National Aeronautics and
Space Administration

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November 29, 2016

Reply to Attn of: RE-16-155

Mr. John E. Kieling, Chief
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

Subject: Request for a "Contained-In" Determination for 400 Area Investigation-Derived Waste (IDW)

NASA is requesting a "No Longer Contained-In" Determination (NLCID) for the investigation-derived waste (IDW soil and IDW debris) initially generated during activities associated with the 400 Area Closure Investigation Work Plan (IWP), which was approved by NMED on November 8, 2011. This "Contained-In" Determination is applicable to the IDW generated from soil boring locations 400-SB-03, 400-SB-04, 400-SB-10, 400-SB-12, and 400-SB-15. Currently, IDW soil and IDW debris are being managed as listed hazardous waste carrying EPA Waste Codes F001 and F002 in accordance with the 400 Area IWP Investigation-Derived Waste Management Plan (Appendix C) and 40 CFR §262.34. The earliest 90-day accumulation time limit expiration date for the IDW associated with this NLCID will expire on December 21, 2016.

NASA received, reviewed, and compared analytical data generated from the IDW soil to the applicable 40 CFR §268 Subpart D Treatment Standards and to the Soil Screening Levels (SSLs) provided in the NMED Risk Assessment Guidance for Site Investigations and Remediation (2015). For all IDW soil generated, F001 and F002 contaminants of concern were not detected above regulatory limits. NASA is requesting a NLCID for the F001 and F002 hazardous waste listing. NASA also compared N-Nitrosodimethylamine (NDMA) data to the SSLs identified in the NMED Risk Assessment Guidance for Site Investigations and Remediation (2015) for Industrial/ Occupational and Construction Worker Soil. NDMA was not detected in the IDW soil at concentrations above these SSLs.

If NMED finds the IDW soil meets the applicable standards and clean-up levels, NASA requests concurrence from the NMED to place the soil on the ground in the area of borings, as identified in the IDW disposition procedures of the NMED approved 400 Area IWP (Appendix C). Upon receipt of an approved NLCID and concurrence from the NMED, NASA will transport the containers of soil back to their point of generation and evenly land apply the environmental media to the ground and away from potential storm water run-off. Final disposal location of all environmental media will be documented. The remaining IDW debris will be disposed of as solid waste.

Enclosure 1 provides a background and basis for the NLCID. Enclosure 2 provides detection summary tables of the analytical results and a comparison to applicable regulatory limits. Enclosure 3 provides a CD-ROM containing analytical summaries, laboratory analytical reports, and chain of custody documentation.

I certify under penalty of law that this document and attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have any questions or comments, please contact me at 575-524-5024, or Antonette Sanchez of my staff, at 575-524-5497.

Timothy J. Davis
Chief, Environmental Office

Enclosures (3)

cc: (w/enclosures)
Mr. Gabriel Acevedo
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2905 Rodeo Park Drive East, Building 1
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Background

Various propulsion systems have been tested in the WSTF 400 Area since the mid-1960s. Two impoundments in the 400 Area received diluted hypergolic propellants in aqueous solution and spent solvents through the mid-1980s. Aqueous solutions of hydrazine based propellants (hydrazine, monomethylhydrazine, unsymmetrical dimethylhydrazine, Aerozine 50) were received at the impoundments and treated through a preconditioning and oxidation (neutralization) process. This process included the addition of caustic soda and either calcium hypochlorite trihydrate or peroxide to the hydrazine/water solution. Once contained in the impoundments, the hydrazine/water mixtures were drawn into mixing tanks, neutralized, and then reintroduced back to the surface impoundments. The wastes were subsequently discharged into an adjacent arroyo when the concentrations of hydrazine species fell below existing detection limits. Research conducted for the historical investigation summary (HIS) associated with the 400 Area Investigation Work Plan (IWP) found chemicals meeting the listing descriptions of spent F001 and F002 per 40 CFR §261 Subpart D were used as solvents and referee propellants in the 400 Area. These F001 and F002 listed wastes were included in the waste streams managed within the 400 Area impoundments, but were not treated before discharge to the adjacent arroyo.

The 400 Area impoundments last received waste in 1985, and were closed in accordance with an approved Closure Plan. Closure activities concluded in March 1989. The impoundments have remained in Post Closure Care (PCC) since that time. The current WSTF Resource Conservation and Recovery Act (RCRA) Hazardous Waste Operating Permit (NMED, 2009; Permit) required an investigation of soil directly beneath and adjacent to the 400 Area impoundments. The NMED Hazardous Waste Bureau approved the 400 Area IWP and an associated abbreviated drilling work plan, which identified 15 soil boring locations. Five of the soil borings were designated to be completed as combination soil vapor/groundwater monitoring wells, while the remainder were designated as soil vapor monitoring wells only. The purpose of the monitoring wells are to provide additional vertical delineation of the soil, soil vapor, and groundwater chemistry around the 400 Area Closure. This information will be used to determine if there is a continuing source of contamination.

NASA initiated the 400 Area Investigation in September 2016. The sonic drilling method was used to advance investigation boreholes through pediment alluvium, which overlies conglomerate and volcanic bedrock. Alluvium encountered thus far has been in the vadose zone, and was unconsolidated to moderately consolidated fine to coarse grain sand and gravel with limestone, dolomite, and quartzite clasts. Groundwater was encountered in discrete fractures in the volcanic bedrock in boreholes that have been advanced beyond the alluvium/bedrock contact. But, the hardness and consolidated nature of the conglomerate and volcanic bedrock made the sonic drilling method ineffective at advancing boreholes to the required depth. After encountering these issues at 400-SB-04, the drilling method was switched to air hammer at the alluvium/bedrock contact in subsequent boreholes designated for completion as a groundwater/soil vapor well. The air hammer drilling method allowed for more efficient advancement of the borings through the conglomerate and volcanic bedrock, where groundwater was encountered.

Investigation-derived waste (IDW) generated to date includes IDW soil (from the sonic drilling method), IDW drill cuttings (from the air hammer drilling method), contact contaminated debris, decontamination water, and contaminated groundwater. The 400 Area Investigation location is within the known boundaries of the WSTF groundwater contamination plume and includes areas near the 400 Area impoundments, which are known to have previously contained F001 and F002 listed hazardous waste. Environmental media, such as soil and groundwater, are considered to meet the definition of a RCRA solid waste at the time it becomes actively managed. Therefore, IDW generated as part of 400 Area Investigation are subject to regulation under the "contained-in" policy carrying EPA Waste Codes F001 and F002 per 40 CFR §261 Subpart D with constituents of concern (COCs): trichloroethene, tetrachloroethene, trichlorofluoromethane, and 1,1,2-trichloro-1,2,2-trifluoroethane.

Waste characterization and hazardous waste determination for 400 Area Investigation IDW is being conducted in accordance with Permit Attachment 12 (Waste Analysis Plan) and 40 CFR §260 and 261. NASA has received analytical results from waste characterization samples collected from 400 Area Investigation IDW soil generated through October 19, 2016, and is requesting that the NMED perform a "contained-in" determination to determine whether the material poses an unacceptable risk for the 17 one-cubic yard containers of IDW soil and two containers, one cubic yard and one 55-gallon, of contact contaminated debris included in this request.

Basis for "Contained-In" Determination

NASA is requesting that NMED perform a NLCID for environmental media (IDW soil) and associated contaminated IDW contact debris. Aqueous IDW, such as decontamination water and contaminated groundwater, is being managed as hazardous waste and treated at the Mid-plume Interception and Treatment System. Aqueous IDW is not part of this request. Analytical data for the IDW drill cuttings, generated during air hammer drilling, will be included in a subsequent request. IDW drill cuttings are also not part of this current NLCID. Analytical sampling data have been received and reviewed for the IDW soil that originated from the 400 Area Investigation boreholes 400-SB-03, 400-SB-04, 400-SB-10, 400-SB-12, and 400-SB-15 using the sonic drilling technique. Waste characterization for the IDW was completed in accordance with Attachment 12 of the Permit: Waste Analysis Plan. Analytical summary tables are provided in Enclosure 2 and the analytical reports are provided in Enclosure 3. Analytical data may be compared to the applicable 40 CFR §268 Subpart D Treatment Standards and the 2015 NMED Soil Screening Levels (SSLs). If the environmental media IDW is found not to pose an unacceptable risk, then NMED may determine the soil and associated contact IDW can be managed as no-longer containing listed hazardous waste.

F001 and F002 Constituents of Concern

F001 and F002 COCs were not detected above the laboratory's method detection reporting limits in the waste characterization samples, which in all cases were below the regulatory limits included in the 40 CFR §268 Subpart D Treatment Standards and the 2015 NMED SSLs. Of the listed COCs, only Tetrachloroethene (PCE) was detected at a concentration of 1.1 mg/Kg with a J flag data qualifier, which indicated the reported result was an estimated concentration between the method detection limit and reporting limit.

Other Constituents

Metals

Native soils located at WSTF are known to have the potential to contain metals at concentrations that exceed regulatory limits. Metals sampling was performed based on the potential for land application of any environmental media that no longer contains listed hazardous waste. The sampling was performed to address the 40 CFR §261.24 Toxicity Characteristic incorporating the 40 CFR §268 Land Disposal Restrictions and the 2015 NMED SSLs. Based on the sampling results, metals were not detected in the IDW soil at concentrations exceeding the 40 CFR §261.24 Toxicity Characteristic limits, 40 CFR §268 40 Treatment Standard Limits, or the NMED SSLs.

N-Nitrosodimethylamine (NDMA)

NDMA is a constituent than can be present in hydrazine based propellants as an impurity. It is also a byproduct generated from treating hydrazine based propellants by oxidation (neutralization), which was known to have occurred at the 400 Area impoundments. The 400 Area Investigation location is within the known boundaries of the WSTF groundwater contamination plume, which is also known to contain NDMA. As with all total concentration results provided with this request, NASA compared the reported total concentration of NDMA with the NMED SSL for Industrial/Occupational Soil and Construction Worker Soil. The comparison was made to the SSL for Industrial/Occupation Soil in accordance with the waste disposition procedures identified in Appendix C (400 Area Closure Investigation Derived Waste Procedures) of the NMED approved 400 Area IWP. A comparison of results to the SSL for Construction Worker Soil was provided as a conservative measure, based on the potential for land application of the IDW soil if NMED finds it does not contains listed hazardous waste. Based on the waste characterization sampling results, NDMA was not detected above 40 CFR §268 40 Treatment Standard Limit, or the 2015 NMED SSLs.

Other Volatile Organics

In addition to the F001 and F002 COCs, the laboratory's target analyte list for SW-846 Method 8260C includes the majority of volatile organics typically analyzed for by SW-846 Method 8260C. Acetone and dichloromethane were detected at trace concentrations (< 10 ppb). Acetone and dichloromethane are known lab contaminates. Carbon disulfide was detected at a concentration of 1.7 ppb and included a J flag data qualifier indicating the reported result was between the method reporting limit and the method detection limit.

Other Semi-Volatile Organics

N-Nitrodimethylamine (DMN) and bromacil are analytes included in EPA Method 607M with the reported NDMA results. The maximum observed concentrations for these constituents were 0.07058 mg/Kg and 0.0002 mg/Kg, respectively. The bromacil result included a J flag data qualifier indicating the reported result was between the method reporting limit and the method detection limit. The 40 CFR §268 40 Treatment Standards do not include a treatment limit for N-Nitrodimethylamine or bromacil. Also, the NMED SSLs, in addition to the U.S. EPA Regional Screening Levels (RSLs) do not include a cleanup level for these constituents.

Analytical Reports and Chain of Custodies

Analytical reports are provided in Enclosure 3 for waste characterization samples collected from individual waste containers. Analytical data sheets specific to each analyses are included in the laboratory reports for each sampling event. The complete analytical report includes the laboratory case narrative and supporting documentation.

Other Considerations

If NMED finds the IDW soil does not contain hazardous waste, NASA is requesting concurrence from the NMED to dispose of this environmental media in accordance with the waste disposition procedures identified in Appendix C of the NMED approved 400 Area IWP (400 Area Closure Investigation Derived Waste Procedures). In addition to the comparison of results to the SSL for Industrial Soils that was identified in the waste disposition procedures of the 400 Area IWP, NASA has included the SSL for Construction Worker Soil in the analytical summary tables to allow a comparison of total concentrations to this limit. NASA believes that the SSL for Construction Worker Soil is the most conservative relevant SSL that would apply in the unlikely scenario that the ground where the IDW soil is applied is disturbed in the future.

Upon NMED approval of the NLCID, NASA will land apply the IDW soil on the ground near the point of generation away from potential storm water run-off. NASA will document the final disposal locations of all land applied environmental media. The remaining IDW contact debris identified in this request will be disposed of as solid waste.

Table 1 400-SB-03 IDW Soil VOC Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Nonwastewaters Concentration (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1610140835 **#7329 1/8/17**	8260C	Acetone	0.0032J	N/A	160	9.60E+05	2.42E+05
1610140830 **#7330 1/8/17**		None	ND	N/A	N/A	N/A	N/A
1610140840 **#7338 1/9/17**		Acetone	0.0032J	N/A	160	9.60E+05	2.42E+05

Table 2 400-SB-03 IDW Soil Nitrosamine Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Nonwastewaters Concentration (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1610140836 **#7329 1/8/17**	607M	N-Nitrosodimethylamine	ND	N/A	2.3	5.03E-01	2.14E+00
		N-Nitrodimethylamine	ND	N/A	N/A	N/A	N/A
		Bromacil	ND	N/A	N/A	N/A	N/A
1610140831 **#7330 1/8/17**		N-Nitrosodimethylamine	ND	N/A	2.3	5.03E-01	2.14E+00
		N-Nitrodimethylamine	0.00033	N/A	N/A	N/A	N/A
		Bromacil	ND	N/A	N/A	N/A	N/A
1610140841 **#7338 1/9/17**		N-Nitrosodimethylamine	ND	N/A	2.3	5.03E-01	2.14E+00
		N-Nitrodimethylamine	ND	N/A	N/A	N/A	N/A
		Bromacil	ND	N/A	N/A	N/A	N/A

Table 3 400-SB-03 IDW Soil TCLP Metals Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	TCLP Results (mg/L)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Nonwastewaters (mg/L TCLP)
1610140838 **#7329** **1/8/17**	1311/6010C	None	ND	N/A	N/A
1610140833 **#7330** **1/8/17**		Chromium Zinc	0.064 0.31	5.0 N/A	0.60 4.3
1610140843 **#7338** **1/9/17**		Zinc	0.12	N/A	4.3

Table 4 400-SB-03 IDW Soil Total Metals Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1610140832 **#7330** **1/8/17**	6010C	Antimony	0.7BJ	5.19E+02	1.42E+02
		Arsenic	3.6	2.15E+01	5.74E+01
		Barium	105	2.55E+05	4.39E+03
		Beryllium	0.40	2.58E+03	1.48E+02
		Cadmium	0.27J	1.11E+03	7.21E+01
		Chromium	6.6	5.05E+02	1.34E+02
		Lead	7.0	8.00E+02	8.00E+02
		Nickel	8.0	2.57E+04	7.53E+02
		Selenium	0.7J	6.49E+03	1.75E+03
		Thallium	4.7	1.30E+01	3.54E+00
		Vanadium	11.9	6.53E+03	6.14E+02
		Zinc	40.7	3.89E+05	1.06E+05
1610140837 **#7329** **1/8/17**	6010C	Arsenic	4.49	2.15E+01	5.74E+01
		Barium	83.3	2.55E+05	4.39E+03
		Beryllium	0.48	2.58E+03	1.48E+02
		Cadmium	0.30J	1.11E+03	7.21E+01
		Chromium	9.03	5.05E+02	1.34E+02
		Lead	8.7	8.00E+02	8.00E+02
		Nickel	8.8	2.57E+04	7.53E+02
		Thallium	1.92	1.30E+01	3.54E+00
		Vanadium	15.1	6.53E+03	6.14E+02
		Zinc	38.1	3.89E+05	1.06E+05
1610140842 **#7338** **1/9/17**	6010C	Arsenic	5.5	2.15E+01	5.74E+01
		Barium	86.4	2.55E+05	4.39E+03
		Beryllium	0.47	2.58E+03	1.48E+02

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1610140842 **#7338 1/9/17 cont.**		Cadmium	0.35J	1.11E+03	7.21E+01
		Chromium	10.9	5.05E+02	1.34E+02
		Lead	8.4	8.00E+02	8.00E+02
		Nickel	9.7	2.57E+04	7.53E+02
		Silver	0.7J	6.49E+03	1.77E+03
		Thallium	2.0	1.30E+01	3.54E+00
		Vanadium	13.5	6.53E+03	6.14E+02
		Zinc	43.8	3.89E+05	1.06E+05

Table 5 400-SB-04 IDW Soil VOC Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Nonwastewaters (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1610040800 **#7287** **12/21/16**	8260C	Dichloromethane	0.00099J	N/A	30	N/A	N/A
1610040801 **#7287** **12/21/16**		Dichloromethane	0.0008J	N/A	30	N/A	N/A
1610040820 **#7288** **12/21/16**		Acetone Dichloromethane	0.0032J 0.00067J	N/A N/A	160 30	9.60E+05 N/A	2.42E+05 N/A
1610040840 **#7294** **12/22/16**		Acetone Dichloromethane	0.0073J 0.00077J	N/A N/A	160 30	9.60E+05 N/A	2.42E+05 N/A
1610040850 **#7295** **12/23/16**		Acetone Dichloromethane	0.0044J 0.0008J	N/A N/A	160 30	9.60E+05 N/A	2.42E+05 N/A
1610040900 **#7296** **12/25/2016**		Acetone Carbon Disulfide Dichloromethane	0.0082 0.0017J 0.0011J	N/A N/A N/A	160 2.6 30	9.60E+05 8.54E+03 N/A	2.42E+05 1.62E+03 N/A

Table 6 400-SB-04 IDW Soil Nitrosamine Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Analyte	Total Results (mg/Kg)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Nonwastewaters Concentration (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1610040803 **#7287** **12/21/16**	607M	N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	0.00153 0.00421 0.0002J	N/A N/A N/A	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A
1610040804 **#7287** **12/21/16**		N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	0.00166 0.00421 ND	N/A N/A N/A	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A
1610040821 **#7288** **12/21/16**		N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	0.07261 0.07058 ND	N/A N/A N/A	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A
1610040841 **#7294** **12/22/16**		N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	0.05540 0.01649 ND	N/A N/A N/A	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A
1610040851 **#7295** **12/23/16**		N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	0.00199 0.00083 ND	N/A N/A N/A	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A
1610040901 **#7296** **12/25/16**		N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	ND ND ND	N/A N/A N/A	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A

Table 7 400-SB-04 IDW Soil TCLP Metals Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	TCLP Results (mg/L)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Nonwastewaters (mg/L TCLP)
1610040809 **#7287 12/21/16**	1311/6010C	None	ND	N/A	N/A
1610040810 **#7287 12/21/16**		None	ND	N/A	N/A
1610040823 **#7288 12/21/16**		None	ND	N/A	N/A
1610040843 **#7294 12/22/16**		Zinc	0.13	N/A	4.3
1610040853 **#7295 12/23/16**		None	ND	N/A	N/A
1610040903 **#7296 12/25/16**		Nickel Zinc	0.13 0.22	N/A N/A	11 4.3

Table 8 400-SB-04 IDW Soil Total Metals Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1610040806 **#7287 12/21/16**	6010C	Arsenic	3.5	2.15E+01	5.74E+01
		Barium	68.5	2.55E+05	4.39E+03
		Beryllium	0.43	2.58E+03	1.48E+02
		Cadmium	0.11J	1.11E+03	7.21E+01
		Chromium	9.5	5.05E+02	1.34E+02
		Lead	7.4	8.00E+02	8.00E+02
		Nickel	8.1	2.57E+04	7.53E+02
		Vanadium	16.8	6.53E+03	6.14E+02
		Zinc	33.8	3.89E+05	1.06E+05
1610040807 **#7287 12/21/16**	6010C/7471B	Arsenic	4.3	2.15E+01	5.74E+01
		Barium	81.4	2.55E+05	4.39E+03
		Beryllium	0.44	2.58E+03	1.48E+02
		Cadmium	0.11J	1.11E+03	7.21E+01
		Chromium	10.4	5.05E+02	1.34E+02
		Lead	7.6	8.00E+02	8.00E+02
		Mercury	0.004J	1.12E+02	2.07E+01
		Nickel	8.8	2.57E+04	7.53E+02
		Thallium	1.1	1.30E+01	3.54E+00
		Vanadium	18.5	6.53E+03	6.14E+02
		Zinc	32.1	3.89E+05	1.06E+05
1610040822 **#7288 12/21/16**	6010C/7471B	Arsenic	4.1	2.15E+01	5.74E+01
		Barium	72.3	2.55E+05	4.39E+03
		Beryllium	0.30 J	2.58E+03	1.48E+02
		Cadmium	0.10J	1.11E+03	7.21E+01
		Chromium	10.5	5.05E+02	1.34E+02
		Lead	8.0	8.00E+02	8.00E+02
		Mercury	0.005J	1.12E+02	2.07E+01
		Nickel	6.1	2.57E+04	7.53E+02
		Thallium	1.0	1.30E+01	3.54E+00
		Vanadium	10.7	6.53E+03	6.14E+02
		Zinc	29.6	3.89E+05	1.06E+05
1610040842 **#7294 12/22/16**	6010C	Arsenic	5.7	2.15E+01	5.74E+01
		Barium	115	2.55E+05	4.39E+03
		Beryllium	0.46	2.58E+03	1.48E+02
		Cadmium	0.14J	1.11E+03	7.21E+01
		Chromium	37.5	5.05E+02	1.34E+02
		Lead	8.1	8.00E+02	8.00E+02
		Nickel	9.6	2.57E+04	7.53E+02

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
		Vanadium	15.9	6.53E+03	6.14E+02
		Zinc	44.0	3.89E+05	1.06E+05
1610040852 **#7295 12/23/16**	6010C/7471B	Arsenic	3.8	2.15E+01	5.74E+01
		Barium	58.5	2.55E+05	4.39E+03
		Beryllium	0.27J	2.58E+03	1.48E+02
		Cadmium	0.09J	1.11E+03	7.21E+01
		Chromium	8.3	5.05E+02	1.34E+02
		Lead	4.3J	8.00E+02	8.00E+02
		Mercury	0.004J	1.12E+02	2.07E+01
		Nickel	6.0	2.57E+04	7.53E+02
		Thallium	1.0	1.30E+01	3.54E+00
		Vanadium	9.3	6.53E+03	6.14E+02
		Zinc	30.1	3.89E+05	1.06E+05
1610040902 **#7296 12/25/16**	6010C	Arsenic	4.8	2.15E+01	5.74E+01
		Barium	106	2.55E+05	4.39E+03
		Beryllium	0.41	2.58E+03	1.48E+02
		Cadmium	0.13J	1.11E+03	7.21E+01
		Chromium	23.8	5.05E+02	1.34E+02
		Lead	7.7	8.00E+02	8.00E+02
		Nickel	7.5	2.57E+04	7.53E+02
		Thallium	2.5	1.30E+01	3.54E+00
		Vanadium	11.5	6.53E+03	6.14E+02
		Zinc	45.6	3.89E+05	1.06E+05

Table 9 400-SB-10 IDW Soil VOC Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Nonwastewaters Concentration (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1610231100 **#7350** **1/17/17**	8260C	Acetone	0.0037J	N/A	30	9.60E+05	2.42E+05
1610231104 **#7349** **1/17/17**		Acetone	0.0046J	N/A	30	9.60E+05	2.42E+05
1610231120 **#7351** **1/17/17**		Acetone Tetrachloroethene	0.0043J 0.0011J	N/A 0.7	30 6.0	9.60E+05 6.29E+02	2.42E+05 1.20E+02
1610231121 **#7351** **1/17/17**		Acetone Tetrachloroethene	0.0049J 0.0011J	N/A 0.7	30 6.0	9.60E+05 6.29E+02	2.42E+05 1.20E+02

Table 10 400-SB-10 IDW Soil Nitrosamine Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Nonwastewaters Concentration (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1610231101 **#7350** **1/17/17**	607M	N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	ND ND ND	N/A N/A N/A	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A
1610231105 **#7349** **1/17/17**		N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	ND ND ND	N/A N/A N/A	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A
1610231123 **#7351** **1/17/17**		N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	ND ND ND	N/A N/A N/A	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Nonwastewaters Concentration (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1610231124 **#7351** **1/17/17**		N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	ND ND ND	N/A N/A N/A	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A

Table 11 400-SB-10 IDW Soil TCLP Metals Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	TCLP Results (mg/L)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Nonwastewaters (mg/L TCLP)
1610231103 **#7350 1/17/17**	1311/6010C	None	ND	N/A	N/A
1610231107 **#7349 1/17/17**		None	ND	N/A	N/A
1610231129 **#7351 1/17/17**		Barium	3.6	100	21
1610231130 **#7351 1/17/17**		Barium	3.1	100	21

Table 12 400-SB-10 IDW Soil Total Metals Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1610231102 **#7350 1/17/17**	6010C	Arsenic	4.0	2.15E+01	5.74E+01
		Barium	78.2	2.55E+05	4.39E+03
		Beryllium	0.41	2.58E+03	1.48E+02
		Cadmium	0.48J	1.11E+03	7.21E+01
		Chromium	8.0	5.05E+02	1.34E+02
		Lead	11.4	8.00E+02	8.00E+02
		Nickel	7.4	2.57E+04	7.53E+02
		Selenium	1.3	6.49E+03	1.75E+03
		Vanadium	15.0	6.53E+03	6.14E+02
		Zinc	51.6	3.89E+05	1.06E+05
1610231106 **#7349 1/17/17**	6010C	Arsenic	4.1	2.15E+01	5.74E+01
		Barium	141	2.55E+05	4.39E+03
		Beryllium	0.41	2.58E+03	1.48E+02
		Cadmium	0.31J	1.11E+03	7.21E+01
		Chromium	12.9	5.05E+02	1.34E+02
		Lead	11.2	8.00E+02	8.00E+02
		Nickel	9.3	2.57E+04	7.53E+02
		Selenium	1.1	6.49E+03	1.75E+03
		Vanadium	12.4	6.53E+03	6.14E+02
		Zinc	40.4	3.89E+05	1.06E+05

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1610231126 **#7351 1/17/17**	6010C	Arsenic	5.8	2.15E+01	5.74E+01
		Barium	204	2.55E+05	4.39E+03
		Beryllium	0.45	2.58E+03	1.48E+02
		Cadmium	0.34J	1.11E+03	7.21E+01
		Chromium	12.9	5.05E+02	1.34E+02
		Lead	9.7	8.00E+02	8.00E+02
		Nickel	10.1	2.57E+04	7.53E+02
		Vanadium	12.5	6.53E+03	6.14E+02
		Zinc	44.3	3.89E+05	1.06E+05
1610231127 **#7351 1/17/17**	6010C	Arsenic	4.85	2.15E+01	5.74E+01
		Barium	237	2.55E+05	4.39E+03
		Beryllium	0.47	2.58E+03	1.48E+02
		Cadmium	0.41J	1.11E+03	7.21E+01
		Chromium	12.3	5.05E+02	1.34E+02
		Lead	12.1	8.00E+02	8.00E+02
		Nickel	10.3	2.57E+04	7.53E+02
		Vanadium	12.5	6.53E+03	6.14E+02
		Zinc	44.5	3.89E+05	1.06E+05

Table 13 400-SB-12 IDW Soil VOC Analytical Detection Summary (400-SB-12)

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Nonwastewaters Concentration in (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1610130940 **#7327 1/6/17**	8260C	None	ND	N/A	N/A	N/A	N/A
1610130950 **#7328 1/7/17**		Acetone	0.0033J	N/A	30	9.60E+05	2.42E+05
1610130945 **#7331 1/6/17**		None	ND	N/A	N/A	N/A	N/A

Table 14 400-SB-12 IDW Soil Nitrosamine Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Nonwastewaters Concentration (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1610130941 **#7327 1/6/17**	607M	N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	ND ND ND	N/A N/A N/A	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A
1610130951 **#7328 1/7/17**		N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	ND ND ND	N/A N/A N/A	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A
1610130946 **#7331 1/6/17**		N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	ND ND ND	N/A N/A N/A	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A

Table 15 400-SB-12 IDW Soil TCLP Metals Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	TCLP Results (mg/L)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Nonwastewaters (mg/L TCLP)
1610130943 **#7327 1/6/17**	1311/6010C	Barium	4.6	100	21
1610130953 **#7328 1/7/16**		None	ND	N/A	N/A
1610130948 **#7331 1/6/17**		Lead	0.084	5.0	0.7

Table 16 400-SB-12 IDW Soil Total Metals Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1610130942 **#7327 1/6/17**	6010C	Arsenic	5.7	2.15E+01	5.74E+01
		Barium	643	2.55E+05	4.39E+03
		Beryllium	0.46	2.58E+03	1.48E+02
		Cadmium	0.41J	1.11E+03	7.21E+01
		Chromium	8.4	5.05E+02	1.34E+02
		Lead	9.0	8.00E+02	8.00E+02
		Nickel	9.3	2.57E+04	7.53E+02
		Thallium	2.9	1.30E+01	3.54E+00
		Vanadium	17.8	6.53E+03	6.14E+02
		Zinc	43.1	3.89E+05	1.06E+05
1610130952 **#7328 1/7/16**	6010C	Arsenic	5.91	2.15E+01	5.74E+01
		Barium	63.1	2.55E+05	4.39E+03
		Beryllium	0.46	2.58E+03	1.48E+02
		Cadmium	0.41J	1.11E+03	7.21E+01
		Chromium	11.9	5.05E+02	1.34E+02
		Lead	10.3	8.00E+02	8.00E+02
		Nickel	9.9	2.57E+04	7.53E+02
		Thallium	2.49	1.30E+01	3.54E+00
		Vanadium	14.2	6.53E+03	6.14E+02
		Zinc	41.3	3.89E+05	1.06E+05
1610130947 **#7331 1/6/17**	6010C	Arsenic	4.24	2.15E+01	5.74E+01
		Barium	53.4	2.55E+05	4.39E+03
		Beryllium	0.42	2.58E+03	1.48E+02
		Cadmium	0.40J	1.11E+03	7.21E+01
		Chromium	10.3	5.05E+02	1.34E+02
		Lead	9.5	8.00E+02	8.00E+02
		Nickel	9.0	2.57E+04	7.53E+02
		Thallium	2.11	1.30E+01	3.54E+00
		Vanadium	14.8	6.53E+03	6.14E+02
		Zinc	37.3	3.89E+05	1.06E+05

Table 17 400-SB-15 IDW Soil VOC Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Nonwastewaters Concentration (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1610130850 **#7321 1/3/17**	8260C	None	ND	N/A	N/A	N/A	N/A
1610130851 **#7321 1/3/17**		Acetone	0.0032J	N/A	30	9.60E+05	2.42E+05
1610130905 **#7322 1/3/17**		None	ND	N/A	N/A	N/A	N/A
1610130915 **#7326 1/4/17**		None	ND	N/A	N/A	N/A	N/A

Table 18 400-SB-15 IDW Soil Nitrosamine Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Analyte	Total Results (mg/Kg)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Nonwastewaters Concentration (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1610130853 **#7321** **1/3/17**	607M	N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	ND ND ND	N/A N/A N/A	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A
1610130854 **#7321** **1/3/17**		N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	ND ND ND	N/A N/A N/A	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A
1610130906 **#7322** **1/3/17**		N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	ND ND ND	N/A N/A N/A	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A
1610130916 **#7326** **1/4/17**		N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	ND ND ND	N/A N/A N/A	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A

Table 19 400-SB-15 IDW Soil TCLP Metals Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	TCLP Results (mg/L)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Nonwastewaters (mg/L TCLP)
1610130859 #7321 1/3/17	1311/6010C	Barium	3.8	100	21
1610130900 #7321 1/3/17		Barium	3.5	100	21
1610130908 #7322 1/3/17		None	ND	N/A	N/A
1610130918 #7326 1/4/17		None	ND	N/A	N/A

Table 20 400-SB-15 IDW Soil Total Metals Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1610130856 #7321 1/3/17	6010C	Arsenic	5.8	2.15E+01	5.74E+01
		Barium	178	2.55E+05	4.39E+03
		Beryllium	0.47	2.58E+03	1.48E+02
		Cadmium	0.53	1.11E+03	7.21E+01
		Chromium	7.2	5.05E+02	1.34E+02
		Lead	9.8	8.00E+02	8.00E+02
		Nickel	9.1	2.57E+04	7.53E+02
		Thallium	3.9	1.30E+01	3.54E+00
		Vanadium	14.1	6.53E+03	6.14E+02
		Zinc	49.4	3.89E+05	1.06E+05
1610130857 #7321 1/3/17		Arsenic	5.5	2.15E+01	5.74E+01
		Barium	170	2.55E+05	4.39E+03
		Beryllium	0.47	2.58E+03	1.48E+02
		Cadmium	0.38J	1.11E+03	7.21E+01
		Chromium	6.5	5.05E+02	1.34E+02
		Lead	16.3	8.00E+02	8.00E+02
		Nickel	8.2	2.57E+04	7.53E+02
		Thallium	3.1	1.30E+01	3.54E+00
		Vanadium	12.7	6.53E+03	6.14E+02
		Zinc	44.7	3.89E+05	1.06E+05
1610130907 #7322 1/3/17		Arsenic	4.20	2.15E+01	5.74E+01
		Barium	89.0	2.55E+05	4.39E+03
		Beryllium	0.41	2.58E+03	1.48E+02

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1610130907 **#7322 1/3/17 cont.**		Cadmium	0.33J	1.11E+03	7.21E+01
		Chromium	8.41	5.05E+02	1.34E+02
		Lead	6.4	8.00E+02	8.00E+02
		Nickel	6.6	2.57E+04	7.53E+02
		Thallium	2.48	1.30E+01	3.54E+00
		Vanadium	13.7	6.53E+03	6.14E+02
		Zinc	29.9	3.89E+05	1.06E+05
1610130917 **#7326 1/4/17**		Arsenic	5.2	2.15E+01	5.74E+01
		Barium	127	2.55E+05	4.39E+03
		Beryllium	0.43	2.58E+03	1.48E+02
		Cadmium	0.40J	1.11E+03	7.21E+01
		Chromium	9.7	5.05E+02	1.34E+02
		Lead	9.4	8.00E+02	8.00E+02
		Nickel	8.4	2.57E+04	7.53E+02
		Selenium	0.9J	6.49E+03	1.75E+03
		Thallium	2.7	1.30E+01	3.54E+00
		Vanadium	12.9	6.53E+03	6.14E+02
		Zinc	46.6	3.89E+05	1.06E+05

Table Notes:
J: Indicates result concentration is between the method reporting limit and the method detection limit.
ND: Indicates not detected.
N/A: Indicates not applicable.

October 20, 2016 Service Request No:R1610541

Mr. Tom Hall
NASA/WSTF/Navarro
P.O. Box 20
Las Cruces, NM 88004

Laboratory Results for: White Sands Test Facility

Dear Mr.Hall,

Enclosed are the results of the sample(s) submitted to our laboratory October 05, 2016
For your reference, these analyses have been assigned our service request number **R1610541.**

All analyses were performed according to our laboratory's quality assurance program. The test results meet requirements of the NELAP standards except as noted in the case narrative report. All results are intended to be considered in their entirety, and ALS Environmental is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report. The measurement uncertainty of the results included in this report is within that expected when using the prescribed method(s) for analysis of these samples, and represented by Laboratory Control Sample control limits. Any events, such as QC failures, which may add to the uncertainty are explained in the report narrative.

Please contact me if you have any questions. My extension is 7472. You may also contact me via email at Janice.Jaeger@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Janice Jaeger
Project Manager

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Narrative Documents

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Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/15EC007B
Sample Matrix: Soil

Service Request:R1610541
Date Received:10/5/16

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables, including results of QC samples analyzed from this delivery group. Analytical procedures performed by the lab are validated in accordance with NELAC standards. Any parameters that are not included in the lab's NELAC accreditation are identified on a "Non-Certified Analytes" report in the Miscellaneous Forms Section of this report. Individual analytical results requiring further explanation are flagged with qualifiers and/or discussed below. The flags are explained in the Report Qualifiers and Definitions page in the Miscellaneous Forms section of this report.

Sample Receipt

Eighteen soil samples were received for analysis at ALS Environmental on 10/5/16. Any discrepancies noted upon initial sample inspection are noted on the cooler receipt and preservation form included in this data package. The samples were received in good condition and consistent with the accompanying chain of custody form. Samples are refrigerated at ≤6°C upon receipt at the lab except for aqueous samples designated for metals analyses, which are stored at room temperature.

Volatile Organic Analyses:

No significant anomalies were noted with this analysis.

Metals Analyses:

No significant anomalies were noted with this analysis.

General Chemistry Analyses:

No significant anomalies were noted with this analysis.

Approved by _____ Date 10/20/2016

SAMPLE DETECTION SUMMARY

CLIENT ID: 1610040800 IBC 7287	Lab ID: R1610541-001					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	95.1				Percent	ALS SOP
Dichloromethane	0.99	J	0.60	5.3	ug/Kg	8260C

CLIENT ID: 1610040801 IBC 7287	Lab ID: R1610541-002					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	96.1				Percent	ALS SOP
Dichloromethane	0.80	J	0.60	5.2	ug/Kg	8260C

CLIENT ID: 1610040806 IBC 7287	Lab ID: R1610541-003					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	96.0				Percent	ALS SOP
Arsenic, Total	3.5		0.3	1.0	mg/Kg	6010C
Barium, Total	68.5		0.2	2.1	mg/Kg	6010C
Beryllium, Total	0.43		0.02	0.31	mg/Kg	6010C
Cadmium, Total	0.11	J	0.04	0.52	mg/Kg	6010C
Chromium, Total	9.5		0.2	1.0	mg/Kg	6010C
Lead, Total	7.4		0.3	5.2	mg/Kg	6010C
Nickel, Total	8.1		0.2	4.2	mg/Kg	6010C
Vanadium, Total	16.8		0.2	5.2	mg/Kg	6010C
Zinc, Total	33.8		0.2	2.1	mg/Kg	6010C

CLIENT ID: 1610040807 IBC 7287	Lab ID: R1610541-004					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	95.4				Percent	ALS SOP
Arsenic, Total	4.3		0.3	1.0	mg/Kg	6010C
Barium, Total	81.4		0.2	2.1	mg/Kg	6010C
Beryllium, Total	0.44		0.02	0.31	mg/Kg	6010C
Cadmium, Total	0.11	J	0.04	0.52	mg/Kg	6010C
Chromium, Total	10.4		0.2	1.0	mg/Kg	6010C
Lead, Total	7.6		0.3	5.2	mg/Kg	6010C
Mercury, Total	0.004	J	0.003	0.033	mg/Kg	7471B
Nickel, Total	8.8		0.2	4.2	mg/Kg	6010C
Thallium, Total	1.1		0.6	1.0	mg/Kg	6010C
Vanadium, Total	18.5		0.2	5.2	mg/Kg	6010C
Zinc, Total	32.1		0.2	2.1	mg/Kg	6010C

CLIENT ID: 1610040820 IBC 7288	Lab ID: R1610541-007					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	97.0				Percent	ALS SOP
Acetone	3.2	J	2.9	5.2	ug/Kg	8260C
Dichloromethane	0.67	J	0.59	5.2	ug/Kg	8260C

SAMPLE DETECTION SUMMARY

CLIENT ID: 1610040822 IBC 7288	Lab ID: R1610541-008					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	97.0				Percent	ALS SOP
Arsenic, Total	4.1		0.3	1.0	mg/Kg	6010C
Barium, Total	72.3		0.2	2.1	mg/Kg	6010C
Beryllium, Total	0.30	J	0.02	0.31	mg/Kg	6010C
Cadmium, Total	0.10	J	0.04	0.52	mg/Kg	6010C
Chromium, Total	10.5		0.2	1.0	mg/Kg	6010C
Lead, Total	8.0		0.3	5.2	mg/Kg	6010C
Mercury, Total	0.005	J	0.003	0.033	mg/Kg	7471B
Nickel, Total	6.1		0.2	4.1	mg/Kg	6010C
Thallium, Total	1.0		0.6	1.0	mg/Kg	6010C
Vanadium, Total	10.7		0.2	5.2	mg/Kg	6010C
Zinc, Total	29.6		0.2	2.1	mg/Kg	6010C

CLIENT ID: 1610040840 IBC 7294	Lab ID: R1610541-010					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	96.9				Percent	ALS SOP
Acetone	7.3		2.9	5.2	ug/Kg	8260C
Dichloromethane	0.77	J	0.59	5.2	ug/Kg	8260C

CLIENT ID: 1610040842 IBC 7294	Lab ID: R1610541-011					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	96.7				Percent	ALS SOP
Arsenic, Total	5.7		0.3	1.0	mg/Kg	6010C
Barium, Total	115		0.2	2.0	mg/Kg	6010C
Beryllium, Total	0.46		0.02	0.31	mg/Kg	6010C
Cadmium, Total	0.14	J	0.04	0.51	mg/Kg	6010C
Chromium, Total	37.5		0.2	1.0	mg/Kg	6010C
Lead, Total	8.1		0.3	5.1	mg/Kg	6010C
Nickel, Total	9.6		0.2	4.1	mg/Kg	6010C
Vanadium, Total	15.9		0.2	5.1	mg/Kg	6010C
Zinc, Total	44.0		0.2	2.0	mg/Kg	6010C

CLIENT ID: 1610040850 IBC 7295	Lab ID: R1610541-013					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	96.1				Percent	ALS SOP
Acetone	4.4	J	3.0	5.2	ug/Kg	8260C
Dichloromethane	0.80	J	0.60	5.2	ug/Kg	8260C

CLIENT ID: 1610040852 IBC 7295	Lab ID: R1610541-014					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	95.5				Percent	ALS SOP
Arsenic, Total	3.8		0.3	1.0	mg/Kg	6010C
Barium, Total	58.5		0.2	2.1	mg/Kg	6010C

SAMPLE DETECTION SUMMARY

CLIENT ID: 1610040852 IBC 7295	Lab ID: R1610541-014					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Beryllium, Total	0.27	J	0.02	0.31	mg/Kg	6010C
Cadmium, Total	0.09	J	0.04	0.52	mg/Kg	6010C
Chromium, Total	8.3		0.2	1.0	mg/Kg	6010C
Lead, Total	4.3	J	0.3	5.2	mg/Kg	6010C
Mercury, Total	0.004	J	0.003	0.033	mg/Kg	7471B
Nickel, Total	6.0		0.2	4.2	mg/Kg	6010C
Thallium, Total	1.0		0.6	1.0	mg/Kg	6010C
Vanadium, Total	9.3		0.2	5.2	mg/Kg	6010C
Zinc, Total	30.1		0.2	2.1	mg/Kg	6010C

CLIENT ID: 1610040900 IBC 7296	Lab ID: R1610541-016					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	87.3				Percent	ALS SOP
Acetone	8.2		3.3	5.8	ug/Kg	8260C
Carbon Disulfide	1.7	J	1.5	5.8	ug/Kg	8260C
Dichloromethane	1.1	J	0.66	5.8	ug/Kg	8260C

CLIENT ID: 1610040902 IBC 7296	Lab ID: R1610541-017					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	90.7				Percent	ALS SOP
Arsenic, Total	4.8		0.3	1.1	mg/Kg	6010C
Barium, Total	106		0.2	2.2	mg/Kg	6010C
Beryllium, Total	0.41		0.02	0.33	mg/Kg	6010C
Cadmium, Total	0.13	J	0.04	0.55	mg/Kg	6010C
Chromium, Total	23.8		0.2	1.1	mg/Kg	6010C
Lead, Total	7.7		0.4	5.5	mg/Kg	6010C
Nickel, Total	7.5		0.2	4.4	mg/Kg	6010C
Thallium, Total	2.5		0.6	1.1	mg/Kg	6010C
Vanadium, Total	11.5		0.2	5.5	mg/Kg	6010C
Zinc, Total	45.6		0.2	2.2	mg/Kg	6010C

Sample Receipt Information

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client: NASA/WSTF/Navarro **Service Request:**R1610541
Project: White Sands Test Facility/15EC007B

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
R1610541-001	1610040800 IBC 7287	10/4/2016	
R1610541-002	1610040801 IBC 7287	10/4/2016	
R1610541-003	1610040806 IBC 7287	10/4/2016	
R1610541-004	1610040807 IBC 7287	10/4/2016	
R1610541-005	1610040809 IBC 7287	10/4/2016	
R1610541-006	1610040810 IBC 7287	10/4/2016	
R1610541-007	1610040820 IBC 7288	10/4/2016	
R1610541-008	1610040822 IBC 7288	10/4/2016	
R1610541-009	1610040823 IBC 7288	10/4/2016	
R1610541-010	1610040840 IBC 7294	10/4/2016	
R1610541-011	1610040842 IBC 7294	10/4/2016	
R1610541-012	1610040843 IBC 7294	10/4/2016	
R1610541-013	1610040850 IBC 7295	10/4/2016	
R1610541-014	1610040852 IBC 7295	10/4/2016	
R1610541-015	1610040853 IBC 7295	10/4/2016	
R1610541-016	1610040900 IBC 7296	10/4/2016	
R1610541-017	1610040902 IBC 7296	10/4/2016	
R1610541-018	1610040903 IBC 7296	10/4/2016	

Date October 4, 2016

Laboratory: ALS Group USA, Corp. dba ALS Environmental

PO #15EC0~~92B~~ 57B as per Tom Hall wny 10/5/16

Analytical Requirements

Special Instructions

Return coolers and reusable packaging materials within 14 days as required in statement of work to:

Return Address:

NASA WSTF Environmental Department
12600 NASA Road, Bldg. 120
Las Cruces, NM 88012
Attn: Lori Minnick

Address shipping questions to:

☐ Lori Minnick, 575-524-5119

☒ Other Tom Hall, 575-524-5453

Send sample receipt confirmation and analytical reports to:

☐ Carlyn Tufts, carlyn.a.tufts@nasa.gov

☐ Shelly Hernandez, shelly.j.hernandez@nasa.gov

☒ Tom Hall, tom.a.hall@nasa.gov

Sample Number	Sample Location	# of Containers	Sample Matrix*	**Total Volatile Organics** SW-846 Method 8260B 4 oz. Glass Jar, Ice	**Total Metals** SW-846-6010C and 7470A 4 oz. Glass Jar, Ice	**TCLP Metals** EPA Method 1311 incorporating SW-846-6010C and 7470A 8 oz. Glass Jar, Ice	Charge Number (WTSF Use Only)	Comments
1610040800	IBC 7287	1	S	X			16EEE4IFW	
1610040801	IBC 7287	1	S	X			16EEE4IFW	
1610040802	IBC 7287	1	S	X			16EEE4IFW	Matrix Spike for 1610040800
1610040806	IBC 7287	1	S		X		16EEE4IFW	
1610040807	IBC 7287	1	S		X		16EEE4IFW	
1610040808	IBC 7287	1	S		X		16EEE4IFW	Matrix Spike for1610040806
1610040809	IBC 7287	1	S			X	16EEE4IFW	
1610040810	IBC 7287	1	S			X	16EEE4IFW	
1610040811	IBC 7287	1	S			X	16EEE4IFW	Matrix Spike for1610040809
1610040820	IBC 7288	1	S	X			16EEE4IFW	
1610040822	IBC 7288	1	S		X		16EEE4IFW	
1610040823	IBC 7288	1	S			X	16EEE4IFW	
1610040840	IBC 7294	1	S	X			16EEE4IFW	
1610040842	IBC 7294	1	S		X		16EEE4IFW	
1610040843	IBC 7294	1	S			X	16EEE4IFW	

* Sample Matrix: A – Aqueous; G – Gaseous; S – Solid

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NASA/WSTF/Navarro
White Sands Test Facility

WSTF 381B (05/2016)

Laboratory: ALS Group USA, Corp. dba ALS Environmental	PO #15EC092B	Analytical Requirements				Special Instructions
Address shipping questions to: ☐ Lori Minnick, 575-524-5119 ☒ Other Tom Hall, 575-524-5453						Return coolers and reusable packaging materials within 14 days as required in statement of work to: Return Address: NASA WSTF Environmental Department 12600 NASA Road, Bldg. 120 Las Cruces, NM 88012 Attn: Lori Minnick
Send sample receipt confirmation and analytical reports to: ☐ Carlyn Tufts, carlyn.a.tufts@nasa.gov ☐ Shelly Hernandez, shelly.j.hernandez@nasa.gov ☒ Tom Hall, tom.a.hall@nasa.gov		# of Containers	Sample Matrix*	**Total Volatile Organics** SW-846 Method 8260B 4 oz. Glass Jar, Ice	**Total Metals** SW-846-6010C and 7470A 4 oz. Glass Jar, Ice	**TCLP Metals** EPA Method 1311 incorporating SW-846-6010C and 7470A 8 oz. Glass Jar, Ice	Charge Number (WTSF Use Only)	Comments
Sample Number	Sample Location							
1610040850	IBC 7295	1	S	X			16EEE4IFW	
1610040852	IBC 7295	1	S		X		16EEE4IFW	
1610040853	IBC 7295	1	S			X	16EEE4IFW	
1610040900	IBC 7296	1	S	X			16EEE4IFW	
1610040902	IBC 7296	1	S		X		16EEE4IFW	
1610040903	IBC 7296	1	S			X	16EEE4IFW	

Relinquished By:	Date/Time:	Accepted By:	Date/Time:
[signature]	10-4-2016 (1030)	[signature]	10-5-16 09:50

* Sample Matrix: A – Aqueous; G – Gaseous; S – Solid

R1610541 5
NASA/WSTF/Navarro
White Sands Test Facility

R1610541 5
NASA/WSTF/Navarro
White Sands Test Facility

Cooler Receipt and Preservation Check Form

Project/Client NASA Folder Number

Cooler received on 10-5-16 by: RE COURIER: ALS UPS (FEDEX) VELOCITY CLIENT

1	Were **Custody seals** on outside of cooler?	(Y) N	5a	**Perchlorate** samples have required headspace?	(Y) N NA
2	**Custody papers** properly completed (ink, signed)?	(Y) N	5b	Did VOA vials, Alk,or Sulfide have sig* **bubbles**?	Y (N) NA
3	Did all bottles arrive in good **condition** (unbroken)?	(Y) N	6	Where did the bottles originate?	(ALS/ROC) (CLIENT)
4	Circle: (**Wet Ice**) **Dry Ice** **Gel packs** present?	(Y) N	7	Soil VOA received as: Bulk Encore 5035set	(NA)

8. Temperature Readings Date: 10-5-16 Time: 10:10 ID: (IR#7) IR#8 From: Temp Blank (Sample Bottle)

Observed Temp (°C)	3.3	3.6					
Correction Factor (°C)	0	0					
Corrected Temp (°C)	3.3	3.6					
Within 0-6°C?	(Y) N	(Y) N	Y N	Y N	Y N	Y N	Y N
If <0°C, were samples frozen?	Y N	Y N	Y N	Y N	Y N	Y N	Y N

If out of Temperature, note packing/ice condition: _____ Ice melted Poorly Packed Same Day Rule

&Client Approval to Run Samples: _____ Standing Approval Client aware at drop-off Client notified by: _____

All samples held in storage location: ROC by RE on 10-5-16 at 10:17
5035 samples placed in storage location: _____ by _____ on _____ at _____

Cooler Breakdown: Date: 10-6-16 Time: 1145 by: TS

1.	Were all bottle labels complete (*i.e.* analysis, preservation, etc.)?	(YES)	NO
2.	Did all bottle labels and tags agree with custody papers?	(YES)	NO
3.	Were correct containers used for the tests indicated?	(YES)	NO
4.	Were 5035 vials acceptable (no extra labels, not leaking)?	YES	NO (N/A)
5.	Air Samples: Cassettes / Tubes Intact	Canisters Pressurized	Tedlar® Bags Inflated (N/A)

Explain any discrepancies:

pH	Reagent	Yes	No	Lot Received	Exp	Sample ID	Vol. Added	Lot Added	Final pH
≥12	NaOH								
≤2	HNO_3								
≤2	H_2SO_4								
<4	$NaHSO_4$								
Residual Chlorine (-)	For CN Phenol and 522			If +, contact PM to add $Na_2S_2O_3$ (CN), ascorbic (phenol).					
	$Na_2S_2O_3$	-	-						
	ZnAcetate	-	-						
	HCl	**	**						

**Not to be tested before analysis – pH tested and recorded by VOAs on a separate worksheet

Yes=All samples OK

No=Samples were preserved at The lab as listed

PM OK to Adjust: _____

Bottle lot numbers: Client Lot #

Other Comments:

CLRES	(BULK)
DO	FLDT
HPROD	HGFB
HTR	LL3541
PH	(SUB)
SO3	MARRS
ALS	REV

PC Secondary Review: MD 10/10/16 *significant air bubbles: VOA > 5-6 mm : WC >1 in. diameter

ALS Environmental Chain of Custody

1565 Jefferson Rd, Building 300 • Rochester, NY 14623 • 585-288-5380 • FAX 585-288-8475

ALS Contact: Janice Jaeger

Project Number: R1610541
Project Manager: Janice Jaeger
QAP: LAB QAP

Lab Code	Sample ID	# of Cont.	Matrix	Sample Date	Sample Time	Lab ID	Ag TCLP 6010C	As TCLP 6010C	Ba TCLP 6010C	Be TCLP 6010C	Cd TCLP 6010C	Cr TCLP 6010C	Hg TCLP 7470A	Ni TCLP 6010C	Pb TCLP 6010C
[redacted]5	1610040809 IBC 7287 QC	2	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610040810 IBC 7287	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X	X	X	X
R[redacted]	1610040823 IBC 7288	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X	X	X	X
R[redacted]	1610040843 IBC 7294	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610040853 IBC 7295	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610040903 IBC 7296	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X	X	X	X

Folder Comments:
ND U

Special Instructions/Comments
NASA/WSTF EDD

H - Test is On Hold P - Test is Authorized for Prep Only

Turnaround Requirements
____ **RUSH** (Surcharges Apply)
PLEASE CIRCLE WORK DAYS
1 2 3 4 5
A **STANDARD**
Requested FAX Date: _____
Requested Report Date: 10/14/16

Report Requirements
___ I. Results Only
A II. Results + QC Summaries
___ III. Results + QC and Calibration Summaries
___ IV. Data Validation Report with Raw Data
PQL/MDL/J Y
EDD Y

Invoice Information
PO# 58R1610541
Bill to

Relinquished By: [signature] 10-10-16 12:50
Received By:
Airbill Number:

Miscellaneous Forms

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

REPORT QUALIFIERS AND DEFINITIONS

U Analyte was analyzed for but not detected. The sample quantitation limit has been corrected for dilution and for percent moisture, unless otherwise noted in the case narrative.

J Estimated value due to either being a Tentatively Identified Compound (TIC) or that the concentration is between the MRL and the MDL. Concentrations are not verified within the linear range of the calibration. For DoD: concentration >40% difference between two GC columns (pesticides/Arclors).

B Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result.

E Inorganics- Concentration is estimated due to the serial dilution was outside control limits.

E Organics- Concentration has exceeded the calibration range for that specific analysis.

D Concentration is a result of a dilution, typically a secondary analysis of the sample due to exceeding the calibration range or that a surrogate has been diluted out of the sample and cannot be assessed.

* Indicates that a quality control parameter has exceeded laboratory limits. Under the ñNotesò column of the Form I, this qualifier denotes analysis was performed out of Holding Time.

H Analysis was performed out of hold time for tests that have an ñimmediateò hold time criteria.

Spike was diluted out.

\+ Correlation coefficient for MSA is <0.995.

N Inorganics- Matrix spike recovery was outside laboratory limits.

N Organics- Presumptive evidence of a compound (reported as a TIC) based on the MS library search.

S Concentration has been determined using Method of Standard Additions (MSA).

W Post-Digestion Spike recovery is outside control limits and the sample absorbance is <50% of the spike absorbance.

P Concentration >40% (25% for CLP) difference between the two GC columns.

C Confirmed by GC/MS

Q DoD reports: indicates a pesticide/Aroclor is not confirmed (Ó100% Difference between two GC columns).

X See Case Narrative for discussion.

MRL Method Reporting Limit. Also known as:
LOQ Limit of Quantitation (LOQ)
The lowest concentration at which the method analyte may be reliably quantified under the method conditions.

MDL Method Detection Limit. A statistical value derived from a study designed to provide the lowest concentration that will be detected 99% of the time. Values between the MDL and MRL are estimated (see J qualifier).

LOD Limit of Detection. A value at or above the MDL which has been verified to be detectable.

ND Non-Detect. Analyte was not detected at the concentration listed. Same as U qualifier.

Rochester Lab ID # for State Certifications[1]

Connecticut ID # PH0556	Maine ID #NY0032	New Hampshire ID # 294100 A/B
Delaware Accredited	Nebraska Accredited	
DoD ELAP #65817	New Jersey ID # NY004	Pennsylvania ID# 68-786
Florida ID # E87674	New York ID # 10145	Rhode Island ID # 158
Illinois ID #200047	North Carolina #676	Virginia #460167

[1] Analyses were performed according to our laboratoryôs NELAP-approved quality assurance program and any applicable state or agency requirements. The test results meet requirements of the current NELAP/TNI standards or state or agency requirements, where applicable, except as noted in the case narrative. Since not all analyte/method/matrix combinations are offered for state/NELAC accreditation, this report may contain results which are not accredited. For a specific list of accredited analytes, contact the laboratory or go to http://www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads/North-America-Downloads

ALS Laboratory Group

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B		

Sample Name:	1610040800 IBC 7287	**Date Collected:**	10/4/16
Lab Code:	R1610541-001	**Date Received:**	10/5/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		MLAMBRECHT

Sample Name:	1610040801 IBC 7287	**Date Collected:**	10/4/16
Lab Code:	R1610541-002	**Date Received:**	10/5/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		MLAMBRECHT

Sample Name:	1610040806 IBC 7287	**Date Collected:**	10/4/16
Lab Code:	R1610541-003	**Date Received:**	10/5/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	CBURLESON	CGILDAY
7471B	CGILDAY	CGILDAY
ALS SOP		MLAMBRECHT

Sample Name:	1610040807 IBC 7287	**Date Collected:**	10/4/16
Lab Code:	R1610541-004	**Date Received:**	10/5/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	CBURLESON	CGILDAY
7471B	CGILDAY	CGILDAY
ALS SOP		MLAMBRECHT

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B		

Sample Name:	1610040820 IBC 7288	**Date Collected:**	10/4/16
Lab Code:	R1610541-007	**Date Received:**	10/5/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		MLAMBRECHT

Sample Name:	1610040822 IBC 7288	**Date Collected:**	10/4/16
Lab Code:	R1610541-008	**Date Received:**	10/5/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	CBURLESON	CGILDAY
7471B	CGILDAY	CGILDAY
ALS SOP		MLAMBRECHT

Sample Name:	1610040840 IBC 7294	**Date Collected:**	10/4/16
Lab Code:	R1610541-010	**Date Received:**	10/5/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		MLAMBRECHT

Sample Name:	1610040842 IBC 7294	**Date Collected:**	10/4/16
Lab Code:	R1610541-011	**Date Received:**	10/5/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	CBURLESON	CGILDAY
7471B	CGILDAY	CGILDAY
ALS SOP		MLAMBRECHT

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B		

Sample Name:	1610040850 IBC 7295	**Date Collected:**	10/4/16
Lab Code:	R1610541-013	**Date Received:**	10/5/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		MLAMBRECHT

Sample Name:	1610040852 IBC 7295	**Date Collected:**	10/4/16
Lab Code:	R1610541-014	**Date Received:**	10/5/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	CBURLESON	CGILDAY
7471B	CGILDAY	CGILDAY
ALS SOP		MLAMBRECHT

Sample Name:	1610040900 IBC 7296	**Date Collected:**	10/4/16
Lab Code:	R1610541-016	**Date Received:**	10/5/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		MLAMBRECHT

Sample Name:	1610040902 IBC 7296	**Date Collected:**	10/4/16
Lab Code:	R1610541-017	**Date Received:**	10/5/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	CBURLESON	CGILDAY
7471B	CGILDAY	CGILDAY
ALS SOP		MLAMBRECHT

The preparation methods associated with this report are found in these tables unless discussed in the case narrative.

Water/Liquid Matrix

Analytical Method	Preparation Method
200.7	200.2
200.8	200.2
6010C	3005A/3010A
6020A	ILM05.3
9014 Cyanide Reactivity	SW846 Ch7, 7.3.4.2
9034 Sulfide Reactivity	SW846 Ch7, 7.3.4.2
9034 Sulfide Acid Soluble	9030B
9056A Bomb (Halogens)	5050A
9066 Manual Distillation	9065
SM 4500-CN-E Residual Cyanide	SM 4500-CN-G
SM 4500-CN-E WAD Cyanide	SM 4500-CN-I

Solid/Soil/Non-Aqueous Matrix

Analytical Method	Preparation Method
6010C	3050B
6020A	3050B
6010C TCLP (1311) extract	3005A/3010A
6010 SPLP (1312) extract	3005A/3010A
7196A	3060A
7199	3060A
9056A Halogens/Halides	5050
300.0 Anions/ 350.1/ 353.2/ SM 2320B/ SM 5210B/ 9056A Anions	DI extraction

For analytical methods not listed, the preparation method is the same as the analytical method reference.

Sample Results

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
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Volatile Organic Compounds by GC/MS

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040800 IBC 7287	**Units:**	ug/Kg
Lab Code:	R1610541-001	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND	U	5.3	0.88	1	10/07/16 17:50	
1,1,1-Trichloroethane (TCA)	ND	U	5.3	0.77	1	10/07/16 17:50	
1,1,2,2-Tetrachloroethane	ND	U	5.3	0.86	1	10/07/16 17:50	
1,1,2-Trichloroethane	ND	U	5.3	0.77	1	10/07/16 17:50	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	U	5.3	1.4	1	10/07/16 17:50	
1,1-Dichloroethene (1,1-DCE)	ND	U	5.3	1.4	1	10/07/16 17:50	
1,2,3-Trichloropropane	ND	U	5.3	1.4	1	10/07/16 17:50	
1,2-Dibromo-3-chloropropane (DBCP)	ND	U	5.3	2.0	1	10/07/16 17:50	
1,2-Dibromoethane	ND	U	5.3	1.3	1	10/07/16 17:50	
1,2-Dichlorobenzene	ND	U	5.3	0.65	1	10/07/16 17:50	
1,2-Dichloroethane	ND	U	5.3	0.65	1	10/07/16 17:50	
1,2-Dichloropropane	ND	U	5.3	1.1	1	10/07/16 17:50	
1,3-Dichlorobenzene	ND	U	5.3	0.67	1	10/07/16 17:50	
1,4-Dioxane	ND	U	110	21	1	10/07/16 17:50	
2-Butanone (MEK)	ND	U	5.3	2.5	1	10/07/16 17:50	
2-Chloro-1,3-butadiene	ND	U	5.3	1.6	1	10/07/16 17:50	
2-Chloroethyl Vinyl Ether	ND	U	5.3	1.8	1	10/07/16 17:50	
Isobutyl Alcohol	ND	U	110	24	1	10/07/16 17:50	
Allyl Chloride	ND	U	5.3	1.8	1	10/07/16 17:50	
4-Methyl-2-pentanone	ND	U	5.3	1.1	1	10/07/16 17:50	
Acetone	ND	U	5.3	3.0	1	10/07/16 17:50	
Acetonitrile	ND	U	26	18	1	10/07/16 17:50	
Acrolein	ND	U	26	3.7	1	10/07/16 17:50	
Acrylonitrile	ND	U	26	6.8	1	10/07/16 17:50	
Benzene	ND	U	5.3	0.31	1	10/07/16 17:50	
Bromodichloromethane	ND	U	5.3	0.65	1	10/07/16 17:50	
Bromoform	ND	U	5.3	0.98	1	10/07/16 17:50	
Bromomethane	ND	U	5.3	1.5	1	10/07/16 17:50	
Carbon Disulfide	ND	U	5.3	1.4	1	10/07/16 17:50	
Carbon Tetrachloride	ND	U	5.3	0.97	1	10/07/16 17:50	
Chlorobenzene	ND	U	5.3	0.31	1	10/07/16 17:50	
Chloroethane	ND	U	5.3	3.1	1	10/07/16 17:50	
Chloroform	ND	U	5.3	1.4	1	10/07/16 17:50	
Chloromethane	ND	U	5.3	0.43	1	10/07/16 17:50	
Dibromochloromethane	ND	U	5.3	0.77	1	10/07/16 17:50	
Dibromomethane	ND	U	5.3	0.67	1	10/07/16 17:50	
Dichlorodifluoromethane (CFC 12)	ND	U	5.3	2.0	1	10/07/16 17:50	
Dichloromethane	**0.99**	**J**	5.3	0.60	1	10/07/16 17:50	
Ethyl Methacrylate	ND	U	5.3	0.79	1	10/07/16 17:50	
Ethylbenzene	ND	U	5.3	0.25	1	10/07/16 17:50	
Iodomethane	ND	U	11	1.2	1	10/07/16 17:50	
Methacrylonitrile	ND	U	5.3	1.6	1	10/07/16 17:50	
Methyl Methacrylate	ND	U	5.3	0.77	1	10/07/16 17:50	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040800 IBC 7287	**Units:**	ug/Kg
Lab Code:	R1610541-001	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	5.3	0.54	1	10/07/16 17:50	
Propionitrile	ND U	26	6.9	1	10/07/16 17:50	
Tetrachloroethene (PCE)	ND U	5.3	0.93	1	10/07/16 17:50	
Toluene	ND U	5.3	1.1	1	10/07/16 17:50	
Trichloroethene (TCE)	ND U	5.3	1.1	1	10/07/16 17:50	
Trichlorofluoromethane (CFC 11)	ND U	5.3	0.70	1	10/07/16 17:50	
Vinyl Chloride	ND U	5.3	2.0	1	10/07/16 17:50	
cis-1,3-Dichloropropene	ND U	5.3	0.95	1	10/07/16 17:50	
m,p-Xylenes	ND U	11	1.2	1	10/07/16 17:50	
o-Xylene	ND U	5.3	0.51	1	10/07/16 17:50	
trans-1,2-Dichloroethene	ND U	5.3	0.91	1	10/07/16 17:50	
trans-1,3-Dichloropropene	ND U	5.3	0.22	1	10/07/16 17:50	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	100	51 - 136	10/07/16 17:50	
Dibromofluoromethane	95	63 - 138	10/07/16 17:50	
Toluene-d8	96	66 - 138	10/07/16 17:50	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
000104-76-7	1-Hexanol, 2-ethyl-	13.57	120	JN

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040801 IBC 7287	**Units:**	ug/Kg
Lab Code:	R1610541-002	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND	U	5.2	0.87	1	10/07/16 18:14	
1,1,1-Trichloroethane (TCA)	ND	U	5.2	0.76	1	10/07/16 18:14	
1,1,2,2-Tetrachloroethane	ND	U	5.2	0.85	1	10/07/16 18:14	
1,1,2-Trichloroethane	ND	U	5.2	0.76	1	10/07/16 18:14	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	U	5.2	1.3	1	10/07/16 18:14	
1,1-Dichloroethene (1,1-DCE)	ND	U	5.2	1.4	1	10/07/16 18:14	
1,2,3-Trichloropropane	ND	U	5.2	1.4	1	10/07/16 18:14	
1,2-Dibromo-3-chloropropane (DBCP)	ND	U	5.2	2.0	1	10/07/16 18:14	
1,2-Dibromoethane	ND	U	5.2	1.3	1	10/07/16 18:14	
1,2-Dichlorobenzene	ND	U	5.2	0.64	1	10/07/16 18:14	
1,2-Dichloroethane	ND	U	5.2	0.64	1	10/07/16 18:14	
1,2-Dichloropropane	ND	U	5.2	1.1	1	10/07/16 18:14	
1,3-Dichlorobenzene	ND	U	5.2	0.66	1	10/07/16 18:14	
1,4-Dioxane	ND	U	100	20	1	10/07/16 18:14	
2-Butanone (MEK)	ND	U	5.2	2.4	1	10/07/16 18:14	
2-Chloro-1,3-butadiene	ND	U	5.2	1.6	1	10/07/16 18:14	
2-Chloroethyl Vinyl Ether	ND	U	5.2	1.8	1	10/07/16 18:14	
Isobutyl Alcohol	ND	U	100	24	1	10/07/16 18:14	
Allyl Chloride	ND	U	5.2	1.8	1	10/07/16 18:14	
4-Methyl-2-pentanone	ND	U	5.2	1.1	1	10/07/16 18:14	
Acetone	ND	U	5.2	3.0	1	10/07/16 18:14	
Acetonitrile	ND	U	26	18	1	10/07/16 18:14	
Acrolein	ND	U	26	3.7	1	10/07/16 18:14	
Acrylonitrile	ND	U	26	6.8	1	10/07/16 18:14	
Benzene	ND	U	5.2	0.31	1	10/07/16 18:14	
Bromodichloromethane	ND	U	5.2	0.64	1	10/07/16 18:14	
Bromoform	ND	U	5.2	0.97	1	10/07/16 18:14	
Bromomethane	ND	U	5.2	1.5	1	10/07/16 18:14	
Carbon Disulfide	ND	U	5.2	1.3	1	10/07/16 18:14	
Carbon Tetrachloride	ND	U	5.2	0.96	1	10/07/16 18:14	
Chlorobenzene	ND	U	5.2	0.31	1	10/07/16 18:14	
Chloroethane	ND	U	5.2	3.0	1	10/07/16 18:14	
Chloroform	ND	U	5.2	1.4	1	10/07/16 18:14	
Chloromethane	ND	U	5.2	0.42	1	10/07/16 18:14	
Dibromochloromethane	ND	U	5.2	0.76	1	10/07/16 18:14	
Dibromomethane	ND	U	5.2	0.66	1	10/07/16 18:14	
Dichlorodifluoromethane (CFC 12)	ND	U	5.2	2.0	1	10/07/16 18:14	
Dichloromethane	**0.80**	**J**	5.2	0.60	1	10/07/16 18:14	
Ethyl Methacrylate	ND	U	5.2	0.79	1	10/07/16 18:14	
Ethylbenzene	ND	U	5.2	0.24	1	10/07/16 18:14	
Iodomethane	ND	U	10	1.2	1	10/07/16 18:14	
Methacrylonitrile	ND	U	5.2	1.6	1	10/07/16 18:14	
Methyl Methacrylate	ND	U	5.2	0.76	1	10/07/16 18:14	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040801 IBC 7287	**Units:**	ug/Kg
Lab Code:	R1610541-002	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	5.2	0.54	1	10/07/16 18:14	
Propionitrile	ND U	26	6.8	1	10/07/16 18:14	
Tetrachloroethene (PCE)	ND U	5.2	0.92	1	10/07/16 18:14	
Toluene	ND U	5.2	1.1	1	10/07/16 18:14	
Trichloroethene (TCE)	ND U	5.2	1.1	1	10/07/16 18:14	
Trichlorofluoromethane (CFC 11)	ND U	5.2	0.69	1	10/07/16 18:14	
Vinyl Chloride	ND U	5.2	2.0	1	10/07/16 18:14	
cis-1,3-Dichloropropene	ND U	5.2	0.94	1	10/07/16 18:14	
m,p-Xylenes	ND U	10	1.2	1	10/07/16 18:14	
o-Xylene	ND U	5.2	0.50	1	10/07/16 18:14	
trans-1,2-Dichloroethene	ND U	5.2	0.90	1	10/07/16 18:14	
trans-1,3-Dichloropropene	ND U	5.2	0.21	1	10/07/16 18:14	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	98	51 - 136	10/07/16 18:14	
Dibromofluoromethane	93	63 - 138	10/07/16 18:14	
Toluene-d8	96	66 - 138	10/07/16 18:14	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
	unknown	13.57	150	J

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040820 IBC 7288	**Units:**	ug/Kg
Lab Code:	R1610541-007	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND	U	5.2	0.86	1	10/07/16 18:38	
1,1,1-Trichloroethane (TCA)	ND	U	5.2	0.76	1	10/07/16 18:38	
1,1,2,2-Tetrachloroethane	ND	U	5.2	0.84	1	10/07/16 18:38	
1,1,2-Trichloroethane	ND	U	5.2	0.76	1	10/07/16 18:38	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	U	5.2	1.3	1	10/07/16 18:38	
1,1-Dichloroethene (1,1-DCE)	ND	U	5.2	1.4	1	10/07/16 18:38	
1,2,3-Trichloropropane	ND	U	5.2	1.4	1	10/07/16 18:38	
1,2-Dibromo-3-chloropropane (DBCP)	ND	U	5.2	2.0	1	10/07/16 18:38	
1,2-Dibromoethane	ND	U	5.2	1.3	1	10/07/16 18:38	
1,2-Dichlorobenzene	ND	U	5.2	0.63	1	10/07/16 18:38	
1,2-Dichloroethane	ND	U	5.2	0.63	1	10/07/16 18:38	
1,2-Dichloropropane	ND	U	5.2	1.0	1	10/07/16 18:38	
1,3-Dichlorobenzene	ND	U	5.2	0.65	1	10/07/16 18:38	
1,4-Dioxane	ND	U	100	20	1	10/07/16 18:38	
2-Butanone (MEK)	ND	U	5.2	2.4	1	10/07/16 18:38	
2-Chloro-1,3-butadiene	ND	U	5.2	1.6	1	10/07/16 18:38	
2-Chloroethyl Vinyl Ether	ND	U	5.2	1.8	1	10/07/16 18:38	
Isobutyl Alcohol	ND	U	100	24	1	10/07/16 18:38	
Allyl Chloride	ND	U	5.2	1.8	1	10/07/16 18:38	
4-Methyl-2-pentanone	ND	U	5.2	1.1	1	10/07/16 18:38	
Acetone	**3.2**	**J**	5.2	2.9	1	10/07/16 18:38	
Acetonitrile	ND	U	26	18	1	10/07/16 18:38	
Acrolein	ND	U	26	3.7	1	10/07/16 18:38	
Acrylonitrile	ND	U	26	6.7	1	10/07/16 18:38	
Benzene	ND	U	5.2	0.30	1	10/07/16 18:38	
Bromodichloromethane	ND	U	5.2	0.63	1	10/07/16 18:38	
Bromoform	ND	U	5.2	0.96	1	10/07/16 18:38	
Bromomethane	ND	U	5.2	1.5	1	10/07/16 18:38	
Carbon Disulfide	ND	U	5.2	1.3	1	10/07/16 18:38	
Carbon Tetrachloride	ND	U	5.2	0.95	1	10/07/16 18:38	
Chlorobenzene	ND	U	5.2	0.30	1	10/07/16 18:38	
Chloroethane	ND	U	5.2	3.0	1	10/07/16 18:38	
Chloroform	ND	U	5.2	1.3	1	10/07/16 18:38	
Chloromethane	ND	U	5.2	0.42	1	10/07/16 18:38	
Dibromochloromethane	ND	U	5.2	0.76	1	10/07/16 18:38	
Dibromomethane	ND	U	5.2	0.65	1	10/07/16 18:38	
Dichlorodifluoromethane (CFC 12)	ND	U	5.2	2.0	1	10/07/16 18:38	
Dichloromethane	**0.67**	**J**	5.2	0.59	1	10/07/16 18:38	
Ethyl Methacrylate	ND	U	5.2	0.78	1	10/07/16 18:38	
Ethylbenzene	ND	U	5.2	0.24	1	10/07/16 18:38	
Iodomethane	ND	U	10	1.2	1	10/07/16 18:38	
Methacrylonitrile	ND	U	5.2	1.6	1	10/07/16 18:38	
Methyl Methacrylate	ND	U	5.2	0.76	1	10/07/16 18:38	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040820 IBC 7288	**Units:**	ug/Kg
Lab Code:	R1610541-007	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	5.2	0.53	1	10/07/16 18:38	
Propionitrile	ND U	26	6.8	1	10/07/16 18:38	
Tetrachloroethene (PCE)	ND U	5.2	0.91	1	10/07/16 18:38	
Toluene	ND U	5.2	1.1	1	10/07/16 18:38	
Trichloroethene (TCE)	ND U	5.2	1.1	1	10/07/16 18:38	
Trichlorofluoromethane (CFC 11)	ND U	5.2	0.69	1	10/07/16 18:38	
Vinyl Chloride	ND U	5.2	1.9	1	10/07/16 18:38	
cis-1,3-Dichloropropene	ND U	5.2	0.93	1	10/07/16 18:38	
m,p-Xylenes	ND U	10	1.2	1	10/07/16 18:38	
o-Xylene	ND U	5.2	0.50	1	10/07/16 18:38	
trans-1,2-Dichloroethene	ND U	5.2	0.89	1	10/07/16 18:38	
trans-1,3-Dichloropropene	ND U	5.2	0.21	1	10/07/16 18:38	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	98	51 - 136	10/07/16 18:38	
Dibromofluoromethane	94	63 - 138	10/07/16 18:38	
Toluene-d8	95	66 - 138	10/07/16 18:38	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
	No Tentatively Identified Compounds Detected			

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040840 IBC 7294	**Units:**	ug/Kg
Lab Code:	R1610541-010	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND	U	5.2	0.86	1	10/07/16 19:03	
1,1,1-Trichloroethane (TCA)	ND	U	5.2	0.76	1	10/07/16 19:03	
1,1,2,2-Tetrachloroethane	ND	U	5.2	0.84	1	10/07/16 19:03	
1,1,2-Trichloroethane	ND	U	5.2	0.76	1	10/07/16 19:03	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	U	5.2	1.3	1	10/07/16 19:03	
1,1-Dichloroethene (1,1-DCE)	ND	U	5.2	1.4	1	10/07/16 19:03	
1,2,3-Trichloropropane	ND	U	5.2	1.4	1	10/07/16 19:03	
1,2-Dibromo-3-chloropropane (DBCP)	ND	U	5.2	2.0	1	10/07/16 19:03	
1,2-Dibromoethane	ND	U	5.2	1.3	1	10/07/16 19:03	
1,2-Dichlorobenzene	ND	U	5.2	0.63	1	10/07/16 19:03	
1,2-Dichloroethane	ND	U	5.2	0.63	1	10/07/16 19:03	
1,2-Dichloropropane	ND	U	5.2	1.1	1	10/07/16 19:03	
1,3-Dichlorobenzene	ND	U	5.2	0.66	1	10/07/16 19:03	
1,4-Dioxane	ND	U	100	20	1	10/07/16 19:03	
2-Butanone (MEK)	ND	U	5.2	2.4	1	10/07/16 19:03	
2-Chloro-1,3-butadiene	ND	U	5.2	1.6	1	10/07/16 19:03	
2-Chloroethyl Vinyl Ether	ND	U	5.2	1.8	1	10/07/16 19:03	
Isobutyl Alcohol	ND	U	100	24	1	10/07/16 19:03	
Allyl Chloride	ND	U	5.2	1.8	1	10/07/16 19:03	
4-Methyl-2-pentanone	ND	U	5.2	1.1	1	10/07/16 19:03	
Acetone	**7.3**		5.2	2.9	1	10/07/16 19:03	
Acetonitrile	ND	U	26	18	1	10/07/16 19:03	
Acrolein	ND	U	26	3.7	1	10/07/16 19:03	
Acrylonitrile	ND	U	26	6.7	1	10/07/16 19:03	
Benzene	ND	U	5.2	0.30	1	10/07/16 19:03	
Bromodichloromethane	ND	U	5.2	0.63	1	10/07/16 19:03	
Bromoform	ND	U	5.2	0.96	1	10/07/16 19:03	
Bromomethane	ND	U	5.2	1.5	1	10/07/16 19:03	
Carbon Disulfide	ND	U	5.2	1.3	1	10/07/16 19:03	
Carbon Tetrachloride	ND	U	5.2	0.95	1	10/07/16 19:03	
Chlorobenzene	ND	U	5.2	0.30	1	10/07/16 19:03	
Chloroethane	ND	U	5.2	3.0	1	10/07/16 19:03	
Chloroform	ND	U	5.2	1.4	1	10/07/16 19:03	
Chloromethane	ND	U	5.2	0.42	1	10/07/16 19:03	
Dibromochloromethane	ND	U	5.2	0.76	1	10/07/16 19:03	
Dibromomethane	ND	U	5.2	0.66	1	10/07/16 19:03	
Dichlorodifluoromethane (CFC 12)	ND	U	5.2	2.0	1	10/07/16 19:03	
Dichloromethane	**0.77**	**J**	5.2	0.59	1	10/07/16 19:03	
Ethyl Methacrylate	ND	U	5.2	0.78	1	10/07/16 19:03	
Ethylbenzene	ND	U	5.2	0.24	1	10/07/16 19:03	
Iodomethane	ND	U	10	1.2	1	10/07/16 19:03	
Methacrylonitrile	ND	U	5.2	1.6	1	10/07/16 19:03	
Methyl Methacrylate	ND	U	5.2	0.76	1	10/07/16 19:03	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040840 IBC 7294	**Units:**	ug/Kg
Lab Code:	R1610541-010	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	5.2	0.53	1	10/07/16 19:03	
Propionitrile	ND U	26	6.8	1	10/07/16 19:03	
Tetrachloroethene (PCE)	ND U	5.2	0.91	1	10/07/16 19:03	
Toluene	ND U	5.2	1.1	1	10/07/16 19:03	
Trichloroethene (TCE)	ND U	5.2	1.1	1	10/07/16 19:03	
Trichlorofluoromethane (CFC 11)	ND U	5.2	0.69	1	10/07/16 19:03	
Vinyl Chloride	ND U	5.2	1.9	1	10/07/16 19:03	
cis-1,3-Dichloropropene	ND U	5.2	0.93	1	10/07/16 19:03	
m,p-Xylenes	ND U	10	1.2	1	10/07/16 19:03	
o-Xylene	ND U	5.2	0.50	1	10/07/16 19:03	
trans-1,2-Dichloroethene	ND U	5.2	0.89	1	10/07/16 19:03	
trans-1,3-Dichloropropene	ND U	5.2	0.21	1	10/07/16 19:03	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	97	51 - 136	10/07/16 19:03	
Dibromofluoromethane	89	63 - 138	10/07/16 19:03	
Toluene-d8	93	66 - 138	10/07/16 19:03	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
000104-76-7	1-Hexanol, 2-ethyl-	13.57	46	JN

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040850 IBC 7295	**Units:**	ug/Kg
Lab Code:	R1610541-013	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	5.2	0.87	1	10/07/16 19:27	
1,1,1-Trichloroethane (TCA)	ND U	5.2	0.76	1	10/07/16 19:27	
1,1,2,2-Tetrachloroethane	ND U	5.2	0.85	1	10/07/16 19:27	
1,1,2-Trichloroethane	ND U	5.2	0.76	1	10/07/16 19:27	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.2	1.3	1	10/07/16 19:27	
1,1-Dichloroethene (1,1-DCE)	ND U	5.2	1.4	1	10/07/16 19:27	
1,2,3-Trichloropropane	ND U	5.2	1.4	1	10/07/16 19:27	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.2	2.0	1	10/07/16 19:27	
1,2-Dibromoethane	ND U	5.2	1.3	1	10/07/16 19:27	
1,2-Dichlorobenzene	ND U	5.2	0.64	1	10/07/16 19:27	
1,2-Dichloroethane	ND U	5.2	0.64	1	10/07/16 19:27	
1,2-Dichloropropane	ND U	5.2	1.1	1	10/07/16 19:27	
1,3-Dichlorobenzene	ND U	5.2	0.66	1	10/07/16 19:27	
1,4-Dioxane	ND U	100	20	1	10/07/16 19:27	
2-Butanone (MEK)	ND U	5.2	2.4	1	10/07/16 19:27	
2-Chloro-1,3-butadiene	ND U	5.2	1.6	1	10/07/16 19:27	
2-Chloroethyl Vinyl Ether	ND U	5.2	1.8	1	10/07/16 19:27	
Isobutyl Alcohol	ND U	100	24	1	10/07/16 19:27	
Allyl Chloride	ND U	5.2	1.8	1	10/07/16 19:27	
4-Methyl-2-pentanone	ND U	5.2	1.1	1	10/07/16 19:27	
Acetone	**4.4 J**	5.2	3.0	1	10/07/16 19:27	
Acetonitrile	ND U	26	18	1	10/07/16 19:27	
Acrolein	ND U	26	3.7	1	10/07/16 19:27	
Acrylonitrile	ND U	26	6.8	1	10/07/16 19:27	
Benzene	ND U	5.2	0.31	1	10/07/16 19:27	
Bromodichloromethane	ND U	5.2	0.64	1	10/07/16 19:27	
Bromoform	ND U	5.2	0.97	1	10/07/16 19:27	
Bromomethane	ND U	5.2	1.5	1	10/07/16 19:27	
Carbon Disulfide	ND U	5.2	1.3	1	10/07/16 19:27	
Carbon Tetrachloride	ND U	5.2	0.96	1	10/07/16 19:27	
Chlorobenzene	ND U	5.2	0.31	1	10/07/16 19:27	
Chloroethane	ND U	5.2	3.0	1	10/07/16 19:27	
Chloroform	ND U	5.2	1.4	1	10/07/16 19:27	
Chloromethane	ND U	5.2	0.42	1	10/07/16 19:27	
Dibromochloromethane	ND U	5.2	0.76	1	10/07/16 19:27	
Dibromomethane	ND U	5.2	0.66	1	10/07/16 19:27	
Dichlorodifluoromethane (CFC 12)	ND U	5.2	2.0	1	10/07/16 19:27	
Dichloromethane	**0.80 J**	5.2	0.60	1	10/07/16 19:27	
Ethyl Methacrylate	ND U	5.2	0.79	1	10/07/16 19:27	
Ethylbenzene	ND U	5.2	0.24	1	10/07/16 19:27	
Iodomethane	ND U	10	1.2	1	10/07/16 19:27	
Methacrylonitrile	ND U	5.2	1.6	1	10/07/16 19:27	
Methyl Methacrylate	ND U	5.2	0.76	1	10/07/16 19:27	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040850 IBC 7295	**Units:**	ug/Kg
Lab Code:	R1610541-013	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	5.2	0.54	1	10/07/16 19:27	
Propionitrile	ND U	26	6.8	1	10/07/16 19:27	
Tetrachloroethene (PCE)	ND U	5.2	0.92	1	10/07/16 19:27	
Toluene	ND U	5.2	1.1	1	10/07/16 19:27	
Trichloroethene (TCE)	ND U	5.2	1.1	1	10/07/16 19:27	
Trichlorofluoromethane (CFC 11)	ND U	5.2	0.69	1	10/07/16 19:27	
Vinyl Chloride	ND U	5.2	2.0	1	10/07/16 19:27	
cis-1,3-Dichloropropene	ND U	5.2	0.94	1	10/07/16 19:27	
m,p-Xylenes	ND U	10	1.2	1	10/07/16 19:27	
o-Xylene	ND U	5.2	0.50	1	10/07/16 19:27	
trans-1,2-Dichloroethene	ND U	5.2	0.90	1	10/07/16 19:27	
trans-1,3-Dichloropropene	ND U	5.2	0.21	1	10/07/16 19:27	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	101	51 - 136	10/07/16 19:27	
Dibromofluoromethane	93	63 - 138	10/07/16 19:27	
Toluene-d8	96	66 - 138	10/07/16 19:27	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
000123-05-7	Hexanal, 2-ethyl-	12.49	49	JN
	unknown	13.57	550	J

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040900 IBC 7296	**Units:**	ug/Kg
Lab Code:	R1610541-016	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND	U	5.8	0.97	1.01	10/07/16 19:51	
1,1,1-Trichloroethane (TCA)	ND	U	5.8	0.85	1.01	10/07/16 19:51	
1,1,2,2-Tetrachloroethane	ND	U	5.8	0.94	1.01	10/07/16 19:51	
1,1,2-Trichloroethane	ND	U	5.8	0.85	1.01	10/07/16 19:51	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	U	5.8	1.5	1.01	10/07/16 19:51	
1,1-Dichloroethene (1,1-DCE)	ND	U	5.8	1.5	1.01	10/07/16 19:51	
1,2,3-Trichloropropane	ND	U	5.8	1.6	1.01	10/07/16 19:51	
1,2-Dibromo-3-chloropropane (DBCP)	ND	U	5.8	2.2	1.01	10/07/16 19:51	
1,2-Dibromoethane	ND	U	5.8	1.4	1.01	10/07/16 19:51	
1,2-Dichlorobenzene	ND	U	5.8	0.71	1.01	10/07/16 19:51	
1,2-Dichloroethane	ND	U	5.8	0.71	1.01	10/07/16 19:51	
1,2-Dichloropropane	ND	U	5.8	1.2	1.01	10/07/16 19:51	
1,3-Dichlorobenzene	ND	U	5.8	0.73	1.01	10/07/16 19:51	
1,4-Dioxane	ND	U	120	23	1.01	10/07/16 19:51	
2-Butanone (MEK)	ND	U	5.8	2.7	1.01	10/07/16 19:51	
2-Chloro-1,3-butadiene	ND	U	5.8	1.8	1.01	10/07/16 19:51	
2-Chloroethyl Vinyl Ether	ND	U	5.8	2.0	1.01	10/07/16 19:51	
Isobutyl Alcohol	ND	U	120	27	1.01	10/07/16 19:51	
Allyl Chloride	ND	U	5.8	2.0	1.01	10/07/16 19:51	
4-Methyl-2-pentanone	ND	U	5.8	1.2	1.01	10/07/16 19:51	
Acetone	**8.2**		5.8	3.3	1.01	10/07/16 19:51	
Acetonitrile	ND	U	29	20	1.01	10/07/16 19:51	
Acrolein	ND	U	29	4.1	1.01	10/07/16 19:51	
Acrylonitrile	ND	U	29	7.5	1.01	10/07/16 19:51	
Benzene	ND	U	5.8	0.34	1.01	10/07/16 19:51	
Bromodichloromethane	ND	U	5.8	0.71	1.01	10/07/16 19:51	
Bromoform	ND	U	5.8	1.1	1.01	10/07/16 19:51	
Bromomethane	ND	U	5.8	1.6	1.01	10/07/16 19:51	
Carbon Disulfide	**1.7**	**J**	5.8	1.5	1.01	10/07/16 19:51	
Carbon Tetrachloride	ND	U	5.8	1.1	1.01	10/07/16 19:51	
Chlorobenzene	ND	U	5.8	0.34	1.01	10/07/16 19:51	
Chloroethane	ND	U	5.8	3.4	1.01	10/07/16 19:51	
Chloroform	ND	U	5.8	1.5	1.01	10/07/16 19:51	
Chloromethane	ND	U	5.8	0.47	1.01	10/07/16 19:51	
Dibromochloromethane	ND	U	5.8	0.85	1.01	10/07/16 19:51	
Dibromomethane	ND	U	5.8	0.73	1.01	10/07/16 19:51	
Dichlorodifluoromethane (CFC 12)	ND	U	5.8	2.2	1.01	10/07/16 19:51	
Dichloromethane	**1.1**	**J**	5.8	0.66	1.01	10/07/16 19:51	
Ethyl Methacrylate	ND	U	5.8	0.87	1.01	10/07/16 19:51	
Ethylbenzene	ND	U	5.8	0.27	1.01	10/07/16 19:51	
Iodomethane	ND	U	12	1.3	1.01	10/07/16 19:51	
Methacrylonitrile	ND	U	5.8	1.8	1.01	10/07/16 19:51	
Methyl Methacrylate	ND	U	5.8	0.85	1.01	10/07/16 19:51	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040900 IBC 7296	**Units:**	ug/Kg
Lab Code:	R1610541-016	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	5.8	0.60	1.01	10/07/16 19:51	
Propionitrile	ND U	29	7.6	1.01	10/07/16 19:51	
Tetrachloroethene (PCE)	ND U	5.8	1.1	1.01	10/07/16 19:51	
Toluene	ND U	5.8	1.2	1.01	10/07/16 19:51	
Trichloroethene (TCE)	ND U	5.8	1.2	1.01	10/07/16 19:51	
Trichlorofluoromethane (CFC 11)	ND U	5.8	0.77	1.01	10/07/16 19:51	
Vinyl Chloride	ND U	5.8	2.2	1.01	10/07/16 19:51	
cis-1,3-Dichloropropene	ND U	5.8	1.1	1.01	10/07/16 19:51	
m,p-Xylenes	ND U	12	1.3	1.01	10/07/16 19:51	
o-Xylene	ND U	5.8	0.56	1.01	10/07/16 19:51	
trans-1,2-Dichloroethene	ND U	5.8	1.0	1.01	10/07/16 19:51	
trans-1,3-Dichloropropene	ND U	5.8	0.24	1.01	10/07/16 19:51	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	96	51 - 136	10/07/16 19:51	
Dibromofluoromethane	92	63 - 138	10/07/16 19:51	
Toluene-d8	95	66 - 138	10/07/16 19:51	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
	No Tentatively Identified Compounds Detected			

Metals

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040806 IBC 7287	**Basis:**	Dry
Lab Code:	R1610541-003		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Q	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND	U	mg/Kg	6.3	0.5	1	10/17/16 12:07	10/14/16	
Arsenic, Total	6010C	**3.5**		mg/Kg	1.0	0.3	1	10/17/16 12:07	10/14/16	
Barium, Total	6010C	**68.5**		mg/Kg	2.1	0.2	1	10/17/16 12:07	10/14/16	
Beryllium, Total	6010C	**0.43**		mg/Kg	0.31	0.02	1	10/17/16 12:07	10/14/16	
Cadmium, Total	6010C	**0.11**	**J**	mg/Kg	0.52	0.04	1	10/17/16 12:07	10/14/16	
Chromium, Total	6010C	**9.5**		mg/Kg	1.0	0.2	1	10/17/16 12:07	10/14/16	
Lead, Total	6010C	**7.4**		mg/Kg	5.2	0.3	1	10/17/16 12:07	10/14/16	
Mercury, Total	7471B	ND	U	mg/Kg	0.034	0.004	1	10/17/16 15:02	10/17/16	
Nickel, Total	6010C	**8.1**		mg/Kg	4.2	0.2	1	10/17/16 12:07	10/14/16	
Selenium, Total	6010C	ND	U	mg/Kg	1.0	0.7	1	10/17/16 12:07	10/14/16	
Silver, Total	6010C	ND	U	mg/Kg	1.0	0.5	1	10/17/16 12:07	10/14/16	
Thallium, Total	6010C	ND	U	mg/Kg	1.0	0.6	1	10/17/16 12:07	10/14/16	
Vanadium, Total	6010C	**16.8**		mg/Kg	5.2	0.2	1	10/17/16 12:07	10/14/16	
Zinc, Total	6010C	**33.8**		mg/Kg	2.1	0.2	1	10/17/16 12:07	10/14/16	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040807 IBC 7287	**Basis:**	Dry
Lab Code:	R1610541-004		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Q	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND	U	mg/Kg	6.2	0.5	1	10/17/16 12:34	10/14/16	
Arsenic, Total	6010C	**4.3**		mg/Kg	1.0	0.3	1	10/17/16 12:34	10/14/16	
Barium, Total	6010C	**81.4**		mg/Kg	2.1	0.2	1	10/17/16 12:34	10/14/16	
Beryllium, Total	6010C	**0.44**		mg/Kg	0.31	0.02	1	10/17/16 12:34	10/14/16	
Cadmium, Total	6010C	**0.11**	**J**	mg/Kg	0.52	0.04	1	10/17/16 12:34	10/14/16	
Chromium, Total	6010C	**10.4**		mg/Kg	1.0	0.2	1	10/17/16 12:34	10/14/16	
Lead, Total	6010C	**7.6**		mg/Kg	5.2	0.3	1	10/17/16 12:34	10/14/16	
Mercury, Total	7471B	**0.004**	**J**	mg/Kg	0.033	0.003	1	10/17/16 15:10	10/17/16	
Nickel, Total	6010C	**8.8**		mg/Kg	4.2	0.2	1	10/17/16 12:34	10/14/16	
Selenium, Total	6010C	ND	U	mg/Kg	1.0	0.7	1	10/17/16 12:34	10/14/16	
Silver, Total	6010C	ND	U	mg/Kg	1.0	0.5	1	10/17/16 12:34	10/14/16	
Thallium, Total	6010C	**1.1**		mg/Kg	1.0	0.6	1	10/17/16 12:34	10/14/16	
Vanadium, Total	6010C	**18.5**		mg/Kg	5.2	0.2	1	10/17/16 12:34	10/14/16	
Zinc, Total	6010C	**32.1**		mg/Kg	2.1	0.2	1	10/17/16 12:34	10/14/16	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040822 IBC 7288	**Basis:**	Dry
Lab Code:	R1610541-008		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Q	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND	U	mg/Kg	6.2	0.5	1	10/17/16 12:38	10/14/16	
Arsenic, Total	6010C	**4.1**		mg/Kg	1.0	0.3	1	10/17/16 12:38	10/14/16	
Barium, Total	6010C	**72.3**		mg/Kg	2.1	0.2	1	10/17/16 12:38	10/14/16	
Beryllium, Total	6010C	**0.30**	**J**	mg/Kg	0.31	0.02	1	10/17/16 12:38	10/14/16	
Cadmium, Total	6010C	**0.10**	**J**	mg/Kg	0.52	0.04	1	10/17/16 12:38	10/14/16	
Chromium, Total	6010C	**10.5**		mg/Kg	1.0	0.2	1	10/17/16 12:38	10/14/16	
Lead, Total	6010C	**8.0**		mg/Kg	5.2	0.3	1	10/17/16 12:38	10/14/16	
Mercury, Total	7471B	**0.005**	**J**	mg/Kg	0.033	0.003	1	10/17/16 15:12	10/17/16	
Nickel, Total	6010C	**6.1**		mg/Kg	4.1	0.2	1	10/17/16 12:38	10/14/16	
Selenium, Total	6010C	ND	U	mg/Kg	1.0	0.7	1	10/17/16 12:38	10/14/16	
Silver, Total	6010C	ND	U	mg/Kg	1.0	0.5	1	10/17/16 12:38	10/14/16	
Thallium, Total	6010C	**1.0**		mg/Kg	1.0	0.6	1	10/19/16 10:37	10/14/16	
Vanadium, Total	6010C	**10.7**		mg/Kg	5.2	0.2	1	10/17/16 12:38	10/14/16	
Zinc, Total	6010C	**29.6**		mg/Kg	2.1	0.2	1	10/17/16 12:38	10/14/16	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040842 IBC 7294	**Basis:**	Dry
Lab Code:	R1610541-011		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/Kg	6.1	0.5	1	10/17/16 12:41	10/14/16	
Arsenic, Total	6010C	**5.7**	mg/Kg	1.0	0.3	1	10/17/16 12:41	10/14/16	
Barium, Total	6010C	**115**	mg/Kg	2.0	0.2	1	10/17/16 12:41	10/14/16	
Beryllium, Total	6010C	**0.46**	mg/Kg	0.31	0.02	1	10/17/16 12:41	10/14/16	
Cadmium, Total	6010C	**0.14 J**	mg/Kg	0.51	0.04	1	10/17/16 12:41	10/14/16	
Chromium, Total	6010C	**37.5**	mg/Kg	1.0	0.2	1	10/17/16 12:41	10/14/16	
Lead, Total	6010C	**8.1**	mg/Kg	5.1	0.3	1	10/17/16 12:41	10/14/16	
Mercury, Total	7471B	ND U	mg/Kg	0.034	0.004	1	10/17/16 15:14	10/17/16	
Nickel, Total	6010C	**9.6**	mg/Kg	4.1	0.2	1	10/17/16 12:41	10/14/16	
Selenium, Total	6010C	ND U	mg/Kg	1.0	0.7	1	10/17/16 12:41	10/14/16	
Silver, Total	6010C	ND U	mg/Kg	1.0	0.5	1	10/17/16 12:41	10/14/16	
Thallium, Total	6010C	ND U	mg/Kg	1.0	0.6	1	10/17/16 12:41	10/14/16	
Vanadium, Total	6010C	**15.9**	mg/Kg	5.1	0.2	1	10/17/16 12:41	10/14/16	
Zinc, Total	6010C	**44.0**	mg/Kg	2.0	0.2	1	10/17/16 12:41	10/14/16	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040852 IBC 7295	**Basis:**	Dry
Lab Code:	R1610541-014		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Q	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND	U	mg/Kg	6.3	0.5	1	10/17/16 12:45	10/14/16	
Arsenic, Total	6010C	**3.8**		mg/Kg	1.0	0.3	1	10/17/16 12:45	10/14/16	
Barium, Total	6010C	**58.5**		mg/Kg	2.1	0.2	1	10/17/16 12:45	10/14/16	
Beryllium, Total	6010C	**0.27**	**J**	mg/Kg	0.31	0.02	1	10/17/16 12:45	10/14/16	
Cadmium, Total	6010C	**0.09**	**J**	mg/Kg	0.52	0.04	1	10/17/16 12:45	10/14/16	
Chromium, Total	6010C	**8.3**		mg/Kg	1.0	0.2	1	10/17/16 12:45	10/14/16	
Lead, Total	6010C	**4.3**	**J**	mg/Kg	5.2	0.3	1	10/17/16 12:45	10/14/16	
Mercury, Total	7471B	**0.004**	**J**	mg/Kg	0.033	0.003	1	10/17/16 15:15	10/17/16	
Nickel, Total	6010C	**6.0**		mg/Kg	4.2	0.2	1	10/17/16 12:45	10/14/16	
Selenium, Total	6010C	ND	U	mg/Kg	1.0	0.7	1	10/17/16 12:45	10/14/16	
Silver, Total	6010C	ND	U	mg/Kg	1.0	0.5	1	10/17/16 12:45	10/14/16	
Thallium, Total	6010C	**1.0**		mg/Kg	1.0	0.6	1	10/17/16 12:45	10/14/16	
Vanadium, Total	6010C	**9.3**		mg/Kg	5.2	0.2	1	10/17/16 12:45	10/14/16	
Zinc, Total	6010C	**30.1**		mg/Kg	2.1	0.2	1	10/17/16 12:45	10/14/16	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040902 IBC 7296	**Basis:**	Dry
Lab Code:	R1610541-017		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/Kg	6.6	0.5	1	10/17/16 12:49	10/14/16	
Arsenic, Total	6010C	**4.8**	mg/Kg	1.1	0.3	1	10/17/16 12:49	10/14/16	
Barium, Total	6010C	**106**	mg/Kg	2.2	0.2	1	10/17/16 12:49	10/14/16	
Beryllium, Total	6010C	**0.41**	mg/Kg	0.33	0.02	1	10/17/16 12:49	10/14/16	
Cadmium, Total	6010C	**0.13 J**	mg/Kg	0.55	0.04	1	10/17/16 12:49	10/14/16	
Chromium, Total	6010C	**23.8**	mg/Kg	1.1	0.2	1	10/17/16 12:49	10/14/16	
Lead, Total	6010C	**7.7**	mg/Kg	5.5	0.4	1	10/17/16 12:49	10/14/16	
Mercury, Total	7471B	ND U	mg/Kg	0.035	0.004	1	10/17/16 15:17	10/17/16	
Nickel, Total	6010C	**7.5**	mg/Kg	4.4	0.2	1	10/17/16 12:49	10/14/16	
Selenium, Total	6010C	ND U	mg/Kg	1.1	0.7	1	10/17/16 12:49	10/14/16	
Silver, Total	6010C	ND U	mg/Kg	1.1	0.5	1	10/17/16 12:49	10/14/16	
Thallium, Total	6010C	**2.5**	mg/Kg	1.1	0.6	1	10/17/16 12:49	10/14/16	
Vanadium, Total	6010C	**11.5**	mg/Kg	5.5	0.2	1	10/17/16 12:49	10/14/16	
Zinc, Total	6010C	**45.6**	mg/Kg	2.2	0.2	1	10/17/16 12:49	10/14/16	

General Chemistry

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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040800 IBC 7287	**Basis:**	As Received
Lab Code:	R1610541-001		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**95.1**	Percent	-	1	10/12/16 16:20	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040801 IBC 7287	**Basis:**	As Received
Lab Code:	R1610541-002		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**96.1**	Percent	-	1	10/12/16 16:20	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040806 IBC 7287	**Basis:**	As Received
Lab Code:	R1610541-003		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**96.0**	Percent	-	-	1	10/12/16 16:20	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040807 IBC 7287	**Basis:**	As Received
Lab Code:	R1610541-004		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**95.4**	Percent	-	-	1	10/12/16 16:20	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040820 IBC 7288	**Basis:**	As Received
Lab Code:	R1610541-007		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**97.0**	Percent	-	1	10/12/16 16:20	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040822 IBC 7288	**Basis:**	As Received
Lab Code:	R1610541-008		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**97.0**	Percent	-	-	1	10/12/16 16:20	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040840 IBC 7294	**Basis:**	As Received
Lab Code:	R1610541-010		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**96.9**	Percent	-	1	10/12/16 16:20	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040842 IBC 7294	**Basis:**	As Received
Lab Code:	R1610541-011		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**96.7**	Percent	-	-	1	10/12/16 16:20	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040850 IBC 7295	**Basis:**	As Received
Lab Code:	R1610541-013		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**96.1**	Percent	-	1	10/12/16 16:20	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040852 IBC 7295	**Basis:**	As Received
Lab Code:	R1610541-014		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**95.5**	Percent	-	-	1	10/12/16 16:20	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040900 IBC 7296	**Basis:**	As Received
Lab Code:	R1610541-016		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**87.3**	Percent	-	1	10/12/16 16:20	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16 09:50
Sample Name:	1610040902 IBC 7296	**Basis:**	As Received
Lab Code:	R1610541-017		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**90.7**	Percent	-	-	1	10/12/16 16:20	

QC Summary Forms

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Volatile Organic Compounds by GC/MS

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Client: NASA/WSTF/Navarro **Service Request:** R1610541
Project: White Sands Test Facility/15EC007B
Sample Matrix: Soil

SURROGATE RECOVERY SUMMARY
Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Extraction Method: EPA 5030C

Sample Name	Lab Code	4-Bromofluorobenzene 51 - 136	Dibromofluoromethane 63 - 138	Toluene-d8 66 - 138
1610040800 IBC 7287	R1610541-001	100	95	96
1610040801 IBC 7287	R1610541-002	98	93	96
1610040820 IBC 7288	R1610541-007	98	94	95
1610040840 IBC 7294	R1610541-010	97	89	93
1610040850 IBC 7295	R1610541-013	101	93	96
1610040900 IBC 7296	R1610541-016	96	92	95
Method Blank	RQ1612062-01	102	94	97
Lab Control Sample	RQ1612062-02	102	97	97
1610040800 IBC 7287 MS	RQ1612062-05	106	98	98
1610040800 IBC 7287 DMS	RQ1612062-06	102	98	96

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16
		Date Analyzed:	10/7/16
		Date Extracted:	NA

Duplicate Matrix Spike Summary
Volatile Organic Compounds by GC/MS, Unpreserved

Sample Name:	1610040800 IBC 7287	**Units:**	ug/Kg
Lab Code:	R1610541-001	**Basis:**	Dry
Analysis Method:	8260C		
Prep Method:	EPA 5030C		

		Matrix Spike RQ1612062-05			Duplicate Matrix Spike RQ1612062-06					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
1,1,1,2-Tetrachloroethane	ND U	44.4	52.6	84	45.5	52.6	87	52-133	4	30
1,1,1-Trichloroethane (TCA)	ND U	44.9	52.6	85	45.5	52.6	86	51-132	1	30
1,1,2,2-Tetrachloroethane	ND U	47.8	52.6	91	47.3	52.6	90	53-134	1	30
1,1,2-Trichloroethane	ND U	49.6	52.6	94	50.1	52.6	95	62-126	1	30
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	42.2	52.6	80	42.4	52.6	81	45-136	1	30
1,1-Dichloroethene (1,1-DCE)	ND U	47.6	52.6	90	46.9	52.6	89	61-139	1	30
1,2,3-Trichloropropane	ND U	47.9	52.6	91	48.0	52.6	91	22-167	<1	30
1,2-Dibromo-3-chloropropane (DBCP)	ND U	44.8	52.6	85	46.0	52.6	87	27-163	2	30
1,2-Dibromoethane	ND U	48.5	52.6	92	48.7	52.6	93	52-137	1	30
1,2-Dichlorobenzene	ND U	44.0	52.6	84	45.5	52.6	87	22-156	4	30
1,2-Dichloroethane	ND U	49.5	52.6	94	48.8	52.6	93	59-125	1	30
1,2-Dichloropropane	ND U	47.2	52.6	90	46.8	52.6	89	67-126	1	30
1,3-Dichlorobenzene	ND U	43.6	52.6	83	44.2	52.6	84	29-146	1	30
1,4-Dioxane	ND U	901	1050	86	878	1050	84	50-148	2	30
2-Butanone (MEK)	ND U	52.0	52.6	99	51.4	52.6	98	43-134	1	30
2-Chloro-1,3-butadiene	ND U	51.8	52.6	99	50.8	52.6	97	45-134	2	30
2-Chloroethyl Vinyl Ether	ND U	38.9	52.6	74	35.8	52.6	68	37-150	8	30
Isobutyl Alcohol	ND U	904	1050	86	891	1050	85	39-146	1	30
Allyl Chloride	ND U	44.8	52.6	85	45.2	52.6	86	34-135	1	30
4-Methyl-2-pentanone	ND U	50.8	52.6	97	50.8	52.6	97	47-145	<1	30
Acetone	ND U	71.9	52.6	137	81.1	52.6	154	11-183	12	30
Acetonitrile	ND U	305	263	116	307	263	117	28-146	<1	30
Acrolein	ND U	115	105	109	124	105	118	10-172	8	30
Acrylonitrile	ND U	261	263	99	257	263	98	46-139	1	30
Benzene	ND U	46.6	52.6	89	45.5	52.6	87	63-126	2	30
Bromodichloromethane	ND U	46.2	52.6	88	46.3	52.6	88	47-141	<1	30
Bromoform	ND U	50.3	52.6	96	51.5	52.6	98	26-157	2	30
Bromomethane	ND U	52.2	52.6	99	51.4	52.6	98	10-137	1	30
Carbon Disulfide	ND U	51.7	52.6	98	52.6	52.6	100	35-135	2	30
Carbon Tetrachloride	ND U	41.0	52.6	78	41.0	52.6	78	46-137	<1	30
Chlorobenzene	ND U	44.7	52.6	85	45.3	52.6	86	51-132	1	30
Chloroethane	ND U	56.5	52.6	107	57.5	52.6	109	45-132	2	30
Chloroform	ND U	49.0	52.6	93	48.6	52.6	92	61-124	1	30
Chloromethane	ND U	48.8	52.6	93	48.5	52.6	92	50-136	1	30
Dibromochloromethane	ND U	47.2	52.6	90	48.3	52.6	92	40-146	2	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16
		Date Analyzed:	10/7/16
		Date Extracted:	NA

Duplicate Matrix Spike Summary
Volatile Organic Compounds by GC/MS, Unpreserved

Sample Name:	1610040800 IBC 7287	**Units:**	ug/Kg
Lab Code:	R1610541-001	**Basis:**	Dry
Analysis Method:	8260C		
Prep Method:	EPA 5030C		

		Matrix Spike RQ1612062-05			Duplicate Matrix Spike RQ1612062-06					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Dibromomethane	ND U	49.3	52.6	94	49.0	52.6	93	61-122	1	30
Dichlorodifluoromethane (CFC 12)	ND U	48.1	52.6	91	46.3	52.6	88	44-138	3	30
Dichloromethane	0.99 J	49.9	52.6	93	50.3	52.6	94	64-120	1	30
Ethyl Methacrylate	ND U	47.2	52.6	90	46.8	52.6	89	17-166	1	30
Ethylbenzene	ND U	43.9	52.6	83	44.0	52.6	84	44-131	1	30
Iodomethane	ND U	47.6	52.6	90	52.3	52.6	100	10-160	11	30
Methacrylonitrile	ND U	52.2	52.6	99	52.2	52.6	99	44-149	<1	30
Methyl Methacrylate	ND U	50.9	52.6	97	51.6	52.6	98	41-162	1	30
Naphthalene	ND U	45.6	52.6	87	47.2	52.6	90	10-187	3	30
Propionitrile	ND U	269	263	102	263	263	100	46-144	2	30
Tetrachloroethene (PCE)	ND U	41.4	52.6	79	42.3	52.6	80	45-141	1	30
Toluene	ND U	45.0	52.6	86	44.8	52.6	85	50-140	1	30
Trichloroethene (TCE)	ND U	48.6	52.6	93	48.3	52.6	92	54-136	1	30
Trichlorofluoromethane (CFC 11)	ND U	45.9	52.6	87	46.6	52.6	89	47-129	2	30
Vinyl Chloride	ND U	55.5	52.6	106	55.8	52.6	106	53-128	<1	30
cis-1,3-Dichloropropene	ND U	46.1	52.6	88	46.1	52.6	88	31-150	<1	30
m,p-Xylenes	ND U	88.7	105	84	90.3	105	86	45-141	2	30
o-Xylene	ND U	44.6	52.6	85	45.9	52.6	87	46-139	2	30
trans-1,2-Dichloroethene	ND U	47.8	52.6	91	48.3	52.6	92	52-128	1	30
trans-1,3-Dichloropropene	ND U	47.8	52.6	91	47.8	52.6	91	23-160	<1	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/Kg
Lab Code:	RQ1612062-01	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	5.0	0.83	1	10/07/16 15:49	
1,1,1-Trichloroethane (TCA)	ND U	5.0	0.73	1	10/07/16 15:49	
1,1,2,2-Tetrachloroethane	ND U	5.0	0.81	1	10/07/16 15:49	
1,1,2-Trichloroethane	ND U	5.0	0.73	1	10/07/16 15:49	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.0	1.3	1	10/07/16 15:49	
1,1-Dichloroethene (1,1-DCE)	ND U	5.0	1.3	1	10/07/16 15:49	
1,2,3-Trichloropropane	ND U	5.0	1.4	1	10/07/16 15:49	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.0	1.9	1	10/07/16 15:49	
1,2-Dibromoethane	ND U	5.0	1.3	1	10/07/16 15:49	
1,2-Dichlorobenzene	ND U	5.0	0.61	1	10/07/16 15:49	
1,2-Dichloroethane	ND U	5.0	0.61	1	10/07/16 15:49	
1,2-Dichloropropane	ND U	5.0	0.97	1	10/07/16 15:49	
1,3-Dichlorobenzene	ND U	5.0	0.63	1	10/07/16 15:49	
1,4-Dioxane	ND U	100	20	1	10/07/16 15:49	
2-Butanone (MEK)	ND U	5.0	2.3	1	10/07/16 15:49	
2-Chloro-1,3-butadiene	ND U	5.0	1.6	1	10/07/16 15:49	
2-Chloroethyl Vinyl Ether	ND U	5.0	1.8	1	10/07/16 15:49	
Isobutyl Alcohol	ND U	100	23	1	10/07/16 15:49	
Allyl Chloride	ND U	5.0	1.7	1	10/07/16 15:49	
4-Methyl-2-pentanone	ND U	5.0	0.98	1	10/07/16 15:49	
Acetone	ND U	5.0	2.9	1	10/07/16 15:49	
Acetonitrile	ND U	25	17	1	10/07/16 15:49	
Acrolein	ND U	25	3.5	1	10/07/16 15:49	
Acrylonitrile	ND U	25	6.5	1	10/07/16 15:49	
Benzene	ND U	5.0	0.29	1	10/07/16 15:49	
Bromodichloromethane	ND U	5.0	0.61	1	10/07/16 15:49	
Bromoform	ND U	5.0	0.93	1	10/07/16 15:49	
Bromomethane	ND U	5.0	1.4	1	10/07/16 15:49	
Carbon Disulfide	ND U	5.0	1.3	1	10/07/16 15:49	
Carbon Tetrachloride	ND U	5.0	0.92	1	10/07/16 15:49	
Chlorobenzene	ND U	5.0	0.29	1	10/07/16 15:49	
Chloroethane	ND U	5.0	2.9	1	10/07/16 15:49	
Chloroform	ND U	5.0	1.3	1	10/07/16 15:49	
Chloromethane	ND U	5.0	0.40	1	10/07/16 15:49	
Dibromochloromethane	ND U	5.0	0.73	1	10/07/16 15:49	
Dibromomethane	ND U	5.0	0.63	1	10/07/16 15:49	
Dichlorodifluoromethane (CFC 12)	ND U	5.0	1.9	1	10/07/16 15:49	
Dichloromethane	ND U	5.0	0.57	1	10/07/16 15:49	
Ethyl Methacrylate	ND U	5.0	0.75	1	10/07/16 15:49	
Ethylbenzene	ND U	5.0	0.23	1	10/07/16 15:49	
Iodomethane	ND U	10	1.2	1	10/07/16 15:49	
Methacrylonitrile	ND U	5.0	1.6	1	10/07/16 15:49	
Methyl Methacrylate	ND U	5.0	0.73	1	10/07/16 15:49	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/Kg
Lab Code:	RQ1612062-01	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	5.0	0.51	1	10/07/16 15:49	
Propionitrile	ND U	25	6.5	1	10/07/16 15:49	
Tetrachloroethene (PCE)	ND U	5.0	0.88	1	10/07/16 15:49	
Toluene	ND U	5.0	1.0	1	10/07/16 15:49	
Trichloroethene (TCE)	ND U	5.0	1.1	1	10/07/16 15:49	
Trichlorofluoromethane (CFC 11)	ND U	5.0	0.66	1	10/07/16 15:49	
Vinyl Chloride	ND U	5.0	1.9	1	10/07/16 15:49	
cis-1,3-Dichloropropene	ND U	5.0	0.90	1	10/07/16 15:49	
m,p-Xylenes	ND U	10	1.1	1	10/07/16 15:49	
o-Xylene	ND U	5.0	0.48	1	10/07/16 15:49	
trans-1,2-Dichloroethene	ND U	5.0	0.86	1	10/07/16 15:49	
trans-1,3-Dichloropropene	ND U	5.0	0.20	1	10/07/16 15:49	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	102	51 - 136	10/07/16 15:49	
Dibromofluoromethane	94	63 - 138	10/07/16 15:49	
Toluene-d8	97	66 - 138	10/07/16 15:49	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
	No Tentatively Identified Compounds Detected			

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/15EC007B
Sample Matrix: Soil

Service Request: R1610541
Date Analyzed: 10/07/16

Lab Control Sample Summary
Volatile Organic Compounds by GC/MS, Unpreserved

Units:ug/Kg
Basis: Dry

Lab Control Sample
RQ1612062-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
1,1,1,2-Tetrachloroethane	8260C	21.1	20.0	105	40-140
1,1,1-Trichloroethane (TCA)	8260C	22.7	20.0	113	40-140
1,1,2,2-Tetrachloroethane	8260C	21.3	20.0	106	40-140
1,1,2-Trichloroethane	8260C	21.0	20.0	105	40-140
1,1,2-Trichloro-1,2,2-trifluoroethane	8260C	22.8	20.0	114	40-140
1,1-Dichloroethene (1,1-DCE)	8260C	23.7	20.0	118	40-140
1,2,3-Trichloropropane	8260C	19.9	20.0	100	40-140
1,2-Dibromo-3-chloropropane (DBCP)	8260C	18.3	20.0	92	40-140
1,2-Dibromoethane	8260C	20.1	20.0	101	40-140
1,2-Dichlorobenzene	8260C	22.2	20.0	111	40-140
1,2-Dichloroethane	8260C	21.1	20.0	106	40-140
1,2-Dichloropropane	8260C	21.6	20.0	108	40-140
1,3-Dichlorobenzene	8260C	22.8	20.0	114	40-140
1,4-Dioxane	8260C	380	400	95	40-140
2-Butanone (MEK)	8260C	18.5	20.0	93	40-140
2-Chloro-1,3-butadiene	8260C	19.7	20.0	98	40-140
2-Chloroethyl Vinyl Ether	8260C	13.7	20.0	69	40-140
Isobutyl Alcohol	8260C	338	400	84	40-140
Allyl Chloride	8260C	21.1	20.0	105	40-140
4-Methyl-2-pentanone	8260C	17.6	20.0	88	40-140
Acetone	8260C	23.9	20.0	120	40-140
Acetonitrile	8260C	88.2	100	88	40-140
Acrolein	8260C	42.9	40.0	107	40-140
Acrylonitrile	8260C	96.2	100	96	40-140
Benzene	8260C	22.1	20.0	111	40-140
Bromodichloromethane	8260C	20.9	20.0	105	40-140
Bromoform	8260C	22.4	20.0	112	40-140
Bromomethane	8260C	25.6	20.0	128	40-140
Carbon Disulfide	8260C	20.4	20.0	102	40-140
Carbon Tetrachloride	8260C	22.4	20.0	112	40-140
Chlorobenzene	8260C	22.1	20.0	111	40-140
Chloroethane	8260C	25.5	20.0	127	40-140
Chloroform	8260C	21.8	20.0	109	40-140

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/15EC007B
Sample Matrix: Soil

Service Request: R1610541
Date Analyzed: 10/07/16

Lab Control Sample Summary
Volatile Organic Compounds by GC/MS, Unpreserved

Units:ug/Kg
Basis: Dry

Lab Control Sample
RQ1612062-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Chloromethane	8260C	23.0	20.0	115	40-140
Dibromochloromethane	8260C	20.6	20.0	103	40-140
Dibromomethane	8260C	20.7	20.0	103	40-140
Dichlorodifluoromethane (CFC 12)	8260C	24.2	20.0	121	40-140
Dichloromethane	8260C	22.0	20.0	110	40-140
Ethyl Methacrylate	8260C	18.4	20.0	92	40-140
Ethylbenzene	8260C	22.7	20.0	114	40-140
Iodomethane	8260C	20.2	20.0	101	40-140
Methacrylonitrile	8260C	19.4	20.0	97	40-140
Methyl Methacrylate	8260C	18.5	20.0	92	40-140
Naphthalene	8260C	21.0	20.0	105	40-140
Propionitrile	8260C	101	100	101	40-140
Tetrachloroethene (PCE)	8260C	23.0	20.0	115	40-140
Toluene	8260C	22.3	20.0	112	40-140
Trichloroethene (TCE)	8260C	22.3	20.0	111	40-140
Trichlorofluoromethane (CFC 11)	8260C	24.9	20.0	124	40-140
Vinyl Chloride	8260C	27.0	20.0	135	40-140
cis-1,3-Dichloropropene	8260C	20.7	20.0	104	40-140
m,p-Xylenes	8260C	46.3	40.0	116	40-140
o-Xylene	8260C	22.3	20.0	111	40-140
trans-1,2-Dichloroethene	8260C	23.2	20.0	116	40-140
trans-1,3-Dichloropropene	8260C	20.9	20.0	104	40-140

Metals

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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	Dry
Lab Code:	R1610541-MB		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/Kg	6.0	0.4	1	10/17/16 10:53	10/14/16	
Arsenic, Total	6010C	ND U	mg/Kg	1.0	0.3	1	10/17/16 10:53	10/14/16	
Barium, Total	6010C	ND U	mg/Kg	2.0	0.2	1	10/17/16 10:53	10/14/16	
Beryllium, Total	6010C	ND U	mg/Kg	0.30	0.02	1	10/17/16 10:53	10/14/16	
Cadmium, Total	6010C	ND U	mg/Kg	0.50	0.04	1	10/17/16 10:53	10/14/16	
Chromium, Total	6010C	ND U	mg/Kg	1.0	0.2	1	10/17/16 10:53	10/14/16	
Lead, Total	6010C	ND U	mg/Kg	5.0	0.3	1	10/17/16 10:53	10/14/16	
Mercury, Total	7471B	ND U	mg/Kg	5.5	0.5	1	10/17/16 14:33	10/17/16	
Nickel, Total	6010C	ND U	mg/Kg	4.0	0.2	1	10/17/16 10:53	10/14/16	
Selenium, Total	6010C	ND U	mg/Kg	1.0	0.6	1	10/17/16 10:53	10/14/16	
Silver, Total	6010C	ND U	mg/Kg	1.0	0.5	1	10/17/16 10:53	10/14/16	
Thallium, Total	6010C	ND U	mg/Kg	1.0	0.6	1	10/17/16 10:53	10/14/16	
Vanadium, Total	6010C	ND U	mg/Kg	5.0	0.2	1	10/17/16 10:53	10/14/16	
Zinc, Total	6010C	**1.2 J**	mg/Kg	2.0	0.2	1	10/17/16 10:53	10/14/16	

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/15EC007B
Sample Matrix: Soil

Service Request:R1610541
Date Collected:10/04/16
Date Received:10/05/16
Date Analyzed:10/17/16

Matrix Spike Summary
Inorganic Parameters

Sample Name: 1610040806 IBC 7287
Lab Code: R1610541-003

Units:mg/Kg
Basis: Dry

Matrix Spike
R1610541-003MS

Analyte Name	Method	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Silver, Total	6010C	ND U	4.8	5.1	95	75-125
Arsenic, Total	6010C	3.5	8.5	4.0	123	75-125
Barium, Total	6010C	68.5	252	202	91	75-125
Beryllium, Total	6010C	0.43	5.00	5.06	90	75-125
Cadmium, Total	6010C	0.11 J	4.50	5.06	87	75-125
Chromium, Total	6010C	9.5	29.3	20.2	98	75-125
Mercury, Total	7471B	ND U	ND U	0.2	96	75-125
Nickel, Total	6010C	8.1	52.8	50.6	88	75-125
Lead, Total	6010C	7.4	52.5	50.6	89	75-125
Antimony, Total	6010C	ND U	39.2	50.6	77	75-125
Selenium, Total	6010C	ND U	91.7	102	90	75-125
Thallium, Total	6010C	ND U	191	202	94	75-125
Vanadium, Total	6010C	16.8	67.0	50.6	99	75-125
Zinc, Total	6010C	33.8	79.7	50.6	91	75-125

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16
		Date Analyzed:	10/17/16

Replicate Sample Summary
Inorganic Parameters

Sample Name:	1610040806 IBC 7287	**Units:**	mg/Kg
Lab Code:	R1610541-003	**Basis:**	Dry

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample R1610541-003DUP Result	Average	RPD	RPD Limit
Antimony, Total	6010C	6.2	0.5	ND U	ND U	NC	NC	20
Arsenic, Total	6010C	1.0	0.3	3.5	7.4	5.44	71 *	20
Barium, Total	6010C	2.1	0.2	68.5	78.6	73.5	14	20
Beryllium, Total	6010C	0.31	0.02	0.43	0.46	0.446	8	20
Cadmium, Total	6010C	0.52	0.04	0.11 J	0.11 J	0.114	<1	20
Chromium, Total	6010C	1.0	0.2	9.5	10	9.75	4	20
Lead, Total	6010C	5.2	0.3	7.4	9.3	8.32	23 *	20
Mercury, Total	7471B	5.5	0.5	ND U	ND U	NC	NC	35
Nickel, Total	6010C	4.1	0.2	8.1	9.7	8.92	18	20
Selenium, Total	6010C	1.0	0.7	ND U	ND U	NC	NC	20
Silver, Total	6010C	1.0	0.5	ND U	ND U	NC	NC	20
Thallium, Total	6010C	1.0	0.6	ND U	1 J	NC	NC	20
Vanadium, Total	6010C	5.2	0.2	16.8	19.1	17.9	13	20
Zinc, Total	6010C	2.1	0.2	33.8	35.4	34.6	5	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/15EC007B
Sample Matrix: Soil

Service Request: R1610541
Date Analyzed: 10/17/16

Lab Control Sample Summary
Inorganic Parameters

Units:mg/Kg
Basis: Dry

Lab Control Sample
R1610541-LCS

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Antimony, Total	6010C	46.8	50.0	94	80-120
Arsenic, Total	6010C	3.93	4.0	98	80-120
Barium, Total	6010C	199	200	99	80-120
Beryllium, Total	6010C	4.72	5.00	94	80-120
Cadmium, Total	6010C	4.94	5.00	99	80-120
Chromium, Total	6010C	19.9	20.0	99	80-120
Lead, Total	6010C	49.3	50.0	99	80-120
Mercury, Total	7471B	ND U	0.2	93	80-120
Nickel, Total	6010C	49.1	50.0	98	80-120
Selenium, Total	6010C	90.3	101	89	80-120
Silver, Total	6010C	4.58	5.0	92	80-120
Thallium, Total	6010C	173	200	87	80-120
Vanadium, Total	6010C	47.9	50.0	96	80-120
Zinc, Total	6010C	46.8	50.0	94	80-120

General Chemistry

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QA/QC Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16
		Date Analyzed:	10/12/16

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	1610040800 IBC 7287	**Units:**	Percent
Lab Code:	R1610541-001	**Basis:**	As Received

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample R1610541-001DUP Result	Average	RPD	RPD Limit
Total Solids	ALS SOP	-	95.1	95.5	95.3	<1	20

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Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1610541
Project	White Sands Test Facility/15EC007B	**Date Collected:**	10/04/16
Sample Matrix:	Soil	**Date Received:**	10/05/16
		Date Analyzed:	10/12/16

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	1610040806 IBC 7287	**Units:**	Percent
Lab Code:	R1610541-003	**Basis:**	As Received

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample R1610541-003DUP Result	Average	RPD	RPD Limit
Total Solids	ALS SOP	-	-	96.0	94.9	95.4	1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Subcontracted Analytical Parameters

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
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ALS Environmental

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

October 14, 2016

Reports and Invoices
ALS Environmental
1565 Jefferson Road
Building 300, Suite 360
Rochester, NY 14623

Certificate of Analysis

Project Name:	**TCLP Metals - no J values**	Workorder:	**2181306**
Purchase Order:	**58R1610541**	Workorder ID:	**R1610541**

Dear Reports Invoices:

Enclosed are the analytical results for samples received by the laboratory on Tuesday, October 11, 2016.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

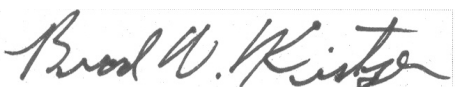
If you have any questions regarding this certificate of analysis, please contact Mr. Brad W Kintzer (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Ellen Smith , Ms. Janice Jaeger

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.



Mr. Brad W Kintzer
Project Coordinator

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SAMPLE SUMMARY

Workorder: 2181306 R1610541

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2181306001	1610040809 IBC 7287	Solid	10/4/2016 00:00	10/11/2016 09:16	Collected by Client
2181306002	1610040810 IBC 7287	Solid	10/4/2016 00:00	10/11/2016 09:16	Collected by Client
2181306003	1610040823 IBC 7288	Solid	10/4/2016 00:00	10/11/2016 09:16	Collected by Client
2181306004	1610040843 IBC 7294	Solid	10/4/2016 00:00	10/11/2016 09:16	Collected by Client
2181306005	1610040853 IBC 7295	Solid	10/4/2016 00:00	10/11/2016 09:16	Collected by Client
2181306006	1610040903 IBC 7296	Solid	10/4/2016 00:00	10/11/2016 09:16	Collected by Client

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SAMPLE SUMMARY

Workorder: 2181306 R1610541

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.
-- For microbiological analyses, the "Prepared" value is the date/time into the incurbator and the "Analyzed" value is the date/time out the incubator.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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ANALYTICAL RESULTS

Workorder: 2181306 R1610541

Lab ID: **2181306001** Date Collected: 10/4/2016 00:00 Matrix: Solid

Sample ID: **1610040809 IBC 7287** Date Received: 10/11/2016 09:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	5.2		%	0.1	S2540G-11			10/13/16 08:57	VKB	
Total Solids	94.8		%	0.1	S2540G-11			10/13/16 08:57	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Barium, Total	ND		mg/L	2.8	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/14/16 11:00	MNP	10/14/16 14:39	MNP	B1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Zinc, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2

Mr. Brad W Kintzer
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2181306 R1610541

Lab ID: **2181306002** Date Collected: 10/4/2016 00:00 Matrix: Solid

Sample ID: **1610040810 IBC 7287** Date Received: 10/11/2016 09:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	4.7		%	0.1	S2540G-11			10/13/16 09:55	VKB	
Total Solids	95.3		%	0.1	S2540G-11			10/13/16 09:55	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Barium, Total	ND		mg/L	2.8	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/14/16 11:00	MNP	10/14/16 14:42	MNP	B1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Zinc, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2

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ANALYTICAL RESULTS

Workorder: 2181306 R1610541

Lab ID: **2181306003** Date Collected: 10/4/2016 00:00 Matrix: Solid

Sample ID: **1610040823 IBC 7288** Date Received: 10/11/2016 09:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	4.1		%	0.1	S2540G-11			10/13/16 09:55	VKB	
Total Solids	95.9		%	0.1	S2540G-11			10/13/16 09:55	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Barium, Total	ND		mg/L	2.8	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/14/16 11:00	MNP	10/14/16 14:44	MNP	B1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Zinc, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2

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ANALYTICAL RESULTS

Workorder: 2181306 R1610541

Lab ID: **2181306004** Date Collected: 10/4/2016 00:00 Matrix: Solid

Sample ID: **1610040843 IBC 7294** Date Received: 10/11/2016 09:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	3.7		%	0.1	S2540G-11			10/13/16 09:55	VKB	
Total Solids	96.3		%	0.1	S2540G-11			10/13/16 09:55	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Barium, Total	ND		mg/L	2.8	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/14/16 11:00	MNP	10/14/16 14:45	MNP	B1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Zinc, Total	0.13		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2

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ANALYTICAL RESULTS

Workorder: 2181306 R1610541

Lab ID: **2181306005** Date Collected: 10/4/2016 00:00 Matrix: Solid

Sample ID: **1610040853 IBC 7295** Date Received: 10/11/2016 09:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	5.0		%	0.1	S2540G-11			10/13/16 09:55	VKB	
Total Solids	95.0		%	0.1	S2540G-11			10/13/16 09:55	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Barium, Total	ND		mg/L	2.8	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/14/16 11:00	MNP	10/14/16 14:46	MNP	B1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Zinc, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2

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ANALYTICAL RESULTS

Workorder: 2181306 R1610541

Lab ID: **2181306006** Date Collected: 10/4/2016 00:00 Matrix: Solid

Sample ID: **1610040903 IBC 7296** Date Received: 10/11/2016 09:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	12.6		%	0.1	S2540G-11			10/13/16 09:55	VKB	
Total Solids	87.4		%	0.1	S2540G-11			10/13/16 09:55	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Barium, Total	ND		mg/L	2.8	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/14/16 11:00	MNP	10/14/16 14:47	MNP	B1
Nickel, Total	0.13		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Zinc, Total	0.22		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

QUALITY CONTROL DATA

Workorder: 2181306 R1610541

QC Batch: MDIG/60238 **Analysis Method:** SW846 7470A

QC Batch Method: SW846 7470A

Associated Lab Samples: 2181306001, 2181306002, 2181306003, 2181306004, 2181306005, 2181306006

METHOD BLANK: 2423798

Parameter	Blank Result	Units	Reporting Limit
Mercury, Total	ND	mg/L	0.0020

LABORATORY CONTROL SAMPLE: 2423799

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Mercury, Total	102	mg/L	.002	0.0020	85 - 115

MATRIX SPIKE: 2423811 DUPLICATE: 2423812 ORIGINAL: 2181306001

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Mercury, Total	0	mg/L	.005	.00442	.00473	88.4	94.6	70 - 130	6.78	20

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QUALITY CONTROL DATA

Workorder: 2181306 R1610541

QC Batch: MDIG/60239 **Analysis Method:** SW846 6010C

QC Batch Method: SW846 3015

Associated Lab Samples: 2181306001, 2181306002, 2181306003, 2181306004, 2181306005, 2181306006

METHOD BLANK: 2423801

Parameter	Blank Result	Units	Reporting Limit
Antimony, Total	ND	mg/L	0.030
Arsenic, Total	ND	mg/L	0.028
Barium, Total	ND	mg/L	0.56
Beryllium, Total	ND	mg/L	0.0044
Cadmium, Total	ND	mg/L	0.0022
Chromium, Total	ND	mg/L	0.0056
Lead, Total	ND	mg/L	0.0067
Nickel, Total	ND	mg/L	0.022
Selenium, Total	ND	mg/L	0.022
Silver, Total	ND	mg/L	0.0044
Thallium, Total	ND	mg/L	0.022
Vanadium, Total	ND	mg/L	0.0056
Zinc, Total	ND	mg/L	0.022

LABORATORY CONTROL SAMPLE: 2423802

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Antimony, Total	101	mg/L	.22	0.22	80 - 120
Arsenic, Total	104	mg/L	.11	0.12	80 - 120
Barium, Total	108	mg/L	1.1	1.2	80 - 120
Beryllium, Total	104	mg/L	.22	0.23	80 - 120
Cadmium, Total	106	mg/L	.11	0.12	80 - 120
Chromium, Total	110	mg/L	.11	0.12	80 - 120
Lead, Total	106	mg/L	.11	0.12	80 - 120
Nickel, Total	106	mg/L	1.1	1.2	80 - 120
Selenium, Total	100	mg/L	1.1	1.1	80 - 120
Silver, Total	110	mg/L	.11	0.12	80 - 120
Thallium, Total	100	mg/L	.11	0.11	80 - 120
Vanadium, Total	108	mg/L	.056	0.060	80 - 120
Zinc, Total	105	mg/L	.56	0.58	80 - 120

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QUALITY CONTROL DATA

Workorder: 2181306 R1610541

MATRIX SPIKE: 2423809 DUPLICATE: 2423810 ORIGINAL: 2181306001

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Arsenic, Total	.015	mg/L	5	6.28327	5.89439	125	118	50 - 150	6.39	20
Barium, Total	1.01332	mg/L	10	12.83876	12.2221	118	112	50 - 150	4.92	20
Cadmium, Total	0	mg/L	1	1.23888	1.1611	124	116	50 - 150	6.48	20
Chromium, Total	.00278	mg/L	5	5.94439	5.54939	119	111	50 - 150	6.87	20
Lead, Total	0	mg/L	5	6.0055	5.64439	120	113	50 - 150	6.2	20
Selenium, Total	0	mg/L	1	1.22554	1.15666	123	116	50 - 150	5.78	20
Silver, Total	0	mg/L	1	1.3361	1.25832	134	126	50 - 150	6	20

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QUALITY CONTROL DATA

Workorder: 2181306 R1610541

QC Batch: WETC/177390 **Analysis Method:** S2540G-11

QC Batch Method: S2540G-11

Associated Lab Samples: 2181306001

SAMPLE DUPLICATE: 2423004 ORIGINAL: 2181015001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	13.2052	%	9.3228	34.5*	10
Total Solids	86.7947	%	90.6771	4.38	5

SAMPLE DUPLICATE: 2423005 ORIGINAL: 2181016005

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	9.5801	%	9.5088	.75	10
Total Solids	90.4198	%	90.4911	.08	5

SAMPLE DUPLICATE: 2423006 ORIGINAL: 2181059003

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	21.4041	%	15.7093	30.7*	10
Total Solids	78.5958	%	84.2906	6.99*	5

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QUALITY CONTROL DATA

Workorder: 2181306 R1610541

QC Batch: WETC/177393 **Analysis Method:** S2540G-11

QC Batch Method: S2540G-11

Associated Lab Samples: 2181306002, 2181306003, 2181306004, 2181306005, 2181306006

SAMPLE DUPLICATE: 2423058 ORIGINAL: 2181306002

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	4.6966	%	5.5124	16*	10
Total Solids	95.3033	%	94.4875	.86	5

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 2181306 R1610541

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
2181306001	1610040809 IBC 7287			S2540G-11	WETC/177390
2181306002	1610040810 IBC 7287			S2540G-11	WETC/177393
2181306003	1610040823 IBC 7288			S2540G-11	WETC/177393
2181306004	1610040843 IBC 7294			S2540G-11	WETC/177393
2181306005	1610040853 IBC 7295			S2540G-11	WETC/177393
2181306006	1610040903 IBC 7296			S2540G-11	WETC/177393
2181306001	1610040809 IBC 7287	SW846 7470A	MDIG/60238	SW846 7470A	META/54586
2181306002	1610040810 IBC 7287	SW846 7470A	MDIG/60238	SW846 7470A	META/54586
2181306003	1610040823 IBC 7288	SW846 7470A	MDIG/60238	SW846 7470A	META/54586
2181306004	1610040843 IBC 7294	SW846 7470A	MDIG/60238	SW846 7470A	META/54586
2181306005	1610040853 IBC 7295	SW846 7470A	MDIG/60238	SW846 7470A	META/54586
2181306006	1610040903 IBC 7296	SW846 7470A	MDIG/60238	SW846 7470A	META/54586
2181306001	1610040809 IBC 7287	SW846 3015	MDIG/60239	SW846 6010C	META/54581
2181306002	1610040810 IBC 7287	SW846 3015	MDIG/60239	SW846 6010C	META/54581
2181306003	1610040823 IBC 7288	SW846 3015	MDIG/60239	SW846 6010C	META/54581
2181306004	1610040843 IBC 7294	SW846 3015	MDIG/60239	SW846 6010C	META/54581
2181306005	1610040853 IBC 7295	SW846 3015	MDIG/60239	SW846 6010C	META/54581
2181306006	1610040903 IBC 7296	SW846 3015	MDIG/60239	SW846 6010C	META/54581

ALS Environmental Chain of Custody

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ALS Con

* 2 1 8 1 3 0 6 *

Project Number: R1610541
Project Manager: Janice Jaeger
QAP: LAB QAP

Lab Code	Sample ID	# of Cont.	Matrix	Sample Date	Sample Time	Lab ID	Ag TCLP 6010C	As TCLP 6010C	Ba TCLP 6010C	Be TCLP 6010C	Cd TCLP 6010C	Cr TCLP 6010	Hg TCLP 7471	Ni TCLP 6010	Pb TCLP 6010
[redacted]5	1610040809 IBC 7287 QC	2	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610040810 IBC 7287	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X	X	X	X
R[redacted]	1610040823 IBC 7288	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X	X	X	X
R[redacted]	1610040843 IBC 7294	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610040853 IBC 7295	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610040903 IBC 7296	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X	X	X	X

	Y	N	Initials
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?	✓		AT
COC/Lbls Complete	✓		
Cont in Good Cond?	✓		
Correct Containers?	✓		
Correct Samp Vol?	✓		
Correct Preservation?	✓		
Headspace/Volatiles?			

Cooler Temp: 3 °C
Cooler #:
Therm ID: TH352
Ship Carrier: (FedEx) UPS DHL
Tracking #: 682680165640

A-802
AT 10/11/16

AT
10/12/16

Folder Comments:
ND U

Special Instructions/Comments
1A8A/WSTF EDD

H - Test is On Hold P - Test is Authorized for Prep Only

Turnaround Requirements
___ RUSH (Surcharges Apply)
PLEASE CIRCLE WORK DAYS
1 2 3 4 5
A STANDARD
Requested FAX Date: _____
Requested Report Date: 10/14/16

Report Requirements
___ I. Results Only
A II. Results + QC Summaries
___ III. Results + QC and Calibration Summaries
___ IV. Data Validation Report with Raw Data
PQL/MDL/J Y
EDD Y

Invoice Information
PO# 58R1610541
Bill to

Relinquished By: [signature] 10-10-16 12:50
Received By: [signature] 10/11/16 0916
Airbill Number:

2181306

							Sb TCLP 6010C	Se TCLP 6010C	TCLP EPA 1311	Tl TCLP 6010C	V TCLP 6010C	Zn TCLP 6010C
[redacted]	1610040809 IBC 7287	2	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610040810 IBC 7287	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610040823 IBC 7288	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610040843 IBC 7294	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610040853 IBC 7295	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610040903 IBC 7296	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X

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ALS Contact: Janice Jaeger

Project Number: R1610541
Project Manager: Janice Jaeger
QAP: LAB QAP

Run QC on sample R1610541-005 for 6010C/Ag TCLP, As TCLP, Ba TCLP, Be TCLP, Cd TCLP, Cr TCLP, Ni TCLP, Pb TCLP, Sb TCLP, Se TCLP, Tl TCLP, V TCLP, Zn TCLP, 7470A/Hg TCLP

R1610541

Ship To: Middletown ALS
ALS Laboratory Group
34 Dogwood Lane
Middletown, PA 17057

PC _____ Date 10/10/16
SMO _____ Date 10/10/16

Instructions:
Ice X
Dry Ice ____
No Ice ____

Shipping:
Overnight X
2nd Day ____
Ground ____

Bill to Client Account _____

Comments:

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October 14, 2016

Ms. Ellen Smith
ALS Environmental-Rochester NY
1565 Jefferson Road, Bldg. 300
Suite 360
Rochester, NY 14623

Certificate of Analysis

Project Name:	**TCLP Metals - no J values**	Workorder:	**2181306**
Purchase Order:	**58R1610541**	Workorder ID:	**R1610541**

Dear Ms. Smith:

Enclosed are the analytical results for samples received by the laboratory on Tuesday, October 11, 2016.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Mr. Brad W Kintzer (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Reports and Invoices , Ms. Janice Jaeger

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Mr. Brad W Kintzer
Project Coordinator

ALS Environmental

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SAMPLE SUMMARY

Workorder: 2181306 R1610541

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2181306001	1610040809 IBC 7287	Solid	10/4/2016 00:00	10/11/2016 09:16	Collected by Client
2181306002	1610040810 IBC 7287	Solid	10/4/2016 00:00	10/11/2016 09:16	Collected by Client
2181306003	1610040823 IBC 7288	Solid	10/4/2016 00:00	10/11/2016 09:16	Collected by Client
2181306004	1610040843 IBC 7294	Solid	10/4/2016 00:00	10/11/2016 09:16	Collected by Client
2181306005	1610040853 IBC 7295	Solid	10/4/2016 00:00	10/11/2016 09:16	Collected by Client
2181306006	1610040903 IBC 7296	Solid	10/4/2016 00:00	10/11/2016 09:16	Collected by Client

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SAMPLE SUMMARY

Workorder: 2181306 R1610541

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.
-- For microbiological analyses, the "Prepared" value is the date/time into the incurbator and the "Analyzed" value is the date/time out the incubator.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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ANALYTICAL RESULTS

Workorder: 2181306 R1610541

Lab ID: **2181306001** Date Collected: 10/4/2016 00:00 Matrix: Solid

Sample ID: **1610040809 IBC 7287** Date Received: 10/11/2016 09:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	5.2		%	0.1	S2540G-11			10/13/16 08:57	VKB	
Total Solids	94.8		%	0.1	S2540G-11			10/13/16 08:57	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Barium, Total	ND		mg/L	2.8	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/14/16 11:00	MNP	10/14/16 14:39	MNP	B1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2
Zinc, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:34	TSS	B2

Mr. Brad W Kintzer
Project Coordinator

ALS Environmental

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ANALYTICAL RESULTS

Workorder: 2181306 R1610541

Lab ID: **2181306002** Date Collected: 10/4/2016 00:00 Matrix: Solid

Sample ID: **1610040810 IBC 7287** Date Received: 10/11/2016 09:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	4.7		%	0.1	S2540G-11			10/13/16 09:55	VKB	
Total Solids	95.3		%	0.1	S2540G-11			10/13/16 09:55	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Barium, Total	ND		mg/L	2.8	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/14/16 11:00	MNP	10/14/16 14:42	MNP	B1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2
Zinc, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:47	TSS	B2

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ANALYTICAL RESULTS

Workorder: 2181306 R1610541

Lab ID: **2181306003** Date Collected: 10/4/2016 00:00 Matrix: Solid

Sample ID: **1610040823 IBC 7288** Date Received: 10/11/2016 09:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	4.1		%	0.1	S2540G-11			10/13/16 09:55	VKB	
Total Solids	95.9		%	0.1	S2540G-11			10/13/16 09:55	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Barium, Total	ND		mg/L	2.8	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/14/16 11:00	MNP	10/14/16 14:44	MNP	B1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2
Zinc, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:51	TSS	B2

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ANALYTICAL RESULTS

Workorder: 2181306 R1610541

Lab ID: **2181306004** Date Collected: 10/4/2016 00:00 Matrix: Solid

Sample ID: **1610040843 IBC 7294** Date Received: 10/11/2016 09:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	3.7		%	0.1	S2540G-11			10/13/16 09:55	VKB	
Total Solids	96.3		%	0.1	S2540G-11			10/13/16 09:55	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Barium, Total	ND		mg/L	2.8	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/14/16 11:00	MNP	10/14/16 14:45	MNP	B1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2
Zinc, Total	0.13		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 12:56	TSS	B2

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ANALYTICAL RESULTS

Workorder: 2181306 R1610541

Lab ID: **2181306005** Date Collected: 10/4/2016 00:00 Matrix: Solid

Sample ID: **1610040853 IBC 7295** Date Received: 10/11/2016 09:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	5.0		%	0.1	S2540G-11			10/13/16 09:55	VKB	
Total Solids	95.0		%	0.1	S2540G-11			10/13/16 09:55	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Barium, Total	ND		mg/L	2.8	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/14/16 11:00	MNP	10/14/16 14:46	MNP	B1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2
Zinc, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:15	TSS	B2

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ANALYTICAL RESULTS

Workorder: 2181306 R1610541

Lab ID: **2181306006** Date Collected: 10/4/2016 00:00 Matrix: Solid

Sample ID: **1610040903 IBC 7296** Date Received: 10/11/2016 09:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	12.6		%	0.1	S2540G-11			10/13/16 09:55	VKB	
Total Solids	87.4		%	0.1	S2540G-11			10/13/16 09:55	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Barium, Total	ND		mg/L	2.8	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/14/16 11:00	MNP	10/14/16 14:47	MNP	B1
Nickel, Total	0.13		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2
Zinc, Total	0.22		mg/L	0.11	SW846 6010C	10/14/16 10:14	TSS	10/14/16 13:20	TSS	B2

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QUALITY CONTROL DATA

Workorder: 2181306 R1610541

QC Batch: MDIG/60238 **Analysis Method:** SW846 7470A

QC Batch Method: SW846 7470A

Associated Lab Samples: 2181306001, 2181306002, 2181306003, 2181306004, 2181306005, 2181306006

METHOD BLANK: 2423798

Parameter	Blank Result	Units	Reporting Limit
Mercury, Total	ND	mg/L	0.0020

LABORATORY CONTROL SAMPLE: 2423799

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Mercury, Total	102	mg/L	.002	0.0020	85 - 115

MATRIX SPIKE: 2423811 DUPLICATE: 2423812 ORIGINAL: 2181306001

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Mercury, Total	0	mg/L	.005	.00442	.00473	88.4	94.6	70 - 130	6.78	20

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QUALITY CONTROL DATA

Workorder: 2181306 R1610541

QC Batch: MDIG/60239 **Analysis Method:** SW846 6010C

QC Batch Method: SW846 3015

Associated Lab Samples: 2181306001, 2181306002, 2181306003, 2181306004, 2181306005, 2181306006

METHOD BLANK: 2423801

Parameter	Blank Result	Units	Reporting Limit
Antimony, Total	ND	mg/L	0.030
Arsenic, Total	ND	mg/L	0.028
Barium, Total	ND	mg/L	0.56
Beryllium, Total	ND	mg/L	0.0044
Cadmium, Total	ND	mg/L	0.0022
Chromium, Total	ND	mg/L	0.0056
Lead, Total	ND	mg/L	0.0067
Nickel, Total	ND	mg/L	0.022
Selenium, Total	ND	mg/L	0.022
Silver, Total	ND	mg/L	0.0044
Thallium, Total	ND	mg/L	0.022
Vanadium, Total	ND	mg/L	0.0056
Zinc, Total	ND	mg/L	0.022

LABORATORY CONTROL SAMPLE: 2423802

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Antimony, Total	101	mg/L	.22	0.22	80 - 120
Arsenic, Total	104	mg/L	.11	0.12	80 - 120
Barium, Total	108	mg/L	1.1	1.2	80 - 120
Beryllium, Total	104	mg/L	.22	0.23	80 - 120
Cadmium, Total	106	mg/L	.11	0.12	80 - 120
Chromium, Total	110	mg/L	.11	0.12	80 - 120
Lead, Total	106	mg/L	.11	0.12	80 - 120
Nickel, Total	106	mg/L	1.1	1.2	80 - 120
Selenium, Total	100	mg/L	1.1	1.1	80 - 120
Silver, Total	110	mg/L	.11	0.12	80 - 120
Thallium, Total	100	mg/L	.11	0.11	80 - 120
Vanadium, Total	108	mg/L	.056	0.060	80 - 120
Zinc, Total	105	mg/L	.56	0.58	80 - 120

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QUALITY CONTROL DATA

Workorder: 2181306 R1610541

MATRIX SPIKE: 2423809 DUPLICATE: 2423810 ORIGINAL: 2181306001

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Arsenic, Total	.015	mg/L	5	6.28327	5.89439	125	118	50 - 150	6.39	20
Barium, Total	1.01332	mg/L	10	12.83876	12.2221	118	112	50 - 150	4.92	20
Cadmium, Total	0	mg/L	1	1.23888	1.1611	124	116	50 - 150	6.48	20
Chromium, Total	.00278	mg/L	5	5.94439	5.54939	119	111	50 - 150	6.87	20
Lead, Total	0	mg/L	5	6.0055	5.64439	120	113	50 - 150	6.2	20
Selenium, Total	0	mg/L	1	1.22554	1.15666	123	116	50 - 150	5.78	20
Silver, Total	0	mg/L	1	1.3361	1.25832	134	126	50 - 150	6	20

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QUALITY CONTROL DATA

Workorder: 2181306 R1610541

QC Batch: WETC/177390 **Analysis Method:** S2540G-11

QC Batch Method: S2540G-11

Associated Lab Samples: 2181306001

SAMPLE DUPLICATE: 2423004 ORIGINAL: 2181015001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	13.2052	%	9.3228	34.5*	10
Total Solids	86.7947	%	90.6771	4.38	5

SAMPLE DUPLICATE: 2423005 ORIGINAL: 2181016005

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	9.5801	%	9.5088	.75	10
Total Solids	90.4198	%	90.4911	.08	5

SAMPLE DUPLICATE: 2423006 ORIGINAL: 2181059003

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	21.4041	%	15.7093	30.7*	10
Total Solids	78.5958	%	84.2906	6.99*	5

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QUALITY CONTROL DATA

Workorder: 2181306 R1610541

QC Batch: WETC/177393 **Analysis Method:** S2540G-11

QC Batch Method: S2540G-11

Associated Lab Samples: 2181306002, 2181306003, 2181306004, 2181306005, 2181306006

SAMPLE DUPLICATE: 2423058 ORIGINAL: 2181306002

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	4.6966	%	5.5124	16*	10
Total Solids	95.3033	%	94.4875	.86	5

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 2181306 R1610541

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
2181306001	1610040809 IBC 7287			S2540G-11	WETC/177390
2181306002	1610040810 IBC 7287			S2540G-11	WETC/177393
2181306003	1610040823 IBC 7288			S2540G-11	WETC/177393
2181306004	1610040843 IBC 7294			S2540G-11	WETC/177393
2181306005	1610040853 IBC 7295			S2540G-11	WETC/177393
2181306006	1610040903 IBC 7296			S2540G-11	WETC/177393
2181306001	1610040809 IBC 7287	SW846 7470A	MDIG/60238	SW846 7470A	META/54586
2181306002	1610040810 IBC 7287	SW846 7470A	MDIG/60238	SW846 7470A	META/54586
2181306003	1610040823 IBC 7288	SW846 7470A	MDIG/60238	SW846 7470A	META/54586
2181306004	1610040843 IBC 7294	SW846 7470A	MDIG/60238	SW846 7470A	META/54586
2181306005	1610040853 IBC 7295	SW846 7470A	MDIG/60238	SW846 7470A	META/54586
2181306006	1610040903 IBC 7296	SW846 7470A	MDIG/60238	SW846 7470A	META/54586
2181306001	1610040809 IBC 7287	SW846 3015	MDIG/60239	SW846 6010C	META/54581
2181306002	1610040810 IBC 7287	SW846 3015	MDIG/60239	SW846 6010C	META/54581
2181306003	1610040823 IBC 7288	SW846 3015	MDIG/60239	SW846 6010C	META/54581
2181306004	1610040843 IBC 7294	SW846 3015	MDIG/60239	SW846 6010C	META/54581
2181306005	1610040853 IBC 7295	SW846 3015	MDIG/60239	SW846 6010C	META/54581
2181306006	1610040903 IBC 7296	SW846 3015	MDIG/60239	SW846 6010C	META/54581

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2181306

Project Number: R1610541
Project Manager: Janice Jaeger
QAP: LAB QAP

Lab Code	Sample ID	# of Cont.	Matrix	Sample Date	Sample Time	Lab ID	Ag TCLP 6010C	As TCLP 6010C	Ba TCLP 6010C	Be TCLP 6010C	Cd TCLP 6010C	Cr TCLP 6010	Hg TCLP 7471	Ni TCLP 6010	Pb TCLP 6010
[redacted]5	1610040809 IBC 7287 QC	2	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610040810 IBC 7287	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610040823 IBC 7288	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610040843 IBC 7294	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610040853 IBC 7295	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610040903 IBC 7296	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X	X	X	X

	Y	N	Initials
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?	✓		AT
COC/Lbls Complete	✓		
Cont in Good Cond?	✓		
Correct Containers?	✓		
Correct Samp Vol?	✓		
Correct Preservation?	✓		
Headspace/Volatiles?			

Cooler Temp: 3 °C
Cooler #:
Therm ID: TH352
Ship Carrier: (FedEx) UPS DHL
Tracking #: 682680165640

A-802
AT 10/11/16

AT
10/12/16

Folder Comments:
ND U

Special Instructions/Comments
1A8A/WSTF EDD

H - Test is On Hold
P - Test is Authorized for Prep Only

Turnaround Requirements
___ RUSH (Surcharges Apply)
PLEASE CIRCLE WORK DAYS
1 2 3 4 5
A STANDARD
Requested FAX Date: _____
Requested Report Date: 10/14/16

Report Requirements
___ I. Results Only
A II. Results + QC Summaries
___ III. Results + QC and Calibration Summaries
___ IV. Data Validation Report with Raw Data
PQL/MDL/J Y
EDD Y

Invoice Information
PO# 58R1610541
Bill to

Relinquished By: [signature] 10-10-16 12:50
Received By: [signature] 10/11/16 0916
Airbill Number:

							Sb TCLP 6010C	Se TCLP 6010C	TCLP EPA 1311	Tl TCLP 6010C	V TCLP 6010C	Zn TCLP 6010C
[redacted]	1610040809 IBC 7287	2	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610040810 IBC 7287	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610040823 IBC 7288	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610040843 IBC 7294	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610040853 IBC 7295	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610040903 IBC 7296	1	Soil	10/4/16		Middletown ALS	X	X	X	X	X	X

ALS Environmental Chain of Custody

1565 Jefferson Rd, Building 300 • Rochester, NY 14623 • 585-288-5380 • FAX 585-288-8475

ALS Contact: Janice Jaeger

Project Number: R1610541
Project Manager: Janice Jaeger
QAP: LAB QAP

Run QC on sample R1610541-005 for 6010C/Ag TCLP, As TCLP, Ba TCLP, Be TCLP, Cd TCLP, Cr TCLP, Ni TCLP, Pb TCLP, Sb TCLP, Se TCLP, Tl TCLP, V TCLP, Zn TCLP, 7470A/Hg TCLP

R1610541

Ship To: Middletown ALS
ALS Laboratory Group
34 Dogwood Lane
Middletown, PA 17057

PC _____ Date 10/10/16
SMO _____ Date 10/10/16

Instructions:
Ice X
Dry Ice ____
No Ice ____

Shipping:
Overnight X
2nd Day ____
Ground ____

Bill to Client Account _____

Comments:

November 01, 2016 Service Request No:R1611059

Mr. Tom Hall
NASA/WSTF/Navarro
P.O. Box 20
Las Cruces, NM 88004

Laboratory Results for: White Sands Test Facility

Dear Mr.Hall,

Enclosed are the results of the sample(s) submitted to our laboratory October 18, 2016
For your reference, these analyses have been assigned our service request number **R1611059.**

All analyses were performed according to our laboratory's quality assurance program. The test results meet requirements of the NELAP standards except as noted in the case narrative report. All results are intended to be considered in their entirety, and ALS Environmental is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report. The measurement uncertainty of the results included in this report is within that expected when using the prescribed method(s) for analysis of these samples, and represented by Laboratory Control Sample control limits. Any events, such as QC failures, which may add to the uncertainty are explained in the report narrative.

Please contact me if you have any questions. My extension is 7472. You may also contact me via email at Janice.Jaeger@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Janice Jaeger
Project Manager

ADDRESS 1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
PHONE +1 585 288 5380 | FAX +1 585 288 8475
ALS Group USA, Corp.
dba ALS Environmental

Narrative Documents

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

1565 Jefferson Rd, Building 300, Rochester, NY 14623 | 585-288-5380 | www.alsglobal.com

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/15EC007B
Sample Matrix: Soil

Service Request:R1611059
Date Received:10/18/16

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables, including results of QC samples analyzed from this delivery group. Analytical procedures performed by the lab are validated in accordance with NELAC standards. Any parameters that are not included in the lab's NELAC accreditation are identified on a "Non-Certified Analytes" report in the Miscellaneous Forms Section of this report. Individual analytical results requiring further explanation are flagged with qualifiers and/or discussed below. The flags are explained in the Report Qualifiers and Definitions page in the Miscellaneous Forms section of this report.

Sample Receipt

Thirty soil samples were received for analysis at ALS Environmental on 10/18/2016. Any discrepancies noted upon initial sample inspection are noted on the cooler receipt and preservation form included in this data package. The samples were received in good condition and consistent with the accompanying chain of custody form. Samples are refrigerated at ≤6°C upon receipt at the lab except for aqueous samples designated for metals analyses, which are stored at room temperature.

Volatile Organic Analyses:

Method 8260C, 10/25/16: The lower control limit was exceeded for one or more analytes in the Continuing Calibration Verification (CCV). Since there were no detections of the analyte(s) in the associated field samples, the quantitation is not affected. The data quality was not significantly affected and no further corrective action was taken.

Metals Analyses:

No significant anomalies were noted with this analysis.

General Chemistry Analyses:

No significant anomalies were noted with this analysis.

Sample Receiving Notes:

Method 8260C: soil samples included in this report were received in jars and not collected using one of the EPA method 5035A low level options. In accordance with the NYSDOH technical notice of October 2012 all results or reporting limits <200 ug/kg should be considered as estimated due to potential low bias.

One or more samples were subcontracted to another laboratory for testing. The certified analytical report from the subcontractor has been included in its entirety at the end of this report and includes the name and address of the subcontracted laboratory.

Approved by _____ Date 11/1/2016

SAMPLE DETECTION SUMMARY

CLIENT ID: 1610140830 IBC 7330	Lab ID: R1611059-001					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	97.2				Percent	ALS SOP

CLIENT ID: 1610140832 IBC 7330	Lab ID: R1611059-002					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	97.6				Percent	ALS SOP
Antimony, Total	0.7	BJ	0.5	6.1	mg/Kg	6010C
Arsenic, Total	3.6		0.3	1.0	mg/Kg	6010C
Barium, Total	105		0.2	2.0	mg/Kg	6010C
Beryllium, Total	0.40		0.02	0.31	mg/Kg	6010C
Cadmium, Total	0.27	J	0.04	0.51	mg/Kg	6010C
Chromium, Total	6.6		0.2	1.0	mg/Kg	6010C
Lead, Total	7.0		0.3	5.1	mg/Kg	6010C
Nickel, Total	8.0		0.2	4.1	mg/Kg	6010C
Selenium, Total	0.7	J	0.7	1.0	mg/Kg	6010C
Thallium, Total	4.7		0.6	1.0	mg/Kg	6010C
Vanadium, Total	11.9		0.2	5.1	mg/Kg	6010C
Zinc, Total	40.7		0.2	2.0	mg/Kg	6010C

CLIENT ID: 1610140835 IBC 7329	Lab ID: R1611059-004					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	97.2				Percent	ALS SOP
Acetone	3.2	J	2.9	5.1	ug/Kg	8260C

CLIENT ID: 1610140837 IBC 7329	Lab ID: R1611059-005					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	97.1				Percent	ALS SOP
Arsenic, Total	4.49		0.24	0.98	mg/Kg	6010C
Barium, Total	83.3		0.2	2.0	mg/Kg	6010C
Beryllium, Total	0.48		0.02	0.29	mg/Kg	6010C
Cadmium, Total	0.30	J	0.04	0.49	mg/Kg	6010C
Chromium, Total	9.03		0.13	0.98	mg/Kg	6010C
Lead, Total	8.7		0.3	4.9	mg/Kg	6010C
Nickel, Total	8.8		0.2	3.9	mg/Kg	6010C
Thallium, Total	1.92		0.51	0.98	mg/Kg	6010C
Vanadium, Total	15.1		0.2	4.9	mg/Kg	6010C
Zinc, Total	38.1		0.2	2.0	mg/Kg	6010C

CLIENT ID: 1610140840 IBC 7338	Lab ID: R1611059-007					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	95.8				Percent	ALS SOP
Acetone	3.2	J	3.0	5.2	ug/Kg	8260C

SAMPLE DETECTION SUMMARY

CLIENT ID: 1610140842 IBC 7338	Lab ID: R1611059-008					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	96.1				Percent	ALS SOP
Arsenic, Total	5.5		0.3	1.0	mg/Kg	6010C
Barium, Total	86.4		0.2	2.0	mg/Kg	6010C
Beryllium, Total	0.47		0.02	0.30	mg/Kg	6010C
Cadmium, Total	0.35	J	0.04	0.50	mg/Kg	6010C
Chromium, Total	10.9		0.2	1.0	mg/Kg	6010C
Lead, Total	8.4		0.3	5.0	mg/Kg	6010C
Nickel, Total	9.7		0.2	4.0	mg/Kg	6010C
Silver, Total	0.7	J	0.5	1.0	mg/Kg	6010C
Thallium, Total	2.0		0.6	1.0	mg/Kg	6010C
Vanadium, Total	13.5		0.2	5.0	mg/Kg	6010C
Zinc, Total	43.8		0.2	2.0	mg/Kg	6010C

CLIENT ID: 1610130850 IBC 7321	Lab ID: R1611059-010					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	98.0				Percent	ALS SOP

CLIENT ID: 1610130851 IBC 7321	Lab ID: R1611059-011					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	97.8				Percent	ALS SOP
Acetone	3.2	J	2.9	5.1	ug/Kg	8260C

CLIENT ID: 1610130856 IBC 7321	Lab ID: R1611059-012					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	97.9				Percent	ALS SOP
Arsenic, Total	5.8		0.3	1.0	mg/Kg	6010C
Barium, Total	178		0.2	2.0	mg/Kg	6010C
Beryllium, Total	0.47		0.02	0.31	mg/Kg	6010C
Cadmium, Total	0.53		0.04	0.51	mg/Kg	6010C
Chromium, Total	7.2		0.2	1.0	mg/Kg	6010C
Lead, Total	9.8		0.3	5.1	mg/Kg	6010C
Nickel, Total	9.1		0.2	4.1	mg/Kg	6010C
Thallium, Total	3.9		0.6	1.0	mg/Kg	6010C
Vanadium, Total	14.1		0.2	5.1	mg/Kg	6010C
Zinc, Total	49.4		0.2	2.0	mg/Kg	6010C

CLIENT ID: 1610130857 IBC 7321	Lab ID: R1611059-013					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	97.7				Percent	ALS SOP
Arsenic, Total	5.5		0.3	1.0	mg/Kg	6010C
Barium, Total	170		0.2	2.0	mg/Kg	6010C
Beryllium, Total	0.47		0.02	0.31	mg/Kg	6010C
Cadmium, Total	0.38	J	0.04	0.51	mg/Kg	6010C

SAMPLE DETECTION SUMMARY

CLIENT ID: 1610130857 IBC 7321	Lab ID: R1611059-013					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Chromium, Total	6.5		0.2	1.0	mg/Kg	6010C
Lead, Total	16.3		0.3	5.1	mg/Kg	6010C
Nickel, Total	8.2		0.2	4.1	mg/Kg	6010C
Thallium, Total	3.1		0.6	1.0	mg/Kg	6010C
Vanadium, Total	12.7		0.2	5.1	mg/Kg	6010C
Zinc, Total	44.7		0.2	2.0	mg/Kg	6010C

CLIENT ID: 1610130905 IBC 7322	Lab ID: R1611059-016					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	98.7				Percent	ALS SOP

CLIENT ID: 1610130907 IBC 7322	Lab ID: R1611059-017					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	98.2				Percent	ALS SOP
Arsenic, Total	4.20		0.24	0.97	mg/Kg	6010C
Barium, Total	89.0		0.2	1.9	mg/Kg	6010C
Beryllium, Total	0.41		0.02	0.29	mg/Kg	6010C
Cadmium, Total	0.33	J	0.04	0.48	mg/Kg	6010C
Chromium, Total	8.41		0.13	0.97	mg/Kg	6010C
Lead, Total	6.4		0.3	4.8	mg/Kg	6010C
Nickel, Total	6.6		0.2	3.9	mg/Kg	6010C
Thallium, Total	2.48		0.51	0.97	mg/Kg	6010C
Vanadium, Total	13.7		0.2	4.8	mg/Kg	6010C
Zinc, Total	29.9		0.2	1.9	mg/Kg	6010C

CLIENT ID: 1610130915 IBC 7326	Lab ID: R1611059-019					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	96.5				Percent	ALS SOP

CLIENT ID: 1610130917 IBC 7326	Lab ID: R1611059-020					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	96.2				Percent	ALS SOP
Arsenic, Total	5.2		0.3	1.0	mg/Kg	6010C
Barium, Total	127		0.2	2.0	mg/Kg	6010C
Beryllium, Total	0.43		0.02	0.31	mg/Kg	6010C
Cadmium, Total	0.40	J	0.04	0.51	mg/Kg	6010C
Chromium, Total	9.7		0.2	1.0	mg/Kg	6010C
Lead, Total	9.4		0.3	5.1	mg/Kg	6010C
Nickel, Total	8.4		0.2	4.1	mg/Kg	6010C
Selenium, Total	0.9	J	0.7	1.0	mg/Kg	6010C
Thallium, Total	2.7		0.6	1.0	mg/Kg	6010C
Vanadium, Total	12.9		0.2	5.1	mg/Kg	6010C
Zinc, Total	46.6		0.2	2.0	mg/Kg	6010C

SAMPLE DETECTION SUMMARY

CLIENT ID: 1610130940 IBC 7327	Lab ID: R1611059-022					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	97.9				Percent	ALS SOP

CLIENT ID: 1610130942 IBC 7327	Lab ID: R1611059-023					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	98.0				Percent	ALS SOP
Arsenic, Total	5.7		0.3	1.0	mg/Kg	6010C
Barium, Total	643		0.2	2.0	mg/Kg	6010C
Beryllium, Total	0.46		0.02	0.31	mg/Kg	6010C
Cadmium, Total	0.41	J	0.04	0.51	mg/Kg	6010C
Chromium, Total	8.4		0.2	1.0	mg/Kg	6010C
Lead, Total	9.0		0.3	5.1	mg/Kg	6010C
Nickel, Total	9.3		0.2	4.1	mg/Kg	6010C
Thallium, Total	2.9		0.6	1.0	mg/Kg	6010C
Vanadium, Total	17.8		0.2	5.1	mg/Kg	6010C
Zinc, Total	43.1		0.2	2.0	mg/Kg	6010C

CLIENT ID: 1610130945 IBC 7331	Lab ID: R1611059-025					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	97.7				Percent	ALS SOP

CLIENT ID: 1610130947 IBC 7331	Lab ID: R1611059-026					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	97.5				Percent	ALS SOP
Arsenic, Total	4.24		0.24	0.99	mg/Kg	6010C
Barium, Total	53.4		0.2	2.0	mg/Kg	6010C
Beryllium, Total	0.42		0.02	0.30	mg/Kg	6010C
Cadmium, Total	0.40	J	0.04	0.49	mg/Kg	6010C
Chromium, Total	10.3		0.13	0.99	mg/Kg	6010C
Lead, Total	9.5		0.3	4.9	mg/Kg	6010C
Nickel, Total	9.0		0.2	3.9	mg/Kg	6010C
Thallium, Total	2.11		0.51	0.99	mg/Kg	6010C
Vanadium, Total	14.8		0.2	4.9	mg/Kg	6010C
Zinc, Total	37.3		0.2	2.0	mg/Kg	6010C

CLIENT ID: 1610130950 IBC 7328	Lab ID: R1611059-028					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	97.8				Percent	ALS SOP
Acetone	3.3	J	2.9	5.1	ug/Kg	8260C

CLIENT ID: 1610130952 IBC 7328	Lab ID: R1611059-029					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	97.5				Percent	ALS SOP
Arsenic, Total	5.91		0.24	1.0	mg/Kg	6010C
Barium, Total	63.1		0.2	2.0	mg/Kg	6010C

SAMPLE DETECTION SUMMARY

CLIENT ID: 1610130952 IBC 7328	Lab ID: R1611059-029					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Beryllium, Total	0.46		0.02	0.30	mg/Kg	6010C
Cadmium, Total	0.41	J	0.04	0.50	mg/Kg	6010C
Chromium, Total	11.9		0.13	1.0	mg/Kg	6010C
Lead, Total	10.3		0.3	5.0	mg/Kg	6010C
Nickel, Total	9.9		0.2	4.0	mg/Kg	6010C
Thallium, Total	2.49		0.51	1.0	mg/Kg	6010C
Vanadium, Total	14.2		0.2	5.0	mg/Kg	6010C
Zinc, Total	41.3		0.2	2.0	mg/Kg	6010C

Sample Receipt Information

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client: NASA/WSTF/Navarro **Service Request:**R1611059
Project: White Sands Test Facility/15EC007B

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
R1611059-001	1610140830 IBC 7330	10/14/2016	
R1611059-002	1610140832 IBC 7330	10/14/2016	
R1611059-003	1610140833 IBC 7330	10/14/2016	
R1611059-004	1610140835 IBC 7329	10/14/2016	
R1611059-005	1610140837 IBC 7329	10/14/2016	
R1611059-006	1610140838 IBC 7329	10/14/2016	
R1611059-007	1610140840 IBC 7338	10/14/2016	
R1611059-008	1610140842 IBC 7338	10/14/2016	
R1611059-009	1610140843 IBC 7338	10/14/2016	
R1611059-010	1610130850 IBC 7321	10/13/2016	
R1611059-011	1610130851 IBC 7321	10/13/2016	
R1611059-012	1610130856 IBC 7321	10/13/2016	
R1611059-013	1610130857 IBC 7321	10/13/2016	
R1611059-014	1610130859 IBC 7321	10/13/2016	
R1611059-015	1610130900 IBC 7321	10/13/2016	
R1611059-016	1610130905 IBC 7322	10/13/2016	
R1611059-017	1610130907 IBC 7322	10/13/2016	
R1611059-018	1610130908 IBC 7322	10/13/2016	
R1611059-019	1610130915 IBC 7326	10/13/2016	
R1611059-020	1610130917 IBC 7326	10/13/2016	
R1611059-021	1610130918 IBC 7326	10/13/2016	
R1611059-022	1610130940 IBC 7327	10/13/2016	
R1611059-023	1610130942 IBC 7327	10/13/2016	
R1611059-024	1610130943 IBC 7327	10/13/2016	
R1611059-025	1610130945 IBC 7331	10/13/2016	
R1611059-026	1610130947 IBC 7331	10/13/2016	
R1611059-027	1610130948 IBC 7331	10/13/2016	
R1611059-028	1610130950 IBC 7328	10/13/2016	
R1611059-029	1610130952 IBC 7328	10/13/2016	
R1611059-030	1610130953 IBC 7328	10/13/2016	

WSTF CHAIN OF CUSTODY RECORD

Date OCTOBER 17, 2016

Laboratory: ALS Group USA, Corp. dba PO#15EC07B2B

Address shipping questions to:
- ☐ Lori Minnick, 575-524-5119
- ☒ Other Tom Hall, 575-524-5453

as per JR Hennessey 10/18/16

Send sample receipt confirmation and analytical reports to:
- ☐ Carlyn Tufts, carlyn.a.tufts@nasa.gov
- ☐ Shelly Hernandez, shelly.j.hernandez@nasa.gov
- ☒ Tom Hall, tom.a.hall@nasa.gov

Special Instructions

Return coolers and reusable packaging materials within 14 days as required in statement of work to:

Return Address:

NASA WSTF Environmental Department
12600 NASA Road; Bldg. 120
Las Cruces, NM 88012
Attn: Lori Minnick

Sample Number	Sample Location	# of Containers	Sample Matrix*	Analytical Requirements: SW-846 Method 8260B 4 oz Glass Jar, Ice	Total Metals 4 oz Glass Jar, Ice	TCLP Metals 16 oz Glass Jar, Ice				Charge Number (WSTF Use Only)	Comments
161014 0830	IBC 7330	1	S	X						16EEE41FW	
161014 0832	IBC 7330	1	S		X					16EEE41FW	
161014 0833	IBC 7330	1	S			X				16EEE41FW	
161014 0835	IBC 7329	1	S	X						16EEE41FW	
161014 0837	IBC 7329	1	S		X					16EEE41FW	
161014 0838	IBC 7329	1	S			X				16EEE41FW	
161014 0840	IBC 7338	1	S	X						16EEE41FW	
161014 0842	IBC 7338	1	S		X					16EEE41FW	
161014 0843	IBC 7338	1	S			X				16EEE41FW	

Relinquished By:	Date/Time:	Accepted By:	Date/Time:
	10-14-16 (0900)		10-18-16 09:50

* Sample Matrix: A – Aqueous; G – Gaseous; S – Solid

R1611059 5
NASA/WSTF/Navarro
White Sands Test Facility

WSTF 381B (05/2016)

Date OCTOBER 17, 2016

WSTF CHAIN OF CUSTODY RECORD

Page 1 of 3

Laboratory: ALS Group USA, Corp. dba PO#15EC092B

Address shipping questions to:
- ☐ Lori Minnick, 575-524-5119
- ☒ Other Tom Hall, 575-524-5453

Send sample receipt confirmation and analytical reports to:
- ☐ Carlyn Tufts, carlyn.a.tufts@nasa.gov
- ☐ Shelly Hernandez, shelly.j.hernandez@nasa.gov
- ☒ Tom Hall, tom.a.hall@nasa.gov

Special Instructions

Return coolers and reusable packaging materials within 14 days as required in statement of work to:

Return Address:

NASA WSTF Environmental Department
12600 NASA Road; Bldg. 120
Las Cruces, NM 88012
Attn: Lori Minnick

Sample Number	Sample Location	# of Containers	Sample Matrix*	Analytical Requirements: SW-846 Method 8260B 4 oz Glass Jar, Ice	Analytical Requirements: Total Metals 4 oz Glass Jar, Ice	Analytical Requirements: TCLP Metals 16 oz Glass Jar, Ice	Analytical Requirements	Analytical Requirements	Analytical Requirements	Charge Number (WSTF Use Only)	Comments
161013 0850	IBC 7321	1	S	X						16EEE41FW	
— 0851	IBC 7321	1	S	X						16EEE41FW	
— 0852	IBC 7321	1	S	X						16EEE41FW	MATRIX SPIKE for 161013 0850
161013 0856	IBC 7321	1	S		X					16EEE41FW	
— 0857	IBC 7321	1	S		X					16EEE41FW	
— 0858	IBC 7321	1	S		X					16EEE41FW	MATRIX SPIKE for 161013 0856
161013 0859	IBC 7321	1	S			X				16EEE41FW	
— 0900	IBC 7321	1	S			X				16EEE41FW	
— 0901	IBC-7321	1	S			X				16EEE41FW	MATRIX SPIKE for 161013 0859

Relinquished By:	Date/Time:	Accepted By:	Date/Time:
[signature]	10-13-2016 (1030)	[signature]	10-18-16 07:50

* Sample Matrix: A – Aqueous; G – Gaseous; S – Solid

R1611059 5
NASA/WSTF/Navarro
White Sands Test Facility

WSTF 381B (05/2016)

WSTF CHAIN OF CUSTODY RECORD

Date OCTOBER 13, 2016

Laboratory: ALS Group USA, Corp. dba PO#15EC092B

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12600 NASA Road; Bldg. 120
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Attn: Lori Minnick

Sample Number	Sample Location	# of Containers	Sample Matrix*	Analytical Requirements: SW-846 Method 8260B 4 oz Glass Jar, Ice	Analytical Requirements: Total Metals 4 oz Glass Jar, Ice	Analytical Requirements: TCLP Metals 16 oz Glass Jar, Ice	Analytical Requirements	Analytical Requirements	Analytical Requirements	Charge Number (WSTF Use Only)	Comments
1610130905	IBC 7322	1	S	X						16EEE41FW	
1610130907	IBC 7322	1	S		X					16EEE91FW	
1610130908	IBC 7322	1	S			X				16EEE41FW	
1610130915	IBC 7326	1	S	X						16EEE41FW	
1610130917	IBC 7326	1	S		X					16EEE41FW	
1610130918	IBC 7326	1	S			X				16EEE91FW	
1610130940	IBC 7327	1	S	X						16EEE91FW	
— 0942	IBC 7327	1	S		X					16EEE41FW	
— 0943	IBC 7327	1	S			X				16EEE41FW	

Relinquished By:	Date/Time:	Accepted By:	Date/Time:
	10-13-2016(1030)		10-18-16 09:50

R1611059 5
NASA/WSTF/Navarro
White Sands Test Facility

* Sample Matrix: A – Aqueous; G – Gaseous; S – Solid

WSTF 381B (05/2016)

WSTF CHAIN OF CUSTODY RECORD

Date OCTOBER 13, 2016

Laboratory: ~~SwRI~~ ALS

PO#15EC092B

Address shipping questions to:

☐ Lori Minnick, 575-524-5119

☒ Other Tom Hall, 575-524-5453

Send sample receipt confirmation and analytical reports to:

☐ Carlyn Tufts, carlyn.a.tufts@nasa.gov

☐ Shelly Hernandez, shelly.j.hernandez@nasa.gov

☒ Tom Hall, tom.a.hall@nasa.gov

Analytical Requirements

Special Instructions

Return coolers and reusable packaging materials within 14 days as required in statement of work to:

Return Address:

NASA WSTF Environmental Department
12600 NASA Road: Bldg. 120
Las Cruces, NM 88012
Attn: Lori Minnick

Sample Number	Sample Location	# of Containers	Sample Matrix*	SW-846 Method 8260B 4 oz Glass Jar, Ice	Total Metals 4 oz Glass Jar, Ice	TCLP Metals 16 oz Glass Jar, Ice				Charge Number (WSTF Use Only)	Comments
161013 0945	IBC 7331	1	S	X						16EEE41FW	
161013 0947	IBC 7331	1	S		X					16EEE41FW	
161013 0948	IBC 7331	1	S			X				16EEE41FW	
161013 0950	IBC 7328	1	S	X						16EEE41FW	
161013 0952	IBC 7328	1	S		X					16EEE41FW	
161013 0953	IBC 7328	1	S			X				16EEE41FW	

Relinquished By:	Date/Time:	Accepted By:	Date/Time:
	10-13-2016 (1030)		

* Sample Matrix: A – Aqueous; G – Gaseous; S – Solid

R1611059 5

NASA/WSTF/Navarro
White Sands Test Facility

R1611059 5
NASA/WSTF/Navarro
White Sands Test Facility

Cooler Receipt and Preservation Check Form

Project/Client NASA Folder Number

Cooler received on 10-18-16 by: MZ

COURIER: ALS UPS (FEDEX) VELOCITY CLIENT

1	Were **Custody seals** on outside of cooler?	(Y)	N
2	**Custody papers** properly completed (ink, signed)?	(Y)	N
3	Did all bottles arrive in good **condition** (unbroken)?	(Y)	N
4	Circle: (**Wet Ice**) **Dry Ice** **Gel packs** present?	(Y)	N

5a	**Perchlorate** samples have required headspace?	Y	N	(NA)
5b	Did VOA vials, Alk,or Sulfide have sig* **bubbles**?	Y	N	(NA)
6	Where did the bottles originate?	(ALS/ROC)		CLIENT
7	Soil VOA received as: Bulk Encore 5035set			(NA)

8. Temperature Readings Date: 10-18-16 Time: 10:12 ID: (IR#7) IR#8 From: Temp Blank (Sample Bottle)

Observed Temp (°C)	3.3						
Correction Factor (°C)	0						
Corrected Temp (°C)	3.3						
Within 0-6°C?	(Y) N	Y N	Y N	Y N	Y N	Y N	Y N
If <0°C, were samples frozen?	Y N	Y N	Y N	Y N	Y N	Y N	Y N

If out of Temperature, note packing/ice condition: _____ Ice melted Poorly Packed Same Day Rule

&Client Approval to Run Samples: _____ Standing Approval Client aware at drop-off Client notified by: _____

All samples held in storage location: R-002 by MZ on 10-18-16 at 10:15
5035 samples placed in storage location: _____ by _____ on _____ at _____

Cooler Breakdown: Date: 10-19 Time: 1200 by: TS

1. Were all bottle labels complete (*i.e.* analysis, preservation, etc.)? (YES) NO
2. Did all bottle labels and tags agree with custody papers? (YES) NO
3. Were correct containers used for the tests indicated? (YES) NO
4. Were 5035 vials acceptable (no extra labels, not leaking)? YES NO (NA)
5. Air Samples: Cassettes / Tubes Intact Canisters Pressurized Tedlar® Bags Inflated (NA)

Explain any discrepancies:

pH	Reagent	Yes	No	Lot Received	Exp	Sample ID	Vol. Added	Lot Added	Final pH
≥12	NaOH								
≤2	HNO_3								
≤2	H_2SO_4								
<4	$NaHSO_4$								
Residual Chlorine (-)	For CN Phenol and 522			If +, contact PM to add $Na_2S_2O_3$ (CN), ascorbic (phenol).					
	$Na_2S_2O_3$	-	-						
	ZnAcetate	-	-						
	HCl	**	**						

**Not to be tested before analysis – pH tested and recorded by VOAs on a separate worksheet

Yes=All samples OK

No=Samples were preserved at The lab as listed

PM OK to Adjust: _____

Bottle lot numbers: 041116-13WS
Other Comments:

CLRES	(BULK)
DO	FLDT
HPROD	HGFB
HTR	LL3541
PH	(SUB)
SO3	MARRS
ALS	REV

PC Secondary Review: JMM 10/20/16 *significant air bubbles: VOA > 5-6 mm : WC >1 in. diameter

Miscellaneous Forms

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

REPORT QUALIFIERS AND DEFINITIONS

U Analyte was analyzed for but not detected. The sample quantitation limit has been corrected for dilution and for percent moisture, unless otherwise noted in the case narrative.

J Estimated value due to either being a Tentatively Identified Compound (TIC) or that the concentration is between the MRL and the MDL. Concentrations are not verified within the linear range of the calibration. For DoD: concentration >40% difference between two GC columns (pesticides/Arclors).

B Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result.

E Inorganics- Concentration is estimated due to the serial dilution was outside control limits.

E Organics- Concentration has exceeded the calibration range for that specific analysis.

D Concentration is a result of a dilution, typically a secondary analysis of the sample due to exceeding the calibration range or that a surrogate has been diluted out of the sample and cannot be assessed.

* Indicates that a quality control parameter has exceeded laboratory limits. Under the ñNotesò column of the Form I, this qualifier denotes analysis was performed out of Holding Time.

H Analysis was performed out of hold time for tests that have an ñimmediateò hold time criteria.

Spike was diluted out.

\+ Correlation coefficient for MSA is <0.995.

N Inorganics- Matrix spike recovery was outside laboratory limits.

N Organics- Presumptive evidence of a compound (reported as a TIC) based on the MS library search.

S Concentration has been determined using Method of Standard Additions (MSA).

W Post-Digestion Spike recovery is outside control limits and the sample absorbance is <50% of the spike absorbance.

P Concentration >40% (25% for CLP) difference between the two GC columns.

C Confirmed by GC/MS

Q DoD reports: indicates a pesticide/Aroclor is not confirmed (Ó100% Difference between two GC columns).

X See Case Narrative for discussion.

MRL Method Reporting Limit. Also known as:
LOQ Limit of Quantitation (LOQ)
The lowest concentration at which the method analyte may be reliably quantified under the method conditions.

MDL Method Detection Limit. A statistical value derived from a study designed to provide the lowest concentration that will be detected 99% of the time. Values between the MDL and MRL are estimated (see J qualifier).

LOD Limit of Detection. A value at or above the MDL which has been verified to be detectable.

ND Non-Detect. Analyte was not detected at the concentration listed. Same as U qualifier.

ACCREDITED IN ACCORDANCE WITH nelac

Rochester Lab ID # for State Certifications[1]

Connecticut ID # PH0556	Maine ID #NY0032	New Hampshire ID # 294100 A/B
Delaware Accredited	Nebraska Accredited	
DoD ELAP #65817	New Jersey ID # NY004	Pennsylvania ID# 68-786
Florida ID # E87674	New York ID # 10145	Rhode Island ID # 158
Illinois ID #200047	North Carolina #676	Virginia #460167

[1] Analyses were performed according to our laboratoryôs NELAP-approved quality assurance program and any applicable state or agency requirements. The test results meet requirements of the current NELAP/TNI standards or state or agency requirements, where applicable, except as noted in the case narrative. Since not all analyte/method/matrix combinations are offered for state/NELAC accreditation, this report may contain results which are not accredited. For a specific list of accredited analytes, contact the laboratory or go to http://www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads/North-America-Downloads

ALS Laboratory Group

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Client: NASA/WSTF/Navarro **Service Request:** R1611059
Project: White Sands Test Facility/15EC007B

Sample Name: 1610140830 IBC 7330 **Date Collected:** 10/14/16
Lab Code: R1611059-001 **Date Received:** 10/18/16
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		KWONG

Sample Name: 1610140832 IBC 7330 **Date Collected:** 10/14/16
Lab Code: R1611059-002 **Date Received:** 10/18/16
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
6010C	SDIRKX	CGILDAY
6010C	SDIRKX	NMANSEN
7471B	SDIRKX	SDIRKX
ALS SOP		KWONG

Sample Name: 1610140835 IBC 7329 **Date Collected:** 10/14/16
Lab Code: R1611059-004 **Date Received:** 10/18/16
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		KWONG

Sample Name: 1610140837 IBC 7329 **Date Collected:** 10/14/16
Lab Code: R1611059-005 **Date Received:** 10/18/16
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
6010C	SDIRKX	CGILDAY
6010C	SDIRKX	NMANSEN
7471B	SDIRKX	SDIRKX
ALS SOP		KWONG

Client: NASA/WSTF/Navarro **Service Request:** R1611059
Project: White Sands Test Facility/15EC007B

Sample Name: 1610140840 IBC 7338 **Date Collected:** 10/14/16
Lab Code: R1611059-007 **Date Received:** 10/18/16
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		KWONG

Sample Name: 1610140842 IBC 7338 **Date Collected:** 10/14/16
Lab Code: R1611059-008 **Date Received:** 10/18/16
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
6010C	SDIRKX	CGILDAY
6010C	SDIRKX	NMANSEN
7471B	SDIRKX	SDIRKX
ALS SOP		KWONG

Sample Name: 1610130850 IBC 7321 **Date Collected:** 10/13/16
Lab Code: R1611059-010 **Date Received:** 10/18/16
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		KWONG

Sample Name: 1610130851 IBC 7321 **Date Collected:** 10/13/16
Lab Code: R1611059-011 **Date Received:** 10/18/16
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		KWONG

Client: NASA/WSTF/Navarro **Service Request:** R1611059
Project: White Sands Test Facility/15EC007B

Sample Name: 1610130856 IBC 7321 **Date Collected:** 10/13/16
Lab Code: R1611059-012 **Date Received:** 10/18/16
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
6010C	SDIRKX	CGILDAY
6010C	SDIRKX	NMANSEN
7471B	SDIRKX	SDIRKX
ALS SOP		KWONG

Sample Name: 1610130857 IBC 7321 **Date Collected:** 10/13/16
Lab Code: R1611059-013 **Date Received:** 10/18/16
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
6010C	SDIRKX	CGILDAY
6010C	SDIRKX	NMANSEN
7471B	SDIRKX	SDIRKX
ALS SOP		KWONG

Sample Name: 1610130905 IBC 7322 **Date Collected:** 10/13/16
Lab Code: R1611059-016 **Date Received:** 10/18/16
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		KWONG

Sample Name: 1610130907 IBC 7322 **Date Collected:** 10/13/16
Lab Code: R1611059-017 **Date Received:** 10/18/16
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
6010C	SDIRKX	CGILDAY
6010C	SDIRKX	NMANSEN
7471B	SDIRKX	SDIRKX

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B		

Sample Name:	1610130907 IBC 7322	**Date Collected:**	10/13/16
Lab Code:	R1611059-017	**Date Received:**	10/18/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
ALS SOP		KWONG

Sample Name:	1610130915 IBC 7326	**Date Collected:**	10/13/16
Lab Code:	R1611059-019	**Date Received:**	10/18/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		KWONG

Sample Name:	1610130917 IBC 7326	**Date Collected:**	10/13/16
Lab Code:	R1611059-020	**Date Received:**	10/18/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	SDIRKX	CGILDAY
6010C	SDIRKX	NMANSEN
7471B	SDIRKX	SDIRKX
ALS SOP		KWONG

Sample Name:	1610130940 IBC 7327	**Date Collected:**	10/13/16
Lab Code:	R1611059-022	**Date Received:**	10/18/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		KWONG

Client: NASA/WSTF/Navarro **Service Request:** R1611059
Project: White Sands Test Facility/15EC007B

Sample Name: 1610130942 IBC 7327 **Date Collected:** 10/13/16
Lab Code: R1611059-023 **Date Received:** 10/18/16
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
6010C	SDIRKX	CGILDAY
6010C	SDIRKX	NMANSEN
7471B	SDIRKX	SDIRKX
ALS SOP		KWONG

Sample Name: 1610130945 IBC 7331 **Date Collected:** 10/13/16
Lab Code: R1611059-025 **Date Received:** 10/18/16
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		KWONG

Sample Name: 1610130947 IBC 7331 **Date Collected:** 10/13/16
Lab Code: R1611059-026 **Date Received:** 10/18/16
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
6010C	SDIRKX	CGILDAY
6010C	SDIRKX	NMANSEN
7471B	SDIRKX	SDIRKX
ALS SOP		KWONG

Sample Name: 1610130950 IBC 7328 **Date Collected:** 10/13/16
Lab Code: R1611059-028 **Date Received:** 10/18/16
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		KWONG

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B		

Sample Name:	1610130952 IBC 7328	**Date Collected:**	10/13/16
Lab Code:	R1611059-029	**Date Received:**	10/18/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	SDIRKX	CGILDAY
6010C	SDIRKX	NMANSEN
7471B	SDIRKX	SDIRKX
ALS SOP		KWONG

The preparation methods associated with this report are found in these tables unless discussed in the case narrative.

Water/Liquid Matrix

Analytical Method	Preparation Method
200.7	200.2
200.8	200.2
6010C	3005A/3010A
6020A	ILM05.3
9014 Cyanide Reactivity	SW846 Ch7, 7.3.4.2
9034 Sulfide Reactivity	SW846 Ch7, 7.3.4.2
9034 Sulfide Acid Soluble	9030B
9056A Bomb (Halogens)	5050A
9066 Manual Distillation	9065
SM 4500-CN-E Residual Cyanide	SM 4500-CN-G
SM 4500-CN-E WAD Cyanide	SM 4500-CN-I

Solid/Soil/Non-Aqueous Matrix

Analytical Method	Preparation Method
6010C	3050B
6020A	3050B
6010C TCLP (1311) extract	3005A/3010A
6010 SPLP (1312) extract	3005A/3010A
7196A	3060A
7199	3060A
9056A Halogens/Halides	5050
300.0 Anions/ 350.1/ 353.2/ SM 2320B/ SM 5210B/ 9056A Anions	DI extraction

For analytical methods not listed, the preparation method is the same as the analytical method reference.

Sample Results

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Volatile Organic Compounds by GC/MS

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/14/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610140830 IBC 7330	**Units:**	ug/Kg
Lab Code:	R1611059-001	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	5.1	0.86	1	10/25/16 15:56	
1,1,1-Trichloroethane (TCA)	ND U	5.1	0.76	1	10/25/16 15:56	
1,1,2,2-Tetrachloroethane	ND U	5.1	0.84	1	10/25/16 15:56	
1,1,2-Trichloroethane	ND U	5.1	0.76	1	10/25/16 15:56	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.1	1.3	1	10/25/16 15:56	
1,1-Dichloroethene (1,1-DCE)	ND U	5.1	1.4	1	10/25/16 15:56	
1,2,3-Trichloropropane	ND U	5.1	1.4	1	10/25/16 15:56	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.1	2.0	1	10/25/16 15:56	
1,2-Dibromoethane	ND U	5.1	1.3	1	10/25/16 15:56	
1,2-Dichlorobenzene	ND U	5.1	0.63	1	10/25/16 15:56	
1,2-Dichloroethane	ND U	5.1	0.63	1	10/25/16 15:56	
1,2-Dichloropropane	ND U	5.1	1.0	1	10/25/16 15:56	
1,3-Dichlorobenzene	ND U	5.1	0.65	1	10/25/16 15:56	
1,4-Dioxane	ND U	100	20	1	10/25/16 15:56	
2-Butanone (MEK)	ND U	5.1	2.4	1	10/25/16 15:56	
2-Chloro-1,3-butadiene	ND U	5.1	1.6	1	10/25/16 15:56	
2-Chloroethyl Vinyl Ether	ND U	5.1	1.8	1	10/25/16 15:56	
Isobutyl Alcohol	ND U	100	24	1	10/25/16 15:56	
Allyl Chloride	ND U	5.1	1.8	1	10/25/16 15:56	
4-Methyl-2-pentanone	ND U	5.1	1.1	1	10/25/16 15:56	
Acetone	ND U	5.1	2.9	1	10/25/16 15:56	
Acetonitrile	ND U	26	18	1	10/25/16 15:56	
Acrolein	ND U	26	3.7	1	10/25/16 15:56	
Acrylonitrile	ND U	26	6.7	1	10/25/16 15:56	
Benzene	ND U	5.1	0.30	1	10/25/16 15:56	
Bromodichloromethane	ND U	5.1	0.63	1	10/25/16 15:56	
Bromoform	ND U	5.1	0.96	1	10/25/16 15:56	
Bromomethane	ND U	5.1	1.5	1	10/25/16 15:56	
Carbon Disulfide	ND U	5.1	1.3	1	10/25/16 15:56	
Carbon Tetrachloride	ND U	5.1	0.95	1	10/25/16 15:56	
Chlorobenzene	ND U	5.1	0.30	1	10/25/16 15:56	
Chloroethane	ND U	5.1	3.0	1	10/25/16 15:56	
Chloroform	ND U	5.1	1.3	1	10/25/16 15:56	
Chloromethane	ND U	5.1	0.42	1	10/25/16 15:56	
Dibromochloromethane	ND U	5.1	0.76	1	10/25/16 15:56	
Dibromomethane	ND U	5.1	0.65	1	10/25/16 15:56	
Dichlorodifluoromethane (CFC 12)	ND U	5.1	2.0	1	10/25/16 15:56	
Dichloromethane	ND U	5.1	0.59	1	10/25/16 15:56	
Ethyl Methacrylate	ND U	5.1	0.78	1	10/25/16 15:56	
Ethylbenzene	ND U	5.1	0.24	1	10/25/16 15:56	
Iodomethane	ND U	10	1.2	1	10/25/16 15:56	
Methacrylonitrile	ND U	5.1	1.6	1	10/25/16 15:56	
Methyl Methacrylate	ND U	5.1	0.76	1	10/25/16 15:56	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/14/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610140830 IBC 7330	**Units:**	ug/Kg
Lab Code:	R1611059-001	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	5.1	0.53	1	10/25/16 15:56	
Propionitrile	ND U	26	6.7	1	10/25/16 15:56	
Tetrachloroethene (PCE)	ND U	5.1	0.91	1	10/25/16 15:56	
Toluene	ND U	5.1	1.1	1	10/25/16 15:56	
Trichloroethene (TCE)	ND U	5.1	1.1	1	10/25/16 15:56	
Trichlorofluoromethane (CFC 11)	ND U	5.1	0.68	1	10/25/16 15:56	
Vinyl Chloride	ND U	5.1	1.9	1	10/25/16 15:56	
cis-1,3-Dichloropropene	ND U	5.1	0.93	1	10/25/16 15:56	
m,p-Xylenes	ND U	10	1.2	1	10/25/16 15:56	
o-Xylene	ND U	5.1	0.50	1	10/25/16 15:56	
trans-1,2-Dichloroethene	ND U	5.1	0.89	1	10/25/16 15:56	
trans-1,3-Dichloropropene	ND U	5.1	0.21	1	10/25/16 15:56	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	99	51 - 136	10/25/16 15:56	
Dibromofluoromethane	95	63 - 138	10/25/16 15:56	
Toluene-d8	96	66 - 138	10/25/16 15:56	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
000124-19-6	Nonanal	14.39	14	JN

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/14/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610140835 IBC 7329	**Units:**	ug/Kg
Lab Code:	R1611059-004	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	5.1	0.86	1	10/25/16 16:20	
1,1,1-Trichloroethane (TCA)	ND U	5.1	0.76	1	10/25/16 16:20	
1,1,2,2-Tetrachloroethane	ND U	5.1	0.84	1	10/25/16 16:20	
1,1,2-Trichloroethane	ND U	5.1	0.76	1	10/25/16 16:20	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.1	1.3	1	10/25/16 16:20	
1,1-Dichloroethene (1,1-DCE)	ND U	5.1	1.4	1	10/25/16 16:20	
1,2,3-Trichloropropane	ND U	5.1	1.4	1	10/25/16 16:20	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.1	2.0	1	10/25/16 16:20	
1,2-Dibromoethane	ND U	5.1	1.3	1	10/25/16 16:20	
1,2-Dichlorobenzene	ND U	5.1	0.63	1	10/25/16 16:20	
1,2-Dichloroethane	ND U	5.1	0.63	1	10/25/16 16:20	
1,2-Dichloropropane	ND U	5.1	1.0	1	10/25/16 16:20	
1,3-Dichlorobenzene	ND U	5.1	0.65	1	10/25/16 16:20	
1,4-Dioxane	ND U	100	20	1	10/25/16 16:20	
2-Butanone (MEK)	ND U	5.1	2.4	1	10/25/16 16:20	
2-Chloro-1,3-butadiene	ND U	5.1	1.6	1	10/25/16 16:20	
2-Chloroethyl Vinyl Ether	ND U	5.1	1.8	1	10/25/16 16:20	
Isobutyl Alcohol	ND U	100	24	1	10/25/16 16:20	
Allyl Chloride	ND U	5.1	1.8	1	10/25/16 16:20	
4-Methyl-2-pentanone	ND U	5.1	1.1	1	10/25/16 16:20	
Acetone	**3.2 J**	5.1	2.9	1	10/25/16 16:20	
Acetonitrile	ND U	26	18	1	10/25/16 16:20	
Acrolein	ND U	26	3.7	1	10/25/16 16:20	
Acrylonitrile	ND U	26	6.7	1	10/25/16 16:20	
Benzene	ND U	5.1	0.30	1	10/25/16 16:20	
Bromodichloromethane	ND U	5.1	0.63	1	10/25/16 16:20	
Bromoform	ND U	5.1	0.96	1	10/25/16 16:20	
Bromomethane	ND U	5.1	1.5	1	10/25/16 16:20	
Carbon Disulfide	ND U	5.1	1.3	1	10/25/16 16:20	
Carbon Tetrachloride	ND U	5.1	0.95	1	10/25/16 16:20	
Chlorobenzene	ND U	5.1	0.30	1	10/25/16 16:20	
Chloroethane	ND U	5.1	3.0	1	10/25/16 16:20	
Chloroform	ND U	5.1	1.3	1	10/25/16 16:20	
Chloromethane	ND U	5.1	0.42	1	10/25/16 16:20	
Dibromochloromethane	ND U	5.1	0.76	1	10/25/16 16:20	
Dibromomethane	ND U	5.1	0.65	1	10/25/16 16:20	
Dichlorodifluoromethane (CFC 12)	ND U	5.1	2.0	1	10/25/16 16:20	
Dichloromethane	ND U	5.1	0.59	1	10/25/16 16:20	
Ethyl Methacrylate	ND U	5.1	0.78	1	10/25/16 16:20	
Ethylbenzene	ND U	5.1	0.24	1	10/25/16 16:20	
Iodomethane	ND U	10	1.2	1	10/25/16 16:20	
Methacrylonitrile	ND U	5.1	1.6	1	10/25/16 16:20	
Methyl Methacrylate	ND U	5.1	0.76	1	10/25/16 16:20	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/14/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610140835 IBC 7329	**Units:**	ug/Kg
Lab Code:	R1611059-004	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	5.1	0.53	1	10/25/16 16:20	
Propionitrile	ND U	26	6.7	1	10/25/16 16:20	
Tetrachloroethene (PCE)	ND U	5.1	0.91	1	10/25/16 16:20	
Toluene	ND U	5.1	1.1	1	10/25/16 16:20	
Trichloroethene (TCE)	ND U	5.1	1.1	1	10/25/16 16:20	
Trichlorofluoromethane (CFC 11)	ND U	5.1	0.68	1	10/25/16 16:20	
Vinyl Chloride	ND U	5.1	1.9	1	10/25/16 16:20	
cis-1,3-Dichloropropene	ND U	5.1	0.93	1	10/25/16 16:20	
m,p-Xylenes	ND U	10	1.2	1	10/25/16 16:20	
o-Xylene	ND U	5.1	0.50	1	10/25/16 16:20	
trans-1,2-Dichloroethene	ND U	5.1	0.89	1	10/25/16 16:20	
trans-1,3-Dichloropropene	ND U	5.1	0.21	1	10/25/16 16:20	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	97	51 - 136	10/25/16 16:20	
Dibromofluoromethane	96	63 - 138	10/25/16 16:20	
Toluene-d8	96	66 - 138	10/25/16 16:20	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
	unknown	13.57	9.5	J
	unknown	14.39	8.1	J
018829-56-6	2-Nonenal, (E)-	15.18	12	JN

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/14/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610140840 IBC 7338	**Units:**	ug/Kg
Lab Code:	R1611059-007	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	5.2	0.87	1	10/25/16 16:44	
1,1,1-Trichloroethane (TCA)	ND U	5.2	0.77	1	10/25/16 16:44	
1,1,2,2-Tetrachloroethane	ND U	5.2	0.85	1	10/25/16 16:44	
1,1,2-Trichloroethane	ND U	5.2	0.77	1	10/25/16 16:44	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.2	1.3	1	10/25/16 16:44	
1,1-Dichloroethene (1,1-DCE)	ND U	5.2	1.4	1	10/25/16 16:44	
1,2,3-Trichloropropane	ND U	5.2	1.4	1	10/25/16 16:44	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.2	2.0	1	10/25/16 16:44	
1,2-Dibromoethane	ND U	5.2	1.3	1	10/25/16 16:44	
1,2-Dichlorobenzene	ND U	5.2	0.64	1	10/25/16 16:44	
1,2-Dichloroethane	ND U	5.2	0.64	1	10/25/16 16:44	
1,2-Dichloropropane	ND U	5.2	1.1	1	10/25/16 16:44	
1,3-Dichlorobenzene	ND U	5.2	0.66	1	10/25/16 16:44	
1,4-Dioxane	ND U	100	20	1	10/25/16 16:44	
2-Butanone (MEK)	ND U	5.2	2.4	1	10/25/16 16:44	
2-Chloro-1,3-butadiene	ND U	5.2	1.6	1	10/25/16 16:44	
2-Chloroethyl Vinyl Ether	ND U	5.2	1.8	1	10/25/16 16:44	
Isobutyl Alcohol	ND U	100	24	1	10/25/16 16:44	
Allyl Chloride	ND U	5.2	1.8	1	10/25/16 16:44	
4-Methyl-2-pentanone	ND U	5.2	1.1	1	10/25/16 16:44	
Acetone	**3.2 J**	5.2	3.0	1	10/25/16 16:44	
Acetonitrile	ND U	26	18	1	10/25/16 16:44	
Acrolein	ND U	26	3.7	1	10/25/16 16:44	
Acrylonitrile	ND U	26	6.8	1	10/25/16 16:44	
Benzene	ND U	5.2	0.31	1	10/25/16 16:44	
Bromodichloromethane	ND U	5.2	0.64	1	10/25/16 16:44	
Bromoform	ND U	5.2	0.98	1	10/25/16 16:44	
Bromomethane	ND U	5.2	1.5	1	10/25/16 16:44	
Carbon Disulfide	ND U	5.2	1.3	1	10/25/16 16:44	
Carbon Tetrachloride	ND U	5.2	0.97	1	10/25/16 16:44	
Chlorobenzene	ND U	5.2	0.31	1	10/25/16 16:44	
Chloroethane	ND U	5.2	3.0	1	10/25/16 16:44	
Chloroform	ND U	5.2	1.4	1	10/25/16 16:44	
Chloromethane	ND U	5.2	0.42	1	10/25/16 16:44	
Dibromochloromethane	ND U	5.2	0.77	1	10/25/16 16:44	
Dibromomethane	ND U	5.2	0.66	1	10/25/16 16:44	
Dichlorodifluoromethane (CFC 12)	ND U	5.2	2.0	1	10/25/16 16:44	
Dichloromethane	ND U	5.2	0.60	1	10/25/16 16:44	
Ethyl Methacrylate	ND U	5.2	0.79	1	10/25/16 16:44	
Ethylbenzene	ND U	5.2	0.25	1	10/25/16 16:44	
Iodomethane	ND U	10	1.2	1	10/25/16 16:44	
Methacrylonitrile	ND U	5.2	1.6	1	10/25/16 16:44	
Methyl Methacrylate	ND U	5.2	0.77	1	10/25/16 16:44	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/14/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610140840 IBC 7338	**Units:**	ug/Kg
Lab Code:	R1611059-007	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND	U	5.2	0.54	1	10/25/16 16:44	
Propionitrile	ND	U	26	6.8	1	10/25/16 16:44	
Tetrachloroethene (PCE)	ND	U	5.2	0.92	1	10/25/16 16:44	
Toluene	ND	U	5.2	1.1	1	10/25/16 16:44	
Trichloroethene (TCE)	ND	U	5.2	1.1	1	10/25/16 16:44	
Trichlorofluoromethane (CFC 11)	ND	U	5.2	0.69	1	10/25/16 16:44	
Vinyl Chloride	ND	U	5.2	2.0	1	10/25/16 16:44	
cis-1,3-Dichloropropene	ND	U	5.2	0.94	1	10/25/16 16:44	
m,p-Xylenes	ND	U	10	1.2	1	10/25/16 16:44	
o-Xylene	ND	U	5.2	0.51	1	10/25/16 16:44	
trans-1,2-Dichloroethene	ND	U	5.2	0.90	1	10/25/16 16:44	
trans-1,3-Dichloropropene	ND	U	5.2	0.21	1	10/25/16 16:44	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	95	51 - 136	10/25/16 16:44	
Dibromofluoromethane	92	63 - 138	10/25/16 16:44	
Toluene-d8	93	66 - 138	10/25/16 16:44	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
	unknown	13.57	23	J

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130850 IBC 7321	**Units:**	ug/Kg
Lab Code:	R1611059-010	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	5.2	0.86	1.01	10/25/16 17:08	
1,1,1-Trichloroethane (TCA)	ND U	5.2	0.76	1.01	10/25/16 17:08	
1,1,2,2-Tetrachloroethane	ND U	5.2	0.84	1.01	10/25/16 17:08	
1,1,2-Trichloroethane	ND U	5.2	0.76	1.01	10/25/16 17:08	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.2	1.3	1.01	10/25/16 17:08	
1,1-Dichloroethene (1,1-DCE)	ND U	5.2	1.4	1.01	10/25/16 17:08	
1,2,3-Trichloropropane	ND U	5.2	1.4	1.01	10/25/16 17:08	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.2	2.0	1.01	10/25/16 17:08	
1,2-Dibromoethane	ND U	5.2	1.3	1.01	10/25/16 17:08	
1,2-Dichlorobenzene	ND U	5.2	0.63	1.01	10/25/16 17:08	
1,2-Dichloroethane	ND U	5.2	0.63	1.01	10/25/16 17:08	
1,2-Dichloropropane	ND U	5.2	1.0	1.01	10/25/16 17:08	
1,3-Dichlorobenzene	ND U	5.2	0.65	1.01	10/25/16 17:08	
1,4-Dioxane	ND U	100	20	1.01	10/25/16 17:08	
2-Butanone (MEK)	ND U	5.2	2.4	1.01	10/25/16 17:08	
2-Chloro-1,3-butadiene	ND U	5.2	1.6	1.01	10/25/16 17:08	
2-Chloroethyl Vinyl Ether	ND U	5.2	1.8	1.01	10/25/16 17:08	
Isobutyl Alcohol	ND U	100	24	1.01	10/25/16 17:08	
Allyl Chloride	ND U	5.2	1.8	1.01	10/25/16 17:08	
4-Methyl-2-pentanone	ND U	5.2	1.1	1.01	10/25/16 17:08	
Acetone	ND U	5.2	2.9	1.01	10/25/16 17:08	
Acetonitrile	ND U	26	18	1.01	10/25/16 17:08	
Acrolein	ND U	26	3.7	1.01	10/25/16 17:08	
Acrylonitrile	ND U	26	6.7	1.01	10/25/16 17:08	
Benzene	ND U	5.2	0.30	1.01	10/25/16 17:08	
Bromodichloromethane	ND U	5.2	0.63	1.01	10/25/16 17:08	
Bromoform	ND U	5.2	0.96	1.01	10/25/16 17:08	
Bromomethane	ND U	5.2	1.5	1.01	10/25/16 17:08	
Carbon Disulfide	ND U	5.2	1.3	1.01	10/25/16 17:08	
Carbon Tetrachloride	ND U	5.2	0.95	1.01	10/25/16 17:08	
Chlorobenzene	ND U	5.2	0.30	1.01	10/25/16 17:08	
Chloroethane	ND U	5.2	3.0	1.01	10/25/16 17:08	
Chloroform	ND U	5.2	1.3	1.01	10/25/16 17:08	
Chloromethane	ND U	5.2	0.42	1.01	10/25/16 17:08	
Dibromochloromethane	ND U	5.2	0.76	1.01	10/25/16 17:08	
Dibromomethane	ND U	5.2	0.65	1.01	10/25/16 17:08	
Dichlorodifluoromethane (CFC 12)	ND U	5.2	2.0	1.01	10/25/16 17:08	
Dichloromethane	ND U	5.2	0.59	1.01	10/25/16 17:08	
Ethyl Methacrylate	ND U	5.2	0.78	1.01	10/25/16 17:08	
Ethylbenzene	ND U	5.2	0.24	1.01	10/25/16 17:08	
Iodomethane	ND U	10	1.2	1.01	10/25/16 17:08	
Methacrylonitrile	ND U	5.2	1.6	1.01	10/25/16 17:08	
Methyl Methacrylate	ND U	5.2	0.76	1.01	10/25/16 17:08	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130850 IBC 7321	**Units:**	ug/Kg
Lab Code:	R1611059-010	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	5.2	0.53	1.01	10/25/16 17:08	
Propionitrile	ND U	26	6.7	1.01	10/25/16 17:08	
Tetrachloroethene (PCE)	ND U	5.2	0.91	1.01	10/25/16 17:08	
Toluene	ND U	5.2	1.1	1.01	10/25/16 17:08	
Trichloroethene (TCE)	ND U	5.2	1.1	1.01	10/25/16 17:08	
Trichlorofluoromethane (CFC 11)	ND U	5.2	0.69	1.01	10/25/16 17:08	
Vinyl Chloride	ND U	5.2	1.9	1.01	10/25/16 17:08	
cis-1,3-Dichloropropene	ND U	5.2	0.93	1.01	10/25/16 17:08	
m,p-Xylenes	ND U	10	1.2	1.01	10/25/16 17:08	
o-Xylene	ND U	5.2	0.50	1.01	10/25/16 17:08	
trans-1,2-Dichloroethene	ND U	5.2	0.89	1.01	10/25/16 17:08	
trans-1,3-Dichloropropene	ND U	5.2	0.21	1.01	10/25/16 17:08	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	94	51 - 136	10/25/16 17:08	
Dibromofluoromethane	94	63 - 138	10/25/16 17:08	
Toluene-d8	94	66 - 138	10/25/16 17:08	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
000124-19-6	Nonanal	14.39	14	JN

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130851 IBC 7321	**Units:**	ug/Kg
Lab Code:	R1611059-011	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	5.1	0.85	1	10/25/16 17:33	
1,1,1-Trichloroethane (TCA)	ND U	5.1	0.75	1	10/25/16 17:33	
1,1,2,2-Tetrachloroethane	ND U	5.1	0.83	1	10/25/16 17:33	
1,1,2-Trichloroethane	ND U	5.1	0.75	1	10/25/16 17:33	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.1	1.3	1	10/25/16 17:33	
1,1-Dichloroethene (1,1-DCE)	ND U	5.1	1.4	1	10/25/16 17:33	
1,2,3-Trichloropropane	ND U	5.1	1.4	1	10/25/16 17:33	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.1	2.0	1	10/25/16 17:33	
1,2-Dibromoethane	ND U	5.1	1.3	1	10/25/16 17:33	
1,2-Dichlorobenzene	ND U	5.1	0.63	1	10/25/16 17:33	
1,2-Dichloroethane	ND U	5.1	0.63	1	10/25/16 17:33	
1,2-Dichloropropane	ND U	5.1	1.0	1	10/25/16 17:33	
1,3-Dichlorobenzene	ND U	5.1	0.65	1	10/25/16 17:33	
1,4-Dioxane	ND U	100	20	1	10/25/16 17:33	
2-Butanone (MEK)	ND U	5.1	2.4	1	10/25/16 17:33	
2-Chloro-1,3-butadiene	ND U	5.1	1.6	1	10/25/16 17:33	
2-Chloroethyl Vinyl Ether	ND U	5.1	1.8	1	10/25/16 17:33	
Isobutyl Alcohol	ND U	100	24	1	10/25/16 17:33	
Allyl Chloride	ND U	5.1	1.8	1	10/25/16 17:33	
4-Methyl-2-pentanone	ND U	5.1	1.1	1	10/25/16 17:33	
Acetone	**3.2 J**	5.1	2.9	1	10/25/16 17:33	
Acetonitrile	ND U	26	18	1	10/25/16 17:33	
Acrolein	ND U	26	3.6	1	10/25/16 17:33	
Acrylonitrile	ND U	26	6.7	1	10/25/16 17:33	
Benzene	ND U	5.1	0.30	1	10/25/16 17:33	
Bromodichloromethane	ND U	5.1	0.63	1	10/25/16 17:33	
Bromoform	ND U	5.1	0.96	1	10/25/16 17:33	
Bromomethane	ND U	5.1	1.5	1	10/25/16 17:33	
Carbon Disulfide	ND U	5.1	1.3	1	10/25/16 17:33	
Carbon Tetrachloride	ND U	5.1	0.95	1	10/25/16 17:33	
Chlorobenzene	ND U	5.1	0.30	1	10/25/16 17:33	
Chloroethane	ND U	5.1	3.0	1	10/25/16 17:33	
Chloroform	ND U	5.1	1.3	1	10/25/16 17:33	
Chloromethane	ND U	5.1	0.41	1	10/25/16 17:33	
Dibromochloromethane	ND U	5.1	0.75	1	10/25/16 17:33	
Dibromomethane	ND U	5.1	0.65	1	10/25/16 17:33	
Dichlorodifluoromethane (CFC 12)	ND U	5.1	2.0	1	10/25/16 17:33	
Dichloromethane	ND U	5.1	0.59	1	10/25/16 17:33	
Ethyl Methacrylate	ND U	5.1	0.77	1	10/25/16 17:33	
Ethylbenzene	ND U	5.1	0.24	1	10/25/16 17:33	
Iodomethane	ND U	10	1.2	1	10/25/16 17:33	
Methacrylonitrile	ND U	5.1	1.6	1	10/25/16 17:33	
Methyl Methacrylate	ND U	5.1	0.75	1	10/25/16 17:33	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130851 IBC 7321	**Units:**	ug/Kg
Lab Code:	R1611059-011	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	5.1	0.53	1	10/25/16 17:33	
Propionitrile	ND U	26	6.7	1	10/25/16 17:33	
Tetrachloroethene (PCE)	ND U	5.1	0.90	1	10/25/16 17:33	
Toluene	ND U	5.1	1.1	1	10/25/16 17:33	
Trichloroethene (TCE)	ND U	5.1	1.1	1	10/25/16 17:33	
Trichlorofluoromethane (CFC 11)	ND U	5.1	0.68	1	10/25/16 17:33	
Vinyl Chloride	ND U	5.1	1.9	1	10/25/16 17:33	
cis-1,3-Dichloropropene	ND U	5.1	0.93	1	10/25/16 17:33	
m,p-Xylenes	ND U	10	1.2	1	10/25/16 17:33	
o-Xylene	ND U	5.1	0.50	1	10/25/16 17:33	
trans-1,2-Dichloroethene	ND U	5.1	0.88	1	10/25/16 17:33	
trans-1,3-Dichloropropene	ND U	5.1	0.21	1	10/25/16 17:33	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	92	51 - 136	10/25/16 17:33	
Dibromofluoromethane	92	63 - 138	10/25/16 17:33	
Toluene-d8	94	66 - 138	10/25/16 17:33	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
000124-19-6	Nonanal	14.39	17	JN

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130905 IBC 7322	**Units:**	ug/Kg
Lab Code:	R1611059-016	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	5.1	0.85	1	10/25/16 17:57	
1,1,1-Trichloroethane (TCA)	ND U	5.1	0.74	1	10/25/16 17:57	
1,1,2,2-Tetrachloroethane	ND U	5.1	0.83	1	10/25/16 17:57	
1,1,2-Trichloroethane	ND U	5.1	0.74	1	10/25/16 17:57	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.1	1.3	1	10/25/16 17:57	
1,1-Dichloroethene (1,1-DCE)	ND U	5.1	1.3	1	10/25/16 17:57	
1,2,3-Trichloropropane	ND U	5.1	1.4	1	10/25/16 17:57	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.1	1.9	1	10/25/16 17:57	
1,2-Dibromoethane	ND U	5.1	1.3	1	10/25/16 17:57	
1,2-Dichlorobenzene	ND U	5.1	0.62	1	10/25/16 17:57	
1,2-Dichloroethane	ND U	5.1	0.62	1	10/25/16 17:57	
1,2-Dichloropropane	ND U	5.1	0.99	1	10/25/16 17:57	
1,3-Dichlorobenzene	ND U	5.1	0.64	1	10/25/16 17:57	
1,4-Dioxane	ND U	100	20	1	10/25/16 17:57	
2-Butanone (MEK)	ND U	5.1	2.4	1	10/25/16 17:57	
2-Chloro-1,3-butadiene	ND U	5.1	1.6	1	10/25/16 17:57	
2-Chloroethyl Vinyl Ether	ND U	5.1	1.8	1	10/25/16 17:57	
Isobutyl Alcohol	ND U	100	24	1	10/25/16 17:57	
Allyl Chloride	ND U	5.1	1.8	1	10/25/16 17:57	
4-Methyl-2-pentanone	ND U	5.1	1.0	1	10/25/16 17:57	
Acetone	ND U	5.1	2.9	1	10/25/16 17:57	
Acetonitrile	ND U	25	17	1	10/25/16 17:57	
Acrolein	ND U	25	3.6	1	10/25/16 17:57	
Acrylonitrile	ND U	25	6.6	1	10/25/16 17:57	
Benzene	ND U	5.1	0.30	1	10/25/16 17:57	
Bromodichloromethane	ND U	5.1	0.62	1	10/25/16 17:57	
Bromoform	ND U	5.1	0.95	1	10/25/16 17:57	
Bromomethane	ND U	5.1	1.4	1	10/25/16 17:57	
Carbon Disulfide	ND U	5.1	1.3	1	10/25/16 17:57	
Carbon Tetrachloride	ND U	5.1	0.94	1	10/25/16 17:57	
Chlorobenzene	ND U	5.1	0.30	1	10/25/16 17:57	
Chloroethane	ND U	5.1	3.0	1	10/25/16 17:57	
Chloroform	ND U	5.1	1.3	1	10/25/16 17:57	
Chloromethane	ND U	5.1	0.41	1	10/25/16 17:57	
Dibromochloromethane	ND U	5.1	0.74	1	10/25/16 17:57	
Dibromomethane	ND U	5.1	0.64	1	10/25/16 17:57	
Dichlorodifluoromethane (CFC 12)	ND U	5.1	2.0	1	10/25/16 17:57	
Dichloromethane	ND U	5.1	0.58	1	10/25/16 17:57	
Ethyl Methacrylate	ND U	5.1	0.76	1	10/25/16 17:57	
Ethylbenzene	ND U	5.1	0.24	1	10/25/16 17:57	
Iodomethane	ND U	10	1.2	1	10/25/16 17:57	
Methacrylonitrile	ND U	5.1	1.6	1	10/25/16 17:57	
Methyl Methacrylate	ND U	5.1	0.74	1	10/25/16 17:57	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130905 IBC 7322	**Units:**	ug/Kg
Lab Code:	R1611059-016	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	5.1	0.52	1	10/25/16 17:57	
Propionitrile	ND U	25	6.6	1	10/25/16 17:57	
Tetrachloroethene (PCE)	ND U	5.1	0.90	1	10/25/16 17:57	
Toluene	ND U	5.1	1.1	1	10/25/16 17:57	
Trichloroethene (TCE)	ND U	5.1	1.1	1	10/25/16 17:57	
Trichlorofluoromethane (CFC 11)	ND U	5.1	0.67	1	10/25/16 17:57	
Vinyl Chloride	ND U	5.1	1.9	1	10/25/16 17:57	
cis-1,3-Dichloropropene	ND U	5.1	0.92	1	10/25/16 17:57	
m,p-Xylenes	ND U	10	1.2	1	10/25/16 17:57	
o-Xylene	ND U	5.1	0.49	1	10/25/16 17:57	
trans-1,2-Dichloroethene	ND U	5.1	0.88	1	10/25/16 17:57	
trans-1,3-Dichloropropene	ND U	5.1	0.21	1	10/25/16 17:57	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	96	51 - 136	10/25/16 17:57	
Dibromofluoromethane	93	63 - 138	10/25/16 17:57	
Toluene-d8	94	66 - 138	10/25/16 17:57	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
000106-35-4	3-Heptanone	11.52	7.9	JN
	unknown	11.74	11	J
	unknown	12.48	12	J
000104-76-7	1-Hexanol, 2-ethyl-	13.57	51	JN
000124-19-6	Nonanal	14.39	11	JN
018829-56-6	2-Nonenal, (E)-	15.18	32	JN

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130915 IBC 7326	**Units:**	ug/Kg
Lab Code:	R1611059-019	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	5.2	0.87	1	10/25/16 18:21	
1,1,1-Trichloroethane (TCA)	ND U	5.2	0.76	1	10/25/16 18:21	
1,1,2,2-Tetrachloroethane	ND U	5.2	0.84	1	10/25/16 18:21	
1,1,2-Trichloroethane	ND U	5.2	0.76	1	10/25/16 18:21	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.2	1.3	1	10/25/16 18:21	
1,1-Dichloroethene (1,1-DCE)	ND U	5.2	1.4	1	10/25/16 18:21	
1,2,3-Trichloropropane	ND U	5.2	1.4	1	10/25/16 18:21	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.2	2.0	1	10/25/16 18:21	
1,2-Dibromoethane	ND U	5.2	1.3	1	10/25/16 18:21	
1,2-Dichlorobenzene	ND U	5.2	0.64	1	10/25/16 18:21	
1,2-Dichloroethane	ND U	5.2	0.64	1	10/25/16 18:21	
1,2-Dichloropropane	ND U	5.2	1.1	1	10/25/16 18:21	
1,3-Dichlorobenzene	ND U	5.2	0.66	1	10/25/16 18:21	
1,4-Dioxane	ND U	100	20	1	10/25/16 18:21	
2-Butanone (MEK)	ND U	5.2	2.4	1	10/25/16 18:21	
2-Chloro-1,3-butadiene	ND U	5.2	1.6	1	10/25/16 18:21	
2-Chloroethyl Vinyl Ether	ND U	5.2	1.8	1	10/25/16 18:21	
Isobutyl Alcohol	ND U	100	24	1	10/25/16 18:21	
Allyl Chloride	ND U	5.2	1.8	1	10/25/16 18:21	
4-Methyl-2-pentanone	ND U	5.2	1.1	1	10/25/16 18:21	
Acetone	ND U	5.2	3.0	1	10/25/16 18:21	
Acetonitrile	ND U	26	18	1	10/25/16 18:21	
Acrolein	ND U	26	3.7	1	10/25/16 18:21	
Acrylonitrile	ND U	26	6.7	1	10/25/16 18:21	
Benzene	ND U	5.2	0.31	1	10/25/16 18:21	
Bromodichloromethane	ND U	5.2	0.64	1	10/25/16 18:21	
Bromoform	ND U	5.2	0.97	1	10/25/16 18:21	
Bromomethane	ND U	5.2	1.5	1	10/25/16 18:21	
Carbon Disulfide	ND U	5.2	1.3	1	10/25/16 18:21	
Carbon Tetrachloride	ND U	5.2	0.96	1	10/25/16 18:21	
Chlorobenzene	ND U	5.2	0.31	1	10/25/16 18:21	
Chloroethane	ND U	5.2	3.0	1	10/25/16 18:21	
Chloroform	ND U	5.2	1.4	1	10/25/16 18:21	
Chloromethane	ND U	5.2	0.42	1	10/25/16 18:21	
Dibromochloromethane	ND U	5.2	0.76	1	10/25/16 18:21	
Dibromomethane	ND U	5.2	0.66	1	10/25/16 18:21	
Dichlorodifluoromethane (CFC 12)	ND U	5.2	2.0	1	10/25/16 18:21	
Dichloromethane	ND U	5.2	0.60	1	10/25/16 18:21	
Ethyl Methacrylate	ND U	5.2	0.78	1	10/25/16 18:21	
Ethylbenzene	ND U	5.2	0.24	1	10/25/16 18:21	
Iodomethane	ND U	10	1.2	1	10/25/16 18:21	
Methacrylonitrile	ND U	5.2	1.6	1	10/25/16 18:21	
Methyl Methacrylate	ND U	5.2	0.76	1	10/25/16 18:21	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130915 IBC 7326	**Units:**	ug/Kg
Lab Code:	R1611059-019	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND	U	5.2	0.53	1	10/25/16 18:21	
Propionitrile	ND	U	26	6.8	1	10/25/16 18:21	
Tetrachloroethene (PCE)	ND	U	5.2	0.92	1	10/25/16 18:21	
Toluene	ND	U	5.2	1.1	1	10/25/16 18:21	
Trichloroethene (TCE)	ND	U	5.2	1.1	1	10/25/16 18:21	
Trichlorofluoromethane (CFC 11)	ND	U	5.2	0.69	1	10/25/16 18:21	
Vinyl Chloride	ND	U	5.2	2.0	1	10/25/16 18:21	
cis-1,3-Dichloropropene	ND	U	5.2	0.94	1	10/25/16 18:21	
m,p-Xylenes	ND	U	10	1.2	1	10/25/16 18:21	
o-Xylene	ND	U	5.2	0.50	1	10/25/16 18:21	
trans-1,2-Dichloroethene	ND	U	5.2	0.90	1	10/25/16 18:21	
trans-1,3-Dichloropropene	ND	U	5.2	0.21	1	10/25/16 18:21	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	95	51 - 136	10/25/16 18:21	
Dibromofluoromethane	94	63 - 138	10/25/16 18:21	
Toluene-d8	93	66 - 138	10/25/16 18:21	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
000104-76-7	1-Hexanol, 2-ethyl-	13.57	54	JN

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130940 IBC 7327	**Units:**	ug/Kg
Lab Code:	R1611059-022	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	5.1	0.85	1	10/25/16 18:45	
1,1,1-Trichloroethane (TCA)	ND U	5.1	0.75	1	10/25/16 18:45	
1,1,2,2-Tetrachloroethane	ND U	5.1	0.83	1	10/25/16 18:45	
1,1,2-Trichloroethane	ND U	5.1	0.75	1	10/25/16 18:45	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.1	1.3	1	10/25/16 18:45	
1,1-Dichloroethene (1,1-DCE)	ND U	5.1	1.4	1	10/25/16 18:45	
1,2,3-Trichloropropane	ND U	5.1	1.4	1	10/25/16 18:45	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.1	2.0	1	10/25/16 18:45	
1,2-Dibromoethane	ND U	5.1	1.3	1	10/25/16 18:45	
1,2-Dichlorobenzene	ND U	5.1	0.63	1	10/25/16 18:45	
1,2-Dichloroethane	ND U	5.1	0.63	1	10/25/16 18:45	
1,2-Dichloropropane	ND U	5.1	1.0	1	10/25/16 18:45	
1,3-Dichlorobenzene	ND U	5.1	0.65	1	10/25/16 18:45	
1,4-Dioxane	ND U	100	20	1	10/25/16 18:45	
2-Butanone (MEK)	ND U	5.1	2.4	1	10/25/16 18:45	
2-Chloro-1,3-butadiene	ND U	5.1	1.6	1	10/25/16 18:45	
2-Chloroethyl Vinyl Ether	ND U	5.1	1.8	1	10/25/16 18:45	
Isobutyl Alcohol	ND U	100	24	1	10/25/16 18:45	
Allyl Chloride	ND U	5.1	1.8	1	10/25/16 18:45	
4-Methyl-2-pentanone	ND U	5.1	1.1	1	10/25/16 18:45	
Acetone	ND U	5.1	2.9	1	10/25/16 18:45	
Acetonitrile	ND U	26	18	1	10/25/16 18:45	
Acrolein	ND U	26	3.6	1	10/25/16 18:45	
Acrylonitrile	ND U	26	6.6	1	10/25/16 18:45	
Benzene	ND U	5.1	0.30	1	10/25/16 18:45	
Bromodichloromethane	ND U	5.1	0.63	1	10/25/16 18:45	
Bromoform	ND U	5.1	0.95	1	10/25/16 18:45	
Bromomethane	ND U	5.1	1.5	1	10/25/16 18:45	
Carbon Disulfide	ND U	5.1	1.3	1	10/25/16 18:45	
Carbon Tetrachloride	ND U	5.1	0.94	1	10/25/16 18:45	
Chlorobenzene	ND U	5.1	0.30	1	10/25/16 18:45	
Chloroethane	ND U	5.1	3.0	1	10/25/16 18:45	
Chloroform	ND U	5.1	1.3	1	10/25/16 18:45	
Chloromethane	ND U	5.1	0.41	1	10/25/16 18:45	
Dibromochloromethane	ND U	5.1	0.75	1	10/25/16 18:45	
Dibromomethane	ND U	5.1	0.65	1	10/25/16 18:45	
Dichlorodifluoromethane (CFC 12)	ND U	5.1	2.0	1	10/25/16 18:45	
Dichloromethane	ND U	5.1	0.59	1	10/25/16 18:45	
Ethyl Methacrylate	ND U	5.1	0.77	1	10/25/16 18:45	
Ethylbenzene	ND U	5.1	0.24	1	10/25/16 18:45	
Iodomethane	ND U	10	1.2	1	10/25/16 18:45	
Methacrylonitrile	ND U	5.1	1.6	1	10/25/16 18:45	
Methyl Methacrylate	ND U	5.1	0.75	1	10/25/16 18:45	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130940 IBC 7327	**Units:**	ug/Kg
Lab Code:	R1611059-022	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	5.1	0.53	1	10/25/16 18:45	
Propionitrile	ND U	26	6.7	1	10/25/16 18:45	
Tetrachloroethene (PCE)	ND U	5.1	0.90	1	10/25/16 18:45	
Toluene	ND U	5.1	1.1	1	10/25/16 18:45	
Trichloroethene (TCE)	ND U	5.1	1.1	1	10/25/16 18:45	
Trichlorofluoromethane (CFC 11)	ND U	5.1	0.68	1	10/25/16 18:45	
Vinyl Chloride	ND U	5.1	1.9	1	10/25/16 18:45	
cis-1,3-Dichloropropene	ND U	5.1	0.92	1	10/25/16 18:45	
m,p-Xylenes	ND U	10	1.2	1	10/25/16 18:45	
o-Xylene	ND U	5.1	0.50	1	10/25/16 18:45	
trans-1,2-Dichloroethene	ND U	5.1	0.88	1	10/25/16 18:45	
trans-1,3-Dichloropropene	ND U	5.1	0.21	1	10/25/16 18:45	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	97	51 - 136	10/25/16 18:45	
Dibromofluoromethane	92	63 - 138	10/25/16 18:45	
Toluene-d8	94	66 - 138	10/25/16 18:45	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
000104-76-7	1-Hexanol, 2-ethyl-	13.57	7.7	JN
	unknown	14.39	5.8	J

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130945 IBC 7331	**Units:**	ug/Kg
Lab Code:	R1611059-025	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	5.1	0.85	1	10/25/16 19:09	
1,1,1-Trichloroethane (TCA)	ND U	5.1	0.75	1	10/25/16 19:09	
1,1,2,2-Tetrachloroethane	ND U	5.1	0.83	1	10/25/16 19:09	
1,1,2-Trichloroethane	ND U	5.1	0.75	1	10/25/16 19:09	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.1	1.3	1	10/25/16 19:09	
1,1-Dichloroethene (1,1-DCE)	ND U	5.1	1.4	1	10/25/16 19:09	
1,2,3-Trichloropropane	ND U	5.1	1.4	1	10/25/16 19:09	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.1	2.0	1	10/25/16 19:09	
1,2-Dibromoethane	ND U	5.1	1.3	1	10/25/16 19:09	
1,2-Dichlorobenzene	ND U	5.1	0.63	1	10/25/16 19:09	
1,2-Dichloroethane	ND U	5.1	0.63	1	10/25/16 19:09	
1,2-Dichloropropane	ND U	5.1	1.0	1	10/25/16 19:09	
1,3-Dichlorobenzene	ND U	5.1	0.65	1	10/25/16 19:09	
1,4-Dioxane	ND U	100	20	1	10/25/16 19:09	
2-Butanone (MEK)	ND U	5.1	2.4	1	10/25/16 19:09	
2-Chloro-1,3-butadiene	ND U	5.1	1.6	1	10/25/16 19:09	
2-Chloroethyl Vinyl Ether	ND U	5.1	1.8	1	10/25/16 19:09	
Isobutyl Alcohol	ND U	100	24	1	10/25/16 19:09	
Allyl Chloride	ND U	5.1	1.8	1	10/25/16 19:09	
4-Methyl-2-pentanone	ND U	5.1	1.1	1	10/25/16 19:09	
Acetone	ND U	5.1	2.9	1	10/25/16 19:09	
Acetonitrile	ND U	26	18	1	10/25/16 19:09	
Acrolein	ND U	26	3.6	1	10/25/16 19:09	
Acrylonitrile	ND U	26	6.7	1	10/25/16 19:09	
Benzene	ND U	5.1	0.30	1	10/25/16 19:09	
Bromodichloromethane	ND U	5.1	0.63	1	10/25/16 19:09	
Bromoform	ND U	5.1	0.96	1	10/25/16 19:09	
Bromomethane	ND U	5.1	1.5	1	10/25/16 19:09	
Carbon Disulfide	ND U	5.1	1.3	1	10/25/16 19:09	
Carbon Tetrachloride	ND U	5.1	0.95	1	10/25/16 19:09	
Chlorobenzene	ND U	5.1	0.30	1	10/25/16 19:09	
Chloroethane	ND U	5.1	3.0	1	10/25/16 19:09	
Chloroform	ND U	5.1	1.3	1	10/25/16 19:09	
Chloromethane	ND U	5.1	0.41	1	10/25/16 19:09	
Dibromochloromethane	ND U	5.1	0.75	1	10/25/16 19:09	
Dibromomethane	ND U	5.1	0.65	1	10/25/16 19:09	
Dichlorodifluoromethane (CFC 12)	ND U	5.1	2.0	1	10/25/16 19:09	
Dichloromethane	ND U	5.1	0.59	1	10/25/16 19:09	
Ethyl Methacrylate	ND U	5.1	0.77	1	10/25/16 19:09	
Ethylbenzene	ND U	5.1	0.24	1	10/25/16 19:09	
Iodomethane	ND U	10	1.2	1	10/25/16 19:09	
Methacrylonitrile	ND U	5.1	1.6	1	10/25/16 19:09	
Methyl Methacrylate	ND U	5.1	0.75	1	10/25/16 19:09	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130945 IBC 7331	**Units:**	ug/Kg
Lab Code:	R1611059-025	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	5.1	0.53	1	10/25/16 19:09	
Propionitrile	ND U	26	6.7	1	10/25/16 19:09	
Tetrachloroethene (PCE)	ND U	5.1	0.91	1	10/25/16 19:09	
Toluene	ND U	5.1	1.1	1	10/25/16 19:09	
Trichloroethene (TCE)	ND U	5.1	1.1	1	10/25/16 19:09	
Trichlorofluoromethane (CFC 11)	ND U	5.1	0.68	1	10/25/16 19:09	
Vinyl Chloride	ND U	5.1	1.9	1	10/25/16 19:09	
cis-1,3-Dichloropropene	ND U	5.1	0.93	1	10/25/16 19:09	
m,p-Xylenes	ND U	10	1.2	1	10/25/16 19:09	
o-Xylene	ND U	5.1	0.50	1	10/25/16 19:09	
trans-1,2-Dichloroethene	ND U	5.1	0.89	1	10/25/16 19:09	
trans-1,3-Dichloropropene	ND U	5.1	0.21	1	10/25/16 19:09	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	95	51 - 136	10/25/16 19:09	
Dibromofluoromethane	92	63 - 138	10/25/16 19:09	
Toluene-d8	95	66 - 138	10/25/16 19:09	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
000104-76-7	1-Hexanol, 2-ethyl-	13.57	230	JN

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130950 IBC 7328	**Units:**	ug/Kg
Lab Code:	R1611059-028	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	5.1	0.85	1	10/25/16 19:34	
1,1,1-Trichloroethane (TCA)	ND U	5.1	0.75	1	10/25/16 19:34	
1,1,2,2-Tetrachloroethane	ND U	5.1	0.83	1	10/25/16 19:34	
1,1,2-Trichloroethane	ND U	5.1	0.75	1	10/25/16 19:34	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.1	1.3	1	10/25/16 19:34	
1,1-Dichloroethene (1,1-DCE)	ND U	5.1	1.4	1	10/25/16 19:34	
1,2,3-Trichloropropane	ND U	5.1	1.4	1	10/25/16 19:34	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.1	2.0	1	10/25/16 19:34	
1,2-Dibromoethane	ND U	5.1	1.3	1	10/25/16 19:34	
1,2-Dichlorobenzene	ND U	5.1	0.63	1	10/25/16 19:34	
1,2-Dichloroethane	ND U	5.1	0.63	1	10/25/16 19:34	
1,2-Dichloropropane	ND U	5.1	1.0	1	10/25/16 19:34	
1,3-Dichlorobenzene	ND U	5.1	0.65	1	10/25/16 19:34	
1,4-Dioxane	ND U	100	20	1	10/25/16 19:34	
2-Butanone (MEK)	ND U	5.1	2.4	1	10/25/16 19:34	
2-Chloro-1,3-butadiene	ND U	5.1	1.6	1	10/25/16 19:34	
2-Chloroethyl Vinyl Ether	ND U	5.1	1.8	1	10/25/16 19:34	
Isobutyl Alcohol	ND U	100	24	1	10/25/16 19:34	
Allyl Chloride	ND U	5.1	1.8	1	10/25/16 19:34	
4-Methyl-2-pentanone	ND U	5.1	1.1	1	10/25/16 19:34	
Acetone	**3.3 J**	5.1	2.9	1	10/25/16 19:34	
Acetonitrile	ND U	26	18	1	10/25/16 19:34	
Acrolein	ND U	26	3.6	1	10/25/16 19:34	
Acrylonitrile	ND U	26	6.7	1	10/25/16 19:34	
Benzene	ND U	5.1	0.30	1	10/25/16 19:34	
Bromodichloromethane	ND U	5.1	0.63	1	10/25/16 19:34	
Bromoform	ND U	5.1	0.96	1	10/25/16 19:34	
Bromomethane	ND U	5.1	1.5	1	10/25/16 19:34	
Carbon Disulfide	ND U	5.1	1.3	1	10/25/16 19:34	
Carbon Tetrachloride	ND U	5.1	0.95	1	10/25/16 19:34	
Chlorobenzene	ND U	5.1	0.30	1	10/25/16 19:34	
Chloroethane	ND U	5.1	3.0	1	10/25/16 19:34	
Chloroform	ND U	5.1	1.3	1	10/25/16 19:34	
Chloromethane	ND U	5.1	0.41	1	10/25/16 19:34	
Dibromochloromethane	ND U	5.1	0.75	1	10/25/16 19:34	
Dibromomethane	ND U	5.1	0.65	1	10/25/16 19:34	
Dichlorodifluoromethane (CFC 12)	ND U	5.1	2.0	1	10/25/16 19:34	
Dichloromethane	ND U	5.1	0.59	1	10/25/16 19:34	
Ethyl Methacrylate	ND U	5.1	0.77	1	10/25/16 19:34	
Ethylbenzene	ND U	5.1	0.24	1	10/25/16 19:34	
Iodomethane	ND U	10	1.2	1	10/25/16 19:34	
Methacrylonitrile	ND U	5.1	1.6	1	10/25/16 19:34	
Methyl Methacrylate	ND U	5.1	0.75	1	10/25/16 19:34	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130950 IBC 7328	**Units:**	ug/Kg
Lab Code:	R1611059-028	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	5.1	0.53	1	10/25/16 19:34	
Propionitrile	ND U	26	6.7	1	10/25/16 19:34	
Tetrachloroethene (PCE)	ND U	5.1	0.90	1	10/25/16 19:34	
Toluene	ND U	5.1	1.1	1	10/25/16 19:34	
Trichloroethene (TCE)	ND U	5.1	1.1	1	10/25/16 19:34	
Trichlorofluoromethane (CFC 11)	ND U	5.1	0.68	1	10/25/16 19:34	
Vinyl Chloride	ND U	5.1	1.9	1	10/25/16 19:34	
cis-1,3-Dichloropropene	ND U	5.1	0.93	1	10/25/16 19:34	
m,p-Xylenes	ND U	10	1.2	1	10/25/16 19:34	
o-Xylene	ND U	5.1	0.50	1	10/25/16 19:34	
trans-1,2-Dichloroethene	ND U	5.1	0.88	1	10/25/16 19:34	
trans-1,3-Dichloropropene	ND U	5.1	0.21	1	10/25/16 19:34	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	94	51 - 136	10/25/16 19:34	
Dibromofluoromethane	90	63 - 138	10/25/16 19:34	
Toluene-d8	91	66 - 138	10/25/16 19:34	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
000104-76-7	1-Hexanol, 2-ethyl-	13.57	14	JN

Metals

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/14/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610140832 IBC 7330	**Basis:**	Dry
Lab Code:	R1611059-002		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	**0.7 BJ**	mg/Kg	6.1	0.5	1	10/25/16 23:32	10/21/16	
Arsenic, Total	6010C	**3.6**	mg/Kg	1.0	0.3	1	10/29/16 14:37	10/21/16	
Barium, Total	6010C	**105**	mg/Kg	2.0	0.2	1	10/25/16 23:32	10/21/16	
Beryllium, Total	6010C	**0.40**	mg/Kg	0.31	0.02	1	10/25/16 23:32	10/21/16	
Cadmium, Total	6010C	**0.27 J**	mg/Kg	0.51	0.04	1	10/25/16 23:32	10/21/16	
Chromium, Total	6010C	**6.6**	mg/Kg	1.0	0.2	1	10/25/16 23:32	10/21/16	
Lead, Total	6010C	**7.0**	mg/Kg	5.1	0.3	1	10/25/16 23:32	10/21/16	
Mercury, Total	7471B	ND U	mg/Kg	5.3	0.5	1	10/25/16 13:52	10/21/16	
Nickel, Total	6010C	**8.0**	mg/Kg	4.1	0.2	1	10/25/16 23:32	10/21/16	
Selenium, Total	6010C	**0.7 J**	mg/Kg	1.0	0.7	1	10/25/16 23:32	10/21/16	
Silver, Total	6010C	ND U	mg/Kg	1.0	0.5	1	10/25/16 23:32	10/21/16	
Thallium, Total	6010C	**4.7**	mg/Kg	1.0	0.6	1	10/29/16 14:37	10/21/16	
Vanadium, Total	6010C	**11.9**	mg/Kg	5.1	0.2	1	10/25/16 23:32	10/21/16	
Zinc, Total	6010C	**40.7**	mg/Kg	2.0	0.2	1	10/25/16 23:32	10/21/16	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/14/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610140837 IBC 7329	**Basis:**	Dry
Lab Code:	R1611059-005		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/Kg	5.9	0.4	1	10/25/16 23:38	10/21/16	
Arsenic, Total	6010C	**4.49**	mg/Kg	0.98	0.24	1	10/29/16 14:40	10/21/16	
Barium, Total	6010C	**83.3**	mg/Kg	2.0	0.2	1	10/25/16 23:38	10/21/16	
Beryllium, Total	6010C	**0.48**	mg/Kg	0.29	0.02	1	10/25/16 23:38	10/21/16	
Cadmium, Total	6010C	**0.30 J**	mg/Kg	0.49	0.04	1	10/25/16 23:38	10/21/16	
Chromium, Total	6010C	**9.03**	mg/Kg	0.98	0.13	1	10/25/16 23:38	10/21/16	
Lead, Total	6010C	**8.7**	mg/Kg	4.9	0.3	1	10/25/16 23:38	10/21/16	
Mercury, Total	7471B	ND U	mg/Kg	5.7	0.6	1	10/25/16 13:54	10/21/16	
Nickel, Total	6010C	**8.8**	mg/Kg	3.9	0.2	1	10/25/16 23:38	10/21/16	
Selenium, Total	6010C	ND U	mg/Kg	0.98	0.60	1	10/25/16 23:38	10/21/16	
Silver, Total	6010C	ND U	mg/Kg	0.98	0.44	1	10/25/16 23:38	10/21/16	
Thallium, Total	6010C	**1.92**	mg/Kg	0.98	0.51	1	10/29/16 14:40	10/21/16	
Vanadium, Total	6010C	**15.1**	mg/Kg	4.9	0.2	1	10/25/16 23:38	10/21/16	
Zinc, Total	6010C	**38.1**	mg/Kg	2.0	0.2	1	10/25/16 23:38	10/21/16	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/14/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610140842 IBC 7338	**Basis:**	Dry
Lab Code:	R1611059-008		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/Kg	6.0	0.4	1	10/25/16 23:44	10/21/16	
Arsenic, Total	6010C	**5.5**	mg/Kg	1.0	0.3	1	10/29/16 14:44	10/21/16	
Barium, Total	6010C	**86.4**	mg/Kg	2.0	0.2	1	10/25/16 23:44	10/21/16	
Beryllium, Total	6010C	**0.47**	mg/Kg	0.30	0.02	1	10/25/16 23:44	10/21/16	
Cadmium, Total	6010C	**0.35 J**	mg/Kg	0.50	0.04	1	10/25/16 23:44	10/21/16	
Chromium, Total	6010C	**10.9**	mg/Kg	1.0	0.2	1	10/25/16 23:44	10/21/16	
Lead, Total	6010C	**8.4**	mg/Kg	5.0	0.3	1	10/25/16 23:44	10/21/16	
Mercury, Total	7471B	ND U	mg/Kg	5.3	0.5	1	10/25/16 13:55	10/21/16	
Nickel, Total	6010C	**9.7**	mg/Kg	4.0	0.2	1	10/25/16 23:44	10/21/16	
Selenium, Total	6010C	ND U	mg/Kg	1.0	0.6	1	10/25/16 23:44	10/21/16	
Silver, Total	6010C	**0.7 J**	mg/Kg	1.0	0.5	1	10/25/16 23:44	10/21/16	
Thallium, Total	6010C	**2.0**	mg/Kg	1.0	0.6	1	10/29/16 14:44	10/21/16	
Vanadium, Total	6010C	**13.5**	mg/Kg	5.0	0.2	1	10/25/16 23:44	10/21/16	
Zinc, Total	6010C	**43.8**	mg/Kg	2.0	0.2	1	10/25/16 23:44	10/21/16	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130856 IBC 7321	**Basis:**	Dry
Lab Code:	R1611059-012		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/Kg	6.1	0.5	1	10/25/16 23:50	10/21/16	
Arsenic, Total	6010C	**5.8**	mg/Kg	1.0	0.3	1	10/29/16 14:53	10/21/16	
Barium, Total	6010C	**178**	mg/Kg	2.0	0.2	1	10/25/16 23:50	10/21/16	
Beryllium, Total	6010C	**0.47**	mg/Kg	0.31	0.02	1	10/25/16 23:50	10/21/16	
Cadmium, Total	6010C	**0.53**	mg/Kg	0.51	0.04	1	10/25/16 23:50	10/21/16	
Chromium, Total	6010C	**7.2**	mg/Kg	1.0	0.2	1	10/25/16 23:50	10/21/16	
Lead, Total	6010C	**9.8**	mg/Kg	5.1	0.3	1	10/25/16 23:50	10/21/16	
Mercury, Total	7471B	ND U	mg/Kg	5.2	0.5	1	10/25/16 13:57	10/21/16	
Nickel, Total	6010C	**9.1**	mg/Kg	4.1	0.2	1	10/25/16 23:50	10/21/16	
Selenium, Total	6010C	ND U	mg/Kg	1.0	0.7	1	10/25/16 23:50	10/21/16	
Silver, Total	6010C	ND U	mg/Kg	1.0	0.5	1	10/25/16 23:50	10/21/16	
Thallium, Total	6010C	**3.9**	mg/Kg	1.0	0.6	1	10/29/16 14:53	10/21/16	
Vanadium, Total	6010C	**14.1**	mg/Kg	5.1	0.2	1	10/25/16 23:50	10/21/16	
Zinc, Total	6010C	**49.4**	mg/Kg	2.0	0.2	1	10/25/16 23:50	10/21/16	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130857 IBC 7321	**Basis:**	Dry
Lab Code:	R1611059-013		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/Kg	6.1	0.5	1	10/26/16 00:21	10/21/16	
Arsenic, Total	6010C	**5.5**	mg/Kg	1.0	0.3	1	10/29/16 15:09	10/21/16	
Barium, Total	6010C	**170**	mg/Kg	2.0	0.2	1	10/26/16 00:21	10/21/16	
Beryllium, Total	6010C	**0.47**	mg/Kg	0.31	0.02	1	10/26/16 00:21	10/21/16	
Cadmium, Total	6010C	**0.38 J**	mg/Kg	0.51	0.04	1	10/26/16 00:21	10/21/16	
Chromium, Total	6010C	**6.5**	mg/Kg	1.0	0.2	1	10/26/16 00:21	10/21/16	
Lead, Total	6010C	**16.3**	mg/Kg	5.1	0.3	1	10/26/16 00:21	10/21/16	
Mercury, Total	7471B	ND U	mg/Kg	5.5	0.5	1	10/25/16 14:02	10/21/16	
Nickel, Total	6010C	**8.2**	mg/Kg	4.1	0.2	1	10/26/16 00:21	10/21/16	
Selenium, Total	6010C	ND U	mg/Kg	1.0	0.7	1	10/26/16 00:21	10/21/16	
Silver, Total	6010C	ND U	mg/Kg	1.0	0.5	1	10/26/16 00:21	10/21/16	
Thallium, Total	6010C	**3.1**	mg/Kg	1.0	0.6	1	10/29/16 15:09	10/21/16	
Vanadium, Total	6010C	**12.7**	mg/Kg	5.1	0.2	1	10/26/16 00:21	10/21/16	
Zinc, Total	6010C	**44.7**	mg/Kg	2.0	0.2	1	10/26/16 00:21	10/21/16	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130907 IBC 7322	**Basis:**	Dry
Lab Code:	R1611059-017		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/Kg	5.8	0.4	1	10/26/16 00:39	10/21/16	
Arsenic, Total	6010C	**4.20**	mg/Kg	0.97	0.24	1	10/29/16 15:12	10/21/16	
Barium, Total	6010C	**89.0**	mg/Kg	1.9	0.2	1	10/26/16 00:39	10/21/16	
Beryllium, Total	6010C	**0.41**	mg/Kg	0.29	0.02	1	10/26/16 00:39	10/21/16	
Cadmium, Total	6010C	**0.33 J**	mg/Kg	0.48	0.04	1	10/26/16 00:39	10/21/16	
Chromium, Total	6010C	**8.41**	mg/Kg	0.97	0.13	1	10/26/16 00:39	10/21/16	
Lead, Total	6010C	**6.4**	mg/Kg	4.8	0.3	1	10/26/16 00:39	10/21/16	
Mercury, Total	7471B	ND U	mg/Kg	5.3	0.5	1	10/25/16 14:07	10/21/16	
Nickel, Total	6010C	**6.6**	mg/Kg	3.9	0.2	1	10/26/16 00:39	10/21/16	
Selenium, Total	6010C	ND U	mg/Kg	0.97	0.60	1	10/26/16 00:39	10/21/16	
Silver, Total	6010C	ND U	mg/Kg	0.97	0.44	1	10/26/16 00:39	10/21/16	
Thallium, Total	6010C	**2.48**	mg/Kg	0.97	0.51	1	10/29/16 15:12	10/21/16	
Vanadium, Total	6010C	**13.7**	mg/Kg	4.8	0.2	1	10/26/16 00:39	10/21/16	
Zinc, Total	6010C	**29.9**	mg/Kg	1.9	0.2	1	10/26/16 00:39	10/21/16	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130917 IBC 7326	**Basis:**	Dry
Lab Code:	R1611059-020		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/Kg	6.1	0.5	1	10/26/16 00:45	10/21/16	
Arsenic, Total	6010C	**5.2**	mg/Kg	1.0	0.3	1	10/29/16 15:15	10/21/16	
Barium, Total	6010C	**127**	mg/Kg	2.0	0.2	1	10/26/16 00:45	10/21/16	
Beryllium, Total	6010C	**0.43**	mg/Kg	0.31	0.02	1	10/26/16 00:45	10/21/16	
Cadmium, Total	6010C	**0.40 J**	mg/Kg	0.51	0.04	1	10/26/16 00:45	10/21/16	
Chromium, Total	6010C	**9.7**	mg/Kg	1.0	0.2	1	10/26/16 00:45	10/21/16	
Lead, Total	6010C	**9.4**	mg/Kg	5.1	0.3	1	10/26/16 00:45	10/21/16	
Mercury, Total	7471B	ND U	mg/Kg	5.3	0.5	1	10/25/16 14:09	10/21/16	
Nickel, Total	6010C	**8.4**	mg/Kg	4.1	0.2	1	10/26/16 00:45	10/21/16	
Selenium, Total	6010C	**0.9 J**	mg/Kg	1.0	0.7	1	10/26/16 00:45	10/21/16	
Silver, Total	6010C	ND U	mg/Kg	1.0	0.5	1	10/26/16 00:45	10/21/16	
Thallium, Total	6010C	**2.7**	mg/Kg	1.0	0.6	1	10/29/16 15:15	10/21/16	
Vanadium, Total	6010C	**12.9**	mg/Kg	5.1	0.2	1	10/26/16 00:45	10/21/16	
Zinc, Total	6010C	**46.6**	mg/Kg	2.0	0.2	1	10/26/16 00:45	10/21/16	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130942 IBC 7327	**Basis:**	Dry
Lab Code:	R1611059-023		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/Kg	6.1	0.5	1	10/26/16 00:51	10/21/16	
Arsenic, Total	6010C	**5.7**	mg/Kg	1.0	0.3	1	10/29/16 15:18	10/21/16	
Barium, Total	6010C	**643**	mg/Kg	2.0	0.2	1	10/26/16 00:51	10/21/16	
Beryllium, Total	6010C	**0.46**	mg/Kg	0.31	0.02	1	10/26/16 00:51	10/21/16	
Cadmium, Total	6010C	**0.41 J**	mg/Kg	0.51	0.04	1	10/26/16 00:51	10/21/16	
Chromium, Total	6010C	**8.4**	mg/Kg	1.0	0.2	1	10/26/16 00:51	10/21/16	
Lead, Total	6010C	**9.0**	mg/Kg	5.1	0.3	1	10/26/16 00:51	10/21/16	
Mercury, Total	7471B	ND U	mg/Kg	5.5	0.5	1	10/25/16 14:10	10/21/16	
Nickel, Total	6010C	**9.3**	mg/Kg	4.1	0.2	1	10/26/16 00:51	10/21/16	
Selenium, Total	6010C	ND U	mg/Kg	1.0	0.7	1	10/26/16 00:51	10/21/16	
Silver, Total	6010C	ND U	mg/Kg	1.0	0.5	1	10/26/16 00:51	10/21/16	
Thallium, Total	6010C	**2.9**	mg/Kg	1.0	0.6	1	10/29/16 15:18	10/21/16	
Vanadium, Total	6010C	**17.8**	mg/Kg	5.1	0.2	1	10/26/16 00:51	10/21/16	
Zinc, Total	6010C	**43.1**	mg/Kg	2.0	0.2	1	10/26/16 00:51	10/21/16	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130947 IBC 7331	**Basis:**	Dry
Lab Code:	R1611059-026		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/Kg	5.9	0.4	1	10/26/16 00:57	10/21/16	
Arsenic, Total	6010C	**4.24**	mg/Kg	0.99	0.24	1	10/29/16 15:21	10/21/16	
Barium, Total	6010C	**53.4**	mg/Kg	2.0	0.2	1	10/26/16 00:57	10/21/16	
Beryllium, Total	6010C	**0.42**	mg/Kg	0.30	0.02	1	10/26/16 00:57	10/21/16	
Cadmium, Total	6010C	**0.40 J**	mg/Kg	0.49	0.04	1	10/26/16 00:57	10/21/16	
Chromium, Total	6010C	**10.3**	mg/Kg	0.99	0.13	1	10/26/16 00:57	10/21/16	
Lead, Total	6010C	**9.5**	mg/Kg	4.9	0.3	1	10/26/16 00:57	10/21/16	
Mercury, Total	7471B	ND U	mg/Kg	5.2	0.5	1	10/25/16 14:12	10/21/16	
Nickel, Total	6010C	**9.0**	mg/Kg	3.9	0.2	1	10/26/16 00:57	10/21/16	
Selenium, Total	6010C	ND U	mg/Kg	0.99	0.60	1	10/26/16 00:57	10/21/16	
Silver, Total	6010C	ND U	mg/Kg	0.99	0.44	1	10/26/16 00:57	10/21/16	
Thallium, Total	6010C	**2.11**	mg/Kg	0.99	0.51	1	10/29/16 15:21	10/21/16	
Vanadium, Total	6010C	**14.8**	mg/Kg	4.9	0.2	1	10/26/16 00:57	10/21/16	
Zinc, Total	6010C	**37.3**	mg/Kg	2.0	0.2	1	10/26/16 00:57	10/21/16	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130952 IBC 7328	**Basis:**	Dry
Lab Code:	R1611059-029		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Q	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND	U	mg/Kg	6.0	0.4	1	10/26/16 01:04	10/21/16	
Arsenic, Total	6010C	**5.91**		mg/Kg	1.0	0.24	1	10/29/16 15:31	10/21/16	
Barium, Total	6010C	**63.1**		mg/Kg	2.0	0.2	1	10/26/16 01:04	10/21/16	
Beryllium, Total	6010C	**0.46**		mg/Kg	0.30	0.02	1	10/26/16 01:04	10/21/16	
Cadmium, Total	6010C	**0.41**	**J**	mg/Kg	0.50	0.04	1	10/26/16 01:04	10/21/16	
Chromium, Total	6010C	**11.9**		mg/Kg	1.0	0.13	1	10/26/16 01:04	10/21/16	
Lead, Total	6010C	**10.3**		mg/Kg	5.0	0.3	1	10/26/16 01:04	10/21/16	
Mercury, Total	7471B	ND	U	mg/Kg	5.6	0.6	1	10/25/16 14:13	10/21/16	
Nickel, Total	6010C	**9.9**		mg/Kg	4.0	0.2	1	10/26/16 01:04	10/21/16	
Selenium, Total	6010C	ND	U	mg/Kg	1.0	0.60	1	10/26/16 01:04	10/21/16	
Silver, Total	6010C	ND	U	mg/Kg	1.0	0.44	1	10/26/16 01:04	10/21/16	
Thallium, Total	6010C	**2.49**		mg/Kg	1.0	0.51	1	10/29/16 15:31	10/21/16	
Vanadium, Total	6010C	**14.2**		mg/Kg	5.0	0.2	1	10/26/16 01:04	10/21/16	
Zinc, Total	6010C	**41.3**		mg/Kg	2.0	0.2	1	10/26/16 01:04	10/21/16	

General Chemistry

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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/14/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610140830 IBC 7330	**Basis:**	As Received
Lab Code:	R1611059-001		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**97.2**	Percent	-	1	10/25/16 17:25	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/14/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610140832 IBC 7330	**Basis:**	As Received
Lab Code:	R1611059-002		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**97.6**	Percent	-	-	1	10/25/16 17:25	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/14/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610140835 IBC 7329	**Basis:**	As Received
Lab Code:	R1611059-004		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**97.2**	Percent	-	1	10/25/16 17:25	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/14/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610140837 IBC 7329	**Basis:**	As Received
Lab Code:	R1611059-005		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**97.1**	Percent	-	-	1	10/25/16 17:25	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/14/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610140840 IBC 7338	**Basis:**	As Received
Lab Code:	R1611059-007		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**95.8**	Percent	-	1	10/25/16 17:25	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/14/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610140842 IBC 7338	**Basis:**	As Received
Lab Code:	R1611059-008		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**96.1**	Percent	-	-	1	10/25/16 17:25	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130850 IBC 7321	**Basis:**	As Received
Lab Code:	R1611059-010		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**98.0**	Percent	-	1	10/25/16 17:25	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130851 IBC 7321	**Basis:**	As Received
Lab Code:	R1611059-011		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**97.8**	Percent	-	1	10/25/16 17:25	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130856 IBC 7321	**Basis:**	As Received
Lab Code:	R1611059-012		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**97.9**	Percent	-	-	1	10/25/16 17:25	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130857 IBC 7321	**Basis:**	As Received
Lab Code:	R1611059-013		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**97.7**	Percent	-	-	1	10/25/16 17:25	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130905 IBC 7322	**Basis:**	As Received
Lab Code:	R1611059-016		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**98.7**	Percent	-	1	10/25/16 17:25	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130907 IBC 7322	**Basis:**	As Received
Lab Code:	R1611059-017		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**98.2**	Percent	-	-	1	10/25/16 17:25	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130915 IBC 7326	**Basis:**	As Received
Lab Code:	R1611059-019		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**96.5**	Percent	-	1	10/25/16 17:25	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130917 IBC 7326	**Basis:**	As Received
Lab Code:	R1611059-020		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**96.2**	Percent	-	-	1	10/25/16 17:25	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130940 IBC 7327	**Basis:**	As Received
Lab Code:	R1611059-022		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**97.9**	Percent	-	1	10/25/16 17:25	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130942 IBC 7327	**Basis:**	As Received
Lab Code:	R1611059-023		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**98.0**	Percent	-	-	1	10/25/16 17:25	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130945 IBC 7331	**Basis:**	As Received
Lab Code:	R1611059-025		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**97.7**	Percent	-	1	10/25/16 17:25	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130947 IBC 7331	**Basis:**	As Received
Lab Code:	R1611059-026		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**97.5**	Percent	-	-	1	10/25/16 17:25	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130950 IBC 7328	**Basis:**	As Received
Lab Code:	R1611059-028		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**97.8**	Percent	-	1	10/25/16 17:25	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16 09:50
Sample Name:	1610130952 IBC 7328	**Basis:**	As Received
Lab Code:	R1611059-029		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**97.5**	Percent	-	-	1	10/25/16 17:25	

QC Summary Forms

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Volatile Organic Compounds by GC/MS

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client: NASA/WSTF/Navarro **Service Request:** R1611059
Project: White Sands Test Facility/15EC007B
Sample Matrix: Soil

SURROGATE RECOVERY SUMMARY
Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Extraction Method: EPA 5030C

Sample Name	Lab Code	4-Bromofluorobenzene 51 - 136	Dibromofluoromethane 63 - 138	Toluene-d8 66 - 138
1610140830 IBC 7330	R1611059-001	99	95	96
1610140835 IBC 7329	R1611059-004	97	96	96
1610140840 IBC 7338	R1611059-007	95	92	93
1610130850 IBC 7321	R1611059-010	94	94	94
1610130851 IBC 7321	R1611059-011	92	92	94
1610130905 IBC 7322	R1611059-016	96	93	94
1610130915 IBC 7326	R1611059-019	95	94	93
1610130940 IBC 7327	R1611059-022	97	92	94
1610130945 IBC 7331	R1611059-025	95	92	95
1610130950 IBC 7328	R1611059-028	94	90	91
Method Blank	RQ1613053-01	95	94	93
Lab Control Sample	RQ1613053-02	98	98	95
1610130850 IBC 7321 MS	RQ1613053-05	97	96	95
1610130850 IBC 7321 DMS	RQ1613053-06	96	94	92

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16
		Date Analyzed:	10/25/16
		Date Extracted:	NA

Duplicate Matrix Spike Summary
Volatile Organic Compounds by GC/MS, Unpreserved

Sample Name:	1610130850 IBC 7321	**Units:**	ug/Kg
Lab Code:	R1611059-010	**Basis:**	Dry
Analysis Method:	8260C		
Prep Method:	EPA 5030C		

		Matrix Spike RQ1613053-05			Duplicate Matrix Spike RQ1613053-06					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
1,1,1,2-Tetrachloroethane	ND U	37.4	51.0	73	40.4	51.0	79	52-133	8	30
1,1,1-Trichloroethane (TCA)	ND U	36.5	51.0	71	38.6	51.0	76	51-132	7	30
1,1,2,2-Tetrachloroethane	ND U	36.1	51.0	71	36.9	51.0	72	53-134	1	30
1,1,2-Trichloroethane	ND U	39.6	51.0	78	42.4	51.0	83	62-126	6	30
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	35.6	51.0	70	36.9	51.0	72	45-136	3	30
1,1-Dichloroethene (1,1-DCE)	ND U	37.3	51.0	73	39.6	51.0	78	61-139	7	30
1,2,3-Trichloropropane	ND U	39.9	51.0	78	40.3	51.0	79	22-167	1	30
1,2-Dibromo-3-chloropropane (DBCP)	ND U	40.7	51.0	80	42.5	51.0	83	27-163	4	30
1,2-Dibromoethane	ND U	40.0	51.0	78	42.0	51.0	82	52-137	5	30
1,2-Dichlorobenzene	ND U	37.5	51.0	73	38.9	51.0	76	22-156	4	30
1,2-Dichloroethane	ND U	38.2	51.0	75	40.5	51.0	79	59-125	5	30
1,2-Dichloropropane	ND U	37.7	51.0	74	39.9	51.0	78	67-126	5	30
1,3-Dichlorobenzene	ND U	36.9	51.0	72	37.9	51.0	74	29-146	3	30
1,4-Dioxane	ND U	766	1020	75	817	1020	80	50-148	6	30
2-Butanone (MEK)	ND U	44.2	51.0	87	42.9	51.0	84	43-134	4	30
2-Chloro-1,3-butadiene	ND U	36.8	51.0	72	39.1	51.0	77	45-134	7	30
2-Chloroethyl Vinyl Ether	ND U	25.5	51.0	50	30.3	51.0	59	37-150	17	30
Isobutyl Alcohol	ND U	731	1020	72	754	1020	74	39-146	3	30
Allyl Chloride	ND U	35.0	51.0	69	38.1	51.0	75	34-135	8	30
4-Methyl-2-pentanone	ND U	41.9	51.0	82	41.4	51.0	81	47-145	1	30
Acetone	ND U	60.0	51.0	118	54.5	51.0	107	11-183	10	30
Acetonitrile	ND U	253	255	99	165	255	65	28-146	41*	30
Acrolein	ND U	88.9	102	87	92.1	102	90	10-172	3	30
Acrylonitrile	ND U	206	255	81	204	255	80	46-139	1	30
Benzene	ND U	37.4	51.0	73	39.2	51.0	77	63-126	5	30
Bromodichloromethane	ND U	36.6	51.0	72	39.4	51.0	77	47-141	7	30
Bromoform	ND U	43.8	51.0	86	46.3	51.0	91	26-157	6	30
Bromomethane	ND U	37.7	51.0	74	33.5	51.0	66	10-137	11	30
Carbon Disulfide	ND U	36.1	51.0	71	40.6	51.0	80	35-135	12	30
Carbon Tetrachloride	ND U	34.9	51.0	68	38.7	51.0	76	46-137	11	30
Chlorobenzene	ND U	37.4	51.0	73	39.3	51.0	77	51-132	5	30
Chloroethane	ND U	43.3	51.0	85	39.9	51.0	78	45-132	9	30
Chloroform	ND U	37.1	51.0	73	40.0	51.0	78	61-124	7	30
Chloromethane	ND U	35.9	51.0	70	38.6	51.0	76	50-136	8	30
Dibromochloromethane	ND U	39.5	51.0	77	42.1	51.0	83	40-146	8	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16
		Date Analyzed:	10/25/16
		Date Extracted:	NA

Duplicate Matrix Spike Summary
Volatile Organic Compounds by GC/MS, Unpreserved

Sample Name:	1610130850 IBC 7321	**Units:**	ug/Kg
Lab Code:	R1611059-010	**Basis:**	Dry
Analysis Method:	8260C		
Prep Method:	EPA 5030C		

		Matrix Spike RQ1613053-05			Duplicate Matrix Spike RQ1613053-06					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Dibromomethane	ND U	39.3	51.0	77	41.2	51.0	81	61-122	5	30
Dichlorodifluoromethane (CFC 12)	ND U	35.1	51.0	69	37.4	51.0	73	44-138	6	30
Dichloromethane	ND U	37.9	51.0	74	40.3	51.0	79	64-120	7	30
Ethyl Methacrylate	ND U	38.0	51.0	74	40.6	51.0	79	17-166	7	30
Ethylbenzene	ND U	37.6	51.0	74	39.2	51.0	77	44-131	4	30
Iodomethane	ND U	21.3	51.0	42	33.5	51.0	66	10-160	44*	30
Methacrylonitrile	ND U	40.9	51.0	80	41.6	51.0	82	44-149	2	30
Methyl Methacrylate	ND U	39.7	51.0	78	41.1	51.0	81	41-162	4	30
Naphthalene	ND U	38.6	51.0	76	40.2	51.0	79	10-187	4	30
Propionitrile	ND U	212	255	83	214	255	84	46-144	1	30
Tetrachloroethene (PCE)	ND U	37.6	51.0	74	39.2	51.0	77	45-141	4	30
Toluene	ND U	37.0	51.0	73	39.1	51.0	77	50-140	5	30
Trichloroethene (TCE)	ND U	42.8	51.0	84	44.8	51.0	88	54-136	5	30
Trichlorofluoromethane (CFC 11)	ND U	38.1	51.0	75	39.2	51.0	77	47-129	3	30
Vinyl Chloride	ND U	41.4	51.0	81	44.1	51.0	86	53-128	6	30
cis-1,3-Dichloropropene	ND U	36.0	51.0	71	39.0	51.0	76	31-150	7	30
m,p-Xylenes	ND U	75.7	102	74	78.7	102	77	45-141	4	30
o-Xylene	ND U	37.9	51.0	74	39.9	51.0	78	46-139	5	30
trans-1,2-Dichloroethene	ND U	37.2	51.0	73	39.3	51.0	77	52-128	5	30
trans-1,3-Dichloropropene	ND U	37.0	51.0	73	40.4	51.0	79	23-160	8	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/Kg
Lab Code:	RQ1613053-01	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	5.0	0.83	1	10/25/16 15:07	
1,1,1-Trichloroethane (TCA)	ND U	5.0	0.73	1	10/25/16 15:07	
1,1,2,2-Tetrachloroethane	ND U	5.0	0.81	1	10/25/16 15:07	
1,1,2-Trichloroethane	ND U	5.0	0.73	1	10/25/16 15:07	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.0	1.3	1	10/25/16 15:07	
1,1-Dichloroethene (1,1-DCE)	ND U	5.0	1.3	1	10/25/16 15:07	
1,2,3-Trichloropropane	ND U	5.0	1.4	1	10/25/16 15:07	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.0	1.9	1	10/25/16 15:07	
1,2-Dibromoethane	ND U	5.0	1.3	1	10/25/16 15:07	
1,2-Dichlorobenzene	ND U	5.0	0.61	1	10/25/16 15:07	
1,2-Dichloroethane	ND U	5.0	0.61	1	10/25/16 15:07	
1,2-Dichloropropane	ND U	5.0	0.97	1	10/25/16 15:07	
1,3-Dichlorobenzene	ND U	5.0	0.63	1	10/25/16 15:07	
1,4-Dioxane	ND U	100	20	1	10/25/16 15:07	
2-Butanone (MEK)	ND U	5.0	2.3	1	10/25/16 15:07	
2-Chloro-1,3-butadiene	ND U	5.0	1.6	1	10/25/16 15:07	
2-Chloroethyl Vinyl Ether	ND U	5.0	1.8	1	10/25/16 15:07	
Isobutyl Alcohol	ND U	100	23	1	10/25/16 15:07	
Allyl Chloride	ND U	5.0	1.7	1	10/25/16 15:07	
4-Methyl-2-pentanone	ND U	5.0	0.98	1	10/25/16 15:07	
Acetone	ND U	5.0	2.9	1	10/25/16 15:07	
Acetonitrile	ND U	25	17	1	10/25/16 15:07	
Acrolein	ND U	25	3.5	1	10/25/16 15:07	
Acrylonitrile	ND U	25	6.5	1	10/25/16 15:07	
Benzene	ND U	5.0	0.29	1	10/25/16 15:07	
Bromodichloromethane	ND U	5.0	0.61	1	10/25/16 15:07	
Bromoform	ND U	5.0	0.93	1	10/25/16 15:07	
Bromomethane	ND U	5.0	1.4	1	10/25/16 15:07	
Carbon Disulfide	ND U	5.0	1.3	1	10/25/16 15:07	
Carbon Tetrachloride	ND U	5.0	0.92	1	10/25/16 15:07	
Chlorobenzene	ND U	5.0	0.29	1	10/25/16 15:07	
Chloroethane	ND U	5.0	2.9	1	10/25/16 15:07	
Chloroform	ND U	5.0	1.3	1	10/25/16 15:07	
Chloromethane	ND U	5.0	0.40	1	10/25/16 15:07	
Dibromochloromethane	ND U	5.0	0.73	1	10/25/16 15:07	
Dibromomethane	ND U	5.0	0.63	1	10/25/16 15:07	
Dichlorodifluoromethane (CFC 12)	ND U	5.0	1.9	1	10/25/16 15:07	
Dichloromethane	ND U	5.0	0.57	1	10/25/16 15:07	
Ethyl Methacrylate	ND U	5.0	0.75	1	10/25/16 15:07	
Ethylbenzene	ND U	5.0	0.23	1	10/25/16 15:07	
Iodomethane	ND U	10	1.2	1	10/25/16 15:07	
Methacrylonitrile	ND U	5.0	1.6	1	10/25/16 15:07	
Methyl Methacrylate	ND U	5.0	0.73	1	10/25/16 15:07	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/Kg
Lab Code:	RQ1613053-01	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	5.0	0.51	1	10/25/16 15:07	
Propionitrile	ND U	25	6.5	1	10/25/16 15:07	
Tetrachloroethene (PCE)	ND U	5.0	0.88	1	10/25/16 15:07	
Toluene	ND U	5.0	1.0	1	10/25/16 15:07	
Trichloroethene (TCE)	ND U	5.0	1.1	1	10/25/16 15:07	
Trichlorofluoromethane (CFC 11)	ND U	5.0	0.66	1	10/25/16 15:07	
Vinyl Chloride	ND U	5.0	1.9	1	10/25/16 15:07	
cis-1,3-Dichloropropene	ND U	5.0	0.90	1	10/25/16 15:07	
m,p-Xylenes	ND U	10	1.1	1	10/25/16 15:07	
o-Xylene	ND U	5.0	0.48	1	10/25/16 15:07	
trans-1,2-Dichloroethene	ND U	5.0	0.86	1	10/25/16 15:07	
trans-1,3-Dichloropropene	ND U	5.0	0.20	1	10/25/16 15:07	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	95	51 - 136	10/25/16 15:07	
Dibromofluoromethane	94	63 - 138	10/25/16 15:07	
Toluene-d8	93	66 - 138	10/25/16 15:07	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
	No Tentatively Identified Compounds Detected			

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/15EC007B
Sample Matrix: Soil

Service Request: R1611059
Date Analyzed: 10/25/16

Lab Control Sample Summary
Volatile Organic Compounds by GC/MS, Unpreserved

Units:ug/Kg
Basis: Dry

Lab Control Sample
RQ1613053-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
1,1,1,2-Tetrachloroethane	8260C	16.2	20.0	81	40-140
1,1,1-Trichloroethane (TCA)	8260C	16.1	20.0	80	40-140
1,1,2,2-Tetrachloroethane	8260C	17.3	20.0	86	40-140
1,1,2-Trichloroethane	8260C	17.1	20.0	86	40-140
1,1,2-Trichloro-1,2,2-trifluoroethane	8260C	15.0	20.0	75	40-140
1,1-Dichloroethene (1,1-DCE)	8260C	15.9	20.0	80	40-140
1,2,3-Trichloropropane	8260C	16.1	20.0	80	40-140
1,2-Dibromo-3-chloropropane (DBCP)	8260C	16.0	20.0	80	40-140
1,2-Dibromoethane	8260C	16.9	20.0	85	40-140
1,2-Dichlorobenzene	8260C	16.7	20.0	84	40-140
1,2-Dichloroethane	8260C	16.9	20.0	84	40-140
1,2-Dichloropropane	8260C	16.4	20.0	82	40-140
1,3-Dichlorobenzene	8260C	17.3	20.0	86	40-140
1,4-Dioxane	8260C	324	400	81	40-140
2-Butanone (MEK)	8260C	16.9	20.0	84	40-140
2-Chloro-1,3-butadiene	8260C	17.0	20.0	85	40-140
2-Chloroethyl Vinyl Ether	8260C	11.9	20.0	60	40-140
Isobutyl Alcohol	8260C	282	400	71	40-140
Allyl Chloride	8260C	15.9	20.0	80	40-140
4-Methyl-2-pentanone	8260C	16.1	20.0	80	40-140
Acetone	8260C	20.1	20.0	100	40-140
Acetonitrile	8260C	99.1	100	99	40-140
Acrolein	8260C	39.5	40.0	99	40-140
Acrylonitrile	8260C	79.4	100	79	40-140
Benzene	8260C	16.4	20.0	82	40-140
Bromodichloromethane	8260C	16.4	20.0	82	40-140
Bromoform	8260C	19.2	20.0	96	40-140
Bromomethane	8260C	16.6	20.0	83	40-140
Carbon Disulfide	8260C	18.4	20.0	92	40-140
Carbon Tetrachloride	8260C	15.4	20.0	77	40-140
Chlorobenzene	8260C	16.6	20.0	83	40-140
Chloroethane	8260C	16.9	20.0	84	40-140
Chloroform	8260C	16.4	20.0	82	40-140

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/15EC007B
Sample Matrix: Soil

Service Request: R1611059
Date Analyzed: 10/25/16

Lab Control Sample Summary
Volatile Organic Compounds by GC/MS, Unpreserved

Units: ug/Kg
Basis: Dry

Lab Control Sample
RQ1613053-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Chloromethane	8260C	16.1	20.0	81	40-140
Dibromochloromethane	8260C	16.8	20.0	84	40-140
Dibromomethane	8260C	16.6	20.0	83	40-140
Dichlorodifluoromethane (CFC 12)	8260C	15.0	20.0	75	40-140
Dichloromethane	8260C	16.7	20.0	83	40-140
Ethyl Methacrylate	8260C	15.8	20.0	79	40-140
Ethylbenzene	8260C	16.2	20.0	81	40-140
Iodomethane	8260C	17.0	20.0	85	40-140
Methacrylonitrile	8260C	16.3	20.0	81	40-140
Methyl Methacrylate	8260C	16.1	20.0	80	40-140
Naphthalene	8260C	17.3	20.0	87	40-140
Propionitrile	8260C	83.5	100	84	40-140
Tetrachloroethene (PCE)	8260C	16.0	20.0	80	40-140
Toluene	8260C	16.2	20.0	81	40-140
Trichloroethene (TCE)	8260C	16.4	20.0	82	40-140
Trichlorofluoromethane (CFC 11)	8260C	15.8	20.0	79	40-140
Vinyl Chloride	8260C	18.2	20.0	91	40-140
cis-1,3-Dichloropropene	8260C	16.4	20.0	82	40-140
m,p-Xylenes	8260C	32.8	40.0	82	40-140
o-Xylene	8260C	16.6	20.0	83	40-140
trans-1,2-Dichloroethene	8260C	16.7	20.0	83	40-140
trans-1,3-Dichloropropene	8260C	16.8	20.0	84	40-140

Metals

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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	Dry
Lab Code:	R1611059-MB		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	**0.5 J**	mg/Kg	6.0	0.4	1	10/25/16 21:19	10/21/16	
Arsenic, Total	6010C	ND U	mg/Kg	1.0	0.3	1	10/29/16 13:37	10/21/16	
Barium, Total	6010C	ND U	mg/Kg	2.0	0.2	1	10/25/16 21:19	10/21/16	
Beryllium, Total	6010C	ND U	mg/Kg	0.30	0.02	1	10/25/16 21:19	10/21/16	
Cadmium, Total	6010C	ND U	mg/Kg	0.50	0.04	1	10/25/16 21:19	10/21/16	
Chromium, Total	6010C	ND U	mg/Kg	1.0	0.2	1	10/25/16 21:19	10/21/16	
Lead, Total	6010C	ND U	mg/Kg	5.0	0.3	1	10/25/16 21:19	10/21/16	
Mercury, Total	7471B	ND U	mg/Kg	5.5	0.5	1	10/25/16 13:31	10/21/16	
Nickel, Total	6010C	**0.6 J**	mg/Kg	4.0	0.2	1	10/25/16 21:19	10/21/16	
Selenium, Total	6010C	ND U	mg/Kg	1.0	0.6	1	10/25/16 21:19	10/21/16	
Silver, Total	6010C	ND U	mg/Kg	1.0	0.5	1	10/25/16 21:19	10/21/16	
Thallium, Total	6010C	ND U	mg/Kg	1.0	0.6	1	10/29/16 13:37	10/21/16	
Vanadium, Total	6010C	ND U	mg/Kg	5.0	0.2	1	10/25/16 21:19	10/21/16	
Zinc, Total	6010C	**1.5 J**	mg/Kg	2.0	0.2	1	10/25/16 21:19	10/21/16	

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/15EC007B
Sample Matrix: Soil

Service Request:R1611059
Date Collected:10/13/16
Date Received:10/18/16
Date Analyzed:10/25/16 - 10/29/16

Matrix Spike Summary
Inorganic Parameters

Sample Name: 1610130856 IBC 7321
Lab Code: R1611059-012

Units:mg/Kg
Basis: Dry

Matrix Spike
R1611059-012MS

Analyte Name	Method	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Silver, Total	6010C	ND U	4.8	5.1	95	75-125
Arsenic, Total	6010C	5.8	9.7	4.1	95	75-125
Barium, Total	6010C	178	415	204	116	75-125
Beryllium, Total	6010C	0.47	5.04	5.11	89	75-125
Cadmium, Total	6010C	0.53	4.56	5.11	79	75-125
Chromium, Total	6010C	7.2	26.5	20.4	95	75-125
Mercury, Total	7471B	ND U	ND U	0.2	106	75-125
Nickel, Total	6010C	9.1	51.2	51.1	83	75-125
Lead, Total	6010C	9.8	51.9	51.1	82	75-125
Antimony, Total	6010C	ND U	42.9	51.1	84	75-125
Selenium, Total	6010C	ND U	93.2	103	90	75-125
Thallium, Total	6010C	3.9	199	204	95	75-125
Vanadium, Total	6010C	14.1	59.7	51.1	89	75-125
Zinc, Total	6010C	49.4	87.6	51.1	75	75-125

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16
		Date Analyzed:	10/25/16 - 10/29/16

Replicate Sample Summary
Inorganic Parameters

Sample Name:	1610130856 IBC 7321	**Units:**	mg/Kg
Lab Code:	R1611059-012	**Basis:**	Dry

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample R1611059-012DUP Result	Average	RPD	RPD Limit
Antimony, Total	6010C	6.1	0.5	ND U	ND U	NC	NC	20
Arsenic, Total	6010C	1.0	0.3	5.8	4.8	5.31	20	20
Barium, Total	6010C	2.0	0.2	178	165	171	7	20
Beryllium, Total	6010C	0.31	0.02	0.47	0.45	0.462	5	20
Cadmium, Total	6010C	0.51	0.04	0.53	0.36 J	0.443	39 *	20
Chromium, Total	6010C	1.0	0.2	7.2	7.0	7.08	3	20
Lead, Total	6010C	5.1	0.3	9.8	9.3	9.57	5	20
Mercury, Total	7471B	5.2	0.5	ND U	ND U	NC	NC	35
Nickel, Total	6010C	4.1	0.2	9.1	8.6	8.85	5	20
Selenium, Total	6010C	1.0	0.7	ND U	ND U	NC	NC	20
Silver, Total	6010C	1.0	0.5	ND U	ND U	NC	NC	20
Thallium, Total	6010C	1.0	0.6	3.9	2.5	3.22	44 *	20
Vanadium, Total	6010C	5.1	0.2	14.1	12.6	13.3	11	20
Zinc, Total	6010C	2.0	0.2	49.4	44.0	46.7	12	20

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Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/15EC007B
Sample Matrix: Soil

Service Request: R1611059
Date Analyzed: 10/25/16 - 10/29/16

Lab Control Sample Summary
Inorganic Parameters

Units:mg/Kg
Basis: Dry

Lab Control Sample
R1611059-LCS

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Antimony, Total	6010C	45.7	50.0	91	80-120
Arsenic, Total	6010C	3.6	4.0	89	80-120
Barium, Total	6010C	198	200	99	80-120
Beryllium, Total	6010C	4.51	5.00	90	80-120
Cadmium, Total	6010C	4.58	5.00	92	80-120
Chromium, Total	6010C	20.0	20.0	100	80-120
Lead, Total	6010C	46.6	50.0	93	80-120
Mercury, Total	7471B	ND U	0.2	100	80-120
Nickel, Total	6010C	48.9	50.0	98	80-120
Selenium, Total	6010C	86.0	101	85	80-120
Silver, Total	6010C	4.5	5.0	90	80-120
Thallium, Total	6010C	168	200	84	80-120
Vanadium, Total	6010C	47.8	50.0	96	80-120
Zinc, Total	6010C	50.6	50.0	101	80-120

General Chemistry

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QA/QC Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16
		Date Analyzed:	10/25/16

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	1610130850 IBC 7321	**Units:**	Percent
Lab Code:	R1611059-010	**Basis:**	As Received

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample R1611059-010DUP Result	Average	RPD	RPD Limit
Total Solids	ALS SOP	-	98.0	97.8	97.9	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16
		Date Analyzed:	10/25/16

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	1610130856 IBC 7321	**Units:**	Percent
Lab Code:	R1611059-012	**Basis:**	As Received

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample R1611059-012DUP Result	Average	RPD	RPD Limit
Total Solids	ALS SOP	-	-	97.9	98.1	98.0	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

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QA/QC Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611059
Project	White Sands Test Facility/15EC007B	**Date Collected:**	10/13/16
Sample Matrix:	Soil	**Date Received:**	10/18/16
		Date Analyzed:	10/25/16

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	1610130945 IBC 7331	**Units:**	Percent
Lab Code:	R1611059-025	**Basis:**	As Received

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample R1611059-025DUP Result	Average	RPD	RPD Limit
Total Solids	ALS SOP	-	97.7	97.6	97.7	<1	20

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Subcontracted Analytical Parameters

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

October 27, 2016

Reports and Invoices
ALS Environmental
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Rochester, NY 14623

Certificate of Analysis

Project Name:	**TCLP Metals - no J values**	Workorder:	**2183897**
Purchase Order:	**58R1611059**	Workorder ID:	**R1611059**

Dear Reports Invoices:

Enclosed are the analytical results for samples received by the laboratory on Friday, October 21, 2016.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Mr. Brad W Kintzer (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Ellen Smith , Ms. Janice Jaeger

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Mr. Brad W Kintzer
Project Coordinator

ALS Environmental

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

SAMPLE SUMMARY

Workorder: 2183897 R1611059

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2183897001	1610140833 IBC 7330	Solid	10/14/2016 00:00	10/21/2016 08:58	Collected by Client
2183897002	1610140838 IBC 7329	Solid	10/14/2016 00:00	10/21/2016 08:58	Collected by Client
2183897003	1610140843 IBC 7338	Solid	10/14/2016 00:00	10/21/2016 08:58	Collected by Client
2183897004	1610130859 IBC 7321	Solid	10/13/2016 00:00	10/21/2016 08:58	Collected by Client
2183897005	1610130900 IBC 7321	Solid	10/13/2016 00:00	10/21/2016 08:58	Collected by Client
2183897006	1610130908 IBC 7322	Solid	10/13/2016 00:00	10/21/2016 08:58	Collected by Client
2183897007	1610130918 IBC 7326	Solid	10/13/2016 00:00	10/21/2016 08:58	Collected by Client
2183897008	1610130943 IBC 7327	Solid	10/13/2016 00:00	10/21/2016 08:58	Collected by Client
2183897009	1610130948 IBC 7331	Solid	10/13/2016 00:00	10/21/2016 08:58	Collected by Client
2183897010	1610130953 IBC 7328	Solid	10/13/2016 00:00	10/21/2016 08:58	Collected by Client

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SAMPLE SUMMARY

Workorder: 2183897 R1611059

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.
-- For microbiological analyses, the "Prepared" value is the date/time into the incurbator and the "Analyzed" value is the date/time out the incubator.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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ANALYTICAL RESULTS

Workorder: 2183897 R1611059

Lab ID: **2183897001** Date Collected: 10/14/2016 00:00 Matrix: Solid

Sample ID: **1610140833 IBC 7330** Date Received: 10/21/2016 08:58

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
WET CHEMISTRY										
Moisture	2.9		%	0.1	S2540G-11			10/24/16 14:23	VKB	
Total Solids	97.1		%	0.1	S2540G-11			10/24/16 14:23	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:52	TSS	A
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:52	TSS	A
Barium, Total	ND		mg/L	2.8	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:52	TSS	A
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:52	TSS	A
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:52	TSS	A
Chromium, Total	0.064		mg/L	0.028	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:52	TSS	A
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:52	TSS	A
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/25/16 02:30	MNP	10/25/16 08:58	MNP	A1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:52	TSS	A
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:52	TSS	A
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:52	TSS	A
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:52	TSS	A
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:52	TSS	A
Zinc, Total	0.31		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:52	TSS	A

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Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2183897 R1611059

Lab ID: **2183897002** Date Collected: 10/14/2016 00:00 Matrix: Solid

Sample ID: **1610140838 IBC 7329** Date Received: 10/21/2016 08:58

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	2.5		%	0.1	S2540G-11			10/24/16 14:23	VKB	
Total Solids	97.5		%	0.1	S2540G-11			10/24/16 14:23	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:56	TSS	A
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:56	TSS	A
Barium, Total	ND		mg/L	2.8	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:56	TSS	A
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:56	TSS	A
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:56	TSS	A
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:56	TSS	A
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:56	TSS	A
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/25/16 02:30	MNP	10/25/16 08:59	MNP	A1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:56	TSS	A
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:56	TSS	A
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:56	TSS	A
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:56	TSS	A
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:56	TSS	A
Zinc, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 17:56	TSS	A

Mr. Brad W Kintzer
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ANALYTICAL RESULTS

Workorder: 2183897 R1611059

Lab ID: **2183897003** Date Collected: 10/14/2016 00:00 Matrix: Solid

Sample ID: **1610140843 IBC 7338** Date Received: 10/21/2016 08:58

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	3.7		%	0.1	S2540G-11			10/24/16 14:23	VKB	
Total Solids	96.3		%	0.1	S2540G-11			10/24/16 14:23	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:00	TSS	A
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:00	TSS	A
Barium, Total	ND		mg/L	2.8	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:00	TSS	A
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:00	TSS	A
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:00	TSS	A
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:00	TSS	A
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:00	TSS	A
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/25/16 02:30	MNP	10/25/16 09:00	MNP	A1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:00	TSS	A
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:00	TSS	A
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:00	TSS	A
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:00	TSS	A
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:00	TSS	A
Zinc, Total	0.12		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:00	TSS	A

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ANALYTICAL RESULTS

Workorder: 2183897 R1611059

Lab ID: **2183897004** Date Collected: 10/13/2016 00:00 Matrix: Solid

Sample ID: **1610130859 IBC 7321** Date Received: 10/21/2016 08:58

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
WET CHEMISTRY										
Moisture	2.3		%	0.1	S2540G-11			10/24/16 14:23	VKB	
Total Solids	97.7		%	0.1	S2540G-11			10/24/16 14:23	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:09	TSS	A
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:09	TSS	A
Barium, Total	3.8		mg/L	2.8	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:09	TSS	A
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:09	TSS	A
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:09	TSS	A
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:09	TSS	A
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:09	TSS	A
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/25/16 02:30	MNP	10/25/16 09:02	MNP	A1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:09	TSS	A
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:09	TSS	A
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:09	TSS	A
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:09	TSS	A
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:09	TSS	A
Zinc, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:09	TSS	A

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ANALYTICAL RESULTS

Workorder: 2183897 R1611059

Lab ID: **2183897005** Date Collected: 10/13/2016 00:00 Matrix: Solid

Sample ID: **1610130900 IBC 7321** Date Received: 10/21/2016 08:58

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	2.0		%	0.1	S2540G-11			10/24/16 14:23	VKB	
Total Solids	98.0		%	0.1	S2540G-11			10/24/16 14:23	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:04	TSS	A
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:04	TSS	A
Barium, Total	3.5		mg/L	2.8	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:04	TSS	A
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:04	TSS	A
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:04	TSS	A
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:04	TSS	A
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:04	TSS	A
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/25/16 02:30	MNP	10/25/16 09:05	MNP	A1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:04	TSS	A
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:04	TSS	A
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:04	TSS	A
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:04	TSS	A
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:04	TSS	A
Zinc, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:04	TSS	A

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ANALYTICAL RESULTS

Workorder: 2183897 R1611059

Lab ID: **2183897006** Date Collected: 10/13/2016 00:00 Matrix: Solid

Sample ID: **1610130908 IBC 7322** Date Received: 10/21/2016 08:58

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
WET CHEMISTRY										
Moisture	1.7		%	0.1	S2540G-11			10/24/16 14:23	VKB	
Total Solids	98.3		%	0.1	S2540G-11			10/24/16 14:23	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:20	TSS	A
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:20	TSS	A
Barium, Total	ND		mg/L	2.8	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:20	TSS	A
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:20	TSS	A
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:20	TSS	A
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:20	TSS	A
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:20	TSS	A
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/25/16 02:30	MNP	10/25/16 09:06	MNP	A1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:20	TSS	A
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:20	TSS	A
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:20	TSS	A
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:20	TSS	A
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:20	TSS	A
Zinc, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 10:35	OTD	10/26/16 18:20	TSS	A

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ANALYTICAL RESULTS

Workorder: 2183897 R1611059

Lab ID: **2183897007** Date Collected: 10/13/2016 00:00 Matrix: Solid

Sample ID: **1610130918 IBC 7326** Date Received: 10/21/2016 08:58

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	3.1		%	0.1	S2540G-11			10/24/16 14:23	VKB	
Total Solids	96.9		%	0.1	S2540G-11			10/24/16 14:23	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:51	TSS	A3
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:51	TSS	A3
Barium, Total	ND		mg/L	2.8	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:51	TSS	A3
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:51	TSS	A3
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:51	TSS	A3
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:51	TSS	A3
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:51	TSS	A3
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/25/16 02:30	MNP	10/25/16 09:07	MNP	A1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:51	TSS	A3
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:51	TSS	A3
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:51	TSS	A3
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:51	TSS	A3
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:51	TSS	A3
Zinc, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:51	TSS	A3

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ANALYTICAL RESULTS

Workorder: 2183897 R1611059

Lab ID: **2183897008** Date Collected: 10/13/2016 00:00 Matrix: Solid

Sample ID: **1610130943 IBC 7327** Date Received: 10/21/2016 08:58

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	2.3		%	0.1	S2540G-11			10/24/16 14:23	VKB	
Total Solids	97.7		%	0.1	S2540G-11			10/24/16 14:23	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:55	TSS	A3
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:55	TSS	A3
Barium, Total	4.6		mg/L	2.8	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:55	TSS	A3
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:55	TSS	A3
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:55	TSS	A3
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:55	TSS	A3
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:55	TSS	A3
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/25/16 02:30	MNP	10/25/16 09:08	MNP	A1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:55	TSS	A3
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:55	TSS	A3
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:55	TSS	A3
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:55	TSS	A3
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:55	TSS	A3
Zinc, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:55	TSS	A3

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ANALYTICAL RESULTS

Workorder: 2183897 R1611059

Lab ID: **2183897009** Date Collected: 10/13/2016 00:00 Matrix: Solid

Sample ID: **1610130948 IBC 7331** Date Received: 10/21/2016 08:58

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	2.8		%	0.1	S2540G-11			10/24/16 14:23	VKB	
Total Solids	97.2		%	0.1	S2540G-11			10/24/16 14:23	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:59	TSS	A3
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:59	TSS	A3
Barium, Total	ND		mg/L	2.8	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:59	TSS	A3
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:59	TSS	A3
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:59	TSS	A3
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:59	TSS	A3
Lead, Total	0.084		mg/L	0.033	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:59	TSS	A3
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/25/16 02:30	MNP	10/25/16 09:11	MNP	A1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:59	TSS	A3
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:59	TSS	A3
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:59	TSS	A3
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:59	TSS	A3
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:59	TSS	A3
Zinc, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 08:25	OTD	10/26/16 18:59	TSS	A3

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ANALYTICAL RESULTS

Workorder: 2183897 R1611059

Lab ID: **2183897010** Date Collected: 10/13/2016 00:00 Matrix: Solid

Sample ID: **1610130953 IBC 7328** Date Received: 10/21/2016 08:58

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
WET CHEMISTRY										
Moisture	2.7		%	0.1	S2540G-11			10/24/16 14:23	VKB	
Total Solids	97.3		%	0.1	S2540G-11			10/24/16 14:23	VKB	
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	10/25/16 08:25	OTD	10/26/16 19:03	TSS	A3
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	10/25/16 08:25	OTD	10/26/16 19:03	TSS	A3
Barium, Total	ND		mg/L	2.8	SW846 6010C	10/25/16 08:25	OTD	10/26/16 19:03	TSS	A3
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 08:25	OTD	10/26/16 19:03	TSS	A3
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	10/25/16 08:25	OTD	10/26/16 19:03	TSS	A3
Chromium, Total	ND		mg/L	0.028	SW846 6010C	10/25/16 08:25	OTD	10/26/16 19:03	TSS	A3
Lead, Total	ND		mg/L	0.033	SW846 6010C	10/25/16 08:25	OTD	10/26/16 19:03	TSS	A3
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	10/25/16 02:30	MNP	10/25/16 09:12	MNP	A1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 08:25	OTD	10/26/16 19:03	TSS	A3
Selenium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 08:25	OTD	10/26/16 19:03	TSS	A3
Silver, Total	ND		mg/L	0.022	SW846 6010C	10/25/16 08:25	OTD	10/26/16 19:03	TSS	A3
Thallium, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 08:25	OTD	10/26/16 19:03	TSS	A3
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	10/25/16 08:25	OTD	10/26/16 19:03	TSS	A3
Zinc, Total	ND		mg/L	0.11	SW846 6010C	10/25/16 08:25	OTD	10/26/16 19:03	TSS	A3

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QUALITY CONTROL DATA

Workorder: 2183897 R1611059

QC Batch: MDIG/60412 **Analysis Method:** SW846 7470A

QC Batch Method: SW846 7470A

Associated Lab Samples: 2183897001, 2183897002, 2183897003, 2183897004, 2183897005, 2183897006, 2183897007, 2183897008, 2183897009, 2183897010

METHOD BLANK: 2428589

Parameter	Blank Result	Units	Reporting Limit
Mercury, Total	ND	mg/L	0.0020

LABORATORY CONTROL SAMPLE: 2428590

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Mercury, Total	107	mg/L	.002	0.0021	85 - 115

MATRIX SPIKE: 2428591 DUPLICATE: 2428592 ORIGINAL: 2183897004

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Mercury, Total	.00003	mg/L	.005	.00489	.00497	97.2	98.8	70 - 130	1.62	20

MATRIX SPIKE: 2428593 DUPLICATE: 2428594 ORIGINAL: 2183897010

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Mercury, Total	.00003	mg/L	.005	.00487	.00485	96.9	96.5	70 - 130	.41	20

QUALITY CONTROL DATA

Workorder: 2183897 R1611059

QC Batch: MDIG/60434 **Analysis Method:** SW846 6010C

QC Batch Method: SW846 3015

Associated Lab Samples: 2183897001, 2183897002, 2183897003, 2183897004, 2183897005, 2183897006

METHOD BLANK: 2429059

Parameter	Blank Result	Units	Reporting Limit
Antimony, Total	ND	mg/L	0.030
Arsenic, Total	ND	mg/L	0.028
Barium, Total	ND	mg/L	0.56
Beryllium, Total	ND	mg/L	0.0044
Cadmium, Total	ND	mg/L	0.0022
Chromium, Total	ND	mg/L	0.0056
Lead, Total	ND	mg/L	0.0067
Nickel, Total	ND	mg/L	0.022
Selenium, Total	ND	mg/L	0.022
Silver, Total	ND	mg/L	0.0044
Thallium, Total	ND	mg/L	0.022
Vanadium, Total	ND	mg/L	0.0056
Zinc, Total	ND	mg/L	0.022

LABORATORY CONTROL SAMPLE: 2429060

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Antimony, Total	96.4	mg/L	.22	0.21	80 - 120
Arsenic, Total	95.9	mg/L	.11	0.11	80 - 120
Barium, Total	99.1	mg/L	1.1	1.1	80 - 120
Beryllium, Total	96.8	mg/L	.22	0.22	80 - 120
Cadmium, Total	98	mg/L	.11	0.11	80 - 120
Chromium, Total	101	mg/L	.11	0.11	80 - 120
Lead, Total	98.6	mg/L	.11	0.11	80 - 120
Nickel, Total	103	mg/L	1.1	1.1	80 - 120
Selenium, Total	94.4	mg/L	1.1	1.0	80 - 120
Silver, Total	97.4	mg/L	.11	0.11	80 - 120
Thallium, Total	103	mg/L	.11	0.11	80 - 120
Vanadium, Total	101	mg/L	.056	0.056	80 - 120
Zinc, Total	102	mg/L	.56	0.57	80 - 120

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

QUALITY CONTROL DATA

Workorder: 2183897 R1611059

MATRIX SPIKE: 2429061 DUPLICATE: 2429062 ORIGINAL: 2183897004

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Arsenic, Total	0	mg/L	5	5.83883	5.78883	117	116	50 - 150	.86	20
Barium, Total	3.84718	mg/L	10	15.37762	15.36096	115	115	50 - 150	.11	20
Cadmium, Total	0	mg/L	1	1.15443	1.15499	115	115	50 - 150	.05	20
Chromium, Total	.00389	mg/L	5	5.94439	6.03883	119	121	50 - 150	1.58	20
Lead, Total	0	mg/L	5	5.7055	5.68328	114	114	50 - 150	.39	20
Selenium, Total	0	mg/L	1	1.10054	1.08554	110	109	50 - 150	1.37	20
Silver, Total	.00278	mg/L	1	1.14943	1.15332	115	115	50 - 150	.34	20

QUALITY CONTROL DATA

Workorder: 2183897 R1611059

QC Batch: MDIG/60439 **Analysis Method:** SW846 6010C

QC Batch Method: SW846 3015

Associated Lab Samples: 2183897007, 2183897008, 2183897009, 2183897010

METHOD BLANK: 2429314

Parameter	Blank Result	Units	Reporting Limit
Antimony, Total	ND	mg/L	0.030
Arsenic, Total	ND	mg/L	0.028
Barium, Total	ND	mg/L	0.56
Beryllium, Total	ND	mg/L	0.0044
Cadmium, Total	ND	mg/L	0.0022
Chromium, Total	ND	mg/L	0.0056
Lead, Total	ND	mg/L	0.0067
Nickel, Total	ND	mg/L	0.022
Selenium, Total	ND	mg/L	0.022
Silver, Total	ND	mg/L	0.0044
Thallium, Total	ND	mg/L	0.022
Vanadium, Total	ND	mg/L	0.0056
Zinc, Total	ND	mg/L	0.022

LABORATORY CONTROL SAMPLE: 2429315

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Antimony, Total	95.1	mg/L	.22	0.21	80 - 120
Arsenic, Total	101	mg/L	.11	0.11	80 - 120
Barium, Total	106	mg/L	1.1	1.2	80 - 120
Beryllium, Total	103	mg/L	.22	0.23	80 - 120
Cadmium, Total	102	mg/L	.11	0.11	80 - 120
Chromium, Total	106	mg/L	.11	0.12	80 - 120
Lead, Total	102	mg/L	.11	0.11	80 - 120
Nickel, Total	107	mg/L	1.1	1.2	80 - 120
Selenium, Total	96.9	mg/L	1.1	1.1	80 - 120
Silver, Total	101	mg/L	.11	0.11	80 - 120
Thallium, Total	99.1	mg/L	.11	0.11	80 - 120
Vanadium, Total	110	mg/L	.056	0.061	80 - 120
Zinc, Total	104	mg/L	.56	0.58	80 - 120

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QUALITY CONTROL DATA

Workorder: 2183897 R1611059

MATRIX SPIKE: 2429316 DUPLICATE: 2429317 ORIGINAL: 2184020001

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Arsenic, Total	0	mg/L	5	5.58328	5.89994	112	118	50 - 150	5.52	20
Barium, Total	.71277	mg/L	10	11.88877	12.41099	112	117	50 - 150	4.3	20
Cadmium, Total	.00111	mg/L	1	1.13166	1.18054	113	118	50 - 150	4.23	20
Chromium, Total	.01	mg/L	5	5.86105	6.02216	117	120	50 - 150	2.71	20
Lead, Total	1.00332	mg/L	5	6.57771	6.86104	111	117	50 - 150	4.22	20
Selenium, Total	0	mg/L	1	1.06721	1.11277	107	111	50 - 150	4.18	20

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

QUALITY CONTROL DATA

Workorder: 2183897 R1611059

QC Batch: WETC/177888 **Analysis Method:** S2540G-11

QC Batch Method: S2540G-11

Associated Lab Samples: 2183897001, 2183897002, 2183897003, 2183897004, 2183897005, 2183897006, 2183897007, 2183897008, 2183897009, 2183897010

SAMPLE DUPLICATE: 2428632 ORIGINAL: 2181835004

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	99.7883	%	99.7973	.009	10
Total Solids	.2116	%	.2026	4.35	5

SAMPLE DUPLICATE: 2428633 ORIGINAL: 2183409003

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	97.2943	%	97.2944	.0001	10
Total Solids	2.7056	%	2.7055	.004	5

SAMPLE DUPLICATE: 2428634 ORIGINAL: 2183600002

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	60.1702	%	58.9269	2.09	10
Total Solids	39.8297	%	41.073	3.07	5

SAMPLE DUPLICATE: 2428635 ORIGINAL: 2183633001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	84.5811	%	84.5022	.09	10
Total Solids	15.4188	%	15.4977	.51	5

SAMPLE DUPLICATE: 2428636 ORIGINAL: 2183741007

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	97.0946	%	96.9205	.18	10
Total Solids	2.9053	%	3.0794	5.82*	5

QUALITY CONTROL DATA

Workorder: 2183897 R1611059

SAMPLE DUPLICATE: 2428637 ORIGINAL: 2183767003

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	7.4393	%	7.8469	5.33	10
Total Solids	92.5606	%	92.153	.44	5

SAMPLE DUPLICATE: 2428638 ORIGINAL: 2183775001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	97.7272	%	97.496	.24	10
Total Solids	2.2727	%	2.5039	9.68*	5

SAMPLE DUPLICATE: 2428639 ORIGINAL: 2183897005

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	2.0152	%	2.1031	4.27	10
Total Solids	97.9847	%	97.8968	.09	5

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 2183897 R1611059

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
2183897001	1610140833 IBC 7330	SW846 7470A	MDIG/60412	SW846 7470A	META/54704
2183897002	1610140838 IBC 7329	SW846 7470A	MDIG/60412	SW846 7470A	META/54704
2183897003	1610140843 IBC 7338	SW846 7470A	MDIG/60412	SW846 7470A	META/54704
2183897004	1610130859 IBC 7321	SW846 7470A	MDIG/60412	SW846 7470A	META/54704
2183897005	1610130900 IBC 7321	SW846 7470A	MDIG/60412	SW846 7470A	META/54704
2183897006	1610130908 IBC 7322	SW846 7470A	MDIG/60412	SW846 7470A	META/54704
2183897007	1610130918 IBC 7326	SW846 7470A	MDIG/60412	SW846 7470A	META/54704
2183897008	1610130943 IBC 7327	SW846 7470A	MDIG/60412	SW846 7470A	META/54704
2183897009	1610130948 IBC 7331	SW846 7470A	MDIG/60412	SW846 7470A	META/54704
2183897010	1610130953 IBC 7328	SW846 7470A	MDIG/60412	SW846 7470A	META/54704
2183897001	1610140833 IBC 7330			S2540G-11	WETC/177888
2183897002	1610140838 IBC 7329			S2540G-11	WETC/177888
2183897003	1610140843 IBC 7338			S2540G-11	WETC/177888
2183897004	1610130859 IBC 7321			S2540G-11	WETC/177888
2183897005	1610130900 IBC 7321			S2540G-11	WETC/177888
2183897006	1610130908 IBC 7322			S2540G-11	WETC/177888
2183897007	1610130918 IBC 7326			S2540G-11	WETC/177888
2183897008	1610130943 IBC 7327			S2540G-11	WETC/177888
2183897009	1610130948 IBC 7331			S2540G-11	WETC/177888
2183897010	1610130953 IBC 7328			S2540G-11	WETC/177888
2183897001	1610140833 IBC 7330	SW846 3015	MDIG/60434	SW846 6010C	META/54732
2183897002	1610140838 IBC 7329	SW846 3015	MDIG/60434	SW846 6010C	META/54732
2183897003	1610140843 IBC 7338	SW846 3015	MDIG/60434	SW846 6010C	META/54732
2183897004	1610130859 IBC 7321	SW846 3015	MDIG/60434	SW846 6010C	META/54732
2183897005	1610130900 IBC 7321	SW846 3015	MDIG/60434	SW846 6010C	META/54732
2183897006	1610130908 IBC 7322	SW846 3015	MDIG/60434	SW846 6010C	META/54732
2183897007	1610130918 IBC 7326	SW846 3015	MDIG/60439	SW846 6010C	META/54732
2183897008	1610130943 IBC 7327	SW846 3015	MDIG/60439	SW846 6010C	META/54732
2183897009	1610130948 IBC 7331	SW846 3015	MDIG/60439	SW846 6010C	META/54732

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 2183897 R1611059

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
2183897010	1610130953 IBC 7328	SW846 3015	MDIG/60439	SW846 6010C	META/54732

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ALS

2183897

Project Number: R1611059
Project Manager: Janice Jaeger
QAP: LAB QAP

Lab Code	Sample ID	# of Cont.	Matrix	Sample Date	Sample Time	Lab ID	Ag TCLP 6010C	As TCLP 6010C	Ba TCLP 6010C	Be TCLP 6010C	Cd TCLP 6010C	Cr TCLP 6010C	Hg TCLP 7470A	Ni TCLP 6010C	Pb TCLP 6010C
[redacted]	1610140833 IBC 7330	1	Soil	10/14/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610140838 IBC 7329	1	Soil	10/14/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610140843 IBC 7338	1	Soil	10/14/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610130859 IBC 7321 QC	2	Soil	10/13/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610130900 IBC 7321	1	Soil	10/13/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610130908 IBC 7322	1	Soil	10/13/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610130918 IBC 7326	1	Soil	10/13/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610130943 IBC 7327	1	Soil	10/13/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610130948 IBC 7331	1	Soil	10/13/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610130953 IBC 7328	1	Soil	10/13/16		Middletown ALS	X	X	X	X	X	X	X	X	X

	Y	N	Initials
Custody Seals Present?	✓		
(if present) Seals Intact?	✓		
Received on Ice?	✓		
COC/Lbls Complete	✓		
Cont in Good Cond?			
Correct Containers?	✓		
Correct Samp Vol?	✓		
Correct Preservation?	✓		
Headspace/Volatiles?			

Cooler Temp: 5 °C
Cooler #:
Therm ID: TH352
Ship Carrier: FedEx UPS DHL
Tracking #:

AG 10/21/16

Special Instructions/Comments
NASA/WSTF EDD

H - Test is On Hold P - Test is Authorized for Prep Only

Turnaround Requirements
____RUSH (Surcharges Apply)
PLEASE CIRCLE WORK DAYS
1 2 3 4 5
X STANDARD
Requested FAX Date: _____
Requested Report Date: 10/28/16

Re
___ I. Results O
X II. Results + QC Summaries
___ III. Results + QC and Calibration Summaries
___ IV. Data Validation Report with Raw Data
PQL/MDL/J Y
EDD Y

PO# 58R1611059
Bill to

Relinquished By: [signature] 10-20-16 1500
Received By: [signature] 10-21-16 0858
Airbill Number:

2183597

							Sb TCLP 6010C	Se TCLP 6010C	TCLP EPA 1311	Tl TCLP 6010C	V TCLP 6010C	Zn TCLP 6010C
[redacted]	1610140833 IBC 7330		Soil	10/14/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610140838 IBC 7329		Soil	10/14/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610140843 IBC 7338		Soil	10/14/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610130859 IBC 7321		Soil	10/13/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610130900 IBC 7321		Soil	10/13/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610130908 IBC 7322		Soil	10/13/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610130918 IBC 7326		Soil	10/13/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610130943 IBC 7327		Soil	10/13/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610130948 IBC 7331		Soil	10/13/16		Middletown ALS	X	X	X	X	X	X
R1611059-030	1610130953 IBC 7328		Soil	10/13/16		Middletown ALS	X	X	X	X	X	X

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ALS Contact: Janice Jaeger

Project Number: R1611059
Project Manager: Janice Jaeger
QAP: LAB QAP

Folder Comments:
ND U

Special Instructions/Comments	Turnaround Requirements	Report Requirements	Invoice Information
H - Test is On Hold P - Test is Authorized for Prep Only	____RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 ____STANDARD Requested FAX Date: _____ Requested Report Date: 10/28/16	___ I. Results Only ____ II. Results + QC Summaries ___ III. Results + QC and Calibration Summaries ____ IV. Data Validation Report with Raw Data PQL/MDL/J Y EDD Y	PO# 58R1611059 Bill to

Relinquished By: _____ Received By: _____ Airbill Number: _____

ALS Environmental Chain of Custody

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ALS Contact: Janice Jaeger

Project Number: R1611059
Project Manager: Janice Jaeger
QAP: LAB QAP

Run QC on sample R1611059-014 for 6010C/Ag TCLP, As TCLP, Ba TCLP, Be TCLP, Cd TCLP, Cr TCLP, Ni TCLP, Pb TCLP, Sb TCLP, Se TCLP, Tl TCLP, V TCLP, Zn TCLP, 7470A/Hg TCLP

R1611059

Ship To: Middletown ALS
ALS Laboratory Group
34 Dogwood Lane
Middletown, PA 17057

PC VMS Date 10/20/16
SMO _____ Date _____

Instructions:
Ice _____
Dry Ice _____
No Ice _____

Shipping:
Overnight _____
2nd Day _____
Ground _____

Bill to Client Account _____

Comments:

November 07, 2016 Service Request No:R1611337

Mr. Tom Hall
NASA/WSTF/Navarro
P.O. Box 20
Las Cruces, NM 88004

Laboratory Results for: White Sands Test Facility

Dear Mr.Hall,

Enclosed are the results of the sample(s) submitted to our laboratory October 26, 2016
For your reference, these analyses have been assigned our service request number **R1611337.**

All analyses were performed according to our laboratory's quality assurance program. The test results meet requirements of the NELAP standards except as noted in the case narrative report. All results are intended to be considered in their entirety, and ALS Environmental is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report. The measurement uncertainty of the results included in this report is within that expected when using the prescribed method(s) for analysis of these samples, and represented by Laboratory Control Sample control limits. Any events, such as QC failures, which may add to the uncertainty are explained in the report narrative.

Please contact me if you have any questions. My extension is 7472. You may also contact me via email at Janice.Jaeger@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Janice Jaeger
Project Manager

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ALS Group USA, Corp.
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Narrative Documents

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Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/15EC007B
Sample Matrix: Soil

Service Request:R1611337
Date Received:10/26/16

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables, including results of QC samples analyzed from this delivery group. Analytical procedures performed by the lab are validated in accordance with NELAC standards. Any parameters that are not included in the lab's NELAC accreditation are identified on a "Non-Certified Analytes" report in the Miscellaneous Forms Section of this report. Individual analytical results requiring further explanation are flagged with qualifiers and/or discussed below. The flags are explained in the Report Qualifiers and Definitions page in the Miscellaneous Forms section of this report.

Sample Receipt

Twelve soil samples were received for analysis at ALS Environmental on 10/26/2016. Any discrepancies noted upon initial sample inspection are noted on the cooler receipt and preservation form included in this data package. The samples were received in good condition and consistent with the accompanying chain of custody form. Samples are refrigerated at ≤6°C upon receipt at the lab except for aqueous samples designated for metals analyses, which are stored at room temperature.

Volatile Organic Analyses:

Method 8260c, 11/3/16: The upper control limit was exceeded for one or more analytes in the Continuing Calibration Verification (CCV). The field samples analyzed in this sequence did not contain the analyte(s) in question above the Method Reporting Limit (MRL). Since the exceedance equates to a potential high bias, the data quality was not significantly affected and no further corrective action was taken.

Method 8260c, 11/3/16: The lower control limit was exceeded for one or more analytes in the Continuing Calibration Verification (CCV). Since there were no detections of the analyte(s) in the associated field samples, the quantitation is not affected. The data quality was not significantly affected and no further corrective action was taken.

Method 8260c, 11/3/16: The upper control criterion was exceeded for one or more analytes in the Laboratory Control Sample (LCS). There were no detections of the analyte(s) in the associated field samples. The error associated with elevated recovery equates to a high bias. The sample data is not significantly affected. No further corrective action was appropriate.

Method 8260c, 11/3/16: The lower control limit for the spike recovery of the Laboratory Control Sample (LCS) was exceeded for one or more analyte. There were no detections of the analyte(s) in the associated field samples. The discrepancy associated with reduced recovery equates to a potential low bias. Additional analysis of the associated field samples could not be performed because holding time was up. The analytes affected are flagged in the LCS Summary.

Metals Analyses:

No significant anomalies were noted with this analysis.

General Chemistry Analyses:

No significant anomalies were noted with this analysis.

Sample Receiving Notes:

Approved by _____ Date 11/7/2016

Method 8260C: soil samples included in this report were received in jars and not collected using one of the EPA method 5035A low level options. In accordance with the NYSDOH technical notice of October 2012 all results or reporting limits <200 ug/kg should be considered as estimated due to potential low bias.

One or more samples were subcontracted to another laboratory for testing. The certified analytical report from the subcontractor has been included in its entirety at the end of this report and includes the name and address of the subcontracted laboratory.

Approved by _____ Date 11/7/2016

SAMPLE DETECTION SUMMARY

CLIENT ID: 1610231100 1BC7350	Lab ID: R1611337-001					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	97.4				Percent	ALS SOP
Acetone	3.7	J	2.9	5.1	ug/Kg	8260C

CLIENT ID: 1610231102 1BC7350	Lab ID: R1611337-002					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	97.6				Percent	ALS SOP
Arsenic, Total	4.0		0.3	1.0	mg/Kg	6010C
Barium, Total	78.2		0.2	2.0	mg/Kg	6010C
Beryllium, Total	0.41		0.02	0.31	mg/Kg	6010C
Cadmium, Total	0.48	J	0.04	0.51	mg/Kg	6010C
Chromium, Total	8.0		0.2	1.0	mg/Kg	6010C
Lead, Total	11.4		0.3	5.1	mg/Kg	6010C
Nickel, Total	7.4		0.2	4.1	mg/Kg	6010C
Selenium, Total	1.3		0.7	1.0	mg/Kg	6010C
Vanadium, Total	15.0		0.2	5.1	mg/Kg	6010C
Zinc, Total	51.6		0.2	2.0	mg/Kg	6010C

CLIENT ID: 1610231104 1BC7349	Lab ID: R1611337-004					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	94.8				Percent	ALS SOP
Acetone	4.6	J	3.0	5.3	ug/Kg	8260C

CLIENT ID: 1610231106 1BC7349	Lab ID: R1611337-005					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	96.3				Percent	ALS SOP
Arsenic, Total	4.1		0.3	1.0	mg/Kg	6010C
Barium, Total	141		0.2	2.0	mg/Kg	6010C
Beryllium, Total	0.41		0.02	0.31	mg/Kg	6010C
Cadmium, Total	0.31	J	0.04	0.51	mg/Kg	6010C
Chromium, Total	12.9		0.2	1.0	mg/Kg	6010C
Lead, Total	11.2		0.3	5.1	mg/Kg	6010C
Nickel, Total	9.3		0.2	4.1	mg/Kg	6010C
Selenium, Total	1.1		0.7	1.0	mg/Kg	6010C
Vanadium, Total	12.4		0.2	5.1	mg/Kg	6010C
Zinc, Total	40.4		0.2	2.0	mg/Kg	6010C

CLIENT ID: 1610231120 1BC7351	Lab ID: R1611337-007					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	96.3				Percent	ALS SOP
Acetone	4.3	J	2.9	5.1	ug/Kg	8260C
Tetrachloroethene (PCE)	1.1	J	0.91	5.1	ug/Kg	8260C

SAMPLE DETECTION SUMMARY

CLIENT ID: 1610231121 1BC7351	Lab ID: R1611337-008					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	95.8				Percent	ALS SOP
Acetone	4.9	J	3.0	5.2	ug/Kg	8260C
Tetrachloroethene (PCE)	1.3	J	0.92	5.2	ug/Kg	8260C

CLIENT ID: 1610231126 1BC7351	Lab ID: R1611337-009					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	95.3				Percent	ALS SOP
Arsenic, Total	5.8		0.3	1.0	mg/Kg	6010C
Barium, Total	204		0.2	2.1	mg/Kg	6010C
Beryllium, Total	0.45		0.02	0.31	mg/Kg	6010C
Cadmium, Total	0.34	J	0.04	0.51	mg/Kg	6010C
Chromium, Total	12.9		0.2	1.0	mg/Kg	6010C
Lead, Total	9.7		0.3	5.1	mg/Kg	6010C
Nickel, Total	10.1		0.2	4.1	mg/Kg	6010C
Selenium, Total	1.2		0.7	1.0	mg/Kg	6010C
Vanadium, Total	12.5		0.2	5.1	mg/Kg	6010C
Zinc, Total	44.3		0.2	2.1	mg/Kg	6010C

CLIENT ID: 1610231127 1BC7351	Lab ID: R1611337-010					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	96.1				Percent	ALS SOP
Arsenic, Total	4.85		0.24	0.99	mg/Kg	6010C
Barium, Total	237		0.2	2.0	mg/Kg	6010C
Beryllium, Total	0.47		0.02	0.30	mg/Kg	6010C
Cadmium, Total	0.41	J	0.04	0.50	mg/Kg	6010C
Chromium, Total	12.3		0.13	0.99	mg/Kg	6010C
Lead, Total	12.1		0.3	5.0	mg/Kg	6010C
Nickel, Total	10.3		0.2	4.0	mg/Kg	6010C
Selenium, Total	1.11		0.60	0.99	mg/Kg	6010C
Vanadium, Total	12.5		0.2	5.0	mg/Kg	6010C
Zinc, Total	44.5		0.2	2.0	mg/Kg	6010C

Sample Receipt Information

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client: NASA/WSTF/Navarro **Service Request:**R1611337
Project: White Sands Test Facility/15EC007B

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
R1611337-001	1610231100 1BC7350	10/23/2016	
R1611337-002	1610231102 1BC7350	10/23/2016	
R1611337-003	1610231103 1BC7350	10/23/2016	
R1611337-004	1610231104 1BC7349	10/23/2016	
R1611337-005	1610231106 1BC7349	10/23/2016	
R1611337-006	1610231107 1BC7349	10/23/2016	
R1611337-007	1610231120 1BC7351	10/23/2016	
R1611337-008	1610231121 1BC7351	10/23/2016	
R1611337-009	1610231126 1BC7351	10/23/2016	
R1611337-010	1610231127 1BC7351	10/23/2016	
R1611337-011	1610231129 1BC7351	10/23/2016	
R1611337-012	1610231130 1BC7351	10/23/2016	

WSTF CHAIN OF CUSTODY RECORD

Date 10-25-2016

Laboratory: ALS Group USA, Corp. dba PO# ~~15EC092B~~ 15EC0071

Address shipping questions to:
- ☐ Lori Minnick, 575-524-5119
- ☒ Other Tom Hall, 575-524-5453

Send sample receipt confirmation and analytical reports to:
- ☐ Carlyn Tufts, carlyn.a.tufts@nasa.gov
- ☐ Shelly Hernandez, shelly.j.hernandez@nasa.gov
- ☒ Tom Hall, tom.a.hall@nasa.gov

Special Instructions

Return coolers and reusable packaging materials within 14 days as required in statement of work to:

Return Address:

NASA WSTF Environmental Department
12600 NASA Road; Bldg. 120
Las Cruces, NM 88012
Attn: Lori Minnick

Sample Number	Sample Location	# of Containers	Sample Matrix*	Analytical Requirements: SW-846 Method 8260B 4 oz Glass Jar, Ice	Analytical Requirements: Total Metals 4 oz Glass Jar, Ice	Analytical Requirements: TCLP Metals 16 oz Glass Jar, Ice	Analytical Requirements	Analytical Requirements	Analytical Requirements	Charge Number (WSTF Use Only)	Comments
161023 1100	IBC 7350	1	S	X						16EEE41FW	
—— 1102	IBC 7350	1	S		X					16EEE41FW	
—— 1103	IBC 7350	1	S			X				16EEE41FW	
—— 1104	IBC 7347	1	S	X						16EEE41FW	
—— 1106	IBC 7349	1	S		X					16EEE41FW	
—— 1107	IBC 7349	1	S			X				16EEE41FW	

Relinquished By:	Date/Time:	Accepted By:	Date/Time:
[signature]	10-25-16 (1220)	Scott Seay	10/26/16 0920

* Sample Matrix: A – Aqueous; G – Gaseous; S – Solid

R1611337 5
NASA/WSTF/Navarro
White Sands Test Facility

WSTF CHAIN OF CUSTODY RECORD

Date 10-25-2016

Laboratory: ALS Group USA, Corp. dba PO# ~~15EC092B~~ 15EC0078

Address shipping questions to:
- ☐ Lori Minnick, 575-524-5119
- ☒ Other Tom Hall, 575-524-5453

Send sample receipt confirmation and analytical reports to:
- ☐ Carlyn Tufts, carlyn.a.tufts@nasa.gov
- ☐ Shelly Hernandez, shelly.j.hernandez@nasa.gov
- ☒ Tom Hall, tom.a.hall@nasa.gov

Special Instructions

Return coolers and reusable packaging materials within 14 days as required in statement of work to:

Return Address:

NASA WSTF Environmental Department
12600 NASA Road; Bldg. 120
Las Cruces, NM 88012
Attn: Lori Minnick

Sample Number	Sample Location	# of Containers	Sample Matrix*	Analytical Requirements: SW-846 Method 8260B 4 oz Glass Jar, Ice	Total Metals 4 oz Glass Jar, Ice	TCLP Metals 16 oz Glass Jar, Ice				Charge Number (WSTF Use Only)	Comments
161023 1120	IBC 7351	1	S	X						16EEE41FW	
—— 1121	IBC 7351	1	S	X						16EEE41FW	
—— 1122	IBC 7351	1	S	X						16EEE41FW	MATRIX SPIKE for 161023 1120
—— 1126	IBC 7351	1	S		X					16EEE41FW	
—— 1127	IBC 7351	1	S		X					16EEE41FW	
—— 1128	IBC 7351	1	S		X					16EEE41FW	MATRIX SPIKE FOR 161023 1126
—— 1129	IBC 7351	1	S			X				16EEE41FW	
—— 1130	IBC 7351	1	S			X				16EEE41FW	
—— 1131	IBC 7351	1	S			X				16EEE41FW	MATRIX SPIKE FOR 161023 1129

Relinquished By:	Date/Time:	Accepted By:	Date/Time:
[signature]	10-25-16 1220	[signature]	10/26/16 0920

* Sample Matrix: A – Aqueous; G – Gaseous; S – Solid

R1611337 5
NASA/WSTF/Navarro
White Sands Test Facility

Cooler Receipt and Preservation Check Form

Project/Client NASA Folder Number_____.

Cooler received on 10/26/16 by: SMS COURIER: ALS UPS FEDEX VELOCITY (CLIENT)

1	Were Custody seals on outside of cooler?	(Y) N	5a	Perchlorate samples have required headspace?	Y N (NA)
2	Custody papers properly completed (ink, signed)?	(Y) N	5b	Did VOA vials, Alk,or Sulfide have sig* bubbles?	Y N (NA)
3	Did all bottles arrive in good condition (unbroken)?	(Y) N	6	Where did the bottles originate? ALS/ROC	(CLIENT)
4	Circle: (Wet Ice) Dry Ice Gel packs present?	(Y) N	7	Soil VOA received as: (Bulk) Encore 5035set	NA

8. Temperature Readings Date: 10/26/16 Time: 0925 ID: IR#7 (IR#8) From: Temp Blank (Sample Bottle)

Observed Temp (°C)	2.0						
Correction Factor (°C)	—						
Corrected Temp (°C)	2.0						
Within 0-6°C?	(Y) N	Y N	Y N	Y N	Y N	Y N	Y N
If <0°C, were samples frozen?	Y N	Y N	Y N	Y N	Y N	Y N	Y N

If out of Temperature, note packing/ice condition: _____ Ice melted Poorly Packed Same Day Rule

&Client Approval to Run Samples: _____ Standing Approval Client aware at drop-off Client notified by: _____

All samples held in storage location: R-002 by SMS on 10/26/16 at 0925
5035 samples placed in storage location: _____ by _____ on _____ at _____

Cooler Breakdown: Date: 10-26-16 Time: 1623 by: TC

1.	Were all bottle labels complete (*i.e.* analysis, preservation, etc.)?	(YES)	NO	
2.	Did all bottle labels and tags agree with custody papers?	(YES)	NO	
3.	Were correct containers used for the tests indicated?	(YES)	NO	
4.	Were 5035 vials acceptable (no extra labels, not leaking)?	YES	NO	(NA)
5.	Air Samples: Cassettes / Tubes Intact	Canisters Pressurized	Tedlar® Bags Inflated	(NA)

Explain any discrepancies:

pH	Reagent	Yes	No	Lot Received	Exp	Sample ID	Vol. Added	Lot Added	Final pH
≥12	NaOH								
≤2	HNO_3								
≤2	H_2SO_4								
<4	$NaHSO_4$								
Residual Chlorine (-)	For CN Phenol and 522			If +, contact PM to add $Na_2S_2O_3$ (CN), ascorbic (phenol).					
	$Na_2S_2O_3$	-	-						
	ZnAcetate	-	-						
	HCl	**	**						

**Not to be tested before analysis – pH tested and recorded by VOAs on a separate worksheet

Yes=All samples OK

No=Samples were preserved at The lab as listed

PM OK to Adjust: _____

Bottle lot numbers: Client bottle

Other Comments:

CLRES	(BULK)
DO	FLDT
HPROD	HGFB
HTR	LL3541
PH	(SUB)
SO3	MARRS
ALS	REV

PC Secondary Review: [signature] 10/27/16 *significant air bubbles: VOA > 5-6 mm : WC >1 in. diameter

Miscellaneous Forms

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

REPORT QUALIFIERS AND DEFINITIONS

U	Analyte was analyzed for but not detected. The sample quantitation limit has been corrected for dilution and for percent moisture, unless otherwise noted in the case narrative.
J	Estimated value due to either being a Tentatively Identified Compound (TIC) or that the concentration is between the MRL and the MDL. Concentrations are not verified within the linear range of the calibration. For DoD: concentration >40% difference between two GC columns (pesticides/Arclors).
B	Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result.
E	Inorganics- Concentration is estimated due to the serial dilution was outside control limits.
E	Organics- Concentration has exceeded the calibration range for that specific analysis.
D	Concentration is a result of a dilution, typically a secondary analysis of the sample due to exceeding the calibration range or that a surrogate has been diluted out of the sample and cannot be assessed.
*	Indicates that a quality control parameter has exceeded laboratory limits. Under the ñNotesò column of the Form I, this qualifier denotes analysis was performed out of Holding Time.
H	Analysis was performed out of hold time for tests that have an ñimmediateò hold time criteria.
#	Spike was diluted out.
+	Correlation coefficient for MSA is <0.995.
N	Inorganics- Matrix spike recovery was outside laboratory limits.
N	Organics- Presumptive evidence of a compound (reported as a TIC) based on the MS library search.
S	Concentration has been determined using Method of Standard Additions (MSA).
W	Post-Digestion Spike recovery is outside control limits and the sample absorbance is <50% of the spike absorbance.
P	Concentration >40% (25% for CLP) difference between the two GC columns.
C	Confirmed by GC/MS
Q	DoD reports: indicates a pesticide/Aroclor is not confirmed (Ó100% Difference between two GC columns).
X	See Case Narrative for discussion.
MRL LOQ	Method Reporting Limit. Also known as: Limit of Quantitation (LOQ) The lowest concentration at which the method analyte may be reliably quantified under the method conditions.
MDL	Method Detection Limit. A statistical value derived from a study designed to provide the lowest concentration that will be detected 99% of the time. Values between the MDL and MRL are estimated (see J qualifier).
LOD	Limit of Detection. A value at or above the MDL which has been verified to be detectable.
ND	Non-Detect. Analyte was not detected at the concentration listed. Same as U qualifier.

Rochester Lab ID # for State Certifications[1]

Connecticut ID # PH0556	Maine ID #NY0032	New Hampshire ID # 294100 A/B
Delaware Accredited	Nebraska Accredited	
DoD ELAP #65817	New Jersey ID # NY004	Pennsylvania ID# 68-786
Florida ID # E87674	New York ID # 10145	Rhode Island ID # 158
Illinois ID #200047	North Carolina #676	Virginia #460167

[1] Analyses were performed according to our laboratoryôs NELAP-approved quality assurance program and any applicable state or agency requirements. The test results meet requirements of the current NELAP/TNI standards or state or agency requirements, where applicable, except as noted in the case narrative. Since not all analyte/method/matrix combinations are offered for state/NELAC accreditation, this report may contain results which are not accredited. For a specific list of accredited analytes, contact the laboratory or go to http://www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads/North-America-Downloads

ALS Laboratory Group

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B		

Sample Name:	1610231100 1BC7350	**Date Collected:**	10/23/16
Lab Code:	R1611337-001	**Date Received:**	10/26/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		KWONG

Sample Name:	1610231102 1BC7350	**Date Collected:**	10/23/16
Lab Code:	R1611337-002	**Date Received:**	10/26/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	CBURLESON	NMANSEN
7471B	CBURLESON	CBURLESON
ALS SOP		KWONG

Sample Name:	1610231104 1BC7349	**Date Collected:**	10/23/16
Lab Code:	R1611337-004	**Date Received:**	10/26/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		KWONG

Sample Name:	1610231106 1BC7349	**Date Collected:**	10/23/16
Lab Code:	R1611337-005	**Date Received:**	10/26/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	CBURLESON	NMANSEN
7471B	CBURLESON	CBURLESON
ALS SOP		KWONG

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B		

Sample Name:	1610231120 1BC7351	**Date Collected:**	10/23/16
Lab Code:	R1611337-007	**Date Received:**	10/26/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		KWONG

Sample Name:	1610231121 1BC7351	**Date Collected:**	10/23/16
Lab Code:	R1611337-008	**Date Received:**	10/26/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
ALS SOP		KWONG

Sample Name:	1610231126 1BC7351	**Date Collected:**	10/23/16
Lab Code:	R1611337-009	**Date Received:**	10/26/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	CBURLESON	NMANSEN
7471B	CBURLESON	CBURLESON
ALS SOP		KWONG

Sample Name:	1610231127 1BC7351	**Date Collected:**	10/23/16
Lab Code:	R1611337-010	**Date Received:**	10/26/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	CBURLESON	NMANSEN
7471B	CBURLESON	CBURLESON
ALS SOP		KWONG

The preparation methods associated with this report are found in these tables unless discussed in the case narrative.

Water/Liquid Matrix

Analytical Method	Preparation Method
200.7	200.2
200.8	200.2
6010C	3005A/3010A
6020A	ILM05.3
9014 Cyanide Reactivity	SW846 Ch7, 7.3.4.2
9034 Sulfide Reactivity	SW846 Ch7, 7.3.4.2
9034 Sulfide Acid Soluble	9030B
9056A Bomb (Halogens)	5050A
9066 Manual Distillation	9065
SM 4500-CN-E Residual Cyanide	SM 4500-CN-G
SM 4500-CN-E WAD Cyanide	SM 4500-CN-I

Solid/Soil/Non-Aqueous Matrix

Analytical Method	Preparation Method
6010C	3050B
6020A	3050B
6010C TCLP (1311) extract	3005A/3010A
6010 SPLP (1312) extract	3005A/3010A
7196A	3060A
7199	3060A
9056A Halogens/Halides	5050
300.0 Anions/ 350.1/ 353.2/ SM 2320B/ SM 5210B/ 9056A Anions	DI extraction

For analytical methods not listed, the preparation method is the same as the analytical method reference.

Sample Results

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Volatile Organic Compounds by GC/MS

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231100 1BC7350	**Units:**	ug/Kg
Lab Code:	R1611337-001	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	5.1	0.86	1	11/03/16 16:06	
1,1,1-Trichloroethane (TCA)	ND U	5.1	0.75	1	11/03/16 16:06	
1,1,2,2-Tetrachloroethane	ND U	5.1	0.84	1	11/03/16 16:06	
1,1,2-Trichloroethane	ND U	5.1	0.75	1	11/03/16 16:06	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.1	1.3	1	11/03/16 16:06	
1,1-Dichloroethene (1,1-DCE)	ND U	5.1	1.4	1	11/03/16 16:06	
1,2,3-Trichloropropane	ND U	5.1	1.4	1	11/03/16 16:06	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.1	2.0	1	11/03/16 16:06	
1,2-Dibromoethane	ND U	5.1	1.3	1	11/03/16 16:06	
1,2-Dichlorobenzene	ND U	5.1	0.63	1	11/03/16 16:06	
1,2-Dichloroethane	ND U	5.1	0.63	1	11/03/16 16:06	
1,2-Dichloropropane	ND U	5.1	1.0	1	11/03/16 16:06	
1,3-Dichlorobenzene	ND U	5.1	0.65	1	11/03/16 16:06	
1,4-Dioxane	ND U	100	20	1	11/03/16 16:06	
2-Butanone (MEK)	ND U	5.1	2.4	1	11/03/16 16:06	
2-Chloro-1,3-butadiene	ND U	5.1	1.6	1	11/03/16 16:06	
2-Chloroethyl Vinyl Ether	ND U	5.1	1.8	1	11/03/16 16:06	
Isobutyl Alcohol	ND U	100	24	1	11/03/16 16:06	
Allyl Chloride	ND U	5.1	1.8	1	11/03/16 16:06	
4-Methyl-2-pentanone	ND U	5.1	1.1	1	11/03/16 16:06	
Acetone	**3.7 J**	5.1	2.9	1	11/03/16 16:06	
Acetonitrile	ND U	26	18	1	11/03/16 16:06	
Acrolein	ND U	26	3.6	1	11/03/16 16:06	
Acrylonitrile	ND U	26	6.7	1	11/03/16 16:06	
Benzene	ND U	5.1	0.30	1	11/03/16 16:06	
Bromodichloromethane	ND U	5.1	0.63	1	11/03/16 16:06	
Bromoform	ND U	5.1	0.96	1	11/03/16 16:06	
Bromomethane	ND U	5.1	1.5	1	11/03/16 16:06	
Carbon Disulfide	ND U	5.1	1.3	1	11/03/16 16:06	
Carbon Tetrachloride	ND U	5.1	0.95	1	11/03/16 16:06	
Chlorobenzene	ND U	5.1	0.30	1	11/03/16 16:06	
Chloroethane	ND U	5.1	3.0	1	11/03/16 16:06	
Chloroform	ND U	5.1	1.3	1	11/03/16 16:06	
Chloromethane	ND U	5.1	0.42	1	11/03/16 16:06	
Dibromochloromethane	ND U	5.1	0.75	1	11/03/16 16:06	
Dibromomethane	ND U	5.1	0.65	1	11/03/16 16:06	
Dichlorodifluoromethane (CFC 12)	ND U	5.1	2.0	1	11/03/16 16:06	
Dichloromethane	ND U	5.1	0.59	1	11/03/16 16:06	
Ethyl Methacrylate	ND U	5.1	0.78	1	11/03/16 16:06	
Ethylbenzene	ND U	5.1	0.24	1	11/03/16 16:06	
Iodomethane	ND U	10	1.2	1	11/03/16 16:06	
Methacrylonitrile	ND U	5.1	1.6	1	11/03/16 16:06	
Methyl Methacrylate	ND U	5.1	0.75	1	11/03/16 16:06	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231100 1BC7350	**Units:**	ug/Kg
Lab Code:	R1611337-001	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	5.1	0.53	1	11/03/16 16:06	
Propionitrile	ND U	26	6.7	1	11/03/16 16:06	
Tetrachloroethene (PCE)	ND U	5.1	0.91	1	11/03/16 16:06	
Toluene	ND U	5.1	1.1	1	11/03/16 16:06	
Trichloroethene (TCE)	ND U	5.1	1.1	1	11/03/16 16:06	
Trichlorofluoromethane (CFC 11)	ND U	5.1	0.68	1	11/03/16 16:06	
Vinyl Chloride	ND U	5.1	1.9	1	11/03/16 16:06	
cis-1,3-Dichloropropene	ND U	5.1	0.93	1	11/03/16 16:06	
m,p-Xylenes	ND U	10	1.2	1	11/03/16 16:06	
o-Xylene	ND U	5.1	0.50	1	11/03/16 16:06	
trans-1,2-Dichloroethene	ND U	5.1	0.89	1	11/03/16 16:06	
trans-1,3-Dichloropropene	ND U	5.1	0.21	1	11/03/16 16:06	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	95	51 - 136	11/03/16 16:06	
Dibromofluoromethane	94	63 - 138	11/03/16 16:06	
Toluene-d8	94	66 - 138	11/03/16 16:06	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
	unknown	13.57	14	J

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231104 1BC7349	**Units:**	ug/Kg
Lab Code:	R1611337-004	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	5.3	0.88	1	11/03/16 16:30	
1,1,1-Trichloroethane (TCA)	ND U	5.3	0.78	1	11/03/16 16:30	
1,1,2,2-Tetrachloroethane	ND U	5.3	0.86	1	11/03/16 16:30	
1,1,2-Trichloroethane	ND U	5.3	0.78	1	11/03/16 16:30	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.3	1.4	1	11/03/16 16:30	
1,1-Dichloroethene (1,1-DCE)	ND U	5.3	1.4	1	11/03/16 16:30	
1,2,3-Trichloropropane	ND U	5.3	1.4	1	11/03/16 16:30	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.3	2.0	1	11/03/16 16:30	
1,2-Dibromoethane	ND U	5.3	1.3	1	11/03/16 16:30	
1,2-Dichlorobenzene	ND U	5.3	0.65	1	11/03/16 16:30	
1,2-Dichloroethane	ND U	5.3	0.65	1	11/03/16 16:30	
1,2-Dichloropropane	ND U	5.3	1.1	1	11/03/16 16:30	
1,3-Dichlorobenzene	ND U	5.3	0.67	1	11/03/16 16:30	
1,4-Dioxane	ND U	110	21	1	11/03/16 16:30	
2-Butanone (MEK)	ND U	5.3	2.5	1	11/03/16 16:30	
2-Chloro-1,3-butadiene	ND U	5.3	1.7	1	11/03/16 16:30	
2-Chloroethyl Vinyl Ether	ND U	5.3	1.9	1	11/03/16 16:30	
Isobutyl Alcohol	ND U	110	24	1	11/03/16 16:30	
Allyl Chloride	ND U	5.3	1.8	1	11/03/16 16:30	
4-Methyl-2-pentanone	ND U	5.3	1.1	1	11/03/16 16:30	
Acetone	**4.6 J**	5.3	3.0	1	11/03/16 16:30	
Acetonitrile	ND U	26	18	1	11/03/16 16:30	
Acrolein	ND U	26	3.7	1	11/03/16 16:30	
Acrylonitrile	ND U	26	6.9	1	11/03/16 16:30	
Benzene	ND U	5.3	0.31	1	11/03/16 16:30	
Bromodichloromethane	ND U	5.3	0.65	1	11/03/16 16:30	
Bromoform	ND U	5.3	0.99	1	11/03/16 16:30	
Bromomethane	ND U	5.3	1.5	1	11/03/16 16:30	
Carbon Disulfide	ND U	5.3	1.4	1	11/03/16 16:30	
Carbon Tetrachloride	ND U	5.3	0.98	1	11/03/16 16:30	
Chlorobenzene	ND U	5.3	0.31	1	11/03/16 16:30	
Chloroethane	ND U	5.3	3.1	1	11/03/16 16:30	
Chloroform	ND U	5.3	1.4	1	11/03/16 16:30	
Chloromethane	ND U	5.3	0.43	1	11/03/16 16:30	
Dibromochloromethane	ND U	5.3	0.78	1	11/03/16 16:30	
Dibromomethane	ND U	5.3	0.67	1	11/03/16 16:30	
Dichlorodifluoromethane (CFC 12)	ND U	5.3	2.0	1	11/03/16 16:30	
Dichloromethane	ND U	5.3	0.61	1	11/03/16 16:30	
Ethyl Methacrylate	ND U	5.3	0.80	1	11/03/16 16:30	
Ethylbenzene	ND U	5.3	0.25	1	11/03/16 16:30	
Iodomethane	ND U	11	1.2	1	11/03/16 16:30	
Methacrylonitrile	ND U	5.3	1.6	1	11/03/16 16:30	
Methyl Methacrylate	ND U	5.3	0.78	1	11/03/16 16:30	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231104 1BC7349	**Units:**	ug/Kg
Lab Code:	R1611337-004	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	5.3	0.54	1	11/03/16 16:30	
Propionitrile	ND U	26	6.9	1	11/03/16 16:30	
Tetrachloroethene (PCE)	ND U	5.3	0.93	1	11/03/16 16:30	
Toluene	ND U	5.3	1.1	1	11/03/16 16:30	
Trichloroethene (TCE)	ND U	5.3	1.1	1	11/03/16 16:30	
Trichlorofluoromethane (CFC 11)	ND U	5.3	0.70	1	11/03/16 16:30	
Vinyl Chloride	ND U	5.3	2.0	1	11/03/16 16:30	
cis-1,3-Dichloropropene	ND U	5.3	0.95	1	11/03/16 16:30	
m,p-Xylenes	ND U	11	1.2	1	11/03/16 16:30	
o-Xylene	ND U	5.3	0.51	1	11/03/16 16:30	
trans-1,2-Dichloroethene	ND U	5.3	0.91	1	11/03/16 16:30	
trans-1,3-Dichloropropene	ND U	5.3	0.22	1	11/03/16 16:30	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	96	51 - 136	11/03/16 16:30	
Dibromofluoromethane	93	63 - 138	11/03/16 16:30	
Toluene-d8	93	66 - 138	11/03/16 16:30	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
	No Tentatively Identified Compounds Detected			

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231120 1BC7351	**Units:**	ug/Kg
Lab Code:	R1611337-007	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	5.1	0.86	.99	11/03/16 16:54	
1,1,1-Trichloroethane (TCA)	ND U	5.1	0.76	.99	11/03/16 16:54	
1,1,2,2-Tetrachloroethane	ND U	5.1	0.84	.99	11/03/16 16:54	
1,1,2-Trichloroethane	ND U	5.1	0.76	.99	11/03/16 16:54	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.1	1.3	.99	11/03/16 16:54	
1,1-Dichloroethene (1,1-DCE)	ND U	5.1	1.4	.99	11/03/16 16:54	
1,2,3-Trichloropropane	ND U	5.1	1.4	.99	11/03/16 16:54	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.1	2.0	.99	11/03/16 16:54	
1,2-Dibromoethane	ND U	5.1	1.3	.99	11/03/16 16:54	
1,2-Dichlorobenzene	ND U	5.1	0.63	.99	11/03/16 16:54	
1,2-Dichloroethane	ND U	5.1	0.63	.99	11/03/16 16:54	
1,2-Dichloropropane	ND U	5.1	1.0	.99	11/03/16 16:54	
1,3-Dichlorobenzene	ND U	5.1	0.65	.99	11/03/16 16:54	
1,4-Dioxane	ND U	100	20	.99	11/03/16 16:54	
2-Butanone (MEK)	ND U	5.1	2.4	.99	11/03/16 16:54	
2-Chloro-1,3-butadiene	ND U	5.1	1.6	.99	11/03/16 16:54	
2-Chloroethyl Vinyl Ether	ND U	5.1	1.8	.99	11/03/16 16:54	
Isobutyl Alcohol	ND U	100	24	.99	11/03/16 16:54	
Allyl Chloride	ND U	5.1	1.8	.99	11/03/16 16:54	
4-Methyl-2-pentanone	ND U	5.1	1.1	.99	11/03/16 16:54	
Acetone	**4.3 J**	5.1	2.9	.99	11/03/16 16:54	
Acetonitrile	ND U	26	18	.99	11/03/16 16:54	
Acrolein	ND U	26	3.6	.99	11/03/16 16:54	
Acrylonitrile	ND U	26	6.7	.99	11/03/16 16:54	
Benzene	ND U	5.1	0.30	.99	11/03/16 16:54	
Bromodichloromethane	ND U	5.1	0.63	.99	11/03/16 16:54	
Bromoform	ND U	5.1	0.96	.99	11/03/16 16:54	
Bromomethane	ND U	5.1	1.5	.99	11/03/16 16:54	
Carbon Disulfide	ND U	5.1	1.3	.99	11/03/16 16:54	
Carbon Tetrachloride	ND U	5.1	0.95	.99	11/03/16 16:54	
Chlorobenzene	ND U	5.1	0.30	.99	11/03/16 16:54	
Chloroethane	ND U	5.1	3.0	.99	11/03/16 16:54	
Chloroform	ND U	5.1	1.3	.99	11/03/16 16:54	
Chloromethane	ND U	5.1	0.42	.99	11/03/16 16:54	
Dibromochloromethane	ND U	5.1	0.76	.99	11/03/16 16:54	
Dibromomethane	ND U	5.1	0.65	.99	11/03/16 16:54	
Dichlorodifluoromethane (CFC 12)	ND U	5.1	2.0	.99	11/03/16 16:54	
Dichloromethane	ND U	5.1	0.59	.99	11/03/16 16:54	
Ethyl Methacrylate	ND U	5.1	0.78	.99	11/03/16 16:54	
Ethylbenzene	ND U	5.1	0.24	.99	11/03/16 16:54	
Iodomethane	ND U	10	1.2	.99	11/03/16 16:54	
Methacrylonitrile	ND U	5.1	1.6	.99	11/03/16 16:54	
Methyl Methacrylate	ND U	5.1	0.76	.99	11/03/16 16:54	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231120 1BC7351	**Units:**	ug/Kg
Lab Code:	R1611337-007	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND	U	5.1	0.53	.99	11/03/16 16:54	
Propionitrile	ND	U	26	6.7	.99	11/03/16 16:54	
Tetrachloroethene (PCE)	**1.1**	**J**	5.1	0.91	.99	11/03/16 16:54	
Toluene	ND	U	5.1	1.1	.99	11/03/16 16:54	
Trichloroethene (TCE)	ND	U	5.1	1.1	.99	11/03/16 16:54	
Trichlorofluoromethane (CFC 11)	ND	U	5.1	0.68	.99	11/03/16 16:54	
Vinyl Chloride	ND	U	5.1	1.9	.99	11/03/16 16:54	
cis-1,3-Dichloropropene	ND	U	5.1	0.93	.99	11/03/16 16:54	
m,p-Xylenes	ND	U	10	1.2	.99	11/03/16 16:54	
o-Xylene	ND	U	5.1	0.50	.99	11/03/16 16:54	
trans-1,2-Dichloroethene	ND	U	5.1	0.89	.99	11/03/16 16:54	
trans-1,3-Dichloropropene	ND	U	5.1	0.21	.99	11/03/16 16:54	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	98	51 - 136	11/03/16 16:54	
Dibromofluoromethane	96	63 - 138	11/03/16 16:54	
Toluene-d8	96	66 - 138	11/03/16 16:54	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
	No Tentatively Identified Compounds Detected			

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231121 1BC7351	**Units:**	ug/Kg
Lab Code:	R1611337-008	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	5.2	0.87	1	11/03/16 17:19	
1,1,1-Trichloroethane (TCA)	ND U	5.2	0.77	1	11/03/16 17:19	
1,1,2,2-Tetrachloroethane	ND U	5.2	0.85	1	11/03/16 17:19	
1,1,2-Trichloroethane	ND U	5.2	0.77	1	11/03/16 17:19	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.2	1.3	1	11/03/16 17:19	
1,1-Dichloroethene (1,1-DCE)	ND U	5.2	1.4	1	11/03/16 17:19	
1,2,3-Trichloropropane	ND U	5.2	1.4	1	11/03/16 17:19	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.2	2.0	1	11/03/16 17:19	
1,2-Dibromoethane	ND U	5.2	1.3	1	11/03/16 17:19	
1,2-Dichlorobenzene	ND U	5.2	0.64	1	11/03/16 17:19	
1,2-Dichloroethane	ND U	5.2	0.64	1	11/03/16 17:19	
1,2-Dichloropropane	ND U	5.2	1.1	1	11/03/16 17:19	
1,3-Dichlorobenzene	ND U	5.2	0.66	1	11/03/16 17:19	
1,4-Dioxane	ND U	100	20	1	11/03/16 17:19	
2-Butanone (MEK)	ND U	5.2	2.4	1	11/03/16 17:19	
2-Chloro-1,3-butadiene	ND U	5.2	1.6	1	11/03/16 17:19	
2-Chloroethyl Vinyl Ether	ND U	5.2	1.8	1	11/03/16 17:19	
Isobutyl Alcohol	ND U	100	24	1	11/03/16 17:19	
Allyl Chloride	ND U	5.2	1.8	1	11/03/16 17:19	
4-Methyl-2-pentanone	ND U	5.2	1.1	1	11/03/16 17:19	
Acetone	**4.9 J**	5.2	3.0	1	11/03/16 17:19	
Acetonitrile	ND U	26	18	1	11/03/16 17:19	
Acrolein	ND U	26	3.7	1	11/03/16 17:19	
Acrylonitrile	ND U	26	6.8	1	11/03/16 17:19	
Benzene	ND U	5.2	0.31	1	11/03/16 17:19	
Bromodichloromethane	ND U	5.2	0.64	1	11/03/16 17:19	
Bromoform	ND U	5.2	0.98	1	11/03/16 17:19	
Bromomethane	ND U	5.2	1.5	1	11/03/16 17:19	
Carbon Disulfide	ND U	5.2	1.3	1	11/03/16 17:19	
Carbon Tetrachloride	ND U	5.2	0.97	1	11/03/16 17:19	
Chlorobenzene	ND U	5.2	0.31	1	11/03/16 17:19	
Chloroethane	ND U	5.2	3.0	1	11/03/16 17:19	
Chloroform	ND U	5.2	1.4	1	11/03/16 17:19	
Chloromethane	ND U	5.2	0.42	1	11/03/16 17:19	
Dibromochloromethane	ND U	5.2	0.77	1	11/03/16 17:19	
Dibromomethane	ND U	5.2	0.66	1	11/03/16 17:19	
Dichlorodifluoromethane (CFC 12)	ND U	5.2	2.0	1	11/03/16 17:19	
Dichloromethane	ND U	5.2	0.60	1	11/03/16 17:19	
Ethyl Methacrylate	ND U	5.2	0.79	1	11/03/16 17:19	
Ethylbenzene	ND U	5.2	0.25	1	11/03/16 17:19	
Iodomethane	ND U	10	1.2	1	11/03/16 17:19	
Methacrylonitrile	ND U	5.2	1.6	1	11/03/16 17:19	
Methyl Methacrylate	ND U	5.2	0.77	1	11/03/16 17:19	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231121 1BC7351	**Units:**	ug/Kg
Lab Code:	R1611337-008	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND	U	5.2	0.54	1	11/03/16 17:19	
Propionitrile	ND	U	26	6.8	1	11/03/16 17:19	
Tetrachloroethene (PCE)	**1.3**	**J**	5.2	0.92	1	11/03/16 17:19	
Toluene	ND	U	5.2	1.1	1	11/03/16 17:19	
Trichloroethene (TCE)	ND	U	5.2	1.1	1	11/03/16 17:19	
Trichlorofluoromethane (CFC 11)	ND	U	5.2	0.69	1	11/03/16 17:19	
Vinyl Chloride	ND	U	5.2	2.0	1	11/03/16 17:19	
cis-1,3-Dichloropropene	ND	U	5.2	0.94	1	11/03/16 17:19	
m,p-Xylenes	ND	U	10	1.2	1	11/03/16 17:19	
o-Xylene	ND	U	5.2	0.51	1	11/03/16 17:19	
trans-1,2-Dichloroethene	ND	U	5.2	0.90	1	11/03/16 17:19	
trans-1,3-Dichloropropene	ND	U	5.2	0.21	1	11/03/16 17:19	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	99	51 - 136	11/03/16 17:19	
Dibromofluoromethane	98	63 - 138	11/03/16 17:19	
Toluene-d8	96	66 - 138	11/03/16 17:19	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
	No Tentatively Identified Compounds Detected			

Metals

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Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231102 1BC7350	**Basis:**	Dry
Lab Code:	R1611337-002		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/Kg	6.1	0.5	1	10/31/16 20:24	10/28/16	
Arsenic, Total	6010C	**4.0**	mg/Kg	1.0	0.3	1	11/02/16 10:40	10/28/16	
Barium, Total	6010C	**78.2**	mg/Kg	2.0	0.2	1	10/31/16 20:24	10/28/16	
Beryllium, Total	6010C	**0.41**	mg/Kg	0.31	0.02	1	10/31/16 20:24	10/28/16	
Cadmium, Total	6010C	**0.48 J**	mg/Kg	0.51	0.04	1	10/31/16 20:24	10/28/16	
Chromium, Total	6010C	**8.0**	mg/Kg	1.0	0.2	1	10/31/16 20:24	10/28/16	
Lead, Total	6010C	**11.4**	mg/Kg	5.1	0.3	1	10/31/16 20:24	10/28/16	
Mercury, Total	7471B	ND U	mg/Kg	0.034	0.004	1	10/31/16 10:33	10/28/16	
Nickel, Total	6010C	**7.4**	mg/Kg	4.1	0.2	1	10/31/16 20:24	10/28/16	
Selenium, Total	6010C	**1.3**	mg/Kg	1.0	0.7	1	10/31/16 20:24	10/28/16	
Silver, Total	6010C	ND U	mg/Kg	1.0	0.5	1	10/31/16 20:24	10/28/16	
Thallium, Total	6010C	ND U	mg/Kg	5.1	2.6	5	11/04/16 17:53	10/28/16	
Vanadium, Total	6010C	**15.0**	mg/Kg	5.1	0.2	1	10/31/16 20:24	10/28/16	
Zinc, Total	6010C	**51.6**	mg/Kg	2.0	0.2	1	10/31/16 20:24	10/28/16	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231106 1BC7349	**Basis:**	Dry
Lab Code:	R1611337-005		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/Kg	6.1	0.5	1	10/31/16 20:30	10/28/16	
Arsenic, Total	6010C	**4.1**	mg/Kg	1.0	0.3	1	11/02/16 10:43	10/28/16	
Barium, Total	6010C	**141**	mg/Kg	2.0	0.2	1	10/31/16 20:30	10/28/16	
Beryllium, Total	6010C	**0.41**	mg/Kg	0.31	0.02	1	10/31/16 20:30	10/28/16	
Cadmium, Total	6010C	**0.31 J**	mg/Kg	0.51	0.04	1	10/31/16 20:30	10/28/16	
Chromium, Total	6010C	**12.9**	mg/Kg	1.0	0.2	1	10/31/16 20:30	10/28/16	
Lead, Total	6010C	**11.2**	mg/Kg	5.1	0.3	1	10/31/16 20:30	10/28/16	
Mercury, Total	7471B	ND U	mg/Kg	0.033	0.003	1	10/31/16 10:35	10/28/16	
Nickel, Total	6010C	**9.3**	mg/Kg	4.1	0.2	1	10/31/16 20:30	10/28/16	
Selenium, Total	6010C	**1.1**	mg/Kg	1.0	0.7	1	10/31/16 20:30	10/28/16	
Silver, Total	6010C	ND U	mg/Kg	1.0	0.5	1	10/31/16 20:30	10/28/16	
Thallium, Total	6010C	ND U	mg/Kg	5.1	2.6	5	11/04/16 17:59	10/28/16	
Vanadium, Total	6010C	**12.4**	mg/Kg	5.1	0.2	1	10/31/16 20:30	10/28/16	
Zinc, Total	6010C	**40.4**	mg/Kg	2.0	0.2	1	10/31/16 20:30	10/28/16	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231126 1BC7351	**Basis:**	Dry
Lab Code:	R1611337-009		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/Kg	6.2	0.5	1	10/31/16 20:36	10/28/16	
Arsenic, Total	6010C	**5.8**	mg/Kg	1.0	0.3	1	11/02/16 10:47	10/28/16	
Barium, Total	6010C	**204**	mg/Kg	2.1	0.2	1	10/31/16 20:36	10/28/16	
Beryllium, Total	6010C	**0.45**	mg/Kg	0.31	0.02	1	10/31/16 20:36	10/28/16	
Cadmium, Total	6010C	**0.34 J**	mg/Kg	0.51	0.04	1	10/31/16 20:36	10/28/16	
Chromium, Total	6010C	**12.9**	mg/Kg	1.0	0.2	1	10/31/16 20:36	10/28/16	
Lead, Total	6010C	**9.7**	mg/Kg	5.1	0.3	1	10/31/16 20:36	10/28/16	
Mercury, Total	7471B	ND U	mg/Kg	0.035	0.004	1	10/31/16 10:37	10/28/16	
Nickel, Total	6010C	**10.1**	mg/Kg	4.1	0.2	1	10/31/16 20:36	10/28/16	
Selenium, Total	6010C	**1.2**	mg/Kg	1.0	0.7	1	10/31/16 20:36	10/28/16	
Silver, Total	6010C	ND U	mg/Kg	1.0	0.5	1	10/31/16 20:36	10/28/16	
Thallium, Total	6010C	ND U	mg/Kg	5.1	2.6	5	11/04/16 18:05	10/28/16	
Vanadium, Total	6010C	**12.5**	mg/Kg	5.1	0.2	1	10/31/16 20:36	10/28/16	
Zinc, Total	6010C	**44.3**	mg/Kg	2.1	0.2	1	10/31/16 20:36	10/28/16	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231127 1BC7351	**Basis:**	Dry
Lab Code:	R1611337-010		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/Kg	5.9	0.4	1	10/31/16 21:19	10/28/16	
Arsenic, Total	6010C	**4.85**	mg/Kg	0.99	0.24	1	11/02/16 11:02	10/28/16	
Barium, Total	6010C	**237**	mg/Kg	2.0	0.2	1	10/31/16 21:19	10/28/16	
Beryllium, Total	6010C	**0.47**	mg/Kg	0.30	0.02	1	10/31/16 21:19	10/28/16	
Cadmium, Total	6010C	**0.41 J**	mg/Kg	0.50	0.04	1	10/31/16 21:19	10/28/16	
Chromium, Total	6010C	**12.3**	mg/Kg	0.99	0.13	1	10/31/16 21:19	10/28/16	
Lead, Total	6010C	**12.1**	mg/Kg	5.0	0.3	1	10/31/16 21:19	10/28/16	
Mercury, Total	7471B	ND U	mg/Kg	0.032	0.003	1	10/31/16 10:42	10/28/16	
Nickel, Total	6010C	**10.3**	mg/Kg	4.0	0.2	1	10/31/16 21:19	10/28/16	
Selenium, Total	6010C	**1.11**	mg/Kg	0.99	0.60	1	10/31/16 21:19	10/28/16	
Silver, Total	6010C	ND U	mg/Kg	0.99	0.44	1	10/31/16 21:19	10/28/16	
Thallium, Total	6010C	ND U	mg/Kg	5.0	2.6	5	11/04/16 18:35	10/28/16	
Vanadium, Total	6010C	**12.5**	mg/Kg	5.0	0.2	1	10/31/16 21:19	10/28/16	
Zinc, Total	6010C	**44.5**	mg/Kg	2.0	0.2	1	10/31/16 21:19	10/28/16	

General Chemistry

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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231100 1BC7350	**Basis:**	As Received
Lab Code:	R1611337-001		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**97.4**	Percent	-	1	10/28/16 12:30	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231102 1BC7350	**Basis:**	As Received
Lab Code:	R1611337-002		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**97.6**	Percent	-	-	1	10/28/16 12:30	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231104 1BC7349	**Basis:**	As Received
Lab Code:	R1611337-004		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**94.8**	Percent	-	1	10/28/16 12:30	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231106 1BC7349	**Basis:**	As Received
Lab Code:	R1611337-005		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**96.3**	Percent	-	-	1	10/28/16 12:30	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231120 1BC7351	**Basis:**	As Received
Lab Code:	R1611337-007		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**96.3**	Percent	-	1	10/28/16 12:30	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231121 1BC7351	**Basis:**	As Received
Lab Code:	R1611337-008		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**95.8**	Percent	-	1	10/28/16 12:30	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231126 1BC7351	**Basis:**	As Received
Lab Code:	R1611337-009		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**95.3**	Percent	-	-	1	10/28/16 12:30	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16 09:20
Sample Name:	1610231127 1BC7351	**Basis:**	As Received
Lab Code:	R1611337-010		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**96.1**	Percent	-	-	1	10/28/16 12:30	

QC Summary Forms

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Volatile Organic Compounds by GC/MS

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Client: NASA/WSTF/Navarro **Service Request:** R1611337
Project: White Sands Test Facility/15EC007B
Sample Matrix: Soil

SURROGATE RECOVERY SUMMARY
Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Extraction Method: EPA 5030C

Sample Name	Lab Code	4-Bromofluorobenzene 51 - 136	Dibromofluoromethane 63 - 138	Toluene-d8 66 - 138
1610231100 1BC7350	R1611337-001	95	94	94
1610231104 1BC7349	R1611337-004	96	93	93
1610231120 1BC7351	R1611337-007	98	96	96
1610231121 1BC7351	R1611337-008	99	98	96
Method Blank	RQ1613524-01	95	95	94
Lab Control Sample	RQ1613524-02	102	100	97
1610231120 1BC7351 MS	RQ1613524-05	100	98	95
1610231120 1BC7351 DMS	RQ1613524-06	100	98	95

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16
		Date Analyzed:	11/3/16
		Date Extracted:	NA

Duplicate Matrix Spike Summary
Volatile Organic Compounds by GC/MS, Unpreserved

Sample Name:	1610231120 1BC7351	**Units:**	ug/Kg
Lab Code:	R1611337-007	**Basis:**	Dry
Analysis Method:	8260C		
Prep Method:	EPA 5030C		

		Matrix Spike RQ1613524-05			Duplicate Matrix Spike RQ1613524-06					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
1,1,1,2-Tetrachloroethane	ND U	42.3	51.9	81	42.6	51.9	82	52-133	1	30
1,1,1-Trichloroethane (TCA)	ND U	36.1	51.9	70	36.5	51.9	70	51-132	<1	30
1,1,2,2-Tetrachloroethane	ND U	37.4	51.9	72	37.2	51.9	72	53-134	<1	30
1,1,2-Trichloroethane	ND U	45.4	51.9	88	45.7	51.9	88	62-126	<1	30
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	33.8	51.9	65	34.1	51.9	66	45-136	2	30
1,1-Dichloroethene (1,1-DCE)	ND U	38.5	51.9	74	38.0	51.9	73	61-139	1	30
1,2,3-Trichloropropane	ND U	42.0	51.9	81	41.8	51.9	80	22-167	1	30
1,2-Dibromo-3-chloropropane (DBCP)	ND U	43.9	51.9	85	44.9	51.9	87	27-163	2	30
1,2-Dibromoethane	ND U	43.6	51.9	84	43.2	51.9	83	52-137	1	30
1,2-Dichlorobenzene	ND U	40.7	51.9	78	41.3	51.9	80	22-156	3	30
1,2-Dichloroethane	ND U	41.1	51.9	79	40.5	51.9	78	59-125	1	30
1,2-Dichloropropane	ND U	40.1	51.9	77	40.9	51.9	79	67-126	3	30
1,3-Dichlorobenzene	ND U	38.9	51.9	75	39.6	51.9	76	29-146	1	30
1,4-Dioxane	ND U	922	1040	89	997	1040	96	50-148	8	30
2-Butanone (MEK)	ND U	39.7	51.9	77	39.2	51.9	75	43-134	3	30
2-Chloro-1,3-butadiene	ND U	39.5	51.9	76	39.4	51.9	76	45-134	<1	30
2-Chloroethyl Vinyl Ether	ND U	38.6	51.9	74	37.9	51.9	73	37-150	1	30
Isobutyl Alcohol	ND U	746	1040	72	792	1040	76	39-146	5	30
Allyl Chloride	ND U	37.6	51.9	72	37.0	51.9	71	34-135	1	30
4-Methyl-2-pentanone	ND U	41.8	51.9	81	41.5	51.9	80	47-145	1	30
Acetone	4.3 J	50.4	51.9	89	50.6	51.9	89	11-183	<1	30
Acetonitrile	ND U	155	260	60	188	260	72	28-146	18	30
Acrolein	ND U	77.6	104	75	75.2	104	72	10-172	4	30
Acrylonitrile	ND U	200	260	77	199	260	77	46-139	<1	30
Benzene	ND U	39.7	51.9	76	39.2	51.9	75	63-126	1	30
Bromodichloromethane	ND U	39.3	51.9	76	40.1	51.9	77	47-141	1	30
Bromoform	ND U	49.1	51.9	94	49.4	51.9	95	26-157	1	30
Bromomethane	ND U	28.7	51.9	55	30.3	51.9	58	10-137	5	30
Carbon Disulfide	ND U	41.8	51.9	81	42.8	51.9	82	35-135	1	30
Carbon Tetrachloride	ND U	36.2	51.9	70	37.9	51.9	73	46-137	4	30
Chlorobenzene	ND U	41.3	51.9	79	41.1	51.9	79	51-132	<1	30
Chloroethane	ND U	38.2	51.9	74	35.3	51.9	68	45-132	8	30
Chloroform	ND U	38.9	51.9	75	39.0	51.9	75	61-124	<1	30
Chloromethane	ND U	34.7	51.9	67	34.6	51.9	67	50-136	<1	30
Dibromochloromethane	ND U	44.2	51.9	85	44.3	51.9	85	40-146	<1	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16
		Date Analyzed:	11/3/16
		Date Extracted:	NA

Duplicate Matrix Spike Summary
Volatile Organic Compounds by GC/MS, Unpreserved

Sample Name:	1610231120 1BC7351	**Units:**	ug/Kg
Lab Code:	R1611337-007	**Basis:**	Dry
Analysis Method:	8260C		
Prep Method:	EPA 5030C		

		Matrix Spike RQ1613524-05			Duplicate Matrix Spike RQ1613524-06					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Dibromomethane	ND U	44.1	51.9	85	44.1	51.9	85	61-122	<1	30
Dichlorodifluoromethane (CFC 12)	ND U	36.8	51.9	71	36.3	51.9	70	44-138	1	30
Dichloromethane	ND U	40.9	51.9	79	40.9	51.9	79	64-120	<1	30
Ethyl Methacrylate	ND U	42.4	51.9	82	43.4	51.9	84	17-166	1	30
Ethylbenzene	ND U	39.0	51.9	75	39.2	51.9	76	44-131	1	30
Iodomethane	ND U	66.5	51.9	128	68.0	51.9	131	10-160	2	30
Methacrylonitrile	ND U	43.9	51.9	84	43.5	51.9	84	44-149	<1	30
Methyl Methacrylate	ND U	43.3	51.9	83	44.5	51.9	86	41-162	4	30
Naphthalene	ND U	51.6	51.9	99	50.1	51.9	97	10-187	2	30
Propionitrile	ND U	208	260	80	213	260	82	46-144	2	30
Tetrachloroethene (PCE)	1.1 J	39.9	51.9	75	40.4	51.9	76	45-141	1	30
Toluene	ND U	40.7	51.9	78	39.8	51.9	77	50-140	1	30
Trichloroethene (TCE)	ND U	47.3	51.9	91	47.2	51.9	91	54-136	<1	30
Trichlorofluoromethane (CFC 11)	ND U	34.1	51.9	66	35.0	51.9	67	47-129	2	30
Vinyl Chloride	ND U	41.1	51.9	79	40.8	51.9	79	53-128	<1	30
cis-1,3-Dichloropropene	ND U	40.8	51.9	79	41.0	51.9	79	31-150	<1	30
m,p-Xylenes	ND U	79.4	104	76	78.9	104	76	45-141	<1	30
o-Xylene	ND U	40.6	51.9	78	40.3	51.9	78	46-139	<1	30
trans-1,2-Dichloroethene	ND U	39.1	51.9	75	38.9	51.9	75	52-128	<1	30
trans-1,3-Dichloropropene	ND U	41.3	51.9	80	41.7	51.9	80	23-160	<1	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/Kg
Lab Code:	RQ1613524-01	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	5.0	0.83	1	11/03/16 15:17	
1,1,1-Trichloroethane (TCA)	ND U	5.0	0.73	1	11/03/16 15:17	
1,1,2,2-Tetrachloroethane	ND U	5.0	0.81	1	11/03/16 15:17	
1,1,2-Trichloroethane	ND U	5.0	0.73	1	11/03/16 15:17	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.0	1.3	1	11/03/16 15:17	
1,1-Dichloroethene (1,1-DCE)	ND U	5.0	1.3	1	11/03/16 15:17	
1,2,3-Trichloropropane	ND U	5.0	1.4	1	11/03/16 15:17	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.0	1.9	1	11/03/16 15:17	
1,2-Dibromoethane	ND U	5.0	1.3	1	11/03/16 15:17	
1,2-Dichlorobenzene	ND U	5.0	0.61	1	11/03/16 15:17	
1,2-Dichloroethane	ND U	5.0	0.61	1	11/03/16 15:17	
1,2-Dichloropropane	ND U	5.0	0.97	1	11/03/16 15:17	
1,3-Dichlorobenzene	ND U	5.0	0.63	1	11/03/16 15:17	
1,4-Dioxane	ND U	100	20	1	11/03/16 15:17	
2-Butanone (MEK)	ND U	5.0	2.3	1	11/03/16 15:17	
2-Chloro-1,3-butadiene	ND U	5.0	1.6	1	11/03/16 15:17	
2-Chloroethyl Vinyl Ether	ND U	5.0	1.8	1	11/03/16 15:17	
Isobutyl Alcohol	ND U	100	23	1	11/03/16 15:17	
Allyl Chloride	ND U	5.0	1.7	1	11/03/16 15:17	
4-Methyl-2-pentanone	ND U	5.0	0.98	1	11/03/16 15:17	
Acetone	ND U	5.0	2.9	1	11/03/16 15:17	
Acetonitrile	ND U	25	17	1	11/03/16 15:17	
Acrolein	ND U	25	3.5	1	11/03/16 15:17	
Acrylonitrile	ND U	25	6.5	1	11/03/16 15:17	
Benzene	ND U	5.0	0.29	1	11/03/16 15:17	
Bromodichloromethane	ND U	5.0	0.61	1	11/03/16 15:17	
Bromoform	ND U	5.0	0.93	1	11/03/16 15:17	
Bromomethane	ND U	5.0	1.4	1	11/03/16 15:17	
Carbon Disulfide	ND U	5.0	1.3	1	11/03/16 15:17	
Carbon Tetrachloride	ND U	5.0	0.92	1	11/03/16 15:17	
Chlorobenzene	ND U	5.0	0.29	1	11/03/16 15:17	
Chloroethane	ND U	5.0	2.9	1	11/03/16 15:17	
Chloroform	ND U	5.0	1.3	1	11/03/16 15:17	
Chloromethane	ND U	5.0	0.40	1	11/03/16 15:17	
Dibromochloromethane	ND U	5.0	0.73	1	11/03/16 15:17	
Dibromomethane	ND U	5.0	0.63	1	11/03/16 15:17	
Dichlorodifluoromethane (CFC 12)	ND U	5.0	1.9	1	11/03/16 15:17	
Dichloromethane	ND U	5.0	0.57	1	11/03/16 15:17	
Ethyl Methacrylate	ND U	5.0	0.75	1	11/03/16 15:17	
Ethylbenzene	ND U	5.0	0.23	1	11/03/16 15:17	
Iodomethane	ND U	10	1.2	1	11/03/16 15:17	
Methacrylonitrile	ND U	5.0	1.6	1	11/03/16 15:17	
Methyl Methacrylate	ND U	5.0	0.73	1	11/03/16 15:17	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/Kg
Lab Code:	RQ1613524-01	**Basis:**	Dry

Volatile Organic Compounds by GC/MS, Unpreserved

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	5.0	0.51	1	11/03/16 15:17	
Propionitrile	ND U	25	6.5	1	11/03/16 15:17	
Tetrachloroethene (PCE)	ND U	5.0	0.88	1	11/03/16 15:17	
Toluene	ND U	5.0	1.0	1	11/03/16 15:17	
Trichloroethene (TCE)	ND U	5.0	1.1	1	11/03/16 15:17	
Trichlorofluoromethane (CFC 11)	ND U	5.0	0.66	1	11/03/16 15:17	
Vinyl Chloride	ND U	5.0	1.9	1	11/03/16 15:17	
cis-1,3-Dichloropropene	ND U	5.0	0.90	1	11/03/16 15:17	
m,p-Xylenes	ND U	10	1.1	1	11/03/16 15:17	
o-Xylene	ND U	5.0	0.48	1	11/03/16 15:17	
trans-1,2-Dichloroethene	ND U	5.0	0.86	1	11/03/16 15:17	
trans-1,3-Dichloropropene	ND U	5.0	0.20	1	11/03/16 15:17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	95	51 - 136	11/03/16 15:17	
Dibromofluoromethane	95	63 - 138	11/03/16 15:17	
Toluene-d8	94	66 - 138	11/03/16 15:17	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
	No Tentatively Identified Compounds Detected			

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/15EC007B
Sample Matrix: Soil

Service Request: R1611337
Date Analyzed: 11/03/16

Lab Control Sample Summary
Volatile Organic Compounds by GC/MS, Unpreserved

Units:ug/Kg
Basis: Dry

Lab Control Sample
RQ1613524-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
1,1,1,2-Tetrachloroethane	8260C	15.0	20.0	75	40-140
1,1,1-Trichloroethane (TCA)	8260C	12.4	20.0	62	40-140
1,1,2,2-Tetrachloroethane	8260C	14.8	20.0	74	40-140
1,1,2-Trichloroethane	8260C	15.8	20.0	79	40-140
1,1,2-Trichloro-1,2,2-trifluoroethane	8260C	10.1	20.0	51	40-140
1,1-Dichloroethene (1,1-DCE)	8260C	13.3	20.0	67	40-140
1,2,3-Trichloropropane	8260C	14.6	20.0	73	40-140
1,2-Dibromo-3-chloropropane (DBCP)	8260C	15.0	20.0	75	40-140
1,2-Dibromoethane	8260C	15.1	20.0	75	40-140
1,2-Dichlorobenzene	8260C	14.8	20.0	74	40-140
1,2-Dichloroethane	8260C	14.1	20.0	70	40-140
1,2-Dichloropropane	8260C	13.9	20.0	69	40-140
1,3-Dichlorobenzene	8260C	14.4	20.0	72	40-140
1,4-Dioxane	8260C	303	400	76	40-140
2-Butanone (MEK)	8260C	16.3	20.0	82	40-140
2-Chloro-1,3-butadiene	8260C	18.7	20.0	94	40-140
2-Chloroethyl Vinyl Ether	8260C	6.16	20.0	31 *	40-140
Isobutyl Alcohol	8260C	235	400	59	40-140
Allyl Chloride	8260C	13.1	20.0	65	40-140
4-Methyl-2-pentanone	8260C	17.0	20.0	85	40-140
Acetone	8260C	22.1	20.0	111	40-140
Acetonitrile	8260C	57.9	100	58	40-140
Acrolein	8260C	40.7	40.0	102	40-140
Acrylonitrile	8260C	64.4	100	64	40-140
Benzene	8260C	14.1	20.0	70	40-140
Bromodichloromethane	8260C	13.9	20.0	70	40-140
Bromoform	8260C	18.4	20.0	92	40-140
Bromomethane	8260C	13.5	20.0	68	40-140
Carbon Disulfide	8260C	20.6	20.0	103	40-140
Carbon Tetrachloride	8260C	12.5	20.0	63	40-140
Chlorobenzene	8260C	15.2	20.0	76	40-140
Chloroethane	8260C	12.8	20.0	64	40-140
Chloroform	8260C	13.3	20.0	66	40-140

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/15EC007B
Sample Matrix: Soil

Service Request: R1611337
Date Analyzed: 11/03/16

Lab Control Sample Summary
Volatile Organic Compounds by GC/MS, Unpreserved

Units:ug/Kg
Basis: Dry

Lab Control Sample
RQ1613524-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Chloromethane	8260C	12.8	20.0	64	40-140
Dibromochloromethane	8260C	15.7	20.0	79	40-140
Dibromomethane	8260C	15.4	20.0	77	40-140
Dichlorodifluoromethane (CFC 12)	8260C	12.2	20.0	61	40-140
Dichloromethane	8260C	14.4	20.0	72	40-140
Ethyl Methacrylate	8260C	13.9	20.0	70	40-140
Ethylbenzene	8260C	13.1	20.0	65	40-140
Iodomethane	8260C	36.1	20.0	180 *	40-140
Methacrylonitrile	8260C	13.3	20.0	67	40-140
Methyl Methacrylate	8260C	14.2	20.0	71	40-140
Naphthalene	8260C	15.1	20.0	75	40-140
Propionitrile	8260C	70.2	100	70	40-140
Tetrachloroethene (PCE)	8260C	12.9	20.0	64	40-140
Toluene	8260C	13.9	20.0	70	40-140
Trichloroethene (TCE)	8260C	15.2	20.0	76	40-140
Trichlorofluoromethane (CFC 11)	8260C	12.3	20.0	61	40-140
Vinyl Chloride	8260C	14.3	20.0	71	40-140
cis-1,3-Dichloropropene	8260C	14.3	20.0	72	40-140
m,p-Xylenes	8260C	26.9	40.0	67	40-140
o-Xylene	8260C	13.9	20.0	70	40-140
trans-1,2-Dichloroethene	8260C	14.2	20.0	71	40-140
trans-1,3-Dichloropropene	8260C	14.6	20.0	73	40-140

Metals

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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	Dry
Lab Code:	R1611337-MB		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/Kg	6.0	0.4	1	10/31/16 18:30	10/28/16	
Arsenic, Total	6010C	ND U	mg/Kg	1.0	0.3	1	11/02/16 10:34	10/28/16	
Barium, Total	6010C	ND U	mg/Kg	2.0	0.2	1	10/31/16 18:30	10/28/16	
Beryllium, Total	6010C	ND U	mg/Kg	0.30	0.02	1	10/31/16 18:30	10/28/16	
Cadmium, Total	6010C	ND U	mg/Kg	0.50	0.04	1	10/31/16 18:30	10/28/16	
Chromium, Total	6010C	ND U	mg/Kg	1.0	0.2	1	10/31/16 18:30	10/28/16	
Lead, Total	6010C	ND U	mg/Kg	5.0	0.3	1	10/31/16 18:30	10/28/16	
Mercury, Total	7471B	ND U	mg/Kg	5.5	0.5	1	10/31/16 10:28	10/28/16	
Nickel, Total	6010C	**0.6 J**	mg/Kg	4.0	0.2	1	10/31/16 18:30	10/28/16	
Selenium, Total	6010C	ND U	mg/Kg	1.0	0.6	1	10/31/16 18:30	10/28/16	
Silver, Total	6010C	ND U	mg/Kg	1.0	0.5	1	10/31/16 18:30	10/28/16	
Thallium, Total	6010C	ND U	mg/Kg	1.0	0.6	1	10/31/16 18:30	10/28/16	
Vanadium, Total	6010C	ND U	mg/Kg	5.0	0.2	1	10/31/16 18:30	10/28/16	
Zinc, Total	6010C	**0.8 J**	mg/Kg	2.0	0.2	1	10/31/16 18:30	10/28/16	

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/15EC007B
Sample Matrix: Soil

Service Request:R1611337
Date Collected:10/23/16
Date Received:10/26/16
Date Analyzed:10/31/16 - 11/04/16

Matrix Spike Summary
Inorganic Parameters

Sample Name: 1610231126 1BC7351
Lab Code: R1611337-009

Units:mg/Kg
Basis: Dry

Matrix Spike
R1611337-009MS

Analyte Name	Method	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Silver, Total	6010C	ND U	4.5	5.1	89	75-125
Arsenic, Total	6010C	5.8	10	4.1	102	75-125
Barium, Total	6010C	204	510	204	151 *	75-125
Beryllium, Total	6010C	0.45	5.30	5.09	95	75-125
Cadmium, Total	6010C	0.34 J	4.78	5.09	87	75-125
Chromium, Total	6010C	12.9	33.7	20.4	102	75-125
Mercury, Total	7471B	ND U	ND U	0.2	109	75-125
Nickel, Total	6010C	10.1	54.1	50.9	86	75-125
Lead, Total	6010C	9.7	55.5	50.9	90	75-125
Antimony, Total	6010C	ND U	43.7	50.9	86	75-125
Selenium, Total	6010C	1.2	96.9	103	93	75-125
Thallium, Total	6010C	ND U	187	204	92	75-125
Vanadium, Total	6010C	12.5	63.9	50.9	101	75-125
Zinc, Total	6010C	44.3	86.8	50.9	83	75-125

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: NASA/WSTF/Navarro
Project White Sands Test Facility/15EC007B
Sample Matrix: Soil

Service Request: R1611337
Date Collected: 10/23/16
Date Received: 10/26/16
Date Analyzed: 10/31/16 - 11/04/16

Replicate Sample Summary
Inorganic Parameters

Sample Name: 1610231126 1BC7351
Lab Code: R1611337-009

Units: mg/Kg
Basis: Dry

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample R1611337-009DUP Result	Average	RPD	RPD Limit
Antimony, Total	6010C	6.1	0.5	ND U	0.6 J	NC	NC	20
Arsenic, Total	6010C	1.0	0.3	5.8	4.7	5.26	21 *	20
Barium, Total	6010C	2.0	0.2	204	191	197	6	20
Beryllium, Total	6010C	0.31	0.02	0.45	0.45	0.454	<1	20
Cadmium, Total	6010C	0.51	0.04	0.34 J	0.32 J	0.330	5	20
Chromium, Total	6010C	1.0	0.2	12.9	11.6	12.2	11	20
Lead, Total	6010C	5.1	0.3	9.7	8.9	9.31	9	20
Mercury, Total	7471B	5.7	0.6	ND U	ND U	NC	NC	35
Nickel, Total	6010C	4.1	0.2	10.1	10	10.0	<1	20
Selenium, Total	6010C	1.0	0.7	1.2	1.3	1.23	8	20
Silver, Total	6010C	1.0	0.5	ND U	ND U	NC	NC	20
Thallium, Total	6010C	5.1	2.6	ND U	ND U	NC	NC	20
Vanadium, Total	6010C	5.1	0.2	12.5	11.9	12.2	5	20
Zinc, Total	6010C	2.0	0.2	44.3	44.7	44.5	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/15EC007B
Sample Matrix: Soil

Service Request: R1611337
Date Analyzed: 10/31/16 - 11/02/16

Lab Control Sample Summary
Inorganic Parameters

Units:mg/Kg
Basis: Dry

Lab Control Sample
R1611337-LCS

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Antimony, Total	6010C	44.8	50.0	90	80-120
Arsenic, Total	6010C	3.7	4.0	92	80-120
Barium, Total	6010C	200	200	100	80-120
Beryllium, Total	6010C	4.58	5.00	92	80-120
Cadmium, Total	6010C	4.70	5.00	94	80-120
Chromium, Total	6010C	20.3	20.0	102	80-120
Lead, Total	6010C	47.6	50.0	95	80-120
Mercury, Total	7471B	ND U	0.2	102	80-120
Nickel, Total	6010C	49.2	50.0	98	80-120
Selenium, Total	6010C	85.3	101	84	80-120
Silver, Total	6010C	4.6	5.0	92	80-120
Thallium, Total	6010C	175	200	88	80-120
Vanadium, Total	6010C	49.2	50.0	98	80-120
Zinc, Total	6010C	48.1	50.0	96	80-120

General Chemistry

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dba ALS Environmental

QA/QC Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16
		Date Analyzed:	10/28/16

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	1610231120 1BC7351	**Units:**	Percent
Lab Code:	R1611337-007	**Basis:**	As Received

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample R1611337-007DUP Result	Average	RPD	RPD Limit
Total Solids	ALS SOP	-	96.3	96.0	96.1	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611337
Project	White Sands Test Facility/15EC007B	**Date Collected:**	10/23/16
Sample Matrix:	Soil	**Date Received:**	10/26/16
		Date Analyzed:	10/28/16

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	1610231126 1BC7351	**Units:**	Percent
Lab Code:	R1611337-009	**Basis:**	As Received

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample R1611337-009DUP Result	Average	RPD	RPD Limit
Total Solids	ALS SOP	-	-	95.3	94.5	94.9	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Subcontracted Analytical Parameters

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

November 2, 2016

Reports and Invoices
ALS Environmental
1565 Jefferson Road
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Rochester, NY 14623

Certificate of Analysis

Project Name:	**TCLP Metals - no J values**	Workorder:	**2185326**
Purchase Order:	**58R1611337**	Workorder ID:	**R1611337**

Dear Reports Invoices:

Enclosed are the analytical results for samples received by the laboratory on Friday, October 28, 2016.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Mr. Brad W Kintzer (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

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ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Ellen Smith , Ms. Janice Jaeger

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Mr. Brad W Kintzer
Project Coordinator

ALS Environmental

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

SAMPLE SUMMARY

Workorder: 2185326 R1611337

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2185326001	1610231103 IBC7350	Solid	10/23/2016 00:00	10/28/2016 08:48	Collected by Client
2185326002	1610231107 IBC7349	Solid	10/23/2016 00:00	10/28/2016 08:48	Collected by Client
2185326003	1610231129 IBC7351	Solid	10/23/2016 00:00	10/28/2016 08:48	Collected by Client
2185326004	1610231130 IBC7351	Solid	10/23/2016 00:00	10/28/2016 08:48	Collected by Client

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

SAMPLE SUMMARY

Workorder: 2185326 R1611337

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.
-- For microbiological analyses, the "Prepared" value is the date/time into the incurbator and the "Analyzed" value is the date/time out the incubator.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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ANALYTICAL RESULTS

Workorder: 2185326 R1611337

Lab ID: **2185326001** Date Collected: 10/23/2016 00:00 Matrix: Solid

Sample ID: **1610231103 IBC7350** Date Received: 10/28/2016 08:48

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	3.1		%	0.1	S2540G-11			10/30/16 20:30	KAM	A
Total Solids	96.9		%	0.1	S2540G-11			10/30/16 20:30	KAM	A
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:18	SRT	A2
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:18	SRT	A2
Barium, Total	ND		mg/L	2.8	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:18	SRT	A2
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:18	SRT	A2
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:18	SRT	A2
Chromium, Total	ND		mg/L	0.028	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:18	SRT	A2
Lead, Total	ND		mg/L	0.033	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:18	SRT	A2
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	11/1/16 01:00	MNP	11/1/16 14:46	MNP	A1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:18	SRT	A2
Selenium, Total	ND		mg/L	0.11	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:18	SRT	A2
Silver, Total	ND		mg/L	0.022	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:18	SRT	A2
Thallium, Total	ND		mg/L	0.11	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:18	SRT	A2
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:18	SRT	A2
Zinc, Total	ND		mg/L	0.11	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:18	SRT	A2

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ANALYTICAL RESULTS

Workorder: 2185326 R1611337

Lab ID: **2185326002** Date Collected: 10/23/2016 00:00 Matrix: Solid

Sample ID: **1610231107 IBC7349** Date Received: 10/28/2016 08:48

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	5.2		%	0.1	S2540G-11			10/30/16 20:30	KAM	A
Total Solids	94.8		%	0.1	S2540G-11			10/30/16 20:30	KAM	A
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:22	SRT	A2
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:22	SRT	A2
Barium, Total	ND		mg/L	2.8	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:22	SRT	A2
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:22	SRT	A2
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:22	SRT	A2
Chromium, Total	ND		mg/L	0.028	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:22	SRT	A2
Lead, Total	ND		mg/L	0.033	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:22	SRT	A2
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	11/1/16 01:00	MNP	11/1/16 14:49	MNP	A1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:22	SRT	A2
Selenium, Total	ND		mg/L	0.11	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:22	SRT	A2
Silver, Total	ND		mg/L	0.022	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:22	SRT	A2
Thallium, Total	ND		mg/L	0.11	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:22	SRT	A2
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:22	SRT	A2
Zinc, Total	ND		mg/L	0.11	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:22	SRT	A2

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ANALYTICAL RESULTS

Workorder: 2185326 R1611337

Lab ID: **2185326003** Date Collected: 10/23/2016 00:00 Matrix: Solid

Sample ID: **1610231129 IBC7351** Date Received: 10/28/2016 08:48

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	4.0		%	0.1	S2540G-11			10/30/16 20:30	KAM	A
Total Solids	96.0		%	0.1	S2540G-11			10/30/16 20:30	KAM	A
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:26	SRT	A2
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:26	SRT	A2
Barium, Total	3.6		mg/L	2.8	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:26	SRT	A2
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:26	SRT	A2
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:26	SRT	A2
Chromium, Total	ND		mg/L	0.028	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:26	SRT	A2
Lead, Total	ND		mg/L	0.033	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:26	SRT	A2
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	11/1/16 01:00	MNP	11/1/16 14:50	MNP	A1
Nickel, Total	ND		mg/L	0.11	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:26	SRT	A2
Selenium, Total	ND		mg/L	0.11	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:26	SRT	A2
Silver, Total	ND		mg/L	0.022	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:26	SRT	A2
Thallium, Total	ND		mg/L	0.11	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:26	SRT	A2
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:26	SRT	A2
Zinc, Total	ND		mg/L	0.11	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:26	SRT	A2

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ANALYTICAL RESULTS

Workorder: 2185326 R1611337

Lab ID: **2185326004** Date Collected: 10/23/2016 00:00 Matrix: Solid

Sample ID: **1610231130 IBC7351** Date Received: 10/28/2016 08:48

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Moisture	4.8		%	0.1	S2540G-11			10/30/16 20:30	KAM	A
Total Solids	95.2		%	0.1	S2540G-11			10/30/16 20:30	KAM	A
TCLP METALS										
Antimony, Total	ND		mg/L	0.15	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:37	SRT	A1
Arsenic, Total	ND		mg/L	0.14	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:37	SRT	A1
Barium, Total	3.1		mg/L	2.8	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:37	SRT	A1
Beryllium, Total	ND		mg/L	0.022	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:37	SRT	A1
Cadmium, Total	ND		mg/L	0.011	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:37	SRT	A1
Chromium, Total	ND		mg/L	0.028	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:37	SRT	A1
Lead, Total	ND		mg/L	0.033	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:37	SRT	A1
Mercury, Total	ND		mg/L	0.0020	SW846 7470A	11/1/16 08:30	MNP	11/1/16 15:08	MNP	A2
Nickel, Total	ND		mg/L	0.11	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:37	SRT	A1
Selenium, Total	ND		mg/L	0.11	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:37	SRT	A1
Silver, Total	ND		mg/L	0.022	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:37	SRT	A1
Thallium, Total	ND		mg/L	0.11	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:37	SRT	A1
Vanadium, Total	ND		mg/L	0.028	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:37	SRT	A1
Zinc, Total	ND		mg/L	0.11	SW846 6010C	11/1/16 05:15	TSS	11/1/16 12:37	SRT	A1

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QUALITY CONTROL DATA

Workorder: 2185326 R1611337

QC Batch: MDIG/60546 **Analysis Method:** SW846 7470A

QC Batch Method: SW846 7470A

Associated Lab Samples: 2185326001, 2185326002, 2185326003

METHOD BLANK: 2432319

Parameter	Blank Result	Units	Reporting Limit
Mercury, Total	ND	mg/L	0.0020

LABORATORY CONTROL SAMPLE: 2432320

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Mercury, Total	99	mg/L	.002	ND	85 - 115

MATRIX SPIKE: 2432321 DUPLICATE: 2432322 ORIGINAL: 2185326003

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Mercury, Total	0	mg/L	.005	.00499	.00508	99.8	102	70 - 130	1.79	20

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QUALITY CONTROL DATA

Workorder: 2185326 R1611337

QC Batch: MDIG/60550 **Analysis Method:** SW846 6010C

QC Batch Method: SW846 3015

Associated Lab Samples: 2185326001, 2185326002, 2185326003, 2185326004

METHOD BLANK: 2432634

Parameter	Blank Result	Units	Reporting Limit
Antimony, Total	ND	mg/L	0.030
Arsenic, Total	ND	mg/L	0.028
Barium, Total	ND	mg/L	0.56
Beryllium, Total	ND	mg/L	0.0044
Cadmium, Total	ND	mg/L	0.0022
Chromium, Total	ND	mg/L	0.0056
Lead, Total	ND	mg/L	0.0067
Nickel, Total	ND	mg/L	0.022
Selenium, Total	ND	mg/L	0.022
Silver, Total	ND	mg/L	0.0044
Thallium, Total	ND	mg/L	0.022
Vanadium, Total	ND	mg/L	0.0056
Zinc, Total	ND	mg/L	0.022

LABORATORY CONTROL SAMPLE: 2432635

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Antimony, Total	98.8	mg/L	.22	0.22	80 - 120
Arsenic, Total	99.9	mg/L	.11	0.11	80 - 120
Barium, Total	104	mg/L	1.1	1.2	80 - 120
Beryllium, Total	103	mg/L	.22	0.23	80 - 120
Cadmium, Total	101	mg/L	.11	0.11	80 - 120
Chromium, Total	103	mg/L	.11	0.11	80 - 120
Lead, Total	104	mg/L	.11	0.12	80 - 120
Nickel, Total	100	mg/L	1.1	1.1	80 - 120
Selenium, Total	98.5	mg/L	1.1	1.1	80 - 120
Silver, Total	101	mg/L	.11	0.11	80 - 120
Thallium, Total	103	mg/L	.11	0.11	80 - 120
Vanadium, Total	102	mg/L	.056	0.057	80 - 120
Zinc, Total	102	mg/L	.56	0.57	80 - 120

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QUALITY CONTROL DATA

Workorder: 2185326 R1611337

MATRIX SPIKE: 2432636 DUPLICATE: 2432637 ORIGINAL: 2185326003

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Arsenic, Total	.02167	mg/L	5	4.73717	5.34161	94.3	106	50 - 150	12	20
Barium, Total	3.58385	mg/L	10	13.09987	13.88319	95.2	103	50 - 150	5.81	20
Cadmium, Total	0	mg/L	1	.95277	1.0711	95.3	107	50 - 150	11.7	20
Chromium, Total	.00056	mg/L	5	4.76106	4.97606	95.2	99.5	50 - 150	4.42	20
Lead, Total	.00333	mg/L	5	4.53051	5.05106	90.5	101	50 - 150	10.9	20
Selenium, Total	.00944	mg/L	1	.9311	1.05443	92.2	104	50 - 150	12.4	20
Silver, Total	0	mg/L	1	.96999	1.02499	97	102	50 - 150	5.51	20

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QUALITY CONTROL DATA

Workorder: 2185326 R1611337

QC Batch: MDIG/60557 **Analysis Method:** SW846 7470A

QC Batch Method: SW846 7470A

Associated Lab Samples: 2185326004

METHOD BLANK: 2432706

Parameter	Blank Result	Units	Reporting Limit
Mercury, Total	ND	mg/L	0.0020

LABORATORY CONTROL SAMPLE: 2432707

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Mercury, Total	103	mg/L	.002	0.0021	85 - 115

MATRIX SPIKE: 2432708 DUPLICATE: 2432709 ORIGINAL: 2185326004

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Mercury, Total	0	mg/L	.005	.00521	.00514	104	103	70 - 130	1.35	20

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QUALITY CONTROL DATA

Workorder: 2185326 R1611337

QC Batch: WETC/178204 **Analysis Method:** S2540G-11

QC Batch Method: S2540G-11

Associated Lab Samples: 2185326001, 2185326002, 2185326003, 2185326004

SAMPLE DUPLICATE: 2431940 ORIGINAL: 2185454001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	1.7964	%	4.6511	88.6*	10
Total Solids	98.2035	%	95.3488	2.95	5

SAMPLE DUPLICATE: 2431941 ORIGINAL: 2184643001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	5.1724	%	4.2682	19.2*	10
Total Solids	94.8275	%	95.7317	.95	5

SAMPLE DUPLICATE: 2431942 ORIGINAL: 2185488002

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	18.7416	%	20.8658	10.7*	10
Total Solids	81.2583	%	79.1341	2.65	5

SAMPLE DUPLICATE: 2431943 ORIGINAL: 2185439004

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	10.2877	%	10.587	2.87	10
Total Solids	89.7122	%	89.4129	.33	5

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 2185326 R1611337

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
2185326001	1610231103 IBC7350			S2540G-11	WETC/178204
2185326002	1610231107 IBC7349			S2540G-11	WETC/178204
2185326003	1610231129 IBC7351			S2540G-11	WETC/178204
2185326004	1610231130 IBC7351			S2540G-11	WETC/178204
2185326001	1610231103 IBC7350	SW846 7470A	MDIG/60546	SW846 7470A	META/54808
2185326002	1610231107 IBC7349	SW846 7470A	MDIG/60546	SW846 7470A	META/54808
2185326003	1610231129 IBC7351	SW846 7470A	MDIG/60546	SW846 7470A	META/54808
2185326001	1610231103 IBC7350	SW846 3015	MDIG/60550	SW846 6010C	META/54803
2185326002	1610231107 IBC7349	SW846 3015	MDIG/60550	SW846 6010C	META/54803
2185326003	1610231129 IBC7351	SW846 3015	MDIG/60550	SW846 6010C	META/54803
2185326004	1610231130 IBC7351	SW846 3015	MDIG/60550	SW846 6010C	META/54803
2185326004	1610231130 IBC7351	SW846 7470A	MDIG/60557	SW846 7470A	META/54808

ALS Environmental Chain of Custody

1565 Jefferson Rd, Building 300 • Rochester, NY 14623 • 585-288-5380 • FAX 585-288-8475

ALS Cor

* 2 1 8 5 3 2 6 *

Project Number: R1611337
Project Manager: Janice Jaeger
QAP: LAB QAP

Lab Code	Sample ID	# of Cont.	Matrix	Sample Date	Sample Time	Lab ID	Ag TCLP 6010C	As TCLP 6010C	Ba TCLP 6010C	Be TCLP 6010C	Cd TCLP 6010C	Cr TCLP 6010C	Hg TCLP 7470A	Ni TCLP 6010C	Pb TCLP 6010C
[redacted]	1610231103 1BC7350	1	Soil	10/23/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610231107 1BC7349	1	Soil	10/23/16		Middletown ALS	X	X	X	X	X	X	X	X	X
[redacted]	1610231129 1BC7351 QC	2	Soil	10/23/16		Middletown ALS	X	X	X	X	X	X	X	X	X
R[redacted]	1610231130 1BC7351	1	Soil	10/23/16		Middletown ALS	X	X	X	X	X	X	X	X	X

	Y	N	Initials	
Custody Seals Present?				Cooler Temp: 3 °C
(if present) Seals Intact?				
Received on Ice?				Cooler #:
COC/Lbls Complete				
Cont in Good Cond?				Therm ID: IR-352
Correct Containers?				
Correct Samp Vol?				Ship Carrier:
Correct Preservation?				FedEx UPS
Headspace/Volatiles?				DHL

Tracking #: 6826 8016 8955

AG
10/28/16

Folder Comments:
ND U

Special Instructions/Comments	Turnaround Requirements	Report Requirements	Invoice Information
H - Test is On Hold P - Test is Authorized for Prep Only	___ RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 X STANDARD Requested FAX Date: ___ Requested Report Date: 11/04/16	___ I. Results Only X II. Results + QC Summaries ___ III. Results + QC and Calibration Summaries ___ IV. Data Validation Report with Raw Data PQL/MDL/J Y EDD Y	PO# 58R1611337 Bill to

Relinquished By: [signature] 10-27-16 1440 Received By: [signature] 10/28/16 0848 Airbill Number: ___

2185326

							Sb TCLP 6010C	Se TCLP 6010C	TCLP EPA 1311	Tl TCLP 6010C	V TCLP 6010C	Zn TCLP 6010C
[redacted]	1610231103 1BC7350		Soil	10/23/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610231107 1BC7349		Soil	10/23/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610231129 1BC7351		Soil	10/23/16		Middletown ALS	X	X	X	X	X	X
[redacted]	1610231130 1BC7351		Soil	10/23/16		Middletown ALS	X	X	X	X	X	X

ALS

SOUTHWEST RESEARCH INSTITUTE®

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Chemistry and Chemical Engineering Division
Department of Analytical & Environmental Chemistry

October 18, 2016

Navarro Research and Engineering Inc.
NASA - JSC - White Sands Test Facility
Transportation Officer, Building 120
12600 NASA Road
Las Cruces, NM 88012
Tel. 575-524-5452

Attention: Tom Hall

Subject: Reports for Batch-607-#717-IBC for NDMA/DMN Analysis of Soil Samples
SwRI Project #: 01.16988.103
SwRI Task Orders: **161005-5**
Navarro P.O. #: 15EC092B

Dear Tom,

Enclosed please find the analytical reports for Batch-607- #717-IBC-Navarro of soil samples.

Southwest Research Institute appreciates the opportunity to provide the service to Navarro Research and Engineering Inc.. If you have any questions, please do not hesitate to call me at 210-522-3954.

Sincerely,

Gang Sun, Ph.D.
Program Manager

APPROVAL:

for Michael Dammann
Director

CLIENT: Navarro Research and Engineering Inc.
SwRI PROJECT: 01.16988
TASK ORDER: 161005-5
NAVARRO PO #: 15EC092B

NARRATIVE

(M-607 - #717-IBC-Navarro)

Total Page Count: 010001 -
Fraction: 607 Pages: 010024
NDMA/DMN Orumacil

CLIENT: NAVARRO
SwRI PROJECT: 01.16988.01.103
BATCH #: Batch-607-#717-IBC
TASK ORDER: 161005-5
CLIENT PO#: 15EC092B
REPORT DATA: 10/18/2016

NARRATIVE FOR NDMA/ DMN/BROMACIL ANALYSIS

1. Samples were extracted with dichloromethane (DCM) and analyzed by GC/MS in selective ion monitoring mode for N-Nitrosodimethylamine (NDMA) and N-Nitrodimethylamine (DMN) according to the modified Method 607.

2. All samples were extracted within 14 days for soil sample of sample collection and were analyzed within 40 days after the extraction.

3. The response factor (RF) values for Calibration curve and/or for continuing calibration standard were less than 25 % for all target compounds. The sample reporting limit is 0.33 ppb for 30 g extracted soil samples.

4. Both blank spike and matrix spike samples were spiked at 17 ppb for soil sample, then extracted and analyzed. The recoveries for all target compounds were within method recovery criteria of 13-110% for NDMA, 30-150% for DMN, and 40-190% for Bromacil, respectively. The soil sample result is reported as received basis and not by dry weight.

5. Surrogate compound was spiked into every sample before sample extraction at 17 ppb for soil sample. The surrogate recoveries for all samples were within method recovery criteria of 40-160%.

6. Laboratory blanks were extracted and analyzed for every sample batch. No analytes were detected above report limits from the blanks.

7. A "J" value was reported if the associated value was below reporting limits but above the MDL value.

8. All analyte concentrations are expressed in ng/g (*ppb*). Sample calculation:

$$\text{for soil: Concentration } (\mu g/kg) = \frac{C\ (ng/\mu L) \times V_{extr}\ (\mu L) \times DF}{W_{samp}(g)} \times \frac{1000\ g}{1\ kg} \times \frac{1\ \mu g}{1000\ ng}$$

where:
- C = result of GC/MS analysis, in ng/µL
- V_{extr} = final volume of sample extract, in µL
- V_{samp} = aqueous sample volume taken for extraction, in mL
- W_{samp} = soil sample weight taken for extraction, in gram
- DF = dilution factor, if any

CLIENT: Navarro Research and Engineering Inc.
SwRI PROJECT: 01.16988
TASK ORDER: 161005-5
NAVARRO PO #: 15EC092B

TASK ORDER AND CHAIN OF CUSTODY

Southwest Research Institute

Laboratory Task Order

TO #: 161005-5 Revision: 1

SDG: 604789

SRR #'s: 58458
Client(s): Navarro

Project(s): 16988.01.10X
Manager(s): SUN, GANG
To Client: 10/26/16

Instructions

Documents Related to this task order: 208573[COC for SRR 58458], 208574[Paperwork for SRR 58458], 108294[PO #179 + #180], 113038[PO #179 + #180 Change Order #1], 113134[PO #NAV0000060], 115908[PO #NAV0000060 CO #1], 117303[PO #NAV0000060 CO #2], 118820[PO #179 + #180 Change Order #2], 120319 [PO #104], 122923[PO #179 Change Order #3], 124787[PO #132], 124995[PO #179 Change Order #5]

Deliverables --> Hard Copy: no EDD: -YES- PDF: -YES-

Test: E607S
Section: EXTLAB

Holding: 14 days from CED

EXTRACTION BY METHOD 607.

Cnt: 7

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
604789		1	Soil	1610040803 IBC 7287	04 Oct 16	18 Oct 16
604790		1	Soil	1610040804 IBC 7287	04 Oct 16	18 Oct 16
604791	MS	1	Soil	1610040805 IBC 7287	04 Oct 16	18 Oct 16
604792		1	Soil	1610040821 IBC 7288	04 Oct 16	18 Oct 16
604793		1	Soil	1610040841 IBC 7294	04 Oct 16	18 Oct 16
604794		1	Soil	1610040851 IBC 7295	04 Oct 16	18 Oct 16
604795		1	Soil	1610040901 IBC 7296	04 Oct 16	18 Oct 16

Test: T607W
Section: TDG

Holding: 40 days from VTSR

NDMA/DMN ANALYSIS BY GC/MS/SIM

Cnt: 7

System ID	Type	Cont	Matrix	Customer ID	VTSR	Method Date
604789		1	Soil	1610040803 IBC 7287	05 Oct 16	14 Nov 16
604790		1	Soil	1610040804 IBC 7287	05 Oct 16	14 Nov 16
604791	MS	1	Soil	1610040805 IBC 7287	05 Oct 16	14 Nov 16
604792		1	Soil	1610040821 IBC 7288	05 Oct 16	14 Nov 16
604793		1	Soil	1610040841 IBC 7294	05 Oct 16	14 Nov 16
604794		1	Soil	1610040851 IBC 7295	05 Oct 16	14 Nov 16
604795		1	Soil	1610040901 IBC 7296	05 Oct 16	14 Nov 16

Date October 4, 2016

Page 1 of 1

010005

Laboratory: Southwest Research Institute	PO #15EC092B	Analytical Requirements			Charge Number (WTSF Use Only)	Special Instructions
Address shipping questions to: ☐ Lori Minnick, 575-524-5119 ☒ Other Tom Hall, 575-524-5453						Return coolers and reusable packaging materials within 14 days as required in statement of work to: Return Address: NASA WSTF Environmental Department 12600 NASA Road, Bldg. 120 Las Cruces, NM 88012 Attn: Lori Minnick
Send sample receipt confirmation and analytical reports to: ☐ Carlyn Tufts, carlyn.a.tufts@nasa.gov ☐ Shelly Hernandez, shelly.j.hernandez@nasa.gov ☒ Tom Hall, tom.a.hall@nasa.gov		# of Containers	Sample Matrix*	NDMA EPA Method 607M 8 oz. Glass Jar, Ice		
Sample Number	Sample Location					Comments
1610040803	IBC 7287	1	S	X	16EEE4IFW	
1610040804	IBC 7287	1	S	X	16EEE4IFW	
1610040805	IBC 7287	1	S	X	16EEE4IFW	Matrix Spike for 1610040803
1610040821	IBC 7288	1	S	X	16EEE4IFW	
1610040841	IBC 7294	1	S	X	16EEE4IFW	
1610040851	IBC 7295	1	S	X	16EEE4IFW	
1610040901	IBC 7296	1	S	X	16EEE4IFW	

Relinquished By:	Date/Time:	Accepted By:	Date/Time:
[signature]	10-4-2016 (1030)	[signature]	10-05-16 / 08:30

* Sample Matrix: A – Aqueous; G – Gaseous; S – Solid

Client: Navarro
SRR # 58458
Project # 16988.01.10X
Case: 15EC092B
VTSR: 10/05/16
Sample(s) Received: Intact
Temperature: 1.8 SN # 021055

010006

NASA-WSTF SHIPPING DOCUMENT

1 Red MR4

SHIPPED FROM: **NASA JSC WHITE SANDS TEST FACILITY** **12600 NASA ROAD; BLDG. 120** **LAS CRUCES, NEW MEXICO 88012**	WSTF ORIGINATOR/MAIL CODE/TELEPHONE NO. Tom Hall 575-524-5453		
	ORDER OR CONTRACT NUMBER Navarro PO #15EC092B		SHIPMENT CONTROL NO
SHIP TO: (ADDRESS, PHONE#, POINT OF CONTACT) Southwest Research Institute 6220 Culebra Raod San Antonio, TX 782238 Gang Sun 210-522-3954	PROJECT or TASK NUMBER CP.6EE4IFW.0.71 - 16EE4IFW		SHIP VIA **Fed Ex Air**
	Contain Batteries NO	NO. PKG. 1	DATE SHIPPE 10/4/2016
	Battery Type-Part # N/A	AUTHORIZED BY: Tom Hall	DEPT. Environmental

ITEM NO.	EQUIPMENT CONTROL NO.	MODEL NO./ STOCK NO./ PART NO.	ITEM NAME - MANUFACTURER'S NAME AND SERIAL NO.	UNIT OF ISSUE	QTY.
1 Lot-Samples			Soil Samples Navarro PO #15EC092B Line Item #1 NDMA and Bromacil for Soil samples by method 607M	ea. ea.	7

Client: Navarro
SRR # 58458
Project # 16988.01.10X
Case: 15EC092B
VTSR: 10/05/16
Sample(s) Received: Intact
Temperature: 1.8 SN # 021055

JUSTIFICATION FOR SHIPMENT: (MDR #, Return Authorization #'s, Warranty Replacement, Repair, Overage/Shortage, Damage, Recycling)
Sample for analysis as requested (Navarro PO #15EC0092B)

DOT HAZARDOUS MATERIALS INFO; EMERGENCY PHONE NUMBER AND GUIDE NUMBER:
Not subject to regulation as a hazard material under 49 CFR.

PROPERTY REVIEW: ☐ REMOVE EQUIPMENT TAG ☐ DO NOT REMOVE EQUIPMENT TAG

PACKED BY:	# CONTAINERS	TYPE CONTAINERS	DIMENSIONS	WEIGHT
Please check off the applicable labels! ☐ FRAGILE ☑ GLASS ☐ DELICATE ☐ DO NOT XRAY ☑ REFRIGERATE ☐ OTHER ☑ BUBBLEWRAP ☑ FOAM	7	Glass Containers	7 ea.8 oz. Glass Jars	
	TOTAL CONTAINERS			TOTAL WEIGHT
	7			

RECEIVED BY: David Ham
REPRESENTING: SwRI

SHIPPERS CERTIFICATION: This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the regulations of the D.O.T. _____ Date_____

CLIENT:	**Navarro Research and Engineering Inc.**
SwRI PROJECT:	**01.16988**
TASK ORDER:	**161005-5**
NAVARRO PO #:	**15EC092B**

ANALYTICAL DATA REPORT SHEETS

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610040803 IBC 7287

Client: Navarro
Batch: M607-#717-IBC
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.15 g

Project: 16988.01.103
Date Received: 10/05/16
Date Extracted: 10/11/16
Date Analyzed: 10/18/16
Date Reported: 10/18/16

Lab Sample ID: 604789
Lab File Name: A1017624.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	1.53	
4164-28-7	N-Nitrodimethylamine	4.21	
314-40-9	Bromacil	0.20	J

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610040804 IBC 7287

Client: Navarro
Batch: M607-#717-IBC
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.15 g

Project: 16988.01.103
Date Received: 10/05/16
Date Extracted: 10/11/16
Date Analyzed: 10/18/16
Date Reported: 10/18/16

Lab Sample ID: 604790
Lab File Name: A1017625.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	1.66	
4164-28-7	N-Nitrodimethylamine	4.21	
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610040821 IBC 7288

Client: Navarro
Batch: M607-#717-IBC
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.05 g

Project: 16988.01.103
Date Received: 10/05/16
Date Extracted: 10/11/16
Date Analyzed: 10/18/16
Date Reported: 10/18/16

Lab Sample ID: 604792
Lab File Name: A1017627.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	72.61	
4164-28-7	N-Nitrodimethylamine	70.58	
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610040841 IBC 7294

Client: Navarro
Batch: M607-#717-IBC
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.07 g

Project: 16988.01.103
Date Received: 10/05/16
Date Extracted: 10/11/16
Date Analyzed: 10/18/16
Date Reported: 10/18/16

Lab Sample ID: 604793
Lab File Name: A1017628.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	55.40	
4164-28-7	N-Nitrodimethylamine	16.49	
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610040851 IBC 7295

Client: Navarro
Batch: M607-#717-IBC
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.08 g

Project: 16988.01.103
Date Received: 10/05/16
Date Extracted: 10/11/16
Date Analyzed: 10/18/16
Date Reported: 10/18/16

Lab Sample ID: 604794
Lab File Name: A1017629.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	1.99	
4164-28-7	N-Nitrodimethylamine	0.83	
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610040901 IBC 7296

Client: Navarro
Batch: M607-#717-IBC
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.11 g

Project: 16988.01.103
Date Received: 10/05/16
Date Extracted: 10/11/16
Date Analyzed: 10/18/16
Date Reported: 10/18/16

Lab Sample ID: 604795
Lab File Name: A1017630.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.33	U
4164-28-7	N-Nitrodimethylamine	<0.33	U
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

CLIENT:	**Navarro Research and Engineering Inc.**
SwRI PROJECT:	**01.16988**
TASK ORDER:	**161005-5**
NAVARRO PO #:	**15EC092B**

QA DATA SHEETS

(BLANK, MATRIX SPIKE, SURROGATE, CALIBRATION)

Southwest Research Institute

Method 607 Blank Summary

Blank ID: BLANK_11OCT16
Client: Navarro
Matrix: Soil

Project: 16988.01.103
SDG: 604789

This method blank applies to the following samples, MS, and MSD's

Client Sample ID	Lab Sample ID	Date Acquired	Time Acquired
LCS_11OCT16	605130 LCS	10/18/16	05:04:00
1610040803 IBC 7287	604789	10/18/16	05:38:00
1610040804 IBC 7287	604790	10/18/16	06:12:00
1610040805 IBC 7287	604791 MS	10/18/16	06:46:00
1610040821 IBC 7288	604792	10/18/16	07:19:00
1610040841 IBC 7294	604793	10/18/16	07:53:00
1610040851 IBC 7295	604794	10/18/16	08:27:00
1610040901 IBC 7296	604795	10/18/16	09:01:00

Southwest Research Institute

Method 607 Surrogate Recovery Summary

Client: Navarro
Matrix: Soil
Project: 16988.01.103

SDG: 604789

	Client Sample ID	Lab Sample ID	N-Nitroso-di-n-propylamine	
			% Recovery	Recovery Limits
1	BLANK_11OCT16	605129	89	40-160
2	LCS_11OCT16	605130 LCS	87	40-160
3	1610040803 IBC 7287	604789	93	40-160
4	1610040804 IBC 7287	604790	93	40-160
5	1610040805 IBC 7287	604791 MS	91	40-160
6	1610040821 IBC 7288	604792	96	40-160
7	1610040841 IBC 7294	604793	88	40-160
8	1610040851 IBC 7295	604794	93	40-160
9	1610040901 IBC 7296	604795	93	40-160

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID: BLANK_11OCT16

Client: Navarro
Batch:
Task Order:
Matrix: Soil
Sample Wt/Vol: 30.00 g

Project: 16988.01.103
Date Received: NA
Date Extracted: 10/11/16
Date Analyzed: 10/18/16
Date Reported:

Lab Sample ID: 605129
Lab File Name: A1017622.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.33	U
4164-28-7	N-Nitrodimethylamine	<0.33	U
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID: LCS_11OCT16

Client: Navarro
Batch:
Task Order:
Matrix: Soil
Sample Wt/Vol: 30.00 g

Project: 16988.01.103
Date Received: NA
Date Extracted: 10/11/16
Date Analyzed: 10/18/16
Date Reported:

Lab Sample ID: 605130 L CS
Lab File Name: A1017623.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	13.80	
4164-28-7	N-Nitrodimethylamine	16.00	
314-40-9	Bromacil	19.13	

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Blank Spike Recovery Report

Sample ID: LCS_11OCT16

Client: Navarro
Batch:
Task Order:
Matrix: Soil
Sample Wt/Vol: 30.00 g

Project: 16988.01.103
Date Received: NA
Date Extracted: 10/11/16
Date Analyzed: 10/18/16
Date Reported:

Lab Sample ID: 605130 LCS
Blank ID: BLANK_11OCT16

ANALYTE	Spike Added ng/g	Blank Conc ng/g	LCS Conc ng/g	% Recovery	QC % Recovery Limits
N-Nitrosodimethylamine	17	0	14	82	13 - 110
N-Nitrodimethylamine	17	0	16	94	30 - 150
Bromacil	17	0	19	112	40 - 190

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610040805 IBC 7287 MS

Client: Navarro
Batch: M607-#717-IBC
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.07 g
Compared Sample: 1610040803 IBC 7287

Project: 16988.01.103
Date Received: 10/05/16
Date Extracted: 10/11/16
Date Analyzed: 10/18/16
Date Reported: 10/18/16

Lab Sample ID: 604791 MS
Lab File Name: A1017626.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Spike	Recovery	Recovery Limit
62-75-9	N-Nitrosodimethylamine	15.53	17.00	91%	13-110%
4164-28-7	N-Nitrodimethylamine	20.09	17.00	118%	30-150%
314-40-9	Bromacil	21.25	17.00	125%	40-190%

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Initial Calibration Data Sheet

SwRI Project #:	01.16988.01.103	Calibration Data:	10/18/16
Sponsor:	Navarro	Analytical Method:	TAP-01-0408-031
SwRI Standard ID:	202-04-120408017	Std Concentration:	0.01-10 µg/mL

ANALYTE	RRF 0.01	RRF 0.05	RRF 0.2	RRF1	RRF5	RRF10	Ave. RRF	RSD%
N-Nitrosodimethylamine	0.291	0.308	0.352	0.369	0.417	0.430	0.361	15.49
N-Nitrodimethylamine	0.109	0.115	0.128	0.134	0.147	0.148	0.13	12.44
N-Nitroso-di-n-propylamine-d14	0.114	0.111	0.124	0.127	1.143	0.145	0.127	11.03
Bromacil	1.435	1.048	1.072	1.081	1.150	1.177	1.161	12.35

CLIENT:	**Navarro Research and Engineering Inc.**
SwRI PROJECT:	**01.16988**
TASK ORDER:	**161005-5**
NAVARRO PO #:	**15EC092B**

EXTRACTION AND INJECTION LOG

X36246

(E607S) SOIL Extraction By Soxhlet 3540C (Navarro)

SwRI Labs
Client: Navarro
Project: 16988.01.10X
Case: 15EC092B

Sample Receipt: 58458
TO#: 161005-5

DATE EXTRACTED	10/11/16
ANALYSTS INVOLVED	Christina Menn (SU,SW,Conc,QT,BD,FV) Hamed Edrisi (SU,SP,Conc) Marina Lebron (Conc)
SURROGATE SOL ID	200-01-120408017 @5.0ng/uL
MTX SPK SOL ID	201-01-120408017
EXTRACTS LOCATION	Tracked by LIMS (10/13/16 CM)
CHEMICAL,BRAND &LOT#	Sodium Sulfate ID:04-0402-004 DCM Fisher Optima Lot #164214

NOTES	Wiretol II Micropipette ID: 50&100uL ID:465673(SURR,MS) Balance #61 was used.
ADDITIONAL NOTES	Soxhlet extraction began at 5:00pm and ended the following day at 11:00am.
EXTRACTION FLOWCHART	Xg >>> FV 1000uL DCM
REFRENCE BOOK &PAGE	16-0402-032 P12
TAP(S) USED	01-0402-152

	System ID	Type	Customer ID	SOLVENT VOL DCM (ML)	SAMPLE WT	SURROGATE SOL VOL
1	604789		1610040803 IBC 7287	250	30.15 g	100 uL
2	604790		1610040804 IBC 7287	250	30.15 g	100 uL
3	604791	MS	1610040805 IBC 7287	250	30.07 g	100 uL
4	604792		1610040821 IBC 7288	250	30.05 g	100 uL
5	604793		1610040841 IBC 7294	250	30.07 g	100 uL
6	604794		1610040851 IBC 7295	250	30.08 g	100 uL
7	604795		1610040901 IBC 7296	250	30.11 g	100 uL
8	605129		BLANK_11OCT16	250	30.00 g	100 uL
9	605130		LCS_11OCT16	250	30.00 g	100 uL

	System ID	Type	Customer ID	MTX SPK SOL VOL	FV DCM
1	604789		1610040803 IBC 7287	0 uL	1000 uL
2	604790		1610040804 IBC 7287	0 uL	1000 uL
3	604791	MS	1610040805 IBC 7287	50 uL	1000 uL
4	604792		1610040821 IBC 7288	0 uL	1000 uL
5	604793		1610040841 IBC 7294	0 uL	1000 uL
6	604794		1610040851 IBC 7295	0 uL	1000 uL
7	604795		1610040901 IBC 7296	0 uL	1000 uL
8	605129		BLANK_11OCT16	0 uL	1000 uL
9	605130		LCS_11OCT16	50 uL	1000 uL

Page created Oct 11 2016 11:55AM by mlebron
Book: EXTRACTION LAB, Volume: EXT-2016, Page: 443 (Section 1 of 1)
Approved by HAMED EDRISI on Oct 18 2016 12:07PM

Date Printed: 10/18/2016

Work continued from Page

injlog

Southwest Research Institute GC/MS Injection Log

OPERATOR: GS SEQUENCE DATE: 10/17/16, 10/18/16INSTRUMENT: Amidala
COLUMN: Agilent 122-0732 DB-1701, 0.25mm * 30m * 0.25um
CARRIER GAS: Helium SOLVENT: DCM
METHOD FILE: MET_607C, MET_607C.M
CLIENT NAME: NAVARRO PROJECT NUMBER: 16988.01.103
SRR: 58473, 58475, 58494, 58496, 58406, 58458 METHOD: M-607 MATRIX: water & soil
DATA PATH: C:\MSDChem\1\DATA\2016\A101716

OVEN PROGRAM

Initial temp: 40 'C (On) Maximum temp: 350 'C
Initial time: 4.00 min Equilibration time: 0.50 min
Ramps:

#	Rate	Final temp	Final time
1	15.00	150	0.00
2	25.00	270	10.00
3	0.0(off)		

Post temp: 270 'C
Post time: 5.00 min
Run time: 29.80 min

FILENAME	VIAL	DATE/TIME	METHOD	SAMPLE DESCRIPTION
A10176C1	100	10/17/16 10:59	MET_607C	SLUG
A10176C2	1	10/17/16 11:32	MET_607C	DCM
A10176S1	95	10/17/16 13:13	MET_607C	NDMA/DMN/BROMACIL STD 0.01NG/UL IS=1NG/UL
A10176S2	96	10/17/16 13:46	MET_607C	NDMA/DMN/BROMACIL STD 0.05NG/UL IS=1NG/UL
A10176S3	97	10/17/16 14:20	MET_607C	NDMA/DMN/BROMACIL STD 0.2NG/UL IS=1NG/UL
A10176S4	98	10/17/16 14:54	MET_607C	NDMA/DMN/BROMACIL STD 1NG/UL IS=1NG/UL
A10176S5	99	10/17/16 15:29	MET_607C	NDMA/DMN/BROMACIL STD 5NG/UL IS=1NG/UL
A10176S6	100	10/17/16 16:03	MET_607C	NDMA/DMN/BROMACIL STD 10NG/UL IS=1NG/UL
A1017601	3	10/17/16 16:37	MET_607C	BLANK_12OCT16 IS=0.2NG/L 605131
A1017602	4	10/17/16 17:11	MET_607C	LCS_12OCT16 IS=0.2NG/L 605132
A1017603	5	10/17/16 17:45	MET_607C	1610050923 (400-SB-15) IS=0.2NG/L 604924
A1017604	6	10/17/16 18:19	MET_607C	1610060738 (400-SB-15) IS=0.2NG/L 604927
A1017605	7	10/17/16 18:53	MET_607C	1610051344A (300-D-153) IS=0.2NG/L 604934
A1017606	8	10/17/16 19:27	MET_607C	1610060923A (200-SG-1) IS=0.2NG/L 604935
A1017607	9	10/17/16 20:01	MET_607C	1610060916Z (BLM-39-560) IS=0.2NG/L 605091
A1017608	10	10/17/16 20:35	MET_607C	1610061058Z (BLM-39-560) IS=0.2NG/L 605092
A1017609	11	10/17/16 21:09	MET_607C	1610061406Z (BLM-39-385) IS=0.2NG/L 605093
A1017610	12	10/17/16 21:43	MET_607C	1610110806Z (BLM-39-385) IS=0.2NG/L 605094
A1017611	13	10/17/16 22:17	MET_607C	1610081509 (400-SB-12) IS=0.2NG/L 605101
A1017612	14	10/17/16 22:51	MET_607C	1610090804 (400-SB-12) IS=0.2NG/L 605103
A1017613	15	10/17/16 23:25	MET_607C	1610101349 (400-SB-3) IS=0.2NG/L 605106
A1017614	16	10/17/16 23:59	MET_607C	1610110809 (400-SB-3) IS=0.2NG/L 605108
A1017615	17	10/18/16 00:32	MET_607C	BLANK_11OCT16 IS=0.2NG/L 604845
A1017616	18	10/18/16 01:06	MET_607C	LCS_11OCT16 IS=0.2NG/L 604846
A1017617	19	10/18/16 01:40	MET_607C	1609251204 (400-SB-04)124'-125')) 604278
A1017618	20	10/18/16 02:14	MET_607C	1609221104 (400-SB-04)9'-10')) 604280
A1017619	21	10/18/16 02:48	MET_607C	1609221419 (400-SB-04)35'-40')) 604281
A1017620	22	10/18/16 03:22	MET_607C	1609221429 (400-SB-04)35'-40')) 604282
A1017621	23	10/18/16 03:56	MET_607C	1609231328 (400-SB-04)79'-80')) 604284
A1017622	24	10/18/16 04:30	MET_607C	BLANK_05OCT16 IS=0.2NG/L 605129
A1017623	25	10/18/16 05:04	MET_607C	LCS_05OCT16 IS=0.2NG/L 605130
A1017624	26	10/18/16 05:38	MET_607C	1610040803 IBC 7287 IS=0.2NG/L 604789
A1017625	27	10/18/16 06:12	MET_607C	1610040804 IBC 7287 IS=0.2NG/L 604790
A1017626	28	10/18/16 06:46	MET_607C	1610040805 IBC 7287 IS=0.2NG/L 604791MS
A1017627	29	10/18/16 07:19	MET_607C	1610040821 IBC 7288 IS=0.2NG/L 604792
A1017628	30	10/18/16 07:53	MET_607C	1610040841 IBC 7294 IS=0.2NG/L 604793
A1017629	31	10/18/16 08:27	MET_607C	1610040851 IBC 7295 IS=0.2NG/L 604794
A1017630	32	10/18/16 09:01	MET_607C	1610040901 IBC 7296 IS=0.2NG/L 604795

10/18/16

REVIEWED BY: [signature]
DATE: 10/18/16

Work continued to Page

SIGNATURE DATE 10/18/16

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

SOUTHWEST RESEARCH INSTITUTE®

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Chemistry and Chemical Engineering Division
Department of Analytical & Environmental Chemistry

October 27, 2016

Navarro Research and Engineering Inc.
NASA - JSC - White Sands Test Facility
Transportation Officer, Building 120
12600 NASA Road
Las Cruces, NM 88012
Tel. 575-524-5452

Attention: Tom Hall

Subject: Reports for Batch-607-#719-IBC for NDMA/DMN Analysis of Soil Samples
SwRI Project #: 01.16988.103
SwRI Task Orders: **161018-4**
Navarro P.O. #: 15EC092B

Dear Tom,

Enclosed please find the analytical reports for Batch-607- #719-IBC-Navarro of soil samples.

Southwest Research Institute appreciates the opportunity to provide the service to Navarro Research and Engineering Inc.. If you have any questions, please do not hesitate to call me at 210-522-3954.

Sincerely,

Gang Sun, Ph.D.
Program Manager

APPROVAL:

Michael Dammann
Director

CLIENT: Navarro Research and Engineering Inc.
SwRI PROJECT: 01.16988
TASK ORDER: 161018-4
NAVARRO PO #: 15EC092B

NARRATIVE

(M-607 - #719-Navarro-IBC)

CLIENT:	**NAVARRO**
SwRI PROJECT:	**01.16988.01.103**
BATCH #:	**Batch-607-#719-IBC**
TASK ORDER:	**161018-4**
CLIENT PO#:	**15EC092B**
REPORT DATA:	**10/27/2016**

NARRATIVE FOR NDMA/ DMN/BROMACIL ANALYSIS

1. Samples were extracted with dichloromethane (DCM) and analyzed by GC/MS in selective ion monitoring mode for N-Nitrosodimethylamine (NDMA) and N-Nitrodimethylamine (DMN) according to the modified Method 607.

2. All samples were extracted within 14 days for soil sample of sample collection and were analyzed within 40 days after the extraction.

3. The response factor (RF) values for Calibration curve and/or for continuing calibration standard were less than 25 % for all target compounds. The sample reporting limit is 0.33 ppb for 30 g extracted soil samples.

4. Both blank spike and matrix spike samples were spiked at 17 ppb for soil sample, then extracted and analyzed. The recoveries for all target compounds were within method recovery criteria of 13-110% for NDMA, 30-150% for DMN, and 40-190% for Bromacil, respectively. The soil sample result is reported as received basis and not by dry weight.

5. Surrogate compound was spiked into every sample before sample extraction at 17 ppb for soil sample. The surrogate recoveries for all samples were within method recovery criteria of 40-160%.

6. Laboratory blanks were extracted and analyzed for every sample batch. No analytes were detected above report limits from the blanks.

7. A "J" value was reported if the associated value was below reporting limits but above the MDL value.

8. All analyte concentrations are expressed in ng/g (*ppb*). Sample calculation:

$$\text{for soil: Concentration } (\mu g/kg) = \frac{C\ (ng/\mu L) \times V_{extr}\ (\mu L) \times DF}{W_{samp}(g)} \times \frac{1000\ g}{1\ kg} \times \frac{1\ \mu g}{1000\ ng}$$

where:

C	=	result of GC/MS analysis, in ng/μL
V_{extr}	=	final volume of sample extract, in μL
V_{samp}	=	aqueous sample volume taken for extraction, in mL
W_{samp}	=	soil sample weight taken for extraction, in gram
DF	=	dilution factor, if any

CLIENT: Navarro Research and Engineering Inc.
SwRI PROJECT: 01.16988
TASK ORDER: 161018-4
NAVARRO PO #: 15EC092B

TASK ORDER AND CHAIN OF CUSTODY

Southwest Research Institute

Laboratory Task Order

TO #: 161018-4 Revision: 1

Project(s): 16988.01.10X
Manager(s): SUN, GANG
To Client: 11/08/16

SDG: 605385

SRR #'s: 58534
Client(s): Navarro

Instructions

Documents Related to this task order: 209459[COC for SRR 58534], 209460[Paperwork for SRR 58534], 108294[PO #179 + #180], 113038[PO #179 + #180 Change Order #1], 113134[PO #NAV0000060], 115908[PO #NAV0000060 CO #1], 117303[PO #NAV0000060 CO #2], 118820[PO #179 + #180 Change Order #2], 120319 [PO #104], 122923[PO #179 Change Order #3], 124787[PO #132], 124995[PO #179 Change Order #5]

Deliverables --> Hard Copy: no EDD: -YES- PDF: -YES-

Test: E607S
Section: EXTLAB

Holding: 14 days from CED

EXTRACTION BY METHOD 607.

Cnt: 11

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
605385		1	Soil	1610140841 (IBC 7338)	14 Oct 16	28 Oct 16
605386		1	Soil	1610130853 (IBC 7321)	13 Oct 16	27 Oct 16
605387		1	Soil	1610130854 IBC (7321)	13 Oct 16	27 Oct 16
605388	MS	1	Soil	1610130855 (IBC 7321)	13 Oct 16	27 Oct 16
605389		1	Soil	1610130906 (IBC 7322)	13 Oct 16	27 Oct 16
605390		1	Soil	1610130916 (IBC 7326)	13 Oct 16	27 Oct 16
605391		1	Soil	1610130941 (IBC 7327)	13 Oct 16	27 Oct 16
605392		1	Soil	1610130946 (IBC 7331)	13 Oct 16	27 Oct 16
605393		1	Soil	1610130951 (IBC 7328)	13 Oct 16	27 Oct 16
605394		1	Soil	1610140831 (IBC 7330)	14 Oct 16	28 Oct 16
605395		1	Soil	1610140836 (IBC 7329)	14 Oct 16	28 Oct 16

Test: T607W
Section: TDG

Holding: 40 days from VTSR

NDMA/DMN ANALYSIS BY GC/MS/SIM

Cnt: 11

System ID	Type	Cont	Matrix	Customer ID	VTSR	Method Date
605385		1	Soil	1610140841 (IBC 7338)	18 Oct 16	27 Nov 16
605386		1	Soil	1610130853 (IBC 7321)	18 Oct 16	27 Nov 16
605387		1	Soil	1610130854 IBC (7321)	18 Oct 16	27 Nov 16
605388	MS	1	Soil	1610130855 (IBC 7321)	18 Oct 16	27 Nov 16
605389		1	Soil	1610130906 (IBC 7322)	18 Oct 16	27 Nov 16
605390		1	Soil	1610130916 (IBC 7326)	18 Oct 16	27 Nov 16
605391		1	Soil	1610130941 (IBC 7327)	18 Oct 16	27 Nov 16
605392		1	Soil	1610130946 (IBC 7331)	18 Oct 16	27 Nov 16
605393		1	Soil	1610130951 (IBC 7328)	18 Oct 16	27 Nov 16
605394		1	Soil	1610140831 (IBC 7330)	18 Oct 16	27 Nov 16
605395		1	Soil	1610140836 (IBC 7329)	18 Oct 16	27 Nov 16

010005

WSTF CHAIN OF CUSTODY RECORD

Date OCTOBER 13 2016

Laboratory:SwRI PO#15EC092B

Address shipping questions to:
- ☐ Lori Minnick, 575-524-5119
- ☒ Other Tom Hall, 575-524-5453

Send sample receipt confirmation and analytical reports to:
- ☐ Carlyn Tufts, carlyn.a.tufts@nasa.gov
- ☐ Shelly Hernandez, shelly.j.hernandez@nasa.gov
- ☒ Tom Hall, tom.a.hall@nasa.gov

Special Instructions

Return coolers and reusable packaging materials within 14 days as required in statement of work to:

Return Address:

NASA WSTF Environmental Department
12600 NASA Road; Bldg. 120
Las Cruces, NM 88012
Attn: Lori Minnick

Sample Number	Sample Location	# of Containers	Sample Matrix*	Analytical Requirements: EPA Method 607M 8 oz Glass Jar; Ice	Charge Number (WSTF Use Only)	Comments
161013 0853	IBC 7321	1	S	X	16EEE41FW	
" 0854	IBC 7321	1	S	X	16EEE41FW	
" 0855	IBC 7321	1	S	X	16EEE41FW	Matrix Spike for 161013 0853
161013 0906	IBC 7322	1	S	X	16EEE41FW	
1610130916	IBC 7326	1	S	X	16EEE41FW	
1610130941	IBC-7327	1	S	X	16EEE41FW	
1610130946	IBC 7331	1	S	X	16EEE41FW	
1610130951	IBC 7328	1	S	X	16EEE41FW	

Relinquished By:	Date/Time:	Accepted By:	Date/Time:
[signature]	10-13-2016 (1030)	[signature]	10/18/16 08:45

* Sample Matrix: A – Aqueous; G – Gaseous; S – Solid

Client: Navarro
SRR # 58534
Project # 16988.01.10X
Case: 15EC092B
VTSR: 10/18/16
Sample(s) Received: Intact
Temperature: 2.0 SN # 021055

010006

WSTF CHAIN OF CUSTODY RECORD

Date OCTOBER 17, 2016

Laboratory:SwRI PO#15EC092B

Address shipping questions to:
- ☐ Lori Minnick, 575-524-5119
- ☒ Other Tom Hall, 575-524-5453

Send sample receipt confirmation and analytical reports to:
- ☐ Carlyn Tufts, carlyn.a.tufts@nasa.gov
- ☐ Shelly Hernandez, shelly.j.hernandez@nasa.gov
- ☒ Tom Hall, tom.a.hall@nasa.gov

Special Instructions

Return coolers and reusable packaging materials within 14 days as required in statement of work to:

Return Address:

NASA WSTF Environmental Department
12600 NASA Road; Bldg. 120
Las Cruces, NM 88012
Attn: Lori Minnick

Sample Number	Sample Location	# of Containers	Sample Matrix*	Analytical Requirements: EPA Method 607M 8 oz Glass Jar, Ice	Charge Number (WSTF Use Only)	Comments
161014 0831	IBC7330	1	S	X	16EEE41FW	
161014 0836	IBC7329	1	S	X	16EEE41FW	
161014 0841	IBC7338	1	S	X	16EEE41FW	~~Matrix Spike for 1615~~

Client: Navarro
SRR # 58534
Project # 16988.01.10X
Case: 15EC092B
VTSR: 10/18/16
Sample(s) Received: Intact
Temperature: 2.0 SN # 021055

Relinquished By:	Date/Time:	Accepted By:	Date/Time:
[signature]	10-14-16(0900)	[signature]	10/14/16 08:45

* Sample Matrix: A – Aqueous; G – Gaseous; S – Solid

010007

NASA-WSTF SHIPPING DOCUMENT

(1) Blue #-160 L[redacted]

SHIPPED FROM: **NASA JSC WHITE SANDS TEST FACILITY** **12600 NASA ROAD; BLDG. 120** **LAS CRUCES, NEW MEXICO 88012**	WSTF ORIGINATOR/MAIL CODE/TELEPHONE NO. Tom Hall 575-524-5453			
	ORDER OR CONTRACT NUMBER Navarro PO #15EC092B		SHIPMENT CONTROL NO	
SHIP TO: (ADDRESS, PHONE#, POINT OF CONTACT) Southwest Research Institute 6220 Culebra Raod San Antonio, TX 782238 Gang Sun 210-522-3954	PROJECT or TASK NUMBER CP.6EE4IFW.0.71 - 16EE4IFW		SHIP VIA **Fed Ex Air**	
	Contain Batteries NO	NO. PKG. 1	DATE SHIPPE 10-17-16	AirBill/ PRO #/Bol #
	Battery Type-Part # N/A	AUTHORIZED BY: Tom Hall		DEPT. Environmental

ITEM NO.	EQUIPMENT CONTROL NO.	MODEL NO./ STOCK NO./ PART NO.	ITEM NAME - MANUFACTURER'S NAME AND SERIAL NO.	UNIT OF ISSUE	QTY.
1 Lot-Samples			Soil Samples Navarro PO #15EC092B Line Item #1 NDMA and Bromacil for Soil samples by method 607M	ea.	11

Client: Navarro
SRR # 58534
Project # 16988.01.10X
Case: 15EC092B
VTSR: 10/18/16
Sample(s) Received: Intact
Temperature: 2.0 SN # 021055

JUSTIFICATION FOR SHIPMENT: (MDR #, Return Authorization #'s, Warranty Replacement, Repair, Overage/Shortage, Damage, Recycling)
Sample for analysis as requested (Navarro PO #15EC0092B)

DOT HAZARDOUS MATERIALS INFO; EMERGENCY PHONE NUMBER AND GUIDE NUMBER:
Not subject to regulation as a hazard material under 49 CFR.

PROPERTY REVIEW: ☐ REMOVE EQUIPMENT TAG ☐ DO NOT REMOVE EQUIPMENT TAG

PACKED BY:	# CONTAINERS	TYPE CONTAINERS	DIMENSIONS	WEIGHT
Please check off the applicable labels! ☐ FRAGILE ☑ GLASS ☐ DELICATE ☐ DO NOT XRAY ☑ REFRIGERATE ☐ OTHER ☑ BUBBLEWRAP ☑ FOAM		Glass Containers	____ea. 8 oz. Glass Jars	
	TOTAL CONTAINERS			TOTAL WEIGHT

RECEIVED BY: David Garner
REPRESENTING: SwRI

SHIPPERS CERTIFICATION: This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the regulations of the D.O.T. _____ Date_____

CLIENT: Navarro Research and Engineering Inc.
SwRI PROJECT: 01.16988
TASK ORDER: 161018-4
NAVARRO PO #: 15EC092B

ANALYTICAL DATA REPORT SHEETS

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610140841 (IBC 7338)

Client: Navarro
Batch: M607-#719
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.25 g

Project: 16988.01.103
Date Received: 10/18/16
Date Extracted: 10/18/16
Date Analyzed: 10/26/16
Date Reported: 10/27/16

Lab Sample ID: 605385
Lab File Name: A1025644.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.33	U
4164-28-7	N-Nitrodimethylamine	<0.33	U
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610130853 (IBC 7321)

Client: Navarro
Batch: M607-#719
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.17 g

Project: 16988.01.103
Date Received: 10/18/16
Date Extracted: 10/18/16
Date Analyzed: 10/26/16
Date Reported: 10/27/16

Lab Sample ID: 605386
Lab File Name: A1025645.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.33	U
4164-28-7	N-Nitrodimethylamine	<0.33	U
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610130854 IBC (7321)

Client: Navarro
Batch: M607-#719
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.21 g

Project: 16988.01.103
Date Received: 10/18/16
Date Extracted: 10/18/16
Date Analyzed: 10/26/16
Date Reported: 10/27/16

Lab Sample ID: 605387
Lab File Name: A1025646.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.33	U
4164-28-7	N-Nitrodimethylamine	<0.33	U
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610130906 (IBC 7322)

Client: Navarro
Batch: M607-#719
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.06 g

Project: 16988.01.103
Date Received: 10/18/16
Date Extracted: 10/18/16
Date Analyzed: 10/26/16
Date Reported: 10/27/16

Lab Sample ID: 605389
Lab File Name: A1025648.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.33	U
4164-28-7	N-Nitrodimethylamine	<0.33	U
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610130916 (IBC 7326)

Client: Navarro
Batch: M607-#719
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.08 g

Project: 16988.01.103
Date Received: 10/18/16
Date Extracted: 10/18/16
Date Analyzed: 10/26/16
Date Reported: 10/27/16

Lab Sample ID: 605390
Lab File Name: A1025649.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.33	U
4164-28-7	N-Nitrodimethylamine	<0.33	U
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610130941 (IBC 7327)

Client: Navarro
Batch: M607-#719
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.03 g

Project: 16988.01.103
Date Received: 10/18/16
Date Extracted: 10/18/16
Date Analyzed: 10/26/16
Date Reported: 10/27/16

Lab Sample ID: 605391
Lab File Name: A1025650.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.33	U
4164-28-7	N-Nitrodimethylamine	<0.33	U
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610130946 (IBC 7331)

Client: Navarro
Batch: M607-#719
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.36 g

Project: 16988.01.103
Date Received: 10/18/16
Date Extracted: 10/18/16
Date Analyzed: 10/26/16
Date Reported: 10/27/16

Lab Sample ID: 605392
Lab File Name: A1025651.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.33	U
4164-28-7	N-Nitrodimethylamine	<0.33	U
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610130951 (IBC 7328)

Client: Navarro
Batch: M607-#719
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.16 g

Project: 16988.01.103
Date Received: 10/18/16
Date Extracted: 10/18/16
Date Analyzed: 10/26/16
Date Reported: 10/27/16

Lab Sample ID: 605393
Lab File Name: A1025652.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.33	U
4164-28-7	N-Nitrodimethylamine	<0.33	U
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610140831 (IBC 7330)

Client: Navarro
Batch: M607-#719
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.08 g

Project: 16988.01.103
Date Received: 10/18/16
Date Extracted: 10/18/16
Date Analyzed: 10/26/16
Date Reported: 10/27/16

Lab Sample ID: 605394
Lab File Name: A1025653.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.33	U
4164-28-7	N-Nitrodimethylamine	0.33	
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610140836 (IBC 7329)

Client: Navarro
Batch: M607-#719
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.03 g

Project: 16988.01.103
Date Received: 10/18/16
Date Extracted: 10/18/16
Date Analyzed: 10/26/16
Date Reported: 10/27/16

Lab Sample ID: 605395
Lab File Name: A1025654.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.33	U
4164-28-7	N-Nitrodimethylamine	<0.33	U
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

CLIENT:	**Navarro Research and Engineering Inc.**
SwRI PROJECT:	**01.16988**
TASK ORDER:	**161018-4**
NAVARRO PO #:	**15EC092B**

QA DATA SHEETS

(BLANK, MATRIX SPIKE, SURROGATE, CALIBRATION)

Southwest Research Institute

Method 607 Internal Standard Summary

Filename: A10256S2.txt
Standard ID: IS=1NG/UL
Project: 16988.01.103

Date Analyzed: 10/26/2016
Time Analyzed: 08:02:00
Client: Navarro

		IS1		IS2	
		Area	RT	Area	RT
	Mid Point Standard	282210	8.4	168312	15.01
	Upper Limit	564420	8.73	336624	15.34
	Lower Limit	141105	8.07	84156	14.68
Client Sample ID	**Lab Sample ID**				
BLANK_18OCT16	605450	247040	8.40	152246	15.01
LCS_18OCT16 LCS	605451 LCS	247038	8.40	147275	15.01
1610140841 (IBC 7338)	605385	286170	8.40	161225	15.01
1610130853 (IBC 7321)	605386	273219	8.40	166057	15.01
1610130854 IBC (7321)	605387	265615	8.40	160338	15.02
1610130855 (IBC 7321) MS	605388 MS	264404	8.40	155965	15.01
1610130906 (IBC 7322)	605389	276964	8.40	158322	15.01
1610130916 (IBC 7326)	605390	268368	8.40	156436	15.01
1610130941 (IBC 7327)	605391	275440	8.40	160358	15.01
1610130946 (IBC 7331)	605392	278933	8.40	166055	15.01
1610130951 (IBC 7328)	605393	274855	8.40	160885	15.01
1610140831 (IBC 7330)	605394	272894	8.40	164317	15.01
1610140836 (IBC 7329)	605395	273484	8.40	161243	15.01

IS1 = 1,4-Dichlorobenzene-D4
IS2 = Atrazine-D5

* Flag indicating value is outside QC limits

Southwest Research Institute

Method 607 Blank Summary

Blank ID: BLANK_18OCT16
Client: Navarro
Matrix: Soil

Project: 16988.01.103
SDG: 605385

This method blank applies to the following samples, MS, and MSD's

Client Sample ID	Lab Sample ID	Date Acquired	Time Acquired
LCS_18OCT16	605451 LCS	10/26/16	09:10:00
1610140841 (IBC 7338)	605385	10/26/16	15:27:00
1610130853 (IBC 7321)	605386	10/26/16	16:01:00
1610130854 IBC (7321)	605387	10/26/16	16:35:00
1610130855 (IBC 7321)	605388 MS	10/26/16	17:09:00
1610130906 (IBC 7322)	605389	10/26/16	17:44:00
1610130916 (IBC 7326)	605390	10/26/16	18:18:00
1610130941 (IBC 7327)	605391	10/26/16	18:52:00
1610130946 (IBC 7331)	605392	10/26/16	19:27:00
1610130951 (IBC 7328)	605393	10/26/16	20:01:00
1610140831 (IBC 7330)	605394	10/26/16	20:35:00
1610140836 (IBC 7329)	605395	10/26/16	21:10:00

Southwest Research Institute

Method 607 Surrogate Recovery Summary

Client: Navarro
Matrix: Soil
Project: 16988.01.103

SDG: 605385

	Client Sample ID	Lab Sample ID	N-Nitroso-di-n-propylamine	
			% Recovery	Recovery Limits
2	BLANK_18OCT16	605450	93	40-160
3	LCS_18OCT16	605451 LCS	99	40-160
4	1610140841 (IBC 7338)	605385	102	40-160
5	1610130853 (IBC 7321)	605386	106	40-160
6	1610130854 IBC (7321)	605387	103	40-160
7	1610130855 (IBC 7321)	605388 MS	104	40-160
8	1610130906 (IBC 7322)	605389	98	40-160
9	1610130916 (IBC 7326)	605390	102	40-160
10	1610130941 (IBC 7327)	605391	104	40-160
11	1610130946 (IBC 7331)	605392	102	40-160
12	1610130951 (IBC 7328)	605393	101	40-160
13	1610140831 (IBC 7330)	605394	101	40-160
14	1610140836 (IBC 7329)	605395	100	40-160

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

BLANK_18OCT16

Client: Navarro
Batch: M607-#719
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.00 g

Project: 16988.01.103
Date Received: NA
Date Extracted: 10/18/16
Date Analyzed: 10/26/16
Date Reported: 10/27/16

Lab Sample ID: 605450
Lab File Name: A1025632.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.33	U
4164-28-7	N-Nitrodimethylamine	<0.33	U
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

LCS_18OCT16

Client: Navarro
Batch: M607-#719
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.00 g

Project: 16988.01.103
Date Received: NA
Date Extracted: 10/18/16
Date Analyzed: 10/26/16
Date Reported: 10/27/16

Lab Sample ID: 605451 LCS
Lab File Name: A1025633.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	12.83	
4164-28-7	N-Nitrodimethylamine	17.53	
314-40-9	Bromacil	23.97	

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Blank Spike Recovery Report

Sample ID: LCS_18OCT16

Client: Navarro
Batch: M607-#719
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.00 g

Project: 16988.01.103
Date Received: NA
Date Extracted: 10/18/16
Date Analyzed: 10/26/16
Date Reported: 10/27/16

Lab Sample ID: 605451 LCS
Blank ID: BLANK_18OCT16

ANALYTE	Spike Added ng/g	Blank Conc ng/g	LCS Conc ng/g	% Recovery	QC % Recovery Limits
N-Nitrosodimethylamine	17	0	13	76	13 - 110
N-Nitrodimethylamine	17	0	18	106	30 - 150
Bromacil	17	0	24	141	40 - 190

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610130855 (IBC 7321) MS

Client: Navarro
Batch: M607-#719
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.17 g
Compared Sample: 1610130853 (IBC 7321)

Project: 16988.01.103
Date Received: 10/18/16
Date Extracted: 10/18/16
Date Analyzed: 10/26/16
Date Reported: 10/27/16

Lab Sample ID: 605388 MS
Lab File Name: A1025647.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Spike	Recovery	Recovery Limit
62-75-9	N-Nitrosodimethylamine	13.42	17.00	79%	13-110%
4164-28-7	N-Nitrodimethylamine	16.54	17.00	97%	30-150%
314-40-9	Bromacil	24.13	17.00	142%	40-190%

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Continuing Calibration Check Sheet

SwRI Project #:	01.16988.01.103	Calibration Date:	10/26/16
Sponsor:	Navarro	Analytical Method:	TAP-01-0408-031
SwRI Standard ID:	202-04-120408017	Std Concentration:	1 µg/mL
File ID #:	A10256S2	Initial Calibration Date:	10/17/16

ANALYTE	Mean RRF	RRF	% Dif.
N-Nitrosodimethylamine	0.341	0.386	-6.9
N-Nitrodimethylamine	0.126	0.136	-4.1
N-Nitroso-di-n-propylamine-d14	0.12	0.132	-3.8
Bromacil	0.977	1.082	6.7

Southwest Research Institute

Initial Calibration Data Sheet

SwRI Project #:	01.16988.01.103	Calibration Data:	10/17/16
Sponsor:	Navarro	Analytical Method:	TAP-01-0408-031
SwRI Standard ID:	202-04-120408017	Std Concentration:	0.01-10 µg/mL

ANALYTE	RRF 0.01	RRF 0.05	RRF 0.2	RRF1	RRF5	RRF10	Ave. RRF	RSD%
N-Nitrosodimethylamine	0.291	0.308	0.352	0.369	0.417	0.430	0.361	15.49
N-Nitrodimethylamine	0.109	0.115	0.128	0.134	0.147	0.148	0.13	12.44
N-Nitroso-di-n-propylamine-d14	0.114	0.111	0.124	0.127	1.143	0.145	0.127	11.03
Bromacil	1.435	1.048	1.072	1.081	1.150	1.177	1.161	12.35

CLIENT:	**Navarro Research and Engineering Inc.**
SwRI PROJECT:	**01.16988**
TASK ORDER:	**161018-4**
NAVARRO PO #:	**15EC092B**

EXTRACTION AND INJECTION LOG

(E607S) SOIL Extraction By Soxhlet 3540C (Navarro)

X36288

SwRI Labs
Client: Navarro
Project: 16988.01.10X
Case: 15EC092B

Sample Receipt: 58534
TO#: 161018-4

DATE EXTRACTED	10/18/16
ANALYSTS INVOLVED	Christina Menn (SU,SW,Conc,QT,BD,FV) Hamed Edrisi (SU,SP,Conc) Marina Lebron (Conc)
SURROGATE SOL ID	200-01-120408017@5.0ng/uL
MTX SPK SOL ID	201-01-120408017@10.0ng/uL
EXTRACTS LOCATION	Tracked by LIMS (10/21/16 CM)
CHEMICAL,BRAND &LOT#	Sodium Sulfate ID:04-0402-004 DCM Fisher Optima Lot #164214
NOTES	Hamilton Co. Syringes: 100uL ID:462905(SURR) 50uL ID:462898(MS) Balance #61 was used.

ADDITIONAL NOTES	1.Soxhlet extraction began at 3:00pm and ended the following day at 8:30am. 2.BLANK(605450) and LCS(605451) are shared with page 458 of this book.
EXTRACTION FLOWCHART	Xg >>> FV 1000uL DCM
REFRENCE BOOK &PAGE	16-0402-032 P21
TAP(S)USED	01-0402-152

	System ID	Type	Customer ID	SOLVENT VOL DCM (ML)	SAMPLE WT	SURROGATE SOL VOL
1	605385		1610140841 (IBC 7338)	250	30.25 g	100 uL
2	605386		1610130853 (IBC 7321)	250	30.17 g	100 uL
3	605387		1610130854 IBC (7321)	250	30.21 g	100 uL
4	605388	MS	1610130855 (IBC 7321)	250	30.17 g	100 uL
5	605389		1610130906 (IBC 7322)	250	30.06 g	100 uL
6	605390		1610130916 (IBC 7326)	250	30.08 g	100 uL
7	605391		1610130941 (IBC 7327)	250	30.03 g	100 uL
8	605392		1610130946 (IBC 7331)	250	30.36 g	100 uL
9	605393		1610130951 (IBC 7328)	250	30.16 g	100 uL
10	605394		1610140831 (IBC 7330)	250	30.08 g	100 uL
11	605395		1610140836 (IBC 7329)	250	30.03 g	100 uL
12	605450		BLANK_18OCT16	250	30.00 g	100 uL
13	605451		LCS_18OCT16	250	30.00 g	100 uL

	System ID	Type	Customer ID	MTX SPK SOL VOL	FV DCM
1	605385		1610140841 (IBC 7338)	0 uL	1000 uL
2	605386		1610130853 (IBC 7321)	0 uL	1000 uL
3	605387		1610130854 IBC (7321)	0 uL	1000 uL
4	605388	MS	1610130855 (IBC 7321)	50 uL	1000 uL
5	605389		1610130906 (IBC 7322)	0 uL	1000 uL
6	605390		1610130916 (IBC 7326)	0 uL	1000 uL
7	605391		1610130941 (IBC 7327)	0 uL	1000 uL
8	605392		1610130946 (IBC 7331)	0 uL	1000 uL
9	605393		1610130951 (IBC 7328)	0 uL	1000 uL

(E607S) SOIL Extraction By Soxhlet 3540C (Navarro)

X36288

SwRI Labs
Client: Navarro
Project: 16988.01.10X
Case: 15EC092B

Sample Receipt: 58534
TO#: 161018-4

	System ID	Type	Customer ID	MTX SPK SOL VOL	FV DCM
10	605394		1610140831 (IBC 7330)	0 uL	1000 uL
11	605395		1610140836 (IBC 7329)	0 uL	1000 uL
12	605450		BLANK_18OCT16	0 uL	1000 uL
13	605451		LCS_18OCT16	50 uL	1000 uL

Page created Oct 18 2016 11:56AM by mlebron
Book: EXTRACTION LAB, Volume: EXT-2016, Page: 460 (Section 2 of 2)
Approved by HAMED EDRISI on Oct 24 2016 2:27PM

Date Printed: 10/27/2016

Work continued from Page

SWRI

injlog

Southwest Research Institute GC/MS Injection Log

OPERATOR: GS SEQUENCE DATE: 10/25/16, 10/26/16 INSTRUMENT: Amidala
COLUMN: Agilent 122-0732 DB-1701, 0.25mm * 30m * 0.25um
CARRIER GAS: Helium SOLVENT: DCM
METHOD FILE: MET_607C, MET_607C.M
CLIENT NAME: NAVARRO PROJECT NUMBER: 16988.01.103
SRR: 58534 METHOD: M-607 MATRIX: soil
DATA PATH: C:\MSDChem\1\DATA\2016\A102516

OVEN PROGRAM
Initial temp: 40 'C (On) Maximum temp: 350 'C
Initial time: 4.00 min Equilibration time: 0.50 min
Ramps:

#	Rate	Final temp	Final time
1	15.00	150	0.00
2	25.00	270	10.00
3	0.0(off)		

Post temp: 270 'C
Post time: 5.00 min
Run time: 29.80 min

GS 10/27/16

FILENAME	VIAL	DATE/TIME	METHOD	SAMPLE DESCRIPTION
A10256S2	2	10/26/16 08:02	MET_607C	NDMA/DMN/BROMACIL STD 1NG/UL IS=1NG/UL
A1025632	34	10/26/16 08:36	MET_607C	BLANK_18OCT16 IS=0.2NG/L 605450
A1025633	35	10/26/16 09:10	MET_607C	LCS_18OCT16 IS=0.2NG/L 605451
A1025644	46	10/26/16 15:27	MET_607C	1610140841 IBC (7338) IS=0.2NG/L 605385
A1025645	47	10/26/16 16:01	MET_607C	1610130853 IBC (7321) IS=0.2NG/L 605386
A1025646	48	10/26/16 16:35	MET_607C	1610130854 IBC (7321) IS=0.2NG/L 605387
A1025647	49	10/26/16 17:09	MET_607C	1610130855 IBC (7321) IS=0.2NG/L 605388MS
A1025648	50	10/26/16 17:44	MET_607C	1610130906 IBC (7322) IS=0.2NG/L 605389
A1025649	51	10/26/16 18:18	MET_607C	1610130916 IBC (7326) IS=0.2NG/L 605390
A1025650	52	10/26/16 18:52	MET_607C	1610130941 IBC (7327) IS=0.2NG/L 605391
A1025651	53	10/26/16 19:27	MET_607C	1610130946 IBC (7331) IS=0.2NG/L 605392
A1025652	54	10/26/16 20:01	MET_607C	1610130951 IBC (7328) IS=0.2NG/L 605393
A1025653	55	10/26/16 20:35	MET_607C	1610140831 IBC (7330) IS=0.2NG/L 605394
A1025654	56	10/26/16 21:10	MET_607C	1610140836 IBC (7329) IS=0.2NG/L 605395

REVIEWED BY: Alice Yan
DATE: 10/27/16

Work continued to Page

SIGNATURE GS DATE 10/27/16

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

SOUTHWEST RESEARCH INSTITUTE®

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Chemistry and Chemical Engineering Division
Department of Analytical & Environmental Chemistry

November 9, 2016

Navarro Research and Engineering Inc.
NASA - JSC - White Sands Test Facility
Transportation Officer, Building 120
12600 NASA Road
Las Cruces, NM 88012
Tel. 575-524-5452

Attention: Tom Hall

Subject: Reports for Batch-607-#721-IBC for NDMA/DMN Analysis of Soil Samples
SwRI Project #: 01.16988.103
SwRI Task Orders: **161026-4**
Navarro P.O. #: 15EC092B

Dear Tom,

Enclosed please find the analytical reports for Batch-607-#721-IBC-Navarro of soil samples.

Southwest Research Institute appreciates the opportunity to provide the service to Navarro Research and Engineering Inc.. If you have any questions, please do not hesitate to call me at 210-522-3954.

Sincerely,

Gang Sun, Ph.D.
Program Manager

APPROVAL:

Michael Dammann
Director

CLIENT: Navarro Research and Engineering Inc.
SwRI PROJECT: 01.16988
TASK ORDER: 161026-4
NAVARRO PO #: 15EC092B

NARRATIVE

(M-607 - #721-Navarro-IBC)

CLIENT: NAVARRO
SwRI PROJECT: 01.16988.01.103
BATCH #: Batch-607-#721-IBC
TASK ORDER: 161026-4
CLIENT PO#: 15EC092B
REPORT DATA: 11/09/2016

NARRATIVE FOR NDMA/ DMN/BROMACIL ANALYSIS

1. Samples were extracted with dichloromethane (DCM) and analyzed by GC/MS in selective ion monitoring mode for N-Nitrosodimethylamine (NDMA) and N-Nitrodimethylamine (DMN) according to the modified Method 607.

2. All samples were extracted within 14 days for soil sample of sample collection and were analyzed within 40 days after the extraction.

3. The response factor (RF) values for Calibration curve and/or for continuing calibration standard were less than 25 % for all target compounds. The sample reporting limit is 0.33 ppb for 30 g extracted soil samples.

4. Both blank spike and matrix spike samples were spiked at 17 ppb for soil sample, then extracted and analyzed. The recoveries for all target compounds were within method recovery criteria of 13-110% for NDMA, 30-150% for DMN, and 40-190% for Bromacil, respectively. The soil sample result is reported as received basis and not by dry weight.

5. Surrogate compound was spiked into every sample before sample extraction at 17 ppb for soil sample. The surrogate recoveries for all samples were within method recovery criteria of 40-160%.

6. Laboratory blanks were extracted and analyzed for every sample batch. No analytes were detected above report limits from the blanks.

7. A "J" value was reported if the associated value was below reporting limits but above the MDL value.

8. All analyte concentrations are expressed in ng/g (*ppb*). Sample calculation:

$$\text{for soil: Concentration } (\mu g/kg) = \frac{C\ (ng/\mu L) \times V_{extr}\ (\mu L) \times DF}{W_{samp}(g)} \times \frac{1000\ g}{1\ kg} \times \frac{1\ \mu g}{1000\ ng}$$

where:
- C = result of GC/MS analysis, in ng/µL
- V_{extr} = final volume of sample extract, in µL
- V_{samp} = aqueous sample volume taken for extraction, in mL
- W_{samp} = soil sample weight taken for extraction, in gram
- DF = dilution factor, if any

CLIENT: Navarro Research and Engineering Inc.
SwRI PROJECT: 01.16988
TASK ORDER: 161026-4
NAVARRO PO #: 15EC092B

TASK ORDER AND CHAIN OF CUSTODY

Southwest Research Institute

Laboratory Task Order

TO #: 161026-4 Revision: 0

Project(s): 16988.01.10X
Manager(s): SUN, GANG
To Client: 11/16/16

SDG: 606059

SRR #'s: 58590
Client(s): Navarro

Instructions

Documents Related to this task order: 210005[COC for SRR 58590], 210006[Paperwork for SRR 58590], 108294[PO #179 + #180], 113038[PO #179 + #180 Change Order #1], 113134[PO #NAV0000060], 115908[PO #NAV0000060 CO #1], 117303[PO #NAV0000060 CO #2], 118820[PO #179 + #180 Change Order #2], 120319 [PO #104], 122923[PO #179 Change Order #3], 124787[PO #132], 124995[PO #179 Change Order #5]

Deliverables --> Hard Copy: no EDD: -YES- PDF: -YES-

Test: E607S
Section: EXTLAB

Holding: 14 days from CED

EXTRACTION BY METHOD 607.

Cnt: 5

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
606059		1	Soil	1610231101 (IBC 7350)	23 Oct 16	06 Nov 16
606060		1	Soil	1610231105 (IBC 7349)	23 Oct 16	06 Nov 16
606061		1	Soil	1610231123 (IBC 7351)	23 Oct 16	06 Nov 16
606062		1	Soil	1610231124 (IBC 7351)	23 Oct 16	06 Nov 16
606063	MS	1	Soil	1610231125 (IBC 7351)	23 Oct 16	06 Nov 16

Test: T607W
Section: TDG

Holding: 40 days from VTSR

NDMA/DMN ANALYSIS BY GC/MS/SIM

Cnt: 5

System ID	Type	Cont	Matrix	Customer ID	VTSR	Method Date
606059		1	Soil	1610231101 (IBC 7350)	26 Oct 16	05 Dec 16
606060		1	Soil	1610231105 (IBC 7349)	26 Oct 16	05 Dec 16
606061		1	Soil	1610231123 (IBC 7351)	26 Oct 16	05 Dec 16
606062		1	Soil	1610231124 (IBC 7351)	26 Oct 16	05 Dec 16
606063	MS	1	Soil	1610231125 (IBC 7351)	26 Oct 16	05 Dec 16

010005

WSTF CHAIN OF CUSTODY RECORD

Date 10-23-2016

Laboratory:SwRI PO#15EC092B

Address shipping questions to:
- ☐ Lori Minnick, 575-524-5119
- ☒ Other Tom Hall, 575-524-5453

Send sample receipt confirmation and analytical reports to:
- ☐ Carlyn Tufts, carlyn.a.tufts@nasa.gov
- ☐ Shelly Hernandez, shelly.j.hernandez@nasa.gov
- ☒ Tom Hall, tom.a.hall@nasa.gov

Special Instructions

Return coolers and reusable packaging materials within 14 days as required in statement of work to:

Return Address:

NASA WSTF Environmental Department
12600 NASA Road; Bldg. 120
Las Cruces, NM 88012
Attn: Lori Minnick

Sample Number	Sample Location	# of Containers	Sample Matrix*	Analytical Requirements: EPA Method 607M 8 oz Glass Jar, Ice	Charge Number (WSTF Use Only)	Comments
161023 1101	IBC 7350	1	S	X	16EEE41FW	
161023 1105	IBC 7349	1	S	X	16EEE41FW	
161023 1123	IBC 7351	1	S	X	16EEE41FW	~~Matrix Spike for 1610~~
161023 1124	IBC 7351	1	S	X	16EEE41FW	
161023 1125	IBC 7351	1	S	X	16EEE41FW	MATRIX SPIKE FOR 161023 1123

Relinquished By:	Date/Time:	Accepted By:	Date/Time:
[signature]	10-23-16 (1220)	[signature]	10-26-16 | 09:10

* Sample Matrix: A – Aqueous; G – Gaseous; S – Solid

Client: Navarro
SRR # 58590
Project # 16988.01.10X
Case: 15EC092B
VTSR: 10/26/16
Sample(s) Received: Intact
Temperature: 2.0 SN # 021055

010006

NASA-WSTF SHIPPING DOCUMENT

(1) Req # 4616

SHIPPED FROM: **NASA JSC WHITE SANDS TEST FACILITY** **12600 NASA ROAD; BLDG. 120** **LAS CRUCES, NEW MEXICO 88012**	WSTF ORIGINATOR/MAIL CODE/TELEPHONE NO. Tom Hall 575-524-5453		
	ORDER OR CONTRACT NUMBER Navarro PO #15EC092B		SHIPMENT CONTROL NO WS-16-298-E
SHIP TO: (ADDRESS, PHONE#, POINT OF CONTACT) Southwest Research Institute 6220 Culebra Raod San Antonio, TX 782238 Gang Sun 210-522-3954	PROJECT or TASK NUMBER CP.6EE4IFW.0.71 - 16EE4IFW		SHIP VIA **Fed Ex Air**
	Contain Batteries NO	NO. PKG. 1	DATE SHIPPE 10-25-16 / AirBill/ PRO #/Bol #
	Battery Type-Part # N/A	AUTHORIZED BY: Tom Hall	DEPT. Environmental

ITEM NO.	EQUIPMENT CONTROL NO.	MODEL NO./ STOCK NO./ PART NO.	ITEM NAME - MANUFACTURER'S NAME AND SERIAL NO.	UNIT OF ISSUE	QTY.
1 Lot-Samples			Soil Samples Navarro PO #15EC092B Line Item #1 NDMA and Bromacil for Soil samples by method 607M	5 ea.	

Client: Navarro
SRR # 58590
Project # 16988.01.10X
Case: 15EC092B
VTSR: 10/26/16
Sample(s) Received: Intact
Temperature: 2.0 SN # 021055

JUSTIFICATION FOR SHIPMENT: (MDR #, Return Authorization #'s, Warranty Replacement, Repair, Overage/Shortage, Damage, Recycling)
Sample for analysis as requested (Navarro PO #15EC0092B)

DOT HAZARDOUS MATERIALS INFO; EMERGENCY PHONE NUMBER AND GUIDE NUMBER:
Not subject to regulation as a hazard material under 49 CFR.

PROPERTY REVIEW: ☐ REMOVE EQUIPMENT TAG ☐ DO NOT REMOVE EQUIPMENT TAG

PACKED BY:	# CONTAINERS	TYPE CONTAINERS	DIMENSIONS	WEIGHT
Please check off the applicable labels! ☐ FRAGILE ☑ GLASS ☐ DELICATE ☐ DO NOT XRAY ☑ REFRIGERATE ☐ OTHER ☑ BUBBLEWRAP ☑ FOAM		Glass Containers	____ea. 8 oz. Glass Jars	
	TOTAL CONTAINERS			TOTAL WEIGHT

RECEIVED BY: David Garcia
REPRESENTING: SwRI

SHIPPERS CERTIFICATION: This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the regulations of the D.O.T. _____ Date_____

CLIENT: Navarro Research and Engineering Inc.
SwRI PROJECT: 01.16988
TASK ORDER: 161026-4
NAVARRO PO #: 15EC092B

ANALYTICAL DATA REPORT SHEETS

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610231101 (IBC 7350)

Client: Navarro
Batch: M607-#721-IBC
Task Order: 161026-4
Matrix: Soil
Sample Wt/Vol: 30.31 g

Project: 16988.01.103
Date Received: 10/26/16
Date Extracted: 11/02/16
Date Analyzed: 11/09/16
Date Reported: 11/09/16

Lab Sample ID: 606059
Lab File Name: A1108630.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.33	U
4164-28-7	N-Nitrodimethylamine	<0.33	U
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610231105 (IBC 7349)

Client: Navarro
Batch: M607-#721-IBC
Task Order: 161026-4
Matrix: Soil
Sample Wt/Vol: 30.15 g

Project: 16988.01.103
Date Received: 10/26/16
Date Extracted: 11/02/16
Date Analyzed: 11/09/16
Date Reported: 11/09/16

Lab Sample ID: 606060
Lab File Name: A1108631.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.33	U
4164-28-7	N-Nitrodimethylamine	<0.33	U
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610231123 (IBC 7351)

Client: Navarro
Batch: M607-#721-IBC
Task Order: 161026-4
Matrix: Soil
Sample Wt/Vol: 30.12 g

Project: 16988.01.103
Date Received: 10/26/16
Date Extracted: 11/02/16
Date Analyzed: 11/09/16
Date Reported: 11/09/16

Lab Sample ID: 606061
Lab File Name: A1108632.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.33	U
4164-28-7	N-Nitrodimethylamine	<0.33	U
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610231124 (IBC 7351)

Client: Navarro
Batch: M607-#721-IBC
Task Order: 161026-4
Matrix: Soil
Sample Wt/Vol: 30.52 g

Project: 16988.01.103
Date Received: 10/26/16
Date Extracted: 11/02/16
Date Analyzed: 11/09/16
Date Reported: 11/09/16

Lab Sample ID: 606062
Lab File Name: A1108633.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.33	U
4164-28-7	N-Nitrodimethylamine	<0.33	U
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

CLIENT: Navarro Research and Engineering Inc.
SwRI PROJECT: 01.16988
TASK ORDER: 161026-4
NAVARRO PO #: 15EC092B

QA DATA SHEETS

(BLANK, MATRIX SPIKE, SURROGATE, CALIBRATION)

Southwest Research Institute

Method 607 Internal Standard Summary

Filename: A11086S1.txt
Standard ID: IS=1NG/UL
Project: 16988.01.103

Date Analyzed: 11/08/2016
Time Analyzed: 01:14:00
Client: Navarro

		IS1		IS2	
		Area	RT	Area	RT
Mid Point Standard		286890	8.41	177619	15.02
Upper Limit		573780	8.74	355238	15.35
Lower Limit		143445	8.08	88809.5	14.69
Client Sample ID	**Lab Sample ID**				
BLANK_02NOV16	606329	261827	8.41	159203	15.01
LCS_02NOV16 LCS	606330 LCS	270283	8.41	157556	15.02
1610231101 (IBC 7350)	606059	274747	8.41	159993	15.01
1610231105 (IBC 7349)	606060	289321	8.41	171582	15.01
1610231123 (IBC 7351)	606061	260527	8.40	157223	15.01
1610231124 (IBC 7351)	606062	274316	8.40	160417	15.01
1610231125 (IBC 7351) MS	606063 MS	266367	8.40	156942	15.01

IS1 = 1,4-Dichlorobenzene-D4
IS2 = Atrazine-D5

* Flag indicating value is outside QC limits

Southwest Research Institute

Method 607 Blank Summary

Blank ID: BLANK_02NOV16
Client: Navarro
Matrix: Soil

Project: 16988.01.103
SDG: 606059

This method blank applies to the following samples, MS, and MSD's

Client Sample ID	Lab Sample ID	Date Acquired	Time Acquired
LCS_02NOV16	606330 LCS	11/09/16	03:54:00
1610231101 (IBC 7350)	606059	11/09/16	06:09:00
1610231105 (IBC 7349)	606060	11/09/16	06:43:00
1610231123 (IBC 7351)	606061	11/09/16	07:17:00
1610231124 (IBC 7351)	606062	11/09/16	07:51:00
1610231125 (IBC 7351)	606063 MS	11/09/16	08:25:00

Southwest Research Institute

Method 607 Surrogate Recovery Summary

Client: Navarro
Matrix: Soil
Project: 16988.01.103

SDG: 606059

	Client Sample ID	Lab Sample ID	N-Nitroso-di-n-propylamine	
			% Recovery	Recovery Limits
2	BLANK_02NOV16	606329	97	40-160
3	LCS_02NOV16	606330 LCS	93	40-160
4	1610231101 (IBC 7350)	606059	90	40-160
5	1610231105 (IBC 7349)	606060	92	40-160
6	1610231123 (IBC 7351)	606061	105	40-160
7	1610231124 (IBC 7351)	606062	100	40-160
8	1610231125 (IBC 7351)	606063 MS	107	40-160

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID: BLANK_02NOV16

Client: Navarro
Batch:
Task Order:
Matrix: Soil
Sample Wt/Vol: 30.21 g

Project: 16988.01.103
Date Received: NA
Date Extracted: 11/02/16
Date Analyzed: 11/09/16
Date Reported:

Lab Sample ID: 606329
Lab File Name: A1108625.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.33	U
4164-28-7	N-Nitrodimethylamine	<0.33	U
314-40-9	Bromacil	<0.33	U

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID: LCS_02NOV16

Client: Navarro
Batch:
Task Order:
Matrix: Soil
Sample Wt/Vol: 30.15 g

Project: 16988.01.103
Date Received: NA
Date Extracted: 11/02/16
Date Analyzed: 11/09/16
Date Reported:

Lab Sample ID: 606330 L
Lab File Name: A1108626.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	11.24	
4164-28-7	N-Nitrodimethylamine	16.58	
314-40-9	Bromacil	23.91	

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Method 607 Blank Spike Recovery Report

Sample ID: LCS_02NOV16

Client: Navarro
Batch:
Task Order:
Matrix: Soil
Sample Wt/Vol: 30.15 g

Project: 16988.01.103
Date Received: NA
Date Extracted: 11/02/16
Date Analyzed: 11/09/16
Date Reported:

Lab Sample ID: 606330 LCS
Blank ID: BLANK_02NOV16

ANALYTE	Spike Added ng/g	Blank Conc ng/g	LCS Conc ng/g	% Recovery	QC % Recovery Limits
N-Nitrosodimethylamine	17	0	11	65	13 - 110
N-Nitrodimethylamine	17	0	17	100	30 - 150
Bromacil	17	0	24	141	40 - 190

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1610231125 (IBC 7351) MS

Client: Navarro
Batch: M607-#721-IBC
Task Order: 161026-4
Matrix: Soil
Sample Wt/Vol: 30.34 g
Compared Sample: 1610231123 (IBC 7351)

Project: 16988.01.103
Date Received: 10/26/16
Date Extracted: 11/02/16
Date Analyzed: 11/09/16
Date Reported: 11/09/16

Lab Sample ID: 606063 MS
Lab File Name: A1108634.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: ng/g
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Spike	Recovery	Recovery Limit
62-75-9	N-Nitrosodimethylamine	13.41	17.00	79%	13-110%
4164-28-7	N-Nitrodimethylamine	16.51	17.00	97%	30-150%
314-40-9	Bromacil	24.09	17.00	142%	40-190%

U - Undetected, indicates not found above the detection limit

J - Estimated value, greater than the MDL but less than the PQL

Southwest Research Institute

Continuing Calibration Check Sheet

SwRI Project #:	01.16988.01.103	Calibration Date:	11/08/16
Sponsor:	Navarro	Analytical Method:	TAP-01-0408-031
SwRI Standard ID:	202-04-120408017	Std Concentration:	1 µg/mL
File ID #:	A11086S1	Initial Calibration Date:	10/17/16

ANALYTE	Mean RRF	RRF	% Dif.
N-Nitrosodimethylamine	0.361	0.386	-6.9
N-Nitrodimethylamine	0.13	0.136	-4.6
N-Nitroso-di-n-propylamine-d14	0.127	0.132	-3.6
Bromacil	1.161	1.057	8.9

Southwest Research Institute

Initial Calibration Data Sheet

SwRI Project #:	01.16988.01.103	Calibration Data:	10/17/16
Sponsor:	Navarro	Analytical Method:	TAP-01-0408-031
SwRI Standard ID:	202-04-120408017	Std Concentration:	0.01-10 µg/mL

ANALYTE	RRF 0.01	RRF 0.05	RRF 0.2	RRF1	RRF5	RRF10	Ave. RRF	RSD%
N-Nitrosodimethylamine	0.291	0.308	0.352	0.369	0.417	0.430	0.361	15.49
N-Nitrodimethylamine	0.109	0.115	0.128	0.134	0.147	0.148	0.13	12.44
N-Nitroso-di-n-propylamine-d14	0.114	0.111	0.124	0.127	1.143	0.145	0.127	11.03
Bromacil	1.435	1.048	1.072	1.081	1.150	1.177	1.161	12.35

CLIENT:	**Navarro Research and Engineering Inc.**
SwRI PROJECT:	**01.16988**
TASK ORDER:	**161026-4**
NAVARRO PO #:	**15EC092B**

EXTRACTION AND INJECTION LOG

(E607S) SOIL Extraction By Soxhlet 3540C (Navarro)

SwRI Labs
Client: Navarro
Project: 16988.01.10X
Case: 15EC092B

Sample Receipt: 58590
TO#: 161026-4

DATE EXTRACTED	11/02/16
ANALYSTS INVOLVED	Hamed Edrisi (SU,SP) Marina Lebron (SU,SW,Conc,QT) Christina Menn (BD,QT,FV)
SURROGATE SOL ID	203-01-120408017@5.0ng/uL
MTX SPK SOL ID	201-01-120408017@10.0ng/uL
EXTRACTS LOCATION	Tracked by LIMS (11/07/16 CM)
CHEMICAL,BRAND &LOT#	Sodium Sulfate ID:04-0402-004 DCM Fisher Optima Lot #164214
NOTES	Hamilton Co. Syringes: 100uL ID:462905(SURR) 50uL ID:462898(MS) Balance #61 was used.

ADDITIONAL NOTES	1.Soxhlet extraction began at 1:30pm and ended the following day at 8:30am. 2.BLANK(606329) and LCS(606330) are shared with page 488 of this book.
EXTRACTION FLOWCHART	Xg >>> FV 1000uL DCM
REFRENCE BOOK &PAGE	16-0402-032 P38
TAP(S) USED	01-0402-152

	System ID	Type	Customer ID	SOLVENT VOL DCM (ML)	SAMPLE WT	SURROGATE SOL VOL
1	606059		1610231101 (IBC 7350)	250	30.31 g	100 uL
2	606060		1610231105 (IBC 7349)	250	30.15 g	100 uL
3	606061		1610231123 (IBC 7351)	250	30.12 g	100 uL
4	606062		1610231124 (IBC 7351)	250	30.52 g	100 uL
5	606063	MS	1610231125 (IBC 7351)	250	30.34 g	100 uL
6	606329		BLANK_02NOV16	250	30.21 g	100 uL
7	606330		LCS_02NOV16	250	30.15 g	100 uL

	System ID	Type	Customer ID	MTX SPK SOL VOL	FV DCM
1	606059		1610231101 (IBC 7350)	0 uL	1000 uL
2	606060		1610231105 (IBC 7349)	0 uL	1000 uL
3	606061		1610231123 (IBC 7351)	0 uL	1000 uL
4	606062		1610231124 (IBC 7351)	0 uL	1000 uL
5	606063	MS	1610231125 (IBC 7351)	50 uL	1000 uL
6	606329		BLANK_02NOV16	0 uL	1000 uL
7	606330		LCS_02NOV16	50 uL	1000 uL

Page created Nov 2 2016 12:24PM by mlebron
Book: EXTRACTION LAB, Volume: EXT-2016, Page: 489 (Section 1 of 1)
Approved by HAMED EDRISI on Nov 8 2016 5:14PM

Date Printed: 11/09/2016

Work continued from Page

injlog

Southwest Research Institute GC/MS Injection Log

OPERATOR: GS SEQUENCE DATE: 11/08/16, 11/09/16INSTRUMENT: Amidala
COLUMN: Agilent 122-0732 DB-1701, 0.25mm * 30m * 0.25um
CARRIER GAS: Helium SOLVENT: DCM
METHOD FILE: MET_607C, MET_607C.M
CLIENT NAME: NAVARRO PROJECT NUMBER: 16988.01.103
SRR: 58579, 58581, 58588, 58595, 58599, 58613, 58563, 58590 METHOD: M-607
DATA PATH: C:\MSDChem\1\DATA\2016\A110816 MATRIX: water & soil

OVEN PROGRAM

Initial temp: 40 'C (On)
Initial time: 4.00 min
Maximum temp: 350 'C
Equilibration time: 0.50 min

Ramps:

#	Rate	Final temp	Final time
1	15.00	150	0.00
2	25.00	270	10.00
3	0.0(off)		

Post temp: 270 'C
Post time: 5.00 min
Run time: 29.80 min

FILENAME	VIAL	DATE/TIME	METHOD	SAMPLE DESCRIPTION
A11086C1	100	11/08/16 12:32	MET_607C	SLUG
A11086C2	1	11/08/16 13:06	MET_607C	DCM
A11086S1	2	11/08/16 13:14	MET_607C	NDMA/DMN/BROMACIL STD 1NG/UL IS=1NG/UL
A1108601	3	11/08/16 13:48	MET_607C	BLANK_26OCT16 IS=0.2NG/L 606080
A1108602	4	11/08/16 14:22	MET_607C	LCS_26OCT16 IS=0.2NG/L 606081
A1108603	5	11/08/16 14:56	MET_607C	1610200851Y (700-H-350) IS=0.2NG/L 605984
A1108604	6	11/08/16 15:29	MET_607C	1610201006Z (PL-5-985) IS=0.2NG/L 605985
A1108605	7	11/08/16 16:03	MET_607C	1610210654 (B650-EFF-1) IS=0.2NG/L 605986
A1108606	8	11/08/16 16:37	MET_607C	1610210714 (B650-INF-1) IS=0.2NG/L 605987
A1108607	9	11/08/16 17:11	MET_607C	1610210755 (PFE-1) IS=0.2NG/L 605988
A1108608	10	11/08/16 17:45	MET_607C	1610210803 (PFE-2) IS=0.2NG/L 605989
A1108609	11	11/08/16 18:19	MET_607C	1610210804 (PFE-2) IS=0.2NG/L 605990
A1108610	12	11/08/16 18:52	MET_607C	1610210826 (PFE-7) IS=0.2NG/L 605991
A1108611	13	11/08/16 19:26	MET_607C	1610210848 (PFE-4A) IS=0.2NG/L 605992
A1108612	14	11/08/16 20:00	MET_607C	1610210906 (B655-EFF-2) IS=0.2NG/L 605993
A1108613	15	11/08/16 20:34	MET_607C	1610211005 (B655-INF-2) IS=0.2NG/L 605995
A1108614	16	11/08/16 21:08	MET_607C	1610230831 (400-SB-12) IS=0.2NG/L 606009
A1108615	17	11/08/16 21:42	MET_607C	1610240851Z (PL-5-495) IS=0.2NG/L 606049
A1108616	18	11/08/16 22:16	MET_607C	1610240933B (BLM-41-670) IS=0.2NG/L 606050
A1108617	19	11/08/16 22:49	MET_607C	1610241340B (BLM-41-420) IS=0.2NG/L 606051
A1108618	20	11/08/16 23:23	MET_607C	BLANK_01NOV16 IS=0.2NG/L 606333
A1108619	21	11/08/16 23:57	MET_607C	LCS_01NOV16 IS=0.2NG/L 606334
A1108620	22	11/09/16 00:31	MET_607C	1610251411B (BLM-14-327) IS=0.2NG/L 606084
A1108621	23	11/09/16 01:05	MET_607C	1610251413B (BLM-14-327) IS=0.2NG/L 606085
A1108622	24	11/09/16 01:39	MET_607C	1610260931 (400-SB-10) IS=0.2NG/L 606125
A1108623	25	11/09/16 02:12	MET_607C	1610280918B (WW-5-459) IS=0.2NG/L 606259
A1108624	26	11/09/16 02:46	MET_607C	1610280932B (WW-5-579) IS=0.2NG/L 606260
A1108625	27	11/09/16 03:20	MET_607C	BLANK_02NOV16 IS=0.2NG/L 606329
A1108626	28	11/09/16 03:54	MET_607C	LCS_02NOV16 IS=0.2NG/L 606330
A1108627	29	11/09/16 04:28	MET_607C	1610190904 (400-SB-10)9'-10')) IS=0.2NG/L 605
A1108628	30	11/09/16 05:02	MET_607C	1610191209 (400-SB-10)39'-40')) IS=0.2NG/L 60
A1108629	31	11/09/16 05:35	MET_607C	1610191644 (400-SB-10)79-80')) IS=0.2NG/L 605
A1108630	32	11/09/16 06:09	MET_607C	1610231101 (IBC 7350) IS=0.2NG/L 606059
A1108631	33	11/09/16 06:43	MET_607C	1610231105 (IBC 7349) IS=0.2NG/L 606060
A1108632	34	11/09/16 07:17	MET_607C	1610231123 (IBC 7351) IS=0.2NG/L 606061
A1108633	35	11/09/16 07:51	MET_607C	1610231124 (IBC 7351) IS=0.2NG/L 606062
A1108634	36	11/09/16 08:25	MET_607C	1610231125 (IBC 7351) IS=0.2NG/L 606063MS

REVIEWED BY: MBurnham
DATE: 11/09/16

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SIGNATURE DATE 11-9

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE