NM1 - ___9____

TREATMENT ZONE CLOSURE REQUEST AND DENIAL

Dec. 24, 2020

Jones, Brad A., EMNRD

From: Jones, Brad A., EMNRD
Sent: Thursday, December 24, 2020 10:55 AM
To: Shacie Murray
Cc: Ryan Merrion; Ryan Davis; 'Philana Thompson'
Subject: RE: [EXT] URGENT Permit NM1-9-0 request for closure of Treatment Zone
Attachments: 2020 1224 Agua Moss NM1-009 TZ Closure Request Denial signed.pdf

Ms. Murray,

Please see the attached OCD response to Agua Moss request and demonstration for closure of the treatment zone for the entire landfarm under permit NM-1-009.. If you have any questions regarding this matter, please do not hesitate to contact me.

Sincerely,

Brad A. Jones

Brad A. Jones ● Environmental Scientist Specialist - Advanced
Environmental Bureau
EMNRD - Oil Conservation Division
1220 S. Saint Francis Drive | Santa Fe, New Mexico 87505
(505) 469-7486 | brad.a.jones@state.nm.us
http://www.emnrd.state.nm.us/OCD/

From: Philana Thompson <pthompson@merrion.bz>
Sent: Monday, June 1, 2020 9:26 AM
To: Jones, Brad A., EMNRD <brad.a.jones@state.nm.us>
Cc: Ryan Merrion <ryan@merrion.bz>; Ryan Davis <RDavis@merrion.bz>; Shacie Murray <shacie@merrion.bz>
Subject: [EXT] URGENT Permit NM1-9-0 request for closure of Treatment Zone

Brad,

Attached is the request for closure of the treatment zone for permit NM1-9-0. A physical copy was sent in the mail May 29th, 2020 via - Certified Mail # 70160910000123658537.

Thank you,

Philana

--
Philana Thompson
HSE & Regulatory Compliance
Merrion Oil & Gas Corp
cell 505-486-1171

State of New Mexico
Energy, Minerals and Natural Resources Department

Michelle Lujan Grisham
Governor

Sarah Cottrell Propst
Cabinet Secretary

Todd E. Leahy, JD, PhD
Deputy Secretary

Adrienne Sandoval
Director, Oil Conservation Division

December 24, 2020

Ms. Shacie Murray
Agua Moss, LLC
PO Box 600
Farmington, New Mexico 87499

RE: Treatment Zone Closure Request
Agua Moss Surface Waste Management Facility, Permit NM1-009
Location: Section 2, Township 29 North, Range 12 West, NMPM
San Juan County, New Mexico

Ms. Murray,

The Oil Conservation Division (OCD) has completed its review of Agua Moss, LLC's (Agua Moss) request, emailed to OCD on June 1, 2020 and dated May 29, 2020 for closure of the treatment zone for the entire landfarm under permit NM-1-009.

The OCD has determined the treatment zone assessment is incomplete and hereby denies Agua Moss request to approve the closure of the treatment zone in Landfarm Cells #1, #2 North, and #2 South for the following reason:

Pursuant to 19.15.36.15.F(5) NMAC, the concentration of constituents listed in Subsections A and B of 20.6.2.3103 NMAC shall be *determined by EPA SW-846 methods 6010B or 6020* or other methods approved by the division. If the concentration of those constituents exceed the PQL or background concentration, the operator shall either perform a site specific risk assessment using EPA approved methods and shall propose closure standards based upon individual site conditions that protect ***fresh water***, public health and the environment, which shall be subject to division approval or remove pursuant to Paragraph (2) of Subsection G of 19.15.36.15 NMAC. The May 29, 2020 Agua Moss cover letter states *"All of the evaluated constituent results and lab detection limits are below the NMED Soil Screening Level and therefore determined not to be a risk to human health or the environment."* The assessment from Rule Engineering LLC, dated May 22, 2020, confirms this by stating in their assessment that *"To evaluate the risk of these constituents to human health and the environment, the concentrations are compared to the New Mexico Environment Department Soil Screening Levels (NMED .SSLs) for residential soils per the New Mexico Environment Department Risk Assessment Guidance: for Site Investigations and Remediation*." OCD was unable to locate any risk assessment to propose closure standards based upon individual site conditions that protect ***fresh water***, as required of 19.15.36.15.F(5) NMAC and the approved Closure/Post-Closure Care Plan.

Section 4.4 of the New Mexico Environment Department Risk Assessment Guidance for Site Investigations and Remediation, Volume I states *"NMED believes that a DAF of 20 for a 0.5 acre source area is protective of groundwater in New Mexico. If the default DAF is not representative of conditions at a specific site, then it is appropriate to calculate a site-specific DAF based upon available site data."*

Section 4.7 further clarifies "Larger source sizes result in lower DAFs. The default DAF used to develop SL-SSLs for a 0.5 acre source may not be protective of groundwater at sites larger than 0.5 acre." Due to the landfarm cells exceeding the 0.5-acre size consideration, OCD would be open to consider the use one of the two approaches, if applicable, recognized in Section 4.7 of the risk assessment guidance, as identified below:

- As the size of the source area increases, the assumptions underlying the generic model are less applicable. One of the conservative assumptions in the generic SSL approach is the uniform distribution of contaminants throughout the vadose zone. There are few sites that have relatively uniform soil contamination (both laterally and vertically) of a single constituent in an area of greater than 0.5 acres (22,000 ft^2). Soil contamination at large facilities (such as federal facilities) are usually concentrated in discrete portions of the site. Contamination at large sites is commonly the result of multiple sources. It is advisable to attempt to subdivide the facility by source and contaminant type and then apply generic SSLs to those smaller source areas.

- If this approach is impractical, calculation of site-specific DAFs is recommended. Most of the parameters required for these calculations are available from routine environmental site investigations or can be reasonably estimated from general geologic and hydrologic studies.

Complete the risk assessment and propose closure standards based upon individual site conditions that protect ***fresh water***, as required of 19.15.36.15.F(5) NMAC. Provide a written justification for the use of the Soil Screening Levels for Residential Land Uses and the use of the cancer or non-cancer limits. Limit the discussion of the compliance of 19.15.36.15.F(5) NMAC to the constituents listed in Subsections A and B of 20.6.2.3103 NMAC determined by EPA SW-846 methods 6010B or 6020 or other methods approved by the division. This would include the following: antimony, arsenic, barium, beryllium, cadmium, chromium, copper, iron, lead, manganese, selenium, silver, thallium, uranium, and zinc all by EPA Method 6010B, along with mercury by EPA Method 7471.

If there are any questions regarding this matter, please do not hesitate to contact me by email at brad.a.jones@state.nm.us.

Respectfully,

Brad A. Jones
Environmental Specialist

Jones, Brad A., EMNRD

From: Philana Thompson <pthompson@merrion.bz>
Sent: Monday, June 1, 2020 9:26 AM
To: Jones, Brad A., EMNRD
Cc: Ryan Merrion; Ryan Davis; Shacie Murray
Subject: [EXT] URGENT Permit NM1-9-0 request for closure of Treatment Zone
Attachments: 2020-05-29 NM19 - Treatment Zone Closure Packet.pdf

Brad,

Attached is the request for closure of the treatment zone for permit NM1-9-0. A physical copy was sent in the mail May 29th, 2020 via - Certified Mail # 70160910000123658537.

Thank you,

Philana

--
Philana Thompson
HSE & Regulatory Compliance
Merrion Oil & Gas Corp
cell 505-486-1171

Agua Moss

May 29, 2020

Oil Conservation Division
New Mexico Energy, Minerals and
Natural Resources Department
Attn: Brad Jones
1220 S. St. Francis Drive
Santa Fe, NM 87505

Re: Permit NM1-9-0, Treatment Zone Closure Request

Mr. Jones,

Agua Moss is requesting closure of the treatment zone for the entire landfarm under permit NM1-9-0. The two required sampling events per the closure plan and rule 19.15.36.15.F NMAC were acquired in September 2019 and March 2020. Details of the sampling events and complete analytical results can be found in the attached report.

Analytical results of the sampling events show that most of the constituents are below closure performance standards, PQL, or background concentrations. For the constituents that are not comparable to or exceed background, Agua Moss requests that the following alternative evaluation method be accepted as a means to determine the sampling results risk to human health and the environment. To evaluate the risk of arsenic, chromium, cyanide, fluoride, mercury, nitrogen, copper, iron, manganese, phenols, and zinc the results are compared to the New Mexico Environment Department Soil Screening Level per the New Mexico Environment Department Risk Assessment Guidance for Site Investigations and Remediation, Volume I Soil Screening Guidance for Human Health Risk Assessments, February 2019 (Revision 2, 6/19/19). All of the evaluated constituent results and lab detection limits are below the NMED Soil Screening Level and therefore determined not to be a risk to human health or the environment.

Sulfate has a background concentration reported in units that are not comparable to current reporting methods, however no NMED Soil Screening Level is provided for sulfates. As the present pH values are above 7.0, it does not appear that sulfate concentrations are enough to create acidic conditions and therefore do not pose a risk to human health or the environment.

Analytical results report pH ranging from 7.80 to 8.55 standard units (su), which exceed the approved facility background of 7.735 su. A review of the National Resources Conservation Service (NRCS) Web

Soil Survey for the facility and surrounding area shows that an estimated pH range for the soils potentially present at the facility is 7.4 to 9.0 su, which is within the samples concentration range and therefore not a risk to human health or the environment. The NRCS Web Soil Survey Map and Chemical Soil Properties Report are included as an attachment.

Total dissolved solids (TDS) are a part of the sampling requirements in Subsections A and B of 20.6.2.3103 NMAC. The samples were not analyzed for TDS as it is a parameter for aqueous samples, not soil samples.

Agua Moss is requesting closure of the treatment zone soils based on the results of the two sampling events and acceptance of the alternate evaluation method for certain constituents as explained above and in the attached report. Thank you for your time. If you have any questions or concerns please contact me at shacie@merrion.bz.

Sincerely,

Agua Moss

Shacie Murray
Engineer
shacie@merrion.bz

Attachments:
Treatment Zone Closure Sampling Results, Rule Engineering, May 22, 2020
NRCS Web Soil Survey Soil Map
NRCS Web Soil Survey Chemical Soil Properties Report

Attachment 1

Treatment Zone Closure Sampling Results, Rule Engineering, May 22, 2020

Rule Engineering, LLC
Solutions to Regulations for Industry

May 22, 2020

Ms. Shacie Murray
Agua Moss LLC
P.O. Box 600
Farmington, New Mexico 87499

Re: Agua Moss Surface Waste Management Facility (NM1-9-0)
Treatment Zone Closure Sampling Results

Dear Ms. Murray:

This report summarizes the sample collection and laboratory analysis of the treatment zone closure samples collected at the Agua Moss Surface Waste Management Facility, hereinafter the "Facility". The samples were collected per 19.15.36.15(F) New Mexico Administrative Code (NMAC) and the *Facility Closure Plan: Permit NM1-9-0* dated June 1, 2015, which was approved by the New Mexico Oil Conservation Division (NMOCD) with amendments on July 1, 2015.

Field Activities
Per the approved closure plan, two sampling events were performed six months apart: one on September 20, 2019, and the second on March 6, 2020. During each sampling event, one composite sample consisting of four discrete samples was collected from each of the three designated areas (Cell #1, Cell #2 North, and Cell #2 South).

Soil samples were collected from the treatment zone utilizing a shovel at a depth of approximately 0.5 feet below the surface.

Sample locations for the September 2019 sample event are illustrated on Figure 1 and for the March 2020 sample event on Figure 2.

Soil Sampling
Rule collected four discrete soil samples from the treatment zone approximately 0.5 feet below ground surface in each of the designated areas. Discrete samples from each designated area were combined into one composite for the area, resulting in a total of three composite soil samples per sampling event (Cell #1 Treatment Comp, Cell #2 North Treatment Comp, and Cell #2 South Treatment Comp).

Soil samples collected for laboratory analysis were placed into laboratory supplied glassware, labeled, and maintained on ice until delivery to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico. The samples were analyzed for total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene, and xylenes

(BTEX), chlorides, and the constituents listed in Subsections A and B of 20.6.2.3103 NMAC. Note that samples were not analyzed for total dissolved solids as it is a parameter for aqueous samples, not soil samples.

Laboratory Analytical Results

Laboratory analytical results are summarized in Table 1 and the analytical laboratory reports are included in the attachments.

Background concentrations from the approved closure plan are provided in Table 1 along with the laboratory analytical results. Comparison of results to background concentrations is not possible for some constituents including fluoride, chloride, nitrite, nitrate, sulfate, cyanide, and iron which were originally analyzed and reported by volume. Currently utilized laboratory methods analyze and report concentrations by weight. Additionally, current laboratory methods provide the total concentration of constituents present in the soil via acid digestion in contrast to previously utilized laboratory methods which appear to have reported the concentration of constituents soluble in a distilled water dilution of the soil. Comparison of uranium concentrations is similarly not possible as the background concentration is reported in picocuries per gram rather than milligrams per kilogram.

QA/QC Considerations

The laboratory reports show an "S" qualifier for TPH as diesel range organics (DRO) and motor oil range organics (MRO) for samples Cell #2 North Comp (9/20/19), Cell #2 North Comp (3/6/20), and Cell #2 South Comp (9/20/19). The "S" qualifier indicates the percent recovery of the surrogate was outside the specified range due to dilution or matrix interference. An "S" qualifier is also shown for cyanide for samples Cell #2 North Comp (9/20/19) and (3/6/20). A "J3" qualifier is shown for pentachlorophenol on sample Cell #2 South Comp (9/20/19).

Evaluation

Laboratory analytical results confirm that concentrations of benzene, total BTEX, TPH, and chloride are below the treatment cell closure performance standards per 19.15.36.15(F) NMAC. Concentrations of constituents listed in Subsections A and B of 20.6.2.3103 NMAC are below the PQL or applicable background concentrations for all constituents except chromium, total mercury, copper, manganese, phenols, zinc, and pH. Constituents that are not comparable to background concentrations reported in units not compatible with current analytical methods but have concentrations above the PQL include arsenic, fluoride, nitrate, iron, and sulfate.

To evaluate the risk of these constituents to human health and the environment, the concentrations are compared to the New Mexico Environment Department Soil Screening Levels (NMED SSLs) for residential soils per the New Mexico Environment Department Risk Assessment Guidance for Site Investigations and Remediation, Volume I Soil Screening Guidance for Human Health Risk

Assessments, February 2019 (Revision 2, 6/19/19). Laboratory results for these constituents are below the NMED SSLs for confirmation samples, however, NMED SSLs are not available for sulfates and pH.

A review of the National Resources Conservation Service (NRCS) Web Soil Survey for the Facility and surrounding area shows that an estimated pH range for the soils potentially present at the site is 7.4 to 9.0 standard units (su). Laboratory results for pH of the closure samples range from 7.80 to 8.55 su, which is within the NRCS range for the site. Additionally, as pH values are above 7.0, it does not appear that sulfate concentrations are sufficient to create acidic soil conditions.

In conclusion, laboratory results for treatment zone closure samples demonstrate compliance with the treatment zone closure performance standards for Cell #1, Cell #2 North, and Cell #2 South.

Closure and Limitations

This report is prepared for the exclusive use of Agua Moss LLC and is subject to the terms, conditions, and limitations stated in Rule's report and Service Agreement with Agua Moss LLC. All work has been performed in accordance with generally accepted professional environmental consulting practices. No other warranty is expressed or implied.

Rule Engineering appreciates the opportunity to provide services to Agua Moss LLC. If you have any questions, please contact me at (505) 325-1055.

Sincerely,
Rule Engineering, LLC

Heather M. Woods

Heather M. Woods, P.G.
Area Manager/Geologist

Attachments:

Table 1. Summary of Laboratory Analytical Results
Figure 1. Sample Location Map: September 20, 2019
Figure 2. Sample Location Map: March 6, 2020
Laboratory Analytical Reports (Hall: 1909B72 and 2003373)

Table 1. Summary of Laboratory Analytical Results

Collection Date	Cell #1 Treatment Comp		Cell #1 Treatment Comp		Cell #2 North Treatment Comp		Cell #2 North Treatment Comp		Cell #2 South Treatment Comp		Cell #2 South Treatment omp		Units	Facility Background Concentration	NMED SSL for Residential Soils	Treatment Cell Closure Concentration
Sample Depth (feet bgs)	0.5		0.5		0.5		0.5		0.5		0.5					
TPH (GRO)	<4.9		<4.9		<4.9		<5.0		<4.8		<5.0		mg/kg	0.2 mg/kg		500 mg/kg (GRO/DRO) / 2,500 mg/kg (total)
TPH (DRO)	95		92		240 S		340 S		270 S		120		mg/kg	0.1 mg/kg		
TPH (MRO)	820		350		1,400 S		2,000 S		2,000 S		820		mg/kg			
Benzene	<0.024		<0.025		<0.025		<0.025		<0.024		<0.025		mg/kg	0.01 mg/kg	17.8 mg/kg	0.2 mg/kg benzene / 50 mg/kg total BTEX
Toluene	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg	0.01 mg/kg	5,230 mg/kg	
Ethylbenzene	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg	0.01 mg/kg	75.1 mg/kg	
Xylenes (total)	<0.098		<0.099		<0.098		<0.099		<0.096		<0.10		mg/kg	0.01* mg/kg	871 mg/kg	
Chloride	11		<15		230		320		290		300		mg/kg	39.15 mg/L	12,000,000 mg/kg	500 mg/kg
Antimony	<5.0		<5.0		<5.0		<4.9		<5.0		<4.9				31.3 mg/kg	
Arsenic	<5.0		<5.0		<5.0		5.1		<5.0		<4.9		mg/kg	3.905 mg/L	7.07 mg/kg	
Barium	1,500		1,500		1,700		3,000		1,600		2,700		mg/kg	274.5 mg/kg	15,600 mg/kg	
Beryllium	0.64		0.67		0.59		0.70		0.59		0.66				156 mg/kg	
Cadmium	<0.20		<0.20		<0.20		<0.20		<0.20		<0.20		mg/kg	0.575 mg/kg	70.5 mg/kg	
Chromium	9.0		9.9		8.5		11		9.6		9.2		mg/kg	8.94 mg/kg	96.6 mg/kg	
Cyanide	<0.250		<0.250		<0.250		<0.250 S		<0.250		<0.250 S			0.003 mg/L	11.2 mg/kg	
Fluoride	6.8		9.2		4.7		4.0		8.0		6.5		mg/kg	1.0075 mg/L	4,690 mg/kg	
Lead	13		12		8.2		12		12		6.6		mg/kg	17.05 mg/kg	400 mg/kg	
Total Mercury	0.63		0.43		1.1		1.1		0.55		0.43		mg/kg	0.315 mg/kg	23.8 mg/kg	
Nitrogen, Nitrate (as N)	32		9.6		14		3.8		4.1		4.4		mg/kg	22.3 mg/L	125,000 mg/kg	
Nitrogen, Nitrite (as N)	<1.5		<3.0		<1.5		<1.5		<1.5		<1.5		mg/kg	0.01 mg/L	7,820 mg/kg	
Selenium	<5.0		<5.0		<5.0		<4.9		<5.0		<4.9		mg/kg	0.595 mg/kg	391 mg/kg	
Silver	<0.50		<0.50		<0.50		<0.49		<0.50		<0.049		mg/kg	0.2525 mg/kg	391 mg/kg	
Thallium	<5.0		<2.00		<5.0		<2.00		<5.0		<2.00				78.2 mg/kg	
Uranium	<10		<9.9		<9.9		<9.9		<10		<9.9		mg/kg	1.919 pCi/g	234 mg/kg	
Radium-228	1.712		1.05		1.387		1.26		1.041		0.881		pCi/g	2.004 pCi/g		
Radium-226	2.538		1.49		3.388		1.97		2.732		1.21		pCi/g	3.5395 pCi/g		
Polychlorinated biphenyls																
Aroclor 1016	<0.048		<0.025		<0.046		<0.024		<0.046		<0.024		mg/kg	0.0188 mg/kg	3.98 mg/kg	
Aroclor 1221	<0.048		<0.025		<0.046		<0.024		<0.046		<0.024		mg/kg	0.0188 mg/kg	1.81 mg/kg	
Aroclor 1232	<0.048		<0.025		<0.046		<0.024		<0.046		<0.024		mg/kg	0.0188 mg/kg	1.86 mg/kg	
Aroclor 1242	<0.048		<0.025		<0.046		<0.024		<0.046		<0.024		mg/kg	0.0188 mg/kg	2.43 mg/kg	
Aroclor 1248	<0.048		<0.025		<0.046		<0.024		<0.046		<0.024		mg/kg	0.0188 mg/kg	2.43 mg/kg	
Aroclor 1254	<0.048		<0.025		<0.046		<0.024		<0.046		<0.024		mg/kg	0.0188 mg/kg	1.14 mg/kg	
Aroclor 1260	<0.048		<0.025		<0.046		<0.024		<0.046		<0.024		mg/kg	0.0188 mg/kg	2.43 mg/kg	
Carbon Tetrachloride	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg	0.0055 mg/kg	10.7 mg/kg	
1,2-dichloroethane (EDC)	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg	0.0055 mg/kg	8.32 mg/kg	
1,1-dichloroethylene (1,1-DCE)	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg	0.0055 mg/kg	440 mg/kg	
tetrachloroethylene (PCE)	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg		111 mg/kg	
trichloroethylene (TCE)	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg		6.77 mg/kg	
methylene chloride	<0.15		<0.15		<0.15		<0.15		<0.14		<0.15		mg/kg	0.0277 mg/kg	409 mg/kg	
Chloroform	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg	0.0277 mg/kg	5.90 mg/kg	
1,1-dichloroethane	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg	0.0055 mg/kg	78.6 mg/kg	
ethylene dibromide (EDB)	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg	0.0055 mg/kg	0.672 mg/kg	
1,1,1-trichloroethane	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg	0.0055 mg/kg	14,400 mg/kg	
1,1,2-trichloroethane	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg	0.0055 mg/kg	2.61 mg/kg	
1,1,2,2-tetrachloroethane	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg	0.0055 mg/kg	7.98 mg/kg	
vinyl chloride	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg		0.742 mg/kg	
PAHs																
Naphthalene	<0.098		<0.099		<0.098		<0.099		<0.096		<0.10		mg/kg	0.0366 mg/kg	49.7 mg/kg	
1-Methylnaphthalene	<0.20		<0.20		<0.20		<0.20		<0.19		<0.20		mg/kg	0.0554 mg/kg	172 mg/kg	
2-Methylnaphthalene	<0.20		<0.20		<0.20		<0.20		<0.19		<0.20		mg/kg	0.0554 mg/kg	232 mg/kg	
benzo-a-pyrene	<0.096		<0.010		<0.085		<0.0096		<0.088		<0.0096		mg/kg	0.0366 mg/kg	1.12 mg/kg	
cis-1,2-dichloroethene	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg		156 mg/kg	
trans-1,2-dichloroethene	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg		295 mg/kg	
1,2-dichloropropane (PDC)	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg		17.8 mg/kg	
styrene	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg		7,260 mg/kg	
1,2-dichlorobenzene	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg		2,150 mg/kg	
1,4-dichlorobenzene	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg		1,290 mg/kg	
1,2,4-trichlorobenzene	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg		82.9 mg/kg	
pentachlorophenol	<0.666		<1.67		<0.666		<3.33		<0.666 J3		<3.33		mg/kg		9.85 mg/kg	
atrazine	<0.666		<1.67		<0.666		<3.33		<0.666		<3.33		mg/kg		23.2 mg/kg	
Copper	15		16		12		21		18		11		mg/kg	10.34 mg/kg	3,130 mg/kg	
Iron	15,000		14,000		14,000		21,000		17,000		14,000		mg/kg	0.01 mg/L	54,800 mg/kg	
Manganese	290		280		230		320		300		240		mg/kg	258 mg/kg	10,500 mg/kg	
Phenols	1.26		<1.67		0.698		<3.33		0.974		<3.33		mg/kg	0.3685 mg/kg	18,500 mg/kg	
Sulfate	130		100		710		1,400		550		500		mg/kg	140.8 mg/L		
Zinc	54		46		42		64		77		40		mg/kg	38.4 mg/kg	23,500 mg/kg	
pH	8.31		8.55		8.16		7.80		8.42		8.12		su	7.735 su		
Methyl tertiary-butyl ether (MTBE)	<0.049		<0.049		<0.049		<0.050		<0.048		<0.050		mg/kg		975 mg/kg	

Notes: *Facility background for p,m-Xylene is 0.01 mg/kg and o-Xylene is 0.01 mg/kg.

bgs - below ground surface
NMED SSL - New Mexico Environment Department Soil Screening Level
mg/kg - milligrams per kilogram
mg/L - milligrams per liter
BTEX - benzene, ethylbenzene, toluene, and xylene
TPH - total petroleum hydrocarbons
GRO - gasoline range organics
DRO - diesel range organics
MRO - mineral oil range organics

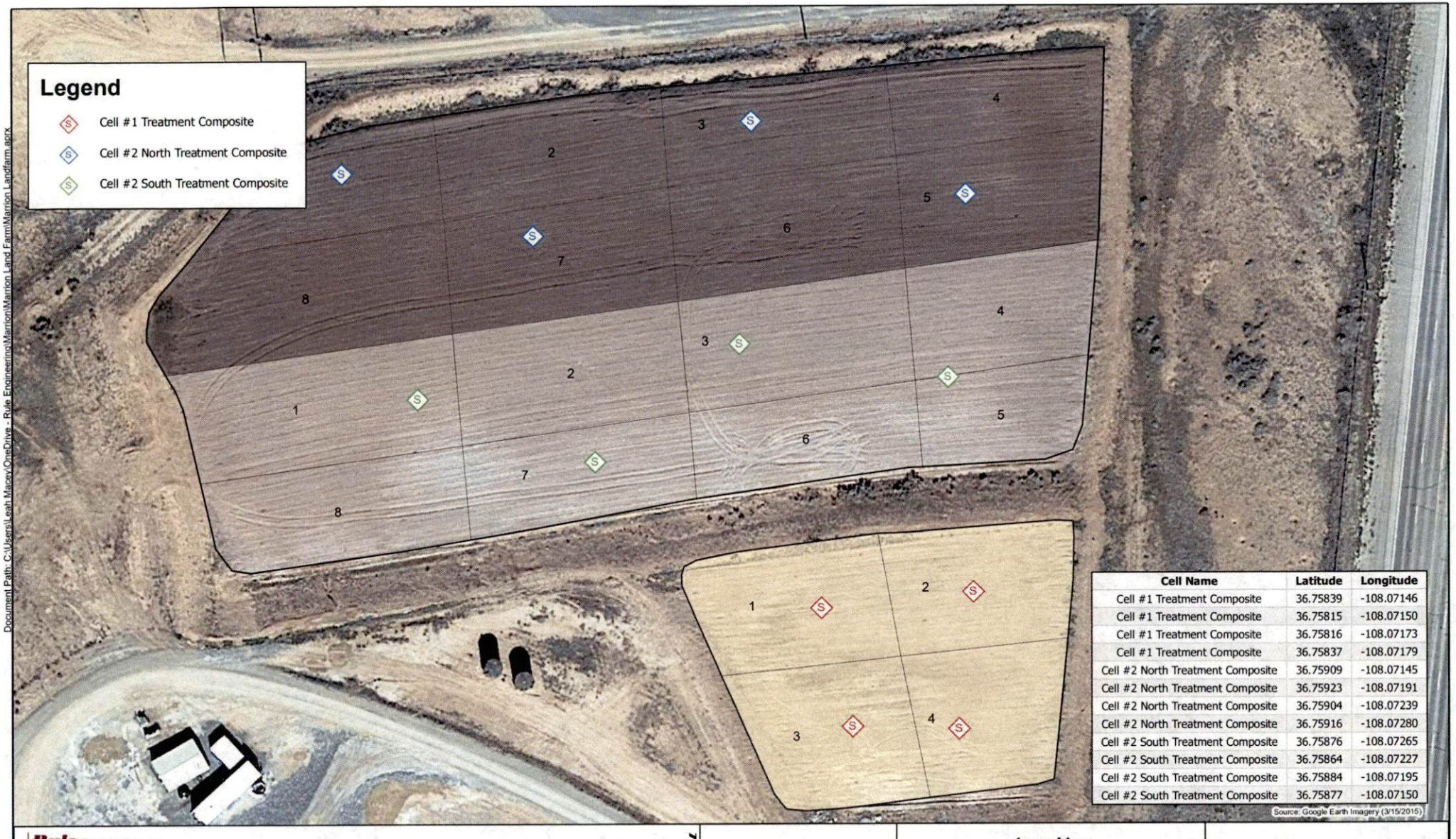
1.00 Value exceeds the greater of the facility background concentration or treatment cell closure concentration

<1.0 Value exceeds facility background concentration, but is below the NMED SSL for residential soils

1.0 mg/L Facility background concentrations noted in red are concentrations by volume inconsistant with current analytical methods which provide concentrations by weight

S - % Recovery outside of range due to dilution or matrix

J3 The batch QC was outside the established quality control ra



Cell Name	Latitude	Longitude
Cell #1 Treatment Composite	36.75839	-108.07146
Cell #1 Treatment Composite	36.75815	-108.07150
Cell #1 Treatment Composite	36.75816	-108.07173
Cell #1 Treatment Composite	36.75837	-108.07179
Cell #2 North Treatment Composite	36.75909	-108.07145
Cell #2 North Treatment Composite	36.75923	-108.07191
Cell #2 North Treatment Composite	36.75904	-108.07239
Cell #2 North Treatment Composite	36.75916	-108.07280
Cell #2 South Treatment Composite	36.75876	-108.07265
Cell #2 South Treatment Composite	36.75864	-108.07227
Cell #2 South Treatment Composite	36.75884	-108.07195
Cell #2 South Treatment Composite	36.75877	-108.07150

Rule Engineering, LLC
Solutions to Regulations for Industry

0 45 90 180 270 360 Feet

1:660

Agua Moss

Agua Moss
Surface Waste Management Facility
NW1/4-S02-T29N-R12W
San Juan County, NM

Figure 2
Sample Location Map
March 6, 2020

Updated Date: 5/4/2020

Document Path: C:\Users\Leah Macey\OneDrive - Rule Engineering\Marrion\Marrion Land Farm\Marrion Landfarm.aprx

Cell Name	Latitude	Longitude
Cell #1 Treatment Composite	36.75833	-108.07175
Cell #1 Treatment Composite	36.75836	-108.07148
Cell #1 Treatment Composite	36.75818	-108.07143
Cell #1 Treatment Composite	36.75813	-108.07168
Cell #2 North Treatment Composite	36.75916	-108.07142
Cell #2 North Treatment Composite	36.75915	-108.07180
Cell #2 North Treatment Composite	36.75916	-108.07227
Cell #2 North Treatment Composite	36.75911	-108.07277
Cell #2 South Treatment Composite	36.75866	-108.07286
Cell #2 South Treatment Composite	36.75863	-108.07235
Cell #2 South Treatment Composite	36.75872	-108.07197
Cell #2 South Treatment Composite	36.75873	-108.07151

Rule Engineering, LLC
Solutions to Regulations for Industry

0 45 90 180 270 360 Feet

1:660

Agua Moss

Agua Moss
Surface Waste Management Facility
NW1/4-S02-T29N-R12W
San Juan County, NM

Figure 1
Sample Location Map
September 19, 2019

Updated Date: 5/4/2020

Document Path: C:\Users\Leah Macey\OneDrive - Rule Engineering\Marrion\Marrion Land Farm\Marrion Landfarm.aprx

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

November 06, 2019

Heather Woods
Rule Engineering LLC
501 Airport Dr., Ste 205
Farmington, NM 87401
TEL: (505) 325-1055
FAX

RE: Agua Moss Sunco Landfarm OrderNo.: 1909B72

Dear Heather Woods:

Hall Environmental Analysis Laboratory received 3 sample(s) on 9/21/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Project: Agua Moss Sunco Landfarm
Lab ID: 1909B72-001 **Matrix:** SOIL

Client Sample ID: Cell #1 Treatment Comp
Collection Date: 9/20/2019 2:08:00 PM
Received Date: 9/21/2019 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Fluoride	6.8	1.5		mg/Kg	5	9/27/2019 10:35:05 AM	47714
Chloride	11	7.5		mg/Kg	5	9/25/2019 4:07:35 PM	47714
Nitrogen, Nitrite (As N)	ND	1.5		mg/Kg	5	9/25/2019 4:07:35 PM	47714
Nitrogen, Nitrate (As N)	32	1.5		mg/Kg	5	9/25/2019 4:07:35 PM	47714
Sulfate	130	7.5		mg/Kg	5	9/25/2019 4:07:35 PM	47714
EPA METHOD 7471: MERCURY						Analyst: **rde**	
Mercury	0.63	0.16		mg/Kg	5	9/26/2019 3:52:42 PM	47745
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**	
Antimony	ND	5.0		mg/Kg	2	9/26/2019 8:11:52 AM	47733
Arsenic	ND	5.0		mg/Kg	2	9/26/2019 8:11:52 AM	47733
Barium	1500	1.0		mg/Kg	10	9/26/2019 8:30:19 AM	47733
Beryllium	0.64	0.30		mg/Kg	2	9/26/2019 8:11:52 AM	47733
Cadmium	ND	0.20		mg/Kg	2	9/26/2019 8:11:52 AM	47733
Chromium	9.0	0.60		mg/Kg	2	9/26/2019 8:11:52 AM	47733
Copper	15	0.60		mg/Kg	2	9/26/2019 8:11:52 AM	47733
Iron	15000	250		mg/Kg	100	9/26/2019 7:53:48 AM	47733
Lead	13	0.50		mg/Kg	2	9/26/2019 8:11:52 AM	47733
Manganese	290	0.20		mg/Kg	2	9/26/2019 8:11:52 AM	47733
Selenium	ND	5.0		mg/Kg	2	9/26/2019 8:11:52 AM	47733
Silver	ND	0.50		mg/Kg	2	9/26/2019 8:11:52 AM	47733
Thallium	ND	5.0		mg/Kg	2	9/26/2019 8:11:52 AM	47733
Uranium	ND	10		mg/Kg	2	9/26/2019 8:11:52 AM	47733
Zinc	54	5.0		mg/Kg	2	9/26/2019 8:11:52 AM	47733
EPA METHOD 8011/504.1 MODIFIED: EDB						Analyst: **JME**	
1,2-Dibromoethane	ND	0.073		µg/Kg	1	9/24/2019 2:52:21 PM	47675
EPA METHOD 8082A: PCB'S						Analyst: **TOM**	
Aroclor 1016	ND	0.048		mg/Kg	1	9/30/2019 3:26:00 PM	47656
Aroclor 1221	ND	0.048		mg/Kg	1	9/30/2019 3:26:00 PM	47656
Aroclor 1232	ND	0.048		mg/Kg	1	9/30/2019 3:26:00 PM	47656
Aroclor 1242	ND	0.048		mg/Kg	1	9/30/2019 3:26:00 PM	47656
Aroclor 1248	ND	0.048		mg/Kg	1	9/30/2019 3:26:00 PM	47656
Aroclor 1254	ND	0.048		mg/Kg	1	9/30/2019 3:26:00 PM	47656
Aroclor 1260	ND	0.048		mg/Kg	1	9/30/2019 3:26:00 PM	47656
Surr: Decachlorobiphenyl	95.2	25.7-135		%Rec	1	9/30/2019 3:26:00 PM	47656
Surr: Tetrachloro-m-xylene	107	32.3-138		%Rec	1	9/30/2019 3:26:00 PM	47656
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	95	52		mg/Kg	5	9/26/2019 11:38:46 AM	47655

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Project: Agua Moss Sunco Landfarm
Lab ID: 1909B72-001 **Matrix:** SOIL

Client Sample ID: Cell #1 Treatment Comp
Collection Date: 9/20/2019 2:08:00 PM
Received Date: 9/21/2019 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Motor Oil Range Organics (MRO)	820	260		mg/Kg	5	9/26/2019 11:38:46 AM	47655
Surr: DNOP	107	70-130		%Rec	5	9/26/2019 11:38:46 AM	47655
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/25/2019 1:42:12 AM	47650
Surr: BFB	86.4	77.4-118		%Rec	1	9/25/2019 1:42:12 AM	47650
EPA METHOD 8310: PAHS						Analyst: **TOM**	
Naphthalene	ND	2.4		mg/Kg	1	9/30/2019 11:47:16 AM	47657
1-Methylnaphthalene	ND	2.4		mg/Kg	1	9/30/2019 11:47:16 AM	47657
2-Methylnaphthalene	ND	2.4		mg/Kg	1	9/30/2019 11:47:16 AM	47657
Benzo(a)pyrene	ND	0.096		mg/Kg	1	9/30/2019 11:47:16 AM	47657
Surr: Benzo(e)pyrene	101	26.5-113		%Rec	1	9/30/2019 11:47:16 AM	47657
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	0.024	!	mg/Kg	1	9/25/2019 5:18:16 PM	47650
Toluene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Ethylbenzene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Methyl tert-butyl ether (MTBE)	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,2,4-Trimethylbenzene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,3,5-Trimethylbenzene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,2-Dichloroethane (EDC)	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,2-Dibromoethane (EDB)	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Naphthalene	ND	0.098		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1-Methylnaphthalene	ND	0.20		mg/Kg	1	9/25/2019 5:18:16 PM	47650
2-Methylnaphthalene	ND	0.20		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Acetone	ND	0.73		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Bromobenzene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Bromodichloromethane	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Bromoform	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Bromomethane	ND	0.15		mg/Kg	1	9/25/2019 5:18:16 PM	47650
2-Butanone	ND	0.49		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Carbon disulfide	ND	0.49		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Carbon tetrachloride	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Chlorobenzene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Chloroethane	ND	0.098		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Chloroform	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Chloromethane	ND	0.15		mg/Kg	1	9/25/2019 5:18:16 PM	47650
2-Chlorotoluene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
4-Chlorotoluene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
cis-1,2-DCE	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Project: Agua Moss Sunco Landfarm
Lab ID: 1909B72-001 **Matrix:** SOIL

Client Sample ID: Cell #1 Treatment Comp
Collection Date: 9/20/2019 2:08:00 PM
Received Date: 9/21/2019 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
cis-1,3-Dichloropropene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,2-Dibromo-3-chloropropane	ND	0.098		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Dibromochloromethane	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Dibromomethane	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,2-Dichlorobenzene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,3-Dichlorobenzene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,4-Dichlorobenzene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Dichlorodifluoromethane	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,1-Dichloroethane	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,1-Dichloroethene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,2-Dichloropropane	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,3-Dichloropropane	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
2,2-Dichloropropane	ND	0.098		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,1-Dichloropropene	ND	0.098		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Hexachlorobutadiene	ND	0.098		mg/Kg	1	9/25/2019 5:18:16 PM	47650
2-Hexanone	ND	0.49		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Isopropylbenzene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
4-Isopropyltoluene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
4-Methyl-2-pentanone	ND	0.49		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Methylene chloride	ND	0.15		mg/Kg	1	9/25/2019 5:18:16 PM	47650
n-Butylbenzene	ND	0.15		mg/Kg	1	9/25/2019 5:18:16 PM	47650
n-Propylbenzene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
sec-Butylbenzene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Styrene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
tert-Butylbenzene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,1,1,2-Tetrachloroethane	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,1,2,2-Tetrachloroethane	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Tetrachloroethene (PCE)	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
trans-1,2-DCE	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
trans-1,3-Dichloropropene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,2,3-Trichlorobenzene	ND	0.098		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,2,4-Trichlorobenzene	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,1,1-Trichloroethane	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,1,2-Trichloroethane	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Trichloroethene (TCE)	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Trichlorofluoromethane	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
1,2,3-Trichloropropane	ND	0.098		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Vinyl chloride	ND	0.049		mg/Kg	1	9/25/2019 5:18:16 PM	47650
Xylenes, Total	ND	0.098		mg/Kg	1	9/25/2019 5:18:16 PM	47650

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Client Sample ID: Cell #1 Treatment Comp
Project: Agua Moss Sunco Landfarm
Collection Date: 9/20/2019 2:08:00 PM
Lab ID: 1909B72-001 **Matrix:** SOIL
Received Date: 9/21/2019 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Surr: Dibromofluoromethane	99.9	70-130		%Rec	1	9/25/2019 5:18:16 PM	47650
Surr: 1,2-Dichloroethane-d4	96.7	70-130		%Rec	1	9/25/2019 5:18:16 PM	47650
Surr: Toluene-d8	101	70-130		%Rec	1	9/25/2019 5:18:16 PM	47650
Surr: 4-Bromofluorobenzene	87.2	70-130		%Rec	1	9/25/2019 5:18:16 PM	47650
SM4500H+B/EPA 9040C						Analyst: **JRR**	
pH	8.31			pH Units	1	10/3/2019 8:43:00 AM	R63389

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Project: Agua Moss Sunco Landfarm
Lab ID: 1909B72-002 **Matrix:** SOIL

Client Sample ID: Cell #2N Treatment Comp
Collection Date: 9/20/2019 2:45:00 PM
Received Date: 9/21/2019 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Fluoride	4.7	1.5		mg/Kg	5	9/27/2019 10:47:29 AM	47714
Chloride	230	7.5		mg/Kg	5	9/25/2019 4:57:13 PM	47714
Nitrogen, Nitrite (As N)	ND	1.5		mg/Kg	5	9/25/2019 4:57:13 PM	47714
Nitrogen, Nitrate (As N)	14	1.5		mg/Kg	5	9/25/2019 4:57:13 PM	47714
Sulfate	710	30		mg/Kg	20	9/25/2019 5:09:38 PM	47714
EPA METHOD 7471: MERCURY						Analyst: **rde**	
Mercury	1.1	0.16		mg/Kg	5	9/26/2019 3:54:41 PM	47745
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**	
Antimony	ND	5.0		mg/Kg	2	9/26/2019 8:18:29 AM	47733
Arsenic	ND	5.0		mg/Kg	2	9/26/2019 8:18:29 AM	47733
Barium	1700	0.99		mg/Kg	10	9/26/2019 8:31:54 AM	47733
Beryllium	0.59	0.30		mg/Kg	2	9/26/2019 8:18:29 AM	47733
Cadmium	ND	0.20		mg/Kg	2	9/26/2019 8:18:29 AM	47733
Chromium	8.5	0.60		mg/Kg	2	9/26/2019 8:18:29 AM	47733
Copper	12	0.60		mg/Kg	2	9/26/2019 8:18:29 AM	47733
Iron	14000	250		mg/Kg	100	9/26/2019 7:55:22 AM	47733
Lead	8.2	0.50		mg/Kg	2	9/26/2019 8:18:29 AM	47733
Manganese	230	0.20		mg/Kg	2	9/26/2019 8:18:29 AM	47733
Selenium	ND	5.0		mg/Kg	2	9/26/2019 8:18:29 AM	47733
Silver	ND	0.50		mg/Kg	2	9/26/2019 8:18:29 AM	47733
Thallium	ND	5.0		mg/Kg	2	9/26/2019 8:18:29 AM	47733
Uranium	ND	9.9		mg/Kg	2	9/26/2019 8:18:29 AM	47733
Zinc	42	5.0		mg/Kg	2	9/26/2019 8:18:29 AM	47733
EPA METHOD 8011/504.1 MODIFIED: EDB						Analyst: **JME**	
1,2-Dibromoethane	ND	0.063		µg/Kg	1	9/24/2019 3:07:33 PM	47675
EPA METHOD 8082A: PCB'S						Analyst: **TOM**	
Aroclor 1016	ND	0.046		mg/Kg	1	9/30/2019 3:59:00 PM	47656
Aroclor 1221	ND	0.046		mg/Kg	1	9/30/2019 3:59:00 PM	47656
Aroclor 1232	ND	0.046		mg/Kg	1	9/30/2019 3:59:00 PM	47656
Aroclor 1242	ND	0.046		mg/Kg	1	9/30/2019 3:59:00 PM	47656
Aroclor 1248	ND	0.046		mg/Kg	1	9/30/2019 3:59:00 PM	47656
Aroclor 1254	ND	0.046		mg/Kg	1	9/30/2019 3:59:00 PM	47656
Aroclor 1260	ND	0.046		mg/Kg	1	9/30/2019 3:59:00 PM	47656
Surr: Decachlorobiphenyl	88.0	25.7-135		%Rec	1	9/30/2019 3:59:00 PM	47656
Surr: Tetrachloro-m-xylene	102	32.3-138		%Rec	1	9/30/2019 3:59:00 PM	47656
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	240	95		mg/Kg	10	9/25/2019 9:06:00 AM	47676

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Client Sample ID: Cell #2N Treatment Comp
Project: Agua Moss Sunco Landfarm
Collection Date: 9/20/2019 2:45:00 PM
Lab ID: 1909B72-002 **Matrix:** SOIL
Received Date: 9/21/2019 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Motor Oil Range Organics (MRO)	1400	470		mg/Kg	10	9/25/2019 9:06:00 AM	47676
Surr: DNOP	0	70-130	S	%Rec	10	9/25/2019 9:06:00 AM	47676
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/25/2019 1:01:57 PM	47691
Surr: BFB	95.5	77.4-118		%Rec	1	9/25/2019 1:01:57 PM	47691
EPA METHOD 8310: PAHS						Analyst: **TOM**	
Naphthalene	ND	2.1		mg/Kg	1	9/30/2019 1:03:47 PM	47657
1-Methylnaphthalene	ND	2.1		mg/Kg	1	9/30/2019 1:03:47 PM	47657
2-Methylnaphthalene	ND	2.1		mg/Kg	1	9/30/2019 1:03:47 PM	47657
Benzo(a)pyrene	ND	0.085		mg/Kg	1	9/30/2019 1:03:47 PM	47657
Surr: Benzo(e)pyrene	73.5	26.5-113		%Rec	1	9/30/2019 1:03:47 PM	47657
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	0.025		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Toluene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Ethylbenzene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Methyl tert-butyl ether (MTBE)	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,2,4-Trimethylbenzene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,3,5-Trimethylbenzene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,2-Dichloroethane (EDC)	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,2-Dibromoethane (EDB)	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Naphthalene	ND	0.098		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1-Methylnaphthalene	ND	0.20		mg/Kg	1	9/25/2019 8:44:08 PM	47691
2-Methylnaphthalene	ND	0.20		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Acetone	ND	0.74		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Bromobenzene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Bromodichloromethane	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Bromoform	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Bromomethane	ND	0.15		mg/Kg	1	9/25/2019 8:44:08 PM	47691
2-Butanone	ND	0.49		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Carbon disulfide	ND	0.49		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Carbon tetrachloride	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Chlorobenzene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Chloroethane	ND	0.098		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Chloroform	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Chloromethane	ND	0.15		mg/Kg	1	9/25/2019 8:44:08 PM	47691
2-Chlorotoluene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
4-Chlorotoluene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
cis-1,2-DCE	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Project: Agua Moss Sunco Landfarm
Lab ID: 1909B72-002 **Matrix:** SOIL

Client Sample ID: Cell #2N Treatment Comp
Collection Date: 9/20/2019 2:45:00 PM
Received Date: 9/21/2019 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
cis-1,3-Dichloropropene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,2-Dibromo-3-chloropropane	ND	0.098		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Dibromochloromethane	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Dibromomethane	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,2-Dichlorobenzene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,3-Dichlorobenzene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,4-Dichlorobenzene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Dichlorodifluoromethane	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,1-Dichloroethane	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,1-Dichloroethene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,2-Dichloropropane	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,3-Dichloropropane	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
2,2-Dichloropropane	ND	0.098		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,1-Dichloropropene	ND	0.098		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Hexachlorobutadiene	ND	0.098		mg/Kg	1	9/25/2019 8:44:08 PM	47691
2-Hexanone	ND	0.49		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Isopropylbenzene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
4-Isopropyltoluene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
4-Methyl-2-pentanone	ND	0.49		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Methylene chloride	ND	0.15		mg/Kg	1	9/25/2019 8:44:08 PM	47691
n-Butylbenzene	ND	0.15		mg/Kg	1	9/25/2019 8:44:08 PM	47691
n-Propylbenzene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
sec-Butylbenzene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Styrene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
tert-Butylbenzene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,1,1,2-Tetrachloroethane	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,1,2,2-Tetrachloroethane	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Tetrachloroethene (PCE)	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
trans-1,2-DCE	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
trans-1,3-Dichloropropene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,2,3-Trichlorobenzene	ND	0.098		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,2,4-Trichlorobenzene	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,1,1-Trichloroethane	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,1,2-Trichloroethane	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Trichloroethene (TCE)	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Trichlorofluoromethane	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
1,2,3-Trichloropropane	ND	0.098		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Vinyl chloride	ND	0.049		mg/Kg	1	9/25/2019 8:44:08 PM	47691
Xylenes, Total	ND	0.098		mg/Kg	1	9/25/2019 8:44:08 PM	47691

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Client Sample ID: Cell #2N Treatment Comp
Project: Agua Moss Sunco Landfarm
Collection Date: 9/20/2019 2:45:00 PM
Lab ID: 1909B72-002
Matrix: SOIL
Received Date: 9/21/2019 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Surr: Dibromofluoromethane	101	70-130		%Rec	1	9/25/2019 8:44:08 PM	47691
Surr: 1,2-Dichloroethane-d4	99.1	70-130		%Rec	1	9/25/2019 8:44:08 PM	47691
Surr: Toluene-d8	101	70-130		%Rec	1	9/25/2019 8:44:08 PM	47691
Surr: 4-Bromofluorobenzene	86.6	70-130		%Rec	1	9/25/2019 8:44:08 PM	47691
SM4500H+B/EPA 9040C						Analyst: **JRR**	
pH	8.16			pH Units	1	10/3/2019 8:43:00 AM	R63389

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Project: Agua Moss Sunco Landfarm
Lab ID: 1909B72-003 **Matrix:** SOIL

Client Sample ID: Cell #2S Treatment Comp
Collection Date: 9/20/2019 2:20:00 PM
Received Date: 9/21/2019 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Fluoride	8.0	1.5		mg/Kg	5	9/27/2019 10:59:54 AM	47714
Chloride	290	7.5		mg/Kg	5	9/25/2019 5:22:03 PM	47714
Nitrogen, Nitrite (As N)	ND	1.5		mg/Kg	5	9/25/2019 5:22:03 PM	47714
Nitrogen, Nitrate (As N)	4.1	1.5		mg/Kg	5	9/25/2019 5:22:03 PM	47714
Sulfate	550	7.5		mg/Kg	5	9/25/2019 5:22:03 PM	47714
EPA METHOD 7471: MERCURY						Analyst: **rde**	
Mercury	0.55	0.15		mg/Kg	5	9/26/2019 3:56:41 PM	47745
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**	
Antimony	ND	5.0		mg/Kg	2	9/26/2019 8:20:05 AM	47733
Arsenic	ND	5.0		mg/Kg	2	9/26/2019 8:20:05 AM	47733
Barium	1600	1.0		mg/Kg	10	9/26/2019 8:33:28 AM	47733
Beryllium	0.59	0.30		mg/Kg	2	9/26/2019 8:20:05 AM	47733
Cadmium	ND	0.20		mg/Kg	2	9/26/2019 8:20:05 AM	47733
Chromium	9.6	0.60		mg/Kg	2	9/26/2019 8:20:05 AM	47733
Copper	18	0.60		mg/Kg	2	9/26/2019 8:20:05 AM	47733
Iron	17000	250		mg/Kg	100	9/26/2019 7:56:57 AM	47733
Lead	12	0.50		mg/Kg	2	9/26/2019 8:20:05 AM	47733
Manganese	300	0.20		mg/Kg	2	9/26/2019 8:20:05 AM	47733
Selenium	ND	5.0		mg/Kg	2	9/26/2019 8:20:05 AM	47733
Silver	ND	0.50		mg/Kg	2	9/26/2019 8:20:05 AM	47733
Thallium	ND	5.0		mg/Kg	2	9/26/2019 8:20:05 AM	47733
Uranium	ND	10		mg/Kg	2	9/26/2019 8:20:05 AM	47733
Zinc	77	5.0		mg/Kg	2	9/26/2019 8:20:05 AM	47733
EPA METHOD 8011/504.1 MODIFIED: EDB						Analyst: **JME**	
1,2-Dibromoethane	ND	0.080		µg/Kg	1	9/24/2019 3:22:41 PM	47675
EPA METHOD 8082A: PCB'S						Analyst: **TOM**	
Aroclor 1016	ND	0.046		mg/Kg	1	9/30/2019 5:05:03 PM	47656
Aroclor 1221	ND	0.046		mg/Kg	1	9/30/2019 5:05:03 PM	47656
Aroclor 1232	ND	0.046		mg/Kg	1	9/30/2019 5:05:03 PM	47656
Aroclor 1242	ND	0.046		mg/Kg	1	9/30/2019 5:05:03 PM	47656
Aroclor 1248	ND	0.046		mg/Kg	1	9/30/2019 5:05:03 PM	47656
Aroclor 1254	ND	0.046		mg/Kg	1	9/30/2019 5:05:03 PM	47656
Aroclor 1260	ND	0.046		mg/Kg	1	9/30/2019 5:05:03 PM	47656
Surr: Decachlorobiphenyl	85.6	25.7-135		%Rec	1	9/30/2019 5:05:03 PM	47656
Surr: Tetrachloro-m-xylene	97.6	32.3-138		%Rec	1	9/30/2019 5:05:03 PM	47656
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	270	97		mg/Kg	10	9/25/2019 9:30:20 AM	47676

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Client Sample ID: Cell #2S Treatment Comp
Project: Agua Moss Sunco Landfarm
Collection Date: 9/20/2019 2:20:00 PM
Lab ID: 1909B72-003 **Matrix:** SOIL
Received Date: 9/21/2019 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Motor Oil Range Organics (MRO)	2000	490		mg/Kg	10	9/25/2019 9:30:20 AM	47676
Surr: DNOP	0	70-130	S	%Rec	10	9/25/2019 9:30:20 AM	47676
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	9/25/2019 1:24:52 PM	47691
Surr: BFB	96.8	77.4-118		%Rec	1	9/25/2019 1:24:52 PM	47691
EPA METHOD 8310: PAHS						Analyst: **TOM**	
Naphthalene	ND	2.2		mg/Kg	1	9/30/2019 2:20:17 PM	47657
1-Methylnaphthalene	ND	2.2		mg/Kg	1	9/30/2019 2:20:17 PM	47657
2-Methylnaphthalene	ND	2.2		mg/Kg	1	9/30/2019 2:20:17 PM	47657
Benzo(a)pyrene	ND	0.088		mg/Kg	1	9/30/2019 2:20:17 PM	47657
Surr: Benzo(e)pyrene	110	26.5-113		%Rec	1	9/30/2019 2:20:17 PM	47657
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	0.024		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Toluene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Ethylbenzene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Methyl tert-butyl ether (MTBE)	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,2,4-Trimethylbenzene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,3,5-Trimethylbenzene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,2-Dichloroethane (EDC)	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,2-Dibromoethane (EDB)	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Naphthalene	ND	0.096		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1-Methylnaphthalene	ND	0.19		mg/Kg	1	9/25/2019 9:13:12 PM	47691
2-Methylnaphthalene	ND	0.19		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Acetone	ND	0.72		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Bromobenzene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Bromodichloromethane	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Bromoform	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Bromomethane	ND	0.14		mg/Kg	1	9/25/2019 9:13:12 PM	47691
2-Butanone	ND	0.48		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Carbon disulfide	ND	0.48		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Carbon tetrachloride	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Chlorobenzene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Chloroethane	ND	0.096		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Chloroform	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Chloromethane	ND	0.14		mg/Kg	1	9/25/2019 9:13:12 PM	47691
2-Chlorotoluene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
4-Chlorotoluene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
cis-1,2-DCE	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Client Sample ID: Cell #2S Treatment Comp
Project: Agua Moss Sunco Landfarm
Collection Date: 9/20/2019 2:20:00 PM
Lab ID: 1909B72-003 **Matrix:** SOIL
Received Date: 9/21/2019 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
cis-1,3-Dichloropropene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,2-Dibromo-3-chloropropane	ND	0.096		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Dibromochloromethane	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Dibromomethane	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,2-Dichlorobenzene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,3-Dichlorobenzene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,4-Dichlorobenzene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Dichlorodifluoromethane	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,1-Dichloroethane	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,1-Dichloroethene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,2-Dichloropropane	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,3-Dichloropropane	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
2,2-Dichloropropane	ND	0.096		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,1-Dichloropropene	ND	0.096		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Hexachlorobutadiene	ND	0.096		mg/Kg	1	9/25/2019 9:13:12 PM	47691
2-Hexanone	ND	0.48		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Isopropylbenzene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
4-Isopropyltoluene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
4-Methyl-2-pentanone	ND	0.48		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Methylene chloride	ND	0.14		mg/Kg	1	9/25/2019 9:13:12 PM	47691
n-Butylbenzene	ND	0.14		mg/Kg	1	9/25/2019 9:13:12 PM	47691
n-Propylbenzene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
sec-Butylbenzene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Styrene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
tert-Butylbenzene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,1,1,2-Tetrachloroethane	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,1,2,2-Tetrachloroethane	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Tetrachloroethene (PCE)	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
trans-1,2-DCE	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
trans-1,3-Dichloropropene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,2,3-Trichlorobenzene	ND	0.096		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,2,4-Trichlorobenzene	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,1,1-Trichloroethane	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,1,2-Trichloroethane	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Trichloroethene (TCE)	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Trichlorofluoromethane	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
1,2,3-Trichloropropane	ND	0.096		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Vinyl chloride	ND	0.048		mg/Kg	1	9/25/2019 9:13:12 PM	47691
Xylenes, Total	ND	0.096		mg/Kg	1	9/25/2019 9:13:12 PM	47691

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Client Sample ID: Cell #2S Treatment Comp
Project: Agua Moss Sunco Landfarm
Collection Date: 9/20/2019 2:20:00 PM
Lab ID: 1909B72-003 **Matrix:** SOIL
Received Date: 9/21/2019 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Surr: Dibromofluoromethane	98.8	70-130		%Rec	1	9/25/2019 9:13:12 PM	47691
Surr: 1,2-Dichloroethane-d4	96.2	70-130		%Rec	1	9/25/2019 9:13:12 PM	47691
Surr: Toluene-d8	101	70-130		%Rec	1	9/25/2019 9:13:12 PM	47691
Surr: 4-Bromofluorobenzene	85.3	70-130		%Rec	1	9/25/2019 9:13:12 PM	47691
SM4500H+B/EPA 9040C						Analyst: **JRR**	
pH	8.42			pH Units	1	10/3/2019 8:43:00 AM	R63389

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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ANALYTICAL REPORT

October 01, 2019

09872

Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Hall Environmental Analysis Laboratory

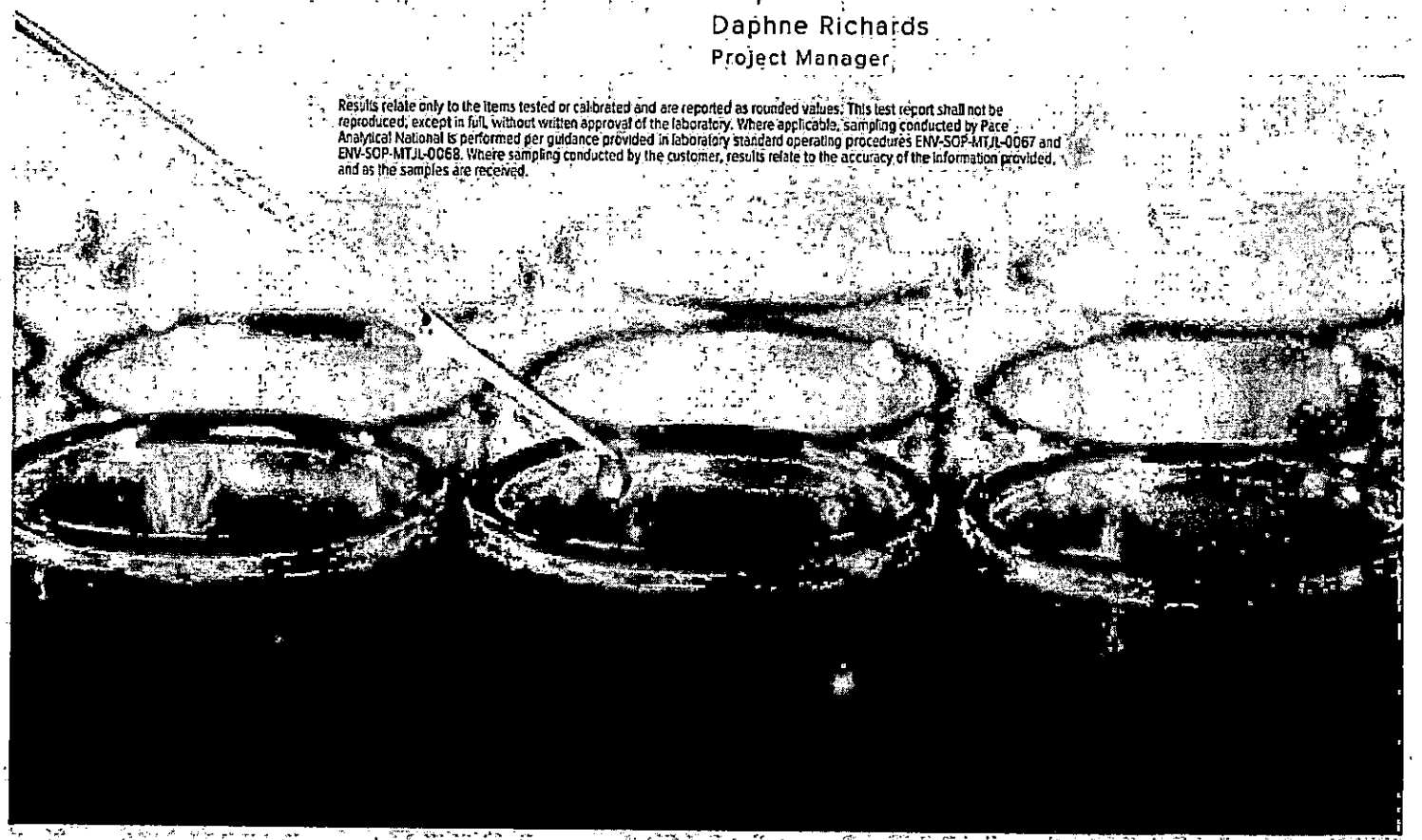
Sample Delivery Group: L1142548
Samples Received: 09/24/2019
Project Number:
Description:

Report To:

4901 Hawkins NE
Albuquerque, NM 87109

Entire Report Reviewed By: Daphne R Richards

Daphne Richards
Project Manager



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ONE LAB. NATIONWIDE.

1909B72-001B CELL #1 TREATMENT COMP L1142548-01 Solid

Collected by | Collected date/time: 09/20/19 14:03 | Received date/time: 09/24/19 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9012B	WG1354222	1	09/30/19 08:00	10/01/19 12:34	SDL	Mt. Juliet, TN
Wet Chemistry by Method 9066	WG1352321	1	09/26/19 11:00	09/26/19 20:11	JER	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1353119	2	09/27/19 10:41	09/28/19 02:37	JNJ	Mt. Juliet, TN

1909B72-002B CELL #2N TREATMENT COMP L1142548-02 Solid

Collected by | Collected date/time: 09/20/19 14:45 | Received date/time: 09/24/19 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9012B	WG1354222	1	09/30/19 08:00	10/01/19 12:38	SDL	Mt. Juliet, TN
Wet Chemistry by Method 9066	WG1352321	1	09/26/19 11:00	09/26/19 20:11	JER	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1353119	2	09/27/19 10:41	09/28/19 02:57	JNJ	Mt. Juliet, TN

1909B72-003B CELL #2S TREATMENT COMP L1142548-03 Solid

Collected by | Collected date/time: 09/20/19 14:20 | Received date/time: 09/24/19 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9012B	WG1354222	1	09/30/19 08:00	10/01/19 12:47	SDL	Mt. Juliet, TN
Wet Chemistry by Method 9066	WG1352321	1	09/26/19 11:00	09/26/19 20:15	JER	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1353119	2	09/27/19 10:41	09/28/19 01:39	JNJ	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Daphne R Richards

Daphne Richards
Project Manager

Wet Chemistry by Method 9012B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Cyanide	ND		0.250	1	10/01/2019 12:34	WG1354222

Wet Chemistry by Method 9066

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Total Phenol by 4AAP	1.26		0.670	1	09/26/2019 20:11	WG1352321

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Acenaphthene	ND		0.0666	2	09/28/2019 02:37	WG1353119
Acenaphthylene	ND		0.0666	2	09/28/2019 02:37	WG1353119
Acetophenone	ND		0.666	2	09/28/2019 02:37	WG1353119
Anthracene	ND		0.0666	2	09/28/2019 02:37	WG1353119
Atrazine	ND		0.666	2	09/28/2019 02:37	WG1353119
Benzaldehyde	ND		0.666	2	09/28/2019 02:37	WG1353119
Benzo(a)anthracene	ND		0.0666	2	09/28/2019 02:37	WG1353119
Benzo(b)fluoranthene	ND		0.0666	2	09/28/2019 02:37	WG1353119
Benzo(k)fluoranthene	ND		0.0666	2	09/28/2019 02:37	WG1353119
Benzo(g,h,i)perylene	ND		0.0666	2	09/28/2019 02:37	WG1353119
Benzo(a)pyrene	ND		0.0666	2	09/28/2019 02:37	WG1353119
Biphenyl	ND		0.666	2	09/28/2019 02:37	WG1353119
Bis(2-chloroethoxy)methane	ND		0.666	2	09/28/2019 02:37	WG1353119
Bis(2-chloroethyl)ether	ND		0.666	2	09/28/2019 02:37	WG1353119
Bis(2-chloroisopropyl)ether	ND		0.666	2	09/28/2019 02:37	WG1353119
4-Bromophenyl-phenylether	ND		0.666	2	09/28/2019 02:37	WG1353119
Caprolactam	ND		0.666	2	09/28/2019 02:37	WG1353119
Carbazole	ND		0.666	2	09/28/2019 02:37	WG1353119
4-Chloroaniline	ND		0.666	2	09/28/2019 02:37	WG1353119
2-Chloronaphthalene	ND		0.0666	2	09/28/2019 02:37	WG1353119
4-Chlorophenyl-phenylether	ND		0.666	2	09/28/2019 02:37	WG1353119
Chrysene	ND		0.0666	2	09/28/2019 02:37	WG1353119
Dibenz(a,h)anthracene	ND		0.0666	2	09/28/2019 02:37	WG1353119
Dibenzofuran	ND		0.666	2	09/28/2019 02:37	WG1353119
3,3-Dichlorobenzidine	ND		0.666	2	09/28/2019 02:37	WG1353119
2,4-Dinitrotoluene	ND		0.666	2	09/28/2019 02:37	WG1353119
2,6-Dinitrotoluene	ND		0.666	2	09/28/2019 02:37	WG1353119
Fluoranthene	ND		0.0666	2	09/28/2019 02:37	WG1353119
Fluorene	ND		0.0666	2	09/28/2019 02:37	WG1353119
Hexachlorobenzene	ND		0.666	2	09/28/2019 02:37	WG1353119
Hexachloro-1,3-butadiene	ND		0.666	2	09/28/2019 02:37	WG1353119
Hexachlorocyclopentadiene	ND		0.666	2	09/28/2019 02:37	WG1353119
Hexachloroethane	ND		0.666	2	09/28/2019 02:37	WG1353119
Indeno(1,2,3-cd)pyrene	ND		0.0666	2	09/28/2019 02:37	WG1353119
Isophorone	ND		0.666	2	09/28/2019 02:37	WG1353119
2-Methylnaphthalene	0.139		0.0666	2	09/28/2019 02:37	WG1353119
Naphthalene	ND		0.0666	2	09/28/2019 02:37	WG1353119
2-Nitroaniline	ND		0.666	2	09/28/2019 02:37	WG1353119
3-Nitroaniline	ND		0.666	2	09/28/2019 02:37	WG1353119
4-Nitroaniline	ND		0.666	2	09/28/2019 02:37	WG1353119
Nitrobenzene	ND		0.666	2	09/28/2019 02:37	WG1353119
n-Nitrosodiphenylamine	ND		0.666	2	09/28/2019 02:37	WG1353119
n-Nitrosodi-n-propylamine	ND		0.666	2	09/28/2019 02:37	WG1353119
Phenanthrene	ND		0.0666	2	09/28/2019 02:37	WG1353119
Benzylbutyl phthalate	ND		0.666	2	09/28/2019 02:37	WG1353119

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Bis(2-ethylhexyl)phthalate	ND		0.666	2	09/28/2019 02:37	WG1353119
Di-n-butyl phthalate	ND		0.666	2	09/28/2019 02:37	WG1353119
Diethyl phthalate	ND		0.666	2	09/28/2019 02:37	WG1353119
Dimethyl phthalate	ND		0.666	2	09/28/2019 02:37	WG1353119
Di-n-octyl phthalate	ND		0.666	2	09/28/2019 02:37	WG1353119
Pyrene	ND		0.0666	2	09/28/2019 02:37	WG1353119
1,2,4,5-Tetrachlorobenzene	ND		0.666	2	09/28/2019 02:37	WG1353119
4-Chloro-3-methylphenol	ND		0.666	2	09/28/2019 02:37	WG1353119
2-Chlorophenol	ND		0.666	2	09/28/2019 02:37	WG1353119
2-Methylphenol	ND		0.666	2	09/28/2019 02:37	WG1353119
3&4-Methyl Phenol	ND		0.666	2	09/28/2019 02:37	WG1353119
2,4-Dichlorophenol	ND		0.666	2	09/28/2019 02:37	WG1353119
2,4-Dimethylphenol	ND		0.666	2	09/28/2019 02:37	WG1353119
4,6-Dinitro-2-methylphenol	ND		0.666	2	09/28/2019 02:37	WG1353119
2,4-Dinitrophenol	ND		0.666	2	09/28/2019 02:37	WG1353119
2-Nitrophenol	ND		0.666	2	09/28/2019 02:37	WG1353119
4-Nitrophenol	ND		0.666	2	09/28/2019 02:37	WG1353119
Pentachlorophenol	ND		0.666	2	09/28/2019 02:37	WG1353119
Phenol	ND		0.666	2	09/28/2019 02:37	WG1353119
2,4,5-Trichlorophenol	ND		0.666	2	09/28/2019 02:37	WG1353119
2,4,6-Trichlorophenol	ND		0.666	2	09/28/2019 02:37	WG1353119
(S) 2-Fluorophenol	*81.0*		*12.0-120*		*09/28/2019 02:37*	WG1353119
(S) Phenol-d5	*68.7*		*10.0-120*		*09/28/2019 02:37*	WG1353119
(S) Nitrobenzene-d5	*59.2*		*10.0-122*		*09/28/2019 02:37*	WG1353119
(S) 2-Fluorobiphenyl	*69.4*		*15.0-120*		*09/28/2019 02:37*	WG1353119
(S) 2,4,6-Tribromophenol	*97.8*		*10.0-127*		*09/28/2019 02:37*	WG1353119
(S) p-Terphenyl-d14	*79.0*		*10.0-120*		*09/28/2019 02:37*	WG1353119

Wet Chemistry by Method 9012B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Cyanide	ND		0.250	1	10/01/2019 12:38	WG1354222

Wet Chemistry by Method 9066

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Total Phenol by 4AAP	0.698		0.670	1	09/26/2019 20:11	WG1352321

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Acenaphthene	ND		0.0666	2	09/28/2019 02:57	WG1353119
Acenaphthylene	ND		0.0666	2	09/28/2019 02:57	WG1353119
Acetophenone	ND		0.666	2	09/28/2019 02:57	WG1353119
Anthracene	ND		0.0666	2	09/28/2019 02:57	WG1353119
Atrazine	ND		0.666	2	09/28/2019 02:57	WG1353119
Benzaldehyde	ND		0.666	2	09/28/2019 02:57	WG1353119
Benzo(a)anthracene	ND		0.0666	2	09/28/2019 02:57	WG1353119
Benzo(b)fluoranthene	ND		0.0666	2	09/28/2019 02:57	WG1353119
Benzo(k)fluoranthene	ND		0.0666	2	09/28/2019 02:57	WG1353119
Benzo(g,h,i)perylene	ND		0.0666	2	09/28/2019 02:57	WG1353119
Benzo(a)pyrene	ND		0.0666	2	09/28/2019 02:57	WG1353119
Biphenyl	ND		0.666	2	09/28/2019 02:57	WG1353119
Bis(2-chloroethoxy)methane	ND		0.666	2	09/28/2019 02:57	WG1353119
Bis(2-chloroethyl)ether	ND		0.666	2	09/28/2019 02:57	WG1353119
Bis(2-chloroisopropyl)ether	ND		0.666	2	09/28/2019 02:57	WG1353119
4-Bromophenyl-phenylether	ND		0.666	2	09/28/2019 02:57	WG1353119
Caprolactam	ND		0.666	2	09/28/2019 02:57	WG1353119
Carbazole	ND		0.666	2	09/28/2019 02:57	WG1353119
4-Chloroaniline	ND		0.666	2	09/28/2019 02:57	WG1353119
2-Chloronaphthalene	ND		0.0666	2	09/28/2019 02:57	WG1353119
4-Chlorophenyl-phenylether	ND		0.666	2	09/28/2019 02:57	WG1353119
Chrysene	ND		0.0666	2	09/28/2019 02:57	WG1353119
Dibenz(a,h)anthracene	ND		0.0666	2	09/28/2019 02:57	WG1353119
Dibenzofuran	ND		0.666	2	09/28/2019 02:57	WG1353119
3,3-Dichlorobenzidine	ND		0.666	2	09/28/2019 02:57	WG1353119
2,4-Dinitrotoluene	ND		0.666	2	09/28/2019 02:57	WG1353119
2,6-Dinitrotoluene	ND		0.666	2	09/28/2019 02:57	WG1353119
Fluoranthene	ND		0.0666	2	09/28/2019 02:57	WG1353119
Fluorene	ND		0.0666	2	09/28/2019 02:57	WG1353119
Hexachlorobenzene	ND		0.666	2	09/28/2019 02:57	WG1353119
Hexachloro-1,3-butadiene	ND		0.666	2	09/28/2019 02:57	WG1353119
Hexachlorocyclopentadiene	ND		0.666	2	09/28/2019 02:57	WG1353119
Hexachloroethane	ND		0.666	2	09/28/2019 02:57	WG1353119
Indeno(1,2,3-cd)pyrene	ND		0.0666	2	09/28/2019 02:57	WG1353119
Isophorone	ND		0.666	2	09/28/2019 02:57	WG1353119
2-Methylnaphthalene	0.194		0.0666	2	09/28/2019 02:57	WG1353119
Naphthalene	ND		0.0666	2	09/28/2019 02:57	WG1353119
2-Nitroaniline	ND		0.666	2	09/28/2019 02:57	WG1353119
3-Nitroaniline	ND		0.666	2	09/28/2019 02:57	WG1353119
4-Nitroaniline	ND		0.666	2	09/28/2019 02:57	WG1353119
Nitrobenzene	ND		0.666	2	09/28/2019 02:57	WG1353119
n-Nitrosodiphenylamine	ND		0.666	2	09/28/2019 02:57	WG1353119
n-Nitrosodi-n-propylamine	ND		0.666	2	09/28/2019 02:57	WG1353119
Phenanthrene	0.0680		0.0666	2	09/28/2019 02:57	WG1353119
Benzylbutyl phthalate	ND		0.666	2	09/28/2019 02:57	WG1353119

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Bis(2-ethylhexyl)phthalate	ND		0.666	2	09/28/2019 02:57	WG1353119
Di-n-butyl phthalate	ND		0.666	2	09/28/2019 02:57	WG1353119
Diethyl phthalate	ND		0.666	2	09/28/2019 02:57	WG1353119
Dimethyl phthalate	ND		0.666	2	09/28/2019 02:57	WG1353119
Di-n-octyl phthalate	ND		0.666	2	09/28/2019 02:57	WG1353119
Pyrene	ND		0.0666	2	09/28/2019 02:57	WG1353119
1,2,4,5-Tetrachlorobenzene	ND		0.666	2	09/28/2019 02:57	WG1353119
4-Chloro-3-methylphenol	ND		0.666	2	09/28/2019 02:57	WG1353119
2-Chlorophenol	ND		0.666	2	09/28/2019 02:57	WG1353119
2-Methylphenol	ND		0.666	2	09/28/2019 02:57	WG1353119
3&4-Methyl Phenol	ND		0.666	2	09/28/2019 02:57	WG1353119
2,4-Dichlorophenol	ND		0.666	2	09/28/2019 02:57	WG1353119
2,4-Dimethylphenol	ND		0.666	2	09/28/2019 02:57	WG1353119
4,6-Dinitro-2-methylphenol	ND		0.666	2	09/28/2019 02:57	WG1353119
2,4-Dinitrophenol	ND		0.666	2	09/28/2019 02:57	WG1353119
2-Nitrophenol	ND		0.666	2	09/28/2019 02:57	WG1353119
4-Nitrophenol	ND		0.666	2	09/28/2019 02:57	WG1353119
Pentachlorophenol	ND		0.666	2	09/28/2019 02:57	WG1353119
Phenol	ND		0.666	2	09/28/2019 02:57	WG1353119
2,4,5-Trichlorophenol	ND		0.666	2	09/28/2019 02:57	WG1353119
2,4,6-Trichlorophenol	ND		0.666	2	09/28/2019 02:57	WG1353119
(S) 2-Fluorophenol	*76.7*		*12.0-120*		*09/28/2019 02:57*	WG1353119
(S) Phenol-d5	*64.3*		*10.0-120*		*09/28/2019 02:57*	WG1353119
(S) Nitrobenzene-d5	*54.7*		*10.0-122*		*09/28/2019 02:57*	WG1353119
(S) 2-Fluorobiphenyl	*67.1*		*15.0-120*		*09/28/2019 02:57*	WG1353119
(S) 2,4,6-Tribromophenol	*94.6*		*10.0-127*		*09/28/2019 02:57*	WG1353119
(S) p-Terphenyl-d14	*81.1*		*10.0-120*		*09/28/2019 02:57*	WG1353119

Cp
Tc
Ss
Cn
Sr
Qc
Gl
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Sc

Wet Chemistry by Method 9012B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Cyanide	ND		0.250	1	10/01/2019 12:47	WG1354222

Wet Chemistry by Method 9066

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Total Phenol by 4AAP	0.974		0.670	1	09/26/2019 20:15	WG1352321

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Acenaphthene	ND		0.0666	2	09/28/2019 01:39	WG1353119
Acenaphthylene	ND		0.0666	2	09/28/2019 01:39	WG1353119
Acetophenone	ND		0.666	2	09/28/2019 01:39	WG1353119
Anthracene	ND		0.0666	2	09/28/2019 01:39	WG1353119
Atrazine	ND		0.666	2	09/28/2019 01:39	WG1353119
Benzaldehyde	ND		0.666	2	09/28/2019 01:39	WG1353119
Benzo(a)anthracene	ND		0.0666	2	09/28/2019 01:39	WG1353119
Benzo(b)fluoranthene	ND		0.0666	2	09/28/2019 01:39	WG1353119
Benzo(k)fluoranthene	ND		0.0666	2	09/28/2019 01:39	WG1353119
Benzo(g,h,i)perylene	ND		0.0666	2	09/28/2019 01:39	WG1353119
Benzo(a)pyrene	ND		0.0666	2	09/28/2019 01:39	WG1353119
Biphenyl	ND		0.666	2	09/28/2019 01:39	WG1353119
Bis(2-chloroethoxy)methane	ND		0.666	2	09/28/2019 01:39	WG1353119
Bis(2-chloroethyl)ether	ND		0.666	2	09/28/2019 01:39	WG1353119
Bis(2-chloroisopropyl)ether	ND		0.666	2	09/28/2019 01:39	WG1353119
4-Bromophenyl-phenylether	ND		0.666	2	09/28/2019 01:39	WG1353119
Caprolactam	ND		0.666	2	09/28/2019 01:39	WG1353119
Carbazole	ND		0.666	2	09/28/2019 01:39	WG1353119
4-Chloroaniline	ND		0.666	2	09/28/2019 01:39	WG1353119
2-Chloronaphthalene	ND		0.0666	2	09/28/2019 01:39	WG1353119
4-Chlorophenyl-phenylether	ND		0.666	2	09/28/2019 01:39	WG1353119
Chrysene	ND		0.0666	2	09/28/2019 01:39	WG1353119
Dibenz(a,h)anthracene	ND		0.0666	2	09/28/2019 01:39	WG1353119
Dibenzofuran	ND		0.666	2	09/28/2019 01:39	WG1353119
3,3-Dichlorobenzidine	ND		0.666	2	09/28/2019 01:39	WG1353119
2,4-Dinitrotoluene	ND		0.666	2	09/28/2019 01:39	WG1353119
2,6-Dinitrotoluene	ND		0.666	2	09/28/2019 01:39	WG1353119
Fluoranthene	ND		0.0666	2	09/28/2019 01:39	WG1353119
Fluorene	ND		0.0666	2	09/28/2019 01:39	WG1353119
Hexachlorobenzene	ND		0.666	2	09/28/2019 01:39	WG1353119
Hexachloro-1,3-butadiene	ND		0.666	2	09/28/2019 01:39	WG1353119
Hexachlorocyclopentadiene	ND	J6	0.666	2	09/28/2019 01:39	WG1353119
Hexachloroethane	ND		0.666	2	09/28/2019 01:39	WG1353119
Indeno(1,2,3-cd)pyrene	ND		0.0666	2	09/28/2019 01:39	WG1353119
Isophorone	ND		0.666	2	09/28/2019 01:39	WG1353119
2-Methylnaphthalene	0.127		0.0666	2	09/28/2019 01:39	WG1353119
Naphthalene	ND		0.0666	2	09/28/2019 01:39	WG1353119
2-Nitroaniline	ND		0.666	2	09/28/2019 01:39	WG1353119
3-Nitroaniline	ND		0.666	2	09/28/2019 01:39	WG1353119
4-Nitroaniline	ND		0.666	2	09/28/2019 01:39	WG1353119
Nitrobenzene	ND		0.666	2	09/28/2019 01:39	WG1353119
n-Nitrosodiphenylamine	ND		0.666	2	09/28/2019 01:39	WG1353119
n-Nitrosodi-n-propylamine	ND		0.666	2	09/28/2019 01:39	WG1353119
Phenanthrene	ND		0.0666	2	09/28/2019 01:39	WG1353119
Benzylbutyl phthalate	ND		0.666	2	09/28/2019 01:39	WG1353119

Semi Volatile Organic Compounds (GC/MS) by Method 8270C.

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Bis(2-ethylhexyl)phthalate	ND		0.666	2	09/28/2019 01:39	WG1353119
Di-n-butyl phthalate	ND		0.666	2	09/28/2019 01:39	WG1353119
Diethyl phthalate	ND		0.666	2	09/28/2019 01:39	WG1353119
Dimethyl phthalate	ND		0.666	2	09/28/2019 01:39	WG1353119
Di-n-octyl phthalate	ND		0.666	2	09/28/2019 01:39	WG1353119
Pyrene	ND		0.0666	2	09/28/2019 01:39	WG1353119
1,2,4,5-Tetrachlorobenzene	ND		0.666	2	09/28/2019 01:39	WG1353119
4-Chloro-3-methylphenol	ND		0.666	2	09/28/2019 01:39	WG1353119
2-Chlorophenol	ND		0.666	2	09/28/2019 01:39	WG1353119
2-Methylphenol	ND		0.666	2	09/28/2019 01:39	WG1353119
3&4-Methyl Phenol	ND		0.666	2	09/28/2019 01:39	WG1353119
2,4-Dichlorophenol	ND		0.666	2	09/28/2019 01:39	WG1353119
2,4-Dimethylphenol	ND		0.666	2	09/28/2019 01:39	WG1353119
4,6-Dinitro-2-methylphenol	ND	J6	0.666	2	09/28/2019 01:39	WG1353119
2,4-Dinitrophenol	ND	J6	0.666	2	09/28/2019 01:39	WG1353119
2-Nitrophenol	ND		0.666	2	09/28/2019 01:39	WG1353119
4-Nitrophenol	ND		0.666	2	09/28/2019 01:39	WG1353119
Pentachlorophenol	ND	J3	0.666	2	09/28/2019 01:39	WG1353119
Phenol	ND		0.666	2	09/28/2019 01:39	WG1353119
2,4,5-Trichlorophenol	ND		0.666	2	09/28/2019 01:39	WG1353119
2,4,6-Trichlorophenol	ND		0.666	2	09/28/2019 01:39	WG1353119
(S) 2-Fluorophenol	*66.8*		*12.0-120*		*09/28/2019 01:39*	WG1353119
(S) Phenol-d5	*59.9*		*10.0-120*		*09/28/2019 01:39*	WG1353119
(S) Nitrobenzene-d5	*50.3*		*10.0-122*		*09/28/2019 01:39*	WG1353119
(S) 2-Fluorobiphenyl	*62.7*		*15.0-120*		*09/28/2019 01:39*	WG1353119
(S) 2,4,6-Tribromophenol	*86.9*		*10.0-127*		*09/28/2019 01:39*	WG1353119
(S) p-Terphenyl-d14	*76.4*		*10.0-120*		*09/28/2019 01:39*	WG1353119

Cp
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Method Blank (MB)

(MB) R3456389-1 10/01/19 12:26

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Cyanide	U		0.0390	0.250

L1142548-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1142548-01 10/01/19 12:34 • (DUP) R3456389-3 10/01/19 12:35

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Cyanide	ND	0.000	1	0.000		20

L1142548-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1142548-02 10/01/19 12:38 • (DUP) R3456389-4 10/01/19 12:39

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Cyanide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3456389-2 10/01/19 12:27

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Cyanide	2.50	2.43	97.0	50.0-150	

L1143457-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1143457-01 10/01/19 12:41 • (MS) R3456389-5 10/01/19 12:43 • (MSD) R3456389-6 10/01/19 12:44

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Cyanide	1.67	ND	1.55	1.57	80.8	82.4	1	75.0-125			1.67	20

L1143681-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1143681-01 10/01/19 13:01 • (MS) R3456389-7 10/01/19 13:02 • (MSD) R3456389-8 10/01/19 13:03

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Cyanide	1.67	0.381	0.496	4.35	6.92	238	1	75.0-125	J6	E J3 J5	159	20

Method Blank (MB)

(MB) R3455057-1 09/26/19 20:05

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Total Phenol by 4AAP	U		0.220	0.670

L1142051-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1142051-02 09/26/19 20:09 • (DUP) R3455057-3 09/26/19 20:10

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Total Phenol by 4AAP	ND	1.21	1	125	P1	20

Laboratory Control Sample (LCS)

(LCS) R3455057-2 09/26/19 20:06

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Total Phenol by 4AAP	8.33	8.38	101	90.0-110	

L1142548-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1142548-02 09/26/19 20:11 • (MS) R3455057-4 09/26/19 20:12 • (MSD) R3455057-5 09/26/19 20:15

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Total Phenol by 4AAP	16.7	0.698	17.2	17.0	98.6	97.3	1	90.0-110			1.21	20

Method Blank (MB)

(MB) R3455468-2 09/27/19 20:27

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Acenaphthene	U		0.00642	0.0333
Acenaphthylene	U		0.00671	0.0333
Acetophenone	U		0.0752	0.333
Anthracene	U		0.00632	0.0333
Atrazine	U		0.0938	0.333
Benzaldehyde	U		0.0532	0.333
Benzo(a)anthracene	U		0.00428	0.0333
Benzo(b)fluoranthene	U		0.00695	0.0333
Benzo(k)fluoranthene	U		0.00582	0.0333
Benzo(g,h,i)perylene	U		0.00721	0.0333
Benzo(a)pyrene	U		0.00548	0.0333
Biphenyl	U		0.00588	0.333
Bis(2-chloroethoxy)methane	U		0.00770	0.333
Bis(2-chloroethyl)ether	U		0.00896	0.333
Bis(2-chloroisopropyl)ether	U		0.00760	0.333
4-Bromophenyl-phenylether	U		0.0114	0.333
Caprolactam	U		0.104	0.333
Carbazole	U		0.00524	0.333
4-Chloroaniline	U		0.0352	0.333
2-Chloronaphthalene	U		0.00639	0.0333
4-Chlorophenyl-phenylether	U		0.00627	0.333
Chrysene	U		0.00555	0.0333
Dibenz(a,h)anthracene	U		0.00821	0.0333
Dibenzofuran	U		0.00518	0.333
3,3-Dichlorobenzidine	U		0.0794	0.333
2,4-Dinitrotoluene	U		0.00607	0.333
2,6-Dinitrotoluene	U		0.00737	0.333
Fluoranthene	U		0.00496	0.0333
Fluorene	U		0.00682	0.0333
Hexachlorobenzene	U		0.00856	0.333
Hexachloro-1,3-butadiene	U		0.0100	0.333
Hexachlorocyclopentadiene	U		0.0587	0.333
Hexachloroethane	U		0.0134	0.333
Indeno(1,2,3-cd)pyrene	U		0.00772	0.0333
Isophorone	U		0.00522	0.333
2-Methylnaphthalene	U		0.00861	0.0333
Naphthalene	U		0.00889	0.0333
2-Nitroaniline	U		0.00755	0.333
3-Nitroaniline	U		0.00850	0.333
4-Nitroaniline	U		0.00639	0.333

Method Blank (MB)

(MB) R3455468-2 09/27/19 20:27

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Nitrobenzene	U		0.00695	0.333
n-Nitrosodiphenylamine	U		0.0900	0.333
n-Nitrosodi-n-propylamine	U		0.00906	0.333
Phenanthrene	U		0.00528	0.0333
Benzylbutyl phthalate	U		0.0103	0.333
Bis(2-ethylhexyl)phthalate	U		0.0120	0.333
Di-n-butyl phthalate	U		0.0109	0.333
Diethyl phthalate	U		0.00691	0.333
Dimethyl phthalate	U		0.00540	0.333
Di-n-octyl phthalate	U		0.00907	0.333
Pyrene	U		0.0123	0.0333
4-Chloro-3-methylphenol	U		0.00477	0.333
2-Chlorophenol	U		0.00831	0.333
2-Methylphenol	U		0.00986	0.333
3&4-Methyl Phenol	U		0.00783	0.333
2,4-Dichlorophenol	U		0.00746	0.333
2,4-Dimethylphenol	U		0.0471	0.333
4,6-Dinitro-2-methylphenol	U		0.124	0.333
2,4-Dinitrophenol	U		0.0980	0.333
2-Nitrophenol	U		0.0130	0.333
4-Nitrophenol	U		0.0525	0.333
Pentachlorophenol	U		0.0480	0.333
Phenol	U		0.00695	0.333
1,2,4,5-Tetrachlorobenzene	U		0.0762	0.333
2,4,5-Trichlorophenol	U		0.0104	0.333
2,4,6-Trichlorophenol	U		0.00779	0.333
(S) Nitrobenzene-d5	*55.3*			*10.0-122*
(S) 2-Fluorobiphenyl	*65.2*			*15.0-120*
(S) p-Terphenyl-d14	*70.3*			*10.0-120*
(S) Phenol-d5	*65.2*			*10.0-120*
(S) 2-Fluorophenol	*76.1*			*12.0-120*
(S) 2,4,6-Tribromophenol	*71.0*			*10.0-127*

Laboratory Control Sample (LCS)

(LCS) R3455468-1 09/27/19 20:07

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acenaphthene	0.666	0.455	68.3	38.0-120	
Acenaphthylene	0.666	0.484	72.7	40.0-120	
Acetophenone	0.666	0.436	65.5	29.0-120	
Anthracene	0.666	0.489	73.4	42.0-120	
Atrazine	0.666	0.506	76.0	43.0-120	
Benzaldehyde	0.666	0.327	49.1	10.0-160	
Benzo(a)anthracene	0.666	0.509	76.4	44.0-120	
Benzo(b)fluoranthene	0.666	0.511	76.7	43.0-120	
Benzo(k)fluoranthene	0.666	0.499	74.9	44.0-120	
Benzo(g,h,i)perylene	0.666	0.519	77.9	43.0-120	
Benzo(a)pyrene	0.666	0.523	78.5	45.0-120	
Biphenyl	0.666	0.472	70.9	39.0-120	
Bis(2-chloroethoxy)methane	0.666	0.360	54.1	20.0-120	
Bis(2-chloroethyl)ether	0.666	0.455	68.3	16.0-120	
Bis(2-chloroisopropyl)ether	0.666	0.413	62.0	23.0-120	
4-Bromophenyl-phenylether	0.666	0.540	81.1	40.0-120	
Caprolactam	0.666	0.513	77.0	38.0-120	
Carbazole	0.666	0.494	74.2	48.0-120	
4-Chloroaniline	0.666	0.258	38.7	18.0-120	
2-Chloronaphthalene	0.666	0.485	72.8	35.0-120	
4-Chlorophenyl-phenylether	0.666	0.510	76.6	40.0-120	
Chrysene	0.666	0.496	74.5	43.0-120	
Dibenz(a,h)anthracene	0.666	0.520	78.1	44.0-120	
Dibenzofuran	0.666	0.481	72.2	44.0-120	
3,3-Dichlorobenzidine	1.33	0.920	69.2	28.0-120	
2,4-Dinitrotoluene	0.666	0.549	82.4	45.0-120	
2,6-Dinitrotoluene	0.666	0.540	81.1	42.0-120	
Fluoranthene	0.666	0.504	75.7	44.0-120	
Fluorene	0.666	0.483	72.5	41.0-120	
Hexachlorobenzene	0.666	0.526	79.0	39.0-120	
Hexachloro-1,3-butadiene	0.666	0.403	60.5	15.0-120	
Hexachlorocyclopentadiene	0.666	0.513	77.0	15.0-120	
Hexachloroethane	0.666	0.417	62.6	17.0-120	
Indeno(1,2,3-cd)pyrene	0.666	0.516	77.5	45.0-120	
Isophorone	0.666	0.354	53.2	23.0-120	
2-Methylnaphthalene	0.666	0.359	53.9	34.0-120	
Naphthalene	0.666	0.364	54.7	18.0-120	
2-Nitroaniline	0.666	0.538	80.8	46.0-120	
3-Nitroaniline	0.666	0.492	73.9	36.0-120	
4-Nitroaniline	0.666	0.474	71.2	36.0-120	

Laboratory Control Sample (LCS)

(LCS) R3455468-1 09/27/19 20:07

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Nitrobenzene	0.666	0.365	54.8	17.0-120	
n-Nitrosodiphenylamine	0.666	0.494	74.2	40.0-120	
n-Nitrosodi-n-propylamine	0.666	0.412	61.9	26.0-120	
Phenanthrene	0.666	0.479	71.9	42.0-120	
Benzylbutyl phthalate	0.666	0.500	75.1	40.0-120	
Bis(2-ethylhexyl)phthalate	0.666	0.481	72.2	41.0-120	
Di-n-butyl phthalate	0.666	0.494	74.2	43.0-120	
Diethyl phthalate	0.666	0.482	72.4	43.0-120	
Dimethyl phthalate	0.666	0.491	73.7	43.0-120	
Di-n-octyl phthalate	0.666	0.509	76.4	40.0-120	
Pyrene	0.666	0.496	74.5	41.0-120	
4-Chloro-3-methylphenol	0.666	0.420	63.1	28.0-120	
2-Chlorophenol	0.666	0.488	73.3	28.0-120	
2-Methylphenol	0.666	0.508	76.3	35.0-120	
384-Methyl Phenol	0.666	0.542	81.4	42.0-120	
2,4-Dichlorophenol	0.666	0.442	66.4	25.0-120	
2,4-Dimethylphenol	0.666	0.395	59.3	15.0-120	
4,6-Dinitro-2-methylphenol	0.666	0.524	78.7	16.0-120	
2,4-Dinitrophenol	0.666	0.471	70.7	10.0-120	
2-Nitrophenol	0.666	0.439	65.9	20.0-120	
4-Nitrophenol	0.666	0.454	68.2	27.0-120	
Pentachlorophenol	0.666	0.570	85.6	29.0-120	
Phenol	0.666	0.464	69.7	28.0-120	
1,2,4,5-Tetrachlorobenzene	0.666	0.475	71.3	30.0-120	
2,4,5-Trichlorophenol	0.666	0.614	92.2	38.0-120	
2,4,6-Trichlorophenol	0.666	0.565	84.8	37.0-120	
(S) Nitrobenzene-d5			*58.9*	*10.0-122*	
(S) 2-Fluorobiphenyl			*70.6*	*15.0-120*	
(S) p-Terphenyl-d14			*73.3*	*10.0-120*	
(S) Phenol-d5			*70.6*	*10.0-120*	
(S) 2-Fluorophenol			*81.7*	*12.0-120*	
(S) 2,4,6-Tribromophenol			*88.3*	*10.0-127*	

L1142548-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1142548-03 09/28/19 01:39 • (MS) R3455468-3 09/28/19 01:58 • (MSD) R3455468-4 09/28/19 02:18

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Acenaphthene	0.666	ND	0.427	0.427	64.1	64.1	2	18.0-120			0.000	32
Acenaphthylene	0.666	ND	0.449	0.436	67.4	65.5	2	25.0-120			2.94	32
Acetophenone	0.666	ND	0.408	0.381	61.3	57.2	2	10.0-120			6.84	37
Anthracene	0.666	ND	0.453	0.467	68.0	70.1	2	22.0-120			3.04	29
Atrazine	0.666	ND	0.455	0.482	68.3	72.4	2	20.0-131			5.76	28
Benzaldehyde	0.666	ND	0.537	0.439	80.6	65.9	2	10.0-160			20.1	40
Benzo(a)anthracene	0.666	ND	0.465	0.487	69.8	73.1	2	25.0-120			4.62	29
Benzo(b)fluoranthene	0.666	ND	0.443	0.463	66.5	69.5	2	19.0-122			4.42	31
Benzo(k)fluoranthene	0.666	ND	0.423	0.437	63.5	65.6	2	23.0-120			3.26	30
Benzo(g,h,i)perylene	0.666	ND	0.455	0.463	68.3	69.5	2	10.0-120			1.74	33
Benzo(a)pyrene	0.666	ND	0.468	0.494	70.3	74.2	2	24.0-120			5.41	30
Biphenyl	0.666	ND	0.473	0.451	71.0	67.7	2	15.0-120			4.76	33
Bis(2-chlorethoxy)methane	0.666	ND	0.359	0.347	53.9	52.1	2	10.0-120			3.40	34
Bis(2-chloroethyl)ether	0.666	ND	0.395	0.395	59.3	59.3	2	10.0-120			0.000	40
Bis(2-chloroisopropyl)ether	0.666	ND	0.381	0.360	57.2	54.1	2	10.0-120			5.67	40
4-Bromophenyl-phenylether	0.666	ND	0.597	0.591	89.6	88.7	2	27.0-120			1.01	30
Caprolactam	0.666	ND	0.485	0.484	72.8	72.7	2	11.0-141			0.206	31
Carbazole	0.666	ND	0.459	0.469	68.9	70.4	2	31.0-120			2.16	24
4-Chloroaniline	0.666	ND	0.271	0.274	40.7	41.1	2	10.0-120			1.10	36
2-Chloronaphthalene	0.666	ND	0.451	0.442	67.7	66.4	2	20.0-120			2.02	32
4-Chlorophenyl-phenylether	0.666	ND	0.480	0.477	72.1	71.6	2	24.0-120			0.627	29
Chrysene	0.666	ND	0.448	0.468	67.3	70.3	2	21.0-120			4.37	29
Dibenz(a,h)anthracene	0.666	ND	0.599	0.584	89.9	87.7	2	10.0-120			2.54	32
Dibenzofuran	0.666	ND	0.454	0.451	68.2	67.7	2	24.0-120			0.663	30
3,3-Dichlorobenzidine	1.33	ND	0.618	0.663	46.5	49.8	2	10.0-120			7.03	34
2,4-Dinitrotoluene	0.666	ND	0.458	0.467	68.8	70.1	2	30.0-120			1.95	31
2,6-Dinitrotoluene	0.666	ND	0.483	0.471	72.5	70.7	2	25.0-120			2.52	31
Fluoranthene	0.666	ND	0.482	0.499	72.4	74.9	2	18.0-126			3.47	32
Fluorene	0.666	ND	0.443	0.451	66.5	67.7	2	25.0-120			1.79	30
Hexachlorobenzene	0.666	ND	0.483	0.519	72.5	77.9	2	27.0-120			7.19	28
Hexachloro-1,3-butadiene	0.666	ND	0.428	0.429	64.3	64.4	2	10.0-120			0.233	38
Hexachlorocyclopentadiene	0.666	ND	ND	ND	0.000	0.000	2	10.0-120	J6	J6	0.000	40
Hexachloroethane	0.666	ND	0.375	0.337	56.3	50.6	2	10.0-120			10.7	40
Indeno(1,2,3-cd)pyrene	0.666	ND	0.489	0.491	73.4	73.7	2	10.0-120			0.408	32
Isophorone	0.666	ND	0.355	0.333	53.3	50.0	2	13.0-120			6.40	34
2-Methylnaphthalene	0.666	0.127	0.476	0.462	52.4	50.3	2	10.0-120			2.99	37
Naphthalene	0.666	ND	0.411	0.406	61.7	61.0	2	10.0-120			1.22	35
2-Nitroaniline	0.666	ND	0.525	0.501	78.8	75.2	2	24.0-120			4.68	30
3-Nitroaniline	0.666	ND	0.413	0.492	62.0	73.9	2	11.0-120			17.5	32
4-Nitroaniline	0.666	ND	0.395	0.413	59.3	62.0	2	15.0-120			4.46	31

Semi Volatile Organic Compounds (GC/MS) by Method 8270C L1142548-01,02,03

L1142548-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1142548-03 09/28/19 01:39 • (MS) R3455468-3 09/28/19 01:58 • (MSD) R3455468-4 09/28/19 02:18

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Nitrobenzene	0.666	ND	0.376	0.351	56.5	52.7	2	10.0-120			6.88	36
n-Nitrosodiphenylamine	0.666	ND	0.489	0.492	73.4	73.9	2	17.0-120			0.612	29
n-Nitrosodi-n-propylamine	0.666	ND	0.358	0.345	53.8	51.8	2	10.0-120			3.70	37
Phenanthrene	0.666	ND	0.480	0.499	72.1	74.9	2	17.0-120			3.88	31
Benzylbutyl phthalate	0.666	ND	0.452	0.496	67.9	74.5	2	23.0-120			9.28	30
Bis(2-ethylhexyl)phthalate	0.666	ND	0.455	0.455	68.3	68.3	2	17.0-126			0.000	30
Di-n-butyl phthalate	0.666	ND	0.485	0.498	72.8	74.8	2	30.0-120			2.64	29
Diethyl phthalate	0.666	ND	0.430	0.436	64.6	65.5	2	26.0-120			1.39	28
Dimethyl phthalate	0.666	ND	0.436	0.430	65.5	64.6	2	25.0-120			1.39	29
Di-n-octyl phthalate	0.666	ND	0.496	0.511	74.5	76.7	2	21.0-123			2.98	29
Pyrene	0.666	ND	0.418	0.456	62.8	68.5	2	16.0-121			8.70	32
4-Chloro-3-methylphenol	0.666	ND	0.422	0.434	63.4	65.2	2	15.0-120			2.80	30
2-Chlorophenol	0.666	ND	0.460	0.425	69.1	63.8	2	15.0-120			7.91	37
2-Methylphenol	0.666	ND	0.565	0.471	84.8	70.7	2	11.0-120			18.1	40
3&4-Methyl Phenol	0.666	ND	0.502	0.468	75.4	70.3	2	12.0-123			7.01	38
2,4-Dichlorophenol	0.666	ND	0.461	0.464	69.2	69.7	2	20.0-120			0.649	31
2,4-Dimethylphenol	0.666	ND	0.402	0.387	60.4	58.1	2	10.0-120			3.80	33
4,6-Dinitro-2-methylphenol	0.666	ND	ND	ND	0.000	0.000	2	10.0-120	J6	J6	0.000	39
2,4-Dinitrophenol	0.666	ND	ND	ND	0.000	0.000	2	10.0-121	J6	J6	0.000	40
2-Nitrophenol	0.666	ND	0.465	0.447	69.8	67.1	2	12.0-120			3.95	39
4-Nitrophenol	0.666	ND	0.463	0.481	69.5	72.2	2	10.0-137			3.81	32
Pentachlorophenol	0.666	ND	0.383	0.533	57.5	80.0	2	10.0-160		J3	32.8	31
Phenol	0.666	ND	0.425	0.390	63.8	58.6	2	12.0-120			8.59	38
1,2,4,5-Tetrachlorobenzene	0.666	ND	0.494	0.511	74.2	76.7	2	14.0-120			3.38	36
2,4,5-Trichlorophenol	0.666	ND	0.584	0.582	87.7	87.4	2	20.0-120			0.343	30
2,4,6-Trichlorophenol	0.666	ND	0.524	0.537	78.7	80.6	2	19.0-120			2.45	32
(S) Nitrobenzene-d5					*55.6*	*54.7*		*10.0-122*				
(S) 2-Fluorobiphenyl					*68.2*	*64.9*		*15.0-120*				
(S) p-Terphenyl-d14					*70.9*	*85.6*		*10.0-120*				
(S) Phenol-d5					*65.5*	*60.1*		*10.0-120*				
(S) 2-Fluorophenol					*77.1*	*70.3*		*12.0-120*				
(S) 2,4,6-Tribromophenol					*89.7*	*95.4*		*10.0-127*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

(dry)	Results are reported based on the dry weight of the sample. (this will only be present on a dry report basis for soils)
MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J3	The associated batch QC was outside the established quality control range for precision.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.

ACCREDITATIONS & LOCATIONS

ONE LAB. NATIONWIDE.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP.	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky [1,5]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1,4]	2006
Louisiana [1]	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

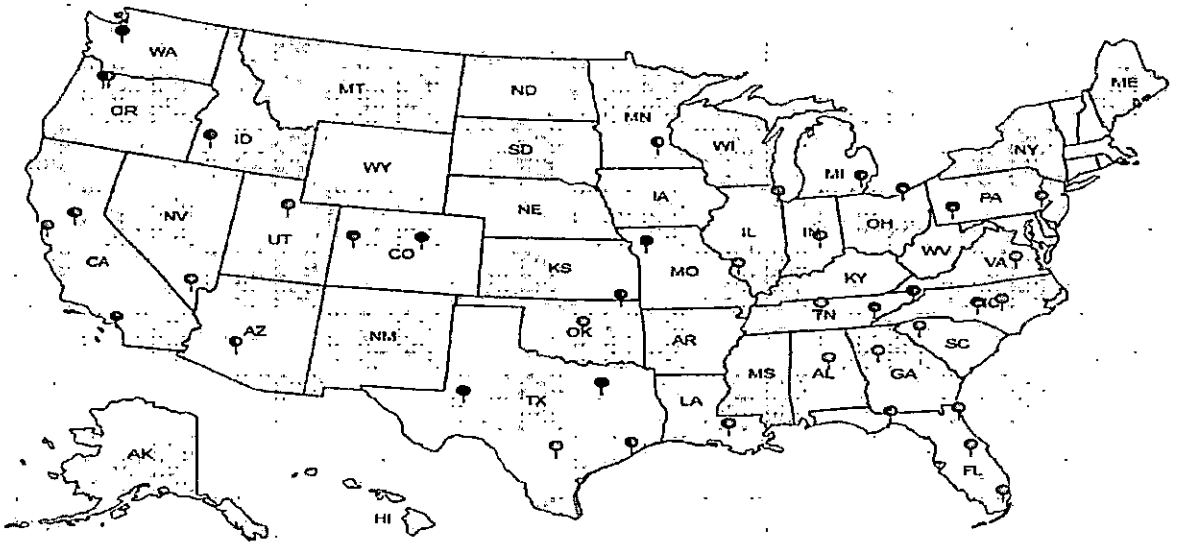
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975
FAX: 505-345-4107
Website: www.hallenvironmental.com

D165

L1142548

SUB CONTRATOR: ESC PACE	COMPANY: ESC PACE	PHONE: (800) 767-5859	FAX: (615) 758-5859
ADDRESS: 12065 Lebanon Rd		ACCOUNT #:	EMAIL:
CITY, STATE, ZIP: Mt. Juliet, TN 37122			

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS	
1	1909B72-001B	Cell #1 Treatment Comp	4OZGU	Soil	9/20/2019 2:08:00 PM	1	8270: Atrazine and Pentachlorophenol, Total CN, Phenols by 9065,	-01
2	1909B72-002B	Cell #2N Treatment Comp	4OZGU	Soil	9/20/2019 2:45:00 PM	1	8270: Atrazine and Pentachlorophenol, Total CN, Phenols by 9065,	-02
3	1909B72-003B	Cell #2S Treatment Comp	4OZGU	Soil	9/20/2019 2:20:00 PM	1	8270: Atrazine and Pentachlorophenol, Total CN, Phenols by 9065,	-03

RAD SCREEN: <0.5 mR/hr

SPECIAL INSTRUCTIONS / COMMENTS:

Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

Relinquished By: [signature]	Date: 9/23/2019	Time: 3:16 PM	Received By: [signature]	Date: 9/24/19	Time: 9:00
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

TAT: Standard ☐ RUSH Next BD ☐ 2nd BD ☐ 3rd BD ☐

REPORT TRANSMITTAL DESIRED:
☐ HARDCOPY (extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY

Temp of samples 0.9+0=0.9 AS CS Attempt to Cool ?

Comments:

4510 1160 9859 TOH1-1

Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client: HALLENIANM	L114-2548	
Cooler Received/Opened On: 9/24/19 Temperature:	0.9	
Received By: Cole Medley		
Signature:		

Receipt Check List	NP	Yes	No
COC Seal Present / Intact?			
COC Signed/ Accurate?			
Bottles arrive intact?			
correct bottles used?			
Sufficient volume sent?			
If Applicable			
VOA Zero headspace?			
Preservation correct/ Checked?			

Pace Analytical
www.pacelabs.com

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

November 05, 2019

Ms. Anne Thorne
Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109

RE: Project: 1909B72
Pace Project No.: 30327365

Dear Ms. Thorne:
Enclosed are the analytical results for sample(s) received by the laboratory on October 02, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jacquelyn Collins
jacquelyn.collins@pacelabs.com
(724)850-5612
Project Manager

Enclosures

cc: Ms. Jackie Ball, Hall Environmental Analysis Laboratory
Felicia Candelario, Hall Environmental Analysis Laboratory
Michelle Garcia, Hall Environmental Analysis Laboratory

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: 1909B72
Pace Project No.: 30327365

Pennsylvania Certification IDs
1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: 1909B72
Pace Project No.: 30327365

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30327365001	1909B72-001C Cell #1 Treatment	Solid	09/20/19 14:08	10/02/19 09:30
30327365002	1909B72-002C Cell #2N Treatmen	Solid	09/20/19 14:45	10/02/19 09:30
30327365003	1909B72-003C Cell #2S Treatmen	Solid	09/20/19 14:20	10/02/19 09:30

Pace Analytical®
www.pacelabs.com

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: 1909B72
Pace Project No.: 30327365

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30327365001	1909B72-001C Cell #1 Treatment	EPA 901.1	MAH	2	PASI-PA
30327365002	1909B72-002C Cell #2N Treatmen	EPA 901.1	MAH	2	PASI-PA
30327365003	1909B72-003C Cell #2S Treatmen	EPA 901.1	MAH	2	PASI-PA

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Pace Analytical Services, LLC
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Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: 1909B72
Pace Project No.: 30327365

Method: EPA 901.1
Description: 901.1 Gamma Spec INGROWTH
Client: Hall Environmental Analysis Laboratory
Date: November 05, 2019

General Information:
3 samples were analyzed for EPA 901.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 1909B72
Pace Project No.: 30327365

Sample: 1909B72-001C Cell #1 Treatment Lab ID: 30327365001 Collected: 09/20/19 14:08 Received: 10/02/19 09:30 Matrix: Solid
PWS: Site ID: Sample Type:
Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1	**2.538 ± 0.450 (0.345) C:NA T:NA**	pCi/g	11/05/19 11:05	13982-63-3	Ra
Radium-228	EPA 901.1	**1.712 ± 0.501 (0.389) C:NA T:NA**	pCi/g	11/05/19 11:05	15262-20-1	

Sample: 1909B72-002C Cell #2N Treatmen Lab ID: 30327365002 Collected: 09/20/19 14:45 Received: 10/02/19 09:30 Matrix: Solid
PWS: Site ID: Sample Type:
Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1	**3.388 ± 0.665 (0.282) C:NA T:NA**	pCi/g	11/05/19 10:10	13982-63-3	Ra
Radium-228	EPA 901.1	**1.387 ± 0.415 (0.407) C:NA T:NA**	pCi/g	11/05/19 10:10	15262-20-1	

Sample: 1909B72-003C Cell #2S Treatmen Lab ID: 30327365003 Collected: 09/20/19 14:20 Received: 10/02/19 09:30 Matrix: Solid
PWS: Site ID: Sample Type:
Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1	**2.732 ± 0.603 (0.349) C:NA T:NA**	pCi/g	11/05/19 10:27	13982-63-3	Ra
Radium-228	EPA 901.1	**1.041 ± 0.609 (0.783) C:NA T:NA**	pCi/g	11/05/19 10:27	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 1909B72
Pace Project No.: 30327365

QC Batch: 368817
QC Batch Method: EPA 901.1
Associated Lab Samples: 30327365001

Analysis Method: EPA 901.1
Analysis Description: 901,1 Gamma Spec Ingrowth

METHOD BLANK: 1789509
Associated Lab Samples: 30327365001

Matrix: Solid

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.002 ± 0.225 (0.262) C:NA T:NA	pCi/g	11/05/19 13:47	Ra
Radium-228	0.136 ± 0.267 (0.323) C:NA T:NA	pCi/g	11/05/19 13:47	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 1909B72
Pace Project No.: 30327365

QC Batch: 368061 Analysis Method: EPA 901.1
QC Batch Method: EPA 901.1 Analysis Description: 901.1 Gamma Spec Ingrowth
Associated Lab Samples: 30327365002, 30327365003

METHOD BLANK: 1786118 Matrix: Solid
Associated Lab Samples: 30327365002, 30327365003

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.542 ± 0.181 (0.147) C:NA T:NA	pCi/g	11/05/19 10:44	Ra
Radium-228	0.113 ± 0.096 (0.167) C:NA T:NA	pCi/g	11/05/19 10:44	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: 1909B72
Pace Project No.: 30327365

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

ANALYTE QUALIFIERS

Ra The reported Ra-226 results were determined by hermetically sealing the dried, processed sample in an appropriate-sized can. Each sample was stored for a minimum of 21 days to ensure that equilibrium between Ra-226 and daughters Bi-214 and Pb-214 was achieved. Reported Ra-226 results were inferred from gamma peaks attributable to Bi-214 and Pb-214.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975
FAX: 505-345-4107
Website: www.hallenvironmental.com

SUB CONTRATOR:	Pace Analytical-PA	COMPANY: Pace Analytical Services, Inc.	PHONE: (724) 850-5600	FAX: (724) 850-5601	
ADDRESS:	1638 Roseytown Rd Ste 2,3,4		ACCOUNT #:	EMAIL:	
CITY, STATE, ZIP:	Greensburg, PA 15601				

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS	
1	1909B72-001C	Cell #1 Treatment Comp	4OZGU	Soil	9/20/2019 2:08:00 PM	1	RADIUM 226/228	001
2	1909B72-002C	Cell #2N Treatment Comp	4OZGU	Soil	9/20/2019 2:45:00 PM	1	RADIUM 226/228	002
3	1909B72-003C	Cell #2S Treatment Comp	4OZGU	Soil	9/20/2019 2:20:00 PM	1	RADIUM 226/228	003

WO#: 30327365

30327365

SPECIAL INSTRUCTIONS / COMMENTS:

Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

Relinquished By:	Date: 9/23/2019	Time: 3:50 PM	Received By:	Date: 10-2-19	Time: 0830
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

TAT: Standard ☑ RUSH Next BD ☐ 2nd BD: ☐ 3rd BD ☐

REPORT TRANSMITTAL DESIRED:
☐ HARDCOPY (extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY
Temp of samples _____ °C Attempt to Cool? _____
Comments: _____

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical® Client Name: Hall Env. Project # # 30327365

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Label ET
LIMS Login ET

Tracking #: 7704 3192 9133

Custody Seal on Cooler/Box Present: ☑ yes ☐ no Seals Intact: ☑ yes ☐ no

Thermometer Used N/A Type of Ice: Wet Blue (None)

Cooler Temperature Observed Temp _____ °C Correction Factor: — °C Final Temp: — °C

Temp should be above freezing to 6°C

Comments:	Yes	No	N/A	pH paper Lot# N/A	Date and Initials of person examining contents: ET 10-2-19
Chain of Custody Present:	✓			1.	
Chain of Custody Filled Out:	✓			2.	
Chain of Custody Relinquished:	✓			3.	
Sampler Name & Signature on COC:		✓		4.	
Sample Labels match COC: -Includes date/time/ID Matrix: SL	✓			5.	
Samples Arrived within Hold Time:	✓			6.	
Short Hold Time Analysis (<72hr remaining):		✓		7.	
Rush Turn Around Time Requested:		✓		8.	
Sufficient Volume:	✓			9.	
Correct Containers Used: -Pace Containers Used:	✓			10.	
Containers Intact:	✓			11.	
Orthophosphate field filtered			✓	12.	
Hex Cr Aqueous sample field filtered			✓	13.	
Organic Samples checked for dechlorination:			✓	14.	
Filtered volume received for Dissolved tests			✓	15.	
All containers have been checked for preservation. exceptions: VOA, coliform, TOC, O&G, Phenolics, Radon, Non-aqueous matrix			✓	16.	
All containers meet method preservation requirements.	✓			Initial when completed ET	Date/time of preservation
				Lot # of added preservative	
Headspace in VOA Vials (>6mm):			✓	17.	
Trip Blank Present:		✓		18.	
Trip Blank Custody Seals Present		✓			
Rad Samples Screened < 0.5 mrem/hr	✓			Initial when completed: ET	Date: 10-2-19

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

☐ **A check in this box indicates that additional information has been stored in ereports.**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1909B72

06-Nov-19

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: MB-47714	SampType: mblk	TestCode: EPA Method 300.0: Anions
Client ID: PBS	Batch ID: 47714	RunNo: 63185
Prep Date: 9/25/2019	Analysis Date: 9/25/2019	SeqNo: 2157006 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								
Nitrogen, Nitrite (As N)	ND	0.30								
Nitrogen, Nitrate (As N)	ND	0.30								
Sulfate	ND	1.5								

Sample ID: LCS-47714	SampType: lcs	TestCode: EPA Method 300.0: Anions
Client ID: LCSS	Batch ID: 47714	RunNo: 63185
Prep Date: 9/25/2019	Analysis Date: 9/25/2019	SeqNo: 2157008 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	96.1	90	110			
Nitrogen, Nitrite (As N)	2.9	0.30	3.000	0	97.7	90	110			
Nitrogen, Nitrate (As N)	7.5	0.30	7.500	0	99.8	90	110			
Sulfate	29	1.5	30.00	0	97.3	90	110			

Sample ID: MB-47714	SampType: mblk	TestCode: EPA Method 300.0: Anions
Client ID: PBS	Batch ID: 47714	RunNo: 63261
Prep Date: 9/25/2019	Analysis Date: 9/27/2019	SeqNo: 2159905 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.30								
Chloride	ND	1.5								
Nitrogen, Nitrite (As N)	ND	0.30								
Nitrogen, Nitrate (As N)	ND	0.30								
Sulfate	ND	1.5								

Sample ID: LCS-47714	SampType: lcs	TestCode: EPA Method 300.0: Anions
Client ID: LCSS	Batch ID: 47714	RunNo: 63261
Prep Date: 9/25/2019	Analysis Date: 9/27/2019	SeqNo: 2159906 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	1.6	0.30	1.500	0	107	90	110			
Chloride	14	1.5	15.00	0	95.1	90	110			
Nitrogen, Nitrite (As N)	3.0	0.30	3.000	0	99.5	90	110			
Nitrogen, Nitrate (As N)	7.4	0.30	7.500	0	99.2	90	110			
Sulfate	30	1.5	30.00	0	99.0	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1909B72**

06-Nov-19

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: **MB-47675**	SampType: **MBLK**	TestCode: **EPA Method 8011/504.1 Modified: EDB**
Client ID: **PBS**	Batch ID: **47675**	RunNo: **63161**
Prep Date: **9/24/2019**	Analysis Date: **9/24/2019**	SeqNo: **2154641** Units: **µg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.10								

Sample ID: **LCS-47675**	SampType: **LCS**	TestCode: **EPA Method 8011/504.1 Modified: EDB**
Client ID: **LCSS**	Batch ID: **47675**	RunNo: **63161**
Prep Date: **9/24/2019**	Analysis Date: **9/24/2019**	SeqNo: **2154642** Units: **µg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	1.1	0.10	1.000	0	111	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- B Analyte detected in the associated Method Blank
- D Sample Diluted Due to Matrix
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- PQL Practical Quanitative Limit
- RL Reporting Limit
- S % Recovery outside of range due to dilution or matrix

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1909B72

06-Nov-19

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: LCS-47655	SampType: LCS	TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: LCSS	Batch ID: 47655	RunNo: 63141							
Prep Date: 9/23/2019	Analysis Date: 9/24/2019	SeqNo: 2154378	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	52	10	50.00	0	104	63.9	124			
Surr: DNOP	5.2		5.000		104	70	130			

Sample ID: MB-47655	SampType: MBLK	TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: PBS	Batch ID: 47655	RunNo: 63141							
Prep Date: 9/23/2019	Analysis Date: 9/24/2019	SeqNo: 2154379	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	11		10.00		106	70	130			

Sample ID: LCS-47676	SampType: LCS	TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: LCSS	Batch ID: 47676	RunNo: 63182							
Prep Date: 9/24/2019	Analysis Date: 9/25/2019	SeqNo: 2155730	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	52	10	50.00	0	105	63.9	124			
Surr: DNOP	4.5		5.000		89.6	70	130			

Sample ID: MB-47676	SampType: MBLK	TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: PBS	Batch ID: 47676	RunNo: 63182							
Prep Date: 9/24/2019	Analysis Date: 9/25/2019	SeqNo: 2155731	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	9.7		10.00		96.8	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1909B72

06-Nov-19

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: MB-47650	SampType: MBLK	TestCode: EPA Method 8015D: Gasoline Range
Client ID: PBS	Batch ID: 47650	RunNo: 63162
Prep Date: 9/23/2019	Analysis Date: 9/24/2019	SeqNo: 2154661 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	910		1000		90.8	77.4	118			

Sample ID: LCS-47650	SampType: LCS	TestCode: EPA Method 8015D: Gasoline Range
Client ID: LCSS	Batch ID: 47650	RunNo: 63162
Prep Date: 9/23/2019	Analysis Date: 9/24/2019	SeqNo: 2154662 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27	5.0	25.00	0	108	80	120			
Surr: BFB	1000		1000		104	77.4	118			

Sample ID: MB-47691	SampType: MBLK	TestCode: EPA Method 8015D: Gasoline Range
Client ID: PBS	Batch ID: 47691	RunNo: 63199
Prep Date: 9/24/2019	Analysis Date: 9/25/2019	SeqNo: 2156070 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	960		1000		95.9	77.4	118			

Sample ID: LCS-47691	SampType: LCS	TestCode: EPA Method 8015D: Gasoline Range
Client ID: LCSS	Batch ID: 47691	RunNo: 63199
Prep Date: 9/24/2019	Analysis Date: 9/25/2019	SeqNo: 2156071 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27	5.0	25.00	0	108	80	120			
Surr: BFB	1100		1000		111	77.4	118			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1909B72

06-Nov-19

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: MB-47656	SampType: MBLK	TestCode: EPA Method 8082A: PCB's							
Client ID: PBS	Batch ID: 47656	RunNo: 63314							
Prep Date: 9/23/2019	Analysis Date: 9/30/2019	SeqNo: 2160689	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aroclor 1016	ND	0.025								
Aroclor 1221	ND	0.025								
Aroclor 1232	ND	0.025								
Aroclor 1242	ND	0.025								
Aroclor 1248	ND	0.025								
Aroclor 1254	ND	0.025								
Aroclor 1260	ND	0.025								
Surr: Decachlorobiphenyl	0.032		0.06250		50.8	25.7	135			
Surr: Tetrachloro-m-xylene	0.032		0.06250		50.8	32.3	138			

Sample ID: LCS-47656	SampType: LCS	TestCode: EPA Method 8082A: PCB's							
Client ID: LCSS	Batch ID: 47656	RunNo: 63314							
Prep Date: 9/23/2019	Analysis Date: 9/30/2019	SeqNo: 2160690	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aroclor 1016	0.10	0.025	0.1250	0	83.7	32	156			
Aroclor 1260	0.081	0.025	0.1250	0	64.7	32.2	111			
Surr: Decachlorobiphenyl	0.037		0.06250		59.2	25.7	135			
Surr: Tetrachloro-m-xylene	0.037		0.06250		59.6	32.3	138			

Sample ID: MB-47656	SampType: MBLK	TestCode: EPA Method 8082A: PCB's							
Client ID: PBS	Batch ID: 47656	RunNo: 63314							
Prep Date: 9/23/2019	Analysis Date: 9/30/2019	SeqNo: 2160772	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aroclor 1016	ND	0.025								
Aroclor 1221	ND	0.025								
Aroclor 1232	ND	0.025								
Aroclor 1242	ND	0.025								
Aroclor 1248	ND	0.025								
Aroclor 1254	ND	0.025								
Aroclor 1260	ND	0.025								
Surr: Decachlorobiphenyl	0.030		0.06250		48.4	25.7	135			
Surr: Tetrachloro-m-xylene	0.030		0.06250		47.2	32.3	138			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- B Analyte detected in the associated Method Blank
- D Sample Diluted Due to Matrix
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- PQL Practical Quanitative Limit
- RL Reporting Limit
- S % Recovery outside of range due to dilution or matrix

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1909B72**

06-Nov-19

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: **mb-47650**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **47650**	RunNo: **63200**
Prep Date: **9/23/2019**	Analysis Date: **9/25/2019**	SeqNo: **2156134** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Methyl tert-butyl ether (MTBE)	ND	0.050								
1,2,4-Trimethylbenzene	ND	0.050								
1,3,5-Trimethylbenzene	ND	0.050								
1,2-Dichloroethane (EDC)	ND	0.050								
1,2-Dibromoethane (EDB)	ND	0.050								
Naphthalene	ND	0.10								
1-Methylnaphthalene	ND	0.20								
2-Methylnaphthalene	ND	0.20								
Acetone	ND	0.75								
Bromobenzene	ND	0.050								
Bromodichloromethane	ND	0.050								
Bromoform	ND	0.050								
Bromomethane	ND	0.15								
2-Butanone	ND	0.50								
Carbon disulfide	ND	0.50								
Carbon tetrachloride	ND	0.050								
Chlorobenzene	ND	0.050								
Chloroethane	ND	0.10								
Chloroform	ND	0.050								
Chloromethane	ND	0.15								
2-Chlorotoluene	ND	0.050								
4-Chlorotoluene	ND	0.050								
cis-1,2-DCE	ND	0.050								
cis-1,3-Dichloropropene	ND	0.050								
1,2-Dibromo-3-chloropropane	ND	0.10								
Dibromochloromethane	ND	0.050								
Dibromomethane	ND	0.050								
1,2-Dichlorobenzene	ND	0.050								
1,3-Dichlorobenzene	ND	0.050								
1,4-Dichlorobenzene	ND	0.050								
Dichlorodifluoromethane	ND	0.050								
1,1-Dichloroethane	ND	0.050								
1,1-Dichloroethene	ND	0.050								
1,2-Dichloropropane	ND	0.050								
1,3-Dichloropropane	ND	0.050								
2,2-Dichloropropane	ND	0.10								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1909B72

06-Nov-19

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: mb-47650	SampType: MBLK	TestCode: EPA Method 8260B: Volatiles
Client ID: PBS	Batch ID: 47650	RunNo: 63200
Prep Date: 9/23/2019	Analysis Date: 9/25/2019	SeqNo: 2156134 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloropropene	ND	0.10								
Hexachlorobutadiene	ND	0.10								
2-Hexanone	ND	0.50								
Isopropylbenzene	ND	0.050								
4-Isopropyltoluene	ND	0.050								
4-Methyl-2-pentanone	ND	0.50								
Methylene chloride	ND	0.15								
n-Butylbenzene	ND	0.15								
n-Propylbenzene	ND	0.050								
sec-Butylbenzene	ND	0.050								
Styrene	ND	0.050								
tert-Butylbenzene	ND	0.050								
1,1,1,2-Tetrachloroethane	ND	0.050								
1,1,2,2-Tetrachloroethane	ND	0.050								
Tetrachloroethene (PCE)	ND	0.050								
trans-1,2-DCE	ND	0.050								
trans-1,3-Dichloropropene	ND	0.050								
1,2,3-Trichlorobenzene	ND	0.10								
1,2,4-Trichlorobenzene	ND	0.050								
1,1,1-Trichloroethane	ND	0.050								
1,1,2-Trichloroethane	ND	0.050								
Trichloroethene (TCE)	ND	0.050								
Trichlorofluoromethane	ND	0.050								
1,2,3-Trichloropropane	ND	0.10								
Vinyl chloride	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: Dibromofluoromethane	0.50		0.5000		99.4	70	130			
Surr: 1,2-Dichloroethane-d4	0.48		0.5000		95.2	70	130			
Surr: Toluene-d8	0.52		0.5000		103	70	130			
Surr: 4-Bromofluorobenzene	0.42		0.5000		84.4	70	130			

Sample ID: lcs-47650	SampType: LCS	TestCode: EPA Method 8260B: Volatiles
Client ID: LCSS	Batch ID: 47650	RunNo: 63200
Prep Date: 9/23/2019	Analysis Date: 9/25/2019	SeqNo: 2156140 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.1	0.025	1.000	0	112	68	135			
Toluene	0.97	0.050	1.000	0	96.9	70	130			
Chlorobenzene	0.95	0.050	1.000	0	95.5	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1909B72**

06-Nov-19

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: **lcs-47650**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **LCSS**	Batch ID: **47650**	RunNo: **63200**
Prep Date: **9/23/2019**	Analysis Date: **9/25/2019**	SeqNo: **2156140** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethene	0.89	0.050	1.000	0	88.9	51.1	139			
Trichloroethene (TCE)	0.90	0.050	1.000	0	90.1	70	130			
Surr: Dibromofluoromethane	0.48		0.5000		96.5	70	130			
Surr: 1,2-Dichloroethane-d4	0.49		0.5000		98.5	70	130			
Surr: Toluene-d8	0.49		0.5000		98.7	70	130			
Surr: 4-Bromofluorobenzene	0.43		0.5000		86.1	70	130			

Sample ID: **mb-47691**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **47691**	RunNo: **63200**
Prep Date: **9/24/2019**	Analysis Date: **9/26/2019**	SeqNo: **2156152** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Methyl tert-butyl ether (MTBE)	ND	0.050								
1,2,4-Trimethylbenzene	ND	0.050								
1,3,5-Trimethylbenzene	ND	0.050								
1,2-Dichloroethane (EDC)	ND	0.050								
1,2-Dibromoethane (EDB)	ND	0.050								
Naphthalene	ND	0.10								
1-Methylnaphthalene	ND	0.20								
2-Methylnaphthalene	ND	0.20								
Acetone	ND	0.75								
Bromobenzene	ND	0.050								
Bromodichloromethane	ND	0.050								
Bromoform	ND	0.050								
Bromomethane	ND	0.15								
2-Butanone	ND	0.50								
Carbon disulfide	ND	0.50								
Carbon tetrachloride	ND	0.050								
Chlorobenzene	ND	0.050								
Chloroethane	ND	0.10								
Chloroform	ND	0.050								
Chloromethane	ND	0.15								
2-Chlorotoluene	ND	0.050								
4-Chlorotoluene	ND	0.050								
cis-1,2-DCE	ND	0.050								
cis-1,3-Dichloropropene	ND	0.050								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- B Analyte detected in the associated Method Blank
- D Sample Diluted Due to Matrix
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- PQL Practical Quanitative Limit
- RL Reporting Limit
- S % Recovery outside of range due to dilution or matrix

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1909B72

06-Nov-19

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: **mb-47691**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **47691**	RunNo: **63200**
Prep Date: **9/24/2019**	Analysis Date: **9/26/2019**	SeqNo: **2156152** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromo-3-chloropropane	ND	0.10								
Dibromochloromethane	ND	0.050								
Dibromomethane	ND	0.050								
1,2-Dichlorobenzene	ND	0.050								
1,3-Dichlorobenzene	ND	0.050								
1,4-Dichlorobenzene	ND	0.050								
Dichlorodifluoromethane	ND	0.050								
1,1-Dichloroethane	ND	0.050								
1,1-Dichloroethene	ND	0.050								
1,2-Dichloropropane	ND	0.050								
1,3-Dichloropropane	ND	0.050								
2,2-Dichloropropane	ND	0.10								
1,1-Dichloropropene	ND	0.10								
Hexachlorobutadiene	ND	0.10								
2-Hexanone	ND	0.50								
Isopropylbenzene	ND	0.050								
4-Isopropyltoluene	ND	0.050								
4-Methyl-2-pentanone	ND	0.50								
Methylene chloride	ND	0.15								
n-Butylbenzene	ND	0.15								
n-Propylbenzene	ND	0.050								
sec-Butylbenzene	ND	0.050								
Styrene	ND	0.050								
tert-Butylbenzene	ND	0.050								
1,1,1,2-Tetrachloroethane	ND	0.050								
1,1,2,2-Tetrachloroethane	ND	0.050								
Tetrachloroethene (PCE)	ND	0.050								
trans-1,2-DCE	ND	0.050								
trans-1,3-Dichloropropene	ND	0.050								
1,2,3-Trichlorobenzene	ND	0.10								
1,2,4-Trichlorobenzene	ND	0.050								
1,1,1-Trichloroethane	ND	0.050								
1,1,2-Trichloroethane	ND	0.050								
Trichloroethene (TCE)	ND	0.050								
Trichlorofluoromethane	ND	0.050								
1,2,3-Trichloropropane	ND	0.10								
Vinyl chloride	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: Dibromofluoromethane	0.49		0.5000		97.6	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1909B72**

06-Nov-19

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: **mb-47691**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **47691**	RunNo: **63200**
Prep Date: **9/24/2019**	Analysis Date: **9/26/2019**	SeqNo: **2156152** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	0.49		0.5000		97.8	70	130			
Surr: Toluene-d8	0.50		0.5000		100	70	130			
Surr: 4-Bromofluorobenzene	0.46		0.5000		91.1	70	130			

Sample ID: **lcs-47691**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **LCSS**	Batch ID: **47691**	RunNo: **63200**
Prep Date: **9/24/2019**	Analysis Date: **9/26/2019**	SeqNo: **2156153** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.1	0.025	1.000	0	111	68	135			
Toluene	0.95	0.050	1.000	0	95.0	70	130			
Chlorobenzene	0.95	0.050	1.000	0	95.2	70	130			
1,1-Dichloroethene	0.88	0.050	1.000	0	87.6	51.1	139			
Trichloroethene (TCE)	0.87	0.050	1.000	0	86.8	70	130			
Surr: Dibromofluoromethane	0.48		0.5000		96.5	70	130			
Surr: 1,2-Dichloroethane-d4	0.48		0.5000		96.8	70	130			
Surr: Toluene-d8	0.48		0.5000		96.8	70	130			
Surr: 4-Bromofluorobenzene	0.44		0.5000		87.2	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1909B72

06-Nov-19

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: MB-47657	SampType: MBLK	TestCode: EPA Method 8310: PAHs							
Client ID: PBS	Batch ID: 47657	RunNo: 63201							
Prep Date: 9/23/2019	Analysis Date: 9/26/2019	SeqNo: 2158021	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	ND	0.25								
1-Methylnaphthalene	ND	0.25								
2-Methylnaphthalene	ND	0.25								
Benzo(a)pyrene	ND	0.010								
Surr: Benzo(e)pyrene	0.32		0.5000		63.4	26.5	113			

Sample ID: LCS-47657	SampType: LCS	TestCode: EPA Method 8310: PAHs							
Client ID: LCSS	Batch ID: 47657	RunNo: 63201							
Prep Date: 9/23/2019	Analysis Date: 9/26/2019	SeqNo: 2158022	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	1.2	0.25	2.000	0	62.1	27.2	80.9			
1-Methylnaphthalene	1.4	0.25	2.000	0	71.3	28.9	83.4			
2-Methylnaphthalene	1.3	0.25	2.000	0	66.9	28.7	83.5			
Benzo(a)pyrene	ND	0.010	0.01250	0	60.0	14.4	105			
Surr: Benzo(e)pyrene	0.40		0.5000		80.6	26.5	113			

Sample ID: MB-47657	SampType: MBLK	TestCode: EPA Method 8310: PAHs							
Client ID: PBS	Batch ID: 47657	RunNo: 63201							
Prep Date: 9/23/2019	Analysis Date: 9/26/2019	SeqNo: 2159460	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	ND	0.25								
1-Methylnaphthalene	ND	0.25								
2-Methylnaphthalene	ND	0.25								
Benzo(a)pyrene	ND	0.010								
Surr: Benzo(e)pyrene	0.33		0.5000		66.4	26.5	113			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1909B72

06-Nov-19

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: MB-47745	SampType: MBLK	TestCode: EPA Method 7471: Mercury
Client ID: PBS	Batch ID: 47745	RunNo: 63223
Prep Date: 9/26/2019	Analysis Date: 9/26/2019	SeqNo: 2157391 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.033								

Sample ID: LCS-47745	SampType: LCS	TestCode: EPA Method 7471: Mercury
Client ID: LCSS	Batch ID: 47745	RunNo: 63223
Prep Date: 9/26/2019	Analysis Date: 9/26/2019	SeqNo: 2157392 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.17	0.033	0.1667	0	102	80	120			

Sample ID: LLLCS-47745	SampType: LCSLL	TestCode: EPA Method 7471: Mercury
Client ID: BatchQC	Batch ID: 47745	RunNo: 63223
Prep Date: 9/26/2019	Analysis Date: 9/26/2019	SeqNo: 2157393 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.033	0.006660	0	117	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1909B72**

06-Nov-19

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: **LCS-47733**	SampType: **LCS**	TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **LCSS**	Batch ID: **47733**	RunNo: **63215**
Prep Date: **9/25/2019**	Analysis Date: **9/26/2019**	SeqNo: **2157189** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	25	2.5	25.00	0	101	80	120			
Arsenic	26	2.5	25.00	0	104	80	120			
Barium	25	0.10	25.00	0	100	80	120			
Beryllium	27	0.15	25.00	0	108	80	120			
Cadmium	26	0.10	25.00	0	105	80	120			
Chromium	25	0.30	25.00	0	101	80	120			
Copper	27	0.30	25.00	0	106	80	120			
Iron	27	2.5	25.00	0	107	80	120			
Lead	25	0.25	25.00	0	101	80	120			
Manganese	25	0.10	25.00	0	102	80	120			
Selenium	27	2.5	25.00	0	108	80	120			
Silver	5.2	0.25	5.000	0	104	80	120			
Thallium	25	2.5	25.00	0	98.1	80	120			
Uranium	24	5.0	25.00	0	96.0	80	120			
Zinc	26	2.5	25.00	0	104	80	120			

Sample ID: **MB-47733**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **PBS**	Batch ID: **47733**	RunNo: **63215**
Prep Date: **9/25/2019**	Analysis Date: **9/26/2019**	SeqNo: **2157191** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	ND	2.5								
Arsenic	ND	2.5								
Barium	ND	0.10								
Beryllium	ND	0.15								
Cadmium	ND	0.10								
Chromium	ND	0.30								
Copper	ND	0.30								
Iron	ND	2.5								
Lead	ND	0.25								
Manganese	ND	0.10								
Selenium	ND	2.5								
Silver	ND	0.25								
Thallium	ND	2.5								
Uranium	ND	5.0								
Zinc	ND	2.5								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1909B72**

06-Nov-19

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: **1909B72-001AMS**	SampType: **MS**	TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **Cell #1 Treatment C**	Batch ID: **47733**	RunNo: **63215**
Prep Date: **9/25/2019**	Analysis Date: **9/26/2019**	SeqNo: **2157203** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	6.4	5.0	24.77	0	25.9	75	125			S
Arsenic	26	5.0	24.77	0	106	75	125			
Beryllium	24	0.30	24.77	0.6378	95.8	75	125			
Cadmium	23	0.20	24.77	0	91.0	75	125			
Chromium	32	0.59	24.77	8.995	94.2	75	125			
Copper	39	0.59	24.77	15.09	96.4	75	125			
Lead	34	0.50	24.77	12.82	84.5	75	125			
Manganese	320	0.20	24.77	290.3	116	75	125			
Selenium	25	5.0	24.77	0	102	75	125			
Silver	3.8	0.50	4.955	0	77.3	75	125			
Thallium	16	5.0	24.77	0	65.3	75	125			S
Uranium	ND	9.9	24.77	0	29.4	75	125			S
Zinc	84	5.0	24.77	54.22	122	75	125			

Sample ID: **1909B72-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **Cell #1 Treatment C**	Batch ID: **47733**	RunNo: **63215**
Prep Date: **9/25/2019**	Analysis Date: **9/26/2019**	SeqNo: **2157204** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	6.4	5.0	24.96	0	25.5	75	125	0.994	20	S
Arsenic	26	5.0	24.96	0	106	75	125	0.505	20	
Beryllium	25	0.30	24.96	0.6378	97.4	75	125	2.28	20	
Cadmium	23	0.20	24.96	0	92.0	75	125	1.87	20	
Chromium	33	0.60	24.96	8.995	95.5	75	125	1.52	20	
Copper	40	0.60	24.96	15.09	98.0	75	125	1.44	20	
Lead	34	0.50	24.96	12.82	85.7	75	125	1.31	20	
Manganese	320	0.20	24.96	290.3	100	75	125	1.21	20	
Selenium	26	5.0	24.96	0	105	75	125	3.63	20	
Silver	3.9	0.50	4.992	0	77.1	75	125	0.497	20	
Thallium	17	5.0	24.96	0	68.0	75	125	4.84	20	S
Uranium	10	10	24.96	0	40.1	75	125	31.5	20	RS
Zinc	80	5.0	24.96	54.22	102	75	125	5.83	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: RULE ENGINEERING LL Work Order Number: 1909B72 RcptNo: 1

Received By: Yazmine Garduno 9/21/2019 8:50:00 AM

Completed By: Yazmine Garduno 9/21/2019 12:47:08 PM

Reviewed By: YG 9/23/19

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Courier

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☑
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

#of preserved bottles checked for pH: (<2 or >12 unless noted)
Adjusted?
Checked by: DAD 9/23/19

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date
By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:
Client Instructions:

16. Additional remarks:

17. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.2	Good				

Chain-of-Custody Record

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Client: Rule Engineering	Turn-Around Time: ☒ Standard ☐ Rush
	Project Name: Agua Moss Sunco Landfarm
Mailing Address: 501 Airport Dr. Ste 205 Farmington, NM 87401	Project #:
Phone #: (505) 716-2787	
email or Fax#: hwoods@ruleengineering.com	Project Manager: H. Woods
QA/QC Package: ☒ Standard ☐ Level 4 (Full Validation)	Sampler: H. Woods
Accreditation: ☐ NELAP ☐ Other	On Ice: ☒ Yes ☐ No
☐ EDD (Type)	Sample Temperature: 4.1+0.1=4.2

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No 1909872	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1)	EDB (Method 504.1)	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions (F,Cl,NO3,NO2,PO4,SO4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	See Attached List				Air Bubbles (Y or N)
9/20/19	1406	Soil	Cell #1 Treatment Comp	(3) 4oz Glass	Non	-001	X		X					X				X				
9/20/19	1445	Soil	Cell #2N Treatment Comp	(3) 4oz Glass	Non	-002	X		X					X				X				
9/20/19	1420	Soil	Cell #2S Treatment Comp	(3) 4oz Glass	Non	-003	X		X					X				X				

MS #1 #2

Date:	Time:	Relinquished by:	Received by:	Date	Time
9/20/19	1812	Heath M. Woods	Christ Walt	9/20/19	1812
9/20/19	1837			9/21/19	8:50

Remarks: Direct Bill to Agua Moss Rates per Andy

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
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CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

SUB CONTRATOR: ESC PACE	COMPANY: ESC PACE	PHONE: (800) 767-5859	FAX: (615) 758-5859
ADDRESS: 12065 Lebanon Rd		ACCOUNT #:	EMAIL:
CITY, STATE, ZIP: Mt. Juliet, TN 37122			

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	1909B72-001B	Cell #1 Treatment Comp	4OZGU	Soil	9/20/2019 2:08:00 PM	1	8270: Atrazine and Pentachlorophenol, Total CN, Phenols by 9065, Ra 226/228
2	1909B72-002B	Cell #2N Treatment Comp	4OZGU	Soil	9/20/2019 2:45:00 PM	1	8270: Atrazine and Pentachlorophenol, Total CN, Phenols by 9065, Ra 226/228
3	1909B72-003B	Cell #2S Treatment Comp	4OZGU	Soil	9/20/2019 2:20:00 PM	1	8270: Atrazine and Pentachlorophenol, Total CN, Phenols by 9065, Ra 226/228

SPECIAL INSTRUCTIONS / COMMENTS:

Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

Relinquished By:	Date: 9/23/2019	Time: 11:01 AM	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

TAT: Standard ☐ RUSH Next BD ☐ 2nd BD ☐ 3rd BD ☐

REPORT TRANSMITTAL DESIRED:
☐ HARDCOPY (extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY

Temp of samples: _____ °C Attempt to Cool ? _____

Comments: _____

NMAC 20.6.2 - Groundwater standards:

A. Human Health Standards

(1) Numerical Standards

(a) Antimony (Sb) (CAS 7440-36-0).....0.006 mg/l
(b) Arsenic (As) (CAS 7440-38-2).....0.01 mg/l
(c) Barium (Ba) (CAS 7440-39-3).....2 mg/l
(d) Beryllium (be) (CAS 7440-41-7).....0.004 mg/l
(e) Cadmium (Cd) (CAS 7440-43-9).....0.005 mg/l
(f) Chromium (Cr) (CAS 7440-47-3).....0.05 mg/l
(g) Cyanide (CN) (CAS 57-12-5).....0.2 mg/l
(h) Fluoride (F) (CAS 16984-48-8).....1.6 mg/l
(i) Lead (Pb) (CAS 7439-92-1).....0.015 mg/l
(j) Total Mercury (Hg) (CAS 7439-97-6).....0.002 mg/l
(k) Nitrate (NO_3 as N) (CAS 14797-55-8).....10.0 mg/l
(l) Nitrite (NO_2 as N) (CAS 10102-44-0).....1.0 mg/l
(m) Selenium (Se) (CAS 7782-49-2).....0.05 mg/l
(n) Silver (Ag) (CAS 7440-224).....0.05 mg/l
(o) Thallium (Tl) (CAS 7440-28-0).....0.002 mg/l
(p) Uranium (U) (CAS 7440-61-1).....0.03 mg/l
(q) Radioactivity: Combined Radium-226 (CAS 13982-63-3) and Radium-228 (CAS 15262-20-1).....5 pCi/l
(r) Benzene (CAS 71-43-2).....0.005 mg/l
(s) Polychlorinated biphenyls (PCB's) (CAS 1336-36-3).0.0005 mg/l
(t) Toluene (CAS 108-88-3).....1 mg/l
(u) Carbon Tetrachloride (CAS 56-23-5).....0.005 mg/l
(v) 1,2-dichloroethane (EDC) (CAS 107-06-2).....0.005 mg/l
(w) 1,1-dichloroethylene (1,1-DCE) (CAS 75-35-4).....0.007 mg/l
(x) tetrachloroethylene (PCE) (CAS 127-18-4).....0.005 mg/l
(y) trichloroethylene (TCE) (CAS 79-01-6).....0.005 mg/l
(z) ethylbenzene (CAS 100-41-4).....0.7 mg/l
(aa) total xylenes (CAS 1330-20-7).....0.62 mg/l
(bb) methylene chloride (CAS 75-09-2).....0.005 mg/l
(cc) chloroform (CAS 67-66-3).....0.1 mg/l
(dd) 1,1-dichloroethane (CAS 75-34-3).....0.025 mg/l
(ee) ethylene dibromide (EDB) (CAS 106-93-4).....0.00005 mg/l
(ff) 1,1,1-trichloroethane (CAS 71-55-6).....0.2 mg/l
(gg) 1,1,2-trichloroethane (CAS 79-00-5).....0.005 mg/l
(hh) 1,1,2,2-tetrachloroethane (CAS 79-34-5).....0.01 mg/l
(ii) vinyl chloride (CAS 75-01-4).....0.002 mg/l
(jj) PAHs: total naphthalene (CAS 91-20-3) plus monomethylnaphthalenes ...0.03 mg/l
(kk) benzo-a-pyrene (CAS 50-32-8).....0.0002 mg/l
(ll) cis-1,2-dichloroethene (CAS 156-59-2).....0.07 mg/l
(mm) trans-1,2-dichloroethene (CAS 156-60-5).....0.1 mg/l
(nn) 1,2-dichloropropane (PDC) (CAS 78-87-5).....0.005 mg/l
(oo) styrene (CAS 100-42-5).....0.1 mg/l
(pp) 1,2-dichlorobenzene (CAS 95-50-1).....0.6 mg/l
(qq) 1,4-dichlorobenzene (CAS 106-46-7).....0.075 mg/l
(rr) 1,2,4-trichlorobenzene (CAS 120-82-1).....0.07 mg/l
(ss) pentachlorophenol (CAS 87-86-5).....0.001 mg/l
(tt) atrazine (CAS 1912-24-9).....0.003 mg/l

(2) Standards for Toxic Pollutants. A toxic pollutant shall not be present at a concentration shown by credible scientific data and other evidence appropriate under the Water Quality Act, currently available to the public, to have potential for causing one or more of the following effects upon exposure, ingestion, or assimilation either directly from the environment or indirectly by ingestion through food chains: (1) unreasonably threatens to injure human health, or the health of animals or plants which are commonly hatched, bred, cultivated or protected for use by man for food or economic benefit; as used in this definition injuries to health include death, histopathologic change, clinical symptoms of disease, behavioral abnormalities, genetic mutation, physiological malfunctions or physical deformations in such organisms or their offspring; or (2) creates a lifetime risk of more than one cancer per 100,000 exposed persons.

(3) Standards for Non-Aqueous Phase Liquids. Non-aqueous phase liquid shall not be present floating atop of or immersed within ground water, as can be reasonably measured.

B. Other Standards for Domestic Water Supply

(1) — Chloride (Cl) (CAS 16887-00-6).....250.0 mg/l
(2) — Copper (Cu) (CAS 7440-50-8).....1.0 mg/l
(3) — Iron (Fe) (CAS 7439-89-6).....1.0 mg/l
(4) — Manganese (Mn) (CAS 7439-96-5).....0.2 mg/l
(5) — Phenols .....0.005 mg/l
(6) — Sulfate (SO_4) (CAS 14808-79-8).....600.0 mg/l
(7) Total Dissolved Solids (TDS) TDS.....1000.0 mg/l
(8) — Zinc (Zn) (CAS 7440-66-6).....10.0 mg/l
(9) — pH.....between 6 and 9
(10) Methyl tertiary-butyl ether (MTBE) (CAS 1634-04-4).....0.1 mg/l

Toxic Pollutant data:

(2) "toxic pollutant" means any water contaminant or combination of the water contaminants in the list below

(a) acrolein (CAS 107-02-8)
(b) acrylonitrile (CAS 107-13-1)
(c) benzene and alkylbenzenes
  (i) benzene (CAS 71-43-2)
  (ii) toluene (methylbenzene) (CAS 108-88-3)
  (iii) ethylbenzene (CAS 100-41-4)
  (iv) xylenes (dimethyl benzene isomers): o-xylene (CAS 95-47-6); m-xylene (CAS 108-38-3); and p-xylene (CAS 106-42-3)
  (v) styrene (ethenylbenzene) (CAS 100-42-5)
(d) chlorinated benzenes
  (i) monochlorobenzene (CAS 108-90-7)
  (ii) 1,2-dichlorobenzene (ortho-dichlorobenzene) (CAS 95-50-1)
  (iii) 1,4-dichlorobenzene (para-dichlorobenzene) (CAS 106-46-7)
  (iv) 1,2,4-trichlorobenzene (CAS 120-82-1)
  (v) 1,2,4,5-tetrachlorobenzene (CAS 95-94-3)
  (vi) pentachlorobenzene (CAS 608-93-5)
  (vii) hexachlorobenzene (CAS 118-74-1)
(e) chlorinated phenols
  (i) 2,4-dichlorophenol (CAS 120-83-2)
  (ii) 2,4,5-trichlorophenol (CAS 95-95-4)
  (iii) 2,4,6-trichlorophenol (CAS 88-06-2)
  (iv) pentachlorophenol (PCP) (CAS 87-86-5)
(f) chloroalkyl ethers
  (i) bis (2-chloroethyl) ether (CAS 111-44-4)
  (ii) bis (2-chloroisopropyl) ether (CAS 108-60-1)
  (iii) bis (chloromethyl) ether (CAS 542-88-1)
(g) 1,2-dichloropropane (propylene dichloride, PDC) (CAS 78-87-5)
(h) dichloropropenes (CAS 542-75-6)
(i) 1,4-dioxane (CAS 123-91-1)
(j) halogenated ethanes
  (i) 1,2-dibromoethane (ethylene dibromide, EDB) (CAS 106-93-4)
  (ii) 1,1-dichloroethane (1,1-DCA) (CAS 75-34-3)
  (iii) 1,2-dichloroethane (ethylene dichloride, EDC) (CAS 107-06-2)
  (iv) 1,1,1-trichloroethane (TCA) (CAS 71-55-6)
  (v) 1,1,2-trichloroethane (1,1,2-TCA) (CAS 79-00-5)
  (vi) 1,1,2,2-tetrachloroethane (CAS 79-34-5)
  (vii) hexachloroethane (CAS 67-72-1)
(k) halogenated ethenes
  (i) chlorothene (vinyl chloride) (CAS 75-01-4)
  (ii) 1,1-dichloroethene (1,1-DCE) (CAS 75-35-4)
  (iii) cis-1,2-dichloroethene (cis-1,2-DCE) (CAS 156-59-2)
  (iv) trans-1,2-dichloroethene (trans-1,2-DCE) (CAS 156-60-5)
  (v) trichloroethene (trichloroethylene, TCE) (CAS 79-01-6)
  (vi) tetrachloroethene (perchloroethylene, PCE) (CAS 127-18-4)
(l) halogenated methanes
  (i) bromodichloromethane (CAS 75-27-4)

no of 7/3

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

April 15, 2020

Heather Woods
Rule Engineering LLC
501 Airport Dr., Ste 205
Farmington, NM 87401
TEL: (505) 325-1055
FAX:

RE: Agua Moss Sunco Landfarm OrderNo.: 2003373

Dear Heather Woods:

Hall Environmental Analysis Laboratory received 3 sample(s) on 3/7/2020 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Client Sample ID: Cell 1 Treatment Comp
Project: Agua Moss Sunco Landfarm
Collection Date: 3/6/2020 10:38:00 AM
Lab ID: 2003373-001 **Matrix:** SOIL
Received Date: 3/7/2020 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	9.2	3.0		mg/Kg	5	3/22/2020 8:50:28 AM	51249
Chloride	ND	15		mg/Kg	5	3/22/2020 8:50:28 AM	51249
Nitrogen, Nitrite (As N)	ND	3.0		mg/Kg	5	3/22/2020 8:50:28 AM	51249
Nitrogen, Nitrate (As N)	9.6	3.0		mg/Kg	5	3/22/2020 8:50:28 AM	51249
Sulfate	100	15		mg/Kg	5	3/22/2020 8:50:28 AM	51249
EPA METHOD 7471: MERCURY						Analyst: **JLF**	
Mercury	0.43	0.16		mg/Kg	5	3/17/2020 4:21:11 PM	51155
EPA METHOD 6010B: SOIL METALS						Analyst: **rde**	
Antimony	ND	5.0		mg/Kg	2	3/17/2020 3:12:41 PM	51057
Arsenic	ND	5.0		mg/Kg	2	3/17/2020 5:33:36 PM	51057
Barium	1500	0.99		mg/Kg	10	3/17/2020 3:34:34 PM	51057
Beryllium	0.67	0.30		mg/Kg	2	3/17/2020 3:12:41 PM	51057
Cadmium	ND	0.20		mg/Kg	2	3/17/2020 3:12:41 PM	51057
Chromium	9.9	0.60		mg/Kg	2	3/17/2020 3:12:41 PM	51057
Copper	16	0.60		mg/Kg	2	3/17/2020 3:12:41 PM	51057
Iron	14000	250		mg/Kg	100	3/23/2020 11:37:43 AM	51057
Lead	12	0.50		mg/Kg	2	3/23/2020 1:36:49 PM	51057
Manganese	280	0.20		mg/Kg	2	3/17/2020 3:12:41 PM	51057
Selenium	ND	5.0		mg/Kg	2	3/23/2020 1:36:49 PM	51057
Silver	ND	0.50		mg/Kg	2	3/17/2020 3:12:41 PM	51057
Uranium	ND	9.9		mg/Kg	2	3/17/2020 3:12:41 PM	51057
Zinc	46	5.0		mg/Kg	2	3/17/2020 5:33:36 PM	51057
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Surr: BFB	96.1	70-130		%Rec	1	3/12/2020 3:42:20 AM	51006
EPA METHOD 8011/504.1 MODIFIED: EDB						Analyst: **JME**	
1,2-Dibromoethane	ND	0.10		µg/Kg	1	3/18/2020 11:40:51 AM	51177
EPA METHOD 8082A: PCB'S						Analyst: **TOM**	
Aroclor 1016	ND	0.025		mg/Kg	1	3/17/2020 7:32:25 PM	51020
Aroclor 1221	ND	0.025		mg/Kg	1	3/17/2020 7:32:25 PM	51020
Aroclor 1232	ND	0.025		mg/Kg	1	3/17/2020 7:32:25 PM	51020
Aroclor 1242	ND	0.025		mg/Kg	1	3/17/2020 7:32:25 PM	51020
Aroclor 1248	ND	0.025		mg/Kg	1	3/17/2020 7:32:25 PM	51020
Aroclor 1254	ND	0.025		mg/Kg	1	3/17/2020 7:32:25 PM	51020
Aroclor 1260	ND	0.025		mg/Kg	1	3/17/2020 7:32:25 PM	51020
Surr: Decachlorobiphenyl	60.8	15-129		%Rec	1	3/17/2020 7:32:25 PM	51020
Surr: Tetrachloro-m-xylene	75.6	16.1-131		%Rec	1	3/17/2020 7:32:25 PM	51020

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Client Sample ID: Cell 1 Treatment Comp
Project: Agua Moss Sunco Landfarm
Collection Date: 3/6/2020 10:38:00 AM
Lab ID: 2003373-001 **Matrix:** SOIL
Received Date: 3/7/2020 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	92	50		mg/Kg	5	3/13/2020 5:07:47 PM	51025
Motor Oil Range Organics (MRO)	350	250		mg/Kg	5	3/13/2020 5:07:47 PM	51025
Surr: DNOP	101	55.1-146		%Rec	5	3/13/2020 5:07:47 PM	51025
EPA METHOD 8310: PAHS						Analyst: **TOM**	
Naphthalene	ND	0.25		mg/Kg	1	3/23/2020 12:02:28 PM	51129
1-Methylnaphthalene	ND	0.25		mg/Kg	1	3/23/2020 12:02:28 PM	51129
2-Methylnaphthalene	0.40	0.25		mg/Kg	1	3/23/2020 12:02:28 PM	51129
Benzo(a)pyrene	ND	0.010		mg/Kg	1	3/23/2020 12:02:28 PM	51129
Surr: Benzo(e)pyrene	78.0	29-98.8		%Rec	1	3/23/2020 12:02:28 PM	51129
EPA METHOD 8260B: VOLATILES						Analyst: **JMR**	
Benzene	ND	0.025		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Toluene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Ethylbenzene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Methyl tert-butyl ether (MTBE)	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,2,4-Trimethylbenzene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,3,5-Trimethylbenzene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,2-Dichloroethane (EDC)	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,2-Dibromoethane (EDB)	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Naphthalene	ND	0.099		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1-Methylnaphthalene	ND	0.20		mg/Kg	1	3/12/2020 3:42:20 AM	51006
2-Methylnaphthalene	ND	0.20		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Acetone	ND	0.74		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Bromobenzene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Bromodichloromethane	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Bromoform	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Bromomethane	ND	0.15		mg/Kg	1	3/12/2020 3:42:20 AM	51006
2-Butanone	ND	0.49		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Carbon disulfide	ND	0.49		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Carbon tetrachloride	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Chlorobenzene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Chloroethane	ND	0.099		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Chloroform	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Chloromethane	ND	0.15		mg/Kg	1	3/12/2020 3:42:20 AM	51006
2-Chlorotoluene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
4-Chlorotoluene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
cis-1,2-DCE	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
cis-1,3-Dichloropropene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,2-Dibromo-3-chloropropane	ND	0.099		mg/Kg	1	3/12/2020 3:42:20 AM	51006

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Project: Agua Moss Sunco Landfarm
Lab ID: 2003373-001 **Matrix:** SOIL

Client Sample ID: Cell 1 Treatment Comp
Collection Date: 3/6/2020 10:38:00 AM
Received Date: 3/7/2020 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **JMR**	
Dibromochloromethane	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Dibromomethane	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,2-Dichlorobenzene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,3-Dichlorobenzene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,4-Dichlorobenzene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Dichlorodifluoromethane	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,1-Dichloroethane	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,1-Dichloroethene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,2-Dichloropropane	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,3-Dichloropropane	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
2,2-Dichloropropane	ND	0.099		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,1-Dichloropropene	ND	0.099		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Hexachlorobutadiene	ND	0.099		mg/Kg	1	3/12/2020 3:42:20 AM	51006
2-Hexanone	ND	0.49		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Isopropylbenzene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
4-Isopropyltoluene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
4-Methyl-2-pentanone	ND	0.49		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Methylene chloride	ND	0.15		mg/Kg	1	3/12/2020 3:42:20 AM	51006
n-Butylbenzene	ND	0.15		mg/Kg	1	3/12/2020 3:42:20 AM	51006
n-Propylbenzene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
sec-Butylbenzene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Styrene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
tert-Butylbenzene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,1,1,2-Tetrachloroethane	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,1,2,2-Tetrachloroethane	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Tetrachloroethene (PCE)	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
trans-1,2-DCE	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
trans-1,3-Dichloropropene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,2,3-Trichlorobenzene	ND	0.099		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,2,4-Trichlorobenzene	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,1,1-Trichloroethane	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,1,2-Trichloroethane	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Trichloroethene (TCE)	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Trichlorofluoromethane	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
1,2,3-Trichloropropane	ND	0.099		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Vinyl chloride	ND	0.049		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Xylenes, Total	ND	0.099		mg/Kg	1	3/12/2020 3:42:20 AM	51006
Surr: Dibromofluoromethane	97.6	70-130		%Rec	1	3/12/2020 3:42:20 AM	51006
Surr: 1,2-Dichloroethane-d4	84.4	70-130		%Rec	1	3/12/2020 3:42:20 AM	51006

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
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ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Project: Agua Moss Sunco Landfarm
Lab ID: 2003373-001 **Matrix:** SOIL

Client Sample ID: Cell 1 Treatment Comp
Collection Date: 3/6/2020 10:38:00 AM
Received Date: 3/7/2020 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **JMR**	
Surr: Toluene-d8	102	70-130		%Rec	1	3/12/2020 3:42:20 AM	51006
Surr: 4-Bromofluorobenzene	94.9	70-130		%Rec	1	3/12/2020 3:42:20 AM	51006
SM4500H+B/EPA 9040C						Analyst: **JRR**	
pH	8.55			pH Units	1	3/19/2020 11:18:00 AM	R67419

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Qualifiers:

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H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
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Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Project: Agua Moss Sunco Landfarm
Lab ID: 2003373-002 **Matrix:** SOIL

Client Sample ID: Cell 2N Treatment Comp
Collection Date: 3/6/2020 10:59:00 AM
Received Date: 3/7/2020 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	4.0	1.5		mg/Kg	5	3/22/2020 9:02:48 AM	51249
Chloride	320	30		mg/Kg	20	3/22/2020 9:15:09 AM	51249
Nitrogen, Nitrite (As N)	ND	1.5		mg/Kg	5	3/22/2020 9:02:48 AM	51249
Nitrogen, Nitrate (As N)	3.8	1.5		mg/Kg	5	3/22/2020 9:02:48 AM	51249
Sulfate	1400	30		mg/Kg	20	3/22/2020 9:15:09 AM	51249
EPA METHOD 7471: MERCURY						Analyst: **JLF**	
Mercury	1.1	0.16		mg/Kg	5	3/17/2020 4:23:42 PM	51155
EPA METHOD 6010B: SOIL METALS						Analyst: **rde**	
Antimony	ND	4.9		mg/Kg	2	3/17/2020 3:31:10 PM	51057
Arsenic	5.1	4.9		mg/Kg	2	3/17/2020 5:39:33 PM	51057
Barium	3000	9.9		mg/Kg	100	3/17/2020 3:39:06 PM	51057
Beryllium	0.70	0.30		mg/Kg	2	3/17/2020 3:31:10 PM	51057
Cadmium	ND	0.20		mg/Kg	2	3/17/2020 3:31:10 PM	51057
Chromium	11	0.59		mg/Kg	2	3/17/2020 3:31:10 PM	51057
Copper	21	0.59		mg/Kg	2	3/17/2020 3:31:10 PM	51057
Iron	21000	250		mg/Kg	100	3/23/2020 11:39:30 AM	51057
Lead	12	0.49		mg/Kg	2	3/23/2020 1:41:52 PM	51057
Manganese	320	0.20		mg/Kg	2	3/17/2020 3:31:10 PM	51057
Selenium	ND	4.9		mg/Kg	2	3/23/2020 1:41:52 PM	51057
Silver	ND	0.49		mg/Kg	2	3/17/2020 3:31:10 PM	51057
Uranium	ND	9.9		mg/Kg	2	3/17/2020 3:31:10 PM	51057
Zinc	64	4.9		mg/Kg	2	3/17/2020 5:39:33 PM	51057
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Surr: BFB	95.0	70-130		%Rec	1	3/12/2020 4:11:08 AM	51006
EPA METHOD 8011/504.1 MODIFIED: EDB						Analyst: **JME**	
1,2-Dibromoethane	ND	0.088		µg/Kg	1	3/18/2020 11:55:52 AM	51177
EPA METHOD 8082A: PCB'S						Analyst: **TOM**	
Aroclor 1016	ND	0.024		mg/Kg	1	3/17/2020 8:05:27 PM	51020
Aroclor 1221	ND	0.024		mg/Kg	1	3/17/2020 8:05:27 PM	51020
Aroclor 1232	ND	0.024		mg/Kg	1	3/17/2020 8:05:27 PM	51020
Aroclor 1242	ND	0.024		mg/Kg	1	3/17/2020 8:05:27 PM	51020
Aroclor 1248	ND	0.024		mg/Kg	1	3/17/2020 8:05:27 PM	51020
Aroclor 1254	ND	0.024		mg/Kg	1	3/17/2020 8:05:27 PM	51020
Aroclor 1260	ND	0.024		mg/Kg	1	3/17/2020 8:05:27 PM	51020
Surr: Decachlorobiphenyl	63.2	15-129		%Rec	1	3/17/2020 8:05:27 PM	51020
Surr: Tetrachloro-m-xylene	90.8	16.1-131		%Rec	1	3/17/2020 8:05:27 PM	51020

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S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Project: Agua Moss Sunco Landfarm
Lab ID: 2003373-002 **Matrix:** SOIL

Client Sample ID: Cell 2N Treatment Comp
Collection Date: 3/6/2020 10:59:00 AM
Received Date: 3/7/2020 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	340	95		mg/Kg	10	3/13/2020 5:24:30 AM	51025
Motor Oil Range Organics (MRO)	2000	480		mg/Kg	10	3/13/2020 5:24:30 AM	51025
Surr: DNOP	0	55.1-146	S	%Rec	10	3/13/2020 5:24:30 AM	51025
EPA METHOD 8310: PAHS						Analyst: **TOM**	
Naphthalene	ND	0.24		mg/Kg	1	3/23/2020 2:55:04 PM	51129
1-Methylnaphthalene	ND	0.24		mg/Kg	1	3/23/2020 2:55:04 PM	51129
2-Methylnaphthalene	0.28	0.24		mg/Kg	1	3/23/2020 2:55:04 PM	51129
Benzo(a)pyrene	ND	0.0096		mg/Kg	1	3/23/2020 2:55:04 PM	51129
Surr: Benzo(e)pyrene	56.9	29-98.8		%Rec	1	3/23/2020 2:55:04 PM	51129
EPA METHOD 8260B: VOLATILES						Analyst: **JMR**	
Benzene	ND	0.025		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Toluene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Ethylbenzene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Methyl tert-butyl ether (MTBE)	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,2,4-Trimethylbenzene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,3,5-Trimethylbenzene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,2-Dichloroethane (EDC)	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,2-Dibromoethane (EDB)	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Naphthalene	ND	0.099		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1-Methylnaphthalene	ND	0.20		mg/Kg	1	3/12/2020 4:11:08 AM	51006
2-Methylnaphthalene	ND	0.20		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Acetone	ND	0.74		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Bromobenzene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Bromodichloromethane	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Bromoform	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Bromomethane	ND	0.15		mg/Kg	1	3/12/2020 4:11:08 AM	51006
2-Butanone	ND	0.50		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Carbon disulfide	ND	0.50		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Carbon tetrachloride	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Chlorobenzene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Chloroethane	ND	0.099		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Chloroform	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Chloromethane	ND	0.15		mg/Kg	1	3/12/2020 4:11:08 AM	51006
2-Chlorotoluene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
4-Chlorotoluene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
cis-1,2-DCE	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
cis-1,3-Dichloropropene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,2-Dibromo-3-chloropropane	ND	0.099		mg/Kg	1	3/12/2020 4:11:08 AM	51006

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ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
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Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Project: Agua Moss Sunco Landfarm
Lab ID: 2003373-002 **Matrix:** SOIL

Client Sample ID: Cell 2N Treatment Comp
Collection Date: 3/6/2020 10:59:00 AM
Received Date: 3/7/2020 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **JMR**	
Dibromochloromethane	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Dibromomethane	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,2-Dichlorobenzene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,3-Dichlorobenzene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,4-Dichlorobenzene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Dichlorodifluoromethane	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,1-Dichloroethane	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,1-Dichloroethene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,2-Dichloropropane	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,3-Dichloropropane	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
2,2-Dichloropropane	ND	0.099		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,1-Dichloropropene	ND	0.099		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Hexachlorobutadiene	ND	0.099		mg/Kg	1	3/12/2020 4:11:08 AM	51006
2-Hexanone	ND	0.50		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Isopropylbenzene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
4-Isopropyltoluene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
4-Methyl-2-pentanone	ND	0.50		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Methylene chloride	ND	0.15		mg/Kg	1	3/12/2020 4:11:08 AM	51006
n-Butylbenzene	ND	0.15		mg/Kg	1	3/12/2020 4:11:08 AM	51006
n-Propylbenzene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
sec-Butylbenzene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Styrene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
tert-Butylbenzene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,1,1,2-Tetrachloroethane	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,1,2,2-Tetrachloroethane	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Tetrachloroethene (PCE)	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
trans-1,2-DCE	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
trans-1,3-Dichloropropene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,2,3-Trichlorobenzene	ND	0.099		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,2,4-Trichlorobenzene	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,1,1-Trichloroethane	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,1,2-Trichloroethane	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Trichloroethene (TCE)	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Trichlorofluoromethane	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
1,2,3-Trichloropropane	ND	0.099		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Vinyl chloride	ND	0.050		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Xylenes, Total	ND	0.099		mg/Kg	1	3/12/2020 4:11:08 AM	51006
Surr: Dibromofluoromethane	98.4	70-130		%Rec	1	3/12/2020 4:11:08 AM	51006
Surr: 1,2-Dichloroethane-d4	88.6	70-130		%Rec	1	3/12/2020 4:11:08 AM	51006

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Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Project: Agua Moss Sunco Landfarm
Lab ID: 2003373-002 **Matrix:** SOIL

Client Sample ID: Cell 2N Treatment Comp
Collection Date: 3/6/2020 10:59:00 AM
Received Date: 3/7/2020 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**
Surr: Toluene-d8	102	70-130		%Rec	1	3/12/2020 4:11:08 AM	51006
Surr: 4-Bromofluorobenzene	91.2	70-130		%Rec	1	3/12/2020 4:11:08 AM	51006
SM4500H+B/EPA 9040C							Analyst: **JRR**
pH	7.80			pH Units	1	3/19/2020 11:18:00 AM	R67419

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Project: Agua Moss Sunco Landfarm
Lab ID: 2003373-003 **Matrix:** SOIL

Client Sample ID: Cell 2S Treatment Comp
Collection Date: 3/6/2020 10:52:00 AM
Received Date: 3/7/2020 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: **JMT**
Fluoride	6.5	1.5		mg/Kg	5	3/22/2020 9:27:29 AM	51249
Chloride	300	30		mg/Kg	20	3/22/2020 9:39:50 AM	51249
Nitrogen, Nitrite (As N)	ND	1.5		mg/Kg	5	3/22/2020 9:27:29 AM	51249
Nitrogen, Nitrate (As N)	4.4	1.5		mg/Kg	5	3/22/2020 9:27:29 AM	51249
Sulfate	500	30		mg/Kg	20	3/22/2020 9:39:50 AM	51249
EPA METHOD 7471: MERCURY							Analyst: **JLF**
Mercury	0.43	0.17		mg/Kg	5	3/17/2020 4:26:13 PM	51155
EPA METHOD 6010B: SOIL METALS							Analyst: **rde**
Antimony	ND	4.9		mg/Kg	2	3/17/2020 3:32:57 PM	51057
Arsenic	ND	4.9		mg/Kg	2	3/17/2020 5:41:02 PM	51057
Barium	2700	9.9		mg/Kg	100	3/17/2020 3:42:06 PM	51057
Beryllium	0.66	0.30		mg/Kg	2	3/17/2020 3:32:57 PM	51057
Cadmium	ND	0.20		mg/Kg	2	3/17/2020 3:32:57 PM	51057
Chromium	9.2	0.59		mg/Kg	2	3/17/2020 3:32:57 PM	51057
Copper	11	0.59		mg/Kg	2	3/17/2020 3:32:57 PM	51057
Iron	14000	250		mg/Kg	100	3/23/2020 11:41:17 AM	51057
Lead	6.6	0.49		mg/Kg	2	3/23/2020 1:43:10 PM	51057
Manganese	240	0.20		mg/Kg	2	3/17/2020 3:32:57 PM	51057
Selenium	ND	4.9		mg/Kg	2	3/23/2020 1:43:10 PM	51057
Silver	ND	0.49		mg/Kg	2	3/17/2020 3:32:57 PM	51057
Uranium	ND	9.9		mg/Kg	2	3/17/2020 3:32:57 PM	51057
Zinc	40	4.9		mg/Kg	2	3/17/2020 5:41:02 PM	51057
EPA METHOD 8015D MOD: GASOLINE RANGE							Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Surr: BFB	98.0	70-130		%Rec	1	3/12/2020 4:39:50 AM	51006
EPA METHOD 8011/504.1 MODIFIED: EDB							Analyst: **JME**
1,2-Dibromoethane	ND	0.095		µg/Kg	1	3/18/2020 12:10:53 PM	51177
EPA METHOD 8082A: PCB'S							Analyst: **TOM**
Aroclor 1016	ND	0.024		mg/Kg	1	3/17/2020 9:11:28 PM	51020
Aroclor 1221	ND	0.024		mg/Kg	1	3/17/2020 9:11:28 PM	51020
Aroclor 1232	ND	0.024		mg/Kg	1	3/17/2020 9:11:28 PM	51020
Aroclor 1242	ND	0.024		mg/Kg	1	3/17/2020 9:11:28 PM	51020
Aroclor 1248	ND	0.024		mg/Kg	1	3/17/2020 9:11:28 PM	51020
Aroclor 1254	ND	0.024		mg/Kg	1	3/17/2020 9:11:28 PM	51020
Aroclor 1260	ND	0.024		mg/Kg	1	3/17/2020 9:11:28 PM	51020
Surr: Decachlorobiphenyl	85.2	15-129		%Rec	1	3/17/2020 9:11:28 PM	51020
Surr: Tetrachloro-m-xylene	112	16.1-131		%Rec	1	3/17/2020 9:11:28 PM	51020

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
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H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Project: Agua Moss Sunco Landfarm
Lab ID: 2003373-003 **Matrix:** SOIL

Client Sample ID: Cell 2S Treatment Comp
Collection Date: 3/6/2020 10:52:00 AM
Received Date: 3/7/2020 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	120	49		mg/Kg	5	3/13/2020 5:32:14 PM	51025
Motor Oil Range Organics (MRO)	820	240		mg/Kg	5	3/13/2020 5:32:14 PM	51025
Surr: DNOP	97.9	55.1-146		%Rec	5	3/13/2020 5:32:14 PM	51025
EPA METHOD 8310: PAHS						Analyst: **TOM**	
Naphthalene	ND	0.24		mg/Kg	1	3/23/2020 3:46:08 PM	51129
1-Methylnaphthalene	ND	0.24		mg/Kg	1	3/23/2020 3:46:08 PM	51129
2-Methylnaphthalene	ND	0.24		mg/Kg	1	3/23/2020 3:46:08 PM	51129
Benzo(a)pyrene	ND	0.0096		mg/Kg	1	3/23/2020 3:46:08 PM	51129
Surr: Benzo(e)pyrene	84.7	29-98.8		%Rec	1	3/23/2020 3:46:08 PM	51129
EPA METHOD 8260B: VOLATILES						Analyst: **JMR**	
Benzene	ND	0.025		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Toluene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Ethylbenzene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Methyl tert-butyl ether (MTBE)	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,2,4-Trimethylbenzene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,3,5-Trimethylbenzene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,2-Dichloroethane (EDC)	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,2-Dibromoethane (EDB)	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Naphthalene	ND	0.10		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1-Methylnaphthalene	ND	0.20		mg/Kg	1	3/12/2020 4:39:50 AM	51006
2-Methylnaphthalene	ND	0.20		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Acetone	ND	0.75		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Bromobenzene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Bromodichloromethane	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Bromoform	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Bromomethane	ND	0.15		mg/Kg	1	3/12/2020 4:39:50 AM	51006
2-Butanone	ND	0.50		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Carbon disulfide	ND	0.50		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Carbon tetrachloride	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Chlorobenzene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Chloroethane	ND	0.10		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Chloroform	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Chloromethane	ND	0.15		mg/Kg	1	3/12/2020 4:39:50 AM	51006
2-Chlorotoluene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
4-Chlorotoluene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
cis-1,2-DCE	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
cis-1,3-Dichloropropene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,2-Dibromo-3-chloropropane	ND	0.10		mg/Kg	1	3/12/2020 4:39:50 AM	51006

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
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S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Client Sample ID: Cell 2S Treatment Comp
Project: Agua Moss Sunco Landfarm
Collection Date: 3/6/2020 10:52:00 AM
Lab ID: 2003373-003 **Matrix:** SOIL
Received Date: 3/7/2020 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **JMR**	
Dibromochloromethane	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Dibromomethane	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,2-Dichlorobenzene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,3-Dichlorobenzene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,4-Dichlorobenzene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Dichlorodifluoromethane	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,1-Dichloroethane	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,1-Dichloroethene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,2-Dichloropropane	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,3-Dichloropropane	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
2,2-Dichloropropane	ND	0.10		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,1-Dichloropropene	ND	0.10		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Hexachlorobutadiene	ND	0.10		mg/Kg	1	3/12/2020 4:39:50 AM	51006
2-Hexanone	ND	0.50		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Isopropylbenzene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
4-Isopropyltoluene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
4-Methyl-2-pentanone	ND	0.50		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Methylene chloride	ND	0.15		mg/Kg	1	3/12/2020 4:39:50 AM	51006
n-Butylbenzene	ND	0.15		mg/Kg	1	3/12/2020 4:39:50 AM	51006
n-Propylbenzene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
sec-Butylbenzene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Styrene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
tert-Butylbenzene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,1,1,2-Tetrachloroethane	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,1,2,2-Tetrachloroethane	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Tetrachloroethene (PCE)	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
trans-1,2-DCE	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
trans-1,3-Dichloropropene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,2,3-Trichlorobenzene	ND	0.10		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,2,4-Trichlorobenzene	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,1,1-Trichloroethane	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,1,2-Trichloroethane	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Trichloroethene (TCE)	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Trichlorofluoromethane	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
1,2,3-Trichloropropane	ND	0.10		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Vinyl chloride	ND	0.050		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Xylenes, Total	ND	0.10		mg/Kg	1	3/12/2020 4:39:50 AM	51006
Surr: Dibromofluoromethane	92.6	70-130		%Rec	1	3/12/2020 4:39:50 AM	51006
Surr: 1,2-Dichloroethane-d4	83.2	70-130		%Rec	1	3/12/2020 4:39:50 AM	51006

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Rule Engineering LLC
Project: Agua Moss Sunco Landfarm
Lab ID: 2003373-003 **Matrix:** SOIL

Client Sample ID: Cell 2S Treatment Comp
Collection Date: 3/6/2020 10:52:00 AM
Received Date: 3/7/2020 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **JMR**	
Surr: Toluene-d8	103	70-130		%Rec	1	3/12/2020 4:39:50 AM	51006
Surr: 4-Bromofluorobenzene	94.9	70-130		%Rec	1	3/12/2020 4:39:50 AM	51006
SM4500H+B/EPA 9040C						Analyst: **JRR**	
pH	8.12			pH Units	1	3/19/2020 11:18:00 AM	R67419

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

March 23, 2020

Hall Environmental Analysis Laboratory

Sample Delivery Group: L1198333

Samples Received: 03/11/2020

Project Number:

Description:

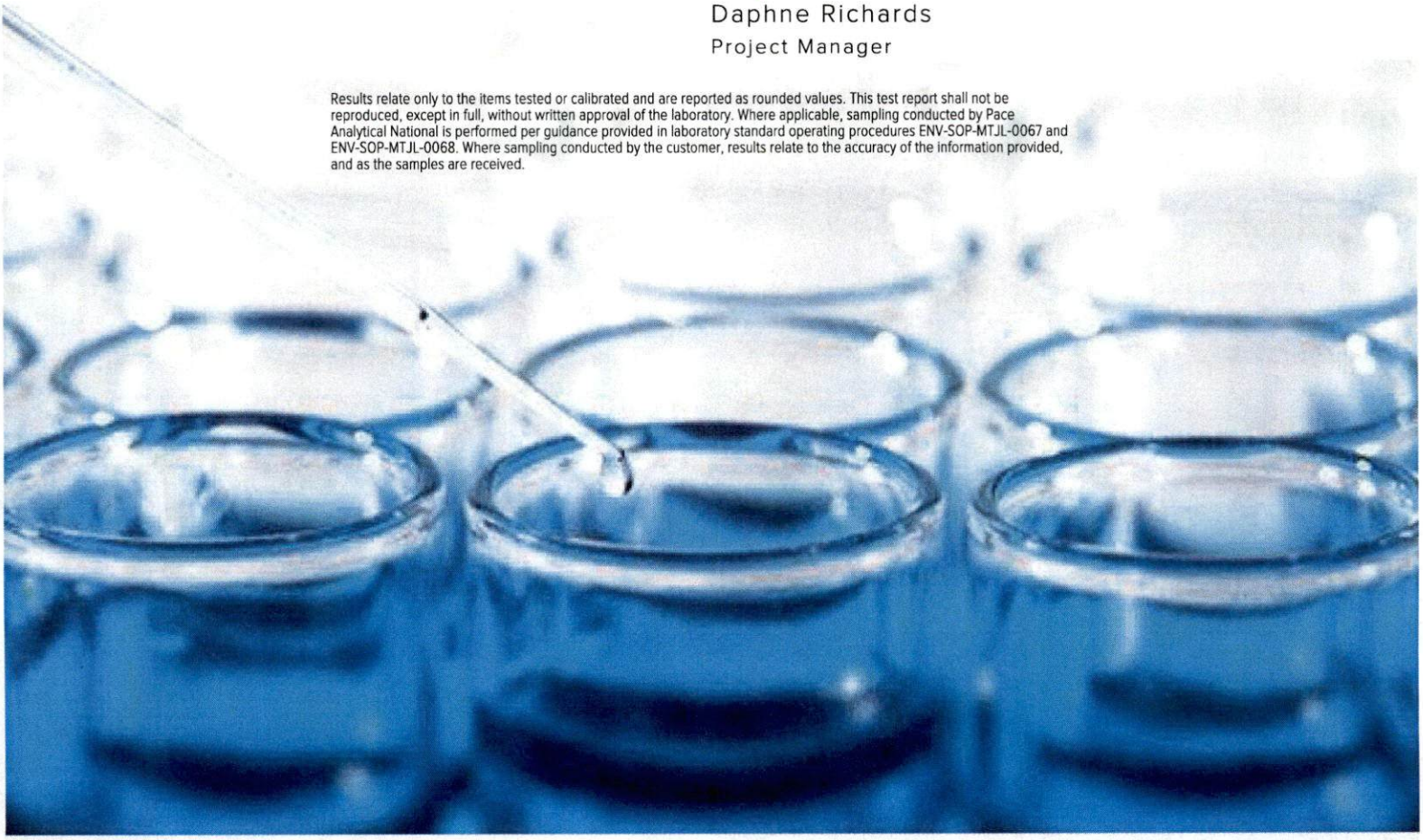
Report To:

4901 Hawkins NE

Albuquerque, NM 87109

Entire Report Reviewed By: Daphne R Richards

Daphne Richards
Project Manager



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ONE LAB. NATIONWIDE.

2003373-001B CELL 1 TREATMENT COMP L1198333-01 Solid

Collected by | Collected date/time 03/06/20 10:38 | Received date/time 03/11/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9012B	WG1445013	1	03/17/20 08:25	03/17/20 15:02	JER	Mt. Juliet, TN
Wet Chemistry by Method 9066	WG1445014	1	03/17/20 09:14	03/17/20 13:47	SDL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1443291	1	03/13/20 09:36	03/14/20 12:36	TRB	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1445818	5	03/18/20 07:12	03/18/20 23:26	SHG	Mt. Juliet, TN

2003373-002B CELL 2N TREATMENT COMP L1198333-02 Solid

Collected by | Collected date/time 03/06/20 10:59 | Received date/time 03/11/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9012B	WG1445013	1	03/17/20 08:25	03/17/20 15:04	JER	Mt. Juliet, TN
Wet Chemistry by Method 9066	WG1445014	1	03/17/20 09:14	03/17/20 13:47	SDL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1443291	1	03/13/20 09:36	03/14/20 12:38	TRB	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1445818	10	03/18/20 07:12	03/18/20 23:49	SHG	Mt. Juliet, TN

2003373-003B CELL 2S TREATMENT COMP L1198333-03 Solid

Collected by | Collected date/time 03/06/20 10:52 | Received date/time 03/11/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9012B	WG1445013	1	03/17/20 08:25	03/17/20 15:07	JER	Mt. Juliet, TN
Wet Chemistry by Method 9066	WG1445014	1	03/17/20 09:14	03/17/20 13:49	SDL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1443291	1	03/13/20 09:36	03/14/20 12:41	TRB	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1445818	5	03/18/20 07:12	03/19/20 00:12	SHG	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Daphne R Richards

Daphne Richards
Project Manager

Wet Chemistry by Method 9012B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Cyanide	ND		0.250	1	03/17/2020 15:02	WG1445013

Wet Chemistry by Method 9066

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Total Phenol by 4AAP	ND		0.670	1	03/17/2020 13:47	WG1445014

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Thallium	ND		2.00	1	03/14/2020 12:36	WG1443291

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Atrazine	ND		1.67	5	03/18/2020 23:26	WG1445818
Pentachlorophenol	ND		1.67	5	03/18/2020 23:26	WG1445818
Phenol	ND		1.67	5	03/18/2020 23:26	WG1445818
(S) 2-Fluorophenol	*39.2*		*12.0-120*		*03/18/2020 23:26*	WG1445818
(S) Phenol-d5	*37.1*		*10.0-120*		*03/18/2020 23:26*	WG1445818
(S) Nitrobenzene-d5	*38.1*		*10.0-122*		*03/18/2020 23:26*	WG1445818
(S) 2-Fluorobiphenyl	*35.6*		*15.0-120*		*03/18/2020 23:26*	WG1445818
(S) 2,4,6-Tribromophenol	*37.5*		*10.0-127*		*03/18/2020 23:26*	WG1445818
(S) p-Terphenyl-d14	*38.4*		*10.0-120*		*03/18/2020 23:26*	WG1445818

Sample Narrative:

L1198333-01 WG1445818: Dilution due to matrix.

Wet Chemistry by Method 9012B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Cyanide	ND	J6	0.250	1	03/17/2020 15:04	WG1445013

Wet Chemistry by Method 9066

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Total Phenol by 4AAP	ND		0.670	1	03/17/2020 13:47	WG1445014

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Thallium	ND		2.00	1	03/14/2020 12:38	WG1443291

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Atrazine	ND		3.33	10	03/18/2020 23:49	WG1445818
Pentachlorophenol	ND		3.33	10	03/18/2020 23:49	WG1445818
Phenol	ND		3.33	10	03/18/2020 23:49	WG1445818
(S) 2-Fluorophenol	*54.3*		*12.0-120*		*03/18/2020 23:49*	WG1445818
(S) Phenol-d5	*51.5*		*10.0-120*		*03/18/2020 23:49*	WG1445818
(S) Nitrobenzene-d5	*50.3*		*10.0-122*		*03/18/2020 23:49*	WG1445818
(S) 2-Fluorobiphenyl	*50.9*		*15.0-120*		*03/18/2020 23:49*	WG1445818
(S) 2,4,6-Tribromophenol	*60.8*		*10.0-127*		*03/18/2020 23:49*	WG1445818
(S) p-Terphenyl-d14	*64.0*		*10.0-120*		*03/18/2020 23:49*	WG1445818

Sample Narrative:

L1198333-02 WG1445818: Dilution due to matrix.

Wet Chemistry by Method 9012B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Cyanide	ND		0.250	1	03/17/2020 15:07	WG1445013

Wet Chemistry by Method 9066

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Total Phenol by 4AAP	ND		0.670	1	03/17/2020 13:49	WG1445014

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Thallium	ND		2.00	1	03/14/2020 12:41	WG1443291

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Atrazine	ND		1.67	5	03/19/2020 00:12	WG1445818
Pentachlorophenol	ND		1.67	5	03/19/2020 00:12	WG1445818
Phenol	ND		1.67	5	03/19/2020 00:12	WG1445818
(S) 2-Fluorophenol	*49.8*		*12.0-120*		*03/19/2020 00:12*	WG1445818
(S) Phenol-d5	*45.6*		*10.0-120*		*03/19/2020 00:12*	WG1445818
(S) Nitrobenzene-d5	*38.3*		*10.0-122*		*03/19/2020 00:12*	WG1445818
(S) 2-Fluorobiphenyl	*46.6*		*15.0-120*		*03/19/2020 00:12*	WG1445818
(S) 2,4,6-Tribromophenol	*55.7*		*10.0-127*		*03/19/2020 00:12*	WG1445818
(S) p-Terphenyl-d14	*53.7*		*10.0-120*		*03/19/2020 00:12*	WG1445818

Sample Narrative:

L1198333-03 WG1445818: Dilution due to matrix.

Method Blank (MB)

(MB) R3509481-1 03/17/20 14:45

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Cyanide	U		0.0390	0.250

L1197892-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1197892-08 03/17/20 14:51 • (DUP) R3509481-3 03/17/20 14:53

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Cyanide	ND	0.000	1	0.000		20

L1198333-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1198333-01 03/17/20 15:02 • (DUP) R3509481-6 03/17/20 15:03

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Cyanide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3509481-2 03/17/20 14:46

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Cyanide	2.50	2.41	96.3	85.0-115	

L1197892-09 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1197892-09 03/17/20 14:54 • (MS) R3509481-4 03/17/20 14:55 • (MSD) R3509481-5 03/17/20 14:58

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Cyanide	2.10	ND	1.56	1.62	74.2	77.2	1	75.0-125	J6		3.89	20

L1198333-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1198333-02 03/17/20 15:04 • (MS) R3509481-7 03/17/20 15:05 • (MSD) R3509481-8 03/17/20 15:06

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Cyanide	1.67	ND	1.21	1.17	72.7	70.5	1	75.0-125	J6	J6	3.01	20

Method Blank (MB)

(MB) R3509429-1 03/17/20 13:43

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Total Phenol by 4AAP	U		0.220	0.670

L1198333-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1198333-02 03/17/20 13:47 • (DUP) R3509429-3 03/17/20 13:48

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Total Phenol by 4AAP	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3509429-2 03/17/20 13:44

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Total Phenol by 4AAP	8.33	8.68	104	90.0-110	

L1199034-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1199034-01 03/17/20 13:50 • (MS) R3509429-4 03/17/20 13:50 • (MSD) R3509429-5 03/17/20 13:53

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Total Phenol by 4AAP	19.5	U	18.4	17.0	94.5	87.4	1	90.0-110		J6	7.82	20

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Method Blank (MB)

(MB) R3508630-1 03/14/20 11:29

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Thallium	U		0.650	2.00

Laboratory Control Sample (LCS)

(LCS) R3508630-2 03/14/20 11:31

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Thallium	100	93.0	93.0	80.0-120	

L1193765-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1193765-06 03/14/20 11:34 • (MS) R3508630-5 03/14/20 11:42 • (MSD) R3508630-6 03/14/20 11:44

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Thallium	100	U	79.8	78.8	79.8	78.8	1	75.0-125			1.34	20

Method Blank (MB)

(MB) R3510368-2 03/18/20 15:06

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Atrazine	U		0.0938	0.333
Pentachlorophenol	U		0.0480	0.333
Phenol	U		0.00695	0.333
(S) Nitrobenzene-d5	*59.2*			*10.0-122*
(S) 2-Fluorobiphenyl	*66.1*			*15.0-120*
(S) p-Terphenyl-d14	*81.1*			*10.0-120*
(S) Phenol-d5	*69.4*			*10.0-120*
(S) 2-Fluorophenol	*76.3*			*12.0-120*
(S) 2,4,6-Tribromophenol	*74.9*			*10.0-127*

Laboratory Control Sample (LCS)

(LCS) R3510368-1 03/18/20 14:43

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Atrazine	0.666	0.503	75.5	43.0-120	
Pentachlorophenol	0.666	0.509	76.4	29.0-120	
Phenol	0.666	0.345	51.8	28.0-120	
(S) Nitrobenzene-d5			*41.1*	*10.0-122*	
(S) 2-Fluorobiphenyl			*53.8*	*15.0-120*	
(S) p-Terphenyl-d14			*66.1*	*10.0-120*	
(S) Phenol-d5			*50.9*	*10.0-120*	
(S) 2-Fluorophenol			*51.1*	*12.0-120*	
(S) 2,4,6-Tribromophenol			*68.6*	*10.0-127*	

L1198475-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1198475-04 03/18/20 17:48 • (MS) R3510368-3 03/18/20 18:11 • (MSD) R3510368-4 03/18/20 18:34

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Atrazine	0.807	U	0.524	0.491	64.9	60.6	1	20.0-131			6.55	28
Pentachlorophenol	0.807	U	0.543	0.532	67.4	65.8	1	10.0-160			2.06	31
Phenol	0.807	U	0.360	0.368	44.7	45.4	1	12.0-120			2.03	38
(S) Nitrobenzene-d5					*34.5*	*31.9*		*10.0-122*				
(S) 2-Fluorobiphenyl					*42.7*	*38.0*		*15.0-120*				
(S) p-Terphenyl-d14					*56.4*	*52.9*		*10.0-120*				
(S) Phenol-d5					*45.4*	*44.2*		*10.0-120*				
(S) 2-Fluorophenol					*44.7*	*43.8*		*12.0-120*				

L1198475-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1198475-04 03/18/20 17:48 • (MS) R3510368-3 03/18/20 18:11 • (MSD) R3510368-4 03/18/20 18:34

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
(S) 2,4,6-Tribromophenol					*56.6*	*51.5*		*10.0-127*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.

ACCREDITATIONS & LOCATIONS

ONE LAB. NATIONWIDE.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975
FAX: 505-345-4107
Website: www.hallenvironmental.com

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

1196333 1197963

SUB CONTRATOR: PACE TN	COMPANY: PACE TN		PHONE: (800) 767-5859	FAX: (615) 758-5859	
ADDRESS: 12065 Lebanon Rd			ACCOUNT #:	EMAIL:	
CITY, STATE, ZIP: Mt. Juliet, TN 37122					

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS	
1	2003373-001B	Cell 1 Treatment Comp	4OZGU	Soil	3/6/2020 10:38:00 AM	1	Pentachlorophenol and ~~Atrizine~~ Atrazine, Phenols by 9065, CN, Tl, Ra226/228	-01
2	2003373-002B	Cell 2N Treatment Comp	4OZGU	Soil	3/6/2020 10:59:00 AM	1	Pentachlorophenol and ~~Atrizine~~ Atrazine, Phenols by 9065, CN, Tl, Ra226/228	-02
3	2003373-003B	Cell 2S Treatment Comp	4OZGU	Soil	3/6/2020 10:52:00 AM	1	Pentachlorophenol and ~~Atrizine~~ Atrazine, Phenols by 9065, CN, Tl, Ra226/228	-03

Atrazine

03/10/20

SPECIAL INSTRUCTIONS / COMMENTS:

Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

E021

FIELD SCREEN: <0.5 mR/hr MPAS .9-.3=.6

No TB 3 total 4510 1668 9480

Relinquished By:	Date: 3/9/2020	Time: 3:41 PM	Received By:	Date:	Time:	REPORT TRANSMITTAL DESIRED:	
Relinquished By:	Date:	Time:	Received By:	Date:	Time:	☐ HARDCOPY (extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE	
Relinquished By:	Date:	Time:	Received By:	Date: 3-11-20	Time: 8:30	FOR LAB USE ONLY	

TAT: Standard ☐ RUSH Next BD ☐ 2nd BD ☐ 3rd BD ☐

Temp of samples _____ °C Attempt to Cool ? _____

Comments: _____

1198333

Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client: HALLENVANIM		L1198333
Cooler Received/Opened On: 3 / 11 / 20	Temperature:	0.6
Received By: Michael Pappas		
Signature: Michael Pappas		

Receipt Check List	NP	Yes	No
COC Seal Present / Intact?			
COC Signed / Accurate?		✓	
Bottles arrive intact?		✓	
Correct bottles used?		✓	
Sufficient volume sent?		✓	
If Applicable			
VOA Zero headspace?			
Preservation Correct / Checked?			

Kelsey Stephenson

Pace Analytical®
National Center for Testing & Innovation

Login #: L1198333	Client:HALLENVANM	Date:03/11	Evaluated by:Kelsey S.

Non-Conformance (check applicable items)

	Sample Integrity		Chain of Custody Clarification		
	Parameter(s) past holding time		Login Clarification Needed		If Broken Container:
	Temperature not in range		Chain of custody is incomplete		Insufficient packing material around container
	Improper container type		Please specify Metals requested.		Insufficient packing material inside cooler
	pH not in range.		Please specify TCLP requested.		Improper handling by carrier (FedEx / UPS / Courie
x	Insufficient sample volume.		Received additional samples not listed on coc.		Sample was frozen
	Sample is biphasic.		Sample ids on containers do not match ids on coc		Container lid not intact
	Vials received with headspace.		Trip Blank not received.		If no Chain of Custody:
	Broken container		Client did not "X" analysis.		Received by:
	Broken container:		Chain of Custody is missing		Date/Time:
	Sufficient sample remains				Temp./Cont. Rec./pH:
					Carrier:
					Tracking#

Login Comments: Only received 1 4oz per id

Client informed by:		Call		Email	X	Voice Mail		Date: 3/12	Time: 1300
TSR Initials:DR	Client Contact: AF								

Login Instructions:

Client will send in another jar on Monday. Begin analysis and what on Rad work until new jars are sent in. Then place rad on a separate SDG

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

April 15, 2020

Hall Environmental Analysis Laboratory

Sample Delivery Group: L1200825

Samples Received: 03/19/2020

Project Number:

Description:

Report To:

Entire Report Reviewed By:

Donna Eidson
Project Manager

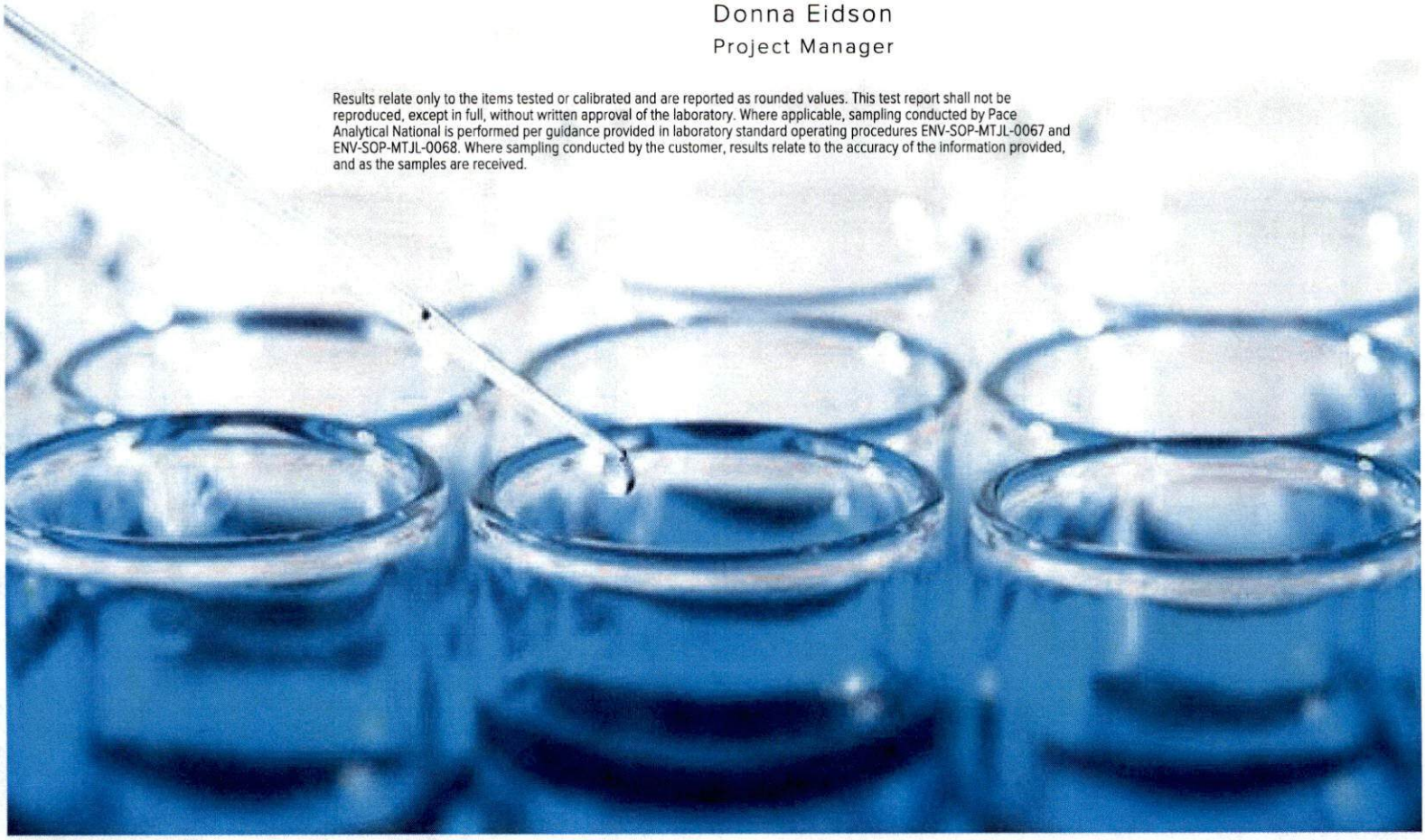


TABLE OF CONTENTS

2003373-001B CELL 1 TREATMENT COMP L1200825-01 Solids and Chemical Materials

Collected by	Collected date/time	Received date/time
	03/06/20 10:38	03/19/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method DOE Ga-01-R/901.1 (21 day)	WG1450684	1	03/23/20 10:43	04/13/20 11:56	DME	Mt. Juliet, TN

2003373-002B CELL 2N TREATMENT COMP L1200825-02 Solids and Chemical Materials

Collected by	Collected date/time	Received date/time
	03/06/20 10:59	03/19/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method DOE Ga-01-R/901.1 (21 day)	WG1450684	1	03/23/20 10:43	04/13/20 13:54	DME	Mt. Juliet, TN

2003373-003B CELL 2S TREATMENT COMP L1200825-03 Solids and Chemical Materials

Collected by	Collected date/time	Received date/time
	03/06/20 10:52	03/19/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method DOE Ga-01-R/901.1 (21 day)	WG1450684	1	03/23/20 10:43	04/13/20 14:56	DME	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Donna Eidson
Project Manager

Radiochemistry by Method DOE Ga-01-R/901.1 (21 day)

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/g		+ / -	pCi/g	date / time	
Actinium-228 (Ra-228)	1.05		0.382	0.623	04/13/2020 11:56	WG1450684
Bismuth-214 (Ra-226)	1.49		0.313	0.369	04/13/2020 11:56	WG1450684

Radiochemistry by Method DOE Ga-01-R/901.1 (21 day)

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/g		+ / -	pCi/g	date / time	
Actinium-228 (Ra-228)	1.26		0.362	0.484	04/13/2020 13:54	WG1450684
Bismuth-214 (Ra-226)	1.97		0.328	0.274	04/13/2020 13:54	WG1450684

Radiochemistry by Method DOE Ga-01-R/901.1 (21 day)

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/g		+ / -	pCi/g	date / time	
Actinium-228 (Ra-228)	0.881		0.353	0.58	04/13/2020 14:56	WG1450684
Bismuth-214 (Ra-226)	1.21		0.285	0.357	04/13/2020 14:56	WG1450684

Method Blank (MB)

(MB) R3517425-3 04/09/20 12:28

Analyte	MB Result pCi/g	MB Qualifier	MB MDA pCi/g
Actinium-228 (Ra-228)	0.00920		0.264
Bismuth-214 (Ra-226)	0.0178		0.164

L1206257-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1206257-03 04/09/20 09:52 • (DUP) R3517425-4 04/09/20 13:32

Analyte	Original Result pCi/g	DUP Result pCi/g	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Actinium-228 (Ra-228)	2.86	2.31	1	21.3	0.910		20	3
Americium-241	-0.236	-0.0145	1	0.000	0.799		20	3
Bismuth-214 (Ra-226)	2.10	2.22	1	5.47	0.270		20	3
Cesium-137	-0.0285	-0.0509	1	0.000	0.200		20	3
Cobalt-60	0.0562	-0.0380	1	200	1.17		20	3

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3517425-1 04/09/20 00:09 • (LCSD) R3517425-2 04/09/20 09:51

Analyte	Spike Amount pCi/g	LCS Result pCi/g	LCSD Result pCi/g	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Americium-241	47.3	42.4	43.8	89.7	92.6	80.0-120			3.20	20
Cesium-137	72.4	69.8	74.7	96.4	103	80.0-120			6.73	20
Cobalt-60	86.9	80.4	86.1	92.5	99.0	80.0-120			6.79	20

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDA	Minimum Detectable Activity.
Rec.	Recovery.
RER	Replicate Error Ratio.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

ACCREDITATIONS & LOCATIONS

ONE LAB. NATIONWIDE.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

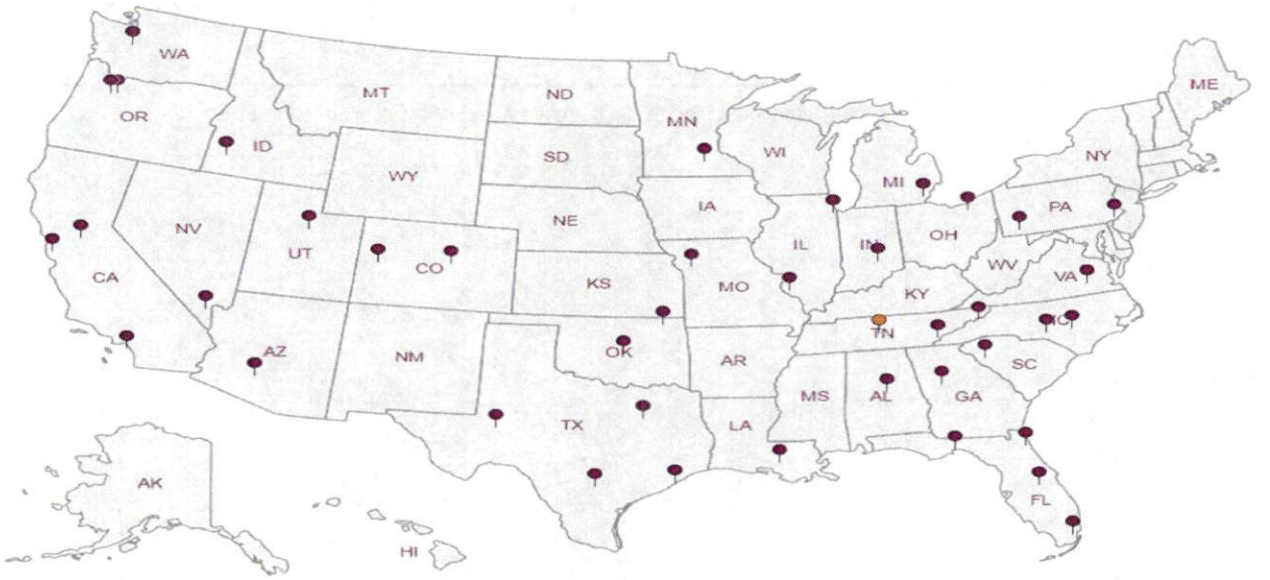
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975
FAX: 505-345-4107
Website: www.hallenvironmental.com

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

G237

SUB CONTRATOR: PACE TN COMPANY: PACE TN PHONE: (800) 767-5859 FAX: (615) 758-5859

ADDRESS: 12065 Lebanon Rd ACCOUNT #: EMAIL:

CITY, STATE, ZIP: Mt. Juliet, TN 37122

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	2003373-001B	Cell 1 Treatment Comp	4OZGU	Soil	3/6/2020 10:38:00 AM	1	Pentachlorophenol and Atrizine, Phenols by 9065, CN, Tl, Ra226/228
2	2003373-002B	Cell 2N Treatment Comp	4OZGU	Soil	3/6/2020 10:59:00 AM	1	Pentachlorophenol and Atrizine, Phenols by 9065, CN, Tl, Ra226/228
3	2003373-003B	Cell 2S Treatment Comp	4OZGU	Soil	3/6/2020 10:52:00 AM	1	Pentachlorophenol and Atrizine, Phenols by 9065, CN, Tl, Ra226/228

1200823

-01

02

03

Additional Volume for samples received on 3/12/20

LB 3/17/2020

SPECIAL INSTRUCTIONS / COMMENTS:

Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

all cont c500 cm

Relinquished By: LB	Date: 3/17/2020	Time: 12:16 PM	Received By: Claud Kemp	Date: 3/19/20	Time: 8:30
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

TAT: Standard ☐ RUSH Next BD ☐ 2nd BD ☐ 3rd BD ☐

REPORT TRANSMITTAL DESIRED:
☐ HARDCOPY (extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY

Temp of samples 2-13.6°C IR Attempt to Cool ? WY

Comments: RAD SCREEN: <0.5 mR/hr

Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client: HALLIBURTON	1200825	
Cooler Received/Opened On: 3/19/20 Temperature:	0.6	
Received By: Carol Kemp		
Signature: Carol Kemp		

Receipt Check List	NP	Yes	No
COC Seal Present / Intact?			
COC Signed / Accurate?		✓	
Bottles arrive intact?		✓	
Correct bottles used?		✓	
Sufficient volume sent?		✓	
If Applicable			
VOA Zero headspace?			
Preservation Correct / Checked?			

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2003373

15-Apr-20

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: MB-51249	SampType: mblk	TestCode: EPA Method 300.0: Anions							
Client ID: PBS	Batch ID: 51249	RunNo: 67482							
Prep Date: 3/20/2020	Analysis Date: 3/22/2020	SeqNo: 2328900	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.30								
Chloride	ND	1.5								
Nitrogen, Nitrite (As N)	ND	0.30								
Nitrogen, Nitrate (As N)	ND	0.30								
Sulfate	ND	1.5								

Sample ID: LCS-51249	SampType: lcs	TestCode: EPA Method 300.0: Anions							
Client ID: LCSS	Batch ID: 51249	RunNo: 67482							
Prep Date: 3/20/2020	Analysis Date: 3/22/2020	SeqNo: 2328901	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	1.5	0.30	1.500	0	102	90	110			
Chloride	14	1.5	15.00	0	93.7	90	110			
Nitrogen, Nitrite (As N)	2.8	0.30	3.000	0	94.3	90	110			
Nitrogen, Nitrate (As N)	7.2	0.30	7.500	0	96.5	90	110			
Sulfate	28	1.5	30.00	0	94.6	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2003373

15-Apr-20

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: MB-51177	SampType: MBLK	TestCode: EPA Method 8011/504.1 Modified: EDB							
Client ID: PBS	Batch ID: 51177	RunNo: 67385							
Prep Date: 3/18/2020	Analysis Date: 3/18/2020	SeqNo: 2323902	Units: µg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.10								

Sample ID: LCS-51177	SampType: LCS	TestCode: EPA Method 8011/504.1 Modified: EDB							
Client ID: LCSS	Batch ID: 51177	RunNo: 67385							
Prep Date: 3/18/2020	Analysis Date: 3/18/2020	SeqNo: 2323903	Units: µg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	1.1	0.10	1.000	0	107	70	130			

Sample ID: MB-51177	SampType: MBLK	TestCode: EPA Method 8011/504.1 Modified: EDB							
Client ID: PBS	Batch ID: 51177	RunNo: 67385							
Prep Date: 3/18/2020	Analysis Date: 3/18/2020	SeqNo: 2323904	Units: µg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.10								

Sample ID: 2003373-003AMS	SampType: MS	TestCode: EPA Method 8011/504.1 Modified: EDB							
Client ID: Cell 2S Treatment C	Batch ID: 51177	RunNo: 67385							
Prep Date: 3/18/2020	Analysis Date: 3/18/2020	SeqNo: 2323921	Units: µg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.75	0.074	0.7447	0	101	65	135			

Sample ID: 2003373-003AMSD	SampType: MSD	TestCode: EPA Method 8011/504.1 Modified: EDB							
Client ID: Cell 2S Treatment C	Batch ID: 51177	RunNo: 67385							
Prep Date: 3/18/2020	Analysis Date: 3/18/2020	SeqNo: 2323922	Units: µg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.81	0.075	0.7543	0	107	65	135	6.81	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2003373**

15-Apr-20

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: **LCS-51025**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **51025**	RunNo: **67227**
Prep Date: **3/11/2020**	Analysis Date: **3/12/2020**	SeqNo: **2317675** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	55	10	50.00	0	111	70	130			
Surr: DNOP	5.1		5.000		102	55.1	146			

Sample ID: **MB-51025**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **51025**	RunNo: **67227**
Prep Date: **3/11/2020**	Analysis Date: **3/12/2020**	SeqNo: **2317677** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	10		10.00		102	55.1	146			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2003373

15-Apr-20

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: MB-51020	SampType: MBLK	TestCode: EPA Method 8082A: PCB's
Client ID: PBS	Batch ID: 51020	RunNo: 67347
Prep Date: 3/11/2020	Analysis Date: 3/17/2020	SeqNo: 2322913 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arodor 1016	ND	0.025								
Arodor 1221	ND	0.025								
Arodor 1232	ND	0.025								
Arodor 1242	ND	0.025								
Arodor 1248	ND	0.025								
Arodor 1254	ND	0.025								
Arodor 1260	ND	0.025								
Surr: Decachlorobiphenyl	0.054		0.06250		86.8	15	129			
Surr: Tetrachloro-m-xylene	0.055		0.06250		88.4	16.1	131			

Sample ID: LCS-51020	SampType: LCS	TestCode: EPA Method 8082A: PCB's
Client ID: LCSS	Batch ID: 51020	RunNo: 67347
Prep Date: 3/11/2020	Analysis Date: 3/17/2020	SeqNo: 2322914 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arodor 1016	0.093	0.025	0.1250	0	74.3	25.1	122			
Arodor 1260	0.097	0.025	0.1250	0	77.9	32.4	92.8			
Surr: Decachlorobiphenyl	0.047		0.06250		74.8	15	129			
Surr: Tetrachloro-m-xylene	0.048		0.06250		76.8	16.1	131			

Sample ID: MB-51020	SampType: MBLK	TestCode: EPA Method 8082A: PCB's
Client ID: PBS	Batch ID: 51020	RunNo: 67347
Prep Date: 3/11/2020	Analysis Date: 3/17/2020	SeqNo: 2322954 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arodor 1016	ND	0.025								
Arodor 1221	ND	0.025								
Arodor 1232	ND	0.025								
Arodor 1242	ND	0.025								
Arodor 1248	ND	0.025								
Arodor 1254	ND	0.025								
Arodor 1260	ND	0.025								
Surr: Decachlorobiphenyl	0.055		0.06250		87.6	15	129			
Surr: Tetrachloro-m-xylene	0.056		0.06250		89.6	16.1	131			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- B Analyte detected in the associated Method Blank
- D Sample Diluted Due to Matrix
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- PQL Practical Quanitative Limit
- RL Reporting Limit
- S % Recovery outside of range due to dilution or matrix

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2003373

15-Apr-20

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: lcs-51006	SampType: LCS	TestCode: EPA Method 8260B: Volatiles
Client ID: LCSS	Batch ID: 51006	RunNo: 67211
Prep Date: 3/10/2020	Analysis Date: 3/11/2020	SeqNo: 2315697 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.025	1.000	0	101	70	130			
Toluene	1.0	0.050	1.000	0	103	70	130			
Chlorobenzene	1.0	0.050	1.000	0	105	70	130			
1,1-Dichloroethene	0.78	0.050	1.000	0	78.2	70	130			
Trichloroethene (TCE)	0.91	0.050	1.000	0	90.7	70	130			
Surr: Dibromofluoromethane	0.46		0.5000		92.7	70	130			
Surr: 1,2-Dichloroethane-d4	0.45		0.5000		89.5	70	130			
Surr: Toluene-d8	0.49		0.5000		98.9	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		93.9	70	130			

Sample ID: mb-51006	SampType: MBLK	TestCode: EPA Method 8260B: Volatiles
Client ID: PBS	Batch ID: 51006	RunNo: 67211
Prep Date: 3/10/2020	Analysis Date: 3/11/2020	SeqNo: 2315698 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Methyl tert-butyl ether (MTBE)	ND	0.050								
1,2,4-Trimethylbenzene	ND	0.050								
1,3,5-Trimethylbenzene	ND	0.050								
1,2-Dichloroethane (EDC)	ND	0.050								
1,2-Dibromoethane (EDB)	ND	0.050								
Naphthalene	ND	0.10								
1-Methylnaphthalene	ND	0.20								
2-Methylnaphthalene	ND	0.20								
Acetone	ND	0.75								
Bromobenzene	ND	0.050								
Bromodichloromethane	ND	0.050								
Bromoform	ND	0.050								
Bromomethane	ND	0.15								
2-Butanone	ND	0.50								
Carbon disulfide	ND	0.50								
Carbon tetrachloride	ND	0.050								
Chlorobenzene	ND	0.050								
Chloroethane	ND	0.10								
Chloroform	ND	0.050								
Chloromethane	ND	0.15								
2-Chlorotoluene	ND	0.050								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- B Analyte detected in the associated Method Blank
- D Sample Diluted Due to Matrix
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- PQL Practical Quantitative Limit
- RL Reporting Limit
- S % Recovery outside of range due to dilution or matrix

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2003373**

15-Apr-20

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: **mb-51006**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **51006**	RunNo: **67211**
Prep Date: **3/10/2020**	Analysis Date: **3/11/2020**	SeqNo: **2315698** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
4-Chlorotoluene	ND	0.050								
cis-1,2-DCE	ND	0.050								
cis-1,3-Dichloropropene	ND	0.050								
1,2-Dibromo-3-chloropropane	ND	0.10								
Dibromochloromethane	ND	0.050								
Dibromomethane	ND	0.050								
1,2-Dichlorobenzene	ND	0.050								
1,3-Dichlorobenzene	ND	0.050								
1,4-Dichlorobenzene	ND	0.050								
Dichlorodifluoromethane	ND	0.050								
1,1-Dichloroethane	ND	0.050								
1,1-Dichloroethene	ND	0.050								
1,2-Dichloropropane	ND	0.050								
1,3-Dichloropropane	ND	0.050								
2,2-Dichloropropane	ND	0.10								
1,1-Dichloropropene	ND	0.10								
Hexachlorobutadiene	ND	0.10								
2-Hexanone	ND	0.50								
Isopropylbenzene	ND	0.050								
4-Isopropyltoluene	ND	0.050								
4-Methyl-2-pentanone	ND	0.50								
Methylene chloride	ND	0.15								
n-Butylbenzene	ND	0.15								
n-Propylbenzene	ND	0.050								
sec-Butylbenzene	ND	0.050								
Styrene	ND	0.050								
tert-Butylbenzene	ND	0.050								
1,1,1,2-Tetrachloroethane	ND	0.050								
1,1,2,2-Tetrachloroethane	ND	0.050								
Tetrachloroethene (PCE)	ND	0.050								
trans-1,2-DCE	ND	0.050								
trans-1,3-Dichloropropene	ND	0.050								
1,2,3-Trichlorobenzene	ND	0.10								
1,2,4-Trichlorobenzene	ND	0.050								
1,1,1-Trichloroethane	ND	0.050								
1,1,2-Trichloroethane	ND	0.050								
Trichloroethene (TCE)	ND	0.050								
Trichlorofluoromethane	ND	0.050								
1,2,3-Trichloropropane	ND	0.10								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- B Analyte detected in the associated Method Blank
- D Sample Diluted Due to Matrix
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- PQL Practical Quanitative Limit
- RL Reporting Limit
- S % Recovery outside of range due to dilution or matrix

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2003373**

15-Apr-20

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: **mb-51006**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **51006**	RunNo: **67211**
Prep Date: **3/10/2020**	Analysis Date: **3/11/2020**	SeqNo: **2315698** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: Dibromofluoromethane	0.48		0.5000		96.7	70	130			
Surr: 1,2-Dichloroethane-d4	0.45		0.5000		90.2	70	130			
Surr: Toluene-d8	0.50		0.5000		99.4	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		94.3	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2003373**

15-Apr-20

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: **MB-51129**	SampType: **MBLK**	TestCode: **EPA Method 8310: PAHs**
Client ID: **PBS**	Batch ID: **51129**	RunNo: **67478**
Prep Date: **3/16/2020**	Analysis Date: **3/23/2020**	SeqNo: **2329033** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	ND	0.25								
1-Methylnaphthalene	ND	0.25								
2-Methylnaphthalene	ND	0.25								
Benzo(a)pyrene	ND	0.010								
Surr: Benzo(e)pyrene	0.26		0.5000		52.0	29	98.8			

Sample ID: **LCS-51129**	SampType: **LCS**	TestCode: **EPA Method 8310: PAHs**
Client ID: **LCSS**	Batch ID: **51129**	RunNo: **67478**
Prep Date: **3/16/2020**	Analysis Date: **3/23/2020**	SeqNo: **2329034** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	1.1	0.25	2.000	0	54.1	33	89.2			
1-Methylnaphthalene	1.1	0.25	2.000	0	56.2	35.1	91.5			
2-Methylnaphthalene	1.1	0.25	2.000	0	56.3	34.2	92.1			
Benzo(a)pyrene	ND	0.010	0.01250	0	22.0	15	98.1			
Surr: Benzo(e)pyrene	0.32		0.5000		63.6	29	98.8			

Sample ID: **MB-51129**	SampType: **MBLK**	TestCode: **EPA Method 8310: PAHs**
Client ID: **PBS**	Batch ID: **51129**	RunNo: **67478**
Prep Date: **3/16/2020**	Analysis Date: **3/23/2020**	SeqNo: **2329035** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	ND	0.25								
1-Methylnaphthalene	ND	0.25								
2-Methylnaphthalene	ND	0.25								
Benzo(a)pyrene	ND	0.010								
Surr: Benzo(e)pyrene	0.27		0.5000		53.0	29	98.8			

Sample ID: **2003373-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 8310: PAHs**
Client ID: **Cell 1 Treatment Co**	Batch ID: **51129**	RunNo: **67478**
Prep Date: **3/16/2020**	Analysis Date: **3/23/2020**	SeqNo: **2330003** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	1.0	0.24	1.917	0	53.7	19	86.7			
1-Methylnaphthalene	1.1	0.24	1.917	0	57.9	15	96.5			
2-Methylnaphthalene	1.2	0.24	1.917	0	64.9	15.8	97.2			
Benzo(a)pyrene	0.011	0.0096	0.01198	0	94.0	15	112			
Surr: Benzo(e)pyrene	0.39		0.4792		80.5	29	98.8			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2003373**

15-Apr-20

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: **2003373-001AMS** SampType: **MS** TestCode: **EPA Method 8310: PAHs**

Client ID: **Cell 1 Treatment Co** Batch ID: **51129** RunNo: **67508**

Prep Date: **3/16/2020** Analysis Date: **3/24/2020** SeqNo: **2330793** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	0.84	0.24	1.955	0	42.9	19	86.7			
1-Methylnaphthalene	1.0	0.24	1.955	0	51.8	15	96.5			
2-Methylnaphthalene	1.1	0.24	1.955	0	58.2	15.8	97.2			
Benzo(a)pyrene	ND	0.0098	0.01222	0	56.0	15	112			
Sum: Benzo(e)pyrene	0.24		0.4888		49.4	29	98.8			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2003373

15-Apr-20

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: MB-51155	SampType: MBLK	TestCode: EPA Method 7471: Mercury							
Client ID: PBS	Batch ID: 51155	RunNo: 67360							
Prep Date: 3/17/2020	Analysis Date: 3/17/2020	SeqNo: 2321939	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.033								

Sample ID: LLLCS-51155	SampType: LCSLL	TestCode: EPA Method 7471: Mercury							
Client ID: BatchQC	Batch ID: 51155	RunNo: 67360							
Prep Date: 3/17/2020	Analysis Date: 3/17/2020	SeqNo: 2321940	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.033	0.006660	0	76.1	70	130			

Sample ID: LCS-51155	SampType: LCS	TestCode: EPA Method 7471: Mercury							
Client ID: LCSS	Batch ID: 51155	RunNo: 67360							
Prep Date: 3/17/2020	Analysis Date: 3/17/2020	SeqNo: 2321941	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.14	0.033	0.1667	0	83.0	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2003373

15-Apr-20

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: MB-51057	SampType: MBLK	TestCode: EPA Method 6010B: Soil Metals							
Client ID: PBS	Batch ID: 51057	RunNo: 67378							
Prep Date: 3/12/2020	Analysis Date: 3/17/2020	SeqNo: 2323495	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	2.5								
Zinc	ND	2.5								

Sample ID: LCS-51057	SampType: LCS	TestCode: EPA Method 6010B: Soil Metals							
Client ID: LCSS	Batch ID: 51057	RunNo: 67378							
Prep Date: 3/12/2020	Analysis Date: 3/17/2020	SeqNo: 2323497	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	25	2.5	25.00	0	98.0	80	120			
Zinc	23	2.5	25.00	0	90.8	80	120			

Sample ID: 2003373-001AMS	SampType: MS	TestCode: EPA Method 6010B: Soil Metals							
Client ID: Cell 1 Treatment Co	Batch ID: 51057	RunNo: 67378							
Prep Date: 3/12/2020	Analysis Date: 3/17/2020	SeqNo: 2323499	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	27	5.1	25.40	0	107	75	125			
Zinc	70	5.1	25.40	45.75	97.3	75	125			

Sample ID: 2003373-001AMSD	SampType: MSD	TestCode: EPA Method 6010B: Soil Metals							
Client ID: Cell 1 Treatment Co	Batch ID: 51057	RunNo: 67378							
Prep Date: 3/12/2020	Analysis Date: 3/17/2020	SeqNo: 2323500	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	25	5.0	24.95	0	99.4	75	125	9.32	20	
Zinc	67	5.0	24.95	45.75	86.5	75	125	4.55	20	

Sample ID: MB-51057	SampType: MBLK	TestCode: EPA Method 6010B: Soil Metals							
Client ID: PBS	Batch ID: 51057	RunNo: 67378							
Prep Date: 3/12/2020	Analysis Date: 3/17/2020	SeqNo: 2323615	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	ND	2.5								
Barium	ND	0.10								
Beryllium	ND	0.15								
Cadmium	ND	0.10								
Chromium	ND	0.30								
Copper	ND	0.30								
Manganese	ND	0.10								
Silver	ND	0.25								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2003373

15-Apr-20

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: MB-51057	SampType: MBLK	TestCode: EPA Method 6010B: Soil Metals
Client ID: PBS	Batch ID: 51057	RunNo: 67378
Prep Date: 3/12/2020	Analysis Date: 3/17/2020	SeqNo: 2323615 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Uranium	ND	5.0								
Zinc	ND	2.5								

Sample ID: LCS-51057	SampType: LCS	TestCode: EPA Method 6010B: Soil Metals
Client ID: LCSS	Batch ID: 51057	RunNo: 67378
Prep Date: 3/12/2020	Analysis Date: 3/17/2020	SeqNo: 2323617 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	25	2.5	25.00	0	99.1	80	120			
Barium	25	0.10	25.00	0	101	80	120			
Beryllium	26	0.15	25.00	0	103	80	120			
Cadmium	25	0.10	25.00	0	101	80	120			
Chromium	25	0.30	25.00	0	102	80	120			
Copper	27	0.30	25.00	0	107	80	120			
Manganese	25	0.10	25.00	0	101	80	120			
Silver	4.9	0.25	5.000	0	98.0	80	120			
Uranium	26	5.0	25.00	0	102	80	120			
Zinc	25	2.5	25.00	0	101	80	120			

Sample ID: 2003373-001AMS	SampType: MS	TestCode: EPA Method 6010B: Soil Metals
Client ID: Cell 1 Treatment Co	Batch ID: 51057	RunNo: 67378
Prep Date: 3/12/2020	Analysis Date: 3/17/2020	SeqNo: 2323628 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	ND	5.1	25.40	0	0	75	125			S
Beryllium	25	0.30	25.40	0.6684	97.1	75	125			
Cadmium	22	0.20	25.40	0	88.3	75	125			
Chromium	36	0.61	25.40	9.918	103	75	125			
Copper	43	0.61	25.40	15.54	110	75	125			
Manganese	350	0.20	25.40	285.0	247	75	125			S
Silver	2.6	0.51	5.079	0	51.2	75	125			S
Uranium	ND	10	25.40	0	0	75	125			S

Sample ID: 2003373-001AMSD	SampType: MSD	TestCode: EPA Method 6010B: Soil Metals
Client ID: Cell 1 Treatment Co	Batch ID: 51057	RunNo: 67378
Prep Date: 3/12/2020	Analysis Date: 3/17/2020	SeqNo: 2323629 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	ND	5.0	24.95	0	0	75	125	0	20	S
Beryllium	25	0.30	24.95	0.6684	95.7	75	125	3.15	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2003373

15-Apr-20

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: **2003373-001AMSD** SampType: **MSD** TestCode: **EPA Method 6010B: Soil Metals**

Client ID: **Cell 1 Treatment Co** Batch ID: **51057** RunNo: **67378**

Prep Date: **3/12/2020** Analysis Date: **3/17/2020** SeqNo: **2323629** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	22	0.20	24.95	0	89.3	75	125	0.660	20	
Chromium	34	0.60	24.95	9.918	96.0	75	125	6.21	20	
Copper	39	0.60	24.95	15.54	92.8	75	125	11.6	20	
Manganese	330	0.20	24.95	285.0	162	75	125	6.67	20	S
Silver	3.0	0.50	4.990	0	59.7	75	125	13.7	20	S
Uranium	ND	10	24.95	0	0	75	125	0	20	S

Sample ID: **MB-51057** SampType: **MBLK** TestCode: **EPA Method 6010B: Soil Metals**

Client ID: **PBS** Batch ID: **51057** RunNo: **67499**

Prep Date: **3/12/2020** Analysis Date: **3/23/2020** SeqNo: **2329481** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	2.6	2.5								

Sample ID: **LCS-51057** SampType: **LCS** TestCode: **EPA Method 6010B: Soil Metals**

Client ID: **LCSS** Batch ID: **51057** RunNo: **67499**

Prep Date: **3/12/2020** Analysis Date: **3/23/2020** SeqNo: **2329482** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	29	2.5	25.00	0	115	80	120			B

Sample ID: **MB-51057** SampType: **MBLK** TestCode: **EPA Method 6010B: Soil Metals**

Client ID: **PBS** Batch ID: **51057** RunNo: **67499**

Prep Date: **3/12/2020** Analysis Date: **3/23/2020** SeqNo: **2329542** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	0.30								
Selenium	ND	2.5								

Sample ID: **LCS-51057** SampType: **LCS** TestCode: **EPA Method 6010B: Soil Metals**

Client ID: **LCSS** Batch ID: **51057** RunNo: **67499**

Prep Date: **3/12/2020** Analysis Date: **3/23/2020** SeqNo: **2329543** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	25	0.30	25.00	0	100	80	120			
Selenium	24	2.5	25.00	0	96.3	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2003373**

15-Apr-20

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: **2003373-001AMS**	SampType: **MS**	TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **Cell 1 Treatment Co**	Batch ID: **51057**	RunNo: **67499**
Prep Date: **3/12/2020**	Analysis Date: **3/23/2020**	SeqNo: **2329570** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	33	0.61	25.40	12.41	82.9	75	125			
Selenium	18	5.1	25.40	0	71.7	75	125			S

Sample ID: **2003373-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **Cell 1 Treatment Co**	Batch ID: **51057**	RunNo: **67499**
Prep Date: **3/12/2020**	Analysis Date: **3/23/2020**	SeqNo: **2329571** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	33	0.60	24.95	12.41	81.9	75	125	1.84	20	
Selenium	21	5.0	24.95	0	84.1	75	125	14.1	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2003373**

15-Apr-20

Client: Rule Engineering LLC

Project: Agua Moss Sunco Landfarm

Sample ID: **lcs-51006**	SampType: **LCS**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **LCSS**	Batch ID: **51006**	RunNo: **67211**
Prep Date: **3/10/2020**	Analysis Date: **3/11/2020**	SeqNo: **2315729** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	22	5.0	25.00	0	87.8	70	130			
Surr: BFB	490		500.0		98.0	70	130			

Sample ID: **mb-51006**	SampType: **MBLK**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **PBS**	Batch ID: **51006**	RunNo: **67211**
Prep Date: **3/10/2020**	Analysis Date: **3/11/2020**	SeqNo: **2315730** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	480		500.0		95.1	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- B Analyte detected in the associated Method Blank
- D Sample Diluted Due to Matrix
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- PQL Practical Quanitative Limit
- RL Reporting Limit
- S % Recovery outside of range due to dilution or matrix

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: RULE ENGINEERING LL Work Order Number: 2003373 RcptNo: 1

Received By: Erin Melendrez 3/7/2020 9:30:00 AM

Completed By: Leah Baca 3/9/2020 2:51:59 PM

Reviewed By: LB 3/10/20

Chain of Custody

1. Is Chain of Custody sufficiently complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Courier		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. Received at least 1 vial with headspace <1/4" for AQ VOA?	Yes ☑	No ☐	NA ☐
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

#.of preserved bottles checked for pH: 3 (<2 or >12 unless noted)

Adjusted? DAD 3/10/20

Checked by: DAD 3/10/20

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.0	Good				
2	4.7	Good				

Chain-of-Custody Record

Client: Rule Engineering

Mailing Address: 501 Airport Dr, Ste 205
Farmington, NM 87401

Phone #: (505) 716-2787

email or Fax#:

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: Agua Moss Sunco Landfarm

Project #:

Project Manager: Heather Woods

Sampler: Heather Woods

On Ice: ☒ Yes ☐ No

# of Coolers: 2

Cooler Temp (including CF): 4.1-0.1(CF) = 4.0°C
4.8-0.1(CF) = 4.7°C

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE, Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2003373	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	(Cl, F, Br, NO3, NO2, PO4, SO4) 300.0 cl	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	See Attached
3/6/20	1038	Soil	Cell #1 Treatment Comp	(3) 4oz Glass	Non	-001	X	X					X				X
3/6/20	1059	Soil	Cell #2N Treatment Comp	(3) 4oz Glass	Non	-002	X	X					X				X
3/6/20	1052	Soil	Cell #2S Treatment Comp	(3) 4oz Glass	Non	-003	X	X					X				X

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
3/6/20	1740	Heath M. Woods	Christine Walls		3/6/20	1740
3/6/20	1814	Christine Walls		Courier	3/7/20	0930

Remarks:
Direct Bill to Agua Moss
Rush per Andy
Reporting Limits per Attached

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

NMAC 20.6.2 - Groundwater standards:

A. Human Health Standards

(1) Numerical Standards

(a) Antimony (Sb) (CAS 7440-36-0).....0.006 mg/l
(b) Arsenic (As) (CAS 7440-38-2).....0.01 mg/l
(c) Barium (Ba) (CAS 7440-39-3).....2 mg/l
(d) Beryllium (be) (CAS 7440-41-7).....0.004 mg/l
(e) Cadmium (Cd) (CAS 7440-43-9).....0.005 mg/l
(f) Chromium (Cr) (CAS 7440-47-3).....0.05 mg/l
(g) Cyanide (CN) (CAS 57-12-5).....0.2 mg/l
(h) Fluoride (F) (CAS 16984-48-8).....1.6 mg/l
(i) Lead (Pb) (CAS 7439-92-1).....0.015 mg/l
(j) Total Mercury (Hg) (CAS 7439-97-6).....0.002 mg/l
(k) Nitrate (NO_3 as N) (CAS 14797-55-8).....10.0 mg/l
(l) Nitrite (NO_2 as N) (CAS 10102-44-0).....1.0 mg/l
(m) Selenium (Se) (CAS 7782-49-2).....0.05 mg/l
(n) Silver (Ag) (CAS 7440-224).....0.05 mg/l
(o) Thallium (Tl) (CAS 7440-28-0).....0.002 mg/l
(p) Uranium (U) (CAS 7440-61-1).....0.03 mg/l
(q) Radioactivity: Combined Radium-226 (CAS 13982-63-3) and Radium-228 (CAS 15262-20-1).....5 pCi/l
(r) Benzene (CAS 71-43-2).....0.005 mg/l
(s) Polychlorinated biphenyls (PCB's) (CAS 1336-36-3).0.0005 mg/l
(t) Toluene (CAS 108-88-3).....1 mg/l
(u) Carbon Tetrachloride (CAS 56-23-5).....0.005 mg/l
(v) 1,2-dichloroethane (EDC) (CAS 107-06-2).....0.005 mg/l
(w) 1,1-dichloroethylene (1,1-DCE) (CAS 75-35-4).....0.007 mg/l
(x) tetrachloroethylene (PCE) (CAS 127-18-4).....0.005 mg/l
(y) trichloroethylene (TCE) (CAS 79-01-6).....0.005 mg/l
(z) ethylbenzene (CAS 100-41-4).....0.7 mg/l
(aa) total xylenes (CAS 1330-20-7).....0.62 mg/l
(bb) methylene chloride (CAS 75-09-2).....0.005 mg/l
(cc) chloroform (CAS 67-66-3).....0.1 mg/l
(dd) 1,1-dichloroethane (CAS 75-34-3).....0.025 mg/l
(ee) ethylene dibromide (EDB) (CAS 106-93-4).....0.00005 mg/l
(ff) 1,1,1-trichloroethane (CAS 71-55-6).....0.2 mg/l
(gg) 1,1,2-trichloroethane (CAS 79-00-5).....0.005 mg/l
(hh) 1,1,2,2-tetrachloroethane (CAS 79-34-5).....0.01 mg/l
(ii) vinyl chloride (CAS 75-01-4).....0.002 mg/l
(jj) PAHs: total naphthalene (CAS 91-20-3) plus monomethylnaphthalenes ...0.03 mg/l
(kk) benzo-a-pyrene (CAS 50-32-8).....0.0002 mg/l
(ll) cis-1,2-dichloroethene (CAS 156-59-2).....0.07 mg/l
(mm) trans-1,2-dichloroethene (CAS 156-60-5).....0.1 mg/l
(nn) 1,2-dichloropropane (PDC) (CAS 78-87-5).....0.005 mg/l
(oo) styrene (CAS 100-42-5).....0.1 mg/l
(pp) 1,2-dichlorobenzene (CAS 95-50-1).....0.6 mg/l
(qq) 1,4-dichlorobenzene (CAS 106-46-7).....0.075 mg/l
(rr) 1,2,4-trichlorobenzene (CAS 120-82-1).....0.07 mg/l
(ss) pentachlorophenol (CAS 87-86-5).....0.001 mg/l
(tt) atrazine (CAS 1912-24-9).....0.003 mg/l

(2) Standards for Toxic Pollutants. A toxic pollutant shall not be present at a concentration shown by credible scientific data and other evidence appropriate under the Water Quality Act, currently available to the public, to have potential for causing one or more of the following effects upon exposure, ingestion, or assimilation either directly from the environment or indirectly by ingestion through food chains: (1) unreasonably threatens to injure human health, or the health of animals or plants which are commonly hatched, bred, cultivated or protected for use by man for food or economic benefit; as used in this definition injuries to health include death, histopathologic change, clinical symptoms of disease, behavioral abnormalities, genetic mutation, physiological malfunctions or physical deformations in such organisms or their offspring; or (2) creates a lifetime risk of more than one cancer per 100,000 exposed persons.

(3) Standards for Non-Aqueous Phase Liquids. Non-aqueous phase liquid shall not be present floating atop of or immersed within ground water, as can be reasonably measured.

B. Other Standards for Domestic Water Supply

(1) Chloride (Cl) (CAS 16887-00-6).....250.0 mg/l
(2) Copper (Cu) (CAS 7440-50-8).....1.0 mg/l
(3) Iron (Fe) (CAS 7439-89-6).....1.0 mg/l
(4) Manganese (Mn) (CAS 7439-96-5).....0.2 mg/l
(5) Phenols.....0.005 mg/l
(6) Sulfate (SO_4) (CAS 14808-79-8).....600.0 mg/l
(7) ~~Total Dissolved Solids (TDS) TDS~~.....1000.0 mg/l
(8) Zinc (Zn) (CAS 7440-66-6).....10.0 mg/l
(9) pH.....between 6 and 9
(10) Methyl tertiary-butyl ether (MTBE) (CAS 1634-04-4).....0.1 mg/l

LB 3/9/2010

Toxic Pollutant data:

(2) "**toxic pollutant**" means any water contaminant or combination of the water contaminants in the list below
- (a) acrolein (CAS 107-02-8)
- (b) acrylonitrile (CAS 107-13-1)
- (c) benzene and alkylbenzenes
  - (i) benzene (CAS 71-43-2)
  - (ii) toluene (methylbenzene) (CAS 108-88-3)
  - (iii) ethylbenzene (CAS 100-41-4)
  - (iv) xylenes (dimethyl benzene isomers): o-xylene (CAS 95-47-6); m-xylene (CAS 108-38-3); and p-xylene (CAS 106-42-3)
  - (v) styrene (ethenylbenzene) (CAS 100-42-5)
- (d) chlorinated benzenes
  - (i) monochlorobenzene (CAS 108-90-7)
  - (ii) 1,2-dichlorobenzene (ortho-dichlorobenzene) (CAS 95-50-1)
  - (iii) 1,4-dichlorobenzene (para-dichlorobenzene) (CAS 106-46-7)
  - (iv) 1,2,4-trichlorobenzene (CAS 120-82-1)
  - (v) 1,2,4,5-tetrachlorobenzene (CAS 95-94-3)
  - (vi) pentachlorobenzene (CAS 608-93-5)
  - (vii) hexachlorobenzene (CAS 118-74-1)
- (e) chlorinated phenols
  - (i) 2,4-dichlorophenol (CAS 120-83-2)
  - (ii) 2,4,5-trichlorophenol (CAS 95-95-4)
  - (iii) 2,4,6-trichlorophenol (CAS 88-06-2)
  - (iv) pentachlorophenol (PCP) (CAS 87-86-5)
- (f) chloroalkyl ethers
  - (i) bis (2-chloroethyl) ether (CAS 111-44-4)
  - (ii) bis (2-chloroisopropyl) ether (CAS 108-60-1)
  - (iii) bis (chloromethyl) ether (CAS 542-88-1)
- (g) 1,2-dichloropropane (propylene dichloride, PDC) (CAS 78-87-5)
- (h) dichloropropenes (CAS 542-75-6)
- (i) 1,4-dioxane (CAS 123-91-1)
- (j) halogenated ethanes
  - (i) 1,2-dibromoethane (ethylene dibromide, EDB) (CAS 106-93-4)
  - (ii) 1,1-dichloroethane (1,1-DCA) (CAS 75-34-3)
  - (iii) 1,2-dichloroethane (ethylene dichloride, EDC) (CAS 107-06-2)
  - (iv) 1,1,1-trichloroethane (TCA) (CAS 71-55-6)
  - (v) 1,1,2-trichloroethane (1,1,2-TCA) (CAS 79-00-5)
  - (vi) 1,1,2,2-tetrachloroethane (CAS 79-34-5)
  - (vii) hexachloroethane (CAS 67-72-1)
- (k) halogenated ethenes
  - (i) chloroethene (vinyl chloride) (CAS 75-01-4)
  - (ii) 1,1-dichloroethene (1,1-DCE) (CAS 75-35-4)
  - (iii) cis-1,2-dichloroethene (cis-1,2-DCE) (CAS 156-59-2)
  - (iv) trans-1,2-dichloroethene (trans-1,2-DCE) (CAS 156-60-5)
  - (v) trichloroethene (trichloroethylene, TCE) (CAS 79-01-6)
  - (vi) tetrachloroethene (perchloroethylene, PCE) (CAS 127-18-4)
- (l) halogenated methanes
  - (i) bromodichloromethane (CAS 75-27-4)

No 7/13

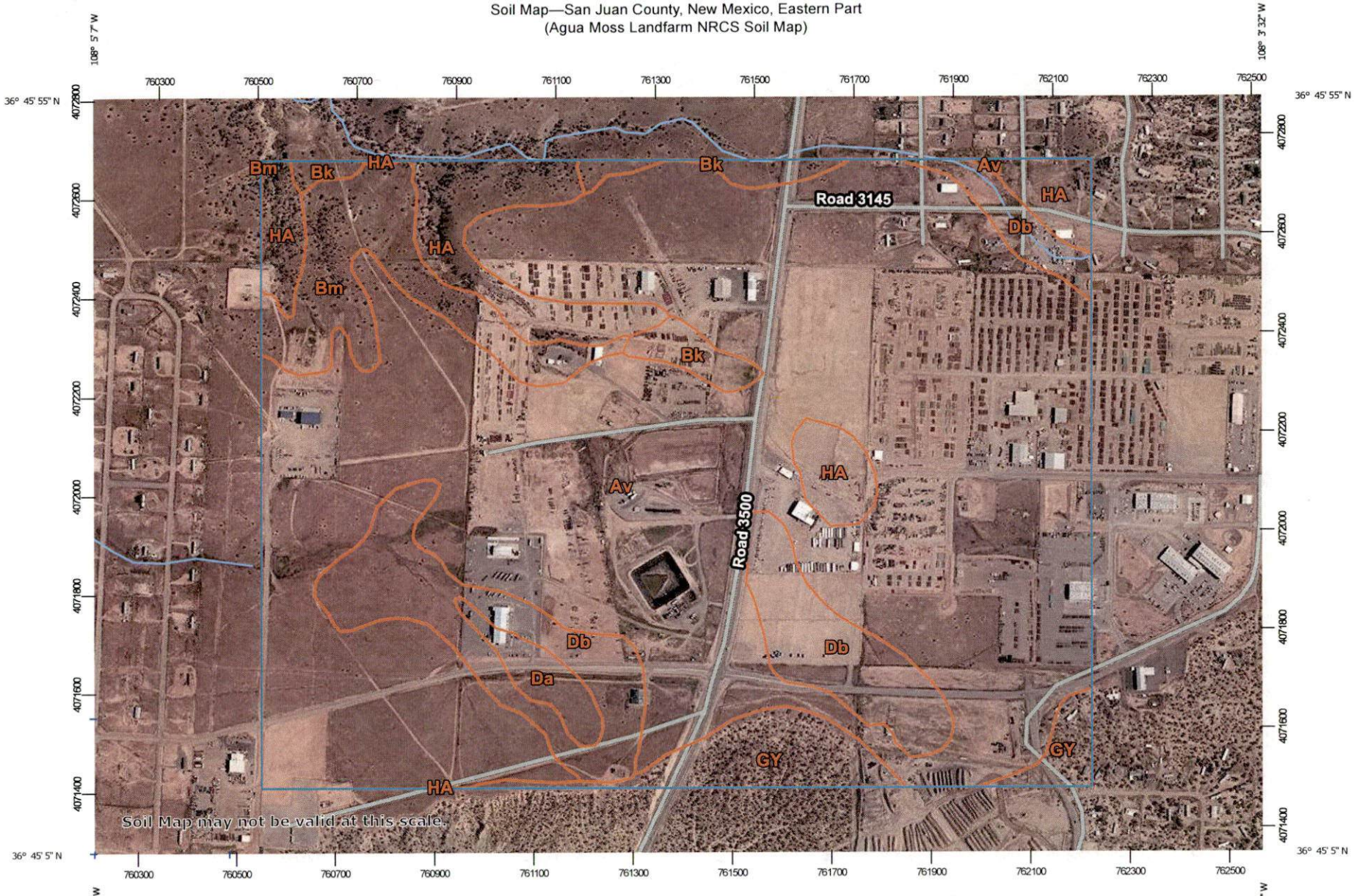
Attachment 2

NRCS Web Soil Survey Soil Map

&

NRCS Web Soil Survey Chemical Soil Properties Report

Soil Map—San Juan County, New Mexico, Eastern Part
(Agua Moss Landfarm NRCS Soil Map)



Map Scale: 1:10,800 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 150 300 600 900

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:63,400.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Juan County, New Mexico, Eastern Part
Survey Area Data: Version 15, Sep 15, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 20, 2015—May 30, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Av	Avalon sandy loam, 2 to 5 percent slopes	367.9	69.9%
Bk	Blackston loam, 0 to 3 percent slopes	10.4	2.0%
Bm	Blackston gravelly loam, 3 to 8 percent slopes	27.9	5.3%
Da	Doak loam, 0 to 1 percent slopes	6.4	1.2%
Db	Doak loam, 1 to 3 percent slopes	56.3	10.7%
GY	Gypsiorthids-Badland-Stumble complex, moderately steep	20.0	3.8%
HA	Haplargids-Blackston-Torriorthents complex, very steep	37.2	7.1%
Totals for Area of Interest		**526.1**	**100.0%**

Chemical Soil Properties

This table shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable cations plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. It is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil.

Gypsum is expressed as a percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size. Gypsum is partially soluble in water. Soils that have a high content of gypsum may collapse if the gypsum is removed by percolating water.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio (SAR) is a measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced saturated hydraulic conductivity and aeration, and a general degradation of soil structure.

Report—Chemical Soil Properties

Chemical Soil Properties–San Juan County, New Mexico, Eastern Part								
Map symbol and soil name	**Depth**	**Cation-exchange capacity**	**Effective cation-exchange capacity**	**Soil reaction**	**Calcium carbonate**	**Gypsum**	**Salinity**	**Sodium adsorption ratio**
	In	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
Av—Avalon sandy loam, 2 to 5 percent slopes								
Avalon	0-14	4.6-12	—	7.9-8.4	1-10	0-2	2.0-8.0	0
	14-53	11-23	—	7.9-8.4	10-20	0-2	2.0-8.0	0
	53-72	4.0-11	—	7.9-8.4	15-20	0-2	2.0-8.0	0
Ax—Avalon sandy loam, 5 to 8 percent slopes								
Avalon	0-16	4.6-12	—	7.9-8.4	1-5	0-2	2.0-8.0	0
	16-80	11-23	—	7.9-8.4	10-20	0-2	2.0-8.0	0
	80-84	4.0-11	—	7.9-8.4	15-20	0-2	2.0-8.0	0
Ay—Avalon loam, 0 to 3 percent slopes								
Avalon	0-18	9.8-15	—	7.9-8.4	1-5	0-2	2.0-8.0	0
	18-60	11-23	—	7.9-8.4	10-20	0-2	2.0-8.0	0
	60-64	4.0-11	—	7.9-8.4	15-20	0-2	2.0-8.0	0
Bk—Blackston loam, 0 to 3 percent slopes								
Blackston	0-11	11-18	—	7.9-8.4	1-5	0	0.0-2.0	0
	11-27	9.8-17	—	7.9-8.4	15-20	0	4.0-8.0	0
	27-80	0.0-4.6	—	7.9-8.4	15-20	0	4.0-8.0	0

Chemical Soil Properties–San Juan County, New Mexico, Eastern Part								
Map symbol and soil name	**Depth**	**Cation-exchange capacity**	**Effective cation-exchange capacity**	**Soil reaction**	**Calcium carbonate**	**Gypsum**	**Salinity**	**Sodium adsorption ratio**
	In	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
Bm—Blackston gravelly loam, 3 to 8 percent slopes								
Blackston	0-9	11-18	—	7.9-8.4	1-5	0	0.0-2.0	0
	9-25	9.8-17	—	7.9-8.4	15-20	0	4.0-8.0	0
	25-60	0.0-4.6	—	7.9-8.4	15-20	0	4.0-8.0	0
BR—Blancot-Fruitland association, gently sloping								
Blancot	0-6	9.8-18	—	7.9-8.4	0-5	0-1	0.0-2.0	0-2
	6-60	13-23	—	7.9-8.4	0-5	0-1	0.0-2.0	0-2
Fruitland	0-8	4.1-7.6	—	7.4-8.4	0-2	0-1	0.0-4.0	0
	8-60	3.1-12	—	7.4-8.4	0-2	0-1	0.0-4.0	0
Da—Doak loam, 0 to 1 percent slopes								
Doak	0-6	11-19	—	7.4-8.4	0-5	0	0.0-2.0	0
	6-41	15-23	—	7.4-9.0	1-10	0	2.0-4.0	0-2
	41-60	15-23	—	7.9-9.0	5-10	0-2	2.0-4.0	0-2
Db—Doak loam, 1 to 3 percent slopes								
Doak	0-4	11-19	—	7.4-8.4	0-5	0	0.0-2.0	0
	4-33	15-23	—	7.4-9.0	1-10	0	2.0-4.0	0-2
	33-60	15-23	—	7.9-9.0	5-10	0-2	2.0-4.0	0-2

Chemical Soil Properties–San Juan County, New Mexico, Eastern Part								
Map symbol and soil name	**Depth**	**Cation-exchange capacity**	**Effective cation-exchange capacity**	**Soil reaction**	**Calcium carbonate**	**Gypsum**	**Salinity**	**Sodium adsorption ratio**
	In	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
GY—Gypsiorthids-Badland-Stumble complex, moderately steep								
Badland	0-2	—	—	—	—	—	—	—
	2-60	—	—	—	—	—	—	—
Gypsiorthids	0-4	2.6-8.1	—	7.4-8.4	0	10-25	2.0-4.0	0
	4-16	2.6-8.1	—	7.4-8.4	0	15-25	2.0-4.0	0
	16-20	—	—	—	—	—	—	—
Stumble	0-8	0.0-7.4	—	7.9-8.4	0-1	0-1	0.0-2.0	0
	8-60	0.0-7.4	—	7.9-9.0	0-1	0-1	0.0-4.0	0
HA—Haplargids-Blackston-Torriorthents complex, very steep								
Haplargids	0-7	7.0-14	—	7.4-8.4	0	0	0.0-4.0	0
	7-26	13-23	—	7.4-8.4	0-5	0	0.0-4.0	0
	26-60	13-18	—	7.4-8.4	1-10	0	0.0-4.0	0
Blackston	0-11	11-18	—	7.9-8.4	0-2	0	0.0-2.0	0
	11-26	9.8-17	—	7.9-8.4	10-20	0	4.0-8.0	0
	26-60	0.0-4.6	—	7.9-8.4	15-30	0	4.0-8.0	0
Torriorthents	0-3	11-17	—	7.4-8.4	0-2	0-2	0.0-4.0	0
	3-15	5.7-19	—	7.4-8.4	0-2	0-2	0.0-4.0	0-2
	15-60	—	—	—	—	—	—	—

Chemical Soil Properties–San Juan County, New Mexico, Eastern Part								
Map symbol and soil name	**Depth**	**Cation-exchange capacity**	**Effective cation-exchange capacity**	**Soil reaction**	**Calcium carbonate**	**Gypsum**	**Salinity**	**Sodium adsorption ratio**
	In	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
SW—Stumble-Fruitland association, gently sloping								
Stumble	0-6	0.0-6.9	—	7.9-8.4	0-1	0	0.0-2.0	0
	6-29	0.0-6.9	—	7.9-9.0	0-1	0	0.0-2.0	0
	29-60	0.0-3.7	—	7.9-9.0	0-1	0	0.0-2.0	0
	60-64	0.0-6.9	—	7.9-9.0	0-1	0	0.0-2.0	0
Fruitland	0-7	3.1-7.4	—	7.4-8.4	1-5	0	0.0-2.0	0
	7-60	3.1-12	—	7.4-8.4	1-5	0	0.0-2.0	0

Data Source Information

Soil Survey Area: San Juan County, New Mexico, Eastern Part
Survey Area Data: Version 15, Sep 15, 2019