this alternative location should not affect the results of the risk assessment. In addition, ground water monitoring well DM-4, located off-site to the south, was found to be dry at the time of sample collection. No other monitoring wells in the vicinity of DM-4 were available to collect a sample from an alternative location; thus no upgradient ground water sample is available for the risk assessment.

Criterion III - Data Sources

The review of data sources is performed to determine whether the analytical techniques used in the site characterization process are appropriate to identify the chemicals of potential concern in the risk assessment for each medium being evaluated and whether field measurements of physical parameters were adequately collected.

The site data collection activities were developed to characterize a broad spectrum of chemicals potentially present on the site, including VOCs, SVOCs, metals and other inorganics, radionuclides, dioxins/furans, PCBs, pesticides, and asbestos. Laboratory analysis for this broad spectrum of analytes was conducted on each of the soil and ground water samples collected at the site, with one exception: VOC analysis was conducted on only five of the six ground water samples collected. The laboratory reported that it did not receive a VOC sample from well B2-8, located in the western portion of the Southern Exposure Area. VOC analytical results are available for the other three on-site ground water monitoring locations and for the two off-site (downgradient) monitoring wells.

Field physical parameter measurements, such as particle size, bulk density, and soil moisture, were analyzed in each sample, when an undisturbed soil core could be collected. At certain locations, an undisturbed core could not be collected due to the presence of gravel or caliche, which crimped or ripped the sampling tubes, or clay, which expanded in the sampling

tubes and could not be removed as an intact sample. In total, soil samples collected for physical parameter analysis were collected from 68 locations. For the purposes of the risk assessment, however, sufficient physical parameter data were collected to adequately characterize the site.

Based on the review of the available information, the data sources for chemical and physical parameter measurements are adequate for use in the risk assessment.

Criterion IV - Analytical Methods and Detection Limits

In addition to the appropriateness of the analytical techniques evaluated as part of Criterion III, the DU process evaluates whether the analytical methods used appropriately identify chemicals of potential concern and whether the detection limits are low enough to allow adequate characterization of risks. At a minimum, this DU criterion can be met through the determination that routine USEPA methods were used in analyzing samples collected from the site. Table 1 (in the report) identifies the USEPA methods that were used in conducting the laboratory analysis of soil and ground water samples. Each of the identified USEPA methods are believed to be the most appropriate method for the respective chemical constituent class and each was approved by NDEP as part of the work plan (ENVIRON 2001).

As an additional step, ENVIRON reviewed the range of detection limits achieved in field samples, as summarized in Tables 2 and 3 of the report. For most of the chemicals, the detection limits did not vary significantly between individual samples, with typical variability of less than a factor of two between the minimum and maximum detection limits. Greater variability was observed in certain pesticide samples. Specifically, sample P-4 (10' – 12') had to be diluted and reanalyzed, with an associated ten-fold increase in detection limits. In addition, for certain pesticides, the maximum detection limit exceeded the maximum detected concentration. To provide a basis for comparison, the maximum detection limit was compared to the USEPA Region 9 PRG. With the exception of Dieldrin, the PRGs reviewed were all greater than 100 times the maximum detection limit and most were 1,000 times greater than the detection limit. For Dieldrin, which was detected in 4 of 72 soil samples, the maximum detected concentration was 4.3 µg/kg, the maximum detection limit was 3.3 µg/kg, and the PRG is 150 µg/kg. Thus, it does not appear that the detection limit for Dieldrin or any of the other COPCs were elevated enough to pose a cause for concern.

Criterion V - Data Review

The data review portion of the DU process focuses primarily of the quality of the analytical data received from the laboratory. All site data that are used in the risk assessment must be evaluated on the basis of completeness, precision (based on duplicates), and accuracy (based on laboratory spikes). In addition, the laboratory results data are reviewed for instrument calibration results, blank contamination, instrument adherence to method specifications and QC

limits, and method performance. The results of ENVIRON's data review for these issues are presented below:

Laboratory QA/QC - Precision, Accuracy, and Method Performance

A tabulated summary of ENVIRON's data review of certain laboratory QA/QC procedures is provided at the end of this appendix[28] (Table F-8) and includes an overview of the laboratory reported results for the method blanks, laboratory control samples, matrix spikes and matrix spike duplicates, and surrogates. Although certain laboratory limits, such as PR (percent recovery) and RPD (relative percent difference) between sample and duplicate, were exceeded for certain compounds or analyses, as identified by the laboratory (and confirmed during ENVIRON's review of the data), there does not appear to be a wide-spread effect on the quality of the analytical results (as indicated from a review of Table F-8). Furthermore, based on a review of the laboratory narratives (provided in the laboratory reports in Appendix D), the laboratory does not believe that the observed exceedances of laboratory criteria represent a concern. Additional discussion of specific exceedances, with respect to precision and accuracy, is provided below under Criterion VI.

It should be noted that certain compounds were detected in the laboratory method blank samples, as indicated in Table F-8. Based on ENVIRON's review, the laboratory did not qualify the data with a "B" flag for several radionuclides that were detected in method blanks, as indicated in Table F-2.

TABLE F-2
Chemicals Detected in Method Blank Samples Not Qualified by Laboratory

Parameter	Samples
Lead 210	A-1(16-18)
Radium 228	P-9(6-8), P-6(10-12), P-6(18-21), P-7(18-20)
Thorium 230	P-11(0-1), P-12(4-5), P-13(0-1), P-16(4-5), A-1(0-1), B-3(0-1), B-3(4-5), DUP2, DUP3, P-5(0-1), P-8(0-1), P-8(10-12), P-17(0-1), DUP2, S-2(0-1), S-2(18-20), B-14, B28, PC-4, PC-56, PC-58, P-9(0-1), P-10(0-1), P-10(10-11), P-10(16.5-17.5)
Thorium 232	PC-4, PC-58

[28] This summary table was placed at the end of the appendix because of the length of the table would disrupt the text of the appendix.

Field and Trip Blanks

ENVIRON reviewed the results of the field and trip blanks to determine whether the detection of certain chemicals in soil and ground water samples may not be site related. The field blanks provide an indication of the possible introduction of chemicals from field equipment, and the trip blanks, which are analyzed solely for VOCs, indicate the possible introduction of chemicals from the atmosphere. A summary of the chemicals detected in the trip blanks is presented in Table F-3. As indicated in Tables F-3, acetone and methylene chloride were the primary contaminants that were detected in trip blanks. Applying the methodology recommended by USEPA (1989) for chemicals detected in trip blanks, the detection of acetone and methylene chloride in several samples was assumed to be due to non-site-related contamination. The specific samples affected are summarized in Table F-4.

A summary of the chemicals detected in field blanks is provided in Table F-5. Only metals and radionuclides were detected, generally at low concentrations, in field blank samples. This was apparently due to the presence of dusty conditions at the site. Any dust that was incorporated into the field blanks would likely have included metals and radionuclides at low concentrations. Thus, the contaminants in the field blank samples were assumed to be site related and the presence of these chemicals in site samples was not qualified.

Field Duplicates

The field duplicates were reviewed to provide an indication of the precision of the field sampling procedures. It is expected that the concentration of a given chemical in a field duplicate and the original sample should be similar given that the samples are collected in the same location, in the same manner, and at the same time. Nonetheless, some variation is expected, and the relative difference (measured as the RPD) between the samples is likely to be greater than for laboratory duplicates. ENVIRON reviewed the analytical data for the chemicals detected in the six pairs of field duplicates, presented in Table F-6. The relative percent difference between the sample concentrations was calculated for those chemicals that were detected in both samples. As indicated by a review of the calculated RPD values in Table F-6, there is significant variation for some chemicals. The greatest variability appears to be associated with analyses for dioxins/furans. In several instances, a congener was detected in one sample of the pair but not the other. In such cases, it was conservatively assumed that the detected concentration applied. For pairs of samples in which a chemical was detected in both the original and the duplicate, the average of the two values was assumed to apply.

TABLE F-3
Analysis of Trip Blanks

Chain of Custody Number	Trip Blank Lot Number	Trip Blank Matrix	Trip Blank Sample Number[1]	Trip Blank Prep Batch Number	Volatile Organic Compounds Detected in Trip Blank	Samples in Cooler with Trip Blank
057720	F1E210132	Soil	5	1152317	Detections below RL[2] for Acetone and Methylene chloride.	B-2(0-1), B-2(4-5), P-15(0-1), P-15(4-5)
057703 057705	F1E210132	Soil	17	1152317	No detections.	DUP1, P-11(0-1), P-11(4-5), P-12(0-1), P-12(4-5), P-14(0-1), P-14(4-5), P-16(0-1), P-16(4-5), P-13(0-1), P-13(4-5), P-7(10-12), P-7(18-20)
057717 057713	F1E210157	Soil	16	1152317	Detection below RL for Methylene chloride.	P-17(0-1), P-17(4-5), DUP2, B-3(0-1), B-3(4-5), A-1(0-1), A-1(10-12), A-1(16-18), P-8(0-1), P-8(10-12), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18), DUP3
057701	F1E180264	Soil	9	1150247	Detection below RL for Methylene chloride.	P-10(0-1), P-10(10-11), P-10(16.5-17.5), P-10(12-12.5), P-9(0-1), P-9(8), P-7(0-1), P-7(2-3)
057718	F1E220189	Soil	11	1152317	No detections.	E-2(0-1), E-2(4-5), E-1(0-1), E-1(4-5), S-1(0-1), S-1(10-12), S-1(16-17), B-1(0-1), B-1(10-12), B-1(19-21)
057706	F1E220189	Soil	21	1154111	Detection below RL for Methylene chloride.	P-3(0-1), P-3(10-12), P-3(18-20), P-2(0-1), P-2(10-12), P-2(16-18), A-2(0-1), A-2(10-12), A-2(19-21)
057709	F1E220189	Soil	30	1154111	Detection above RL for Methylene chloride. Detections below RL for Acetone, Tetrachloroethene, and Xylenes.	P-6(0-1), P-6(10-12), P-6(18-21), P-1(0-1), P-1(10-12), P-1(18-20)
057722 057723	F1E230191	Water	2	1155153	Detections below RL for Methylene chloride and Carbon disulfide.	WB01
057726	F1E230191	Soil	8	1155153	Detections above RL for Methylene chloride and Carbon disulfide. Detection below RL for Acetone.	P-17(6-8), P-12(15-17), P-11(15-17)
057729	F1E230191	Soil	17	1155153	Detection below RL for Methylene chloride.	S-2(0-1), S-2(10-12), S-2(18-20), P-4(0-1), P-4(10-12), P-4(20-22), P-7(19-21), E-2(6-8)
057744 057745	F1E240210	Water	9	1155162	Detection below RL for Methylene chloride.	PC56-GW01, DUP6
057712 057715	F1E240210	Water	10	1155162	Detections below RL for Methylene chloride and Acetone.	B2-14, PC4-GW01
057719 057728	F1E240210	Water	11	1155162	Detection below RL for Dibromochloromethane	PC-58, PC-2
057738 057739	F1E240210	Water	12	1156367	Detections below RL for Methylene chloride and Acetone.	RINSE3

1) Sample number is listed on the Chain of Custody and in the Analytical Report.
2) Reporting Limit.

TABLE F-4 Chemicals Detected in Trip Blank Samples	
Parameter	**Samples**
Acetone	B-2(4-5), P-14(4-5), P-15(0-1), P-15(4-5), B2-14
Methylene chloride	P-14(4-5), P-1(18-20), P-7(0-1)

TABLE F-5 Summary of Chemicals Detected in Field (Rinse) Blank Samples	
Sample	**Samples**
WB01 (Rinse 1)	**Metals and Inorganics** - Chromium, Manganese, Titanium, , Calcium, Sodium **Radionuclides** – Uranium 234, Thorium 230, Thorium 232
Rinse 3	**Metals and Inorganics** - Manganese, Molybdenum, Nickel, Calcium, Sodium **Radionuclides** – Thorium 230, Lead 210

TABLE F-6

Summary of Field Duplicate Sampling Results

Field Duplicate Analyses for P-7(0-1) - DUP1

Analysis	Parameter	P-7(0-1) Result	DUP1 Result	RPD	Comments
Dioxins/Furans	1,2,3,4,6,7,8-HpCDF	ND	18	N/A	Original result is below detection limit. The detected value was used to calculate exposure.
Dioxins/Furans	1,2,3,4,7,8,9-HpCDF	ND	5	N/A	Original result is below detection limit. The detected value was used to calculate exposure.
Dioxins/Furans	1,2,3,4,7,8-HxCDF	ND	9	N/A	Original result is below detection limit. The detected value was used to calculate exposure.
Dioxins/Furans	1,2,3,6,7,8-HxCDF	ND	5.2	N/A	Original result is below detection limit. The detected value was used to calculate exposure.
Dioxins/Furans	1,2,3,7,8-PeCDF	ND	3.9	N/A	Original result is below detection limit. The detected value was used to calculate exposure.
Dioxins/Furans	2,3,7,8-TCDF	ND	1.9	N/A	Original result is below detection limit. The detected value was used to calculate exposure.
Dioxins/Furans	OCDD	ND	8.1	N/A	Original result is below detection limit. The detected value was used to calculate exposure.
Dioxins/Furans	OCDF	ND	55	N/A	Original result is below detection limit. The detected value was used to calculate exposure.
Inorganics	Perchlorate	19400	6280	102.18	
Metals	Aluminum	11600	15600	29.41	
Metals	Arsenic	7.6	4.7	47.15	
Metals	Barium	113	444	118.85	
Metals	Beryllium	0.63	0.8	23.78	
Metals	Cadmium	0.086	0.12	33.01	
Metals	Chromium	13.5	10	29.79	
Metals	Copper	12.5	15.2	19.49	
Metals	Iron	14600	24200	49.48	
Metals	Lead	6.3	9.6	41.51	
Metals	Magnesium	13800	13000	5.97	
Metals	Manganese	309	535	53.55	
Metals	Mercury	0.011	0.017	42.86	
Metals	Molybdenum	0.69	0.84	19.61	
Metals	Nickel	13.9	14.5	4.23	
Metals	Selenium	0.46	0.32	35.90	
Metals	Silver	0.075	0.11	37.84	
Metals	Thorium	5.3	7.3	31.75	
Metals	Titanium	397	600	40.72	
Metals	Vanadium	42	36.8	13.20	
Metals	Zinc	33.9	57	50.83	
Rads	Actinium 228	1.04	1.34	25.21	
Rads	Bismuth 214	1	1.11	10.43	
Rads	Lead 212	1.2	1.11	7.79	
Rads	Lead 214	1.03	0.85	19.15	
Rads	Potassium 40	24	25.6	6.45	

TABLE F-6

Summary of Field Duplicate Sampling Results

Rads	Radium 224	3.5	2.7	25.81	
Rads	Radium 226	0.99	1.11	11.43	
Rads	Radium 226	2.75	0.22	170.37	Radium 226 and Radium 228 were analyzed in a separate lot.
Rads	Radium 228	0.858	1.36	45.27	Radium 226 and Radium 228 were analyzed in a separate lot.
Rads	Thallium 208	0.44	0.42	4.65	
Rads	Thorium 228	1.46	1.2	19.55	
Rads	Thorium 230	1.22	1.03	16.89	
Rads	Thorium 232	1.43	1.5	4.78	
Rads	Thorium 232DA	1.04	N/A	N/A	
Rads	Uranium 234	1.15	1.48	25.10	
Rads	Uranium 238	0.97	1.13	15.24	
VOCs	Acetone	17	10	51.85	
VOCs	Methylene chloride	1.3	ND	N/A	Duplicate result is below detection limit. The detected value was used to calculate exposure.
VOCs	Toluene	1.4	ND	N/A	Duplicate result is below detection limit. The detected value was used to calculate exposure.

TABLE F-6

Summary of Field Duplicate Sampling Results

Field Duplicate Analyses for P-17(0-1) - DUP2

Analysis	Parameter	P-17(0-1) Result	DUP2 Result	RPD	Comments
Dioxins/Furans	OCDD	8.4	ND	N/A	Duplicate result is below detection limit. The detected value was used to calculate exposure.
Dioxins/Furans	OCDF	5.9	ND	N/A	Duplicate result is below detection limit. The detected value was used to calculate exposure.
Inorganics	Perchlorate	3100	2770	11.24	
Metals	Aluminum	12400	12300	0.81	
Metals	Arsenic	2.3	8.7	116.36	
Metals	Barium	292	182	46.41	
Metals	Beryllium	0.47	0.57	19.23	
Metals	Cadmium	0.12	0.1	18.18	
Metals	Chromium	6.4	8.6	29.33	
Metals	Copper	13.5	14.6	7.83	
Metals	Iron	25500	19100	28.70	
Metals	Lead	11.9	9.6	21.40	
Metals	Magnesium	10200	14500	34.82	
Metals	Manganese	742	806	8.27	
Metals	Mercury	ND	0.012	N/A	Original result is below detection limit. The detected value was used to calculate exposure.
Metals	Molybdenum	0.45	0.77	52.46	
Metals	Nickel	12.5	15.7	22.70	
Metals	Selenium	0.36	0.39	8.00	
Metals	Silver	0.11	0.12	8.70	
Metals	Thorium	6.1	6.4	4.80	
Metals	Titanium	625	542	14.22	
Metals	Vanadium	25.2	31.4	21.91	
Metals	Zinc	51.3	41.6	20.88	
Rads	Actinium 228	1.21	1.3	7.17	Laboratory duplicate analyses run for Rads for Sample P-17(0-1).
Rads	Actinium 228	1.24	1.3	4.72	
Rads	Bismuth 212	2.9	ND	N/A	Duplicate result is below detection limit. The detected value was used to calculate exposure.
Rads	Bismuth 214	0.74	1.03	32.77	
Rads	Bismuth 214	1.01	1.03	1.96	
Rads	Lead 212	0.99	1.05	5.88	
Rads	Lead 212	1.17	1.05	10.81	
Rads	Lead 214	0.81	0.71	13.16	
Rads	Lead 214	0.85	0.71	17.95	
Rads	Potassium 40	22.4	22.7	1.33	
Rads	Potassium 40	18.6	22.7	19.85	
Rads	Radium 224	3	3.7	20.90	
Rads	Radium 224	3	3.7	20.90	
Rads	Radium 226	0.74	1.02	31.82	

TABLE F-6

Summary of Field Duplicate Sampling Results

Rads	Radium 226	1.01	1.02	0.99	
Rads	Radium 226	0.97	ND	N/A	Duplicate result is below detection limit. The detected value was used to calculate exposure.
Rads	Radium 228	1.12	1.22	8.55	Radium 226 and Radium 228 were analyzed in a separate lot.
Rads	Thallium 208	0.39	0.32	19.72	
Rads	Thallium 208	0.38	0.32	17.14	
Rads	Thorium 228	1.3	1.35	3.77	
Rads	Thorium 228	1.04	1.35	25.94	
Rads	Thorium 230	1.11	1.41	23.81	
Rads	Thorium 230	1.04	1.41	30.20	
Rads	Thorium 232	1.5	1.41	6.19	
Rads	Thorium 232	0.95	1.41	38.98	
Rads	Thorium 232DA	0.86	0.9	4.55	
Rads	Thorium 232DA	0.87	0.9	3.39	
Rads	Uranium 234	1.52	0.99	42.23	
Rads	Uranium 234	1.24	0.99	22.42	
Rads	Uranium 238	0.99	0.88	11.76	
Rads	Uranium 238	0.93	0.88	5.52	
VOCs	Acetone	8.8	5	55.07	
VOCs	Methylene chloride	3.8	3.5	8.22	

TABLE F-6

Summary of Field Duplicate Sampling Results

Field Duplicate Analyses for P-5(0-1) - DUP3

Analysis	Parameter	P-5(0-1) Result	DUP3 Result	RPD	Comments
Inorganics	Perchlorate	5520	797	149.53	
Metals	Aluminum	12900	12700	1.56	
Metals	Arsenic	1.7	1.9	11.11	
Metals	Barium	281	299	6.21	
Metals	Beryllium	0.55	0.52	5.61	
Metals	Cadmium	0.14	0.13	7.41	
Metals	Chromium	8.1	8	1.24	
Metals	Copper	14.6	14.9	2.03	
Metals	Iron	22200	21900	1.36	
Metals	Lead	10.3	11.7	12.73	
Metals	Magnesium	11000	10900	0.91	
Metals	Manganese	575	630	9.13	
Metals	Mercury	0.033	0.012	93.33	
Metals	Molybdenum	0.4	0.43	7.23	
Metals	Nickel	14	14.1	0.71	
Metals	Selenium	0.29	0.34	15.87	
Metals	Silver	0.13	0.14	7.41	
Metals	Thorium	6.8	7.2	5.71	
Metals	Titanium	704	723	2.66	
Metals	Vanadium	27	27.4	1.47	
Metals	Zinc	47.7	47.2	1.05	
Rads	Actinium 228	1.49	1.53	2.65	
Rads	Bismuth 214	1.12	0.77	37.04	
Rads	Lead 212	1.23	1.32	7.06	
Rads	Lead 214	0.72	0.78	8.00	
Rads	Potassium 40	24.3	27.1	10.89	
Rads	Radium 224	ND	2.6	N/A	Original result is below detection limit. The detected value was used to calculate exposure.
Rads	Radium 226	1.12	0.77	37.04	
Rads	Radium 226	1.41	0.13	166.23	Radium 226 and Radium 228 were analyzed in a separate lot.
Rads	Radium 228	1.38	1.19	14.79	Radium 226 and Radium 228 were analyzed in a separate lot.
Rads	Thallium 208	0.37	0.55	39.13	
Rads	Thorium 228	1.39	1.66	17.70	
Rads	Thorium 230	0.9	1.19	27.75	
Rads	Thorium 232	1.6	1.41	12.62	
Rads	Uranium 234	0.65	0.94	36.48	
Rads	Uranium 238	0.8	0.76	5.13	
VOCs	Acetone	5.2	4.4	16.67	
VOCs	Methylene chloride	7	6.2	12.12	

TABLE F-6

Summary of Field Duplicate Sampling Results

Field Duplicate Analyses for PC-56 - DUP6

Analysis	Parameter	PC-56 Result	DUP6 Result	RPD	Comments
General Chemistry	Chloride	2830	2750	2.87	
General Chemistry	Conductivity	12200	12600	3.23	
General Chemistry	Fluoride	0.17	0.28	48.89	
General Chemistry	Nitrate	17.1	17.9	4.57	
General Chemistry	Perchlorate	247000	256000	3.58	
General Chemistry	pH	7.5	7.4	1.34	
General Chemistry	Sulfate	2180	2090	4.22	
General Chemistry	TDS	8170	7720	5.66	
General Chemistry	TDS	8170	9830	18.44	
General Chemistry	Total Alkalinity	150	159	5.83	
General Chemistry	Total Hardness	3950	36000	160.45	
Metals	Aluminum	547	58.2	161.53	
Metals	Arsenic	77.3	77.2	0.13	
Metals	Barium	42.2	41.2	2.40	
Metals	Cadmium	0.53	0.5	5.83	
Metals	Calcium	749000	724000	3.39	
Metals	Chromium	0.79	0.92	15.20	
Metals	Iron	154	136	12.41	
Metals	Magnesium	269000	292000	8.20	
Metals	Manganese	629	648	2.98	
Metals	Molybdenum	87.2	83.4	4.45	
Metals	Nickel	29.2	30.6	4.68	
Metals	Potassium	35800	32500	9.66	
Metals	Selenium	8	7.3	9.15	
Metals	Sodium	1280000	1390000	8.24	
Metals	Titanium	8.7	8.6	1.16	
Metals	Vanadium	43.8	44.8	2.26	
Metals	Zinc	16.6	32	63.37	
Pesticides (8081A)	alpha-BHC	0.27	0.24	11.76	
Pesticides (8081A)	beta-BHC	0.1	0.096	4.08	
Rads	Radium 228	0.77	0.89	14.46	
Rads	Thorium 230	0.91	0.85	6.82	
Rads	Uranium 234	32.6	33.3	2.12	
Rads	Uranium 235	1.04	1.54	38.76	
Rads	Uranium 238	22	21.7	1.37	
Semi-Volatiles	bis(2-Ethylhexyl)phthalate	2.7	ND	N/A	Duplicate result is below detection limit. The detected value was used to calculate exposure.

Relative Percent Difference (RPD) = absolute value of 100 * (original sample conc - DUP conc)/(0.5*(original sample conc + DUP conc))

Calibration

The calibration of instrumentation used to perform the laboratory analyses was verified by STL, which reported that the equipment was properly calibrated for the analytical methods being performed. ENVIRON did not, however, obtain and review instrument calibration curves prepared by the laboratory.

Review of the Ground Water Indicator Parameter Data

The indicator parameter data obtained by analysis of the ground water samples were examined for consistency among the various measurements. The indicator parameters include total dissolved solids (TDS), electrical conductivity (EC), turbidity, pH, hardness, alkalinity, and concentrations of the major anions and cations. Table D-3 (Appendix D) provides the data for these indicators. Some inconsistencies among the data are evident in this table (e.g., the TDS values for some samples are lower than the concentrations reported for some of the major anions and cations). The only data presented in Table D-3 that are used in the risk calculations are the magnesium concentrations. The quality of the magnesium data obtained from the ground water samples (and of the other ground water data used in the risk assessment) is addressed in the other sections of this Appendix. The quality of the indicator parameter data is addressed separately in this section because the laboratory documentation does not provide the information needed to assess the precision and accuracy of some of the data, and because the ground water indicator parameter data are not used in the risk assessment.

The reliability of the ground water data presented in Table D-3 was evaluated using calculations described in *Standard Methods for the Examination of Water and Wastewater* (APHA/AWWA/WEF 1998, 20th edition). This evaluation involves comparisons among the anion and cation sums, the EC data, and the TDS data. The results of the evaluation indicate that the EC and TDS data for many samples are not consistent with the concentration data reported for the major anions and cations. Although the anion and cation sums for some samples do not balance well, the differences are within the criterion specified in *Standard Methods*. These observations do not affect the risk assessment, but they indicate that the indicator parameter data (with the exception of the magnesium concentrations) should not be used for the regional ground water analysis that will be conducted in the future.

Criterion VI - Data Quality Indicators

The analytical data collected during field activities were evaluated for certain data quality indicators that include precision, accuracy, representativeness, completeness, and comparability

(PARCC). Precision and accuracy were discussed above under Criterion V. Addition evaluation of these data quality indicators and the other PARCC parameters is outlined below.

Precision

Precision is a measure of the degree of agreement between replicate measurements of the same source or sample. Precision is expressed by relative percent differences (RPD) between replicate measurements. Replicate measurements can be made on the same sample or on two samples from the same source. Precision is generally assessed using a subset of the measurements made.

The laboratory limits for precision, as measured by the RPD between laboratory Duplicate Control Sample (DCS) analyses, are the laboratory control limits based on historical data calculated as specified in the analytical methods. If these limits are not met, the laboratory will follow the actions specified in the analytical method and the laboratory's standard operating procedures (SOPs).

Precision of a set of analyses is evaluated by determining the RPDs for matrix spike and matrix spike duplicate (MS/MSD) samples for organics and duplicate samples for inorganics. Precision is calculated using the following equation, where X_1 and X_2 are duplicate measurements:

$$RPD(\%) = \left(\frac{(X_1 - X_2)}{\left(\frac{(X_1 + X_2)}{2} \right)} \right) \bullet 100$$

As discussed above, the precision of the data were evaluated using several laboratory QA/QC procedures. Based on ENVIRON's review of the results of these procedures, there do not appear to be any wide-spread data usability issues associated with precision. In several instances, however, the calculated RPDs were outside the laboratory QC limits for individual chemicals as discussed below.

Matrix spike/matrix spike duplicates - Except as noted below, laboratory MS/MSD analyses were performed and RPDs were calculated for all perchlorate analyses, metals, VOCs, SVOC, PCBs, pesticides. An MS/MSD analysis for perchlorate was not performed in lot F1E210132 and in one sample from lot F1E210157 because the calculated sample amount was greater than four times the spike amount. An MS/MSD analysis was not performed for PCBs in lot F1E220189 because the batch MS extract on this sample broke during the

preparation process; only the MSD was reported. The laboratory analytical report for lot F1E220189 did not include a matrix spike sample evaluation report for pesticides; however, the case narrative indicates that an MS/MSD analysis was performed and no laboratory acceptance criteria were violated. An MS/MSD analysis was not performed for sample 052201-WB01 for pesticides, PCBs, and SVOCs due to insufficient sample volume; the laboratory included LCS/LCSD sample evaluation reports instead.

RPDs calculated by the laboratory were generally within the laboratory's acceptance criteria[29]; however, RPD exceedances occurred in at least one preparation batch for the following analytes: alpha-Chlordane, Aroclor 1260, N-nitrosodi-n-propyl-amine, methoxychlor, and 4,4'-DDT. MS/MSD analyses alone cannot be used to evaluate the precision and accuracy of individual samples, and the presence of RPD exceedances in individual samples does not necessarily indicate a lack of precision or accuracy. Based on both the laboratory's and ENVIRON review there do not appear to be any significant data usability issues resulting from the MS/MSD results.

Duplicate Control Sample (DCS) – DCS analyses are used to demonstrate acceptable method precision by the laboratory at the time of analysis. Laboratory DCS analyses were performed and RPDs were calculated for radionuclides at least once in each sample lot. Except as noted below, no radionuclide DCS analyses were flagged by the laboratory for RPDs outside of the laboratory's acceptance criteria[20]. According to the laboratory analytical report for sample lot F1E240210, the results for one Radium 228 sample and its duplicate did not agree. Only one sample was analyzed in this preparation batch, and Radium 228 was not detected above the stated reporting limit in this sample. The laboratory analytical report further indicated that the total alpha radium/Radium 226 results were less than the minimum detectable activity (MDA) and, therefore, were not affected by this lack of agreement for Radium 228. ENVIRON, therefore, believes that laboratory duplicates for radionuclide analytes meet the precision parameter.

Laboratory DCS analyses were also performed and RPDs were calculated for several general chemistry parameters, including hexavalent chromium, percent moisture, and Total Organic Carbon (TOC) in soil samples and total hardness,

[29] Laboratory acceptance criteria (i.e., RPD limits) for MS/MSD analyses vary by chemical and are presented in the laboratory analytical sheets, which are provided electronically (on CD) as part of Appendix D.

total alkalinity, Total Dissolved Solids (TDS), conductivity, turbidity, and pH in water samples. The RPD exceeded laboratory acceptance criteria for one TOC analysis; however, only one sample was associated with this preparation batch. According to the laboratory analytical reports, no other general chemistry DCS analyses were flagged due to RPDs outside of the laboratory's acceptance criteria. ENVIRON therefore believes that laboratory duplicates for general chemistry analytes meet the precision parameter.

Laboratory control samples (LCS) - Laboratory LCS/LCSD analyses were performed and RPDs were calculated by the laboratory in all sample lots for mercury, hexavalent chromium, total cyanide, and TOC and in some lots for SVOCs, pesticides, PCBs, and general chemistry parameters. RPDs exceeding the laboratory's acceptance criteria[30] were reported for total cyanide in lots F1E230191 and F1E240210; however, all samples were non-detect. An RPD exceeding the laboratory's acceptance criteria was also reported for 4-nitrophenol; however, all other semi-volatiles were within the acceptable range. ENVIRON, therefore, believes that LCS/LCSD analyses meet the precision parameter.

Accuracy

Accuracy measures the level of bias that an analytical method or measurement exhibits. To measure accuracy, a standard or reference material containing a known concentration is analyzed or measured and the result is compared to the known value. Several QC parameters are used to evaluate the accuracy of reported analytical results:

- Holding times and sample temperatures;
- Laboratory control sample (LCS) percent recovery;
- MS/MSD percent recovery (organics);
- Spike sample recovery (inorganics)
- Surrogate spike recovery;
- Blank sample results; and
- Dilution.

The results of ENVIRON's analysis of accuracy are presented below:

[30] The laboratory acceptance criteria (i.e., RPD limits) for LCS analyses vary by chemical and are presented in the laboratory analytical sheets, which are provided electronically (on CD) as part of Appendix D.

Holding times and sample temperature - The accuracy of analytical results may depend upon analysis within specified holding times and sample temperature. In general, a longer holding time is assumed to result in a less accurate measurement due to the potential for loss or degradation of the analyte over time. Sample temperature is of greatest concern for VOCs that may volatilize from the sample at higher temperatures. A summary of the cooler temperatures and holding time violations is presented in Table F-7.

All soil samples were initially analyzed within the recommended internal holding times; however, some required dilutions of perchlorate soil samples were performed outside of the recommended 28-day holding time. In addition, some water samples were analyzed outside of holding time due to an analyst error. RINSE3 was analyzed outside of holding time for TDS. The 14-day holding time for total cyanide was exceeded for PC56-GW01, DUP6, PC4-GW01, PC58-MW04, PC2-GW02, and RINSE3. Sample B-14 was analyzed outside of the 7-day hold time for 8141A-pesticides due to a vial breakage. Hexavalent chromium analyses were performed outside of the laboratory holding time for PC56-GW01, DUP6, PC4-GW01, PC58-MW04, PC2-GW02, and RINSE3.

The purpose of holding times is to reduce the likelihood that that the concentration of a chemical in a sample will change over time prior to laboratory analysis. Mechanisms of change vary by chemical but generally include physical (e.g., evaporation) and biological (e.g., degradation). It is possible that there are minor reductions in concentration for those samples that exceeded the laboratory's specified holding times; however, such reductions are unlikely to be significant given that the laboratory did not report significant exceedances of holding times (Appendix D). ENVIRON believes that the data are usable despite the holding time violations for some water parameters.

As indicated in Table F-7, 6 of the 19 coolers used to ship samples arrived at the laboratory at temperatures above the recommended 6° C. VOCs were not expected to be present in significant concentrations in soil samples; thus, the exceedance of the recommended temperature for certain coolers does not represent a significant concern. Furthermore, all of the ground water samples, in which VOCs are present to a greater extent, arrived at the laboratory at or below the recommended temperature.

TABLE F-7
Cooler Temperatures and Holding Time Notations

Chain of Custody Number	Sample IDs	Cooler Temperature at Laboratory	Holding Time Notations from Laboratory
057720, 057703, 057705	B-2(0-1), B-2(4-5), P-15(0-1), P-15(4-5), DUP1, P-11(0-1), P-11(4-5), P-12(0-1), P-12(4-5), P-14(0-1), P-14(4-5), P-16(0-1), P-16(4-5), P-13(0-1), P-13(4-5), P-7(10-12), P-7(18-20)	4°C, 3°C	Soil Perchlorate samples were analyzed within the recommended 28 days, but some required dilutions were analyzed outside of 28 days.
057717, 057713	P-17(0-1), P-17(4-5), DUP2, B-3(0-1), B-3(4-5), A-1(0-1), A-1(10-12), A-1(16-18), P-8(0-1), P-8(10-12), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18), DUP3	7°C, 12°C	None
057701	P-10(0-1), P-10(10-11), P-10(16.5-17.5), P-10(12-12.5), P-9(0-1), P-9(8), P-7(0-1), P-7(2-3)	8.2°C	None
057709, 057718, 057706	E-2(0-1), E-2(4-5), E-1(0-1), E-1(4-5), S-1(0-1), S-1(10-12), S-1(16-17), B-1(0-1), B-1(10-12), B-1(19-21), P-3(0-1), P-3(10-12), P-3(18-20), P-2(0-1), P-2(10-12), P-2(16-18), A-2(0-1), A-2(10-12), A-2(19-21), P-6(0-1), P-6(10-12), P-6(18-21), P-1(0-1), P-1(10-12), P-1(18-20)	14°C, 10°C, 8°C	Soil Perchlorate samples were analyzed within the recommended 28 days, but some required dilutions were analyzed outside of 28 days.
057722, 057726, 057729	052201-WB01, P-17(6-8), P-12(15-17), P-11(15-17), S-2(0-1), S-2(10-12), S-2(18-20), P-4(0-12), P-4(10-12), P-4(20-22), P-7(19-21), E-2(6-8)	5°C, 3°C, 6°C	Soil Perchlorate samples were analyzed within the recommended 28 days, but some required dilutions were analyzed outside of 28 days.
003957, 057715, 057728, 057740, 057719, 057712, 057744, 057745, 057741, 057738, 057739	PC-56-GW01, DUP6, B-14, PC4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	2°C, 6°C, 6°C, 6°C, 6°C, 3°C, 6°C, 6°C	Due to analyst error, sample "RINSE 3" was analyzed outside of holding time for Total Dissolved Solids. PC56-GW01, DUP6, PC4-GW01, PC58-MW04, PC2-GW02, and RINSE 3 were analyzed outside of holding time for Total Cyanide. Sample B-14 was analyzed outside of holding time for Organophosphorus Pesticides due to a vial breakage. Hexavalent Chromium analysis was performed outside of holding time for PC56-GW01, PC4-GW01, PC-58-MW04, PC-2-GW02, B2-8-GW01, and RINSE 3.

Laboratory control samples - LCS evaluation reports were included with all analyses of metals, general chemistry, SVOCs, VOCs, pesticides, dioxins/furans, and PCBs. According to the analytical report for lot F1E240210, percent recovery exceeded the laboratory's recovery limits for toluene in this lot; however, the analyte was not detected in any of the samples above 1.0 ppb and the impact on data quality is thus considered minimal. Some percent recoveries for metals also exceeded the recovery limits; however, LCS was within the stated control limits. The LCS percent recovery for one Radium-228 analysis batch in lot J1F180123 and for one analysis batch in lot J1F150279 were below acceptable limits; however, a second LCS evaluation for each lot was within limits, as were LCS recoveries for both previous and subsequent analysis batches. The data are, therefore, accepted for reporting.

The 13C-Pentachlorodibenzofuran (PeCDF) internal standard recovery listed on the LCS evaluation report for dioxins/furans in lot F1E210157 has a percent recovery above the laboratory recovery limit; however the eight other surrogates listed on the LCS report are within the applicable recovery limits and the applicable samples are all non-detect for PeCDFs. Except as noted, no LCS evaluations were flagged by the laboratory due to percent recovery outside of the laboratory's acceptance criteria. ENVIRON, therefore, believes that LCS evaluations meet the requirement of accuracy.

Matrix spike recovery - Matrix spike evaluation reports were included in all sample lots for analyses of metals, VOCs, pesticides, and general chemistry and in some sample lots for analyses of SVOCs and PCBs. Matrix spike percent recovery was outside of the laboratory's recovery limits for 4,4'-DDT and Dieldrin for lots F1E210132 and F1E210157; however, method blanks and LCS evaluations for these batches were acceptable and the data were reportable. Percent recovery was also outside of recovery limits for mercury in lots F1E210157, F1E220189, and F1E210132; however, the associated samples were below reporting limits and the LCS and LCSD have acceptable recoveries. Percent recovery was outside the laboratory's recovery limits for 4,4-DDT, 4,4-DDD, and Dieldrin in some pesticides analyses due to the slight exceedance of calibration standards. Percent recovery for TOC was below the laboratory's recovery limits for two analyses; however, the method blanks and LCS/LCSD analyses have acceptable recoveries. One VOCs analysis in lots F1E230191, F1E210157, and F1E220189 has one or two surrogates listed on the MS/MSD

evaluation report with percent recoveries outside of the laboratory's acceptance criteria; the LCS analyses and the other surrogates listed on the MS/MSD evaluation report have acceptable recoveries. Some metal evaluations are also outside the laboratory's recovery limits. With the exception of those analyses noted, no MS/MSD evaluations were flagged by the laboratory due to percent recovery outside of the laboratory's acceptance criteria. ENVIRON, therefore, believes that MS/MSD evaluations meet the requirements of the accuracy parameter.

Surrogate recovery - Surrogate spike recovery is used to evaluate the accuracy of reported measurements. A surrogate standard is a distinct chemical that behaves similarly to the target chemical and is purposely added to the sample prior to cleanup and extraction. The surrogate spike recovery is used to assess recovery of the target chemical from the sample matrix. A known amount of a surrogate standard is added to the sample prior to cleanup. The amount of the surrogate detected in the analysis is compared to the amount added and the percent recovery is determined. Accuracy is calculated as follows:

$$\%R = \left[\frac{(X-T)}{K}\right] \bullet 100$$

where:

R = recovery
X = analytical result of spike sample,
T = analytical result of the unspiked aliquot, and
K = known addition of the spiked compound

Surrogate spike recoveries were listed for all lots for SVOCs, VOCs, pesticides, and PCBs. Exceedances of 4-Bromofluorobenzene and/or Toluene-d8 were flagged in lots F1E210157, F1E230191, F1E220189, and F1E210132 for several VOC samples; however, these comparisons were based on LCS spike/surrogate recoveries. When a comparison was instead made against real-time limits that are based on sample surrogate/spike recoveries, these recoveries were in control. Surrogate recovery for decachlorobiphenyl was outside of internal limits for lots F1E210132, F1E230191, F1E180264, and F1E220189 for some pesticide samples due to matrix interference and/or dilution; however, the data is acceptable because the recovery of the second surrogate, tetrachloro-m-xylene, is within limits. Surrogate recovery for chlormephos in lot F1E220189 was less than the

established lower control limit. This low chlormephos recovery was confirmed in a re-analysis of the extract. However, the LCS and blank were in control, and ethyl pirimiphos surrogate recovery was acceptable. With the exception of those analyses noted, no surrogate/spike recoveries were flagged by the laboratory due to recoveries outside of the laboratory's acceptance criteria. ENVIRON believes that surrogate spike recovery evaluations meet the requirements of the accuracy parameter.

Blanks - Accuracy is also evaluated by comparing results for the analysis of field, trip, and method blank samples to results for investigative samples. Blanks are artificial samples designed to evaluate the nature and extent of contamination of environmental samples that may be introduced by field or laboratory procedures. Contaminant concentrations in blanks should be less than detection or reporting limits. A discussion of the chemicals detected in the various blank samples is presented previously under Criterion V.

Dilution –Identified issues associated with dilution included the following: Sample P-4 (10' – 12') was originally analyzed with no dilution, and several organochlorine pesticides were detected. Due to overlapping of peaks in the GC results, the sample was re-analyzed for these compounds at a 10x dilution, with an associated ten-fold increase in detection limits. None of the previously detected compounds were detected in the re-analyzed sample. However, 4,4'-DDE, which was not detected in the original sample (likely because the peak for this compound was not distinguishable) was detected at a concentration of 150 µg/kg.

Most of the soil samples analyzed for perchlorate were diluted because of elevated levels of this chemical. In the two samples in which perchlorate was not detected [E-2 (0-1') and P-14 (0-1')], no dilutions were necessary, and the detection limits were low (0.0208 mg/kg and 0.0211 mg/kg, respectively). Thus, the dilutions used in the analysis of perchlorate are not expected to have affected the results of the assessment.

Representativeness

Representativeness is the degree to which data accurately and precisely represent a characteristic of the population at a sampling point or an environmental condition. There is no standard method or formula for evaluating representativeness, which is a qualitative term. Representativeness is achieved through selection of sampling locations

that are appropriate relative to the objective of the specific sampling task, and by collection of an adequate number of samples from the relevant types of locations.

The work plan for the WRF expansion site was developed to allow collection of samples that are representative of the media to which the receptors described in Chapter V may be exposed at the site. Samples were collected at 12 locations in the northern exposure area and at 14 locations in the southern exposure area. These locations were distributed among areas categorized as (1) former ponds, (2) ditches, and (3) other (i.e., neither pond nor ditch). There was one sample location in each of the 17 former ponds within the WRF expansion property; five sample locations in the ditches that cross the property; and four sample locations outside of the ponds and ditches. The sample locations were described in general terms in the site characterization work plan (ENVIRON 2001).

Each of the actual sample locations was selected by field personnel to be representative of the area in which it was located. The work plan specified that each pond sampling point would be located at the approximate geometric center of the former pond. As shown in Figure 6 of the report, the actual location within each pond was not always close to the center (e.g., points P-1, P-12, and P-15). The ENVIRON personnel in the field often found it difficult to identify the perimeter of the former pond and did not attempt to locate the geometric center precisely. Instead, they selected a location within each former pond that appeared to be representative of the area of interest. For this reason, none of the former pond sampling points is adjacent to the berms that were observed in the field.

The fact that the berms themselves and the portions of the former ponds closest to them are not represented in the resulting data set may be a source of bias. Although there is no direct indication of the magnitude or direction of this potential bias, there is reason to expect that this bias would not result in a significant underestimation of the actual exposure concentrations. The berms were reportedly constructed by re-grading the natural soils before the wastewaters were introduced to the ponds; this suggests that the berm materials probably have lower concentrations of the chemicals of concern than are present in sediments that accumulated in the bottoms of the former ponds. The only relevant data that ENVIRON is aware of were obtained in a previous investigation (*Discrete/Composite Data Analysis, BMI Common Areas*; ERM 2000a) of the general area that included collection of soil samples at six locations in each of seven former ponds (only one of which is within the WRF expansion area). The distance from each location to the nearest berm is not reported, but none of these samples appears to have been collected on or next to the berms. The data obtained from these samples do not

suggest any consistent patterns or trends within the former ponds, and there is no obvious relationship between concentration and distance from the berms.

As explained in Chapter V, receptors in the southern exposure area may be exposed to soils from the surface to 30 feet bgs, while receptors in the northern exposure area may be exposed to soils from the surface to 5 feet bgs. In order to represent conditions in soils throughout these depth intervals, ENVIRON collected soil samples at three depths at most sampling locations. The sampling depths were 0-1 feet below ground surface (bgs) at all locations; 4-5 feet bgs and deeper (generally 15-17 feet bgs) in the northern exposure area; and 10-12 feet bgs and deeper (generally 19-21 feet bgs) in the southern exposure area. The soils in the deepest portion of the potential exposure interval in the southern exposure area were not sampled, but these soils are below the water table. The potential receptors will not be exposed to these soils in their current saturated condition for extended periods, and the concentrations of chemicals in these soils will change as the soils are dewatered. Therefore, the exposure concentrations of constituents in the soils that are currently below the water table are appropriately represented by the soil samples collected immediately above the water table in the boreholes in the southern exposure area.

The soils at depths between the sampling depth intervals are not represented directly in the data set. This is not likely to result in a significant underestimation of the actual exposure concentrations, however, because ENVIRON used the highest of two estimates of the exposure point concentration for each chemical and exposure area. This is explained in more detail in section V.B.1 of the risk assessment. The concentrations between the sampling intervals are not likely to be higher than those in the sampling intervals used to generate these estimates.

Completeness

Completeness is commonly expressed as a percentage of measurements that are valid and usable relative to the total number of measurements made. Analytical completeness is a measure of the number of overall accepted analytical results, including estimated values, compared to the total number of analytical results requested on samples submitted for analysis after review of the analytical data. The formula for calculating completeness is as follows, where V is the amount of valid data obtained and T is the amount of valid data expected under normal conditions:

$$COM = \left(\frac{V}{T}\right) \bullet 100$$

None of the data from the May 2001 site characterization program was eliminated due to data usability concerns. Detection of blank contamination was used to qualify a few of the data obtained for organic chemicals; as discussed in section II.B of the report, application of the protocol described in RAGS (USEPA 1989) led to treatment of some of the VOCs measurements as non-detects. All of the analytical data collected were used in the risk assessment.

Comparability

Comparability is a qualitative characteristic expressing the confidence with which one data set can be compared with another. The desire for comparability is the basis for specifying the analytical methods listed in Table 1; these methods are generally consistent with those used in previous investigations of the site. The comparability goal is achieved through using standard techniques to collect and analyze representative samples and reporting analytical results in appropriate units. Only when precision and accuracy are known can data sets be compared with confidence.

Comparability is not a concern within the context of this risk assessment because all of the data used was collected during a single site characterization program; no historical site data was used in calculating the risk estimates. All of the chemical analyses for each analyte and medium were conducted by the same laboratory and method. The data review presented earlier in this appendix did not identify any reasons to qualify the comparability of the data within this data set.

TABLE F-8
Summary of Data Usability Parameters

Lot Number (see Table F-9)	Prep Batch	Matrix	Group	Samples	Method Blank	LCS*	Matrix Spike*	Surrogates	Sample Duplicate
F1E180264	1161115	Soil	Dioxins/ Furans	P-10(0-1), P-10(10-11), P-10(16.5-17.5), P-9(0-1), P-9(8), P-7(0-1)	Detection below RL for OCDD.	PR within limits.	N/A	N/A	N/A
F1E180264	1166461	Soil	General Chemistry (Hexavalent Chromium)	P-10(0-1), P-10(10-11), P-10(16.5-17.5), P-9(0-1), P-9(8), P-7(0-1)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E180264	1162263	Soil	General Chemistry (Percent Moisture)	P-10(0-1), P-10(10-11), P-10(16.5-17.5), P-9(0-1), P-9(8), P-7(0-1)	N/A	N/A	N/A	N/A	N/A
F1E180264	1158251	Soil	General Chemistry (Perchlorate)	P-10(0-1), P-10(10-11), P-10(16.5-17.5), P-9(0-1), P-9(8), P-7(0-1)	No detections.	PR within limits.	PR and RPD within limits.	N/A	N/A
F1E180264	1157261	Soil	General Chemistry (Total Cyanide)	P-10(0-1), P-10(10-11), P-10(16.5-17.5), P-9(0-1), P-9(8), P-7(0-1)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E180264	1152447	Soil	General Chemistry (Total Organic Carbon)	P-10(0-1), P-10(10-11), P-10(16.5-17.5), P-9(0-1), P-9(8)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E180264	1152450	Soil	General Chemistry (Total Organic Carbon)	P-7(0-1)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E180264	1167096	Soil	Metals (Aluminum-Zinc)	P-10(0-1), P-10(10-11), P-10(16.5-17.5), P-9(0-1), P-9(8), P-7(0-1)	No Detections.	PR within limits.	PR above limit for Aluminum and Iron. PR below limit for Aluminum and Iron. RPD above limit for Aluminum and Iron.	N/A	N/A
F1E180264	1167095	Soil	Metals (Antimony-Vanadium)	P-10(0-1), P-10(10-11), P-10(16.5-17.5), P-9(0-1), P-9(8), P-7(0-1)	Detections below RL4 for Manganese, Nickel and Vanadium.	PR above limit for Vanadium, Copper, Nickel, and Titanium.	PR below limit for Antimony, Barium, Copper, Manganese, and Titanium. PR above limit for Beryllium. RPD above limit for Antimony, Beryllium, and Manganese.	N/A	N/A
F1E180264	1163440	Soil	Metals (Mercury)	P-10(0-1), P-10(10-11), P-10(16.5-17.5), P-9(0-1), P-9(8), P-7(0-1)	No detections.	PR and RPD within limits.	PR and RPD within limits.	N/A	N/A
F1E180264	1145443	Soil	PCBs	P-10(0-1), P-10(10-11), P-10(16.5-17.5), P-9(0-1), P-9(8), P-7(0-1)	No detections.	PR within limits.	RPD above limit for Aroclor 1260.	All within recovery limits.	N/A
F1E180264	1151510	Soil	Pesticides (8081A)	P-10(0-1), P-10(10-11), P-10(16.5-17.5), P-9(0-1), P-9(8), P-7(0-1)	No detections.	PR within limits.	PR above limit for 4,4'-DDT and Dieldrin. RPD above limit for alpha-Chlordane.	Decachlorobiphenyl above limit for P-10(0-1)	N/A
F1E180264	1151181	Soil	Pesticides (8141A)	P-10(0-1), P-10(10-11), P-10(16.5-17.5), P-9(0-1), P-9(8), P-7(0-1)	No detections.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E180264	1143168	Soil	Rads (Actinium 228 - Thorium 232DA)	P-10(0-1), P-10(10-11), P-10(16.5-17.5), P-9(0-1), P-9(8), P-7(0-1)	Detection above RL for Thorium 232.	% Recovery within QC control limits.	N/A	N/A	Precision values are 49, 44, 14, 136, 10, 24, 5, 14, 10, 64, and 767.
F1E180264	1144377	Soil	Rads (Thorium 228 - Thorium 232)	P-10(0-1), P-10(10-11), P-10(16.5-17.5), P-9(0-1), P-9(8), P-7(0-1)	Detections below RL for Thorium 230 and Thorium 232.	% Recovery within QC control limits.	N/A	N/A	Precision values are 23, 31, and 4.

Notes:
NA - not applicable
RL - reporting limit
PR - precent recovery
RPD - relative percent difference
LCS - laboratory control sample

TABLE F-8
Summary of Data Usability Parameters

Lot Number (see Table F-9)	Prep Batch	Matrix	Group	Samples	Method Blank	LCS*	Matrix Spike*	Surrogates	Sample Duplicate
F1E180264	1144383	Soil	Rads (Uranium 234 - Uranium 238)	P-10(0-1), P-10(10-11), P-10(16.5-17.5), P-9(0-1), P-9(8), P-7(0-1)	No detections.	% Recovery within QC control limits.	N/A	N/A	Precision values are 38, 4, and 5.
F1E180264	1150475	Soil	Semi-Volatiles	P-10(0-1), P-10(10-11), P-10(16.5-17.5), P-9(0-1), P-9(8), P-7(0-1)	No detections.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E180264	1150247	Soil	Volatiles	Trip Blank	Detections below RL for Acetone and Methylene chloride.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E180264	1151135	Soil	Volatiles	P-10(0-1), P-10(12-12.5), P-10(16.5-17.5), P-9(0-1), P-9(8), P-7(0-1), P-7(2-3)	No detections.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E210132	1161114	Soil	Dioxins/ Furans	B-2(0-1), B-2(4-5), P-15(0-1), P-15(4-5), DUP1, P-11(0-1), P-11(4-5), P-12(0-1), P-12(4-5), P-14(0-1), P-14(4-5), P-16(0-1), P-16(4-5), P-13(0-1), P-13(4-5), P-7 (10-12), P-7 (18-20)	No detections.	PR within limits.	N/A	N/A	N/A
F1E210132	1170177	Soil	General Chemistry (Hexavalent Chromium)	B-2(0-1), B-2(4-5), P-15(0-1), P-15(4-5), DUP1, P-11(0-1), P-11(4-5), P-12(0-1), P-12(4-5), P-14(0-1), P-14(4-5), P-16(0-1), P-16(4-5), P-13(0-1), P-13(4-5)	No detections.	PR and RPD within limits.	PR within limits.	N/A	RPD within limits.
F1E210132	1170179	Soil	General Chemistry (Hexavalent Chromium)	P-7(10-12), P-7(18-20)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E210132	1162263	Soil	General Chemistry (Percent Moisture)	B-2(0-1)	N/A	N/A	N/A	N/A	N/A
F1E210132	1162264	Soil	General Chemistry (Percent Moisture)	B-2(4-5), P-15(0-1), P-15(4-5), DUP1, P-11(0-1), P-11(4-5), P-12(0-1), P-12(4-5), P-14(0-1), P-14(4-5), P-16(0-1), P-16(4-5), P-13(0-1), P-13(4-5), P-7(10-12), P-7(18-20)	N/A	N/A	N/A	N/A	N/A
F1E210132	1164437	Soil	General Chemistry (Perchlorate)	B-2(0-1), B-2(4-5), P-15(0-1), P-15(4-5), DUP1, P-11(0-1), P-11(4-5), P-12(0-1), P-12(4-5), P-14(0-1), P-14(4-5), P-16(0-1), P-16(4-5), P-13(0-1), P-13(4-5), P-7 (10-12), P-7 (18-20)	No detections.	PR within limits.	PR and RPD not calculated because sample amount was greater than four times the spike amount.	N/A	N/A
F1E210132	1157261	Soil	General Chemistry (Total Cyanide)	DUP1, P-7(10-12), P-7(18-20)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E210132	1157267	Soil	General Chemistry (Total Cyanide)	B-2(0-1), B-2(4-5), P-15(0-1), P-15(4-5), P-11(0-1), P-11(4-5), P-12(0-1), P-12(4-5), P-14(0-1), P-14(4-5), P-16(0-1), P-16(4-5), P-13(0-1), P-13(4-5)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E210132	1152450	Soil	General Chemistry (Total Organic Carbon)	DUP1, P-7(10-12), P-7(18-20)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E210132	1162462	Soil	General Chemistry (Total Organic Carbon)	P-12(0-1)	No detections.	PR and RPD within limits.	PR below limit for Total Organic Carbon.	N/A	N/A

Notes:
NA - not applicable
RL - reporting limit
PR - precent recovery
RPD - relative percent difference
LCS - laboratory control sample

TABLE F-8
Summary of Data Usability Parameters

Lot Number (see Table F-9)	Prep Batch	Matrix	Group	Samples	Method Blank	LCS*	Matrix Spike*	Surrogates	Sample Duplicate
F1E210132	1162463	Soil	General Chemistry (Total Organic Carbon)	P-12(4-5), P-14(0-1), P-14(4-5), P-16(0-1), P-16(4-5), P-13(0-1), P-13(4-5)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E210132	1162464	Soil	General Chemistry (Total Organic Carbon)	B-2(0-1), B-2(4-5), P-15(0-1), P-15(4-5), P-11(0-1), P-11(4-5)	Detection below RL for Total Organic Carbon.	PR and RPD within limits.	N/A	N/A	N/A
F1E210132	1167101	Soil	Metals (Aluminum-Zinc)	B-2(0-1), B-2(4-5), P-15(0-1), P-15(4-5), DUP1, P-11(0-1), P-11(4-5), P-12(0-1), P-12(4-5), P-14(0-1), P-14(4-5), P-16(0-1), P-16(4-5), P-13(0-1), P-13(4-5), P-7 (10-12), P-7 (18-20)	Detection above RL for Zinc and below RL for Aluminum.	PR within limits.	PR below limit for Aluminum, Iron, and Zinc. RPD within limits.	N/A	N/A
F1E210132	1167100	Soil	Metals (Antimony-Vanadium)	B-2(0-1), B-2(4-5), P-15(0-1), P-15(4-5), DUP1, P-11(0-1), P-11(4-5), P-12(0-1), P-12(4-5), P-14(0-1), P-14(4-5), P-16(0-1), P-16(4-5), P-13(0-1), P-13(4-5), P-7 (10-12), P-7 (18-20)	Detections below RL for Lead, Manganese, and Silver.	PR above limit for Copper. PR below limit for Magnesium and Titanium.	PR below limit for Antimony, Chromium, Copper, Lead, Magnesium, Nickel, Selenium, Titanium, and Vanadium. PR above limit for Barium and Titanium. RPD above limit for Titanium.	N/A	N/A
F1E210132	1163436	Soil	Metals (Mercury)	B-2(0-1), DUP1, P-7(18-20)	No detections.	PR and RPD within limits.	PR below limit for Mercury. RPD within limits.	N/A	N/A
F1E210132	1163440	Soil	Metals (Mercury)	B-2(4-5), P-15(0-1), P-15(4-5), P-11(0-1), P-12(0-1), P-12(4-5), P-14(0-1), P-14(4-5), P-16(0-1), P-16(4-5), P-13(0-1), P-13(4-5)	No detections.	PR and RPD within limits.	PR and RPD within limits.	N/A	N/A
F1E210132	1164487	Soil	Metals (Mercury)	P-11(4-5), P-7(10-12)	No detections.	PR and RPD within limits.	PR above limit for Mercury. RPD within limits.	N/A	N/A
F1E210132	1151439	Soil	PCBs	B-2(0-1), B-2(4-5), P-15(0-1), P-15(4-5), DUP1, P-11(0-1), P-11(4-5), P-12(0-1), P-12(4-5), P-14(0-1), P-14(4-5), P-16(0-1), P-16(4-5), P-13(0-1), P-13(4-5), P-7 (10-12), P-7 (18-20)	No detections.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E210132	1151510	Soil	Pesticides (8081A)	DUP1, P-7(10-12), P-7(18-20)	No detections.	PR within limits.	PR above limit for 4,4'-DDT and Dieldrin. RPD above limit for alpha-Chlordane.	All within recovery limits.	N/A
F1E210132	1152470	Soil	Pesticides (8081A)	B-2(0-1), B-2(4-5), P-15(0-1), P-15(4-5), P-11(0-1), P-11(4-5), P-12(0-1), P-12(4-5), P-14(0-1), P-14(4-5), P-16(0-1), P-16(4-5), P-13(0-1), P-13(4-5)	No detections.	PR within limits.	PR and RPD within limits.	Decachlorobiphenyl above limit for B-2(0-1) and P-11(0-1).	N/A

Notes:
NA - not applicable
RL - reporting limit
PR - precent recovery
RPD - relative percent difference
LCS - laboratory control sample

TABLE F-8
Summary of Data Usability Parameters

Lot Number (see Table F-9)	Prep Batch	Matrix	Group	Samples	Method Blank	LCS*	Matrix Spike*	Surrogates	Sample Duplicate
F1E210132	1151182	Soil	Pesticides (8141A)	B-2(0-1), B-2(4-5), P-15(0-1), P-15(4-5), DUP1, P-11(0-1), P-11(4-5), P-12(0-1), P-12(4-5), P-14(0-1), P-14(4-5), P-16(0-1), P-16(4-5), P-13(0-1), P-13(4-5), P-7 (10-12), P-7 (18-20)	No detections.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E210132	1147098	Soil	Rads (Actinium 228 - Thorium 232D)	B-2(0-1), B-2(0-1), B-2(4-5), P-15(0 1), P-15(4-5), DUP1, P-11(0-1), P-11(4-5), P-12(0-1), P-12(4-5), P-14(0-1), P-14(4-5), P-16(0-1), P-16(4-5), P-13(0-1), P-13(4-5), P-7 (10-12), P-7 (18-20)	No detections.	% Recovery within QC control limits.	N/A	N/A	Precision values of 37, 46, 5, 15, 3, 12, 2, 5, 25, 20, 58, and 41.
F1E210132	1150229	Soil	Rads (Thorium 228 - Thorium 232)	B-2(0-1), B-2(0-1), B-2(4-5), P-15(0 1), P-15(4-5), DUP1, P-11(0-1), P-11(4-5), P-12(0-1), P-12(4-5), P-14(0-1), P-14(4-5), P-16(0-1), P-13(4-5), P-7 (10-12), P-7 (18-20)	Detection below RL for Thorium 230.	% Recovery within QC control limits.	N/A	N/A	Precision values of 18, 13, and 20.
F1E210132	1159359	Soil	Rads (Thorium 228 - Thorium 232)	P-16(4-5), P-13(0-1)	Detection below RL for Thorium 230.	% Recovery within QC control limits.	N/A	N/A	Precision values of 25, 1, and 10.
F1E210132	1150224	Soil	Rads (Uranium 234 - Uranium 238)	B-2(0-1), B-2(0-1), B-2(4-5), P-15(0 1), P-15(4-5), DUP1, P-11(0-1), P-11(4-5), P-12(0-1), P-12(4-5), P-14(0-1), P-14(4-5), P-16(0-1), P-16(4-5), P-13(0-1), P-13(4-5), P-7 (10-12), P-7 (18-20)	No detections.	% Recovery within QC control limits.	N/A	N/A	Precision values of 11, 87, and 21.
F1E210132	1150475	Soil	Semi-Volatiles	B-2(0-1), B-2(4-5), P-15(0-1), P-15(4-5), DUP1, P-11(0-1), P-11(4-5), P-12(0-1), P-12(4-5), P-14(0-1), P-16(0-1), P-16(4-5), P-13(0-1)	No detections.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E210132	1150476	Soil	Semi-Volatiles	P-13(4-5), P-7(10-12), P-7(18-20)	No detections.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E210132	1152459	Soil	Semi-Volatiles	P-14(4-5)	No detections.	PR and RPD within limits.	N/A	All within recovery limits.	N/A
F1E210132	1151135	Soil	Volatiles	B-2(0-1), B-2(4-5), P-15(0-1), P-15(4-5), DUP1, P-11(0-1), P-11(4-5), P-7(18-20)	No detections.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E210132	1152138	Soil	Volatiles	P-12(0-1), P-12(4-5), P-14(0-1), P-14(4-5), P-16(0-1), P-16(4-5), P-13(0-1), P-13(4-5)	Detections below RL for Acetone, Methylene chloride, Toluene, Tetrachloroethene, and Xylenes.	PR within limits.	PR and RPD within limits.	4-Bromofluorobenzene above limit for P-14(0-1) and P-16(4-5).	N/A
F1E210132	1152317	Soil	Volatiles	Trip Blank, Trip Blank	Detections below RL for Acetone and Methylene chloride.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E210157	1159294	Soil	Dioxins/ Furans	P-17(0-1), P-17(4-5), DUP2, B-3(0-1), B-3(4-5), A-1(0-1), A-1(10-12), A-1(16-18), P-8(0-1), P-8(10-12), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18), DUP3	No detections.	PR within limits. Surrogate above limit for 13C-1,2,3,4,7,8-HxCDF.	N/A	N/A	N/A

Notes:
NA - not applicable
RL - reporting limit
PR - precent recovery
RPD - relative percent difference
LCS - laboratory control sample

TABLE F-8
Summary of Data Usability Parameters

Lot Number (see Table F-9)	Prep Batch	Matrix	Group	Samples	Method Blank	LCS*	Matrix Spike*	Surrogates	Sample Duplicate
F1E210157	1170177	Soil	General Chemistry (Hexavalent Chromium)	P-17(0-1), P-17(4-5), DUP2, B-3(0-1), B-3(4-5)	No detections.	PR and RPD within limits.	PR within limits.	N/A	RPD within limits.
F1E210157	1170179	Soil	General Chemistry (Hexavalent Chromium)	A-1(0-1), A-1(10-12), A-1(16-18), P 8(0-1), P-8(10-12), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18), DUP3	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E210157	1163244	Soil	General Chemistry (Percent Moisture)	P-17(0-1), P-17(4-5), DUP2, B-3(0-1), B-3(4-5)	N/A	N/A	N/A	N/A	N/A
F1E210157	1164237	Soil	General Chemistry (Percent Moisture)	A-1(0-1), A-1(10-12), A-1(16-18), P 8(0-1), P-8(10-12), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18), DUP3	N/A	N/A	N/A	N/A	N/A
F1E210157	1164440	Soil	General Chemistry (Perchlorate)	P-17(0-1), P-17(4-5), DUP2, B-3(0-1), B-3(4-5), A-1(0-1), A-1(10-12), A-1(16-18), P-8(0-1), P-8(10-12), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18), DUP3	No detections.	PR within limits.	PR and RPD not calculated because sample amount was greater than four times the spike amount.	N/A	N/A
F1E210157	1157264	Soil	General Chemistry (Total Cyanide)	P-17(4-5), DUP2, B-3(0-1), B-3(4-5), A-1(0-1), A-1(10-12), A-1(16-18), P-8(0-1), P-8(10-12), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18), DUP3	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E210157	1157269	Soil	General Chemistry (Total Cyanide)	P-17(0-1)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E210157	1162462	Soil	General Chemistry (Total Organic Carbon)	P-17(0-1)	No detections.	PR and RPD within limits.	PR below limits for Total Organic Carbon.	N/A	RPD within limits.
F1E210157	1163358	Soil	General Chemistry (Total Organic Carbon)	P-17(4-5), DUP2, B-3(0-1), B-3(4-5), A-1(0-1), A-1(10-12), A-1(16-18), P-8(0-1), P-8(10-12), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18), DUP3	No detections.	PR and RPD within limits.	PR below limit for Total Organic Carbon.	N/A	N/A
F1E210157	1167106	Soil	Metals (Aluminum-Zinc)	P-17(0-1), P-17(4-5), DUP2, B-3(0-1), B-3(4-5), A-1(0-1), A-1(10-12), A-1(16-18), P-8(0-1), P-8(10-12), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18), DUP3	Detections below RL for Aluminum, Iron, and Zinc.	PR within limits.	PR below limit for Aluminum and Iron. RPD above limit for Aluminum.	N/A	N/A
F1E210157	1167103	Soil	Metals (Antimony-Vanadium)	P-17(0-1), P-17(4-5), DUP2, B-3(0-1), B-3(4-5), A-1(0-1), A-1(10-12), A-1(16-18), P-8(0-1), P-8(10-12), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18), DUP3	Detection below RL for Manganese.	PR above limit for Barium and Copper. PR below limit for Titanium.	PR below limit for Antimony, Barium, and Manganese. RPD above limit for Manganese.	N/A	N/A
F1E210157	1164482	Soil	Metals (Mercury)	P-17(0-1), P-17(4-5), DUP2, B-3(0-1), B-3(4-5), A-1(0-1), A-1(16-18), P-8(0-1), P-8(10-12)	No detections.	PR and RPD within limits.	PR above limit for Mercury. RPD within limits.	N/A	N/A
F1E210157	1164487	Soil	Metals (Mercury)	A-1(10-12), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18), DUP3	No detections.	PR and RPD within limits.	PR above limit for Mercury. RPD within limits.	N/A	N/A

Notes:
NA - not applicable
RL - reporting limit
PR - precent recovery
RPD - relative percent difference
LCS - laboratory control sample

TABLE F-8
Summary of Data Usability Parameters

Lot Number (see Table F-9)	Prep Batch	Matrix	Group	Samples	Method Blank	LCS*	Matrix Spike*	Surrogates	Sample Duplicate
F1E210157	1152477	Soil	PCBs	P-17(4-5), DUP2, B-3(0-1), B-3(4-5), A-1(0-1), A-1(10-12), A-1(16-18), P-8(0-1), P-8(10-12), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18), DUP3	No detections.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E210157	1152479	Soil	PCBs	P-17(0-1)	No detections.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E210157	1152471	Soil	Pesticides (8081A)	P-17(4-5), DUP2, B-3(0-1), B-3(4-5), A-1(0-1), A-1(10-12), A-1(16-18), P-8(0-1), P-8(10-12), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18), DUP3	No detections.	PR within limits.	PR above limit for 4,4'-DDT. RPD above limit for Methoxychlor and 4,4'-DDT.	All within recovery limits.	N/A
F1E210157	1152472	Soil	Pesticides (8081A)	P-17(0-1)	No detections.	PR within limits.	PR below limit for 4,4'-DDT. RPD within limits.	All within recovery limits.	N/A
F1E210157	1152313	Soil	Pesticides (8141A)	P-17(0-1), P-17(4-5), DUP2, B-3(0-1), B-3(4-5), A-1(0-1), A-1(10-12), A-1(16-18), P-8(0-1), P-8(10-12), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18), DUP3	No detections.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E210157	1145399	Soil	Rads (Actinium 228 - Thorium 232D)	P-17(0-1), P-17(0-1), P-17(4-5), DUP2, B-3(0-1), B-3(4-5), A-1(0-1), A-1(10-12), A-1(16-18), P-8(0-1), P-8(10-12), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18), DUP3	Detection above RL for Lead 210.	% Recovery within QC control limits.	N/A	N/A	Precision values are 3, 26, 31, 91, 16, 5, 18, 31, 1, 3, 4, and 1
F1E210157	1150313	Soil	Rads (Thorium 228 - Thorium 232)	P-17(0-1), P-17(0-1), P-17(4-5), DUP2, B-3(0-1), B-3(4-5), A-1(0-1), A-1(10-12), A-1(16-18), P-8(0-1), P-8(10-12), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18)	Detection below RL for Thorium 230.	% Recovery within QC control limits.	N/A	N/A	Precision values are 23, 7, and 45.
F1E210157	1162310	Soil	Rads (Thorium 228 - Thorium 232)	DUP3	Detection below RL for Thorium 230.	% Recovery within QC control limits.	N/A	N/A	N/A
F1E210157	1150308	Soil	Rads (Uranium 234 - Uranium 238)	P-17(0-1), P-17(0-1), P-17(4-5), DUP2, B-3(0-1), B-3(4-5), A-1(0-1), A-1(10-12), A-1(16-18), P-8(0-1), P-8(10-12), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18), DUP3	No detections.	% Recovery within QC control limits.	N/A	N/A	Precision values are 20, 32, and 5.
F1E210157	1150476	Soil	Semi-Volatiles	P-17(0-1), P-17(4-5), DUP2, B-3(0-1), B-3(4-5), A-1(0-1), A-1(10-12), A-1(16-18), P-8(0-1), P-8(10-12), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18), DUP3	No detections.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E210157	1152138	Soil	Volatiles	P-17(0-1)	Detections below RL for Acetone, Methylene chloride, Toluene, Tetrachloroethene, and Xylenes (total).	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E210157	1152317	Soil	Volatiles	Trip Blank	Detections below RL for Acetone and Methylene chloride.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A

Notes:
NA - not applicable
RL - reporting limit
PR - precent recovery
RPD - relative percent difference
LCS - laboratory control sample

TABLE F-8
Summary of Data Usability Parameters

Lot Number (see Table F-9)	Prep Batch	Matrix	Group	Samples	Method Blank	LCS*	Matrix Spike*	Surrogates	Sample Duplicate
F1E210157	1153092	Soil	Volatiles	P-17(4-5), DUP2, B-3(0-1), B-3(4-5), A-1(0-1), A-1(10-12), A-1(16-18), P-8(0-1), P-8(10-12), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18), DUP3	Detection below RL for Acetone. Detection above RL for Methylene chloride.	PR within limits.	PR and RPD within limits. Surrogate above limit for 4-Bromofluorobenzene.	4-Bromofluorobenzene above limit for A-1(0-1), A-1(16-18), P-8(16 18), P-5(0-1), P-5(10-12), and P-5(16-18). Toluene-d8 above limit for A-1(10-12) and P-5(0-1).	N/A
F1E220189	1163404	Soil	Dioxins/ Furans	E-2(0-1), E-2(4-5), E-1(0-1), E-1(4-5), S-1(0-1), S-1(10-12), S-1(16-17), B-1(0-1), B-1(10-12), B-1(19-21), P-3(0-1), P-3(10-12), P-3(18-20), P-2(0-1), P-2(10-12), P-2(16-18), A-2(0-1), A-2(10-12), A-2(19-21), P-6(0-1)	No detections.	PR within limits.	N/A	N/A	N/A
F1E220189	1163414	Soil	Dioxins/ Furans	P-6(10-12), P-6(18-21), P-1(0-1), P-1(10-12), P-1(18-20)	No detections.	PR within limits.	N/A	N/A	N/A
F1E220189	1170560	Soil	General Chemistry (Hexavalent Chromium)	E-2(0-1), E-2(4-5), E-1(0-1), E-1(4-5), S-1(0-1), S-1(10-12), S-1(16-17), B-1(0-1), B-1(10-12), B-1(19-21), P-3(0-1), P-3(10-12), P-3(18-20), P-2(0-1), P-2(10-12), P-2(16-18), A-2(0-1), A-2(10-12), A-2(19-21), P-6(0-1)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E220189	1170561	Soil	General Chemistry (Hexavalent Chromium)	P-6(10-12), P-6(18-21), P-1(0-1), P-1(10-12), P-1(18-20)	No detections.	PR and RPD within limits.	PR within limits.	N/A	RPD within limits.
F1E220189	1163245	Soil	General Chemistry (Percent Moisture)	E-2(0-1), E-2(4-5), E-1(0-1), E-1(4-5), S-1(0-1), S-1(10-12), S-1(16-17), B-1(0-1), B-1(10-12), B-1(19-21), P-3(0-1), P-3(10-12), P-3(18-20), P-2(0-1), P-2(10-12)	N/A	N/A	N/A	N/A	N/A
F1E220189	1163246	Soil	General Chemistry (Percent Moisture)	P-2(16-18), A-2(0-1), A-2(10-12), A-2(19-21), P-6(0-1), P-6(10-12), P-6(18-21), P-1(0-1), P-1(10-12), P-1(18-20)	N/A	N/A	N/A	N/A	N/A
F1E220189	1164440	Soil	General Chemistry (Perchlorate)	E-2(0-1), E-2(4-5), E-1(0-1), E-1(4-5), S-1(0-1)	No detections.	PR within limits.	PR and RPD not calculated because sample amount greater than four times the spike amount.	N/A	N/A
F1E220189	1164442	Soil	General Chemistry (Perchlorate)	S-1(10-12), S-1(16-17), B-1(0-1), B-1(10-12), B-1(19-21), P-3(0-1), P-3(10-12), P-3(18-20), P-2(0-1), P-2(10-12), P-2(16-18), A-2(0-1), A-2(10-12), A-2(19-21), P-6(0-1), P-6(10-12), P-6(18-21), P-1(0-1), P-1(10-12), P-1(18-20)	No detections.	PR within limits.	PR below limit, but has no qualifier and has value of 0. RPD within limits.	N/A	N/A

Notes:
NA - not applicable
RL - reporting limit
PR - precent recovery
RPD - relative percent difference
LCS - laboratory control sample

TABLE F-8
Summary of Data Usability Parameters

Lot Number (see Table F-9)	Prep Batch	Matrix	Group	Samples	Method Blank	LCS*	Matrix Spike*	Surrogates	Sample Duplicate
F1E220189	1157261	Soil	General Chemistry (Total Cyanide)	E-2(4-5)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E220189	1157264	Soil	General Chemistry (Total Cyanide)	E-2(0-1)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E220189	1157271	Soil	General Chemistry (Total Cyanide)	E-1(0-1), E-1(4-5), S-1(0-1), S-1(10-12), S-1(16-17), B-1(0-1), B-1(10-12), B-1(19-21), P-3(0-1), P-3(10-12), P-3(18-20), P-2(0-1), P-2(10-12), P-2(16-18)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E220189	1158233	Soil	General Chemistry (Total Cyanide)	A-2(0-1), A-2(10-12), A-2(19-21), P 6(0-1), P-6(10-12), P-6(18-21), P-1(0-1), P-1(10-12), P-1(18-20)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E220189	1163360	Soil	General Chemistry (Total Organic Carbon)	E-2(0-1), E-2(4-5), E-1(0-1), E-1(4-5), S-1(0-1), S-1(10-12), S-1(16-17)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E220189	1164519	Soil	General Chemistry (Total Organic Carbon)	B-1(0-1), B-1(10-12), B-1(19-21), P-3(0-1), P-3(10-12), P-3(18-20), P-2(0-1), P-2(10-12), P-2(16-18), A-2(0-1), A-2(10-12), A-2(19-21), P-6(0-1), P-6(10-12), P-6(18-21), P-1(0-1), P-1(10-12), P-1(18-20)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E220189	1167101	Soil	Metals (Aluminum-Zinc)	E-2(0-1), E-2(4-5), E-1(0-1)	Detection below RL for Aluminum. Detection above RL for Zinc.	PR within limits.	PR below limit for Aluminum, Iron, and Zinc. RPD within limits.	N/A	N/A
F1E220189	1167106	Soil	Metals (Aluminum-Zinc)	E-1(4-5), S-1(0-1), S-1(10-12), S-1(16-17)	Detections below RL for Aluminum, Iron, and Zinc.	PR within limits.	PR below limit for Aluminum and Iron. RPD above limit for Aluminum.	N/A	N/A
F1E220189	1169182	Soil	Metals (Aluminum-Zinc)	B-1(0-1), B-1(10-12), B-1(19-21), P-3(0-1), P-3(10-12), P-3(18-20), P-2(0-1), P-2(10-12), P-2(16-18), A-2(0-1), A-2(10-12), A-2(19-21), P-6(0-1), P-6(10-12), P-6(18-21), P-1(0-1), P-1(10-12), P-1(18-20)	No detections.	PR within limits.	PR below limit for Aluminum and Iron. RPD within limits.	N/A	N/A
F1E220189	1167100	Soil	Metals (Antimony-Vanadium)	E-2(0-1), E-2(4-5), E-1(0-1)	Detections below RL for Lead, Manganese, and Silver.	PR above limit for Copper. PR below limit for Magnesium and Titanium.	PR below limit for Antimony, Chromium, Copper, Lead, Magnesium, Nickel, Selenium, Titanium, and Vanadium. PR above limit for Barium and Titanium. RPD above limit for Titanium.	N/A	N/A
F1E220189	1167103	Soil	Metals (Antimony-Vanadium)	E-1(4-5), S-1(0-1), S-1(10-12), S-1(16-17)	Detection below RL for Manganese.	PR above limit for Barium and Copper. PR below limit for Titanium.	PR below limit for Antimony, Barium and Manganese. RPD above limit for Manganese.	N/A	N/A

Notes:
NA - not applicable
RL - reporting limit
PR - precent recovery
RPD - relative percent difference
LCS - laboratory control sample

TABLE F-8
Summary of Data Usability Parameters

Lot Number (see Table F-9)	Prep Batch	Matrix	Group	Samples	Method Blank	LCS*	Matrix Spike*	Surrogates	Sample Duplicate
F1E220189	1169178	Soil	Metals (Antimony-Vanadium)	B-1(0-1), B-1(10-12), B-1(19-21), P-3(0-1), P-3(10-12), P-3(18-20), P-2(0-1), P-2(10-12), P-2(16-18), A-2(0-1), A-2(10-12), A-2(19-21), P-6(0-1), P-6(10-12), P-6(18-21), P-1(0-1), P-1(10-12), P-1(18-20)	Detection below RL for Manganese.	PR below limit for Magnesium, Antimony, Titanium, Arsenic, Beryllium, and Cadmium.	PR below limit for Antimony, Barium, Lead, Manganese, Titanium, and Vanadium. PR above limit for Barium, Lead, Manganese, and Titanium. RPD above limit for Lead, Manganese, and Titanium.	N/A	N/A
F1E220189	1164487	Soil	Metals (Mercury)	P-6(0-1), P-6(10-12), P-6(18-21), P-1(0-1), P-1(10-12), P-1(18-20)	No detections.	PR and RPD within limits.	PR above limit for Mercury. RPD within limits.	N/A	N/A
F1E220189	1164490	Soil	Metals (Mercury)	E-2(0-1), E-2(4-5), E-1(0-1), E-1(4-5), S-1(0-1), S-1(10-12), S-1(16-17), B-1(0-1), B-1(10-12), B-1(19-21), P-3(0-1), P-3(10-12), P-3(18-20), P-2(0-1), P-2(10-12), P-2(16-18), A-2(0-1), A-2(10-12), A-2(19-21)	No detections.	PR and RPD within limits.	PR and RPD within limits.	N/A	N/A
F1E220189	1153140	Soil	PCBs	E-2(0-1), E-2(4-5), E-1(0-1), E-1(4-5), S-1(0-1), S-1(10-12), S-1(16-17), B-1(0-1), B-1(10-12), B-1(19-21), P-3(0-1), P-3(10-12), P-3(18-20), P-2(0-1), P-2(16-18), A-2(0-1), A-2(10-12), A-2(19-21), P-6(0-1), P-6(10-12)	No detections.	PR within limits.	N/A	All within recovery limits.	N/A
F1E220189	1153141	Soil	PCBs	P-2(10-12), P-6(18-21). P-1(0-1), P-1(10-12), P-1(18-20)	No detections.	PR within limits.	N/A	All within recovery limits.	N/A
F1E220189	1153137	Soil	Pesticides (8081A)	E-2(0-1), E-2(4-5), E-1(0-1), E-1(4-5), S-1(0-1), S-1(10-12), S-1(16-17), B-1(0-1), B-1(10-12), B-1(19-21), P-3(0-1), P-3(10-12), P-3(18-20), P-2(0-1), P-2(16-18), A-2(0-1), A-2(10-12), A-2(19-21), P-6(0-1), P-6(10-12)	No detections.	PR within limits.	N/A	Decachlorobiphenyl above limit for B-1(0-1) and A-2(0-1).	N/A
F1E220189	1153138	Soil	Pesticides (8081A)	P-2(10-12), P-6(18-21). P-1(0-1), P-1(10-12), P-1(18-20)	No detections.	PR within limits.	N/A	Decachlorobiphenyl above limit for .	N/A
F1E220189	1152318	Soil	Pesticides (8141A)	E-2(0-1), E-2(4-5), E-1(0-1), E-1(4-5), S-1(0-1), S-1(10-12), S-1(16-17), B-1(0-1), B-1(10-12), B-1(19-21)	No detections.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E220189	1153112	Soil	Pesticides (8141A)	P-3(0-1), P-3(10-12), P-3(18-20), P-2(0-1), P-2(10-12), P-2(16-18), A-2(0-1), A-2(10-12), A-2(19-21), P-6(0-1), P-6(10-12), P-6(18-21), P-1(0-1), P-1(10-12), P-1(18-20)	No detections.	PR within limits.	PR and RPD within limits.	Chlormefos below limit for .	N/A

Notes:
NA - not applicable
RL - reporting limit
PR - precent recovery
RPD - relative percent difference
LCS - laboratory control sample

TABLE F-8
Summary of Data Usability Parameters

Lot Number (see Table F-9)	Prep Batch	Matrix	Group	Samples	Method Blank	LCS*	Matrix Spike*	Surrogates	Sample Duplicate
F1E220189	1147099	Soil	Rads (Actinium 228 - Thorium 232D)	E-2(0-1), E-2(0-1), E-2(4-5), E-1(0-1), E-1(4-5), S-1(0-1), S-1(10-12), S-1(16-17), B-1(0-1), B-1(10-12), B-1(19-21), P-3(0-1), P-3(10-12), P-3(18-20), P-2(0-1), P-2(10-12), P-2(16-18), A-2(0-1), A-2(10-12), A-2(19-21), P-6(0-1)	No detections.	% Recovery within QC control limits.	N/A	N/A	Precision values of 10, 8, 0.6, 67, 15, 2, 1, 0.6, 48, 28, and 166.
F1E220189	1147100	Soil	Rads (Actinium 228 - Thorium 232D)	P-6(10-12), P-6(10-12), P-6(18-21), P-1(0-1), P-1(10-12), P-1(18-20)	No detections.	% Recovery within QC control limits.	N/A	N/A	Precision values of 2, 6, 1, 20, 14, 0.6, 1, 1, 84, 34, and 15.
F1E220189	1151380	Soil	Rads (Uranium 234 - Uranium 238)	E-2(0-1), E-2(0-1), E-2(4-5), E-1(0-1), E-1(4-5), S-1(0-1), S-1(10-12), S-1(16-17), B-1(0-1), B-1(10-12), B-1(19-21), P-3(0-1), P-3(10-12), P-3(18-20)	No detections.	% Recovery within QC control limits.	N/A	N/A	Precision values of 36, 28, and 14.
F1E220189	1151385	Soil	Rads (Uranium 234 - Uranium 238)	E-2(0-1), E-2(0-1), E-2(4-5), E-1(0-1), E-1(4-5), S-1(0-1), S-1(10-12), S-1(16-17), B-1(0-1), B-1(10-12), B-1(19-21), P-3(0-1), P-3(10-12), P-3(18-20)	Detection below RL for Thorium 230.	% Recovery within QC control Limits.	N/A	N/A	Precision values of 5, 13, and 7.
F1E220189	1152151	Soil	Rads (Uranium 234 - Uranium 238)	P-2(0-1), P-2(0-1), P-2(10-12), P-2(16-18), A-2(0-1), A-2(10-12), A-2(19-21), P-6(0-1), P-6(10-12), P-6(18-21), P-1(0-1), P-1(10-12), P-1(18-20)	No detections.	% Recovery within QC control limits.	N/A	N/A	Precision values of 3, 22, and 4.
F1E220189	1152153	Soil	Rads (Uranium 234 - Uranium 238)	P-2(0-1), P-2(0-1), P-2(10-12), P-2(16-18), A-2(0-1), A-2(10-12), A-2(19-21), P-6(0-1), P-6(10-12), P-6(18-21), P-1(0-1), P-1(10-12), P-1(18-20)	Detection below RL for Thorium 230.	% Recovery within QC control Limits.	N/A	N/A	Precision values of 0.1, 10, and 26.
F1E220189	1151491	Soil	Semi-Volatiles	E-2(0-1), E-2(4-5), E-1(0-1), E-1(4-5), S-1(0-1), S-1(10-12), S-1(16-17), B-1(0-1), B-1(10-12), B-1(19-21), P-3(0-1), P-3(10-12), P-3(18-20), P-2(0-1), P-2(10-12), P-2(16-18), A-2(0-1), A-2(10-12), A-2(19-21), P-6(0-1)	No detections.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E220189	1151495	Soil	Semi-Volatiles	P-6(10-12), P-6(18-21), P-1(0-1), P-1(10-12), P-1(18-20)	No detections.	PR within limits.	PR within limits. RPD above limit for N-Nitrosodi-n-propyl-amine.	All within recovery limits.	N/A
F1E220189	1152317	Soil	Volatiles	Trip Blank	Detections below RL for Acetone and Methylene chloride.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E220189	1153142	Soil	Volatiles	E-2(0-1), E-2(4-5), E-1(0-1), E-1(4-5), S-1(0-1), S-1(10-12), S-1(16-17), B-1(0-1), B-1(10-12), B-1(19-21), P-3(0-1), P-3(10-12), P-3(18-20), P-2(0-1), P-2(10-12)	Detection below RL for Acetone.	PR within limits.	PR and RPD within limits.	Toluene-d8 above limit for E-1(0-1) and B-1(0-1). 4-Bromofluorobenzene above limit for S-1(16-17).	N/A

Notes:
NA - not applicable
RL - reporting limit
PR - precent recovery
RPD - relative percent difference
LCS - laboratory control sample

TABLE F-8
Summary of Data Usability Parameters

Lot Number (see Table F-9)	Prep Batch	Matrix	Group	Samples	Method Blank	LCS*	Matrix Spike*	Surrogates	Sample Duplicate
F1E220189	1154107	Soil	Volatiles	P-2(16-18), A-2(0-1), A-2(10-12), A 2(19-21), P-6(0-1), P-6(10-12), P-6(18-21), P-1(0-1), P-1(10-12), P-1(18-20)	Detection below RL for Acetone.	PR within limits.	PR and RPD within limits. Surrogates above limits for 4-Bromofluorobenzene and Toluene-d8.	4-Bromofluorobenzene above limit for P-1(10-12) and . Toluene-d8 above limit for P-1(10-12).	N/A
F1E220189	1154111	Soil	Volatiles	Trip Blank, Trip Blank	Detections above RL for Acetone and Methylene chloride. Detection below RL for Bromomethane.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E230191	1166429	Soil	Dioxins/ Furans	P-17(6-8), P-12(15-17), P-11(15-17), S-2(0-1), S-2(10-12), S-2(18-20), P-4(0-12), P-4(10-12), P-4(20-22), P-7(19-21), E-2(6-8)	No detections.	PR within limits.	N/A	N/A	N/A
F1E230191	1156123	Water	Dioxins/ Furans	052201-WB01	No detections.	PR within limits.	N/A	N/A	N/A
F1E230191	1156472	Water	General Chemistry (Alkalinity)	052201-WB01	No detections.	PR within limits.	N/A	N/A	N/A
F1E230191	1148114	Water	General Chemistry (Chloride)	052201-WB01	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E230191	1169596	Water	General Chemistry (Conductivity)	052201-WB01	Detection below RL for Conductivity.	PR within limits.	N/A	N/A	N/A
F1E230191	1148113	Water	General Chemistry (Fluoride)	052201-WB01	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E230191	1172213	Water	General Chemistry (Hardness)	052201-WB01	No detections.	PR within limits.	N/A	N/A	RPD within limits.
F1E230191	1170561	Soil	General Chemistry (Hexavalent Chromium)	P-17(6-8), P-12(15-17), P-11(15-17), S-2(0-1), S-2(10-12), S-2(18-20), P-4(0-12), P-4(10-12), P-4(20-22), P-7(19-21), E-2(6-8)	No detections.	PR and RPD within limits.	PR within limits.	N/A	RPD within limits.
F1E230191	1143494	Water	General Chemistry (Hexavalent Chromium)	052201-WB01	No detections.	N/A	N/A	N/A	N/A
F1E230191	1148112	Water	General Chemistry (Nitrate)	052201-WB01	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E230191	1164237	Soil	General Chemistry (Percent Moisture)	P-17(6-8), P-12(15-17), P-11(15-17), S-2(0-1), S-2(10-12), S-2(18-20), P-4(0-12), P-4(10-12)	N/A	N/A	N/A	N/A	N/A
F1E230191	1164238	Soil	General Chemistry (Percent Moisture)	P-4(20-22), P-7(19-21), E-2(6-8)	N/A	N/A	N/A	N/A	N/A
F1E230191	1169288	Soil	General Chemistry (Perchlorate)	P-17(6-8), P-12(15-17), P-11(15-17), S-2(0-1), S-2(10-12), S-2(18-20), P-4(0-12), P-4(10-12), P-4(20-22), P-7(19-21), E-2(6-8)	No detections.	PR within limits.	PR and RPD within limits.	N/A	N/A
F1E230191	1162429	Water	General Chemistry (Perchlorate)	052201-WB01	No detections.	PR within limits.	PR and RPD within limits.	N/A	N/A
F1E230191	1170418	Water	General Chemistry (pH)	052201-WB01	N/A	PR within limits.	N/A	N/A	N/A
F1E230191	1148115	Water	General Chemistry (Phosphate as P, Ortho)	052201-WB01	No detections.	PR and RPD within limits.	N/A	N/A	N/A

Notes:
NA - not applicable
RL - reporting limit
PR - precent recovery
RPD - relative percent difference
LCS - laboratory control sample

TABLE F-8
Summary of Data Usability Parameters

Lot Number (see Table F-9)	Prep Batch	Matrix	Group	Samples	Method Blank	LCS*	Matrix Spike*	Surrogates	Sample Duplicate
F1E230191	1148111	Water	General Chemistry (Sulfate)	052201-WB01	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E230191	1157276	Soil	General Chemistry (Total Cyanide)	DUP5 , E-2(6-8)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E230191	1158234	Soil	General Chemistry (Total Cyanide)	P-17(6-8), P-12(15-17), P-11(15-17), S-2(0-1), S-2(10-12), S-2(18-20), P-4(0-12), P-4(10-12), P-4(20-22), P-7(19-21)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E230191	1157277	Water	General Chemistry (Total Cyanide)	052201-WB01	No detections.	PR within limits. RPD above limit for Total cyanide.	N/A	N/A	N/A
F1E230191	1155426	Water	General Chemistry (Total Dissolved Solids)	052201-WB01	No detections.	PR within limits.	N/A	N/A	N/A
F1E230191	1166366	Soil	General Chemistry (Total Organic Carbon)	S-2(0-1), S-2(10-12), S-2(18-20)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E230191	1166404	Soil	General Chemistry (Total Organic Carbon)	P-17(6-8), P-12(15-17), P-11(15-17), P-4(0-12), P-4(10-12), P-4(20-22), P-7(19-21), E-2(6-8)	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E230191	1146126	Water	General Chemistry (Turbidity)	052201-WB01	No detections.	PR above limit, but recovery limits listed as "0-0.0"	N/A	N/A	RPD within limits.
F1E230191	1170216	Soil	Metals (Aluminum-Zinc)	P-17(6-8), P-12(15-17), P-11(15-17), S-2(0-1), S-2(10-12), S-2(18-20), P-4(0-12), P-4(10-12), P-4(20-22), P-7(19-21), E-2(6-8)	Detection below RL for Aluminum.	PR within limits.	PR above limit for Aluminum and Iron. PR below limit for Iron. RPD above limit for Iron.	N/A	N/A
F1E230191	1151256	Water	Metals (Aluminum-Zinc)	052201-WB01	Detections below RL for Iron, Magnesium, and Sodium.	PR within limits.	PR above limits for Aluminum and Iron. RPD within limits.	N/A	N/A
F1E230191	1170211	Soil	Metals (Antimony-Vanadium)	P-17(6-8), P-12(15-17), P-11(15-17), S-2(0-1), S-2(10-12), S-2(18-20), P-4(0-12), P-4(10-12), P-4(20-22), P-7(19-21), E-2(6-8)	Detection below RL for Manganese.	PR above limit for for Chromium, Copper, Nickel, and Vanadium. PR below limit for Magnesium.	PR below limit for Antimony, Manganese, and Titanium. PR above limit for Manganese.	N/A	N/A
F1E230191	1151242	Water	Metals (Antimony-Vanadium)	052201-WB01	N/A	PR above limit for Titanium.	PR below limits for Antimony. RPD within limits.	N/A	N/A
F1E230191	1165522	Soil	Metals (Mercury)	S-2(0-1), S-2(10-12), S-2(18-20), P-4(0-12), P-4(10-12), P-4(20-22), P-7(19-21)	No detections.	PR and RPD within limits.	PR within limits.	N/A	N/A
F1E230191	1165525	Soil	Metals (Mercury)	P-17(6-8), P-12(15-17), P-11(15-17), E-2(6-8)	No detections.	PR and RPD within limits.	PR within limits.	N/A	N/A
F1E230191	1165517	Water	Metals (Mercury)	052201-WB01	No detections.	PR and RPD within limits.	PR within limits.	N/A	N/A
F1E230191	1155440	Soil	PCBs	P-17(6-8), P-12(15-17), P-11(15-17), S-2(0-1), S-2(10-12), S-2(18-20), P-4(0-12), P-4(10-12), P-4(20-22), P-7(19-21), E-2(6-8)	No detections.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A

Notes:
NA - not applicable
RL - reporting limit
PR - precent recovery
RPD - relative percent difference
LCS - laboratory control sample

TABLE F-8
Summary of Data Usability Parameters

Lot Number (see Table F-9)	Prep Batch	Matrix	Group	Samples	Method Blank	LCS*	Matrix Spike*	Surrogates	Sample Duplicate
F1E230191	1149529	Water	PCBs	052201-WB01	No detections.	PR within limits.	N/A	All within recovery limits.	N/A
F1E230191	1155429	Soil	Pesticides (8081A)	P-17(6-8), P-12(15-17), P-11(15-17), S-2(0-1), S-2(10-12), S-2(18-20), P-4(0-12), P-4(10-12), P-4(10-12), P-4(20-22), P-7(19-21), E-2(6-8)	No detections.	PR within limits.	PR above limit for 4,4'-DDD. RPD within limits.	Decachlorobiphenyl above limit for P-4(0-12), and P-4(10-12).	N/A
F1E230191	1149528	Water	Pesticides (8081A)	052201-WB01	No detections.	PR and RPD within limits.	N/A	All within recovery limits.	N/A
F1E230191	1155144	Soil	Pesticides (8141A)	P-17(6-8), P-12(15-17), P-11(15-17), S-2(0-1), S-2(10-12), S-2(18-20), P-4(0-12), P-4(10-12), P-4(20-22), P-7(19-21), E-2(6-8)	No detections.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E230191	1149353	Water	Pesticides (8141A)	052201-WB01	No detections.	PR and RPD within limits.	N/A	All within recovery limits.	N/A
F1E230191	1150432	Soil	Rads (Actinium 228 - Thorium 232DA)	P-17(6-8), P-17(6-8), P-12(15-17), P 11(15-17), S-2(0-1), S-2(10-12), S-2(18-20), P-4(0-12), P-4(10-12), P-4(20-22), P-7(19-21), E-2(6-8)	No detections.	% Recovery within QC control limits.	N/A	N/A	Precision values are 28, 18, 13, 53, 8, 6, 8, 13, 22, 28, and 90.
F1E230191	1158331	Water	Rads (Actinium 228 - Thorium 234)	052201-WB01	No detections.	% Recovery within QC control limits.	N/A	N/A	Precision values are -41, 700, -134, -45, 34, -66, -0.6, -673, -65, -1.6, and -86
F1E230191	1155334	Water	Rads (Radium 226)	052201-WB01	No detections.	% Recovery within QC control limits.	N/A	N/A	N/A
F1E230191	1155342	Water	Rads (Radium 228)	052201-WB01	No detections.	% Recovery within QC control limits.	N/A	N/A	N/A
F1E230191	1152290	Soil	Rads (Thorium 228 - Thorium 232)	P-17(6-8), P-17(6-8), P-12(15-17), P 11(15-17), S-2(0-1), S-2(10-12), S-2(18-20), P-4(0-12), P-4(10-12), P-4(20-22), P-7(19-21), E-2(6-8)	Detection below RL for Thorium 230.	% Recovery within QC control limits.	N/A	N/A	Precision values are 4, 25, and 16.
F1E230191	1151317	Water	Rads (Thorium 228 - Thorium 232)	052201-WB01	Detections below RL for Thorium 230 and Thorium 232.	% Recovery within QC control limits.	N/A	N/A	N/A
F1E230191	1152286	Soil	Rads (Uranium 234 - Uranium 238)	P-17(6-8), P-17(6-8), P-12(15-17), P 11(15-17), S-2(0-1), S-2(10-12), S-2(18-20), P-4(0-12), P-4(10-12), P-4(20-22), P-7(19-21), E-2(6-8)	No detections.	% Recovery within QC control limits.	N/A	N/A	Precision values are 11, 6, and 9.
F1E230191	1151325	Water	Rads (Uranium 234 - Uranium 238)	052201-WB01, 052201-WB01 DUP	No detections.	% Recovery within QC control limits.	N/A	N/A	Precision values are 1, 200, and 232.
F1E230191	1151495	Soil	Semi-Volatiles	P-17(6-8), P-12(15-17), P-11(15-17), S-2(0-1), S-2(10-12), S-2(18-20), P-4(0-12), P-4(10-12), P-4(20-22), P-7(19-21), E-2(6-8)	No detections.	PR within limits.	PR within limits. RPD above limits for N-Nitrosodi-n-propyl-amine.	All within recovery limits.	N/A
F1E230191	1145409	Water	Semi-Volatiles	052201-WB01	No detections.	PR within limits.	N/A	All within recovery limits.	N/A

Notes:
NA - not applicable
RL - reporting limit
PR - precent recovery
RPD - relative percent difference
LCS - laboratory control sample

TABLE F-8
Summary of Data Usability Parameters

Lot Number (see Table F-9)	Prep Batch	Matrix	Group	Samples	Method Blank	LCS*	Matrix Spike*	Surrogates	Sample Duplicate
F1E230191	1154107	Soil	Volatiles	S-2(0-1), S-2(10-12), S-2(18-20)	Detection below RL for Acetone.	PR within limits.	PR and RPD within limits. Surrogates above limits for 4-Bromofluorobenzene and Toluene-d8.	All within recovery limits.	N/A
F1E230191	1154108	Soil	Volatiles	P-17(6-8), P-12(15-17), P-11(15-17), P-4(0-12), P-4(20-22), P-7(19-21), E-2(6-8)	Detection below RL for Acetone.	PR within limits.	N/A	4-Bromofluorobenzene above limit for DUP4.	N/A
F1E230191	1155153	Water	Volatiles	052201-WB01, Trip Blank #1, Trip Blank #2, Trip Blank #3	Detection below RL for Bromomethane.	PR within limits.	PR and RPD within limits.	All within recovery limits.	N/A
F1E240210	1156123	Water	Dioxins/ Furans	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No detections.	PR within limits.	N/A	N/A	N/A
F1E240210	1156472	Water	General Chemistry (Alkalinity)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No detections.	PR within limits.	N/A	N/A	N/A
F1E240210	1149440	Water	General Chemistry (Chloride)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No detections.	PR within limits.	N/A	N/A	N/A
F1E240210	1169596	Water	General Chemistry (Conductivity)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	Dectection below RL for Conductivity.	PR within limits.	N/A	N/A	N/A
F1E240210	1149441	Water	General Chemistry (Fluoride)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E240210	1172213	Water	General Chemistry (Hardness)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No detections.	PR within limits.	N/A	N/A	RPD within limits.
F1E240210	1146127	Water	General Chemistry (Hexavalent Chromium)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E240210	1149442	Water	General Chemistry (Nitrate)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E240210	1162429	Water	General Chemistry (Perchlorate)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No detections.	PR within limits.	PR and RPD within limits.	N/A	N/A
F1E240210	1170418	Water	General Chemistry (pH)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, RINSE3	N/A	PR within limits.	N/A	N/A	N/A
F1E240210	1172453	Water	General Chemistry (pH)	B28-GW01	N/A	PR within limits.	N/A	N/A	RPD within limits.
F1E240210	1149443	Water	General Chemistry (Phosphate as P, Ortho)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E240210	1149439	Water	General Chemistry (Sulfate)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E240210	1157277	Water	General Chemistry (Total Cyanide)	B-14, B28-GW01	No detections.	PR within limits. RPD above limit for Total cyanide.	N/A	N/A	N/A

Notes:
NA - not applicable
RL - reporting limit
PR - precent recovery
RPD - relative percent difference
LCS - laboratory control sample

TABLE F-8
Summary of Data Usability Parameters

Lot Number (see Table F-9)	Prep Batch	Matrix	Group	Samples	Method Blank	LCS*	Matrix Spike*	Surrogates	Sample Duplicate
F1E240210	1169321	Water	General Chemistry (Total Cyanide)	PC-56-GW-01, DUP6, PC-4-GW01, PC-58-MW04, PC-2-GW02, RINSE3	No detections.	PR and RPD within limits.	N/A	N/A	N/A
F1E240210	1155426	Water	General Chemistry (Total Dissolved Solids)	B-14, B28-GW01	No detections.	PR within limits.	N/A	N/A	N/A
F1E240210	1170436	Water	General Chemistry (Total Dissolved Solids)	PC-56-GW-01, DUP6, PC-4-GW01, PC-58-MW04, PC-2-GW02	Detection above RL for Total Dissolved Solids.	PR within limits.	N/A	N/A	N/A
F1E240210	1179242	Water	General Chemistry (Total Dissolved Solids)	DUP6	Detection above RL for Total Dissolved Solids.	PR within limits.	N/A	N/A	N/A
F1E240210	1179256	Water	General Chemistry (Total Dissolved Solids)	RINSE3	No detections.	PR within limits.	N/A	N/A	RPD within limits.
F1E240210	1146126	Water	General Chemistry (Turbidity)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No detections.	PR above limit, but recovery limits listed as "0.0-0.0"	N/A	N/A	N/A
F1E240210	1151256	Water	Metals (Aluminum-Zinc)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	Detections below RL for Iron, Magnesium, and Sodium.	PR within limits.	PR above limit for Aluminum and Iron. RPD within limits.	N/A	N/A
F1E240210	1151242	Water	Metals (Antimony - Vanadium)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	N/A	PR above limit for Titanium, but recovery limits listed as "0-0.0".	PR below limit for Antimony. RPD within limits.	N/A	N/A
F1E240210	1169328	Water	Metals (Mercury)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No detections.	PR and RPD within limits.	PR and RPD within limits.	N/A	N/A
F1E240210	1149529	Water	PCBs	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No detections.	PR and RPD within limits.	N/A	All within recovery limits.	N/A
F1E240210	1149528	Water	Pesticides (8081A)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No detections.	PR and RPD within limits.	N/A	All within recovery limits.	N/A
F1E240210	1149353	Water	Pesticides (8141A)	PC-56-GW-01, DUP6, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No detections.	PR and RPD within limits.	N/A	All within recovery limits.	N/A
F1E240210	1156215	Water	Pesticides (8141A)	B-14	No detections.	PR and RPD within limits.	PR within limits.	All within recovery limits.	N/A
F1E240210	1158331	Water	Rads (Actinium 228 - Thorium 234)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No detections.	% Recovery within QC control limits.	N/A	N/A	Precision values of -41, 700, -134, -45, 34, -66, -0.6, -673, -65, -1.6, and -86.
F1E240210	1155334	Water	Rads (Radium 226)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No detections.	% Recovery within QC control limits.	N/A	N/A	N/A
F1E240210	1155342	Water	Rads (Radium 228)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No detections.	% Recovery within QC control limits.	N/A	N/A	N/A

Notes:
NA - not applicable
RL - reporting limit
PR - precent recovery
RPD - relative percent difference
LCS - laboratory control sample

TABLE F-8
Summary of Data Usability Parameters

Lot Number (see Table F-9)	Prep Batch	Matrix	Group	Samples	Method Blank	LCS*	Matrix Spike*	Surrogates	Sample Duplicate
F1E240210	1151317	Water	Rads (Thorium 228 - Thorium 232)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	Detections below RL for Thorium 230 and Thorium 232.	% Recovery within QC control limits.	N/A	N/A	N/A
F1E240210	1151325	Water	Rads (Uranium 234 - Uranium 238)	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No detections.	% Recovery within QC control limits.	N/A	N/A	Precision values of 1, 200, and 232.
F1E240210	1150121	Water	Semi-Volatiles	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, B28-GW01, RINSE3	No Detections. Surrogate below RL for Phenol-d5.	PR within limits. RPD above limit for 4-Nitrophenol.	N/A	All within recovery limits.	N/A
F1E240210	1155162	Water	Volatiles	PC-56-GW-01, DUP6, B-14, PC-4-GW01, PC-58-MW04, PC-2-GW02, RINSE3, Trip Blank COC 057744, Trip Blank COC 057712, Trip Blank 057719	No detections.	PR above limit for Toluene.	PR and RPD within limits.	All within recovery limits.	N/A
F1E240210	1156367	Water	Volatiles	Trip Blank COC 057738	No detections.	PR within limits.	PR below limit for Trichloroethene. RPD within limits.	All within recovery limits.	N/A
J1F150269	1186136	Soil	Radium 226	B-2(0-1), B-2(0-1), P-15(0-1), P-15(4-5), P-11(0-1), P-12(0-1), P-12(4-5), P-14(0-1), P-14(4-5), P-16(0-1), P-14(4-5), P-13(0-1), P-13(4-5), P-7(10-12), P-7(18-20), DUP1, B-2(4-5)	No detections.	% Recovered is within QC control limits.	N/A	N/A	Precision value of 9.
J1F150269	1187227	Soil	Radium 226	P-11(4-5)	No detections.	% Recovery within QC control limits.	N/A	N/A	N/A
J1F150269	1170331	Soil	Radium 228	B-2(0-1), P-11(0-1), P-11(4-5), P-12(0-1), P-12(4-5), P-14(0-1), P-14(4-5), P-15(0-1), P-15(4-5), P-16(0-1)	Detection below RL for Radium 228.	LCS performed.	N/A	N/A	Duplicate performed.
J1F150269	1170337	Soil	Radium 228	B-2(4-5), DUP1, P-13(0-1), P-13(4-5), P-16(4-5), P-7(10-12), P-7(18-20)	No detections.	LCS performed.	N/A	N/A	Duplicate performed.
J1F150279	1186316	Soil	Radium 226	P-17(6-8), P-17(6-8), P-12(15-17), P 11(15-17), S-2(0-1), S-2(10-12), S-2(18-20), P-4(0-1), P-4(10-12), P-4(20-22), P-7(19-21), E-2(6-8), DUP5	No detections.	% Recovery within QC control limits.	N/A	N/A	Precision value of 210.
J1F150279	1170349	Soil	Radium 228	E-2(6-8)	Detection below RL for Radium 228.	LCS performed.	N/A	N/A	Duplicate performed.
J1F150279	1170344	Soil	Radium 228	P-11(15-17), P-12(15-17), P-17(6-8), P-4(0-1), P-4(10-12), P-4(20-22), P-7(19-21), S-2(0-1), S-2(10-12), S-2(18-20)	Detection below RL for Radium 228.	LCS performed.	N/A	N/A	Duplicate performed.
J1F180120	1187227	Soil	Radium 226	P-17(0-1), P-17(4-5), B-3(0-1), B-3(4-5), A-1(0-1), A-1(10-12), A-1(16-18), P-8(0-1), P-8(10-12), P-8(16-18), P-8(16-18), P-5(0-1), P-5(10-12), P-5(16-18), DUP2, DUP3	No detections.	% Recovery within QC control limits.	N/A	N/A	Precision value of 130.
J1F180120	1170318	Soil	Radium 228	A-1(0-1), A-1(10-12), A-1(16-18), B-3(0-1), B-3(4-5), P-8(0-1), P-8(10-12), P-8(16-18), P-17(0-1), P-17(4-5)	No detections.	LCS performed.	N/A	N/A	Duplicate performed.

Notes:
NA - not applicable
RL - reporting limit
PR - precent recovery
RPD - relative percent difference
LCS - laboratory control sample

TABLE F-8
Summary of Data Usability Parameters

Lot Number (see Table F-9)	Prep Batch	Matrix	Group	Samples	Method Blank	LCS*	Matrix Spike*	Surrogates	Sample Duplicate
J1F180120	1170325	Soil	Radium 228	DUP2, DUP3, P-5(0-1), P-5(10-12), P-5(16-18)	No detections.	LCS performed.	N/A	N/A	Duplicate performed.
J1F180123	1187227	Soil	Radium 226	P-10(0-1), P-10(10-11), P-10(16.5-17.5)	No detections.	% Recovered is within QC control limits.	N/A	N/A	N/A
J1F180123	1186136	Soil	Radium 226	P-9(0-1), P-9(8), P-7(0-1)	No detections.	% Recovered is within QC control limits.	N/A	N/A	N/A
J1F180123	1170349	Soil	Radium 228	P-10(0-1), P-10(10-11), P-10(16.5-17.5), P-7(0-1), P-9(0-1), P-9(8)	Detection below RL for Radium 228.	LCS performed.	N/A	N/A	Duplicate performed.
J1F180131	1186199	Soil	Radium 226	E-2(0-1), E-2(0-1), E-2(4-5), E-1(0-1), E-1(4-5), S-1(0-1), S-1(10-12), S 1(16-17), B-1(0-1), B-1(10-12), B-1(19-21), P-3(0-1), P-3(10-12), P-3(18-20), P-2(0-1), P-2(10-12), P-2(16-18), A-2(0-1), A-2(10-12), A-2(19-21), P-6(0-1)	No detections.	% Recovery within QC control limits.	N/A	N/A	Precision value of 160.
J1F180131	1186316	Soil	Radium 226	P-6(10-12), P-6(18-21), P-1(0-1), P-1(10-12), P-1(18-20)	No detections.	% Recovery within QC control limits.	N/A	N/A	N/A
J1F180131	1170309	Soil	Radium 228	A-2(0-1), A-2(10-12), A-2(19-21), P 2(0-1), P-2(10-12), P-2(16-18), P-3(0-1), P-3(10-12), P-3(18-20), P-6(0-1)	Detection below RL for Radium 228.	LCS performed.	N/A	N/A	Duplicate performed.
J1F180131	1170295	Soil	Radium 228	B-1(0-1), B-1(10-12), B-1(19-21), E 1(0-1), E-1(4-5), E-2(0-1), E-2(4-5), S-1(0-1), S-1(10-12), S-1(16-17)	Detection below RL for Radium 228.	LCS performed.	N/A	N/A	Duplicate performed.
J1F180131	1170313	Soil	Radium 228	P-1(0-1), P-1(10-12), P-1(18-20), P-6(10-12), P-6(18-21)	Detection below RL for Radium 228.	LCS performed.	N/A	N/A	Duplicate performed.

Note:
* - Control limits are estimated by the laboratory and presented in the laboratory reports (Appendix E).

Notes:
NA - not applicable
RL - reporting limit
PR - precent recovery
RPD - relative percent difference
LCS - laboratory control sample

TABLE F-9 Lot Numbers Corresponding to Field Sample IDs		
Lot Number	**Field Sample ID**	**Lot Number (Radium 226 and Radium 228)[2]**
F1E180264	P-7(0-1)	J1F180123
F1E180264	P-7(2-3)	N/A
F1E180264	P-9(0-1)	J1F180123
F1E180264	P-9(8)	J1F180123
F1E180264	P-10(0-1)	J1F180123
F1E180264	P-10(10-11)	J1F180123
F1E180264	P-10(12-12.5)	N/A
F1E180264	P-10(16.5-17.5)	J1F180123
F1E210132	B-2(0-1)	J1F150269
F1E210132	B-2(4-5)	J1F150269
F1E210132	DUP1	J1F150269
F1E210132	P-7(10-12)	J1F150269
F1E210132	P-7(18-20)	J1F150269
F1E210132	P-11(0-1)	J1F150269
F1E210132	P-11(4-5)	J1F150269
F1E210132	P-12(0-1)	J1F150269
F1E210132	P-12(4-5)	J1F150269
F1E210132	P-13(0-1)	J1F150269
F1E210132	P-13(4-5)	J1F150269
F1E210132	P-14(0-1)	J1F150269
F1E210132	P-14(4-5)	J1F150269
F1E210132	P-15(0-1)	J1F150269
F1E210132	P-15(4-5)	J1F150269
F1E210132	P-16(0-1)	J1F150269
F1E210132	P-16(4-5)	J1F150269
F1E210157	A-1(0-1)	J1F180120
F1E210157	A-1(10-12)	J1F180120
F1E210157	A-1(16-18)	J1F180120
F1E210157	B-3(0-1)	J1F180120
F1E210157	B-3(4-5)	J1F180120
F1E210157	DUP2	J1F180120
F1E210157	DUP3	J1F180120
F1E210157	P-5(0-1)	J1F180120
F1E210157	P-5(10-12)	J1F180120
F1E210157	P-5(16-18)	J1F180120
F1E210157	P-8(0-1)	J1F180120
F1E210157	P-8(10-12)	J1F180120
F1E210157	P-8(16-18)	J1F180120
F1E210157	P-17(0-1)	J1F180120
F1E210157	P-17(4-5)	J1F180120
F1E220189	A-2(0-1)	J1F180131
F1E220189	A-2(10-12)	J1F180131
F1E220189	A-2(19-21)	J1F180131
F1E220189	B-1(0-1)	J1F180131
F1E220189	B-1(10-12)	J1F180131
F1E220189	B-1(19-21)	J1F180131
F1E220189	E-1(0-1)	J1F180131

TABLE F-9 Lot Numbers Corresponding to Field Sample IDs		
Lot Number	**Field Sample ID**	**Lot Number (Radium 226 and Radium 228)[2]**
F1E220189	E-1(4-5)	J1F180131
F1E220189	E-2(0-1)	J1F180131
F1E220189	E-2(4-5)	J1F180131
F1E220189	P-1(0-1)	J1F180131
F1E220189	P-1(10-12)	J1F180131
F1E220189	P-1(18-20)	J1F180131
F1E220189	P-2(0-1)	J1F180131
F1E220189	P-2(10-12)	J1F180131
F1E220189	P-2(16-18)	J1F180131
F1E220189	P-3(0-1)	J1F180131
F1E220189	P-3(10-12)	J1F180131
F1E220189	P-3(18-20)	J1F180131
F1E220189	P-6(0-1)	J1F180131
F1E220189	P-6(10-12)	J1F180131
F1E220189	P-6(18-21)	J1F180131
F1E220189	S-1(0-1)	J1F180131
F1E220189	S-1(10-12)	J1F180131
F1E220189	S-1(16-17)	J1F180131
F1E220189	WTP-1(0-1)	J1F180131
F1E220189	WTP-2(0-1)	J1F180131
F1E230191	DUP4	J1F150279
F1E230191	DUP5	J1F150279
F1E230191	E-2(6-8)	J1F150279
F1E230191	P-4(0-1)	J1F150279
F1E230191	P-4(10-12)	J1F150279
F1E230191	P-4(20-22)	J1F150279
F1E230191	P-7(19-21)	J1F150279
F1E230191	P-11(15-17)	J1F150279
F1E230191	P-12(15-17)	J1F150279
F1E230191	P-17(6-8)	J1F150279
F1E230191	S-2(0-1)	J1F150279
F1E230191	S-2(10-12)	J1F150279
F1E230191	S-2(18-20)	J1F150279
F1E230191	052201-WB01	N/A
F1E240210	B-14	N/A
F1E240210	B28-GW01	N/A
F1E240210	DUP6	N/A
F1E240210	PC-2-GW02	N/A
F1E240210	PC-4-GW01	N/A
F1E240210	PC-56-GW01	N/A
F1E240210	PC-58-MW04	N/A
F1E240210	RINSE3	N/A

1) Corresponds to lot number for all analyses except Radium 226 and Radium 228.

2) Radium 226 and Radium 228 performed separately under different lot numbers. Radium 226 and Radium 228 analyses not performed for all samples.