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A-Area Miscellaneous Rubble Pile (731-6A) Data Usability Report Operable Unit (U)

SRNS-RP-2018-01045

Revision 0

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TABLE OF CONTENTS

LIST OF TABLES

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1.0 PROJECT SUMMARY

This report presents analytical data verification, validation and usability assessment results for the characterization sampling that was conducted in accordance with the *Sampling and Analysis Plan for the A-Area Miscellaneous Rubble Pile (731-6A) Operable Unit (U)*, SRNS-RP-2015-00007, Revision 1 (Sampling and Analysis [SAP] 2015). The project generated fifty (50) regular (REG) field samples, three (3) field duplicate (FD) samples, six (6) trip blanks (TBs) and two (2) rinsate blanks (RBs). The samples, along with the requested analytical analyses, are listed in Table 1.

Table 1. Sample Identification Summary

Station ID	Sample				Matrix	Interval *(ft.)*	Analysis Requested
	ID	Type	Date	Time			
AMRP15TR-01	AMRP000000028	REG	7/16/18	10:15	Ash	4 - 5	1, 2
AMRP15TR-01	AMRP000000029	REG	7/16/18	10:50	Ash	7 - 8	1, 2
AMRP15TR-01	AMRP000000030	REG	7/16/18	11:20	Ash	10 - 11	1, 2
AMRP15TR-01	AMRP000000031	REG	7/16/18	11:40	Soil	12 - 13	1, 2
AMRP15TR-02	AMRP000000032	REG	7/16/18	13:45	Ash	4 - 5	1, 2
AMRP15TR-02	AMRP000000033	REG	7/16/18	14:10	Ash	7 - 8	1, 2
AMRP15TR-02	AMRP000000034	REG	7/16/18	14:30	Ash	10 - 11	1, 2
AMRP15TR-02	AMRP000000035	REG	7/16/18	14:45	Soil	12.5 - 13.5	1, 2
AMRP15TR-03	AMRP000000036	REG	7/17/18	08:25	Ash	4 - 5	1, 2
AMRP15TR-03	AMRP000000037	REG	7/17/18	09:00	Ash	7 - 8	1, 2
AMRP15TR-03	AMRP000000038	REG	7/17/18	09:35	Ash	10 - 11	1, 2
AMRP15TR-03	AMRP000000039	REG	7/17/18	10:55	Soil	15 - 16	1, 2
AMRP15TR-04	AMRP000000041	REG	7/17/18	09:30	Ash	4 - 5	1, 2
AMRP15TR-04	AMRP000000042	REG	7/17/18	09:50	Ash	7 - 8	1, 2
AMRP15TR-04	AMRP000000043	REG	7/17/18	10:20	Ash	10 - 11	1, 2
AMRP15TR-04	AMRP000000044	REG	7/17/18	10:50	Soil	15 - 16	1, 2
AMRP15TR-05	AMRP000000046	REG	7/17/18	13:15	Ash	4 - 5	1, 2
AMRP15TR-05	AMRP000000047	REG	7/17/18	13:40	Ash	7 - 8	1, 2
AMRP15TR-05	AMRP000000048	REG	7/17/18	14:00	Ash	10 - 11	1, 2
AMRP15TR-05	AMRP000000049	REG	-	-	Soil	-	**Unused COC**
AMRP15TR-06	AMRP000000050	FD	7/17/18	14:25	Ash	7 - 8	1, 2
AMRP15TR-06	AMRP000000051	FD	7/18/18	08:20	Ash	10 - 11	1, 2
AMRP15TR-06	AMRP000000052	FD	7/18/18	09:30	Soil	16 - 17	1, 2
AMRP15TR-06	AMRP000000053	REG	7/17/18	13:35	Ash	4.5 - 5.5	1, 2
AMRP15TR-06	AMRP000000054	REG	7/17/18	14:25	Ash	7 - 8	1, 2
AMRP15TR-06	AMRP000000055	REG	7/18/18	08:20	Ash	10 - 11	1, 2
AMRP15TR-06	AMRP000000056	REG	7/18/18	09:30	Soil	16 - 17	1, 2
AMRP15TR-07	AMRP000000057	REG	-	-	Ash	-	**Refusal Encountered Unused COC**
AMRP15TR-07	AMRP000000058	REG	-	-	Ash	-	**Refusal Encountered**

Table 1. Sample Identification Summary *(Continued)*

Station ID	Sample				Matrix	Interval *(ft.)*	Analysis Requested
	ID	Type	Date	Time			
AMRP15TR-07	AMRP000000059	REG	-	-	Ash	-	**Refusal Encountered**
AMRP15TR-07	AMRP000000060	REG	-	-	Soil	-	**Refusal Encountered**
AMRP15TR-07	AMRP000000061	SPL	-	-	Soil	-	**Refusal Encountered**
AMRP15TR-07	AMRP000000062	SPL	-	-	Soil	-	**Refusal Encountered**
AMRP15TR-07	AMRP000000063	SPL	-	-	Soil	-	**Refusal Encountered**
AMRP15TR-08	AMRP000000064	REG	7/19/18	10:10	Ash	4.5 - 5.5	1, 2
AMRP15TR-08	AMRP000000065	REG	7/19/18	11:10	Ash	7 - 8	1, 2
AMRP15TR-08	AMRP000000066	REG	7/19/18	12:40	Ash	10 - 11	1, 2
AMRP15TR-08	AMRP000000067	REG	7/19/18	14:35	Soil	14 - 15	1, 2
AMRP15TR-09	AMRP000000068	REG	7/19/18	10:40	Ash	4.5 - 5.5	1, 2
AMRP15TR-09	AMRP000000069	REG	7/19/18	12:40	Ash	7 - 8	1, 2
AMRP15TR-09	AMRP000000070	REG	7/23/18	08:45	Ash	10 - 11	1, 2
AMRP15TR-09	AMRP000000071	REG	7/23/18	09:10	Soil	13 - 14	1, 2
AMRP15TR-10	AMRP000000072	REG	-	-	Ash	-	**Refusal Encountered**
AMRP15TR-10	AMRP000000073	REG	-	-	Ash	-	**Refusal Encountered**
AMRP15TR-10	AMRP000000074	REG	-	-	Ash	-	**Refusal Encountered**
AMRP15TR-10	AMRP000000075	REG	-	-	Soil	-	**Refusal Encountered**
AMRP15TR-11	AMRP000000076	REG	-	-	Ash	-	**Refusal Encountered**
AMRP15TR-11	AMRP000000077	REG	7/23/18	14:00	Ash	7 - 8	1, 2
AMRP15TR-11	AMRP000000078	REG	7/23/18	14:25	Ash	10 - 11	1, 2
AMRP15TR-11	AMRP000000079	REG	7/23/18	14:55	Soil	12 - 13	1, 2
AMRP15TR-12	AMRP000000080	REG	7/24/18	09:35	Ash	5.5 - 6.5	1, 2
AMRP15TR-12	AMRP000000081	REG	7/24/18	10:10	Ash	7 - 8	1, 2
AMRP15TR-12	AMRP000000082	REG	7/24/18	10:45	Ash	10 - 10.5	1, 2
AMRP15TR-12	AMRP000000083	REG	7/24/18	11:15	Soil	11 - 12	1, 2
AMRP15TR-13	AMRP000000001	REG	7/23/18	10:40	Ash	5 - 6	1, 2
AMRP15TR-13	AMRP000000002	REG	7/23/18	11:15	Ash	7 - 8	1, 2
AMRP15TR-13	AMRP000000003	REG	7/23/18	11:35	Ash	10 - 11	1, 2
AMRP15TR-13	AMRP000000004	REG	7/23/18	12:05	Soil	12.5 - 13.5	1, 2
AMRP15TR-14	AMRP000000084	REG	7/18/18	11:30	Ash	4 - 5	1, 2
AMRP15TR-14	AMRP000000085	REG	7/18/18	11:50	Ash	7 - 8	1, 2
AMRP15TR-14	AMRP000000086	REG	7/18/18	12:10	Ash	10 - 11	1, 2
AMRP15TR-14	AMRP000000087	REG	-	-	Soil	-	**Possible Asbestos**
AMRP15TR-15	AMRP000000088	REG	7/18/18	13:45	Ash	4 - 5	1, 2
AMRP15TR-15	AMRP000000089	REG	7/18/18	14:10	Ash	7 - 8	1, 2
AMRP15TR-15	AMRP000000090	REG	-	-	Ash	-	**Unused COC**
AMRP15TR-15	AMRP000000091	REG	7/19/18	09:20	Soil	10 - 11	1, 2

Table 1. Sample Identification Summary *(Continued/End)*

Station ID	Sample				Matrix	Interval *(ft.)*	Analysis Requested
	ID	Type	Date	Time			
AMRP15TR-16	AMRP000000092	REG	7/19/18	08:35	Ash	4 - 5	1, 2
AMRP15TR-16	AMRP000000093	REG	7/19/18	-	Ash	-	**Unused COC**
AMRP15TR-16	AMRP000000094	REG	7/19/18	-	Ash	-	**Unused COC**
AMRP15TR-16	AMRP000000095	REG	7/19/18	09:10	Soil	7 - 8	1, 2
AMRP-TB	AMRP000000006	TB	7/23/18	08:30	Water	-	1
AMRP-TB	AMRP000000007	TB	7/24/18	08:30	Water	-	1
AMRP-TB	AMRP000000008	TB	7/16/18	10:00	Water	-	1
AMRP-TB	AMRP000000009	TB	7/17/18	08:00	Water	-	1
AMRP-TB	AMRP000000010	TB	7/18/18	08:00	Water	-	1
AMRP-TB	AMRP000000011	TB	7/19/18	08:00	Water	-	1
RINSATE	AMRP000000040	RB	7/17/18	13:00	Water	-	1, 2
RINSATE	AMRP000000045	RB	7/17/18	15:00	Water	-	1, 2

SPL = Split ft. = feet ID = Identification

Analyses Requested:

1. Volatiles
2. Total Petroleum Hydrocarbons (TPH) by gas chromatograph with a flame ionization detector (GC/FID) Diesel Range Organics

A total of 177 analytical records were produced consisting of 159 REG records and 18 Quality Control (QC) records. See Table 2.

Table 2. Total Number of Records

Record Type	Chemical	Radiochemical	Totals
Analytical	159	N/A	159
Field QC	18	N/A	18
Totals	**177**	**N/A**	**177**

The verification process was conducted to review completeness of the sampling and analytical requirements. Validation has been performed to assess compliance with methods, procedures, and contracts, and to assess a comparison with measurement performance criteria in the ER-SOP-033, *Analytical Data Qualification* (SRNS 2015a). A usability assessment will provide the data user with an assessment of whether the process execution and resulting data meet project quality objectives in the Quality Assurance Project Plan (SRNS 2012) and the *Sampling and Analysis Plan for the A-Area Miscellaneous Rubble Pile (731-6A) Operable Unit (U),* SRNS-RP-2015-00007, Revision 1 (SAP 2015). These processes involve examination of the SAP, electronic data files, the field data, analytical data, and laboratory records. Computer programs are used to verify that samples were properly preserved and were analyzed within the required holding time (HT), that QC results were within specified acceptable ranges, and that the appropriate detection limits were employed by the laboratories. Additionally, manual reviews of field data and laboratory records are conducted to ensure the quality of these items. Validation summaries for HT, preservation,

calibration (CAL), analyte identification (ID), and analyte quantitation can be found in Subsections 3.1, *Holding Times*; 3.2, *Preservation*; and 3.3, *Calibration, Identification, and Quantitation*.

The data were validated to determine if the records conform to the technical criteria per ER-SOP-033 (SRNS 2015b). Table 3 provides a brief validation summary for the project. Review qualifiers are assigned by a data validator internal to Savannah River Nuclear Solutions and external to the analytical laboratory. Environmental records include REG sample, split (SPL) and FD records.

Table 3. Environmental Record Review Qualifier Summary

	Detects		Non-detects		Rejected	
Method Code	**# NULL Qualifiers**	**# J Qualifiers**	**# U Qualifiers**	**# UJ Qualifiers**	**# R Qualifiers**	**Total**
EPA8015	2	9	13	6	23	53
EPA8260B	71	24	11	0	0	106
Totals	**73**	**33**	**24**	**6**	**23**	**159**
% of Total	**45.9**	**20.8%**	**15.1%**	**3.8%**	**14.5%**	**100%**

EPA = Environmental Protection Agency

2.0 ASSESSMENT OF PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, and COMPLETENESS DATA QUALITY INDICATORS AND MEASUREMENT PERFORMANCE CRITERIA

This section discusses the analytical data in terms of the following indicators of data quality: precision, accuracy, representativeness, comparability, and completeness. Precision is determined from the field and laboratory duplicate analyses and indicates the consistency of field and laboratory techniques. Accuracy is determined from the laboratory control samples (LCS), matrix spikes (MS) and the results of the results of the method blanks (MBs), FDs, TBs and RBs; it indicates the ability of the laboratory to generate correct results. Representativeness measures how well the data represents the sample population. Comparability expresses the confidence in which data from different laboratories are considered to be equivalent. Representative completeness measures the amount of data resulting from the data collection activity.

2.1 Precision

Precision is the degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves. FDs measure the repeatability of the sampling and analytical techniques, and laboratory duplicates measure the ability of the laboratory to reproduce a result. Low precision can be caused by poor instrument performance, poor operator technique, inconsistent application of method protocols, laboratory environment, time between analyses, or by a difficult, heterogeneous sample matrix. Precision is especially important when the action limit approaches the quantification limit. At least 5% of the samples were collected in

duplicate for this project in accordance with the SAP. The laboratory performs duplicate analyses on at least 5% of the samples received.

Precision is expressed in terms of the relative percent differences (RPD) as follows:

$$RPD = \frac{|x - y|}{\left(\frac{x + y}{2}\right)} \times 100$$

where
x is the original sample result, and
y is the duplicate sample result.

When one result of a duplicate pair is below the method detection limit (MDL_, the sample specific estimated quantification limit (ssEQL) is used for that result in the calculation. When both results are below the MDL, the RPD is not calculated.

The RPD should be less than 20% for water samples and less than 35% for solid samples when results are greater than the ssEQL. In the case where results are between the ssEQL and the MDL, the RPD should be less than 100% for water samples and less than 200% for soil samples. In the event analytical precision goals are not met, a determination of the usability of that information is made through the environmental data assessment process.

No records were rejected due to precision issues. Details for this project can be found in Subsections 3.6*, Laboratory Duplicate RPD*; and 3.7, *Field Duplicate RPD*.

2.2 Accuracy

Accuracy is defined as the closeness of agreement between an observed value and an accepted reference value. Accuracy is especially important when the concentration of concern approaches the detection limit and/or the action limit. When the concentration is underestimated near the detection limit, the analyte may be present but reported as not detected. When the concentration is underestimated near the action limit, the analyte may be at a concentration that would require remediation, but the remediation would not be performed. When the concentration is overestimated near the detection limit, the analyte may not be present but reported as detected. When the concentration is overestimated near the action limit, the analyte may not be at a concentration that would require remediation, but the remediation would be performed. The sample types used to evaluate accuracy are performance evaluation studies LCSs, surrogate (SURR) spikes, MSs, MB, TBs, and RBs.

LCSs monitor the performance of all steps in the analytical process, including sample preparation, and are used to identify problems with the analytical procedure. LCSs are deionized water that is spiked with the target analyte, digested, and analyzed with the REG samples. The LCS spiking solution is obtained from the Environmental Protection Agency (EPA), a third-party supplier, or is prepared in the laboratory using chemicals from a different source than the CAL standards.

The LCS percent recovery is calculated as follows:

$$\% \text{ Recovery} = \frac{\text{Blank spike concentration}}{\text{Spike concentration}} \times 100$$

One hundred percent recovery is equivalent to 100% accuracy. Values less than 100% or greater than 100% may indicate a sample matrix effect and a false reading. A periodic program of sample spiking is required (e.g., one [1] MS and one [1] Matrix Spike duplicate [MSD] per 20 samples). In the event that analytical accuracy goals are not met, a determination is made through the environmental data assessment process relative to the usability of that information.

Twenty-three (23) records were rejected because the surrogate recovery was outside of limits. Details for this project can be found in Subsections 3.4*, Trip Blanks*; 3.5, *Method Blanks*; 3.8, *Matrix Spike Recovery*; 3.9, *LCS Recovery*; and 3.10, *Surrogate/Tracer Recovery*.

2.3 Representativeness

The representativeness of samples collected is controlled by adhering to the detailed descriptions of sampling procedures. Representativeness expresses the relative degree to which the data depict the characteristics of a population, parameter, sampling point, process condition, or environmental condition. The objective of this study is to accurately represent the concentrations of target analytes or compounds. Representative samples for this investigation will be required by implementing approved sampling and analytical procedures that will generate data representative of the sampling point location and will be maintained. Analytical methods are selected that will most accurately represent the true concentration of the parameter of interest. The accumulation of QC procedures and information (i.e., RPD values, blank QC concentrations, MS percent recoveries, etc.) employed for a given analysis combine to exhibit the representativeness of the data generated.

The goal for representative sample data will therefore be met by properly documenting field and analytical protocols. In the event these procedures and methods are not able to be implemented, the appropriate corrective action documentation should encompass the impact on the representativeness of the information. When review of the data and documentation determines the data to be non-representative, the information is qualified in its use or is not used by the project.

All samples were collected and analyzed per established procedures.

2.4 Comparability

Comparability is the degree to which different methods, data sets, and decisions agree or can be represented as similar. The comparability of the data from the laboratories is based on the results of the SPL samples and on confirmation that the laboratories used the same standardized procedures for sample analysis, the same reporting unit, and obtained similar quantitation limits. Comparability of the data produced for this investigation may be obtained by implementing the identified protocols for sampling and analysis of samples. Implementation of traceable reference materials such as laboratory standards, expression of results in standard concentration units, and

successful participation by the laboratories in external performance evaluation programs will enable the information produced through this investigation to be compared with future data sets, if required. For this project, no SPL samples were collected and sent to the designated QC laboratory.

2.5 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under correct, normal circumstances. The Quality Assurance completeness objective for this project is to obtain valid field and laboratory analytical results for at least 90% of the samples collected during the project. This implies that completeness of sample collection (i.e., the number of samples collected compared to the number of samples planned) must be virtually 100% to allow for some loss of data during the laboratory analytical process. Accountability of samples collected, from field to final disposal, must be 100%.

Completeness is a measure of the amount of data obtained from a measurement process that achieves the project goals as compared to the amount of data planned to be obtained by the project. Completeness is affected by unexpected conditions during the data collection process that reduce the usable data achieved relative to the data planned.

When review of the data and documentation determines the data to be incomplete, the impact relative to the project objective will be assessed and documented.

The following are measures of completeness:

Sample Collection:

$$\text{Completeness} = \frac{\text{Number of Sample Points Sampled}}{\text{Number of Sample Points Planned}} \times 100$$

Field Measurement:

$$\text{Completeness} = \frac{\text{Number of Valid Measurements Made}}{\text{Number of Measurements Planned}} \times 100$$

Laboratory Analysis:

$$\text{Completeness} = \frac{\text{Number of Valid Data Points}}{\text{Number of Data Points Planned}} \times 100$$

The completeness numbers for this project are listed below:

Sample Collection Completeness	78.2%
Field Measurement Completeness	100%

Laboratory Analysis Completeness 100%

3.0 VALIDATION FINDINGS

3.1 Holding Times

EPA8015, TPH BY GC/FID DIESEL RANGE ORGANICS

Six (6) TPH records were qualified as estimated due to HT exceedance, J/Q.

One (1) TPH record was qualified as approximate due to HT exceedance, UJ/Q.

EPA8260B, VOLATILES

One (1) trichloroethylene (TCE) record was qualified as estimated due to HT exceedance, J/Q.

One (1) tetrachloroethylene (PCE) record was qualified as estimated due to HT exceedance, J/Q.

HTs for the reported samples are shown in Table 4.

Table 4. Holding Time Review Qualifier Summary

Method Code	Total Number of Records	Number of Records Qualified for HT	Associated Samples Qualified
EPA8015	53	7	AMRP000000001, AMRP000000002, AMRP000000003 AMRP000000078, AMRP000000080, AMRP000000082, AMRP000000092
EPA8260B	106	2	AMRP000000065

3.2 Preservation

All chemical and physical preservation for the reported analyses were properly applied. No qualification was required.

No qualification was required as shown in Table 5.

Table 5. Preservation Review Qualifier Summary

Method Code	Total Number of Records	Number of Records Qualified for Preservation	Associated Samples Qualified
EPA8015	53	0	
EPA8260B	106	0	

3.3 Calibration, Identification, and Quantitation

All calibration, identification and quantification criteria for the reported analyses were met. No qualification was required as shown in Table 6.

Table 6. Calibration, Identification, and Quantitation Review Summary

Method Code	Total Number of Records	Number of Records Qualified for CAL, ID and Quantitation	Associated Samples Qualified
EPA8015	53	0	
EPA8260B	106	0	

3.4 Trip Blanks and Rinsate Blanks

Two (2) TCE records were qualified as approximate due to HT exceedance, UJ/Q.

Two (2) CE records were qualified as approximate due to HT exceedance, UJ/Q.

One (1) TCE record was qualified as estimated due to detection of analyte in the MB, J/V.

TB for the reported analyses results are shown in Table 7A.

Table 7A. Trip Blank Review Qualifier Summary

Method Code	Total Number of TB Records	Number of TB Records Qualified	Associated Samples Qualified
EPA8260B	12	5	AMRP000000006, AMRP000000010, AMRP000000011

All RB criteria for the reported analyses were met. No qualification was required as shown in Table 7B.

Table 7B. Rinsate Blank Review Qualifier Summary

Method Code	Total Number of RB Records	Number of RB Records Qualified	Associated Samples Qualified
EPA8015	2	0	
EPA8260B	4	0	

3.5 Method Blanks

MB for the reported analyses results are shown in Table 8.

EPA8015, TPH BY GC/FID DIESEL RANGE ORGANICS

Nine (9) TPH records were qualified as non-detect due to the detection of the analyte in the MB, U/V.

One (1) TPH record was qualified as estimated due to the detection of the analyte in the MB, J/V.

Table 8. Method Blank Review Qualifier Summary

Method Code	Total Number of MB Records	Number of MB Records Qualified	Associated Samples Qualified
EPA8015	10	10	AMRP000000004, AMRP000000031, AMRP000000039, AMRP000000044, AMRP000000056, AMRP000000066, AMRP000000071, AMRP000000079, AMRP000000091, AMRP000000095

3.6 Laboratory Duplicate Relative Percent Differences

EPA8015, TPH BY GC/FID DIESEL RANGE ORGANICS

Two (2) TPH records were qualified estimated due to the RPD between the MS and MSD recovery outside of the established control limits, J/18.

Laboratory Duplicate Qualifier for the reported analyses results are shown in Table 9.

Table 9. Laboratory Duplicate Qualifier Summary

Method Code	Total Number of Duplicate Records	Number of Duplicate Records Qualified	Associated Samples Qualified
EPA8015	6	2	AMRP000000003, AMRP000000092

3.7 Field Duplicate Relative Percent Differences

EPA8015, TPH BY GC/FID DIESEL RANGE ORGANICS

One (1) TPH record was qualified as estimated due to the FD RPD recovery was not within control limits, J/9.

One (1) TPH record was qualified as non-detect due to the FD RPD recovery was not within control limits, U/9.

EPA8260B, VOLATILES

Two (2) TCE records was qualified as estimated due to the FD RPD recovery outside of control limits, J/9.

Two (2) PCE record was qualified as estimated due to the FD RPD recovery outside of control limits, J/9.

FD RPD for the reported analyses results are shown in Table 10.

Table 10. Field Duplicate Qualifier Summary

Method Code	Total Number of Duplicate Records	Number of FD Records Qualified	Associated Samples Qualified
EPA8015	3	4	AMRP000000052, AMRP000000056
EPA8260B	6	2	AMRP000000052, AMRP000000056

3.8 Matrix Spike Recovery

EPA8015, TTPH BY GC/FID DIESEL RANGE ORGANICS

Three (3) TPH records were qualified as approximate due to the MS/MSD recovery being outside the established control limits, UJ/11.

Five (5) TPH records were qualified as estimated due to the MS/MSD recovery being outside the established control limits, J/11.

Nine (9) TPH records were qualified as estimated due to the MS/MSD recovery was outside the established control limits, however, the records were rejected due to surrogate recovery outside of control limits, R/14/11.

MS Recovery for the reported analyses results are shown in Table 11.

Table 11. Matrix Spike Recovery Qualifier Summary

Method Code	Total Number of MS/MSD Records	Number of MS/MSD Records Qualified	Associated Samples Qualified
EPA8015	12	5	AMRP000000001, AMRP000000002, AMRP000000003, AMRP000000048, AMRP000000050, AMRP000000051, AMRP000000053, AMRP000000054, AMRP000000055, AMRP000000064, AMRP000000078, AMRP000000084, AMRP000000085, AMRP000000086, AMRP000000088, AMRP000000089, AMRP000000092

3.9 Laboratory Control Samples Recovery

All LCS recovery criteria for the reported analyses were met. No qualification was required as shown in Table 12.

Table 12. Laboratory Control Samples Qualifier Summary

Method Code	Total Number of LCS Records	Number of LCS Records Qualified	Associated Samples Qualified
EPA8015	20	0	
EPA8260B	60	0	

3.10 Surrogate/Tracer Recovery

EPA8015, TPH BY GC/FID DIESEL RANGE ORGANICS

Four (4) TPH records were qualified as approximate due to the surrogate recovery outside of established control limits, UJ/14.

One (1) TPH record was qualified as estimated due to the surrogate recovery outside of established control limits, J/14.

Twenty-three (23) TPH records were rejected due to the surrogate recovery outside of established control limits, R/14.

EPA8260B, VOLATILES

Three (3) TCE records were qualified as estimated due to the surrogate recovery outside of established control limits, J/14.

Three (3) PCE records were qualified as estimated due to the surrogate recovery outside of established control limits, J/14.

All Surrogate/Tracer recovery criteria for the reported analyses are shown in Table 13.

Table 13. Surrogate/Tracer Recovery Qualifier Summary

Method Code	Total Number of Surr/Tracer Records	Number of Surr Records Qualified	Associated Samples Qualified
EPA8015	53	28	AMRP000000028, AMRP000000029, AMRP000000030, AMRP000000033, AMRP000000034, AMRP000000036, AMRP000000037, AMRP000000038, AMRP000000041, AMRP000000042, AMRP000000043, AMRP000000046, AMRP000000047, AMRP000000048, AMRP000000050, AMRP000000051, AMRP000000053, AMRP000000054, AMRP000000055, AMRP000000065, AMRP000000069, AMRP000000070, AMRP000000081, AMRP000000084, AMRP000000085, AMRP000000086, AMRP000000088, AMRP000000089
EPA8260B	159	6	AMRP000000032, AMRP000000033, AMRP000000036

3.11 Split Samples Comparability

No SPL samples were collected.

4.0 DATA USABILITY

The analytical data from this project are considered usable for purposes outlined in the *Sampling and Analysis Plan for the A-Area Miscellaneous Rubble Pile (731-6A) Operable Unit (U)*, SRNS-RP-2015-00007, Revision 1 (SAP 2015).

Twenty-three (23) environmental sample records were rejected due surrogate recovery criteria not being met. Rejected data should not be used. Qualification details are found in Section 3.0, *Validation Findings*.

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