National Aeronautics and
Space Administration

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White Sands Test Facility
P.O. Box 20
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December 23, 2016

Reply to Attn of: RE-16-168

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 Second "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, IDW drill cuttings, and IDW debris) generated during activities associated with the 400 Area Closure Investigation Work Plan (IWP), which was approved by NMED on November 8, 2011. This second "Contained-In" Determination request for the 400 Area Investigation is for applicable IDW drill cuttings from soil boring locations 400-SB-10 and 400-SB-12, IDW soil generated from soil boring location 400-SB-14, and IDW contact debris associated with drilling activities. The IDW soil, IDW drill cuttings, and IDW debris are currently being managed in accordance with 40 CFR § 262.34, as listed hazardous wastes carrying EPA Waste Codes F001 and F002. The earliest 90-day accumulation time limit expiration date for the IDW associated with this NLCID will expire on January 16, 2017.

NASA received, reviewed, and compared analytical data generated from the IDW soil and IDW drill cuttings to the applicable 40 CFR § 268 Subpart D Treatment Standards and current NMED Soil Screening Levels (SSLs). 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 does not contain hazardous waste, NASA requests concurrence from the NMED to spread 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 drill cuttings and contact 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.

for

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

The Resource Conservation and Recovery Act (RCRA) Hazardous Waste Operating Permit (NMED, 2009; Permit) for the White Sands Test Facility (WSTF) required an investigation of soil directly beneath and adjacent to the WSTF 400 Area surface impoundments. Research conducted for the Historical Information 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 NMED Hazardous Waste Bureau approved the 400 Area IWP (November 8, 2011) and an associated abbreviated drilling work plan (August 30, 2016), 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 monitoring wells are intended 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 near the 400 Area impoundments. NASA initiated the 400 Area Investigation in September 2016, and in consultation with NMED, modified the planned approach to include eight combination soil vapor/groundwater monitoring wells. The seven remaining borings have or will be completed as soil vapor monitoring wells. Investigation-derived waste (IDW) has been generated during the 400 Area Investigation, and an initial request for a "contained-in" determination was approved by NMED on December 15, 2016. The non-hazardous determination was approved for IDW soil generated from borehole locations 400-SB-03, 400-SB-04, 400-SB-10, 400-SB-12, and 400-SB-15.

Material generated during 400 Area Investigation drilling activities includes IDW soil and IDW drill cuttings. IDW soil is defined as environmental media produced using the sonic drilling technique within alluvium from ground surface to the top of cemented alluvium, or conglomerate bedrock. Water is generally not added while using the sonic drilling method in alluvium. IDW drill cuttings generated are defined as environmental media produced using the air hammer drilling process while drilling boreholes within cemented alluvium and andesite bedrock. The air hammer drilling method allowed for more efficient advancement of the borings through bedrock, where groundwater was encountered. Groundwater and water added during drilling produced slurry, or mixed media with aqueous and settleable solid phases, returns from the borehole. All IDW generated as part of the 400 Area Investigation is 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 is providing analytical results from waste characterization samples collected from 400 Area Investigation IDW soil and IDW drill cuttings generated through November 3, 2016, and is requesting that the NMED perform a "contained-in" determination to determine whether the fourteen 55-gallon containers of IDW drill cuttings, three 1-cubic yard containers of IDW soil, and one 1-cubic yard container of contact contaminated debris included in this request poses an unacceptable risk.

Basis for "Contained-In" Determination

NASA is requesting that NMED perform a No Longer Contained-in Determination (NLCID) for environmental media (IDW soil and IDW drill cuttings) 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. IDW decontamination water and groundwater is not part of this request. Analytical sampling data have been received and

reviewed for the mixed media IDW drill cuttings from 400 Area Investigation boreholes 400-SB-10 and 400-SB-12 and IDW soil that originated from 400-SB-14. 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 Industrial and Construction Worker Soil Screening Levels (SSLs). If the environmental media IDW is found not to pose an unacceptable risk, then the NMED may determine the soil, drill cuttings, 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 maximum concentration of 0.0024 mg/Kg in the settleable solid phase of IDW drill cuttings generated from borehole 400-SB-10 and at a concentration of 0.0014 mg/Kg in the settleable solid phase of IDW drill cuttings generated from borehole 400-SB-12. PCE was also detected at a maximum concentration of 0.0036 mg/Kg in IDW soil generated at borehole 400-SB-14. All detections of PCE included a J flag data qualifier, which indicated the reported result was an estimated concentration between the method detection limit and reporting limit. The reported PCE concentrations did not exceed the applicable regulatory limits.

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 shipment cooler that contained the Toxicity Characteristic Leaching Procedure (TCLP) samples had a delayed delivery, which resulted in the samples getting to the analytical laboratory out of the temperature specification. As a result, these samples were discarded and the total concentrations were used to calculate the maximum theoretical leachate concentration that could result from performing the TCLP (EPA Method 1311). 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 or the NMED SSLs. Chromium was detected in settable solid phase samples obtained from borehole 400-SB-12 at concentrations of 12.1 mg/Kg and 16.4 mg/Kg. The maximum theoretical leachate concentration for these samples was calculated as 0.605 mg/L and 0.82 mg/L, which are below the 40 CFR 261.24 toxicity limit of 5.0 mg/L. The maximum theoretical leachate concentration is greater than the 40 CFR Part 268 Subpart D Treatment Standard (nonwastewaters) for chromium of 0.60 mg/L (TCLP), but this treatment standard does not apply if the drill cuttings are determined to be a non-hazardous waste. The total concentration of chromium in these samples is also considerably lower than the industrial and construction worker SSLs of 505 mg/Kg and 134 mg/Kg, respectively.

N-Nitrosodimethylamine (NDMA)

NDMA is a constituent sometimes 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. Based on the waste characterization sampling results, NDMA was not detected above 40 CFR §268.40 Treatment Standard Limit, or the NMED SSLs. N-Nitrosodimethylamine was detected at the maximum concentration of 0.00016 mg/Kg in the mixed media settleable solids phase, which does not

exceed any applicable regulatory limit. NASA compared the reported total concentration of NDMA with the NMED SSL for Industrial/Occupational Soil and Construction Worker 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.

Other Volatile Organic Compounds

In addition to the F001 and F002 COCs, the laboratory's target analyte list for SW-846 Method 8260C includes the majority of volatile organic compounds typically analyzed for by SW-846 Method 8260C. Acetone and dichloromethane were detected at trace concentrations (< 0.01 mg/Kg). Acetone and dichloromethane are known lab contaminates. Carbon disulfide was detected in the settleable solid phase of IDW drill cuttings generated at borehole 400-SB-10 at a maximum concentration of 0.0069 mg/Kg. Naphthalene was detected at a maximum concentration of 0.00089J mg/Kg in IDW soil generated from borehole 400-SB-14. Detected volatile organic compounds did not exceed any applicable regulatory limit.

Other Semi-Volatile Organics

N-Nitrodimethylamine (DMN) is included in EPA Method 607M with the reported NDMA results. The maximum observed concentration was 0.0001 mg/L in the mixed media aqueous phase. The 40 CFR §268.40 Treatment Standards do not include a treatment limit for N-Nitrodimethylamine or bromacil. Also, the NMED SSLs do not include a limit for these constituents.

Analytical Reports and Chains of Custody

Analytical reports and chains of custody 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 concludes that the IDW soil and IDW drill cuttings do 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 IDW drill cuttings and contact debris identified in this request will be disposed of as solid waste.

Table 1 400-SB-10 IDW Mixed Media Aqueous Phase VOC Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/L)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Wastewaters Concentration (mg/L)
1611301340 (Composite Sample) Nos. 7374, 7375, 7376, 7377, 7378, 7379, 7380, 7381, 7382 1/23/17	8260C	Acetone	0.055	N/A	0.28
1611301341 (Composite Sample) Nos. 7374, 7375, 7376, 7377, 7378, 7379, 7380, 7381, 7382 1/23/17		Acetone	0.050	N/A	0.28

Table 2 400-SB-10 IDW Mixed Media Settleable Solids Phase 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 in mg/Kg unless noted as "mg/L TCLP"	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1611301343 (Composite Sample) Nos. 7374, 7375, 7376, 7377, 7378, 7379, 7380, 7381, 7382 1/23/17	8260C	Acetone Carbon Disulfide Dichloromethane Tetrachloroethene	0.0069 0.0058J 0.0013BJ 0.0018J	N/A N/A N/A 0.7	160 4.8 mg/L TCLP 30 6.0	9.60E+05 8.54E+03 N/A 6.29E+02	2.42E+05 1.62E+03 N/A 1.20E+02
1611301344 (Composite Sample) Nos. 7374, 7375, 7376, 7377, 7378, 7379, 7380, 7381, 7382 1/23/17		Acetone Carbon Disulfide Dichloromethane Tetrachloroethene	0.0095 0.0069 0.0015BJ 0.0024J	N/A N/A N/A 0.7	160 4.8 mg/L TCLP 30 6.0	9.60E+05 8.54E+03 N/A 6.29E+02	2.42E+05 1.62E+03 N/A 1.20E+02

Table 3 400-SB-10 IDW Mixed Media Aqueous Phase Nitrosamine Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Wastewaters Concentration (mg/L)
1611181118 (Composite Sample) Nos. 7374, 7375, 7376, 7377, 7378, 7379, 7380, 7381, 7382 1/23/17	607M	N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	ND 0.0001 ND	0.40 N/A N/A
1611181119 (Composite Sample) Nos. 7374, 7375, 7376, 7377, 7378, 7379, 7380, 7381, 7382 1/23/17		N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	ND 0.0001 ND	0.40 N/A N/A

Table 4 400-SB-10 IDW Mixed Media Settleable Solids Phase Nitrosamine Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	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)
1611181127 (Composite Sample) Nos. 7374, 7375, 7376, 7377, 7378, 7379, 7380, 7381, 7382 1/23/17	607M	N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	ND ND ND	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A
1611181128 (Composite Sample) Nos. 7374, 7375, 7376, 7377, 7378, 7379, 7380, 7381, 7382 1/23/17		N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	ND ND ND	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A

Table 5 400-SB-10 IDW Mixed Media Aqueous Phase Metals Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/L)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Wastewaters (mg/L)
1611181121 (Composite Sample) Nos. 7374, 7375, 7376, 7377, 7378, 7379, 7380, 7381, 7382 1/23/17	1311/6010C	Barium Chromium Vanadium[1] Zinc[1]	0.036B 0.00003 BJ 0.002BJ 0.012BJ	100 5.0 N/A N/A	1.2 2.77 4.3 2.61
1611181122 (Composite Sample) Nos. 7374, 7375, 7376, 7377, 7378, 7379, 7380, 7381, 7382 1/23/17		Barium Chromium Vanadium[1] Zinc[1]	0.036B 0.00004 BJ 0.002BJ 0.015BJ	100 5.0 N/A N/A	1.2 2.77 4.3 2.61

Table 6 400-SB-10 IDW Mixed Media Settleable Solids Phase Total Metals Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	TCLP Results (mg/L)[2]	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Nonwastewaters (mg/L TCLP)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1611181130 (Composite Sample) Nos. 7374, 7375, 7376, 7377, 7378, 7379, 7380, 7381, 7382 1/23/17	1311/6010C	Antimony	1.0J	0.05	N/A	1.15	5.19E+02	1.42E+02
		Arsenic	5.4	0.27	5.0	5.0	2.15E+01	5.74E+01
		Barium	180	9	100.0	21	2.55E+05	4.39E+03
		Beryllium	0.53	0.027	N/A	1.22	2.58E+03	1.48E+02
		Cadmium	0.05J	0.003	1.0	0.11	1.11E+03	7.21E+01
		Chromium	1.8	0.09	5.0	0.60	5.05E+02	1.34E+02
		Lead	7.5J	0.375	5.0	0.75	8.00E+02	8.00E+02
		Nickel	3.5J	0.175	N/A	11	2.57E+04	7.53E+02
		Selenium	2.1J	0.105	N/A	5.7	6.49E+03	1.75E+03
		Vanadium[1]	42.7	2.14	N/A	1.6	5.53E+03	6.14E+02
		Zinc[1]	37.0	1.85	N/A	4.3	3.89E+05	1.06E+05
1611181131 (Composite Sample) Nos. 7374, 7375, 7376, 7377, 7378, 7379, 7380, 7381, 7382 1/23/17		Arsenic	5.7	0.285	5.0	5.0	2.15E+01	5.74E+01
		Barium	147	7.35	100.0	21	2.55E+05	4.39E+03
		Beryllium	0.55	0.028	N/A	1.22	2.58E+03	1.48E+02
		Cadmium	0.06J	0.003	1.0	0.11	1.11E+03	7.21E+01
		Chromium	2.7	0.135	5.0	0.60	5.05E+02	1.34E+02
		Lead	7.3J	0.365	5.0	0.75	8.00E+02	8.00E+02
		Nickel	3.4J	0.17	N/A	11	2.57E+04	7.53E+02
		Selenium	1.7	0.085	N/A	5.7	6.49E+03	1.75E+03
		Vanadium[1]	47.1	2.36	N/A	1.6	5.53E+03	6.14E+02
		Zinc[1]	37.4	1.87	N/A	4.3	3.89E+05	1.06E+05

Table 7 400-SB-12 IDW Mixed Media Aqueous Phase VOC Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/L)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Wastewaters Concentration (mg/L)
1611301400 (Composite Sample) Nos. 7357, 7358, 7359, 7360, 7361 1/20/17	8260C	Acetone	0.026	N/A	0.28
1611301401 (Composite Sample) Nos. 7357, 7358, 7359, 7360, 7361 1/20/17		Acetone	0.025	N/A	0.28

Table 8 400-SB-12 IDW Mixed Media Settleable Solids Phase 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)
1611301403 (Composite Sample) Nos. 7357, 7358, 7359, 7360, 7361 1/20/17	8260C	Acetone Dichloromethane Tetrachloroethene	0.160 0.0014 BJ 0.0014J	N/A N/A 0.7	160 30 6.0	9.60E+05 N/A 6.29E+02	2.42E+05 N/A 1.20E+02
1611301404 (Composite Sample) Nos. 7357, 7358, 7359, 7360, 7361 1/20/17		Acetone Dichloromethane	0.130 0.0014 BJ	N/A N/A	160 30	9.60E+05 N/A	2.42E+05 N/A

Table 9 400-SB-12 IDW Mixed Media Aqueous Phase Nitrosamine Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/L)	40 CFR Part 268 Subpart D Treatment Standard wastewaters Concentration (mg/L)
1611181143 (Composite Sample) Nos. 7357, 7358, 7359, 7360, 7361 1/20/17	607M	N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	ND ND ND	0.40 N/A N/A
1611181144 (Composite Sample) Nos. 7357, 7358, 7359, 7360, 7361 1/20/17		N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	ND ND ND	0.40 N/A N/A

Table 10 400-SB-12 IDW Mixed Media Settleable Solids Phase Nitrosamine Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	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)
1611181152 (Composite Sample) Nos. 7357, 7358, 7359, 7360, 7361 1/20/17	607M	N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	ND ND ND	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A
1611181153 (Composite Sample) Nos. 7357, 7358, 7359, 7360, 7361 1/20/17		N-Nitrosodimethylamine N-Nitrodimethylamine Bromacil	0.00016 ND ND	2.3 N/A N/A	5.03E-01 N/A N/A	2.14E+00 N/A N/A

Table 11 400-SB-12 IDW Mixed Media Aqueous Phase Metals Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/L)	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Wastewaters (mg/L)
1611181146 (Composite Sample) Nos. 7357, 7358, 7359, 7360, 7361 1/20/17	1311/6010C	Barium Beryllium Chromium Vanadium[1] Zinc[1]	0.153 0.0002BJ 0.004BJ 0.016BJ 0.025	100 N/A 5.0 N/A N/A	1.2 0.82 2.77 4.3 2.61
1611181147 (Composite Sample) Nos. 7357, 7358, 7359, 7360, 7361 1/20/17		Barium Chromium Vanadium[1] Zinc[1]	0.036B 0.0004 BJ 0.003BJ 0.018BJ	100 5.0 N/A N/A	1.2 2.77 4.3 2.61

Table 12 400-SB-12 IDW Mixed Media Settleable Solids Phase Total Metals Analytical Detection Summary

Sample ID Container No. 90-Day Expiration Date	Analytical Method	Detected Analyte	Total Results (mg/Kg)	TCLP Results (mg/L)[2]	Toxicity Limit 40 CFR 261.24 (mg/L)	40 CFR Part 268 Subpart D Treatment Standard Nonwastewaters (mg/L TCLP)	NMED Industrial Soil Screening Level (mg/Kg)	NMED Construction Worker Soil Screening Level (mg/Kg)
1611181155 (Composite Sample) Nos. 7357, 7358, 7359, 7360, 7361 1/20/17	1311/6010C	Arsenic	0.8J	0.04	5.0	5.0	2.15E+01	5.74E+01
		Barium	237	11.85	100.0	21	2.55E+05	4.39E+03
		Beryllium	0.59	0.030	N/A	1.22	2.58E+03	1.48E+02
		Cadmium	0.71	0.036	1.0	0.11	1.11E+03	7.21E+01
		Chromium	12.1	0.605	5.0	0.60	5.05E+02	1.34E+02
		Lead	4.3J	0.215	5.0	0.75	8.00E+02	8.00E+02
		Nickel	8.8	0.44	N/A	11	2.57E+04	7.53E+02
		Vanadium[1]	59.4	2.97	N/A	1.6	5.53E+03	6.14E+02
		Zinc[1]	41.4	2.07	N/A	4.3	3.89E+05	1.06E+05
1611181156 (Composite Sample) Nos. 7357, 7358, 7359, 7360, 7361 1/20/17		Arsenic	1.0J	0.05	5.0	5.0	2.15E+01	5.74E+01
		Barium	330	16.5	100.0	21	2.55E+05	4.39E+03
		Beryllium	0.57	0.0285	N/A	1.22	2.58E+03	1.48E+02
		Cadmium	0.74	0.037	1.0	0.11	1.11E+03	7.21E+01
		Chromium	16.4	0.82	5.0	0.60	5.05E+02	1.34E+02
		Lead	4.7J	0.235	5.0	0.75	8.00E+02	8.00E+02
		Nickel	9.9	0.495	N/A	11	2.57E+04	7.53E+02
		Selenium	1.5	0.075	N/A	5.7	6.49E+03	1.75E+03
		Vanadium[1]	72.2	3.61	N/A	1.6	5.53E+03	6.14E+02
		Zinc[1]	43.7	2.17	N/A	4.3	3.89E+05	1.06E+05

Table 13 400-SB-14 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)
1611090900 No. 7393 1/31/17	8260C	Dichloromethane Naphthalene Tetrachloroethene	0.00082J 0.00089J 0.001J	N/A N/A 5.0	30 5.6 6.0	5.13E+03 2.41E+02 6.29E+02	1.21E+03 1.59E+02 1.20E+02
1611090901 No. 7393 1/31/17		Dichloromethane Naphthalene Tetrachloroethene	0.0015J 0.00085J 0.0012J	N/A N/A 5.0	30 5.6 6.0	5.13E+03 2.41E+02 6.29E+02	1.21E+03 1.59E+02 1.20E+02
1611090920 No. 7392 1/31/17		Dichloromethane Naphthalene Tetrachloroethene	0.0014J 0.00067J 0.0036J	N/A N/A 5.0	30 5.6 6.0	5.13E+03 2.41E+02 6.29E+02	1.21E+03 1.59E+02 1.20E+02
1611090930 No. 7394 1/31/17		Dichloromethane Naphthalene Tetrachloroethene	0.0016J 0.00055J 0.00099J	N/A N/A 5.0	30 5.6 6.0	5.13E+03 2.41E+02 6.29E+02	1.21E+03 1.59E+02 1.20E+02

Table 14 400-SB-14 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)
1611090903 No. 7393 1/31/17	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
1611090904 No. 7393 1/31/17		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
1611090921 No. 7392 1/31/17		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
1611090931 No. 7394 1/31/17		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-14 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)
1611090909 No. 7393 1/31/17	1311/6010C	Barium Cadmium Zinc[1]	1.2J 0.0039J 0.077J	100 1.0 N/A	21 0.11 4.3
1611090910 No. 7393 1/31/17		Arsenic Barium Cadmium Chromium Zinc[1]	0.056J 1.4J 0.012 0.047 0.061J	5.0 100 1.0 5.0 N/A	5.0 21 0.11 0.6 4.3
1611090923 No. 7392 1/31/17		Barium Cadmium Chromium Vanadium[1] Zinc[1]	1.1J 0.0044J 0.019J 0.011J 0.071J	100 1.0 5.0 N/A N/A	21 0.11 0.6 1.6 4.3
1611090933 No. 7394 1/31/17		Barium Cadmium Zinc[1]	2.4J 0.0044J 0.055J	100 1.0 N/A	21 0.11 4.3

Table 16 400-SB-14 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)
1611090906 No. 7393 1/31/17	6010C	Arsenic	6.3	2.15E+01	5.74E+01
		Barium	76.3	2.55E+05	4.39E+03
		Beryllium	0.58B	2.58E+03	1.48E+02
		Cadmium	0.07BJ	1.11E+03	7.21E+01
		Chromium	11.6	5.05E+02	1.34E+02
		Lead	8.6	8.00E+02	8.00E+02
		Nickel	9.9	2.57E+04	7.53E+02
		Selenium	2.0	6.49E+03	1.75E+03
		Thallium	1.6	1.30E+01	3.54E+00
		Vanadium	15.0	6.53E+03	6.14E+02
		Zinc	46.6	3.89E+05	1.06E+05
1611090907 No. 7393 1/31/17	6010C	Arsenic	4.8	2.15E+01	5.74E+01
		Barium	60.6	2.55E+05	4.39E+03
		Beryllium	0.49B	2.58E+03	1.48E+02
		Cadmium	0.08J	1.11E+03	7.21E+01
		Chromium	18.8	5.05E+02	1.34E+02
		Lead	9.1	8.00E+02	8.00E+02
		Nickel	9.0	2.57E+04	7.53E+02
		Thallium	3.2	1.30E+01	3.54E+00
		Vanadium	15.8	6.53E+03	6.14E+02
		Zinc	46.4	3.89E+05	1.06E+05
1611090922 No. 7392 1/31/17	6010C	Arsenic	6.1	2.15E+01	5.74E+01
		Barium	71.7	2.55E+05	4.39E+03
		Beryllium	0.49B	2.58E+03	1.48E+02
		Cadmium	0.58B	1.11E+03	7.21E+01
		Chromium	17.2	5.05E+02	1.34E+02
		Lead	7.7	8.00E+02	8.00E+02
		Nickel	8.1	2.57E+04	7.53E+02
		Thallium	3.0	1.30E+01	3.54E+00
		Vanadium	24.5	6.53E+03	6.14E+02
		Zinc	72.5	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)
1611090932 No. 7394 1/31/17	6010C	Arsenic	8.4	2.15E+01	5.74E+01
		Barium	68.6	2.55E+05	4.39E+03
		Beryllium	0.43B	2.58E+03	1.48E+02
		Cadmium	0.12BJ	1.11E+03	7.21E+01
		Chromium	10.7	5.05E+02	1.34E+02
		Lead	8.3	8.00E+02	8.00E+02
		Nickel	6.8	2.57E+04	7.53E+02
		Thallium	3.2	1.30E+01	3.54E+00
		Vanadium	12.6	6.53E+03	6.14E+02
		Zinc	63.4	3.89E+05	1.06E+05

Table Notes:

B: Indicates analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result

J: Indicates result concentration is between the method reporting limit and the method detection limit.

ND: Indicates not detected.

N/A: Indicates not applicable.

[1] These constituents are not "underlying hazardous constituents" in characteristic wastes, according to the definition at 40 CFR 268.2(i).

[2] Indicates that total metal results were divided by 20. This represents the maximum theoretical leachate concentration that could result from performing the Toxicity Characteristic Leaching Procedure (EPA Method 1311).

December 02, 2016 Service Request No:R1611998

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 November 11, 2016
For your reference, these analyses have been assigned our service request number **R1611998.**

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.
dba ALS Environmental

Narrative Documents

ALS Environmental—Rochester Laboratory
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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:R1611998
Date Received:11/11/16

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 11/11/2016. 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, 11/14/16: 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.

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 12/2/2016

SAMPLE DETECTION SUMMARY

CLIENT ID: 1611090900 400-SB-14 (0-153.5)	Lab ID: R1611998-001					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	92.5				Percent	ALS SOP
Dichloromethane	0.82	J	0.62	5.4	ug/Kg	8260C
Naphthalene	0.89	J	0.56	5.4	ug/Kg	8260C
Tetrachloroethene (PCE)	1.0	J	0.96	5.4	ug/Kg	8260C

CLIENT ID: 1611090901 400-SB-14 (0-153.5)	Lab ID: R1611998-002					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	92.0				Percent	ALS SOP
Dichloromethane	1.5	J	0.63	5.5	ug/Kg	8260C
Naphthalene	0.85	J	0.56	5.5	ug/Kg	8260C
Tetrachloroethene (PCE)	1.2	J	0.97	5.5	ug/Kg	8260C

CLIENT ID: 1611090906 400-SB-14 (0-153.5)	Lab ID: R1611998-003					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	92.6				Percent	ALS SOP
Arsenic, Total	6.3		0.3	1.1	mg/Kg	6010C
Barium, Total	76.3		0.2	2.1	mg/Kg	6010C
Beryllium, Total	0.58	B	0.02	0.32	mg/Kg	6010C
Cadmium, Total	0.07	BJ	0.04	0.53	mg/Kg	6010C
Chromium, Total	11.6		0.2	1.1	mg/Kg	6010C
Lead, Total	8.6		0.3	5.3	mg/Kg	6010C
Nickel, Total	9.9		0.2	4.3	mg/Kg	6010C
Selenium, Total	2.0		0.7	1.0	mg/Kg	6010C
Thallium, Total	1.6		0.6	1.1	mg/Kg	6010C
Vanadium, Total	15.0		0.2	5.3	mg/Kg	6010C
Zinc, Total	46.6		0.2	2.1	mg/Kg	6010C

CLIENT ID: 1611090907 400-SB-14 (0-153.5)	Lab ID: R1611998-004					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	91.3				Percent	ALS SOP
Arsenic, Total	4.8		0.3	1.1	mg/Kg	6010C
Barium, Total	60.6		0.2	2.2	mg/Kg	6010C
Beryllium, Total	0.49	B	0.02	0.33	mg/Kg	6010C
Cadmium, Total	0.08	BJ	0.04	0.54	mg/Kg	6010C
Chromium, Total	18.8		0.2	1.1	mg/Kg	6010C
Lead, Total	9.1		0.3	5.4	mg/Kg	6010C
Nickel, Total	9.0		0.2	4.3	mg/Kg	6010C
Selenium, Total	2.0		0.7	1.1	mg/Kg	6010C
Thallium, Total	3.2		0.6	1.1	mg/Kg	6010C
Vanadium, Total	15.8		0.2	5.4	mg/Kg	6010C
Zinc, Total	46.4		0.2	2.2	mg/Kg	6010C

SAMPLE DETECTION SUMMARY

CLIENT ID: 1611090920 400-SB-14 (0-62)	Lab ID: R1611998-007					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	91.2				Percent	ALS SOP
Dichloromethane	1.4	J	0.63	5.5	ug/Kg	8260C
Naphthalene	0.67	J	0.56	5.5	ug/Kg	8260C
Tetrachloroethene (PCE)	3.6	J	0.97	5.5	ug/Kg	8260C

CLIENT ID: 1611090922 400-SB-14 (0-62)	Lab ID: R1611998-008					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	88.9				Percent	ALS SOP
Arsenic, Total	6.1		0.3	1.1	mg/Kg	6010C
Barium, Total	71.7		0.2	2.2	mg/Kg	6010C
Beryllium, Total	0.49	B	0.02	0.34	mg/Kg	6010C
Cadmium, Total	0.58	B	0.04	0.56	mg/Kg	6010C
Chromium, Total	17.2		0.2	1.1	mg/Kg	6010C
Lead, Total	7.7		0.4	5.6	mg/Kg	6010C
Mercury, Total	0.004	J	0.004	0.034	mg/Kg	7471B
Nickel, Total	8.1		0.2	4.5	mg/Kg	6010C
Selenium, Total	2.3		0.7	1.1	mg/Kg	6010C
Thallium, Total	3.0		0.6	1.1	mg/Kg	6010C
Vanadium, Total	24.5		0.2	5.6	mg/Kg	6010C
Zinc, Total	72.5		0.2	2.2	mg/Kg	6010C

CLIENT ID: 1611090930 400-SB-14 (62-153.5)	Lab ID: R1611998-010					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	94.0				Percent	ALS SOP
Dichloromethane	1.6	J	0.61	5.3	ug/Kg	8260C
Naphthalene	0.55	J	0.54	5.3	ug/Kg	8260C
Tetrachloroethene (PCE)	0.99	J	0.93	5.3	ug/Kg	8260C

CLIENT ID: 1611090932 400-SB-14 (62-153.5)	Lab ID: R1611998-011					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	92.5				Percent	ALS SOP
Arsenic, Total	8.4		0.3	1.1	mg/Kg	6010C
Barium, Total	68.6		0.2	2.2	mg/Kg	6010C
Beryllium, Total	0.43	B	0.02	0.32	mg/Kg	6010C
Cadmium, Total	0.12	BJ	0.04	0.54	mg/Kg	6010C
Chromium, Total	10.7		0.2	1.1	mg/Kg	6010C
Lead, Total	8.3		0.3	5.4	mg/Kg	6010C
Nickel, Total	6.8		0.2	4.3	mg/Kg	6010C
Selenium, Total	1.8		0.7	1.0	mg/Kg	6010C
Thallium, Total	3.2		0.6	1.1	mg/Kg	6010C
Vanadium, Total	12.6		0.2	5.4	mg/Kg	6010C
Zinc, Total	63.4		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:**R1611998
Project: White Sands Test Facility/15EC007B

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
R1611998-001	1611090900 400-SB-14 (0-153.5)	11/9/2016	
R1611998-002	1611090901 400-SB-14 (0-153.5)	11/9/2016	
R1611998-003	1611090906 400-SB-14 (0-153.5)	11/9/2016	
R1611998-004	1611090907 400-SB-14 (0-153.5)	11/9/2016	
R1611998-005	1611090909 400-SB-14 (0-153.5)	11/9/2016	
R1611998-006	1611090910 400-SB-14 (0-153.5)	11/9/2016	
R1611998-007	1611090920 400-SB-14 (0-62)	11/9/2016	
R1611998-008	1611090922 400-SB-14 (0-62)	11/9/2016	
R1611998-009	1611090923 400-SB-14 (0-62)	11/9/2016	
R1611998-010	1611090930 400-SB-14 (62-153.5)	11/9/2016	
R1611998-011	1611090932 400-SB-14 (62-153.5)	11/9/2016	
R1611998-012	1611090933 400-SB-14 (62-153.5)	11/9/2016	

Date 11-9-2016

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Laboratory: ALS	PO #15EC007B	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						

Sample Number	Sample Location	# of Containers	Sample Matrix*	W-846 Method 8260B 4 oz. Glass Jar, Ice	Total Metals 4 oz. Glass Jar, Ice	TCLP Metals 16 oz. Glass Jar, Ice	Charge Number (WTSF Use Only)	Comments
1611090900	400-SB-1410-1535 (7393)	1	S	X			41FW	
0901	"	1	S	X			"	
0902 (MS)	"	1	S	X			"	MATRIX SPIKE FOR 0900
0906	"	1	S		X		"	
0907	"	1	S		X		"	
0908 (MS)	"	1	S		X		"	MATRIX SPIKE FOR 0906
0909	"	1	S			X	"	
0910	"	1	S			X	"	
0911 (MS)	"	1	S			X	"	MATRIX SPIKE FOR 0909

Relinquished By:	Date/Time:	Accepted By:	Date/Time:
	11-9-16(1030)		11/11/16 0930

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NASA/WSTF/Navarro
White Sands Test Facility

Date 11-9-2016

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Laboratory: ALS	PO #15EC007B	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*	W-846 Method 8260B 4 oz. Glass Jar, Ice	Total Metals 4 oz. Glass Jar, Ice	TCLP Metals 16 oz. Glass Jar, Ice	Charge Number (WTSF Use Only)	
Sample Number	Sample Location (7392)							Comments
1611090920	4000-SB-14 (0-62")	1	S	X			41FW	
0922	" (0-62")	1	S		X		"	
0923	" (0-62")	1	S			X	"	
1611090930	4000-SB-14 (7394) (62-153.5")	1	S	X			"	
0932	" (62-153.5")	1	S		X		"	
0933	" (62-153.5")	1	S			X	"	

Relinquished By:	Date/Time:	Accepted By:	Date/Time:
[signature]	11-9-16 (1030)	[signature]	11/11/16 0930

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White Sands Test Facility

WSTF 381B (05/2016)

R1611998 5
NASA/WSTF/Navarro
White Sands Test Facility

Cooler Receipt and Preservation Check Form

Project/Client NASA Folder Number _____

Cooler received on 11/11/16 by: SAS

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: 11/11/16 Time: 0950 ID: IR#7 (IR#8) From: Temp Blank (Sample Bottle)

Observed Temp (°C)	.9						
Correction Factor (°C)	+2.0						
Corrected Temp (°C)	2.9						
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 SAS on 11/11/16 at 0950
5035 samples placed in storage location: _____ by _____ on _____ at _____

Cooler Breakdown: Date: 11/11/16 Time: 1252 by: (A)

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

Other Comments:

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

PC Secondary Review: JMW 11/14/16 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.

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:**	R1611998
Project:	White Sands Test Facility/15EC007B		

Sample Name:	1611090900 400-SB-14 (0-153.5)	**Date Collected:**	11/9/16
Lab Code:	R1611998-001	**Date Received:**	11/11/16
Sample Matrix:	Soil		

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

Sample Name:	1611090901 400-SB-14 (0-153.5)	**Date Collected:**	11/9/16
Lab Code:	R1611998-002	**Date Received:**	11/11/16
Sample Matrix:	Soil		

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

Sample Name:	1611090906 400-SB-14 (0-153.5)	**Date Collected:**	11/9/16
Lab Code:	R1611998-003	**Date Received:**	11/11/16
Sample Matrix:	Soil		

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

Sample Name:	1611090907 400-SB-14 (0-153.5)	**Date Collected:**	11/9/16
Lab Code:	R1611998-004	**Date Received:**	11/11/16
Sample Matrix:	Soil		

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

Client: NASA/WSTF/Navarro **Service Request:** R1611998
Project: White Sands Test Facility/15EC007B

Sample Name: 1611090920 400-SB-14 (0-62) **Date Collected:** 11/9/16
Lab Code: R1611998-007 **Date Received:** 11/11/16
Sample Matrix: Soil

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

Sample Name: 1611090922 400-SB-14 (0-62) **Date Collected:** 11/9/16
Lab Code: R1611998-008 **Date Received:** 11/11/16
Sample Matrix: Soil

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

Sample Name: 1611090930 400-SB-14 (62-153.5) **Date Collected:** 11/9/16
Lab Code: R1611998-010 **Date Received:** 11/11/16
Sample Matrix: Soil

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

Sample Name: 1611090932 400-SB-14 (62-153.5) **Date Collected:** 11/9/16
Lab Code: R1611998-011 **Date Received:** 11/11/16
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
6010C	CBURLESON	NMANSEN
6010C	CBURLESON	CGILDAY
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
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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:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090900 400-SB-14 (0-153.5)	**Units:**	ug/Kg
Lab Code:	R1611998-001	**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	5.4	0.90	1	11/14/16 20:42	
1,1,1-Trichloroethane (TCA)	ND U	5.4	0.79	1	11/14/16 20:42	
1,1,2,2-Tetrachloroethane	ND U	5.4	0.88	1	11/14/16 20:42	
1,1,2-Trichloroethane	ND U	5.4	0.79	1	11/14/16 20:42	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.4	1.4	1	11/14/16 20:42	
1,1-Dichloroethene (1,1-DCE)	ND U	5.4	1.4	1	11/14/16 20:42	
1,2,3-Trichloropropane	ND U	5.4	1.5	1	11/14/16 20:42	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.4	2.1	1	11/14/16 20:42	
1,2-Dibromoethane	ND U	5.4	1.4	1	11/14/16 20:42	
1,2-Dichlorobenzene	ND U	5.4	0.66	1	11/14/16 20:42	
1,2-Dichloroethane	ND U	5.4	0.66	1	11/14/16 20:42	
1,2-Dichloropropane	ND U	5.4	1.1	1	11/14/16 20:42	
1,3-Dichlorobenzene	ND U	5.4	0.69	1	11/14/16 20:42	
1,4-Dioxane	ND U	110	21	1	11/14/16 20:42	
2-Butanone (MEK)	ND U	5.4	2.5	1	11/14/16 20:42	
2-Chloro-1,3-butadiene	ND U	5.4	1.7	1	11/14/16 20:42	
2-Chloroethyl Vinyl Ether	ND U	5.4	1.9	1	11/14/16 20:42	
Isobutyl Alcohol	ND U	110	25	1	11/14/16 20:42	
Allyl Chloride	ND U	5.4	1.9	1	11/14/16 20:42	
4-Methyl-2-pentanone	ND U	5.4	1.1	1	11/14/16 20:42	
Acetone	ND U	5.4	3.1	1	11/14/16 20:42	
Acetonitrile	ND U	27	19	1	11/14/16 20:42	
Acrolein	ND U	27	3.8	1	11/14/16 20:42	
Acrylonitrile	ND U	27	7.0	1	11/14/16 20:42	
Benzene	ND U	5.4	0.32	1	11/14/16 20:42	
Bromodichloromethane	ND U	5.4	0.66	1	11/14/16 20:42	
Bromoform	ND U	5.4	1.1	1	11/14/16 20:42	
Bromomethane	ND U	5.4	1.5	1	11/14/16 20:42	
Carbon Disulfide	ND U	5.4	1.4	1	11/14/16 20:42	
Carbon Tetrachloride	ND U	5.4	1.0	1	11/14/16 20:42	
Chlorobenzene	ND U	5.4	0.32	1	11/14/16 20:42	
Chloroethane	ND U	5.4	3.2	1	11/14/16 20:42	
Chloroform	ND U	5.4	1.4	1	11/14/16 20:42	
Chloromethane	ND U	5.4	0.44	1	11/14/16 20:42	
Dibromochloromethane	ND U	5.4	0.79	1	11/14/16 20:42	
Dibromomethane	ND U	5.4	0.69	1	11/14/16 20:42	
Dichlorodifluoromethane (CFC 12)	ND U	5.4	2.1	1	11/14/16 20:42	
Dichloromethane	**0.82 J**	5.4	0.62	1	11/14/16 20:42	
Ethyl Methacrylate	ND U	5.4	0.82	1	11/14/16 20:42	
Ethylbenzene	ND U	5.4	0.25	1	11/14/16 20:42	
Iodomethane	ND U	11	1.3	1	11/14/16 20:42	
Methacrylonitrile	ND U	5.4	1.7	1	11/14/16 20:42	
Methyl Methacrylate	ND U	5.4	0.79	1	11/14/16 20:42	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090900 400-SB-14 (0-153.5)	**Units:**	ug/Kg
Lab Code:	R1611998-001	**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	**0.89**	**J**	5.4	0.56	1	11/14/16 20:42	
Propionitrile	ND	U	27	7.1	1	11/14/16 20:42	
Tetrachloroethene (PCE)	**1.0**	**J**	5.4	0.96	1	11/14/16 20:42	
Toluene	ND	U	5.4	1.1	1	11/14/16 20:42	
Trichloroethene (TCE)	ND	U	5.4	1.1	1	11/14/16 20:42	
Trichlorofluoromethane (CFC 11)	ND	U	5.4	0.72	1	11/14/16 20:42	
Vinyl Chloride	ND	U	5.4	2.0	1	11/14/16 20:42	
cis-1,3-Dichloropropene	ND	U	5.4	0.98	1	11/14/16 20:42	
m,p-Xylenes	ND	U	11	1.2	1	11/14/16 20:42	
o-Xylene	ND	U	5.4	0.52	1	11/14/16 20:42	
trans-1,2-Dichloroethene	ND	U	5.4	0.93	1	11/14/16 20:42	
trans-1,3-Dichloropropene	ND	U	5.4	0.22	1	11/14/16 20:42	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	99	51 - 136	11/14/16 20:42	
Dibromofluoromethane	99	63 - 138	11/14/16 20:42	
Toluene-d8	103	66 - 138	11/14/16 20:42	

Tentatively Identified Compounds

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

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090901 400-SB-14 (0-153.5)	**Units:**	ug/Kg
Lab Code:	R1611998-002	**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	5.5	0.92	1.01	11/14/16 21:07	
1,1,1-Trichloroethane (TCA)	ND U	5.5	0.81	1.01	11/14/16 21:07	
1,1,2,2-Tetrachloroethane	ND U	5.5	0.89	1.01	11/14/16 21:07	
1,1,2-Trichloroethane	ND U	5.5	0.81	1.01	11/14/16 21:07	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.5	1.4	1.01	11/14/16 21:07	
1,1-Dichloroethene (1,1-DCE)	ND U	5.5	1.5	1.01	11/14/16 21:07	
1,2,3-Trichloropropane	ND U	5.5	1.5	1.01	11/14/16 21:07	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.5	2.1	1.01	11/14/16 21:07	
1,2-Dibromoethane	ND U	5.5	1.4	1.01	11/14/16 21:07	
1,2-Dichlorobenzene	ND U	5.5	0.67	1.01	11/14/16 21:07	
1,2-Dichloroethane	ND U	5.5	0.67	1.01	11/14/16 21:07	
1,2-Dichloropropane	ND U	5.5	1.1	1.01	11/14/16 21:07	
1,3-Dichlorobenzene	ND U	5.5	0.70	1.01	11/14/16 21:07	
1,4-Dioxane	ND U	110	22	1.01	11/14/16 21:07	
2-Butanone (MEK)	ND U	5.5	2.6	1.01	11/14/16 21:07	
2-Chloro-1,3-butadiene	ND U	5.5	1.7	1.01	11/14/16 21:07	
2-Chloroethyl Vinyl Ether	ND U	5.5	1.9	1.01	11/14/16 21:07	
Isobutyl Alcohol	ND U	110	25	1.01	11/14/16 21:07	
Allyl Chloride	ND U	5.5	1.9	1.01	11/14/16 21:07	
4-Methyl-2-pentanone	ND U	5.5	1.1	1.01	11/14/16 21:07	
Acetone	ND U	5.5	3.1	1.01	11/14/16 21:07	
Acetonitrile	ND U	27	19	1.01	11/14/16 21:07	
Acrolein	ND U	27	3.9	1.01	11/14/16 21:07	
Acrylonitrile	ND U	27	7.1	1.01	11/14/16 21:07	
Benzene	ND U	5.5	0.32	1.01	11/14/16 21:07	
Bromodichloromethane	ND U	5.5	0.67	1.01	11/14/16 21:07	
Bromoform	ND U	5.5	1.1	1.01	11/14/16 21:07	
Bromomethane	ND U	5.5	1.6	1.01	11/14/16 21:07	
Carbon Disulfide	ND U	5.5	1.4	1.01	11/14/16 21:07	
Carbon Tetrachloride	ND U	5.5	1.1	1.01	11/14/16 21:07	
Chlorobenzene	ND U	5.5	0.32	1.01	11/14/16 21:07	
Chloroethane	ND U	5.5	3.2	1.01	11/14/16 21:07	
Chloroform	ND U	5.5	1.4	1.01	11/14/16 21:07	
Chloromethane	ND U	5.5	0.44	1.01	11/14/16 21:07	
Dibromochloromethane	ND U	5.5	0.81	1.01	11/14/16 21:07	
Dibromomethane	ND U	5.5	0.70	1.01	11/14/16 21:07	
Dichlorodifluoromethane (CFC 12)	ND U	5.5	2.1	1.01	11/14/16 21:07	
Dichloromethane	**1.5 J**	5.5	0.63	1.01	11/14/16 21:07	
Ethyl Methacrylate	ND U	5.5	0.83	1.01	11/14/16 21:07	
Ethylbenzene	ND U	5.5	0.26	1.01	11/14/16 21:07	
Iodomethane	ND U	11	1.3	1.01	11/14/16 21:07	
Methacrylonitrile	ND U	5.5	1.7	1.01	11/14/16 21:07	
Methyl Methacrylate	ND U	5.5	0.81	1.01	11/14/16 21:07	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090901 400-SB-14 (0-153.5)	**Units:**	ug/Kg
Lab Code:	R1611998-002	**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	**0.85**	**J**	5.5	0.56	1.01	11/14/16 21:07	
Propionitrile	ND	U	27	7.2	1.01	11/14/16 21:07	
Tetrachloroethene (PCE)	**1.2**	**J**	5.5	0.97	1.01	11/14/16 21:07	
Toluene	ND	U	5.5	1.1	1.01	11/14/16 21:07	
Trichloroethene (TCE)	ND	U	5.5	1.2	1.01	11/14/16 21:07	
Trichlorofluoromethane (CFC 11)	ND	U	5.5	0.73	1.01	11/14/16 21:07	
Vinyl Chloride	ND	U	5.5	2.1	1.01	11/14/16 21:07	
cis-1,3-Dichloropropene	ND	U	5.5	0.99	1.01	11/14/16 21:07	
m,p-Xylenes	ND	U	11	1.2	1.01	11/14/16 21:07	
o-Xylene	ND	U	5.5	0.53	1.01	11/14/16 21:07	
trans-1,2-Dichloroethene	ND	U	5.5	0.95	1.01	11/14/16 21:07	
trans-1,3-Dichloropropene	ND	U	5.5	0.22	1.01	11/14/16 21:07	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	102	51 - 136	11/14/16 21:07	
Dibromofluoromethane	99	63 - 138	11/14/16 21:07	
Toluene-d8	102	66 - 138	11/14/16 21:07	

Tentatively Identified Compounds

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

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090920 400-SB-14 (0-62)	**Units:**	ug/Kg
Lab Code:	R1611998-007	**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	5.5	0.92	1	11/14/16 21:31	
1,1,1-Trichloroethane (TCA)	ND U	5.5	0.81	1	11/14/16 21:31	
1,1,2,2-Tetrachloroethane	ND U	5.5	0.89	1	11/14/16 21:31	
1,1,2-Trichloroethane	ND U	5.5	0.81	1	11/14/16 21:31	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.5	1.4	1	11/14/16 21:31	
1,1-Dichloroethene (1,1-DCE)	ND U	5.5	1.5	1	11/14/16 21:31	
1,2,3-Trichloropropane	ND U	5.5	1.5	1	11/14/16 21:31	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.5	2.1	1	11/14/16 21:31	
1,2-Dibromoethane	ND U	5.5	1.4	1	11/14/16 21:31	
1,2-Dichlorobenzene	ND U	5.5	0.67	1	11/14/16 21:31	
1,2-Dichloroethane	ND U	5.5	0.67	1	11/14/16 21:31	
1,2-Dichloropropane	ND U	5.5	1.1	1	11/14/16 21:31	
1,3-Dichlorobenzene	ND U	5.5	0.70	1	11/14/16 21:31	
1,4-Dioxane	ND U	110	21	1	11/14/16 21:31	
2-Butanone (MEK)	ND U	5.5	2.6	1	11/14/16 21:31	
2-Chloro-1,3-butadiene	ND U	5.5	1.7	1	11/14/16 21:31	
2-Chloroethyl Vinyl Ether	ND U	5.5	1.9	1	11/14/16 21:31	
Isobutyl Alcohol	ND U	110	25	1	11/14/16 21:31	
Allyl Chloride	ND U	5.5	1.9	1	11/14/16 21:31	
4-Methyl-2-pentanone	ND U	5.5	1.1	1	11/14/16 21:31	
Acetone	ND U	5.5	3.1	1	11/14/16 21:31	
Acetonitrile	ND U	27	19	1	11/14/16 21:31	
Acrolein	ND U	27	3.9	1	11/14/16 21:31	
Acrylonitrile	ND U	27	7.1	1	11/14/16 21:31	
Benzene	ND U	5.5	0.32	1	11/14/16 21:31	
Bromodichloromethane	ND U	5.5	0.67	1	11/14/16 21:31	
Bromoform	ND U	5.5	1.1	1	11/14/16 21:31	
Bromomethane	ND U	5.5	1.6	1	11/14/16 21:31	
Carbon Disulfide	ND U	5.5	1.4	1	11/14/16 21:31	
Carbon Tetrachloride	ND U	5.5	1.1	1	11/14/16 21:31	
Chlorobenzene	ND U	5.5	0.32	1	11/14/16 21:31	
Chloroethane	ND U	5.5	3.2	1	11/14/16 21:31	
Chloroform	ND U	5.5	1.4	1	11/14/16 21:31	
Chloromethane	ND U	5.5	0.44	1	11/14/16 21:31	
Dibromochloromethane	ND U	5.5	0.81	1	11/14/16 21:31	
Dibromomethane	ND U	5.5	0.70	1	11/14/16 21:31	
Dichlorodifluoromethane (CFC 12)	ND U	5.5	2.1	1	11/14/16 21:31	
Dichloromethane	**1.4 J**	5.5	0.63	1	11/14/16 21:31	
Ethyl Methacrylate	ND U	5.5	0.83	1	11/14/16 21:31	
Ethylbenzene	ND U	5.5	0.26	1	11/14/16 21:31	
Iodomethane	ND U	11	1.3	1	11/14/16 21:31	
Methacrylonitrile	ND U	5.5	1.7	1	11/14/16 21:31	
Methyl Methacrylate	ND U	5.5	0.81	1	11/14/16 21:31	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090920 400-SB-14 (0-62)	**Units:**	ug/Kg
Lab Code:	R1611998-007	**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	**0.67**	**J**	5.5	0.56	1	11/14/16 21:31	
Propionitrile	ND	U	27	7.2	1	11/14/16 21:31	
Tetrachloroethene (PCE)	**3.6**	**J**	5.5	0.97	1	11/14/16 21:31	
Toluene	ND	U	5.5	1.1	1	11/14/16 21:31	
Trichloroethene (TCE)	ND	U	5.5	1.2	1	11/14/16 21:31	
Trichlorofluoromethane (CFC 11)	ND	U	5.5	0.73	1	11/14/16 21:31	
Vinyl Chloride	ND	U	5.5	2.1	1	11/14/16 21:31	
cis-1,3-Dichloropropene	ND	U	5.5	0.99	1	11/14/16 21:31	
m,p-Xylenes	ND	U	11	1.2	1	11/14/16 21:31	
o-Xylene	ND	U	5.5	0.53	1	11/14/16 21:31	
trans-1,2-Dichloroethene	ND	U	5.5	0.95	1	11/14/16 21:31	
trans-1,3-Dichloropropene	ND	U	5.5	0.22	1	11/14/16 21:31	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	100	51 - 136	11/14/16 21:31	
Dibromofluoromethane	99	63 - 138	11/14/16 21:31	
Toluene-d8	102	66 - 138	11/14/16 21:31	

Tentatively Identified Compounds

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

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090930 400-SB-14 (62-153.5)	**Units:**	ug/Kg
Lab Code:	R1611998-010	**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	5.3	0.88	.99	11/14/16 21:55	
1,1,1-Trichloroethane (TCA)	ND U	5.3	0.77	.99	11/14/16 21:55	
1,1,2,2-Tetrachloroethane	ND U	5.3	0.86	.99	11/14/16 21:55	
1,1,2-Trichloroethane	ND U	5.3	0.77	.99	11/14/16 21:55	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.3	1.4	.99	11/14/16 21:55	
1,1-Dichloroethene (1,1-DCE)	ND U	5.3	1.4	.99	11/14/16 21:55	
1,2,3-Trichloropropane	ND U	5.3	1.4	.99	11/14/16 21:55	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.3	2.0	.99	11/14/16 21:55	
1,2-Dibromoethane	ND U	5.3	1.3	.99	11/14/16 21:55	
1,2-Dichlorobenzene	ND U	5.3	0.65	.99	11/14/16 21:55	
1,2-Dichloroethane	ND U	5.3	0.65	.99	11/14/16 21:55	
1,2-Dichloropropane	ND U	5.3	1.1	.99	11/14/16 21:55	
1,3-Dichlorobenzene	ND U	5.3	0.67	.99	11/14/16 21:55	
1,4-Dioxane	ND U	110	21	.99	11/14/16 21:55	
2-Butanone (MEK)	ND U	5.3	2.5	.99	11/14/16 21:55	
2-Chloro-1,3-butadiene	ND U	5.3	1.7	.99	11/14/16 21:55	
2-Chloroethyl Vinyl Ether	ND U	5.3	1.9	.99	11/14/16 21:55	
Isobutyl Alcohol	ND U	110	24	.99	11/14/16 21:55	
Allyl Chloride	ND U	5.3	1.8	.99	11/14/16 21:55	
4-Methyl-2-pentanone	ND U	5.3	1.1	.99	11/14/16 21:55	
Acetone	ND U	5.3	3.0	.99	11/14/16 21:55	
Acetonitrile	ND U	26	18	.99	11/14/16 21:55	
Acrolein	ND U	26	3.7	.99	11/14/16 21:55	
Acrylonitrile	ND U	26	6.9	.99	11/14/16 21:55	
Benzene	ND U	5.3	0.31	.99	11/14/16 21:55	
Bromodichloromethane	ND U	5.3	0.65	.99	11/14/16 21:55	
Bromoform	ND U	5.3	0.98	.99	11/14/16 21:55	
Bromomethane	ND U	5.3	1.5	.99	11/14/16 21:55	
Carbon Disulfide	ND U	5.3	1.4	.99	11/14/16 21:55	
Carbon Tetrachloride	ND U	5.3	0.97	.99	11/14/16 21:55	
Chlorobenzene	ND U	5.3	0.31	.99	11/14/16 21:55	
Chloroethane	ND U	5.3	3.1	.99	11/14/16 21:55	
Chloroform	ND U	5.3	1.4	.99	11/14/16 21:55	
Chloromethane	ND U	5.3	0.43	.99	11/14/16 21:55	
Dibromochloromethane	ND U	5.3	0.77	.99	11/14/16 21:55	
Dibromomethane	ND U	5.3	0.67	.99	11/14/16 21:55	
Dichlorodifluoromethane (CFC 12)	ND U	5.3	2.0	.99	11/14/16 21:55	
Dichloromethane	**1.6 J**	5.3	0.61	.99	11/14/16 21:55	
Ethyl Methacrylate	ND U	5.3	0.79	.99	11/14/16 21:55	
Ethylbenzene	ND U	5.3	0.25	.99	11/14/16 21:55	
Iodomethane	ND U	11	1.2	.99	11/14/16 21:55	
Methacrylonitrile	ND U	5.3	1.6	.99	11/14/16 21:55	
Methyl Methacrylate	ND U	5.3	0.77	.99	11/14/16 21:55	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090930 400-SB-14 (62-153.5)	**Units:**	ug/Kg
Lab Code:	R1611998-010	**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	**0.55**	**J**	5.3	0.54	.99	11/14/16 21:55	
Propionitrile	ND	U	26	6.9	.99	11/14/16 21:55	
Tetrachloroethene (PCE)	**0.99**	**J**	5.3	0.93	.99	11/14/16 21:55	
Toluene	ND	U	5.3	1.1	.99	11/14/16 21:55	
Trichloroethene (TCE)	ND	U	5.3	1.1	.99	11/14/16 21:55	
Trichlorofluoromethane (CFC 11)	ND	U	5.3	0.70	.99	11/14/16 21:55	
Vinyl Chloride	ND	U	5.3	2.0	.99	11/14/16 21:55	
cis-1,3-Dichloropropene	ND	U	5.3	0.95	.99	11/14/16 21:55	
m,p-Xylenes	ND	U	11	1.2	.99	11/14/16 21:55	
o-Xylene	ND	U	5.3	0.51	.99	11/14/16 21:55	
trans-1,2-Dichloroethene	ND	U	5.3	0.91	.99	11/14/16 21:55	
trans-1,3-Dichloropropene	ND	U	5.3	0.22	.99	11/14/16 21:55	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	102	51 - 136	11/14/16 21:55	
Dibromofluoromethane	100	63 - 138	11/14/16 21:55	
Toluene-d8	103	66 - 138	11/14/16 21:55	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
000104-76-7	1-Hexanol, 2-ethyl-	13.57	6.5	JN

Metals

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Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090906 400-SB-14 (0-153.5)	**Basis:**	Dry
Lab Code:	R1611998-003		

Inorganic Parameters

Analyte Name	Analysis Method	Result		Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND	U	mg/Kg	6.4	0.5	1	11/21/16 20:20	11/18/16	
Arsenic, Total	6010C	**6.3**		mg/Kg	1.1	0.3	1	11/21/16 20:20	11/18/16	
Barium, Total	6010C	**76.3**		mg/Kg	2.1	0.2	1	11/21/16 20:20	11/18/16	
Beryllium, Total	6010C	**0.58**	**B**	mg/Kg	0.32	0.02	1	11/21/16 20:20	11/18/16	
Cadmium, Total	6010C	**0.07**	**BJ**	mg/Kg	0.53	0.04	1	11/21/16 20:20	11/18/16	
Chromium, Total	6010C	**11.6**		mg/Kg	1.1	0.2	1	11/21/16 20:20	11/18/16	
Lead, Total	6010C	**8.6**		mg/Kg	5.3	0.3	1	11/21/16 20:20	11/18/16	
Mercury, Total	7471B	ND	U	mg/Kg	0.034	0.004	1	11/17/16 14:07	11/15/16	
Nickel, Total	6010C	**9.9**		mg/Kg	4.3	0.2	1	11/21/16 20:20	11/18/16	
Selenium, Total	6010C	**2.0**		mg/Kg	1.0	0.7	1	11/29/16 15:17	11/28/16	
Silver, Total	6010C	ND	U	mg/Kg	1.1	0.5	1	11/21/16 20:20	11/18/16	
Thallium, Total	6010C	**1.6**		mg/Kg	1.1	0.6	1	11/21/16 20:20	11/18/16	
Vanadium, Total	6010C	**15.0**		mg/Kg	5.3	0.2	1	11/21/16 20:20	11/18/16	
Zinc, Total	6010C	**46.6**		mg/Kg	2.1	0.2	1	11/21/16 20:20	11/18/16	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090907 400-SB-14 (0-153.5)	**Basis:**	Dry
Lab Code:	R1611998-004		

Inorganic Parameters

Analyte Name	Analysis Method	Result		Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND	U	mg/Kg	6.5	0.5	1	11/21/16 20:43	11/18/16	
Arsenic, Total	6010C	**4.8**		mg/Kg	1.1	0.3	1	11/21/16 20:43	11/18/16	
Barium, Total	6010C	**60.6**		mg/Kg	2.2	0.2	1	11/21/16 20:43	11/18/16	
Beryllium, Total	6010C	**0.49**	**B**	mg/Kg	0.33	0.02	1	11/21/16 20:43	11/18/16	
Cadmium, Total	6010C	**0.08**	**BJ**	mg/Kg	0.54	0.04	1	11/21/16 20:43	11/18/16	
Chromium, Total	6010C	**18.8**		mg/Kg	1.1	0.2	1	11/21/16 20:43	11/18/16	
Lead, Total	6010C	**9.1**		mg/Kg	5.4	0.3	1	11/21/16 20:43	11/18/16	
Mercury, Total	7471B	ND	U	mg/Kg	0.036	0.004	1	11/17/16 14:15	11/15/16	
Nickel, Total	6010C	**9.0**		mg/Kg	4.3	0.2	1	11/21/16 20:43	11/18/16	
Selenium, Total	6010C	**2.0**		mg/Kg	1.1	0.7	1	11/29/16 15:47	11/28/16	
Silver, Total	6010C	ND	U	mg/Kg	1.1	0.5	1	11/21/16 20:43	11/18/16	
Thallium, Total	6010C	**3.2**		mg/Kg	1.1	0.6	1	11/21/16 20:43	11/18/16	
Vanadium, Total	6010C	**15.8**		mg/Kg	5.4	0.2	1	11/21/16 20:43	11/18/16	
Zinc, Total	6010C	**46.4**		mg/Kg	2.2	0.2	1	11/21/16 20:43	11/18/16	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090922 400-SB-14 (0-62)	**Basis:**	Dry
Lab Code:	R1611998-008		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/Kg	6.7	0.5	1	11/21/16 20:46	11/18/16	
Arsenic, Total	6010C	**6.1**	mg/Kg	1.1	0.3	1	11/21/16 20:46	11/18/16	
Barium, Total	6010C	**71.7**	mg/Kg	2.2	0.2	1	11/21/16 20:46	11/18/16	
Beryllium, Total	6010C	**0.49 B**	mg/Kg	0.34	0.02	1	11/21/16 20:46	11/18/16	
Cadmium, Total	6010C	**0.58 B**	mg/Kg	0.56	0.04	1	11/21/16 20:46	11/18/16	
Chromium, Total	6010C	**17.2**	mg/Kg	1.1	0.2	1	11/21/16 20:46	11/18/16	
Lead, Total	6010C	**7.7**	mg/Kg	5.6	0.4	1	11/21/16 20:46	11/18/16	
Mercury, Total	7471B	**0.004 J**	mg/Kg	0.034	0.004	1	11/17/16 14:17	11/15/16	
Nickel, Total	6010C	**8.1**	mg/Kg	4.5	0.2	1	11/21/16 20:46	11/18/16	
Selenium, Total	6010C	**2.3**	mg/Kg	1.1	0.7	1	11/29/16 16:05	11/28/16	
Silver, Total	6010C	ND U	mg/Kg	1.1	0.5	1	11/21/16 20:46	11/18/16	
Thallium, Total	6010C	**3.0**	mg/Kg	1.1	0.6	1	11/21/16 20:46	11/18/16	
Vanadium, Total	6010C	**24.5**	mg/Kg	5.6	0.2	1	11/21/16 20:46	11/18/16	
Zinc, Total	6010C	**72.5**	mg/Kg	2.2	0.2	1	11/21/16 20:46	11/18/16	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090932 400-SB-14 (62-153.5)	**Basis:**	Dry
Lab Code:	R1611998-011		

Inorganic Parameters

Analyte Name	Analysis Method	Result		Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND	U	mg/Kg	6.5	0.5	1	11/21/16 20:49	11/18/16	
Arsenic, Total	6010C	**8.4**		mg/Kg	1.1	0.3	1	11/21/16 20:49	11/18/16	
Barium, Total	6010C	**68.6**		mg/Kg	2.2	0.2	1	11/21/16 20:49	11/18/16	
Beryllium, Total	6010C	**0.43**	**B**	mg/Kg	0.32	0.02	1	11/21/16 20:49	11/18/16	
Cadmium, Total	6010C	**0.12**	**BJ**	mg/Kg	0.54	0.04	1	11/21/16 20:49	11/18/16	
Chromium, Total	6010C	**10.7**		mg/Kg	1.1	0.2	1	11/21/16 20:49	11/18/16	
Lead, Total	6010C	**8.3**		mg/Kg	5.4	0.3	1	11/21/16 20:49	11/18/16	
Mercury, Total	7471B	ND	U	mg/Kg	0.036	0.004	1	11/17/16 14:18	11/15/16	
Nickel, Total	6010C	**6.8**		mg/Kg	4.3	0.2	1	11/21/16 20:49	11/18/16	
Selenium, Total	6010C	**1.8**		mg/Kg	1.0	0.7	1	11/29/16 16:11	11/28/16	
Silver, Total	6010C	ND	U	mg/Kg	1.1	0.5	1	11/21/16 20:49	11/18/16	
Thallium, Total	6010C	**3.2**		mg/Kg	1.1	0.6	1	11/21/16 20:49	11/18/16	
Vanadium, Total	6010C	**12.6**		mg/Kg	5.4	0.2	1	11/21/16 20:49	11/18/16	
Zinc, Total	6010C	**63.4**		mg/Kg	2.2	0.2	1	11/21/16 20:49	11/18/16	

General Chemistry

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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090900 400-SB-14 (0-153.5)	**Basis:**	As Received
Lab Code:	R1611998-001		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**92.5**	Percent	-	1	11/17/16 09:49	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090901 400-SB-14 (0-153.5)	**Basis:**	As Received
Lab Code:	R1611998-002		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**92.0**	Percent	-	1	11/17/16 09:49	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090906 400-SB-14 (0-153.5)	**Basis:**	As Received
Lab Code:	R1611998-003		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**92.6**	Percent	-	-	1	11/17/16 09:49	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090907 400-SB-14 (0-153.5)	**Basis:**	As Received
Lab Code:	R1611998-004		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**91.3**	Percent	-	-	1	11/17/16 09:49	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090920 400-SB-14 (0-62)	**Basis:**	As Received
Lab Code:	R1611998-007		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**91.2**	Percent	-	1	11/17/16 09:49	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090922 400-SB-14 (0-62)	**Basis:**	As Received
Lab Code:	R1611998-008		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**88.9**	Percent	-	-	1	11/17/16 09:49	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090930 400-SB-14 (62-153.5)	**Basis:**	As Received
Lab Code:	R1611998-010		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**94.0**	Percent	-	1	11/17/16 09:49	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16 09:30
Sample Name:	1611090932 400-SB-14 (62-153.5)	**Basis:**	As Received
Lab Code:	R1611998-011		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**92.5**	Percent	-	-	1	11/17/16 09:49	

QC Summary Forms

ALS Environmental—Rochester Laboratory
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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:** R1611998
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
1611090900 400-SB-14 (0-153.5)	R1611998-001	99	99	103
1611090901 400-SB-14 (0-153.5)	R1611998-002	102	99	102
1611090920 400-SB-14 (0-62)	R1611998-007	100	99	102
1611090930 400-SB-14 (62-153.5)	R1611998-010	102	100	103
Method Blank	RQ1614029-01	102	102	102
Lab Control Sample	RQ1614029-02	106	104	102
1611090900 400-SB-14 (0-153.5) MS	RQ1614029-05	104	102	104
1611090900 400-SB-14 (0-153.5) DMS	RQ1614029-06	103	104	105

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16
		Date Analyzed:	11/14/16
		Date Extracted:	NA

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

Sample Name:	1611090900 400-SB-14 (0-153.5)	**Units:**	ug/Kg
Lab Code:	R1611998-001	**Basis:**	Dry
Analysis Method:	8260C		
Prep Method:	EPA 5030C		

		Matrix Spike RQ1614029-05			Duplicate Matrix Spike RQ1614029-06					
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	54.6	81	45.7	54.1	85	52-133	5	30
1,1,1-Trichloroethane (TCA)	ND U	43.4	54.6	79	45.4	54.1	84	51-132	6	30
1,1,2,2-Tetrachloroethane	ND U	40.7	54.6	74	41.1	54.1	76	53-134	3	30
1,1,2-Trichloroethane	ND U	47.3	54.6	87	48.6	54.1	90	62-126	3	30
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	39.8	54.6	73	39.6	54.1	73	45-136	<1	30
1,1-Dichloroethene (1,1-DCE)	ND U	42.5	54.6	78	44.4	54.1	82	61-139	5	30
1,2,3-Trichloropropane	ND U	47.2	54.6	87	48.2	54.1	89	22-167	2	30
1,2-Dibromo-3-chloropropane (DBCP)	ND U	46.7	54.6	86	49.5	54.1	92	27-163	7	30
1,2-Dibromoethane	ND U	47.6	54.6	87	49.9	54.1	92	52-137	6	30
1,2-Dichlorobenzene	ND U	43.7	54.6	80	43.6	54.1	81	22-156	1	30
1,2-Dichloroethane	ND U	47.1	54.6	86	47.7	54.1	88	59-125	2	30
1,2-Dichloropropane	ND U	46.3	54.6	85	47.2	54.1	87	67-126	2	30
1,3-Dichlorobenzene	ND U	41.6	54.6	76	41.5	54.1	77	29-146	1	30
1,4-Dioxane	ND U	994	1090	91	1170	1080	108	50-148	17	30
2-Butanone (MEK)	ND U	41.6	54.6	76	49.4	54.1	91	43-134	18	30
2-Chloro-1,3-butadiene	ND U	50.3	54.6	92	51.7	54.1	96	45-134	4	30
2-Chloroethyl Vinyl Ether	ND U	54.6	54.6	100	59.1	54.1	109	37-150	9	30
Isobutyl Alcohol	ND U	902	1090	83	1080	1080	100	39-146	19	30
Allyl Chloride	ND U	41.1	54.6	75	43.2	54.1	80	34-135	6	30
4-Methyl-2-pentanone	ND U	47.8	54.6	87	52.1	54.1	96	47-145	10	30
Acetone	ND U	64.9	54.6	119	82.6	54.1	153	11-183	25	30
Acetonitrile	ND U	233	273	85	238	270	88	28-146	3	30
Acrolein	ND U	25.5	109	23	24.4 J	108	23	10-172	<1	30
Acrylonitrile	ND U	225	273	82	247	270	91	46-139	10	30
Benzene	ND U	45.3	54.6	83	46.0	54.1	85	63-126	2	30
Bromodichloromethane	ND U	44.4	54.6	81	46.3	54.1	86	47-141	6	30
Bromoform	ND U	47.4	54.6	87	50.6	54.1	94	26-157	8	30
Bromomethane	ND U	49.6	54.6	91	56.2	54.1	104	10-137	13	30
Carbon Disulfide	ND U	47.0	54.6	86	49.7	54.1	92	35-135	7	30
Carbon Tetrachloride	ND U	42.0	54.6	77	43.2	54.1	80	46-137	4	30
Chlorobenzene	ND U	44.0	54.6	81	43.9	54.1	81	51-132	<1	30
Chloroethane	ND U	39.0	54.6	71	35.8	54.1	66	45-132	7	30
Chloroform	ND U	44.7	54.6	82	45.2	54.1	84	61-124	2	30
Chloromethane	ND U	39.5	54.6	72	41.4	54.1	77	50-136	7	30
Dibromochloromethane	ND U	48.4	54.6	89	50.2	54.1	93	40-146	4	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:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16
		Date Analyzed:	11/14/16
		Date Extracted:	NA

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

Sample Name:	1611090900 400-SB-14 (0-153.5)	**Units:**	ug/Kg
Lab Code:	R1611998-001	**Basis:**	Dry
Analysis Method:	8260C		
Prep Method:	EPA 5030C		

		Matrix Spike RQ1614029-05			**Duplicate Matrix Spike** RQ1614029-06					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Dibromomethane	ND U	47.1	54.6	86	48.6	54.1	90	61-122	5	30
Dichlorodifluoromethane (CFC 12)	ND U	39.5	54.6	72	40.5	54.1	75	44-138	4	30
Dichloromethane	0.82 J	46.9	54.6	84	47.9	54.1	87	64-120	4	30
Ethyl Methacrylate	ND U	45.7	54.6	84	48.6	54.1	90	17-166	7	30
Ethylbenzene	ND U	42.5	54.6	78	42.3	54.1	78	44-131	<1	30
Iodomethane	ND U	41.9	54.6	77	49.9	54.1	92	10-160	18	30
Methacrylonitrile	ND U	47.4	54.6	87	50.6	54.1	94	44-149	8	30
Methyl Methacrylate	ND U	49.8	54.6	91	53.9	54.1	100	41-162	9	30
Naphthalene	0.89 J	43.2	54.6	77	45.3	54.1	82	10-187	6	30
Propionitrile	ND U	234	273	86	263	270	97	46-144	12	30
Tetrachloroethene (PCE)	1.0 J	41.4	54.6	74	42.6	54.1	77	45-141	4	30
Toluene	ND U	43.8	54.6	80	44.4	54.1	82	50-140	2	30
Trichloroethene (TCE)	ND U	49.9	54.6	91	51.4	54.1	95	54-136	4	30
Trichlorofluoromethane (CFC 11)	ND U	41.4	54.6	76	41.5	54.1	77	47-129	1	30
Vinyl Chloride	ND U	44.5	54.6	82	46.8	54.1	87	53-128	6	30
cis-1,3-Dichloropropene	ND U	44.4	54.6	81	45.8	54.1	85	31-150	5	30
m,p-Xylenes	ND U	85.5	109	78	86.5	108	80	45-141	3	30
o-Xylene	ND U	44.6	54.6	82	44.3	54.1	82	46-139	<1	30
trans-1,2-Dichloroethene	ND U	43.5	54.6	80	44.5	54.1	82	52-128	2	30
trans-1,3-Dichloropropene	ND U	45.0	54.6	82	47.7	54.1	88	23-160	7	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:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/Kg
Lab Code:	RQ1614029-01	**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	11/14/16 15:03	
1,1,1-Trichloroethane (TCA)	ND U	5.0	0.73	1	11/14/16 15:03	
1,1,2,2-Tetrachloroethane	ND U	5.0	0.81	1	11/14/16 15:03	
1,1,2-Trichloroethane	ND U	5.0	0.73	1	11/14/16 15:03	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	5.0	1.3	1	11/14/16 15:03	
1,1-Dichloroethene (1,1-DCE)	ND U	5.0	1.3	1	11/14/16 15:03	
1,2,3-Trichloropropane	ND U	5.0	1.4	1	11/14/16 15:03	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	5.0	1.9	1	11/14/16 15:03	
1,2-Dibromoethane	ND U	5.0	1.3	1	11/14/16 15:03	
1,2-Dichlorobenzene	ND U	5.0	0.61	1	11/14/16 15:03	
1,2-Dichloroethane	ND U	5.0	0.61	1	11/14/16 15:03	
1,2-Dichloropropane	ND U	5.0	0.97	1	11/14/16 15:03	
1,3-Dichlorobenzene	ND U	5.0	0.63	1	11/14/16 15:03	
1,4-Dioxane	ND U	100	20	1	11/14/16 15:03	
2-Butanone (MEK)	ND U	5.0	2.3	1	11/14/16 15:03	
2-Chloro-1,3-butadiene	ND U	5.0	1.6	1	11/14/16 15:03	
2-Chloroethyl Vinyl Ether	ND U	5.0	1.8	1	11/14/16 15:03	
Isobutyl Alcohol	ND U	100	23	1	11/14/16 15:03	
Allyl Chloride	ND U	5.0	1.7	1	11/14/16 15:03	
4-Methyl-2-pentanone	ND U	5.0	0.98	1	11/14/16 15:03	
Acetone	ND U	5.0	2.9	1	11/14/16 15:03	
Acetonitrile	ND U	25	17	1	11/14/16 15:03	
Acrolein	ND U	25	3.5	1	11/14/16 15:03	
Acrylonitrile	ND U	25	6.5	1	11/14/16 15:03	
Benzene	ND U	5.0	0.29	1	11/14/16 15:03	
Bromodichloromethane	ND U	5.0	0.61	1	11/14/16 15:03	
Bromoform	ND U	5.0	0.93	1	11/14/16 15:03	
Bromomethane	ND U	5.0	1.4	1	11/14/16 15:03	
Carbon Disulfide	ND U	5.0	1.3	1	11/14/16 15:03	
Carbon Tetrachloride	ND U	5.0	0.92	1	11/14/16 15:03	
Chlorobenzene	ND U	5.0	0.29	1	11/14/16 15:03	
Chloroethane	ND U	5.0	2.9	1	11/14/16 15:03	
Chloroform	ND U	5.0	1.3	1	11/14/16 15:03	
Chloromethane	ND U	5.0	0.40	1	11/14/16 15:03	
Dibromochloromethane	ND U	5.0	0.73	1	11/14/16 15:03	
Dibromomethane	ND U	5.0	0.63	1	11/14/16 15:03	
Dichlorodifluoromethane (CFC 12)	ND U	5.0	1.9	1	11/14/16 15:03	
Dichloromethane	ND U	5.0	0.57	1	11/14/16 15:03	
Ethyl Methacrylate	ND U	5.0	0.75	1	11/14/16 15:03	
Ethylbenzene	ND U	5.0	0.23	1	11/14/16 15:03	
Iodomethane	ND U	10	1.2	1	11/14/16 15:03	
Methacrylonitrile	ND U	5.0	1.6	1	11/14/16 15:03	
Methyl Methacrylate	ND U	5.0	0.73	1	11/14/16 15:03	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/Kg
Lab Code:	RQ1614029-01	**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	11/14/16 15:03	
Propionitrile	ND U	25	6.5	1	11/14/16 15:03	
Tetrachloroethene (PCE)	ND U	5.0	0.88	1	11/14/16 15:03	
Toluene	ND U	5.0	1.0	1	11/14/16 15:03	
Trichloroethene (TCE)	ND U	5.0	1.1	1	11/14/16 15:03	
Trichlorofluoromethane (CFC 11)	ND U	5.0	0.66	1	11/14/16 15:03	
Vinyl Chloride	ND U	5.0	1.9	1	11/14/16 15:03	
cis-1,3-Dichloropropene	ND U	5.0	0.90	1	11/14/16 15:03	
m,p-Xylenes	ND U	10	1.1	1	11/14/16 15:03	
o-Xylene	ND U	5.0	0.48	1	11/14/16 15:03	
trans-1,2-Dichloroethene	ND U	5.0	0.86	1	11/14/16 15:03	
trans-1,3-Dichloropropene	ND U	5.0	0.20	1	11/14/16 15:03	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	102	51 - 136	11/14/16 15:03	
Dibromofluoromethane	102	63 - 138	11/14/16 15:03	
Toluene-d8	102	66 - 138	11/14/16 15:03	

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: R1611998
Date Analyzed: 11/14/16

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

Units:ug/Kg
Basis: Dry

Lab Control Sample
RQ1614029-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
1,1,1,2-Tetrachloroethane	8260C	20.3	20.0	102	40-140
1,1,1-Trichloroethane (TCA)	8260C	18.8	20.0	94	40-140
1,1,2,2-Tetrachloroethane	8260C	19.6	20.0	98	40-140
1,1,2-Trichloroethane	8260C	20.2	20.0	101	40-140
1,1,2-Trichloro-1,2,2-trifluoroethane	8260C	17.3	20.0	87	40-140
1,1-Dichloroethene (1,1-DCE)	8260C	18.7	20.0	94	40-140
1,2,3-Trichloropropane	8260C	19.4	20.0	97	40-140
1,2-Dibromo-3-chloropropane (DBCP)	8260C	19.9	20.0	99	40-140
1,2-Dibromoethane	8260C	19.7	20.0	99	40-140
1,2-Dichlorobenzene	8260C	20.2	20.0	101	40-140
1,2-Dichloroethane	8260C	20.3	20.0	101	40-140
1,2-Dichloropropane	8260C	19.4	20.0	97	40-140
1,3-Dichlorobenzene	8260C	20.2	20.0	101	40-140
1,4-Dioxane	8260C	367	400	92	40-140
2-Butanone (MEK)	8260C	17.3	20.0	86	40-140
2-Chloro-1,3-butadiene	8260C	19.7	20.0	98	40-140
2-Chloroethyl Vinyl Ether	8260C	18.5	20.0	92	40-140
Isobutyl Alcohol	8260C	328	400	82	40-140
Allyl Chloride	8260C	18.4	20.0	92	40-140
4-Methyl-2-pentanone	8260C	18.2	20.0	91	40-140
Acetone	8260C	18.0	20.0	90	40-140
Acetonitrile	8260C	87.3	100	87	40-140
Acrolein	8260C	38.5	40.0	96	40-140
Acrylonitrile	8260C	90.7	100	91	40-140
Benzene	8260C	19.8	20.0	99	40-140
Bromodichloromethane	8260C	19.7	20.0	98	40-140
Bromoform	8260C	21.6	20.0	108	40-140
Bromomethane	8260C	18.3	20.0	91	40-140
Carbon Disulfide	8260C	19.5	20.0	97	40-140
Carbon Tetrachloride	8260C	19.8	20.0	99	40-140
Chlorobenzene	8260C	19.9	20.0	100	40-140
Chloroethane	8260C	19.1	20.0	95	40-140
Chloroform	8260C	19.3	20.0	97	40-140

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

Service Request: R1611998
Date Analyzed: 11/14/16

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

Units:ug/Kg
Basis: Dry

Lab Control Sample
RQ1614029-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Chloromethane	8260C	17.0	20.0	85	40-140
Dibromochloromethane	8260C	21.1	20.0	106	40-140
Dibromomethane	8260C	20.5	20.0	103	40-140
Dichlorodifluoromethane (CFC 12)	8260C	16.9	20.0	84	40-140
Dichloromethane	8260C	19.0	20.0	95	40-140
Ethyl Methacrylate	8260C	20.0	20.0	100	40-140
Ethylbenzene	8260C	19.5	20.0	98	40-140
Iodomethane	8260C	18.4	20.0	92	40-140
Methacrylonitrile	8260C	19.5	20.0	97	40-140
Methyl Methacrylate	8260C	20.1	20.0	100	40-140
Naphthalene	8260C	19.2	20.0	96	40-140
Propionitrile	8260C	93.2	100	93	40-140
Tetrachloroethene (PCE)	8260C	18.8	20.0	94	40-140
Toluene	8260C	19.8	20.0	99	40-140
Trichloroethene (TCE)	8260C	19.9	20.0	99	40-140
Trichlorofluoromethane (CFC 11)	8260C	19.1	20.0	95	40-140
Vinyl Chloride	8260C	19.1	20.0	96	40-140
cis-1,3-Dichloropropene	8260C	19.9	20.0	99	40-140
m,p-Xylenes	8260C	39.9	40.0	100	40-140
o-Xylene	8260C	19.9	20.0	99	40-140
trans-1,2-Dichloroethene	8260C	19.1	20.0	96	40-140
trans-1,3-Dichloropropene	8260C	20.2	20.0	101	40-140

Metals

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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	Dry
Lab Code:	R1611998-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	11/21/16 20:05	11/18/16	
Arsenic, Total	6010C	ND U	mg/Kg	1.0	0.3	1	11/21/16 20:05	11/18/16	
Barium, Total	6010C	**3.5**	mg/Kg	2.0	0.2	1	11/21/16 20:05	11/18/16	
Beryllium, Total	6010C	**0.06 J**	mg/Kg	0.30	0.02	1	11/21/16 20:05	11/18/16	
Cadmium, Total	6010C	**0.14 J**	mg/Kg	0.50	0.04	1	11/21/16 20:05	11/18/16	
Chromium, Total	6010C	**0.8 J**	mg/Kg	1.0	0.2	1	11/21/16 20:05	11/18/16	
Lead, Total	6010C	**0.7 J**	mg/Kg	5.0	0.3	1	11/21/16 20:05	11/18/16	
Mercury, Total	7471B	ND U	mg/Kg	0.033	0.003	1	11/17/16 14:02	11/15/16	
Nickel, Total	6010C	**0.4 J**	mg/Kg	4.0	0.2	1	11/21/16 20:05	11/18/16	
Selenium, Total	6010C	ND U	mg/Kg	1.0	0.6	1	11/29/16 14:53	11/28/16	
Silver, Total	6010C	ND U	mg/Kg	1.0	0.5	1	11/21/16 20:05	11/18/16	
Thallium, Total	6010C	ND U	mg/Kg	1.0	0.6	1	11/21/16 20:05	11/18/16	
Vanadium, Total	6010C	**0.7 J**	mg/Kg	5.0	0.2	1	11/21/16 20:05	11/18/16	
Zinc, Total	6010C	**0.4 J**	mg/Kg	2.0	0.2	1	11/21/16 20:05	11/18/16	

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

Service Request:R1611998
Date Collected:11/09/16
Date Received:11/11/16
Date Analyzed:11/17/16 - 11/29/16

Matrix Spike Summary
Inorganic Parameters

Sample Name: 1611090906 400-SB-14 (0-153.5)
Lab Code: R1611998-003

Units:mg/Kg
Basis: Dry

Matrix Spike
R1611998-003MS

Analyte Name	Method	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Silver, Total	6010C	ND U	5.1	5.3	96	75-125
Arsenic, Total	6010C	6.3	9.1	4.2	68 *	75-125
Barium, Total	6010C	76.3	263	212	88	75-125
Beryllium, Total	6010C	0.58 B	5.34	5.29	90	75-125
Cadmium, Total	6010C	0.07 BJ	4.82	5.29	90	75-125
Chromium, Total	6010C	11.6	34.0	21.2	106	75-125
Mercury, Total	7471B	ND U	0.171	0.174	98	75-125
Nickel, Total	6010C	9.9	54.7	52.9	85	75-125
Lead, Total	6010C	8.6	57.7	52.9	93	75-125
Antimony, Total	6010C	ND U	42.3	52.9	80	75-125
Selenium, Total	6010C	2.0	100	105	94	75-125
Thallium, Total	6010C	1.6	213	212	100	75-125
Vanadium, Total	6010C	15.0	66.0	52.9	96	75-125
Zinc, Total	6010C	46.6	93.5	52.9	89	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:**	R1611998
Project	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16
		Date Analyzed:	11/17/16 - 11/29/16

Replicate Sample Summary
Inorganic Parameters

Sample Name:	1611090906 400-SB-14 (0-153.5)	**Units:**	mg/Kg
Lab Code:	R1611998-003	**Basis:**	Dry

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample R1611998-003DUP Result	Average	RPD	RPD Limit
Antimony, Total	6010C	6.5	0.5	ND U	ND U	NC	NC	20
Arsenic, Total	6010C	1.1	0.3	6.3	3.9	5.09	46 *	20
Barium, Total	6010C	2.2	0.2	76.3	62.4	69.3	20	20
Beryllium, Total	6010C	0.32	0.02	0.58 B	0.42	0.499	31 *	20
Cadmium, Total	6010C	0.54	0.04	0.07 BJ	ND U	NC	NC	20
Chromium, Total	6010C	1.1	0.2	11.6	13.0	12.3	12	20
Lead, Total	6010C	5.4	0.3	8.6	9.1	8.84	6	20
Mercury, Total	7471B	0.034	0.004	ND U	ND U	NC	NC	35
Nickel, Total	6010C	4.3	0.2	9.9	6.7	8.31	38 *	20
Selenium, Total	6010C	1.1	0.7	2.0	1.9	1.95	8	20
Silver, Total	6010C	1.1	0.5	ND U	ND U	NC	NC	20
Thallium, Total	6010C	1.1	0.6	1.6	1 J	1.31	50 *	20
Vanadium, Total	6010C	5.4	0.2	15.0	14.5	14.8	4	20
Zinc, Total	6010C	2.2	0.2	46.6	38.3	42.4	19	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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Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/15EC007B
Sample Matrix: Soil

Service Request: R1611998
Date Analyzed: 11/17/16 - 11/29/16

Lab Control Sample Summary
Inorganic Parameters

Units:mg/Kg
Basis: Dry

Lab Control Sample
R1611998-LCS

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Antimony, Total	6010C	46.8	50.0	94	80-120
Arsenic, Total	6010C	3.53	4.0	88	80-120
Barium, Total	6010C	206	200	103	80-120
Beryllium, Total	6010C	4.78	5.00	96	80-120
Cadmium, Total	6010C	5.06	5.00	101	80-120
Chromium, Total	6010C	20.2	20.0	101	80-120
Lead, Total	6010C	50.2	50.0	100	80-120
Mercury, Total	7471B	0.161	0.167	96	80-120
Nickel, Total	6010C	50.0	50.0	100	80-120
Selenium, Total	6010C	88.7	101	88	80-120
Silver, Total	6010C	4.63	5.0	93	80-120
Thallium, Total	6010C	174	200	87	80-120
Vanadium, Total	6010C	50.2	50.0	100	80-120
Zinc, Total	6010C	46.2	50.0	92	80-120

General Chemistry

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QA/QC Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1611998
Project	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16
		Date Analyzed:	11/17/16

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	1611090900 400-SB-14 (0-153.5)	**Units:**	Percent
Lab Code:	R1611998-001	**Basis:**	As Received

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample R1611998-001DUP Result	Average	RPD	RPD Limit
Total Solids	ALS SOP	-	92.5	92.5	92.5	<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:**	R1611998
Project	White Sands Test Facility/15EC007B	**Date Collected:**	11/09/16
Sample Matrix:	Soil	**Date Received:**	11/11/16
		Date Analyzed:	11/17/16

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	1611090906 400-SB-14 (0-153.5)	**Units:**	Percent
Lab Code:	R1611998-003	**Basis:**	As Received

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample R1611998-003DUP Result	Average	RPD	RPD Limit
Total Solids	ALS SOP	-	-	92.6	92.4	92.5	<1	20

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

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Subcontracted Analytical Parameters

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

November 23, 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:	**2189986**
Purchase Order:		Workorder ID:	**R1611998**

Dear Reports Invoices:

Enclosed are the analytical results for samples received by the laboratory on Thursday, November 17, 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.

Brad W. Kintzer

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: 2189986 R1611998

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2189986001	R1611998-005	Solid	11/9/2016 00:00	11/17/2016 08:41	Collected by Client
2189986002	R1611998-006	Solid	11/9/2016 00:00	11/17/2016 08:41	Collected by Client
2189986003	R1611998-009	Solid	11/9/2016 00:00	11/17/2016 08:41	Collected by Client
2189986004	R1611998-012	Solid	11/9/2016 00:00	11/17/2016 08:41	Collected by Client

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SAMPLE SUMMARY

Workorder: 2189986 R1611998

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: 2189986 R1611998

Lab ID: **2189986001** Date Collected: 11/9/2016 00:00 Matrix: Solid

Sample ID: **R1611998-005** Date Received: 11/17/2016 08:41

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
WET CHEMISTRY											
Moisture	7.9		%	0.1	0.01	S2540G-11			11/22/16 19:45	KAM	A
Total Solids	92.1		%	0.1	0.01	S2540G-11			11/22/16 19:45	KAM	A
TCLP METALS											
Antimony, Total	ND		mg/L	0.15	0.050	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:04	SRT	A1
Arsenic, Total	ND		mg/L	0.14	0.046	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:04	SRT	A1
Barium, Total	1.2J	J	mg/L	2.8	0.94	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:04	SRT	A1
Beryllium, Total	ND		mg/L	0.022	0.0070	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:04	SRT	A1
Cadmium, Total	0.0039J	J	mg/L	0.011	0.0037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:04	SRT	A1
Chromium, Total	ND		mg/L	0.028	0.010	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:04	SRT	A1
Lead, Total	ND		mg/L	0.033	0.011	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:04	SRT	A1
Mercury, Total	ND		mg/L	0.0020	0.00066	SW846 7470A	11/21/16 11:00	MNP	11/21/16 15:17	MNP	A2
Nickel, Total	ND		mg/L	0.11	0.037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:04	SRT	A1
Selenium, Total	ND		mg/L	0.11	0.037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:04	SRT	A1
Silver, Total	ND		mg/L	0.022	0.0070	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:04	SRT	A1
Thallium, Total	ND		mg/L	0.11	0.037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:04	SRT	A1
Vanadium, Total	ND		mg/L	0.028	0.010	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:04	SRT	A1
Zinc, Total	0.077J	J	mg/L	0.11	0.037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:04	SRT	A1

Mr. Brad W Kintzer
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ANALYTICAL RESULTS

Workorder: 2189986 R1611998

Lab ID: **2189986002** Date Collected: 11/9/2016 00:00 Matrix: Solid

Sample ID: **R1611998-006** Date Received: 11/17/2016 08:41

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
WET CHEMISTRY											
Moisture	6.7		%	0.1	0.01	S2540G-11			11/22/16 19:45	KAM	A
Total Solids	93.3		%	0.1	0.01	S2540G-11			11/22/16 19:45	KAM	A
TCLP METALS											
Antimony, Total	ND		mg/L	0.15	0.050	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:15	SRT	A1
Arsenic, Total	0.056J	J	mg/L	0.14	0.046	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:15	SRT	A1
Barium, Total	1.4J	J	mg/L	2.8	0.94	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:15	SRT	A1
Beryllium, Total	ND		mg/L	0.022	0.0070	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:15	SRT	A1
Cadmium, Total	0.012		mg/L	0.011	0.0037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:15	SRT	A1
Chromium, Total	0.047		mg/L	0.028	0.010	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:15	SRT	A1
Lead, Total	ND		mg/L	0.033	0.011	SW846 6010C	11/21/16 09:45	TSS	11/21/16 15:31	SRT	A1
Mercury, Total	ND		mg/L	0.0020	0.00066	SW846 7470A	11/21/16 11:00	MNP	11/21/16 15:22	MNP	A2
Nickel, Total	ND		mg/L	0.11	0.037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:15	SRT	A1
Selenium, Total	ND		mg/L	0.11	0.037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:15	SRT	A1
Silver, Total	ND		mg/L	0.022	0.0070	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:15	SRT	A1
Thallium, Total	ND		mg/L	0.11	0.037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:15	SRT	A1
Vanadium, Total	ND		mg/L	0.028	0.010	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:15	SRT	A1
Zinc, Total	0.061J	J	mg/L	0.11	0.037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:15	SRT	A1

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ANALYTICAL RESULTS

Workorder: 2189986 R1611998

Lab ID: **2189986003** Date Collected: 11/9/2016 00:00 Matrix: Solid

Sample ID: **R1611998-009** Date Received: 11/17/2016 08:41

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
WET CHEMISTRY											
Moisture	9.1		%	0.1	0.01	S2540G-11			11/22/16 19:45	KAM	A
Total Solids	90.9		%	0.1	0.01	S2540G-11			11/22/16 19:45	KAM	A
TCLP METALS											
Antimony, Total	ND		mg/L	0.15	0.050	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:19	SRT	A1
Arsenic, Total	ND		mg/L	0.14	0.046	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:19	SRT	A1
Barium, Total	1.1J	J	mg/L	2.8	0.94	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:19	SRT	A1
Beryllium, Total	ND		mg/L	0.022	0.0070	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:19	SRT	A1
Cadmium, Total	0.0044J	J	mg/L	0.011	0.0037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:19	SRT	A1
Chromium, Total	0.019J	J	mg/L	0.028	0.010	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:19	SRT	A1
Lead, Total	ND		mg/L	0.033	0.011	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:19	SRT	A1
Mercury, Total	ND		mg/L	0.0020	0.00066	SW846 7470A	11/21/16 11:00	MNP	11/21/16 15:23	MNP	A2
Nickel, Total	ND		mg/L	0.11	0.037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:19	SRT	A1
Selenium, Total	ND		mg/L	0.11	0.037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:19	SRT	A1
Silver, Total	ND		mg/L	0.022	0.0070	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:19	SRT	A1
Thallium, Total	ND		mg/L	0.11	0.037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:19	SRT	A1
Vanadium, Total	0.011J	J	mg/L	0.028	0.010	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:19	SRT	A1
Zinc, Total	0.071J	J	mg/L	0.11	0.037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:19	SRT	A1

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

ANALYTICAL RESULTS

Workorder: 2189986 R1611998

Lab ID: **2189986004** Date Collected: 11/9/2016 00:00 Matrix: Solid

Sample ID: **R1611998-012** Date Received: 11/17/2016 08:41

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
WET CHEMISTRY											
Moisture	5.7		%	0.1	0.01	S2540G-11			11/22/16 19:45	KAM	A
Total Solids	94.3		%	0.1	0.01	S2540G-11			11/22/16 19:45	KAM	A
TCLP METALS											
Antimony, Total	ND		mg/L	0.15	0.050	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:23	SRT	A1
Arsenic, Total	ND		mg/L	0.14	0.046	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:23	SRT	A1
Barium, Total	2.4J	J	mg/L	2.8	0.94	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:23	SRT	A1
Beryllium, Total	ND		mg/L	0.022	0.0070	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:23	SRT	A1
Cadmium, Total	0.0044J	J	mg/L	0.011	0.0037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:23	SRT	A1
Chromium, Total	ND		mg/L	0.028	0.010	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:23	SRT	A1
Lead, Total	ND		mg/L	0.033	0.011	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:23	SRT	A1
Mercury, Total	ND		mg/L	0.0020	0.00066	SW846 7470A	11/21/16 11:00	MNP	11/21/16 15:24	MNP	A2
Nickel, Total	ND		mg/L	0.11	0.037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:23	SRT	A1
Selenium, Total	ND		mg/L	0.11	0.037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:23	SRT	A1
Silver, Total	ND		mg/L	0.022	0.0070	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:23	SRT	A1
Thallium, Total	ND		mg/L	0.11	0.037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:23	SRT	A1
Vanadium, Total	ND		mg/L	0.028	0.010	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:23	SRT	A1
Zinc, Total	0.055J	J	mg/L	0.11	0.037	SW846 6010C	11/21/16 09:45	TSS	11/21/16 13:23	SRT	A1

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QUALITY CONTROL DATA

Workorder: 2189986 R1611998

QC Batch: MDIG/60975 **Analysis Method:** SW846 6010C

QC Batch Method: SW846 3015

Associated Lab Samples: 2189986001, 2189986002, 2189986003, 2189986004

METHOD BLANK: 2443192

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: 2443193

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Antimony, Total	107	mg/L	.22	0.24	80 - 120
Arsenic, Total	109	mg/L	.11	0.12	80 - 120
Barium, Total	108	mg/L	1.1	1.2	80 - 120
Beryllium, Total	106	mg/L	.22	0.24	80 - 120
Cadmium, Total	109	mg/L	.11	0.12	80 - 120
Chromium, Total	107	mg/L	.11	0.12	80 - 120
Lead, Total	107	mg/L	.11	0.12	80 - 120
Nickel, Total	109	mg/L	1.1	1.2	80 - 120
Selenium, Total	107	mg/L	1.1	1.2	80 - 120
Silver, Total	108	mg/L	.11	0.12	80 - 120
Thallium, Total	113	mg/L	.11	0.13	80 - 120
Vanadium, Total	109	mg/L	.056	0.061	80 - 120
Zinc, Total	110	mg/L	.56	0.61	80 - 120

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QUALITY CONTROL DATA

Workorder: 2189986 R1611998

MATRIX SPIKE: 2443196 DUPLICATE: 2443197 ORIGINAL: 2189986001

****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	.02	mg/L	5	5.92772	5.76105	118	115	50 - 150	2.85	20
Barium, Total	1.2061	mg/L	10	11.83877	11.72766	106	105	50 - 150	.94	20
Cadmium, Total	.00389	mg/L	1	1.14499	1.10888	114	110	50 - 150	3.2	20
Chromium, Total	.00167	mg/L	5	5.18939	5.1705	104	103	50 - 150	.36	20
Lead, Total	0	mg/L	5	5.58328	5.43217	112	109	50 - 150	2.74	20
Selenium, Total	.00333	mg/L	1	1.17777	1.14221	117	114	50 - 150	3.07	20
Silver, Total	0	mg/L	1	1.14277	1.1361	114	114	50 - 150	.59	20

QUALITY CONTROL DATA

Workorder: 2189986 R1611998

QC Batch: MDIG/60980 **Analysis Method:** SW846 7470A

QC Batch Method: SW846 7470A

Associated Lab Samples: 2189986001, 2189986002, 2189986003, 2189986004

METHOD BLANK: 2443294

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

LABORATORY CONTROL SAMPLE: 2443295

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Mercury, Total	104	mg/L	.002	0.0021	85 - 115

MATRIX SPIKE: 2443296 DUPLICATE: 2443297 ORIGINAL: 2189986001

****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	.00582	.00558	116	112	70 - 130	4.21	20

MATRIX SPIKE: 2443298 DUPLICATE: 2443299 ORIGINAL: 2189986004

****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	.0053	.00534	106	107	70 - 130	.75	20

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QUALITY CONTROL DATA

Workorder: 2189986 R1611998

QC Batch: WETC/179385 **Analysis Method:** S2540G-11

QC Batch Method: S2540G-11

Associated Lab Samples: 2189986001, 2189986002, 2189986003, 2189986004

SAMPLE DUPLICATE: 2444293 ORIGINAL: 2187505002

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	41.4507	%	40.1091	3.29	10
Total Solids	58.5492	%	59.8908	2.27	5

SAMPLE DUPLICATE: 2444294 ORIGINAL: 2188802007

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	16.5887	%	16.7014	.68	10
Total Solids	83.4112	%	83.2985	.14	5

SAMPLE DUPLICATE: 2444295 ORIGINAL: 2189804002

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	4.1666	%	2.0833	66.7*	10
Total Solids	95.8333	%	97.9166	2.15	5

SAMPLE DUPLICATE: 2444296 ORIGINAL: 2189959004

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	.5964	%	.5115	15.3*	10
Total Solids	99.4035	%	99.4884	.09	5

SAMPLE DUPLICATE: 2444297 ORIGINAL: 2190139001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	19.1091	%	19.209	.52	10
Total Solids	80.8908	%	80.7909	.12	5

QUALITY CONTROL DATA

Workorder: 2189986 R1611998

SAMPLE DUPLICATE: 2444298 ORIGINAL: 2190151007

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	16.0569	%	14.9659	7.03	10
Total Solids	83.943	%	85.034	1.29	5

SAMPLE DUPLICATE: 2444299 ORIGINAL: 2190160001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	21.2912	%	22.0272	3.4	10
Total Solids	78.7087	%	77.9727	.94	5

SAMPLE DUPLICATE: 2444300 ORIGINAL: 2190168001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	8.2432	%	8.5539	3.7	10
Total Solids	91.7567	%	91.446	.34	5

SAMPLE DUPLICATE: 2444301 ORIGINAL: 2190171009

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	6.6066	%	6.5359	1.08	10
Total Solids	93.3933	%	93.464	.08	5

SAMPLE DUPLICATE: 2444302 ORIGINAL: 2190179004

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Moisture	9.1633	%	7.4257	20.9*	10
Total Solids	90.8366	%	92.5742	1.89	5

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 2189986 R1611998

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
2189986001	R1611998-005	SW846 3015	MDIG/60975	SW846 6010C	META/55043
2189986002	R1611998-006	SW846 3015	MDIG/60975	SW846 6010C	META/55043
2189986003	R1611998-009	SW846 3015	MDIG/60975	SW846 6010C	META/55043
2189986004	R1611998-012	SW846 3015	MDIG/60975	SW846 6010C	META/55043
2189986001	R1611998-005	SW846 7470A	MDIG/60980	SW846 7470A	META/55048
2189986002	R1611998-006	SW846 7470A	MDIG/60980	SW846 7470A	META/55048
2189986003	R1611998-009	SW846 7470A	MDIG/60980	SW846 7470A	META/55048
2189986004	R1611998-012	SW846 7470A	MDIG/60980	SW846 7470A	META/55048
2189986001	R1611998-005			S2540G-11	WETC/179385
2189986002	R1611998-006			S2540G-11	WETC/179385
2189986003	R1611998-009			S2540G-11	WETC/179385
2189986004	R1611998-012			S2540G-11	WETC/179385

ALS Environmental Chain of Custody

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

B

AI

2189986

Project Number: R1611998
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
R1611998-005	1611090909 400-SB-14 (0-153.5) QC	2	Soil	11/9/16		Middletown ALS	X	X	X	X	X	X	X	X	X
R1611998-006	1611090910 400-SB-14 (0-153.5)	1	Soil	11/9/16		Middletown ALS	X	X	X	X	X	X	X	X	X
R1611998-009	1611090923 400-SB-14 (0-62)	1	Soil	11/9/16		Middletown ALS	X	X	X	X	X	X	X	X	X
R1611998-012	1611090933 400-SB-14 (62-153.5)	1	Soil	11/9/16		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/Labls Complete			
Cont in Good Cond?			
Correct Containers?			
Correct Samp Vol?			
Correct Preservation?			
Headspace/Volatiles?			

Cooler Temp 4 °C
Cooler #
Therm ID: IR352
Ship Carrier:
FedEx UPS
DHL
Tracking # 6-526 8017 3009

Folder Comments:
ND U

Special Instructions/Comments
NAEA/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: 11/25/16

Report Requirements
____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

Invoice Information
PO# 58R1611998
Bill to

Relinquished By: 11/16/16 17:30 Received By: 11/17/16 0841 Airbill Number:

							Sb TCLP 6010C	Se TCLP 6010C	TCLP EPA 1311	Tl TCLP 6010C	V TCLP 6010C	Zn TCLP 6010C
R1611998-005	1611090909 400-SB-14 (0-153.5)		Soil	11/9/16		Middletown ALS	X	X	X	X	X	X
R1611998-006	1611090910 400-SB-14 (0-153.5)		Soil	11/9/16		Middletown ALS	X	X	X	X	X	X
R1611998-009	1611090923 400-SB-14 (0-62)		Soil	11/9/16		Middletown ALS	X	X	X	X	X	X
R1611998-012	1611090933 400-SB-14 (62-153.5)		Soil	11/9/16		Middletown ALS	X	X	X	X	X	X

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ALS Contact: Janice Jaeger

Project Number: R1611998
Project Manager: Janice Jaeger
QAP: LAB QAP

Run QC on sample R1611998-005 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

R1611998

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

PC _____ Date 11/14/16
SMO _____ Date 11-16-16

Instructions:
Ice X
Dry Ice ____
No Ice ____

Shipping:
Overnight X
2nd Day ____
Ground ____

Bill to Client Account _____

Comments:

December 06, 2016 Service Request No:R1612461

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 November 28, 2016
For your reference, these analyses have been assigned our service request number **R1612461.**

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.
dba ALS Environmental

Narrative Documents

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

Service Request:R1612461
Date Received:11/28/16

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

Eight water and soil samples were received for analysis at ALS Environmental on 11/28/2016. 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.

Metals Analyses:

No significant anomalies were noted with this analysis.

General Chemistry Analyses:

No significant anomalies were noted with this analysis.

Approved by _____ Date 12/6/2016

SAMPLE DETECTION SUMMARY

CLIENT ID: 1611181121 400-SB-10	Lab ID: R1612461-001					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Barium, Total	0.036	B	0.002	0.020	mg/L	6010C
Chromium, Total	0.0003	BJ	0.0003	0.010	mg/L	6010C
Vanadium, Total	0.002	BJ	0.0010	0.050	mg/L	6010C
Zinc, Total	0.012	BJ	0.007	0.020	mg/L	6010C

CLIENT ID: 1611181122 400-SB-10	Lab ID: R1612461-002					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Barium, Total	0.036	B	0.002	0.020	mg/L	6010C
Chromium, Total	0.0004	BJ	0.0003	0.010	mg/L	6010C
Vanadium, Total	0.002	BJ	0.0010	0.050	mg/L	6010C
Zinc, Total	0.015	BJ	0.007	0.020	mg/L	6010C

CLIENT ID: 1611181130 400-SB-10	Lab ID: R1612461-003					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	63.9				Percent	ALS SOP
Antimony, Total	1.0	J	0.7	9.3	mg/Kg	6010C
Arsenic, Total	5.4		0.4	1.5	mg/Kg	6010C
Barium, Total	180		0.2	3.1	mg/Kg	6010C
Beryllium, Total	0.53		0.03	0.46	mg/Kg	6010C
Cadmium, Total	0.05	J	0.05	0.77	mg/Kg	6010C
Chromium, Total	1.8		0.2	1.5	mg/Kg	6010C
Lead, Total	7.5	J	0.5	7.7	mg/Kg	6010C
Nickel, Total	3.5	J	0.2	6.2	mg/Kg	6010C
Selenium, Total	2.1		1.0	1.5	mg/Kg	6010C
Vanadium, Total	42.7		0.2	7.7	mg/Kg	6010C
Zinc, Total	37.0		0.3	3.1	mg/Kg	6010C

CLIENT ID: 1611181131 400-SB-10	Lab ID: R1612461-004					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	61.2				Percent	ALS SOP
Arsenic, Total	5.7		0.4	1.6	mg/Kg	6010C
Barium, Total	147		0.2	3.1	mg/Kg	6010C
Beryllium, Total	0.55		0.03	0.47	mg/Kg	6010C
Cadmium, Total	0.06	J	0.05	0.78	mg/Kg	6010C
Chromium, Total	2.7		0.2	1.6	mg/Kg	6010C
Lead, Total	7.3	J	0.5	7.8	mg/Kg	6010C
Nickel, Total	3.4	J	0.2	6.2	mg/Kg	6010C
Selenium, Total	1.7		1.0	1.6	mg/Kg	6010C
Vanadium, Total	47.1		0.2	7.8	mg/Kg	6010C
Zinc, Total	37.4		0.3	3.1	mg/Kg	6010C

SAMPLE DETECTION SUMMARY

CLIENT ID: 1611181146 400-SB-12	Lab ID: R1612461-005					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Barium, Total	0.153		0.002	0.020	mg/L	6010C
Beryllium, Total	0.0002	BJ	0.0002	0.0030	mg/L	6010C
Chromium, Total	0.004	BJ	0.0003	0.010	mg/L	6010C
Vanadium, Total	0.016	BJ	0.0010	0.050	mg/L	6010C
Zinc, Total	0.025		0.007	0.020	mg/L	6010C

CLIENT ID: 1611181147 400-SB-12	Lab ID: R1612461-006					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Barium, Total	0.036	B	0.002	0.020	mg/L	6010C
Chromium, Total	0.0004	BJ	0.0003	0.010	mg/L	6010C
Vanadium, Total	0.003	BJ	0.0010	0.050	mg/L	6010C
Zinc, Total	0.018	BJ	0.007	0.020	mg/L	6010C

CLIENT ID: 1611181155 400-SB-12	Lab ID: R1612461-007					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	76.1				Percent	ALS SOP
Arsenic, Total	0.8	J	0.4	1.3	mg/Kg	6010C
Barium, Total	237		0.2	2.6	mg/Kg	6010C
Beryllium, Total	0.59		0.03	0.39	mg/Kg	6010C
Cadmium, Total	0.71		0.04	0.64	mg/Kg	6010C
Chromium, Total	12.1		0.2	1.3	mg/Kg	6010C
Lead, Total	4.3	J	0.4	6.4	mg/Kg	6010C
Nickel, Total	8.8		0.2	5.2	mg/Kg	6010C
Vanadium, Total	59.4		0.2	6.4	mg/Kg	6010C
Zinc, Total	41.4		0.2	2.6	mg/Kg	6010C

CLIENT ID: 1611181156 400-SB-12	Lab ID: R1612461-008					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	70.9				Percent	ALS SOP
Arsenic, Total	1.0	J	0.4	1.4	mg/Kg	6010C
Barium, Total	330		0.2	2.8	mg/Kg	6010C
Beryllium, Total	0.57		0.03	0.42	mg/Kg	6010C
Cadmium, Total	0.74		0.05	0.70	mg/Kg	6010C
Chromium, Total	16.4		0.2	1.4	mg/Kg	6010C
Lead, Total	4.7	J	0.4	7.0	mg/Kg	6010C
Nickel, Total	9.9		0.2	5.6	mg/Kg	6010C
Selenium, Total	1.5		0.9	1.4	mg/Kg	6010C
Vanadium, Total	72.2		0.2	7.0	mg/Kg	6010C
Zinc, Total	43.7		0.2	2.8	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:**R1612461
Project: White Sands Test Facility/15EC007B

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
R1612461-001	1611181121 400-SB-10	11/18/2016	
R1612461-002	1611181122 400-SB-10	11/18/2016	
R1612461-003	1611181130 400-SB-10	11/18/2016	
R1612461-004	1611181131 400-SB-10	11/18/2016	
R1612461-005	1611181146 400-SB-12	11/18/2016	
R1612461-006	1611181147 400-SB-12	11/18/2016	
R1612461-007	1611181155 400-SB-12	11/18/2016	
R1612461-008	1611181156 400-SB-12	11/18/2016	

Laboratory PO #15EC007B

Return Address for Analytical Reports

NASA WSTF Environmental Department
12,600 NASA Road
Las Cruces, NM 88012

Attn: ☒ Tom Hall ☒
Other_____
(575) 524-5453

Analytical Requirements

Special Instructions
Please return coolers and reusable packaging materials as possible.

Return Address:

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

Sample No.	Sample Location	# of Containers	Sample Type: Aqueous (A); Slurry (S)	SW-846 Method 8260B 40 ml Amber Glass Vial, Ice	SW-846 Method 8260B 4 oz Glass Jar, Ice	Total Metals SW-846-6010C and 7470A 500 Ml poly, 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	Comments
1611181115	400-SB-10	1	A	X					
1611181116	400-SB-10	1	A	X					
1611181117	400-SB-10	1	A	X					Matrix Spike for 1611181115
1611181124	400-SB-10	1	S		X				
1611181125	400-SB-10	1	S		X				
1611181126	400-SB-10	1	S		X				Matrix Spike for 1611181124
1611181121	400-SB-10	1	A			X			
1611181122	400-SB-10	1	A			X			
1611181123	400-SB-10	1	A			X			Matrix Spike for 1611181121
1611181130	400-SB-10	1	S				X		
1611181131	400-SB-10	1	S				X		
1611181132	400-SB-10	1	S				X		Matrix Spike for 1611181130
1611181133	400-SB-10	1	S					X	
1611181134	400-SB-10	1	S					X	
1611181135	400-SB-10	1	S					X	Matrix Spike for 1611181133

Relinquished By:	*Date/Time:*	*Accepted By:*	*Date/Time:*
Steven Maestas	11/21/16 11:00		11-28-16 11:15

R1612461 5
NASA/WSTF/Navarro
White Sands Test Facility

WSTF – 381C (02/15)

Laboratory PO #15EC007B

Return Address for Analytical Reports

NASA WSTF Environmental Department
12,600 NASA Road
Las Cruces, NM 88012

Attn: ☒ Tom Hall ☒
Other ______

(575) 524-5453

Analytical Requirements

Special Instructions
Please return coolers and reusable packaging materials as possible.

Return Address:

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

" sampling except for metals as per Tom Hall due to temp VM 11/28/16

Sample No.	Sample Location	# of Containers	Sample Type: Aqueous (A); Slurry (S)	SW-846 Method 8260B 40 ml Amber Glass Vial, Ice	SW-846 Method 8260B 4 oz. Glass Jar, Ice	Total Metals SW-846-6010C and 7470A 500 Ml poly, 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	Comments
1611181140	400-SB-12	1	A	X					
1611181141	400-SB-12	1	A	X					
1611181142	400-SB-12	1	A	X					Matrix Spike for 1611181140
1611181149	400-SB-12	1	S		X				
1611181150	400-SB-12	1	S		X				
1611181151	400-SB-12	1	S		X				Matrix Spike for 1611181149
1611181146	400-SB-12	1	A			X			
1611181147	400-SB-12	1	A			X			
1611181148	400-SB-12	1	A			X			Matrix Spike for 1611181146
~~1611181155~~	~~400-SB-12~~	~~1~~	~~S~~				~~X~~		
1611181156	400-SB-12	1	S				X		
1611181157	400-SB-12	1	S				X		Matrix Spike for 1611181155
1611181158	400-SB-12	1	S					X	
1611181159	400-SB-12	1	S					X	
1611181200	400-SB-12	1	S					X	Matrix Spike for 1611181158

Relinquished By:	Date/Time:	Accepted By:	Date/Time:
Steven Moestas	11/21/16 11:00	[signature]	11-28-16 11:15

R1612461 5
NASA/WSTF/Navarro
White Sands Test Facility

R1612461 5
NASA/WSTF/Navarro
White Sands Test Facility

Cooler Receipt and Preservation Check Form

Project/Client NASA Folder Number

Cooler received on 11-28-16 by: HE

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: 11-28-16 Time: 11:21 ID: (IR#7) IR#8 From: Temp Blank (Sample Bottle)

Observed Temp (°C)	14.5						
Correction Factor (°C)	0						
Corrected Temp (°C)	14.5						
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: X (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 HE on 11-28-16 at 11:26
5035 samples placed in storage location: _____ by _____ on _____ at _____

Cooler Breakdown: Date: 11-28-16 Time: 12:45 by: T.S

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		X	Client		006	2ml	B070261561	<2
≤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:

* 1611181155-400SB-12 402 Jar broken in shipment. Sample lost. HE 11-28-16

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

PC Secondary Review: _____

*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.

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:**	R1612461
Project:	White Sands Test Facility/15EC007B		

Sample Name:	1611181121 400-SB-10	**Date Collected:**	11/18/16
Lab Code:	R1612461-001	**Date Received:**	11/28/16
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	CBURLESON	NMANSEN
7470A	CBURLESON	CBURLESON

Sample Name:	1611181122 400-SB-10	**Date Collected:**	11/18/16
Lab Code:	R1612461-002	**Date Received:**	11/28/16
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	CBURLESON	NMANSEN
7470A	CBURLESON	CBURLESON

Sample Name:	1611181130 400-SB-10	**Date Collected:**	11/18/16
Lab Code:	R1612461-003	**Date Received:**	11/28/16
Sample Matrix:	Soil		

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

Sample Name:	1611181131 400-SB-10	**Date Collected:**	11/18/16
Lab Code:	R1612461-004	**Date Received:**	11/28/16
Sample Matrix:	Soil		

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

Client: NASA/WSTF/Navarro **Service Request:** R1612461
Project: White Sands Test Facility/15EC007B

Sample Name: 1611181146 400-SB-12 **Date Collected:** 11/18/16
Lab Code: R1612461-005 **Date Received:** 11/28/16
Sample Matrix: Water

Analysis Method	Extracted/Digested By	Analyzed By
6010C	CBURLESON	NMANSEN
7470A	CBURLESON	CBURLESON

Sample Name: 1611181147 400-SB-12 **Date Collected:** 11/18/16
Lab Code: R1612461-006 **Date Received:** 11/28/16
Sample Matrix: Water

Analysis Method	Extracted/Digested By	Analyzed By
6010C	CBURLESON	NMANSEN
7470A	CBURLESON	CBURLESON

Sample Name: 1611181155 400-SB-12 **Date Collected:** 11/18/16
Lab Code: R1612461-007 **Date Received:** 11/28/16
Sample Matrix: Soil

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

Sample Name: 1611181156 400-SB-12 **Date Collected:** 11/18/16
Lab Code: R1612461-008 **Date Received:** 11/28/16
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
6010C	CBURLESON	CGILDAY
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

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:**	R1612461
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/18/16
Sample Matrix:	Water	**Date Received:**	11/28/16 11:15
Sample Name:	1611181121 400-SB-10	**Basis:**	NA
Lab Code:	R1612461-001		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/L	0.060	0.005	1	11/30/16 20:40	11/29/16	
Arsenic, Total	6010C	ND U	mg/L	0.010	0.005	1	11/30/16 20:40	11/29/16	
Barium, Total	6010C	**0.036 B**	mg/L	0.020	0.002	1	11/30/16 20:40	11/29/16	
Beryllium, Total	6010C	ND U	mg/L	0.0030	0.0002	1	11/30/16 20:40	11/29/16	
Cadmium, Total	6010C	ND U	mg/L	0.0050	0.0002	1	11/30/16 20:40	11/29/16	
Chromium, Total	6010C	**0.0003 BJ**	mg/L	0.010	0.0003	1	11/30/16 20:40	11/29/16	
Lead, Total	6010C	ND U	mg/L	0.050	0.005	1	11/30/16 20:40	11/29/16	
Mercury, Total	7470A	ND U	mg/L	0.00020	0.00004	1	11/30/16 11:18	11/29/16	
Nickel, Total	6010C	ND U	mg/L	0.040	0.002	1	11/30/16 20:40	11/29/16	
Selenium, Total	6010C	ND U	mg/L	0.010	0.005	1	12/01/16 16:15	11/29/16	
Silver, Total	6010C	ND U	mg/L	0.010	0.0006	1	11/30/16 20:40	11/29/16	
Thallium, Total	6010C	ND U	mg/L	0.010	0.005	1	11/30/16 20:40	11/29/16	
Vanadium, Total	6010C	**0.002 BJ**	mg/L	0.050	0.0010	1	11/30/16 20:40	11/29/16	
Zinc, Total	6010C	**0.012 BJ**	mg/L	0.020	0.007	1	11/30/16 20:40	11/29/16	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612461
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/18/16
Sample Matrix:	Water	**Date Received:**	11/28/16 11:15
Sample Name:	1611181122 400-SB-10	**Basis:**	NA
Lab Code:	R1612461-002		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/L	0.060	0.005	1	11/30/16 21:02	11/29/16	
Arsenic, Total	6010C	ND U	mg/L	0.010	0.005	1	11/30/16 21:02	11/29/16	
Barium, Total	6010C	**0.036 B**	mg/L	0.020	0.002	1	11/30/16 21:02	11/29/16	
Beryllium, Total	6010C	ND U	mg/L	0.0030	0.0002	1	11/30/16 21:02	11/29/16	
Cadmium, Total	6010C	ND U	mg/L	0.0050	0.0002	1	11/30/16 21:02	11/29/16	
Chromium, Total	6010C	**0.0004 BJ**	mg/L	0.010	0.0003	1	11/30/16 21:02	11/29/16	
Lead, Total	6010C	ND U	mg/L	0.050	0.005	1	11/30/16 21:02	11/29/16	
Mercury, Total	7470A	ND U	mg/L	0.00020	0.00004	1	11/30/16 11:23	11/29/16	
Nickel, Total	6010C	ND U	mg/L	0.040	0.002	1	11/30/16 21:02	11/29/16	
Selenium, Total	6010C	ND U	mg/L	0.010	0.005	1	12/01/16 16:31	11/29/16	
Silver, Total	6010C	ND U	mg/L	0.010	0.0006	1	11/30/16 21:02	11/29/16	
Thallium, Total	6010C	ND U	mg/L	0.010	0.005	1	11/30/16 21:02	11/29/16	
Vanadium, Total	6010C	**0.002 BJ**	mg/L	0.050	0.0010	1	11/30/16 21:02	11/29/16	
Zinc, Total	6010C	**0.015 BJ**	mg/L	0.020	0.007	1	11/30/16 21:02	11/29/16	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612461
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/18/16
Sample Matrix:	Soil	**Date Received:**	11/28/16 11:15
Sample Name:	1611181130 400-SB-10	**Basis:**	Dry
Lab Code:	R1612461-003		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Q	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	**1.0**	**J**	mg/Kg	9.3	0.7	1	12/02/16 17:36	12/01/16	
Arsenic, Total	6010C	**5.4**		mg/Kg	1.5	0.4	1	12/02/16 17:36	12/01/16	
Barium, Total	6010C	**180**		mg/Kg	3.1	0.2	1	12/02/16 17:36	12/01/16	
Beryllium, Total	6010C	**0.53**		mg/Kg	0.46	0.03	1	12/02/16 17:36	12/01/16	
Cadmium, Total	6010C	**0.05**	**J**	mg/Kg	0.77	0.05	1	12/02/16 17:36	12/01/16	
Chromium, Total	6010C	**1.8**		mg/Kg	1.5	0.2	1	12/02/16 17:36	12/01/16	
Lead, Total	6010C	**7.5**	**J**	mg/Kg	7.7	0.5	1	12/02/16 17:36	12/01/16	
Mercury, Total	7471B	ND	U	mg/Kg	0.048	0.005	1	12/01/16 15:27	12/01/16	
Nickel, Total	6010C	**3.5**	**J**	mg/Kg	6.2	0.2	1	12/02/16 17:36	12/01/16	
Selenium, Total	6010C	**2.1**		mg/Kg	1.5	1.0	1	12/02/16 17:36	12/01/16	
Silver, Total	6010C	ND	U	mg/Kg	1.5	0.7	1	12/02/16 17:36	12/01/16	
Thallium, Total	6010C	ND	U	mg/Kg	1.5	0.8	1	12/02/16 17:36	12/01/16	
Vanadium, Total	6010C	**42.7**		mg/Kg	7.7	0.2	1	12/02/16 17:36	12/01/16	
Zinc, Total	6010C	**37.0**		mg/Kg	3.1	0.3	1	12/02/16 17:36	12/01/16	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612461
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/18/16
Sample Matrix:	Soil	**Date Received:**	11/28/16 11:15
Sample Name:	1611181131 400-SB-10	**Basis:**	Dry
Lab Code:	R1612461-004		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Q	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND	U	mg/Kg	9.3	0.7	1	12/02/16 18:06	12/01/16	
Arsenic, Total	6010C	**5.7**		mg/Kg	1.6	0.4	1	12/02/16 18:06	12/01/16	
Barium, Total	6010C	**147**		mg/Kg	3.1	0.2	1	12/02/16 18:06	12/01/16	
Beryllium, Total	6010C	**0.55**		mg/Kg	0.47	0.03	1	12/02/16 18:06	12/01/16	
Cadmium, Total	6010C	**0.06**	**J**	mg/Kg	0.78	0.05	1	12/02/16 18:06	12/01/16	
Chromium, Total	6010C	**2.7**		mg/Kg	1.6	0.2	1	12/02/16 18:06	12/01/16	
Lead, Total	6010C	**7.3**	**J**	mg/Kg	7.8	0.5	1	12/02/16 18:06	12/01/16	
Mercury, Total	7471B	ND	U	mg/Kg	0.050	0.005	1	12/01/16 15:32	12/01/16	
Nickel, Total	6010C	**3.4**	**J**	mg/Kg	6.2	0.2	1	12/02/16 18:06	12/01/16	
Selenium, Total	6010C	**1.7**		mg/Kg	1.6	1.0	1	12/02/16 18:06	12/01/16	
Silver, Total	6010C	ND	U	mg/Kg	1.6	0.7	1	12/02/16 18:06	12/01/16	
Thallium, Total	6010C	ND	U	mg/Kg	1.6	0.8	1	12/02/16 18:06	12/01/16	
Vanadium, Total	6010C	**47.1**		mg/Kg	7.8	0.2	1	12/02/16 18:06	12/01/16	
Zinc, Total	6010C	**37.4**		mg/Kg	3.1	0.3	1	12/02/16 18:06	12/01/16	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612461
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/18/16
Sample Matrix:	Water	**Date Received:**	11/28/16 11:15
Sample Name:	1611181146 400-SB-12	**Basis:**	NA
Lab Code:	R1612461-005		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Q	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND	U	mg/L	0.060	0.005	1	11/30/16 21:05	11/29/16	
Arsenic, Total	6010C	ND	U	mg/L	0.010	0.005	1	11/30/16 21:05	11/29/16	
Barium, Total	6010C	**0.153**		mg/L	0.020	0.002	1	11/30/16 21:05	11/29/16	
Beryllium, Total	6010C	**0.0002**	**BJ**	mg/L	0.0030	0.0002	1	11/30/16 21:05	11/29/16	
Cadmium, Total	6010C	ND	U	mg/L	0.0050	0.0002	1	11/30/16 21:05	11/29/16	
Chromium, Total	6010C	**0.004**	**BJ**	mg/L	0.010	0.0003	1	11/30/16 21:05	11/29/16	
Lead, Total	6010C	ND	U	mg/L	0.050	0.005	1	11/30/16 21:05	11/29/16	
Mercury, Total	7470A	ND	U	mg/L	0.00020	0.00004	1	11/30/16 11:28	11/29/16	
Nickel, Total	6010C	ND	U	mg/L	0.040	0.002	1	11/30/16 21:05	11/29/16	
Selenium, Total	6010C	ND	U	mg/L	0.010	0.005	1	12/01/16 16:40	11/29/16	
Silver, Total	6010C	ND	U	mg/L	0.010	0.0006	1	11/30/16 21:05	11/29/16	
Thallium, Total	6010C	ND	U	mg/L	0.010	0.005	1	11/30/16 21:05	11/29/16	
Vanadium, Total	6010C	**0.016**	**BJ**	mg/L	0.050	0.0010	1	11/30/16 21:05	11/29/16	
Zinc, Total	6010C	**0.025**		mg/L	0.020	0.007	1	12/06/16 11:08	12/05/16	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612461
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/18/16
Sample Matrix:	Water	**Date Received:**	11/28/16 11:15
Sample Name:	1611181147 400-SB-12	**Basis:**	NA
Lab Code:	R1612461-006		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND U	mg/L	0.060	0.005	1	11/30/16 21:21	11/29/16	
Arsenic, Total	6010C	ND U	mg/L	0.010	0.005	1	11/30/16 21:21	11/29/16	
Barium, Total	6010C	**0.036 B**	mg/L	0.020	0.002	1	11/30/16 21:21	11/29/16	
Beryllium, Total	6010C	ND U	mg/L	0.0030	0.0002	1	11/30/16 21:21	11/29/16	
Cadmium, Total	6010C	ND U	mg/L	0.0050	0.0002	1	11/30/16 21:21	11/29/16	
Chromium, Total	6010C	**0.0004 BJ**	mg/L	0.010	0.0003	1	11/30/16 21:21	11/29/16	
Lead, Total	6010C	ND U	mg/L	0.050	0.005	1	11/30/16 21:21	11/29/16	
Mercury, Total	7470A	ND U	mg/L	0.00020	0.00004	1	11/30/16 11:33	11/29/16	
Nickel, Total	6010C	ND U	mg/L	0.040	0.002	1	11/30/16 21:21	11/29/16	
Selenium, Total	6010C	ND U	mg/L	0.010	0.005	1	12/01/16 16:56	11/29/16	
Silver, Total	6010C	ND U	mg/L	0.010	0.0006	1	11/30/16 21:21	11/29/16	
Thallium, Total	6010C	ND U	mg/L	0.010	0.005	1	11/30/16 21:21	11/29/16	
Vanadium, Total	6010C	**0.003 BJ**	mg/L	0.050	0.0010	1	11/30/16 21:21	11/29/16	
Zinc, Total	6010C	**0.018 BJ**	mg/L	0.020	0.007	1	11/30/16 21:21	11/29/16	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612461
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/18/16
Sample Matrix:	Soil	**Date Received:**	11/28/16 11:15
Sample Name:	1611181155 400-SB-12	**Basis:**	Dry
Lab Code:	R1612461-007		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Q	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND	U	mg/Kg	7.7	0.6	1	12/02/16 18:12	12/01/16	
Arsenic, Total	6010C	**0.8**	**J**	mg/Kg	1.3	0.4	1	12/02/16 18:12	12/01/16	
Barium, Total	6010C	**237**		mg/Kg	2.6	0.2	1	12/02/16 18:12	12/01/16	
Beryllium, Total	6010C	**0.59**		mg/Kg	0.39	0.03	1	12/02/16 18:12	12/01/16	
Cadmium, Total	6010C	**0.71**		mg/Kg	0.64	0.04	1	12/02/16 18:12	12/01/16	
Chromium, Total	6010C	**12.1**		mg/Kg	1.3	0.2	1	12/02/16 18:12	12/01/16	
Lead, Total	6010C	**4.3**	**J**	mg/Kg	6.4	0.4	1	12/02/16 18:12	12/01/16	
Mercury, Total	7471B	ND	U	mg/Kg	0.043	0.004	1	12/01/16 15:34	12/01/16	
Nickel, Total	6010C	**8.8**		mg/Kg	5.2	0.2	1	12/02/16 18:12	12/01/16	
Selenium, Total	6010C	ND	U	mg/Kg	1.3	0.8	1	12/02/16 18:12	12/01/16	
Silver, Total	6010C	ND	U	mg/Kg	1.3	0.6	1	12/02/16 18:12	12/01/16	
Thallium, Total	6010C	ND	U	mg/Kg	1.3	0.7	1	12/05/16 18:58	12/01/16	
Vanadium, Total	6010C	**59.4**		mg/Kg	6.4	0.2	1	12/02/16 18:12	12/01/16	
Zinc, Total	6010C	**41.4**		mg/Kg	2.6	0.2	1	12/02/16 18:12	12/01/16	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612461
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/18/16
Sample Matrix:	Soil	**Date Received:**	11/28/16 11:15
Sample Name:	1611181156 400-SB-12	**Basis:**	Dry
Lab Code:	R1612461-008		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Q	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND	U	mg/Kg	8.4	0.6	1	12/02/16 18:55	12/01/16	
Arsenic, Total	6010C	**1.0**	**J**	mg/Kg	1.4	0.4	1	12/02/16 18:55	12/01/16	
Barium, Total	6010C	**330**		mg/Kg	2.8	0.2	1	12/02/16 18:55	12/01/16	
Beryllium, Total	6010C	**0.57**		mg/Kg	0.42	0.03	1	12/02/16 18:55	12/01/16	
Cadmium, Total	6010C	**0.74**		mg/Kg	0.70	0.05	1	12/02/16 18:55	12/01/16	
Chromium, Total	6010C	**16.4**		mg/Kg	1.4	0.2	1	12/02/16 18:55	12/01/16	
Lead, Total	6010C	**4.7**	**J**	mg/Kg	7.0	0.4	1	12/02/16 18:55	12/01/16	
Mercury, Total	7471B	ND	U	mg/Kg	0.046	0.005	1	12/01/16 15:39	12/01/16	
Nickel, Total	6010C	**9.9**		mg/Kg	5.6	0.2	1	12/02/16 18:55	12/01/16	
Selenium, Total	6010C	**1.5**		mg/Kg	1.4	0.9	1	12/02/16 18:55	12/01/16	
Silver, Total	6010C	ND	U	mg/Kg	1.4	0.7	1	12/02/16 18:55	12/01/16	
Thallium, Total	6010C	ND	U	mg/Kg	1.4	0.7	1	12/05/16 19:20	12/01/16	
Vanadium, Total	6010C	**72.2**		mg/Kg	7.0	0.2	1	12/02/16 18:55	12/01/16	
Zinc, Total	6010C	**43.7**		mg/Kg	2.8	0.2	1	12/02/16 18:55	12/01/16	

General Chemistry

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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612461
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/18/16
Sample Matrix:	Soil	**Date Received:**	11/28/16 11:15
Sample Name:	1611181130 400-SB-10	**Basis:**	As Received
Lab Code:	R1612461-003		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**63.9**	Percent	-	-	1	11/28/16 11:51	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612461
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/18/16
Sample Matrix:	Soil	**Date Received:**	11/28/16 11:15
Sample Name:	1611181131 400-SB-10	**Basis:**	As Received
Lab Code:	R1612461-004		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**61.2**	Percent	-	-	1	11/28/16 11:51	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612461
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/18/16
Sample Matrix:	Soil	**Date Received:**	11/28/16 11:15
Sample Name:	1611181155 400-SB-12	**Basis:**	As Received
Lab Code:	R1612461-007		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**76.1**	Percent	-	-	1	11/28/16 11:51	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612461
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/18/16
Sample Matrix:	Soil	**Date Received:**	11/28/16 11:15
Sample Name:	1611181156 400-SB-12	**Basis:**	As Received
Lab Code:	R1612461-008		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**70.9**	Percent	-	-	1	11/28/16 11:51	

QC Summary Forms

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Metals

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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612461
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	R1612461-MB1		

Inorganic Parameters

Analyte Name	Analysis Method	Result		Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	ND	U	mg/L	0.060	0.005	1	11/30/16 19:33	11/29/16	
Arsenic, Total	6010C	ND	U	mg/L	0.010	0.005	1	11/30/16 19:33	11/29/16	
Barium, Total	6010C	**0.012**	**J**	mg/L	0.020	0.002	1	11/30/16 19:33	11/29/16	
Beryllium, Total	6010C	**0.0002**	**J**	mg/L	0.0030	0.0002	1	11/30/16 19:33	11/29/16	
Cadmium, Total	6010C	**0.0006**	**J**	mg/L	0.0050	0.0002	1	11/30/16 19:33	11/29/16	
Chromium, Total	6010C	**0.002**	**J**	mg/L	0.010	0.0003	1	11/30/16 19:33	11/29/16	
Lead, Total	6010C	ND	U	mg/L	0.050	0.005	1	11/30/16 19:33	11/29/16	
Mercury, Total	7470A	ND	U	mg/L	0.00020	0.00004	1	11/30/16 10:48	11/29/16	
Nickel, Total	6010C	**0.003**	**J**	mg/L	0.040	0.002	1	11/30/16 19:33	11/29/16	
Selenium, Total	6010C	ND	U	mg/L	0.010	0.005	1	12/01/16 15:11	11/29/16	
Silver, Total	6010C	ND	U	mg/L	0.010	0.0006	1	11/30/16 19:33	11/29/16	
Thallium, Total	6010C	ND	U	mg/L	0.010	0.005	1	11/30/16 19:33	11/29/16	
Vanadium, Total	6010C	**0.003**	**J**	mg/L	0.050	0.0010	1	11/30/16 19:33	11/29/16	
Zinc, Total	6010C	ND	U	mg/L	0.020	0.007	1	12/06/16 10:39	12/05/16	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612461
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	Dry
Lab Code:	R1612461-MB2		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Antimony, Total	6010C	**0.7 J**	mg/Kg	6.0	0.4	1	12/02/16 16:24	12/01/16	
Arsenic, Total	6010C	ND U	mg/Kg	1.0	0.3	1	12/02/16 16:24	12/01/16	
Barium, Total	6010C	**0.3 J**	mg/Kg	2.0	0.2	1	12/02/16 16:24	12/01/16	
Beryllium, Total	6010C	ND U	mg/Kg	0.30	0.02	1	12/02/16 16:24	12/01/16	
Cadmium, Total	6010C	ND U	mg/Kg	0.50	0.04	1	12/02/16 16:24	12/01/16	
Chromium, Total	6010C	**0.2 J**	mg/Kg	1.0	0.2	1	12/02/16 16:24	12/01/16	
Lead, Total	6010C	ND U	mg/Kg	5.0	0.3	1	12/02/16 16:24	12/01/16	
Mercury, Total	7471B	ND U	mg/Kg	0.033	0.003	1	12/01/16 15:08	12/01/16	
Nickel, Total	6010C	ND U	mg/Kg	4.0	0.2	1	12/02/16 16:24	12/01/16	
Selenium, Total	6010C	ND U	mg/Kg	1.0	0.6	1	12/02/16 16:24	12/01/16	
Silver, Total	6010C	ND U	mg/Kg	1.0	0.5	1	12/02/16 16:24	12/01/16	
Thallium, Total	6010C	ND U	mg/Kg	1.0	0.6	1	12/02/16 16:24	12/01/16	
Vanadium, Total	6010C	ND U	mg/Kg	5.0	0.2	1	12/02/16 16:24	12/01/16	
Zinc, Total	6010C	**0.5 J**	mg/Kg	2.0	0.2	1	12/02/16 16:24	12/01/16	

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

Service Request:R1612461
Date Collected:11/18/16
Date Received:11/28/16
Date Analyzed:11/30/16 - 12/01/16

Matrix Spike Summary
Inorganic Parameters

Sample Name: 1611181121 400-SB-10
Lab Code: R1612461-001

Units:mg/L
Basis:NA

Matrix Spike
R1612461-001MS

Analyte Name	Method	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Silver, Total	6010C	ND U	0.051	0.050	102	75-125
Arsenic, Total	6010C	ND U	0.041	0.040	103	75-125
Barium, Total	6010C	0.036 B	2.21	2.00	108	75-125
Beryllium, Total	6010C	ND U	0.0529	0.0500	106	75-125
Cadmium, Total	6010C	ND U	0.0526	0.0500	105	75-125
Chromium, Total	6010C	0.0003 BJ	0.208	0.200	104	75-125
Mercury, Total	7470A	ND U	0.0010	0.00100	100	75-125
Nickel, Total	6010C	ND U	0.487	0.500	97	75-125
Lead, Total	6010C	ND U	0.522	0.500	104	75-125
Antimony, Total	6010C	ND U	0.522	0.500	104	75-125
Selenium, Total	6010C	ND U	0.942	1.01	93	75-125
Thallium, Total	6010C	ND U	2.02	2.00	101	75-125
Vanadium, Total	6010C	0.002 BJ	0.550	0.500	110	75-125
Zinc, Total	6010C	0.012 BJ	0.519	0.500	101	75-125

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.

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

Service Request:R1612461
Date Collected:11/18/16
Date Received:11/28/16
Date Analyzed:12/01/16 - 12/02/16

Matrix Spike Summary
Inorganic Parameters

Sample Name: 1611181130 400-SB-10
Lab Code: R1612461-003

Units:mg/Kg
Basis: Dry

Matrix Spike
R1612461-003MS

Analyte Name	Method	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Silver, Total	6010C	ND U	6.0	7.5	81	75-125
Arsenic, Total	6010C	5.4	11.2	6.0	99	75-125
Barium, Total	6010C	180	449	298	90	75-125
Beryllium, Total	6010C	0.53	7.42	7.45	92	75-125
Cadmium, Total	6010C	0.05 J	6.48	7.45	86	75-125
Chromium, Total	6010C	1.8	29.0	29.8	91	75-125
Mercury, Total	7471B	ND U	0.244	0.248	98	75-125
Nickel, Total	6010C	3.5 J	67.9	74.5	86	75-125
Lead, Total	6010C	7.5 J	73.8	74.5	89	75-125
Antimony, Total	6010C	1.0 J	62.1	74.5	82	75-125
Selenium, Total	6010C	2.1	136	151	89	75-125
Thallium, Total	6010C	ND U	233	298	78	75-125
Vanadium, Total	6010C	42.7	114	74.5	95	75-125
Zinc, Total	6010C	37.0	98.3	74.5	82	75-125

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

Service Request:R1612461
Date Collected:11/18/16
Date Received:11/28/16
Date Analyzed:11/30/16 - 12/06/16

Matrix Spike Summary
Inorganic Parameters

Sample Name: 1611181146 400-SB-12
Lab Code: R1612461-005

Units:mg/L
Basis:NA

Matrix Spike
R1612461-005MS

Analyte Name	Method	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Silver, Total	6010C	ND U	0.051	0.050	102	75-125
Arsenic, Total	6010C	ND U	0.043	0.040	109	75-125
Barium, Total	6010C	0.153	2.30	2.00	108	75-125
Beryllium, Total	6010C	0.0002 BJ	0.0530	0.0500	106	75-125
Cadmium, Total	6010C	ND U	0.0521	0.0500	104	75-125
Chromium, Total	6010C	0.004 BJ	0.208	0.200	102	75-125
Mercury, Total	7470A	ND U	0.00099	0.00100	99	75-125
Nickel, Total	6010C	ND U	0.461	0.500	92	75-125
Lead, Total	6010C	ND U	0.520	0.500	104	75-125
Antimony, Total	6010C	ND U	0.497	0.500	99	75-125
Selenium, Total	6010C	ND U	0.933	1.01	92	75-125
Thallium, Total	6010C	ND U	2.03	2.00	102	75-125
Vanadium, Total	6010C	0.016 BJ	0.561	0.500	109	75-125
Zinc, Total	6010C	0.025	0.490	0.500	93	75-125

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

Service Request:R1612461
Date Collected:11/18/16
Date Received:11/28/16
Date Analyzed:12/01/16 - 12/05/16

Matrix Spike Summary
Inorganic Parameters

Sample Name: 1611181155 400-SB-12
Lab Code: R1612461-007

Units:mg/Kg
Basis: Dry

Matrix Spike
R1612461-007MS

Analyte Name	Method	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Silver, Total	6010C	ND U	4.1	6.3	65 *	75-125
Arsenic, Total	6010C	0.8 J	5.7	5.0	97	75-125
Barium, Total	6010C	237	538	250	120	75-125
Beryllium, Total	6010C	0.59	6.16	6.26	89	75-125
Cadmium, Total	6010C	0.71	6.05	6.26	85	75-125
Chromium, Total	6010C	12.1	38.6	25.0	106	75-125
Mercury, Total	7471B	ND U	0.217	0.219	99	75-125
Nickel, Total	6010C	8.8	62.3	62.6	85	75-125
Lead, Total	6010C	4.3 J	58.5	62.6	86	75-125
Antimony, Total	6010C	ND U	49.0	62.6	78	75-125
Selenium, Total	6010C	ND U	111	126	88	75-125
Thallium, Total	6010C	ND U	234	250	93	75-125
Vanadium, Total	6010C	59.4	123	62.6	102	75-125
Zinc, Total	6010C	41.4	93.1	62.6	83	75-125

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QA/QC Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612461
Project	White Sands Test Facility/15EC007B	**Date Collected:**	11/18/16
Sample Matrix:	Water	**Date Received:**	11/28/16
		Date Analyzed:	11/30/16 - 12/01/16

Replicate Sample Summary
Inorganic Parameters

Sample Name:	1611181121 400-SB-10	**Units:**	mg/L
Lab Code:	R1612461-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample R1612461-001DUP Result	Average	RPD	RPD Limit
Antimony, Total	6010C	0.060	0.005	ND U	ND U	NC	NC	20
Arsenic, Total	6010C	0.010	0.005	ND U	ND U	NC	NC	20
Barium, Total	6010C	0.020	0.002	0.036 B	0.037	0.0367	4	20
Beryllium, Total	6010C	0.0030	0.0002	ND U	ND U	NC	NC	20
Cadmium, Total	6010C	0.0050	0.0002	ND U	ND U	NC	NC	20
Chromium, Total	6010C	0.010	0.0003	0.0003 BJ	0.0005 J	0.000400	50 *	20
Lead, Total	6010C	0.050	0.005	ND U	ND U	NC	NC	20
Mercury, Total	7470A	0.00020	0.00004	ND U	ND U	NC	NC	20
Nickel, Total	6010C	0.040	0.002	ND U	ND U	NC	NC	20
Selenium, Total	6010C	0.010	0.005	ND U	ND U	NC	NC	20
Silver, Total	6010C	0.010	0.0006	ND U	ND U	NC	NC	20
Thallium, Total	6010C	0.010	0.005	ND U	ND U	NC	NC	20
Vanadium, Total	6010C	0.050	0.00096	0.002 BJ	0.002 J	0.00215	14	20
Zinc, Total	6010C	0.020	0.007	0.012 BJ	0.011 J	0.0117	12	20

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QA/QC Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612461
Project	White Sands Test Facility/15EC007B	**Date Collected:**	11/18/16
Sample Matrix:	Soil	**Date Received:**	11/28/16
		Date Analyzed:	12/01/16 - 12/02/16

Replicate Sample Summary
Inorganic Parameters

Sample Name:	1611181130 400-SB-10	**Units:**	mg/Kg
Lab Code:	R1612461-003	**Basis:**	Dry

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample R1612461-003DUP Result	Average	RPD	RPD Limit
Antimony, Total	6010C	9.1	0.7	1.0 J	ND U	NC	NC	20
Arsenic, Total	6010C	1.5	0.4	5.4	5.0	5.18	7	20
Barium, Total	6010C	3.0	0.2	180	159	170	12	20
Beryllium, Total	6010C	0.46	0.03	0.53	0.53	0.534	<1	20
Cadmium, Total	6010C	0.76	0.05	0.05 J	ND U	NC	NC	20
Chromium, Total	6010C	1.5	0.2	1.8	2.0	1.92	11	20
Lead, Total	6010C	7.6	0.5	7.5 J	7.6 J	7.56	<1	20
Mercury, Total	7471B	0.051	0.005	ND U	ND U	NC	NC	35
Nickel, Total	6010C	6.1	0.2	3.5 J	3.5 J	3.50	<1	20
Selenium, Total	6010C	1.5	0.9	2.1	1.9	2.03	12	20
Silver, Total	6010C	1.5	0.7	ND U	ND U	NC	NC	20
Thallium, Total	6010C	1.5	0.8	ND U	ND U	NC	NC	20
Vanadium, Total	6010C	7.6	0.2	42.7	42.5	42.6	<1	20
Zinc, Total	6010C	3.0	0.3	37.0	32.6	34.8	13	20

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QA/QC Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612461
Project	White Sands Test Facility/15EC007B	**Date Collected:**	11/18/16
Sample Matrix:	Water	**Date Received:**	11/28/16
		Date Analyzed:	11/30/16 - 12/06/16

Replicate Sample Summary
Inorganic Parameters

Sample Name:	1611181146 400-SB-12	**Units:**	mg/L
Lab Code:	R1612461-005	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample R1612461-005DUP Result	Average	RPD	RPD Limit
Antimony, Total	6010C	0.060	0.005	ND U	ND U	NC	NC	20
Arsenic, Total	6010C	0.010	0.005	ND U	ND U	NC	NC	20
Barium, Total	6010C	0.020	0.002	0.153	0.147	0.150	4	20
Beryllium, Total	6010C	0.0030	0.0002	0.0002 BJ	0.0002 J	0.000200	<1	20
Cadmium, Total	6010C	0.0050	0.0002	ND U	ND U	NC	NC	20
Chromium, Total	6010C	0.010	0.0003	0.004 BJ	0.003 J	0.00360	11	20
Lead, Total	6010C	0.050	0.005	ND U	ND U	NC	NC	20
Mercury, Total	7470A	0.00020	0.00004	ND U	ND U	NC	NC	20
Nickel, Total	6010C	0.040	0.002	ND U	ND U	NC	NC	20
Selenium, Total	6010C	0.010	0.005	ND U	ND U	NC	NC	20
Silver, Total	6010C	0.010	0.0006	ND U	ND U	NC	NC	20
Thallium, Total	6010C	0.010	0.005	ND U	ND U	NC	NC	20
Vanadium, Total	6010C	0.050	0.00096	0.016 BJ	0.015 J	0.0151	7	20
Zinc, Total	6010C	0.020	0.007	0.025	0.026	0.0252	4	20

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

Service Request: R1612461
Date Collected: 11/18/16
Date Received: 11/28/16
Date Analyzed: 12/01/16 - 12/05/16

Replicate Sample Summary
Inorganic Parameters

Sample Name: 1611181155 400-SB-12
Lab Code: R1612461-007

Units: mg/Kg
Basis: Dry

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample R1612461-007DUP Result	Average	RPD	RPD Limit
Antimony, Total	6010C	7.5	0.5	ND U	ND U	NC	NC	20
Arsenic, Total	6010C	1.3	0.3	0.8 J	0.8 J	0.811	6	20
Barium, Total	6010C	2.5	0.2	237	262	250	10	20
Beryllium, Total	6010C	0.38	0.03	0.59	0.50	0.545	18	20
Cadmium, Total	6010C	0.63	0.04	0.71	0.68	0.695	5	20
Chromium, Total	6010C	1.3	0.2	12.1	13.5	12.8	11	20
Lead, Total	6010C	6.3	0.4	4.3 J	4.4 J	4.36	<1	20
Mercury, Total	7471B	0.041	0.004	ND U	ND U	NC	NC	35
Nickel, Total	6010C	5.0	0.2	8.8	8.6	8.73	3	20
Selenium, Total	6010C	1.3	0.8	ND U	1.0 J	NC	NC	20
Silver, Total	6010C	1.3	0.6	ND U	ND U	NC	NC	20
Thallium, Total	6010C	1.3	0.7	ND U	ND U	NC	NC	20
Vanadium, Total	6010C	6.3	0.2	59.4	62.8	61.1	6	20
Zinc, Total	6010C	2.5	0.2	41.4	39.8	40.6	4	20

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

Service Request: R1612461
Date Analyzed: 12/01/16 - 12/02/16

Lab Control Sample Summary
Inorganic Parameters

Units:mg/Kg
Basis: Dry

Lab Control Sample
R1612461-LCS1

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Antimony, Total	6010C	41.9	50.0	84	80-120
Arsenic, Total	6010C	3.76	4.0	94	80-120
Barium, Total	6010C	197	200	98	80-120
Beryllium, Total	6010C	4.63	5.00	93	80-120
Cadmium, Total	6010C	4.58	5.00	92	80-120
Chromium, Total	6010C	19.1	20.0	96	80-120
Lead, Total	6010C	47.3	50.0	95	80-120
Mercury, Total	7471B	0.162	0.167	97	80-120
Nickel, Total	6010C	47.7	50.0	95	80-120
Selenium, Total	6010C	86.5	101	86	80-120
Silver, Total	6010C	4.43	5.0	89	80-120
Thallium, Total	6010C	174	200	87	80-120
Vanadium, Total	6010C	47.8	50.0	96	80-120
Zinc, Total	6010C	46.5	50.0	93	80-120

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

Service Request: R1612461
Date Analyzed: 11/30/16 - 12/06/16

Lab Control Sample Summary
Inorganic Parameters

Units:mg/L
Basis:NA

Lab Control Sample
R1612461-LCS2

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Antimony, Total	6010C	0.496	0.500	99	80-120
Arsenic, Total	6010C	0.0385	0.040	96	80-120
Barium, Total	6010C	2.15	2.00	107	80-120
Beryllium, Total	6010C	0.0514	0.0500	103	80-120
Cadmium, Total	6010C	0.0529	0.0500	106	80-120
Chromium, Total	6010C	0.207	0.200	104	80-120
Lead, Total	6010C	0.531	0.500	106	80-120
Mercury, Total	7470A	0.00099	0.00100	99	80-120
Nickel, Total	6010C	0.524	0.500	105	80-120
Selenium, Total	6010C	0.907	1.01	90	80-120
Silver, Total	6010C	0.0492	0.050	98	80-120
Thallium, Total	6010C	1.87	2.00	94	80-120
Vanadium, Total	6010C	0.528	0.500	106	80-120
Zinc, Total	6010C	0.471	0.500	94	80-120

General Chemistry

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ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612461
Project	White Sands Test Facility/15EC007B	**Date Collected:**	11/18/16
Sample Matrix:	Soil	**Date Received:**	11/28/16
		Date Analyzed:	11/28/16

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	1611181130 400-SB-10	**Units:**	Percent
Lab Code:	R1612461-003	**Basis:**	As Received

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample R1612461-003DUP Result	Average	RPD	RPD Limit
Total Solids	ALS SOP	-	-	63.9	65.2	64.6	2	20

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ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612461
Project	White Sands Test Facility/15EC007B	**Date Collected:**	11/18/16
Sample Matrix:	Soil	**Date Received:**	11/28/16
		Date Analyzed:	11/28/16

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	1611181155 400-SB-12	**Units:**	Percent
Lab Code:	R1612461-007	**Basis:**	As Received

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample R1612461-007DUP Result	Average	RPD	RPD Limit
Total Solids	ALS SOP	-	-	76.1	75.4	75.8	<1	20

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December 13, 2016 Service Request No:R1612673

Mr. Tom Hall
NASA/WSTF/Navarro
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 December 02, 2016
For your reference, these analyses have been assigned our service request number **R1612673.**

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:R1612673
Date Received:12/2/16

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

Eight soil and water samples were received for analysis at ALS Environmental on 12/02/2016. 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, 12/7/16: 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, 12/7/16: 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, 12/8/16: 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.

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.

Approved by _____ Date 12/13/2016

SAMPLE DETECTION SUMMARY

CLIENT ID: 1611301340 400-SB-10	Lab ID: R1612673-001					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Acetone	55		1.3	5.0	ug/L	8260C

CLIENT ID: 1611301341 400-SB-10	Lab ID: R1612673-002					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Acetone	50		1.3	5.0	ug/L	8260C

CLIENT ID: 1611301343 400-SB-10	Lab ID: R1612673-003					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	73.6				Percent	ALS SOP
Acetone	6.9		3.8	6.7	ug/Kg	8260C
Carbon Disulfide	5.8	J	1.7	6.7	ug/Kg	8260C
Dichloromethane	1.3	BJ	0.77	6.7	ug/Kg	8260C
Tetrachloroethene (PCE)	1.8	J	1.2	6.7	ug/Kg	8260C

CLIENT ID: 1611301344 400-SB-10	Lab ID: R1612673-004					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	73.9				Percent	ALS SOP
Acetone	9.5		3.9	6.8	ug/Kg	8260C
Carbon Disulfide	6.9		1.7	6.8	ug/Kg	8260C
Dichloromethane	1.5	BJ	0.78	6.8	ug/Kg	8260C
Tetrachloroethene (PCE)	2.4	J	1.2	6.8	ug/Kg	8260C

CLIENT ID: 1611301400 400-SB-12	Lab ID: R1612673-005					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Acetone	26		1.3	5.0	ug/L	8260C

CLIENT ID: 1611301401 400-SB-12	Lab ID: R1612673-006					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Acetone	25		1.3	5.0	ug/L	8260C

CLIENT ID: 1611301403 400-SB-12	Lab ID: R1612673-007					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	74.7				Percent	ALS SOP
Acetone	160		3.8	6.6	ug/Kg	8260C
Dichloromethane	1.4	BJ	0.76	6.6	ug/Kg	8260C
Tetrachloroethene (PCE)	1.4	J	1.2	6.6	ug/Kg	8260C

CLIENT ID: 1611301404 400-SB-12	Lab ID: R1612673-008					
Analyte	**Results**	**Flag**	**MDL**	**PQL**	**Units**	**Method**
Total Solids	74.0				Percent	ALS SOP
Acetone	130		3.8	6.8	ug/Kg	8260C
Dichloromethane	1.4	BJ	0.78	6.8	ug/Kg	8260C

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:**R1612673
Project: White Sands Test Facility/15EC007B

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
R1612673-001	1611301340 400-SB-10	11/30/2016	
R1612673-002	1611301341 400-SB-10	11/30/2016	
R1612673-003	1611301343 400-SB-10	11/30/2016	
R1612673-004	1611301344 400-SB-10	11/30/2016	
R1612673-005	1611301400 400-SB-12	11/30/2016	
R1612673-006	1611301401 400-SB-12	11/30/2016	
R1612673-007	1611301403 400-SB-12	11/30/2016	
R1612673-008	1611301404 400-SB-12	11/30/2016	

Date: November 30, 2016

Laboratory PO #15EC007B

Return Address for Analytical Reports

NASA WSTF Environmental Department
12,600 NASA Road
Las Cruces, NM 88012

Attn: ☒ Tom Hall ☒
Other_____
(575) 524-5453

Analytical Requirements

Special Instructions
Please return coolers and reusable packaging materials as possible.

Return Address:

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

Sample No.	Sample Location	# of Containers	Sample Type: Aqueous (A); Slurry (S)	SW-846 Method 8260B 40 ml Amber Glass Vial, Ice	SW-846 Method 8260B 4 oz Glass Jar, Ice				Comments
161130 1340	400-SB-10	1	A	X					
161130 1341	400-SB-10	1	A	X					
161130 1342	400-SB-10	1	A	X					Matrix Spike for 161130 1340
161130 1343	400-SB-10	1	S		X				
161130 1344	400-SB-10	1	S		X				
161130 1345	400-SB-10	1	S		X				Matrix Spike for 161130 1343
161130 1400	400-SB-12	1	A	X					
161130 1401	400-SB-12	1	A	X					
161130 1402	400-SB-12	1	A	X					Matrix Spike for 161130 1400
161130 1403	400-SB-12	1	S		X				
161130 1404	400-SB-12	1	S		X				
161130 1405	400-SB-12	1	S		X				Matrix Spike for 161130 1403

Relinquished By:	Date/Time:	Accepted By:	Date/Time:
	11-30-16 (1440)		12-2-16 09:15

R1612673 5
NASA/WSTF/Navarro
White Sands Test Facility

R1612673 5
NASA/WSTF/Navarro
White Sands Test Facility

Cooler Receipt and Preservation Check Form

Project/Client NASA Folder Number

Cooler received on 12-2-16 by: ME

COURIER: ALS UPS (FEDEX) VELOCITY CLIENT ME 12-2-16

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: 12-2-16 Time: 09:26 ID: IR#7 (IR#8) From: Temp Blank (Sample Bottle)

Observed Temp (°C)	0.1	0.4					
Correction Factor (°C)	0	+2.0					
Corrected Temp (°C)	0.1	2.4					
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 ME on 12-2-16 at 09:31
5035 samples placed in storage location: _____ by _____ on _____ at _____

Cooler Breakdown: Date: 12-2-16 Time: 1510 by: T.S

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
5.	Air Samples: Cassettes / Tubes Intact	Canisters Pressurized	Tedlar® Bags Inflated

(NA) (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: 042516-IBALS

Other Comments:

*1611301342 400-SB-10: One of 3 vials broken (Frozen)
ME, 12-2-16

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

PC Secondary Review: JMS 12/7/16

*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:**	R1612673
Project:	White Sands Test Facility/15EC007B		

Sample Name:	1611301340 400-SB-10	**Date Collected:**	11/30/16
Lab Code:	R1612673-001	**Date Received:**	12/2/16
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER

Sample Name:	1611301341 400-SB-10	**Date Collected:**	11/30/16
Lab Code:	R1612673-002	**Date Received:**	12/2/16
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER

Sample Name:	1611301343 400-SB-10	**Date Collected:**	11/30/16
Lab Code:	R1612673-003	**Date Received:**	12/2/16
Sample Matrix:	Soil		

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

Sample Name:	1611301344 400-SB-10	**Date Collected:**	11/30/16
Lab Code:	R1612673-004	**Date Received:**	12/2/16
Sample Matrix:	Soil		

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

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B		

Sample Name:	1611301400 400-SB-12	**Date Collected:**	11/30/16
Lab Code:	R1612673-005	**Date Received:**	12/2/16
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER

Sample Name:	1611301401 400-SB-12	**Date Collected:**	11/30/16
Lab Code:	R1612673-006	**Date Received:**	12/2/16
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER

Sample Name:	1611301403 400-SB-12	**Date Collected:**	11/30/16
Lab Code:	R1612673-007	**Date Received:**	12/2/16
Sample Matrix:	Soil		

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

Sample Name:	1611301404 400-SB-12	**Date Collected:**	11/30/16
Lab Code:	R1612673-008	**Date Received:**	12/2/16
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
8260C		FNAEGLER
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:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Soil	**Date Received:**	12/02/16 09:15
Sample Name:	1611301343 400-SB-10	**Units:**	ug/Kg
Lab Code:	R1612673-003	**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	6.7	1.2	.99	12/08/16 12:57	
1,1,1-Trichloroethane (TCA)	ND	U	6.7	0.99	.99	12/08/16 12:57	
1,1,2,2-Tetrachloroethane	ND	U	6.7	1.1	.99	12/08/16 12:57	
1,1,2-Trichloroethane	ND	U	6.7	0.99	.99	12/08/16 12:57	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	U	6.7	1.7	.99	12/08/16 12:57	
1,1-Dichloroethene (1,1-DCE)	ND	U	6.7	1.8	.99	12/08/16 12:57	
1,2,3-Trichloropropane	ND	U	6.7	1.8	.99	12/08/16 12:57	
1,2-Dibromo-3-chloropropane (DBCP)	ND	U	6.7	2.6	.99	12/08/16 12:57	
1,2-Dibromoethane	ND	U	6.7	1.7	.99	12/08/16 12:57	
1,2-Dichlorobenzene	ND	U	6.7	0.83	.99	12/08/16 12:57	
1,2-Dichloroethane	ND	U	6.7	0.83	.99	12/08/16 12:57	
1,2-Dichloropropane	ND	U	6.7	1.4	.99	12/08/16 12:57	
1,3-Dichlorobenzene	ND	U	6.7	0.85	.99	12/08/16 12:57	
1,4-Dioxane	ND	U	130	26	.99	12/08/16 12:57	
2-Butanone (MEK)	ND	U	6.7	3.1	.99	12/08/16 12:57	
2-Chloro-1,3-butadiene	ND	U	6.7	2.1	.99	12/08/16 12:57	
2-Chloroethyl Vinyl Ether	ND	U	6.7	2.4	.99	12/08/16 12:57	
Isobutyl Alcohol	ND	U	130	31	.99	12/08/16 12:57	
Allyl Chloride	ND	U	6.7	2.3	.99	12/08/16 12:57	
4-Methyl-2-pentanone	ND	U	6.7	1.4	.99	12/08/16 12:57	
Acetone	**6.9**		6.7	3.8	.99	12/08/16 12:57	
Acetonitrile	ND	U	34	23	.99	12/08/16 12:57	
Acrolein	ND	U	34	4.8	.99	12/08/16 12:57	
Acrylonitrile	ND	U	34	8.7	.99	12/08/16 12:57	
Benzene	ND	U	6.7	0.40	.99	12/08/16 12:57	
Bromodichloromethane	ND	U	6.7	0.83	.99	12/08/16 12:57	
Bromoform	ND	U	6.7	1.3	.99	12/08/16 12:57	
Bromomethane	ND	U	6.7	1.9	.99	12/08/16 12:57	
Carbon Disulfide	**5.8**	**J**	6.7	1.7	.99	12/08/16 12:57	
Carbon Tetrachloride	ND	U	6.7	1.3	.99	12/08/16 12:57	
Chlorobenzene	ND	U	6.7	0.40	.99	12/08/16 12:57	
Chloroethane	ND	U	6.7	3.9	.99	12/08/16 12:57	
Chloroform	ND	U	6.7	1.7	.99	12/08/16 12:57	
Chloromethane	ND	U	6.7	0.54	.99	12/08/16 12:57	
Dibromochloromethane	ND	U	6.7	0.99	.99	12/08/16 12:57	
Dibromomethane	ND	U	6.7	0.85	.99	12/08/16 12:57	
Dichlorodifluoromethane (CFC 12)	ND	U	6.7	2.6	.99	12/08/16 12:57	
Dichloromethane	**1.3**	**BJ**	6.7	0.77	.99	12/08/16 12:57	
Ethyl Methacrylate	ND	U	6.7	1.1	.99	12/08/16 12:57	
Ethylbenzene	ND	U	6.7	0.31	.99	12/08/16 12:57	
Iodomethane	ND	U	13	1.6	.99	12/08/16 12:57	
Methacrylonitrile	ND	U	6.7	2.1	.99	12/08/16 12:57	
Methyl Methacrylate	ND	U	6.7	0.99	.99	12/08/16 12:57	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Soil	**Date Received:**	12/02/16 09:15
Sample Name:	1611301343 400-SB-10	**Units:**	ug/Kg
Lab Code:	R1612673-003	**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	6.7	0.69	.99	12/08/16 12:57	
Propionitrile	ND	U	34	8.8	.99	12/08/16 12:57	
Tetrachloroethene (PCE)	**1.8**	**J**	6.7	1.2	.99	12/08/16 12:57	
Toluene	ND	U	6.7	1.4	.99	12/08/16 12:57	
Trichloroethene (TCE)	ND	U	6.7	1.4	.99	12/08/16 12:57	
Trichlorofluoromethane (CFC 11)	ND	U	6.7	0.89	.99	12/08/16 12:57	
Vinyl Chloride	ND	U	6.7	2.5	.99	12/08/16 12:57	
cis-1,3-Dichloropropene	ND	U	6.7	1.3	.99	12/08/16 12:57	
m,p-Xylenes	ND	U	13	1.5	.99	12/08/16 12:57	
o-Xylene	ND	U	6.7	0.65	.99	12/08/16 12:57	
trans-1,2-Dichloroethene	ND	U	6.7	1.2	.99	12/08/16 12:57	
trans-1,3-Dichloropropene	ND	U	6.7	0.27	.99	12/08/16 12:57	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	84	51 - 136	12/08/16 12:57	
Dibromofluoromethane	98	63 - 138	12/08/16 12:57	
Toluene-d8	96	66 - 138	12/08/16 12:57	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
000104-76-7	1-Hexanol, 2-ethyl-	13.57	80	JN

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Soil	**Date Received:**	12/02/16 09:15
Sample Name:	1611301344 400-SB-10	**Units:**	ug/Kg
Lab Code:	R1612673-004	**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	6.8	1.2	1	12/08/16 13:22	
1,1,1-Trichloroethane (TCA)	ND	U	6.8	0.99	1	12/08/16 13:22	
1,1,2,2-Tetrachloroethane	ND	U	6.8	1.1	1	12/08/16 13:22	
1,1,2-Trichloroethane	ND	U	6.8	0.99	1	12/08/16 13:22	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	U	6.8	1.7	1	12/08/16 13:22	
1,1-Dichloroethene (1,1-DCE)	ND	U	6.8	1.8	1	12/08/16 13:22	
1,2,3-Trichloropropane	ND	U	6.8	1.8	1	12/08/16 13:22	
1,2-Dibromo-3-chloropropane (DBCP)	ND	U	6.8	2.6	1	12/08/16 13:22	
1,2-Dibromoethane	ND	U	6.8	1.7	1	12/08/16 13:22	
1,2-Dichlorobenzene	ND	U	6.8	0.83	1	12/08/16 13:22	
1,2-Dichloroethane	ND	U	6.8	0.83	1	12/08/16 13:22	
1,2-Dichloropropane	ND	U	6.8	1.4	1	12/08/16 13:22	
1,3-Dichlorobenzene	ND	U	6.8	0.86	1	12/08/16 13:22	
1,4-Dioxane	ND	U	140	26	1	12/08/16 13:22	
2-Butanone (MEK)	ND	U	6.8	3.1	1	12/08/16 13:22	
2-Chloro-1,3-butadiene	ND	U	6.8	2.1	1	12/08/16 13:22	
2-Chloroethyl Vinyl Ether	ND	U	6.8	2.4	1	12/08/16 13:22	
Isobutyl Alcohol	ND	U	140	31	1	12/08/16 13:22	
Allyl Chloride	ND	U	6.8	2.3	1	12/08/16 13:22	
4-Methyl-2-pentanone	ND	U	6.8	1.4	1	12/08/16 13:22	
Acetone	**9.5**		6.8	3.9	1	12/08/16 13:22	
Acetonitrile	ND	U	34	23	1	12/08/16 13:22	
Acrolein	ND	U	34	4.8	1	12/08/16 13:22	
Acrylonitrile	ND	U	34	8.8	1	12/08/16 13:22	
Benzene	ND	U	6.8	0.40	1	12/08/16 13:22	
Bromodichloromethane	ND	U	6.8	0.83	1	12/08/16 13:22	
Bromoform	ND	U	6.8	1.3	1	12/08/16 13:22	
Bromomethane	ND	U	6.8	1.9	1	12/08/16 13:22	
Carbon Disulfide	**6.9**		6.8	1.7	1	12/08/16 13:22	
Carbon Tetrachloride	ND	U	6.8	1.3	1	12/08/16 13:22	
Chlorobenzene	ND	U	6.8	0.40	1	12/08/16 13:22	
Chloroethane	ND	U	6.8	3.9	1	12/08/16 13:22	
Chloroform	ND	U	6.8	1.8	1	12/08/16 13:22	
Chloromethane	ND	U	6.8	0.55	1	12/08/16 13:22	
Dibromochloromethane	ND	U	6.8	0.99	1	12/08/16 13:22	
Dibromomethane	ND	U	6.8	0.86	1	12/08/16 13:22	
Dichlorodifluoromethane (CFC 12)	ND	U	6.8	2.6	1	12/08/16 13:22	
Dichloromethane	**1.5**	**BJ**	6.8	0.78	1	12/08/16 13:22	
Ethyl Methacrylate	ND	U	6.8	1.1	1	12/08/16 13:22	
Ethylbenzene	ND	U	6.8	0.32	1	12/08/16 13:22	
Iodomethane	ND	U	14	1.6	1	12/08/16 13:22	
Methacrylonitrile	ND	U	6.8	2.1	1	12/08/16 13:22	
Methyl Methacrylate	ND	U	6.8	0.99	1	12/08/16 13:22	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Soil	**Date Received:**	12/02/16 09:15
Sample Name:	1611301344 400-SB-10	**Units:**	ug/Kg
Lab Code:	R1612673-004	**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	6.8	0.70	1	12/08/16 13:22	
Propionitrile	ND	U	34	8.8	1	12/08/16 13:22	
Tetrachloroethene (PCE)	**2.4**	**J**	6.8	1.2	1	12/08/16 13:22	
Toluene	ND	U	6.8	1.4	1	12/08/16 13:22	
Trichloroethene (TCE)	ND	U	6.8	1.4	1	12/08/16 13:22	
Trichlorofluoromethane (CFC 11)	ND	U	6.8	0.90	1	12/08/16 13:22	
Vinyl Chloride	ND	U	6.8	2.5	1	12/08/16 13:22	
cis-1,3-Dichloropropene	ND	U	6.8	1.3	1	12/08/16 13:22	
m,p-Xylenes	ND	U	14	1.5	1	12/08/16 13:22	
o-Xylene	ND	U	6.8	0.65	1	12/08/16 13:22	
trans-1,2-Dichloroethene	ND	U	6.8	1.2	1	12/08/16 13:22	
trans-1,3-Dichloropropene	ND	U	6.8	0.28	1	12/08/16 13:22	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	90	51 - 136	12/08/16 13:22	
Dibromofluoromethane	92	63 - 138	12/08/16 13:22	
Toluene-d8	97	66 - 138	12/08/16 13:22	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
000104-76-7	1-Hexanol, 2-ethyl-	13.57	110	JN

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Soil	**Date Received:**	12/02/16 09:15
Sample Name:	1611301403 400-SB-12	**Units:**	ug/Kg
Lab Code:	R1612673-007	**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	6.6	1.1	.99	12/08/16 13:46	
1,1,1-Trichloroethane (TCA)	ND	U	6.6	0.97	.99	12/08/16 13:46	
1,1,2,2-Tetrachloroethane	ND	U	6.6	1.1	.99	12/08/16 13:46	
1,1,2-Trichloroethane	ND	U	6.6	0.97	.99	12/08/16 13:46	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	U	6.6	1.7	.99	12/08/16 13:46	
1,1-Dichloroethene (1,1-DCE)	ND	U	6.6	1.7	.99	12/08/16 13:46	
1,2,3-Trichloropropane	ND	U	6.6	1.8	.99	12/08/16 13:46	
1,2-Dibromo-3-chloropropane (DBCP)	ND	U	6.6	2.5	.99	12/08/16 13:46	
1,2-Dibromoethane	ND	U	6.6	1.7	.99	12/08/16 13:46	
1,2-Dichlorobenzene	ND	U	6.6	0.81	.99	12/08/16 13:46	
1,2-Dichloroethane	ND	U	6.6	0.81	.99	12/08/16 13:46	
1,2-Dichloropropane	ND	U	6.6	1.3	.99	12/08/16 13:46	
1,3-Dichlorobenzene	ND	U	6.6	0.84	.99	12/08/16 13:46	
1,4-Dioxane	ND	U	130	26	.99	12/08/16 13:46	
2-Butanone (MEK)	ND	U	6.6	3.1	.99	12/08/16 13:46	
2-Chloro-1,3-butadiene	ND	U	6.6	2.1	.99	12/08/16 13:46	
2-Chloroethyl Vinyl Ether	ND	U	6.6	2.3	.99	12/08/16 13:46	
Isobutyl Alcohol	ND	U	130	31	.99	12/08/16 13:46	
Allyl Chloride	ND	U	6.6	2.3	.99	12/08/16 13:46	
4-Methyl-2-pentanone	ND	U	6.6	1.3	.99	12/08/16 13:46	
Acetone	**160**		6.6	3.8	.99	12/08/16 13:46	
Acetonitrile	ND	U	33	23	.99	12/08/16 13:46	
Acrolein	ND	U	33	4.7	.99	12/08/16 13:46	
Acrylonitrile	ND	U	33	8.6	.99	12/08/16 13:46	
Benzene	ND	U	6.6	0.39	.99	12/08/16 13:46	
Bromodichloromethane	ND	U	6.6	0.81	.99	12/08/16 13:46	
Bromoform	ND	U	6.6	1.3	.99	12/08/16 13:46	
Bromomethane	ND	U	6.6	1.9	.99	12/08/16 13:46	
Carbon Disulfide	ND	U	6.6	1.7	.99	12/08/16 13:46	
Carbon Tetrachloride	ND	U	6.6	1.3	.99	12/08/16 13:46	
Chlorobenzene	ND	U	6.6	0.39	.99	12/08/16 13:46	
Chloroethane	ND	U	6.6	3.9	.99	12/08/16 13:46	
Chloroform	ND	U	6.6	1.7	.99	12/08/16 13:46	
Chloromethane	ND	U	6.6	0.54	.99	12/08/16 13:46	
Dibromochloromethane	ND	U	6.6	0.97	.99	12/08/16 13:46	
Dibromomethane	ND	U	6.6	0.84	.99	12/08/16 13:46	
Dichlorodifluoromethane (CFC 12)	ND	U	6.6	2.6	.99	12/08/16 13:46	
Dichloromethane	**1.4**	**BJ**	6.6	0.76	.99	12/08/16 13:46	
Ethyl Methacrylate	ND	U	6.6	1.0	.99	12/08/16 13:46	
Ethylbenzene	ND	U	6.6	0.31	.99	12/08/16 13:46	
Iodomethane	ND	U	13	1.5	.99	12/08/16 13:46	
Methacrylonitrile	ND	U	6.6	2.1	.99	12/08/16 13:46	
Methyl Methacrylate	ND	U	6.6	0.97	.99	12/08/16 13:46	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Soil	**Date Received:**	12/02/16 09:15
Sample Name:	1611301403 400-SB-12	**Units:**	ug/Kg
Lab Code:	R1612673-007	**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	6.6	0.68	.99	12/08/16 13:46	
Propionitrile	ND	U	33	8.7	.99	12/08/16 13:46	
Tetrachloroethene (PCE)	**1.4**	**J**	6.6	1.2	.99	12/08/16 13:46	
Toluene	ND	U	6.6	1.4	.99	12/08/16 13:46	
Trichloroethene (TCE)	ND	U	6.6	1.4	.99	12/08/16 13:46	
Trichlorofluoromethane (CFC 11)	ND	U	6.6	0.88	.99	12/08/16 13:46	
Vinyl Chloride	ND	U	6.6	2.5	.99	12/08/16 13:46	
cis-1,3-Dichloropropene	ND	U	6.6	1.2	.99	12/08/16 13:46	
m,p-Xylenes	ND	U	13	1.5	.99	12/08/16 13:46	
o-Xylene	ND	U	6.6	0.64	.99	12/08/16 13:46	
trans-1,2-Dichloroethene	ND	U	6.6	1.2	.99	12/08/16 13:46	
trans-1,3-Dichloropropene	ND	U	6.6	0.27	.99	12/08/16 13:46	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	88	51 - 136	12/08/16 13:46	
Dibromofluoromethane	97	63 - 138	12/08/16 13:46	
Toluene-d8	96	66 - 138	12/08/16 13:46	

Tentatively Identified Compounds

CAS#	Compound Identification	RT	Result ug/Kg	Q
000104-76-7	1-Hexanol, 2-ethyl-	13.57	21	JN

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Soil	**Date Received:**	12/02/16 09:15
Sample Name:	1611301404 400-SB-12	**Units:**	ug/Kg
Lab Code:	R1612673-008	**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	6.8	1.2	1	12/08/16 14:10	
1,1,1-Trichloroethane (TCA)	ND	U	6.8	0.99	1	12/08/16 14:10	
1,1,2,2-Tetrachloroethane	ND	U	6.8	1.1	1	12/08/16 14:10	
1,1,2-Trichloroethane	ND	U	6.8	0.99	1	12/08/16 14:10	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	U	6.8	1.7	1	12/08/16 14:10	
1,1-Dichloroethene (1,1-DCE)	ND	U	6.8	1.8	1	12/08/16 14:10	
1,2,3-Trichloropropane	ND	U	6.8	1.8	1	12/08/16 14:10	
1,2-Dibromo-3-chloropropane (DBCP)	ND	U	6.8	2.6	1	12/08/16 14:10	
1,2-Dibromoethane	ND	U	6.8	1.7	1	12/08/16 14:10	
1,2-Dichlorobenzene	ND	U	6.8	0.83	1	12/08/16 14:10	
1,2-Dichloroethane	ND	U	6.8	0.83	1	12/08/16 14:10	
1,2-Dichloropropane	ND	U	6.8	1.4	1	12/08/16 14:10	
1,3-Dichlorobenzene	ND	U	6.8	0.86	1	12/08/16 14:10	
1,4-Dioxane	ND	U	140	26	1	12/08/16 14:10	
2-Butanone (MEK)	ND	U	6.8	3.1	1	12/08/16 14:10	
2-Chloro-1,3-butadiene	ND	U	6.8	2.1	1	12/08/16 14:10	
2-Chloroethyl Vinyl Ether	ND	U	6.8	2.4	1	12/08/16 14:10	
Isobutyl Alcohol	ND	U	140	31	1	12/08/16 14:10	
Allyl Chloride	ND	U	6.8	2.3	1	12/08/16 14:10	
4-Methyl-2-pentanone	ND	U	6.8	1.4	1	12/08/16 14:10	
Acetone	**130**		6.8	3.8	1	12/08/16 14:10	
Acetonitrile	ND	U	34	23	1	12/08/16 14:10	
Acrolein	ND	U	34	4.8	1	12/08/16 14:10	
Acrylonitrile	ND	U	34	8.8	1	12/08/16 14:10	
Benzene	ND	U	6.8	0.40	1	12/08/16 14:10	
Bromodichloromethane	ND	U	6.8	0.83	1	12/08/16 14:10	
Bromoform	ND	U	6.8	1.3	1	12/08/16 14:10	
Bromomethane	ND	U	6.8	1.9	1	12/08/16 14:10	
Carbon Disulfide	ND	U	6.8	1.7	1	12/08/16 14:10	
Carbon Tetrachloride	ND	U	6.8	1.3	1	12/08/16 14:10	
Chlorobenzene	ND	U	6.8	0.40	1	12/08/16 14:10	
Chloroethane	ND	U	6.8	3.9	1	12/08/16 14:10	
Chloroform	ND	U	6.8	1.8	1	12/08/16 14:10	
Chloromethane	ND	U	6.8	0.55	1	12/08/16 14:10	
Dibromochloromethane	ND	U	6.8	0.99	1	12/08/16 14:10	
Dibromomethane	ND	U	6.8	0.86	1	12/08/16 14:10	
Dichlorodifluoromethane (CFC 12)	ND	U	6.8	2.6	1	12/08/16 14:10	
Dichloromethane	**1.4**	**BJ**	6.8	0.78	1	12/08/16 14:10	
Ethyl Methacrylate	ND	U	6.8	1.1	1	12/08/16 14:10	
Ethylbenzene	ND	U	6.8	0.32	1	12/08/16 14:10	
Iodomethane	ND	U	14	1.6	1	12/08/16 14:10	
Methacrylonitrile	ND	U	6.8	2.1	1	12/08/16 14:10	
Methyl Methacrylate	ND	U	6.8	0.99	1	12/08/16 14:10	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Soil	**Date Received:**	12/02/16 09:15
Sample Name:	1611301404 400-SB-12	**Units:**	ug/Kg
Lab Code:	R1612673-008	**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	6.8	0.69	1	12/08/16 14:10	
Propionitrile	ND U	34	8.8	1	12/08/16 14:10	
Tetrachloroethene (PCE)	ND U	6.8	1.2	1	12/08/16 14:10	
Toluene	ND U	6.8	1.4	1	12/08/16 14:10	
Trichloroethene (TCE)	ND U	6.8	1.4	1	12/08/16 14:10	
Trichlorofluoromethane (CFC 11)	ND U	6.8	0.90	1	12/08/16 14:10	
Vinyl Chloride	ND U	6.8	2.5	1	12/08/16 14:10	
cis-1,3-Dichloropropene	ND U	6.8	1.3	1	12/08/16 14:10	
m,p-Xylenes	ND U	14	1.5	1	12/08/16 14:10	
o-Xylene	ND U	6.8	0.65	1	12/08/16 14:10	
trans-1,2-Dichloroethene	ND U	6.8	1.2	1	12/08/16 14:10	
trans-1,3-Dichloropropene	ND U	6.8	0.28	1	12/08/16 14:10	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	88	51 - 136	12/08/16 14:10	
Dibromofluoromethane	96	63 - 138	12/08/16 14:10	
Toluene-d8	97	66 - 138	12/08/16 14:10	

Tentatively Identified Compounds

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

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Water	**Date Received:**	12/02/16 09:15
Sample Name:	1611301340 400-SB-10	**Units:**	ug/L
Lab Code:	R1612673-001	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	1.0	0.22	1	12/07/16 14:55	
1,1,1-Trichloroethane (TCA)	ND U	1.0	0.36	1	12/07/16 14:55	
1,1,2,2-Tetrachloroethane	ND U	1.0	0.25	1	12/07/16 14:55	
1,1,2-Trichloroethane	ND U	1.0	0.34	1	12/07/16 14:55	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	1.0	0.31	1	12/07/16 14:55	
1,1-Dichloroethene (1,1-DCE)	ND U	1.0	0.57	1	12/07/16 14:55	
1,2,3-Trichloropropane	ND U	1.0	0.70	1	12/07/16 14:55	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	2.0	0.74	1	12/07/16 14:55	
1,2-Dibromoethane	ND U	1.0	0.24	1	12/07/16 14:55	
1,2-Dichlorobenzene	ND U	1.0	0.21	1	12/07/16 14:55	
1,2-Dichloroethane	ND U	1.0	0.36	1	12/07/16 14:55	
1,2-Dichloropropane	ND U	1.0	0.20	1	12/07/16 14:55	
1,3-Dichlorobenzene	ND U	1.0	0.20	1	12/07/16 14:55	
1,4-Dioxane	ND U	40	20	1	12/07/16 14:55	
2-Butanone (MEK)	ND U	5.0	0.81	1	12/07/16 14:55	
2-Chloro-1,3-butadiene	ND U	1.0	0.27	1	12/07/16 14:55	
2-Chloroethyl Vinyl Ether	ND U	1.0	0.44	1	12/07/16 14:55	
Isobutyl Alcohol	ND U	40	11	1	12/07/16 14:55	
Allyl Chloride	ND U	1.0	0.26	1	12/07/16 14:55	
4-Methyl-2-pentanone	ND U	5.0	0.67	1	12/07/16 14:55	
Acetone	**55**	5.0	1.3	1	12/07/16 14:55	
Acetonitrile	ND U	10	4.7	1	12/07/16 14:55	
Acrolein	ND U	10	3.0	1	12/07/16 14:55	
Acrylonitrile	ND U	10	1.4	1	12/07/16 14:55	
Benzene	ND U	1.0	0.20	1	12/07/16 14:55	
Bromodichloromethane	ND U	1.0	0.32	1	12/07/16 14:55	
Bromoform	ND U	1.0	0.42	1	12/07/16 14:55	
Bromomethane	ND U	1.0	0.29	1	12/07/16 14:55	
Carbon Disulfide	ND U	1.0	0.22	1	12/07/16 14:55	
Carbon Tetrachloride	ND U	1.0	0.45	1	12/07/16 14:55	
Chlorobenzene	ND U	1.0	0.29	1	12/07/16 14:55	
Chloroethane	ND U	1.0	0.24	1	12/07/16 14:55	
Chloroform	ND U	1.0	0.25	1	12/07/16 14:55	
Chloromethane	ND U	1.0	0.21	1	12/07/16 14:55	
Dibromochloromethane	ND U	1.0	0.31	1	12/07/16 14:55	
Dibromomethane	ND U	1.0	0.32	1	12/07/16 14:55	
Dichlorodifluoromethane (CFC 12)	ND U	1.0	0.46	1	12/07/16 14:55	
Dichloromethane	ND U	1.0	0.60	1	12/07/16 14:55	
Ethyl Methacrylate	ND U	2.0	0.44	1	12/07/16 14:55	
Ethylbenzene	ND U	1.0	0.20	1	12/07/16 14:55	
Iodomethane	ND U	2.0	0.98	1	12/07/16 14:55	
Methacrylonitrile	ND U	2.0	0.50	1	12/07/16 14:55	
Methyl Methacrylate	ND U	2.0	0.62	1	12/07/16 14:55	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Water	**Date Received:**	12/02/16 09:15
Sample Name:	1611301340 400-SB-10	**Units:**	ug/L
Lab Code:	R1612673-001	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	1.0	0.20	1	12/07/16 14:55	
Propionitrile	ND U	5.0	3.1	1	12/07/16 14:55	
Tetrachloroethene (PCE)	ND U	1.0	0.30	1	12/07/16 14:55	
Toluene	ND U	1.0	0.20	1	12/07/16 14:55	
Trichloroethene (TCE)	ND U	1.0	0.22	1	12/07/16 14:55	
Trichlorofluoromethane (CFC 11)	ND U	1.0	0.20	1	12/07/16 14:55	
Vinyl Chloride	ND U	1.0	0.32	1	12/07/16 14:55	
cis-1,3-Dichloropropene	ND U	1.0	0.24	1	12/07/16 14:55	
m,p-Xylenes	ND U	2.0	0.33	1	12/07/16 14:55	
o-Xylene	ND U	1.0	0.20	1	12/07/16 14:55	
trans-1,2-Dichloroethene	ND U	1.0	0.33	1	12/07/16 14:55	
trans-1,3-Dichloropropene	ND U	1.0	0.20	1	12/07/16 14:55	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	96	85 - 122	12/07/16 14:55	
Dibromofluoromethane	93	89 - 119	12/07/16 14:55	
Toluene-d8	101	87 - 121	12/07/16 14:55	

Tentatively Identified Compounds

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

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Water	**Date Received:**	12/02/16 09:15
Sample Name:	1611301341 400-SB-10	**Units:**	ug/L
Lab Code:	R1612673-002	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	1.0	0.22	1	12/07/16 15:20	
1,1,1-Trichloroethane (TCA)	ND U	1.0	0.36	1	12/07/16 15:20	
1,1,2,2-Tetrachloroethane	ND U	1.0	0.25	1	12/07/16 15:20	
1,1,2-Trichloroethane	ND U	1.0	0.34	1	12/07/16 15:20	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	1.0	0.31	1	12/07/16 15:20	
1,1-Dichloroethene (1,1-DCE)	ND U	1.0	0.57	1	12/07/16 15:20	
1,2,3-Trichloropropane	ND U	1.0	0.70	1	12/07/16 15:20	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	2.0	0.74	1	12/07/16 15:20	
1,2-Dibromoethane	ND U	1.0	0.24	1	12/07/16 15:20	
1,2-Dichlorobenzene	ND U	1.0	0.21	1	12/07/16 15:20	
1,2-Dichloroethane	ND U	1.0	0.36	1	12/07/16 15:20	
1,2-Dichloropropane	ND U	1.0	0.20	1	12/07/16 15:20	
1,3-Dichlorobenzene	ND U	1.0	0.20	1	12/07/16 15:20	
1,4-Dioxane	ND U	40	20	1	12/07/16 15:20	
2-Butanone (MEK)	ND U	5.0	0.81	1	12/07/16 15:20	
2-Chloro-1,3-butadiene	ND U	1.0	0.27	1	12/07/16 15:20	
2-Chloroethyl Vinyl Ether	ND U	1.0	0.44	1	12/07/16 15:20	
Isobutyl Alcohol	ND U	40	11	1	12/07/16 15:20	
Allyl Chloride	ND U	1.0	0.26	1	12/07/16 15:20	
4-Methyl-2-pentanone	ND U	5.0	0.67	1	12/07/16 15:20	
Acetone	**50**	5.0	1.3	1	12/07/16 15:20	
Acetonitrile	ND U	10	4.7	1	12/07/16 15:20	
Acrolein	ND U	10	3.0	1	12/07/16 15:20	
Acrylonitrile	ND U	10	1.4	1	12/07/16 15:20	
Benzene	ND U	1.0	0.20	1	12/07/16 15:20	
Bromodichloromethane	ND U	1.0	0.32	1	12/07/16 15:20	
Bromoform	ND U	1.0	0.42	1	12/07/16 15:20	
Bromomethane	ND U	1.0	0.29	1	12/07/16 15:20	
Carbon Disulfide	ND U	1.0	0.22	1	12/07/16 15:20	
Carbon Tetrachloride	ND U	1.0	0.45	1	12/07/16 15:20	
Chlorobenzene	ND U	1.0	0.29	1	12/07/16 15:20	
Chloroethane	ND U	1.0	0.24	1	12/07/16 15:20	
Chloroform	ND U	1.0	0.25	1	12/07/16 15:20	
Chloromethane	ND U	1.0	0.21	1	12/07/16 15:20	
Dibromochloromethane	ND U	1.0	0.31	1	12/07/16 15:20	
Dibromomethane	ND U	1.0	0.32	1	12/07/16 15:20	
Dichlorodifluoromethane (CFC 12)	ND U	1.0	0.46	1	12/07/16 15:20	
Dichloromethane	ND U	1.0	0.60	1	12/07/16 15:20	
Ethyl Methacrylate	ND U	2.0	0.44	1	12/07/16 15:20	
Ethylbenzene	ND U	1.0	0.20	1	12/07/16 15:20	
Iodomethane	ND U	2.0	0.98	1	12/07/16 15:20	
Methacrylonitrile	ND U	2.0	0.50	1	12/07/16 15:20	
Methyl Methacrylate	ND U	2.0	0.62	1	12/07/16 15:20	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Water	**Date Received:**	12/02/16 09:15
Sample Name:	1611301341 400-SB-10	**Units:**	ug/L
Lab Code:	R1612673-002	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND	U	1.0	0.20	1	12/07/16 15:20	
Propionitrile	ND	U	5.0	3.1	1	12/07/16 15:20	
Tetrachloroethene (PCE)	ND	U	1.0	0.30	1	12/07/16 15:20	
Toluene	ND	U	1.0	0.20	1	12/07/16 15:20	
Trichloroethene (TCE)	ND	U	1.0	0.22	1	12/07/16 15:20	
Trichlorofluoromethane (CFC 11)	ND	U	1.0	0.20	1	12/07/16 15:20	
Vinyl Chloride	ND	U	1.0	0.32	1	12/07/16 15:20	
cis-1,3-Dichloropropene	ND	U	1.0	0.24	1	12/07/16 15:20	
m,p-Xylenes	ND	U	2.0	0.33	1	12/07/16 15:20	
o-Xylene	ND	U	1.0	0.20	1	12/07/16 15:20	
trans-1,2-Dichloroethene	ND	U	1.0	0.33	1	12/07/16 15:20	
trans-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/07/16 15:20	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	96	85 - 122	12/07/16 15:20	
Dibromofluoromethane	95	89 - 119	12/07/16 15:20	
Toluene-d8	104	87 - 121	12/07/16 15:20	

Tentatively Identified Compounds

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

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Water	**Date Received:**	12/02/16 09:15
Sample Name:	1611301400 400-SB-12	**Units:**	ug/L
Lab Code:	R1612673-005	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	1.0	0.22	1	12/07/16 15:44	
1,1,1-Trichloroethane (TCA)	ND U	1.0	0.36	1	12/07/16 15:44	
1,1,2,2-Tetrachloroethane	ND U	1.0	0.25	1	12/07/16 15:44	
1,1,2-Trichloroethane	ND U	1.0	0.34	1	12/07/16 15:44	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	1.0	0.31	1	12/07/16 15:44	
1,1-Dichloroethene (1,1-DCE)	ND U	1.0	0.57	1	12/07/16 15:44	
1,2,3-Trichloropropane	ND U	1.0	0.70	1	12/07/16 15:44	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	2.0	0.74	1	12/07/16 15:44	
1,2-Dibromoethane	ND U	1.0	0.24	1	12/07/16 15:44	
1,2-Dichlorobenzene	ND U	1.0	0.21	1	12/07/16 15:44	
1,2-Dichloroethane	ND U	1.0	0.36	1	12/07/16 15:44	
1,2-Dichloropropane	ND U	1.0	0.20	1	12/07/16 15:44	
1,3-Dichlorobenzene	ND U	1.0	0.20	1	12/07/16 15:44	
1,4-Dioxane	ND U	40	20	1	12/07/16 15:44	
2-Butanone (MEK)	ND U	5.0	0.81	1	12/07/16 15:44	
2-Chloro-1,3-butadiene	ND U	1.0	0.27	1	12/07/16 15:44	
2-Chloroethyl Vinyl Ether	ND U	1.0	0.44	1	12/07/16 15:44	
Isobutyl Alcohol	ND U	40	11	1	12/07/16 15:44	
Allyl Chloride	ND U	1.0	0.26	1	12/07/16 15:44	
4-Methyl-2-pentanone	ND U	5.0	0.67	1	12/07/16 15:44	
Acetone	**26**	5.0	1.3	1	12/07/16 15:44	
Acetonitrile	ND U	10	4.7	1	12/07/16 15:44	
Acrolein	ND U	10	3.0	1	12/07/16 15:44	
Acrylonitrile	ND U	10	1.4	1	12/07/16 15:44	
Benzene	ND U	1.0	0.20	1	12/07/16 15:44	
Bromodichloromethane	ND U	1.0	0.32	1	12/07/16 15:44	
Bromoform	ND U	1.0	0.42	1	12/07/16 15:44	
Bromomethane	ND U	1.0	0.29	1	12/07/16 15:44	
Carbon Disulfide	ND U	1.0	0.22	1	12/07/16 15:44	
Carbon Tetrachloride	ND U	1.0	0.45	1	12/07/16 15:44	
Chlorobenzene	ND U	1.0	0.29	1	12/07/16 15:44	
Chloroethane	ND U	1.0	0.24	1	12/07/16 15:44	
Chloroform	ND U	1.0	0.25	1	12/07/16 15:44	
Chloromethane	ND U	1.0	0.21	1	12/07/16 15:44	
Dibromochloromethane	ND U	1.0	0.31	1	12/07/16 15:44	
Dibromomethane	ND U	1.0	0.32	1	12/07/16 15:44	
Dichlorodifluoromethane (CFC 12)	ND U	1.0	0.46	1	12/07/16 15:44	
Dichloromethane	ND U	1.0	0.60	1	12/07/16 15:44	
Ethyl Methacrylate	ND U	2.0	0.44	1	12/07/16 15:44	
Ethylbenzene	ND U	1.0	0.20	1	12/07/16 15:44	
Iodomethane	ND U	2.0	0.98	1	12/07/16 15:44	
Methacrylonitrile	ND U	2.0	0.50	1	12/07/16 15:44	
Methyl Methacrylate	ND U	2.0	0.62	1	12/07/16 15:44	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Water	**Date Received:**	12/02/16 09:15
Sample Name:	1611301400 400-SB-12	**Units:**	ug/L
Lab Code:	R1612673-005	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND	U	1.0	0.20	1	12/07/16 15:44	
Propionitrile	ND	U	5.0	3.1	1	12/07/16 15:44	
Tetrachloroethene (PCE)	ND	U	1.0	0.30	1	12/07/16 15:44	
Toluene	ND	U	1.0	0.20	1	12/07/16 15:44	
Trichloroethene (TCE)	ND	U	1.0	0.22	1	12/07/16 15:44	
Trichlorofluoromethane (CFC 11)	ND	U	1.0	0.20	1	12/07/16 15:44	
Vinyl Chloride	ND	U	1.0	0.32	1	12/07/16 15:44	
cis-1,3-Dichloropropene	ND	U	1.0	0.24	1	12/07/16 15:44	
m,p-Xylenes	ND	U	2.0	0.33	1	12/07/16 15:44	
o-Xylene	ND	U	1.0	0.20	1	12/07/16 15:44	
trans-1,2-Dichloroethene	ND	U	1.0	0.33	1	12/07/16 15:44	
trans-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/07/16 15:44	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	100	85 - 122	12/07/16 15:44	
Dibromofluoromethane	94	89 - 119	12/07/16 15:44	
Toluene-d8	105	87 - 121	12/07/16 15:44	

Tentatively Identified Compounds

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

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Water	**Date Received:**	12/02/16 09:15
Sample Name:	1611301401 400-SB-12	**Units:**	ug/L
Lab Code:	R1612673-006	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	1.0	0.22	1	12/07/16 16:08	
1,1,1-Trichloroethane (TCA)	ND U	1.0	0.36	1	12/07/16 16:08	
1,1,2,2-Tetrachloroethane	ND U	1.0	0.25	1	12/07/16 16:08	
1,1,2-Trichloroethane	ND U	1.0	0.34	1	12/07/16 16:08	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	1.0	0.31	1	12/07/16 16:08	
1,1-Dichloroethene (1,1-DCE)	ND U	1.0	0.57	1	12/07/16 16:08	
1,2,3-Trichloropropane	ND U	1.0	0.70	1	12/07/16 16:08	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	2.0	0.74	1	12/07/16 16:08	
1,2-Dibromoethane	ND U	1.0	0.24	1	12/07/16 16:08	
1,2-Dichlorobenzene	ND U	1.0	0.21	1	12/07/16 16:08	
1,2-Dichloroethane	ND U	1.0	0.36	1	12/07/16 16:08	
1,2-Dichloropropane	ND U	1.0	0.20	1	12/07/16 16:08	
1,3-Dichlorobenzene	ND U	1.0	0.20	1	12/07/16 16:08	
1,4-Dioxane	ND U	40	20	1	12/07/16 16:08	
2-Butanone (MEK)	ND U	5.0	0.81	1	12/07/16 16:08	
2-Chloro-1,3-butadiene	ND U	1.0	0.27	1	12/07/16 16:08	
2-Chloroethyl Vinyl Ether	ND U	1.0	0.44	1	12/07/16 16:08	
Isobutyl Alcohol	ND U	40	11	1	12/07/16 16:08	
Allyl Chloride	ND U	1.0	0.26	1	12/07/16 16:08	
4-Methyl-2-pentanone	ND U	5.0	0.67	1	12/07/16 16:08	
Acetone	**25**	5.0	1.3	1	12/07/16 16:08	
Acetonitrile	ND U	10	4.7	1	12/07/16 16:08	
Acrolein	ND U	10	3.0	1	12/07/16 16:08	
Acrylonitrile	ND U	10	1.4	1	12/07/16 16:08	
Benzene	ND U	1.0	0.20	1	12/07/16 16:08	
Bromodichloromethane	ND U	1.0	0.32	1	12/07/16 16:08	
Bromoform	ND U	1.0	0.42	1	12/07/16 16:08	
Bromomethane	ND U	1.0	0.29	1	12/07/16 16:08	
Carbon Disulfide	ND U	1.0	0.22	1	12/07/16 16:08	
Carbon Tetrachloride	ND U	1.0	0.45	1	12/07/16 16:08	
Chlorobenzene	ND U	1.0	0.29	1	12/07/16 16:08	
Chloroethane	ND U	1.0	0.24	1	12/07/16 16:08	
Chloroform	ND U	1.0	0.25	1	12/07/16 16:08	
Chloromethane	ND U	1.0	0.21	1	12/07/16 16:08	
Dibromochloromethane	ND U	1.0	0.31	1	12/07/16 16:08	
Dibromomethane	ND U	1.0	0.32	1	12/07/16 16:08	
Dichlorodifluoromethane (CFC 12)	ND U	1.0	0.46	1	12/07/16 16:08	
Dichloromethane	ND U	1.0	0.60	1	12/07/16 16:08	
Ethyl Methacrylate	ND U	2.0	0.44	1	12/07/16 16:08	
Ethylbenzene	ND U	1.0	0.20	1	12/07/16 16:08	
Iodomethane	ND U	2.0	0.98	1	12/07/16 16:08	
Methacrylonitrile	ND U	2.0	0.50	1	12/07/16 16:08	
Methyl Methacrylate	ND U	2.0	0.62	1	12/07/16 16:08	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Water	**Date Received:**	12/02/16 09:15
Sample Name:	1611301401 400-SB-12	**Units:**	ug/L
Lab Code:	R1612673-006	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND U	1.0	0.20	1	12/07/16 16:08	
Propionitrile	ND U	5.0	3.1	1	12/07/16 16:08	
Tetrachloroethene (PCE)	ND U	1.0	0.30	1	12/07/16 16:08	
Toluene	ND U	1.0	0.20	1	12/07/16 16:08	
Trichloroethene (TCE)	ND U	1.0	0.22	1	12/07/16 16:08	
Trichlorofluoromethane (CFC 11)	ND U	1.0	0.20	1	12/07/16 16:08	
Vinyl Chloride	ND U	1.0	0.32	1	12/07/16 16:08	
cis-1,3-Dichloropropene	ND U	1.0	0.24	1	12/07/16 16:08	
m,p-Xylenes	ND U	2.0	0.33	1	12/07/16 16:08	
o-Xylene	ND U	1.0	0.20	1	12/07/16 16:08	
trans-1,2-Dichloroethene	ND U	1.0	0.33	1	12/07/16 16:08	
trans-1,3-Dichloropropene	ND U	1.0	0.20	1	12/07/16 16:08	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	98	85 - 122	12/07/16 16:08	
Dibromofluoromethane	96	89 - 119	12/07/16 16:08	
Toluene-d8	107	87 - 121	12/07/16 16:08	

Tentatively Identified Compounds

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

General Chemistry

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:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Soil	**Date Received:**	12/02/16 09:15
Sample Name:	1611301343 400-SB-10	**Basis:**	As Received
Lab Code:	R1612673-003		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**73.6**	Percent	-	1	12/05/16 12:05	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Soil	**Date Received:**	12/02/16 09:15
Sample Name:	1611301344 400-SB-10	**Basis:**	As Received
Lab Code:	R1612673-004		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**73.9**	Percent	-	1	12/05/16 12:05	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Soil	**Date Received:**	12/02/16 09:15
Sample Name:	1611301403 400-SB-12	**Basis:**	As Received
Lab Code:	R1612673-007		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**74.7**	Percent	-	1	12/05/16 12:05	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Soil	**Date Received:**	12/02/16 09:15
Sample Name:	1611301404 400-SB-12	**Basis:**	As Received
Lab Code:	R1612673-008		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**74.0**	Percent	-	1	12/05/16 12:05	

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:** R1612673
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
1611301343 400-SB-10	R1612673-003	84	98	96
1611301344 400-SB-10	R1612673-004	90	92	97
1611301403 400-SB-12	R1612673-007	88	97	96
1611301404 400-SB-12	R1612673-008	88	96	97
Method Blank	RQ1615064-01	95	97	98
Lab Control Sample	RQ1615064-02	96	99	96
1611301343 400-SB-10 MS	RQ1615064-05	90	97	97
1611301343 400-SB-10 DMS	RQ1615064-06	88	98	98
1611301403 400-SB-12 MS	RQ1615064-07	92	101	98
1611301403 400-SB-12 DMS	RQ1615064-08	92	99	98

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Soil	**Date Received:**	12/02/16
		Date Analyzed:	12/8/16
		Date Extracted:	NA

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

Sample Name:	1611301343 400-SB-10	**Units:**	ug/Kg
Lab Code:	R1612673-003	**Basis:**	Dry
Analysis Method:	8260C		
Prep Method:	EPA 5030C		

		Matrix Spike RQ1615064-05			Duplicate Matrix Spike RQ1615064-06					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
1,1,1,2-Tetrachloroethane	ND U	57.4	67.9	84	55.1	67.3	82	52-133	2	30
1,1,1-Trichloroethane (TCA)	ND U	53.9	67.9	79	51.8	67.3	77	51-132	3	30
1,1,2,2-Tetrachloroethane	ND U	64.3	67.9	95	62.7	67.3	93	53-134	2	30
1,1,2-Trichloroethane	ND U	60.1	67.9	89	57.7	67.3	86	62-126	3	30
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	44.2	67.9	65	42.8	67.3	64	45-136	2	30
1,1-Dichloroethene (1,1-DCE)	ND U	52.6	67.9	77	51.3	67.3	76	61-139	1	30
1,2,3-Trichloropropane	ND U	65.0	67.9	96	63.6	67.3	95	22-167	1	30
1,2-Dibromo-3-chloropropane (DBCP)	ND U	58.3	67.9	86	56.2	67.3	84	27-163	2	30
1,2-Dibromoethane	ND U	62.7	67.9	92	61.4	67.3	91	52-137	1	30
1,2-Dichlorobenzene	ND U	58.0	67.9	85	55.2	67.3	82	22-156	4	30
1,2-Dichloroethane	ND U	61.9	67.9	91	60.2	67.3	89	59-125	2	30
1,2-Dichloropropane	ND U	61.3	67.9	90	59.1	67.3	88	67-126	2	30
1,3-Dichlorobenzene	ND U	57.6	67.9	85	55.1	67.3	82	29-146	4	30
1,4-Dioxane	ND U	1390	1360	102	1320	1350	98	50-148	4	30
2-Butanone (MEK)	ND U	54.7	67.9	80	51.5	67.3	77	43-134	4	30
2-Chloro-1,3-butadiene	ND U	62.4	67.9	92	61.6	67.3	92	45-134	<1	30
2-Chloroethyl Vinyl Ether	ND U	65.9	67.9	97	64.9	67.3	97	37-150	<1	30
Isobutyl Alcohol	ND U	1110	1360	82	1060	1350	79	39-146	4	30
Allyl Chloride	ND U	58.4	67.9	86	54.1	67.3	80	34-135	7	30
4-Methyl-2-pentanone	ND U	58.9	67.9	87	57.4	67.3	85	47-145	2	30
Acetone	6.9	66.3	67.9	88	63.9	67.3	85	11-183	3	30
Acetonitrile	ND U	310	340	91	228	336	68	28-146	29	30
Acrolein	ND U	83.8	136	62	68.9	135	51	10-172	19	30
Acrylonitrile	ND U	275	340	81	268	336	80	46-139	1	30
Benzene	ND U	60.3	67.9	89	58.4	67.3	87	63-126	2	30
Bromodichloromethane	ND U	57.6	67.9	85	54.5	67.3	81	47-141	5	30
Bromoform	ND U	56.3	67.9	83	52.4	67.3	78	26-157	6	30
Bromomethane	ND U	70.2	67.9	103	60.8	67.3	90	10-137	13	30
Carbon Disulfide	5.8 J	69.6	67.9	94	67.8	67.3	92	35-135	2	30
Carbon Tetrachloride	ND U	49.8	67.9	73	46.4	67.3	69	46-137	6	30
Chlorobenzene	ND U	59.9	67.9	88	57.2	67.3	85	51-132	3	30
Chloroethane	ND U	58.9	67.9	87	56.0	67.3	83	45-132	5	30
Chloroform	ND U	60.7	67.9	89	58.2	67.3	87	61-124	2	30
Chloromethane	ND U	57.2	67.9	84	52.1	67.3	77	50-136	9	30
Dibromochloromethane	ND U	58.6	67.9	86	55.6	67.3	83	40-146	4	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:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Soil	**Date Received:**	12/02/16
		Date Analyzed:	12/8/16
		Date Extracted:	NA

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

Sample Name:	1611301343 400-SB-10	**Units:**	ug/Kg
Lab Code:	R1612673-003	**Basis:**	Dry
Analysis Method:	8260C		
Prep Method:	EPA 5030C		

		Matrix Spike RQ1615064-05			Duplicate Matrix Spike RQ1615064-06					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Dibromomethane	ND U	62.4	67.9	92	61.0	67.3	91	61-122	1	30
Dichlorodifluoromethane (CFC 12)	ND U	47.9	67.9	70	47.0	67.3	70	44-138	<1	30
Dichloromethane	1.3 BJ	58.4	67.9	84	56.5	67.3	82	64-120	2	30
Ethyl Methacrylate	ND U	61.0	67.9	90	58.6	67.3	87	17-166	3	30
Ethylbenzene	ND U	54.4	67.9	80	51.3	67.3	76	44-131	5	30
Iodomethane	ND U	54.6	67.9	80	64.3	67.3	96	10-160	18	30
Methacrylonitrile	ND U	56.4	67.9	83	53.8	67.3	80	44-149	4	30
Methyl Methacrylate	ND U	60.8	67.9	90	57.7	67.3	86	41-162	5	30
Naphthalene	ND U	42.0	67.9	62	38.9	67.3	58	10-187	7	30
Propionitrile	ND U	268	340	79	263	336	78	46-144	1	30
Tetrachloroethene (PCE)	1.8 J	50.8	67.9	72	48.0	67.3	69	45-141	4	30
Toluene	ND U	58.4	67.9	86	55.4	67.3	82	50-140	5	30
Trichloroethene (TCE)	ND U	57.9	67.9	85	55.7	67.3	83	54-136	2	30
Trichlorofluoromethane (CFC 11)	ND U	52.6	67.9	77	51.2	67.3	76	47-129	1	30
Vinyl Chloride	ND U	54.3	67.9	80	50.2	67.3	75	53-128	6	30
cis-1,3-Dichloropropene	ND U	57.3	67.9	84	54.1	67.3	80	31-150	5	30
m,p-Xylenes	ND U	113	136	83	106	135	79	45-141	5	30
o-Xylene	ND U	57.4	67.9	84	54.4	67.3	81	46-139	4	30
trans-1,2-Dichloroethene	ND U	56.9	67.9	84	54.6	67.3	81	52-128	4	30
trans-1,3-Dichloropropene	ND U	56.8	67.9	84	53.9	67.3	80	23-160	5	30

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Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Soil	**Date Received:**	12/02/16
		Date Analyzed:	12/8/16
		Date Extracted:	NA

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

Sample Name:	1611301403 400-SB-12	**Units:**	ug/Kg
Lab Code:	R1612673-007	**Basis:**	Dry
Analysis Method:	8260C		
Prep Method:	EPA 5030C		

		Matrix Spike			Duplicate Matrix Spike					
		RQ1615064-07			RQ1615064-08					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
1,1,1,2-Tetrachloroethane	ND U	64.4	66.9	96	62.8	66.9	94	52-133	2	30
1,1,1-Trichloroethane (TCA)	ND U	67.7	66.9	101	65.5	66.9	98	51-132	3	30
1,1,2,2-Tetrachloroethane	ND U	64.9	66.9	97	63.4	66.9	95	53-134	2	30
1,1,2-Trichloroethane	ND U	66.1	66.9	99	64.3	66.9	96	62-126	3	30
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	61.8	66.9	92	60.5	66.9	90	45-136	2	30
1,1-Dichloroethene (1,1-DCE)	ND U	67.2	66.9	100	66.3	66.9	99	61-139	1	30
1,2,3-Trichloropropane	ND U	68.6	66.9	102	67.7	66.9	101	22-167	<1	30
1,2-Dibromo-3-chloropropane (DBCP)	ND U	64.7	66.9	97	62.0	66.9	93	27-163	4	30
1,2-Dibromoethane	ND U	68.9	66.9	103	67.5	66.9	101	52-137	2	30
1,2-Dichlorobenzene	ND U	67.5	66.9	101	65.3	66.9	98	22-156	3	30
1,2-Dichloroethane	ND U	68.4	66.9	102	66.6	66.9	99	59-125	3	30
1,2-Dichloropropane	ND U	67.7	66.9	101	65.8	66.9	98	67-126	3	30
1,3-Dichlorobenzene	ND U	67.3	66.9	101	64.9	66.9	97	29-146	4	30
1,4-Dioxane	ND U	1650	1340	123	1520	1340	114	50-148	8	30
2-Butanone (MEK)	ND U	60.1	66.9	90	57.3	66.9	86	43-134	5	30
2-Chloro-1,3-butadiene	ND U	69.1	66.9	103	67.1	66.9	100	45-134	3	30
2-Chloroethyl Vinyl Ether	ND U	75.0	66.9	112	70.8	66.9	106	37-150	6	30
Isobutyl Alcohol	ND U	1430	1340	107	1240	1340	93	39-146	14	30
Allyl Chloride	ND U	72.0	66.9	108	69.9	66.9	104	34-135	4	30
4-Methyl-2-pentanone	ND U	65.3	66.9	98	62.8	66.9	94	47-145	4	30
Acetone	160	196	66.9	53	208	66.9	72	11-183	30	30
Acetonitrile	ND U	393	335	117	295	335	88	28-146	28	30
Acrolein	ND U	80.7	134	60	53.9	134	40	10-172	40*	30
Acrylonitrile	ND U	315	335	94	305	335	91	46-139	3	30
Benzene	ND U	69.2	66.9	103	67.2	66.9	100	63-126	3	30
Bromodichloromethane	ND U	64.5	66.9	96	63.0	66.9	94	47-141	2	30
Bromoform	ND U	64.6	66.9	97	64.2	66.9	96	26-157	1	30
Bromomethane	ND U	71.3	66.9	107	69.2	66.9	103	10-137	4	30
Carbon Disulfide	ND U	68.4	66.9	102	65.6	66.9	98	35-135	4	30
Carbon Tetrachloride	ND U	64.1	66.9	96	62.9	66.9	94	46-137	2	30
Chlorobenzene	ND U	67.3	66.9	101	66.5	66.9	99	51-132	2	30
Chloroethane	ND U	67.3	66.9	101	68.7	66.9	103	45-132	2	30
Chloroform	ND U	68.1	66.9	102	66.6	66.9	99	61-124	3	30
Chloromethane	ND U	66.5	66.9	99	64.0	66.9	96	50-136	3	30
Dibromochloromethane	ND U	65.7	66.9	98	65.1	66.9	97	40-146	1	30

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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.

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Soil	**Date Received:**	12/02/16
		Date Analyzed:	12/8/16
		Date Extracted:	NA

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

Sample Name:	1611301403 400-SB-12	**Units:**	ug/Kg
Lab Code:	R1612673-007	**Basis:**	Dry
Analysis Method:	8260C		
Prep Method:	EPA 5030C		

		Matrix Spike			Duplicate Matrix Spike					
		RQ1615064-07			RQ1615064-08					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Dibromomethane	ND U	69.7	66.9	104	66.0	66.9	99	61-122	5	30
Dichlorodifluoromethane (CFC 12)	ND U	65.4	66.9	98	63.1	66.9	94	44-138	4	30
Dichloromethane	1.4 BJ	65.7	66.9	96	63.4	66.9	93	64-120	3	30
Ethyl Methacrylate	ND U	68.1	66.9	102	66.7	66.9	100	17-166	2	30
Ethylbenzene	ND U	65.1	66.9	97	62.9	66.9	94	44-131	3	30
Iodomethane	ND U	78.2	66.9	117	76.0	66.9	114	10-160	3	30
Methacrylonitrile	ND U	62.4	66.9	93	61.6	66.9	92	44-149	1	30
Methyl Methacrylate	ND U	66.5	66.9	99	64.4	66.9	96	41-162	3	30
Naphthalene	ND U	54.4	66.9	81	51.6	66.9	77	10-187	5	30
Propionitrile	ND U	330	335	99	306	335	91	46-144	8	30
Tetrachloroethene (PCE)	1.4 J	63.0	66.9	92	63.7	66.9	93	45-141	1	30
Toluene	ND U	67.2	66.9	100	65.4	66.9	98	50-140	2	30
Trichloroethene (TCE)	ND U	71.1	66.9	106	70.1	66.9	105	54-136	<1	30
Trichlorofluoromethane (CFC 11)	ND U	70.6	66.9	105	69.3	66.9	104	47-129	<1	30
Vinyl Chloride	ND U	72.2	66.9	108	68.7	66.9	103	53-128	5	30
cis-1,3-Dichloropropene	ND U	65.0	66.9	97	62.9	66.9	94	31-150	3	30
m,p-Xylenes	ND U	134	134	100	132	134	98	45-141	2	30
o-Xylene	ND U	66.8	66.9	100	65.8	66.9	98	46-139	2	30
trans-1,2-Dichloroethene	ND U	67.5	66.9	101	66.0	66.9	99	52-128	2	30
trans-1,3-Dichloropropene	ND U	63.9	66.9	95	62.5	66.9	93	23-160	2	30

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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/Kg
Lab Code:	RQ1615064-01	**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	12/08/16 12:21	
1,1,1-Trichloroethane (TCA)	ND	U	5.0	0.73	1	12/08/16 12:21	
1,1,2,2-Tetrachloroethane	ND	U	5.0	0.81	1	12/08/16 12:21	
1,1,2-Trichloroethane	ND	U	5.0	0.73	1	12/08/16 12:21	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	U	5.0	1.3	1	12/08/16 12:21	
1,1-Dichloroethene (1,1-DCE)	ND	U	5.0	1.3	1	12/08/16 12:21	
1,2,3-Trichloropropane	ND	U	5.0	1.4	1	12/08/16 12:21	
1,2-Dibromo-3-chloropropane (DBCP)	ND	U	5.0	1.9	1	12/08/16 12:21	
1,2-Dibromoethane	ND	U	5.0	1.3	1	12/08/16 12:21	
1,2-Dichlorobenzene	ND	U	5.0	0.61	1	12/08/16 12:21	
1,2-Dichloroethane	ND	U	5.0	0.61	1	12/08/16 12:21	
1,2-Dichloropropane	ND	U	5.0	0.97	1	12/08/16 12:21	
1,3-Dichlorobenzene	ND	U	5.0	0.63	1	12/08/16 12:21	
1,4-Dioxane	ND	U	100	20	1	12/08/16 12:21	
2-Butanone (MEK)	ND	U	5.0	2.3	1	12/08/16 12:21	
2-Chloro-1,3-butadiene	ND	U	5.0	1.6	1	12/08/16 12:21	
2-Chloroethyl Vinyl Ether	ND	U	5.0	1.8	1	12/08/16 12:21	
Isobutyl Alcohol	ND	U	100	23	1	12/08/16 12:21	
Allyl Chloride	ND	U	5.0	1.7	1	12/08/16 12:21	
4-Methyl-2-pentanone	ND	U	5.0	0.98	1	12/08/16 12:21	
Acetone	ND	U	5.0	2.9	1	12/08/16 12:21	
Acetonitrile	ND	U	25	17	1	12/08/16 12:21	
Acrolein	ND	U	25	3.5	1	12/08/16 12:21	
Acrylonitrile	ND	U	25	6.5	1	12/08/16 12:21	
Benzene	ND	U	5.0	0.29	1	12/08/16 12:21	
Bromodichloromethane	ND	U	5.0	0.61	1	12/08/16 12:21	
Bromoform	ND	U	5.0	0.93	1	12/08/16 12:21	
Bromomethane	ND	U	5.0	1.4	1	12/08/16 12:21	
Carbon Disulfide	ND	U	5.0	1.3	1	12/08/16 12:21	
Carbon Tetrachloride	ND	U	5.0	0.92	1	12/08/16 12:21	
Chlorobenzene	ND	U	5.0	0.29	1	12/08/16 12:21	
Chloroethane	ND	U	5.0	2.9	1	12/08/16 12:21	
Chloroform	ND	U	5.0	1.3	1	12/08/16 12:21	
Chloromethane	ND	U	5.0	0.40	1	12/08/16 12:21	
Dibromochloromethane	ND	U	5.0	0.73	1	12/08/16 12:21	
Dibromomethane	ND	U	5.0	0.63	1	12/08/16 12:21	
Dichlorodifluoromethane (CFC 12)	ND	U	5.0	1.9	1	12/08/16 12:21	
Dichloromethane	**0.67**	**J**	5.0	0.57	1	12/08/16 12:21	
Ethyl Methacrylate	ND	U	5.0	0.75	1	12/08/16 12:21	
Ethylbenzene	ND	U	5.0	0.23	1	12/08/16 12:21	
Iodomethane	ND	U	10	1.2	1	12/08/16 12:21	
Methacrylonitrile	ND	U	5.0	1.6	1	12/08/16 12:21	
Methyl Methacrylate	ND	U	5.0	0.73	1	12/08/16 12:21	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/Kg
Lab Code:	RQ1615064-01	**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	12/08/16 12:21	
Propionitrile	ND	U	25	6.5	1	12/08/16 12:21	
Tetrachloroethene (PCE)	ND	U	5.0	0.88	1	12/08/16 12:21	
Toluene	ND	U	5.0	1.0	1	12/08/16 12:21	
Trichloroethene (TCE)	ND	U	5.0	1.1	1	12/08/16 12:21	
Trichlorofluoromethane (CFC 11)	ND	U	5.0	0.66	1	12/08/16 12:21	
Vinyl Chloride	ND	U	5.0	1.9	1	12/08/16 12:21	
cis-1,3-Dichloropropene	ND	U	5.0	0.90	1	12/08/16 12:21	
m,p-Xylenes	ND	U	10	1.1	1	12/08/16 12:21	
o-Xylene	ND	U	5.0	0.48	1	12/08/16 12:21	
trans-1,2-Dichloroethene	ND	U	5.0	0.86	1	12/08/16 12:21	
trans-1,3-Dichloropropene	ND	U	5.0	0.20	1	12/08/16 12:21	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	95	51 - 136	12/08/16 12:21	
Dibromofluoromethane	97	63 - 138	12/08/16 12:21	
Toluene-d8	98	66 - 138	12/08/16 12:21	

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: R1612673
Date Analyzed: 12/08/16

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

Units:ug/Kg
Basis: Dry

Lab Control Sample
RQ1615064-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
1,1,1,2-Tetrachloroethane	8260C	19.6	20.0	98	40-140
1,1,1-Trichloroethane (TCA)	8260C	20.7	20.0	103	40-140
1,1,2,2-Tetrachloroethane	8260C	19.1	20.0	96	40-140
1,1,2-Trichloroethane	8260C	19.4	20.0	97	40-140
1,1,2-Trichloro-1,2,2-trifluoroethane	8260C	20.4	20.0	102	40-140
1,1-Dichloroethene (1,1-DCE)	8260C	21.2	20.0	106	40-140
1,2,3-Trichloropropane	8260C	18.9	20.0	94	40-140
1,2-Dibromo-3-chloropropane (DBCP)	8260C	18.0	20.0	90	40-140
1,2-Dibromoethane	8260C	20.6	20.0	103	40-140
1,2-Dichlorobenzene	8260C	21.2	20.0	106	40-140
1,2-Dichloroethane	8260C	20.2	20.0	101	40-140
1,2-Dichloropropane	8260C	20.3	20.0	102	40-140
1,3-Dichlorobenzene	8260C	21.2	20.0	106	40-140
1,4-Dioxane	8260C	420	400	105	40-140
2-Butanone (MEK)	8260C	16.5	20.0	83	40-140
2-Chloro-1,3-butadiene	8260C	18.2	20.0	91	40-140
2-Chloroethyl Vinyl Ether	8260C	18.5	20.0	93	40-140
Isobutyl Alcohol	8260C	346	400	86	40-140
Allyl Chloride	8260C	21.6	20.0	108	40-140
4-Methyl-2-pentanone	8260C	17.0	20.0	85	40-140
Acetone	8260C	16.7	20.0	83	40-140
Acetonitrile	8260C	98.9	100	99	40-140
Acrolein	8260C	40.1	40.0	100	40-140
Acrylonitrile	8260C	89.9	100	90	40-140
Benzene	8260C	21.2	20.0	106	40-140
Bromodichloromethane	8260C	19.8	20.0	99	40-140
Bromoform	8260C	20.0	20.0	100	40-140
Bromomethane	8260C	22.9	20.0	114	40-140
Carbon Disulfide	8260C	18.8	20.0	94	40-140
Carbon Tetrachloride	8260C	22.0	20.0	110	40-140
Chlorobenzene	8260C	21.0	20.0	105	40-140
Chloroethane	8260C	22.1	20.0	110	40-140
Chloroform	8260C	20.1	20.0	101	40-140

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

Service Request: R1612673
Date Analyzed: 12/08/16

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

Units:ug/Kg
Basis: Dry

Lab Control Sample
RQ1615064-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Chloromethane	8260C	20.7	20.0	104	40-140
Dibromochloromethane	8260C	20.0	20.0	100	40-140
Dibromomethane	8260C	20.5	20.0	103	40-140
Dichlorodifluoromethane (CFC 12)	8260C	21.4	20.0	107	40-140
Dichloromethane	8260C	19.6	20.0	98	40-140
Ethyl Methacrylate	8260C	19.6	20.0	98	40-140
Ethylbenzene	8260C	20.8	20.0	104	40-140
Iodomethane	8260C	21.0	20.0	105	40-140
Methacrylonitrile	8260C	18.5	20.0	92	40-140
Methyl Methacrylate	8260C	19.3	20.0	96	40-140
Naphthalene	8260C	18.8	20.0	94	40-140
Propionitrile	8260C	85.3	100	85	40-140
Tetrachloroethene (PCE)	8260C	21.1	20.0	105	40-140
Toluene	8260C	21.0	20.0	105	40-140
Trichloroethene (TCE)	8260C	21.3	20.0	106	40-140
Trichlorofluoromethane (CFC 11)	8260C	22.8	20.0	114	40-140
Vinyl Chloride	8260C	23.0	20.0	115	40-140
cis-1,3-Dichloropropene	8260C	19.5	20.0	98	40-140
m,p-Xylenes	8260C	43.1	40.0	108	40-140
o-Xylene	8260C	20.9	20.0	104	40-140
trans-1,2-Dichloroethene	8260C	20.4	20.0	102	40-140
trans-1,3-Dichloropropene	8260C	19.2	20.0	96	40-140

Client: NASA/WSTF/Navarro **Service Request:** R1612673
Project: White Sands Test Facility/15EC007B
Sample Matrix: Water

SURROGATE RECOVERY SUMMARY
Volatile Organic Compounds by GC/MS

Analysis Method: 8260C

Sample Name	Lab Code	4-Bromofluorobenzene 85 - 122	Dibromofluoromethane 89 - 119	Toluene-d8 87 - 121
1611301340 400-SB-10	R1612673-001	96	93	101
1611301341 400-SB-10	R1612673-002	96	95	104
1611301400 400-SB-12	R1612673-005	100	94	105
1611301401 400-SB-12	R1612673-006	98	96	107
Method Blank	RQ1614938-01	98	95	102
Lab Control Sample	RQ1614938-02	105	100	105
1611301400 400-SB-12 MS	RQ1614938-05	109	100	108
1611301400 400-SB-12 DMS	RQ1614938-06	103	99	106

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Water	**Date Received:**	12/02/16
		Date Analyzed:	12/7/16

Duplicate Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name:	1611301400 400-SB-12	**Units:**	ug/L
Lab Code:	R1612673-005	**Basis:**	NA
Analysis Method:	8260C		

		Matrix Spike RQ1614938-05			Duplicate Matrix Spike RQ1614938-06					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
1,1,1,2-Tetrachloroethane	ND U	48.4	50.0	97	47.6	50.0	95	77-126	2	30
1,1,1-Trichloroethane (TCA)	ND U	52.3	50.0	105	50.9	50.0	102	74-127	3	30
1,1,2,2-Tetrachloroethane	ND U	48.5	50.0	97	50.1	50.0	100	72-122	3	30
1,1,2-Trichloroethane	ND U	49.8	50.0	100	47.4	50.0	95	79-119	5	30
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	49.5	50.0	99	47.3	50.0	95	59-131	4	30
1,1-Dichloroethene (1,1-DCE)	ND U	54.7	50.0	109	51.2	50.0	102	74-139	7	30
1,2,3-Trichloropropane	ND U	42.5	50.0	85	45.7	50.0	91	75-122	7	30
1,2-Dibromo-3-chloropropane (DBCP)	ND U	44.5	50.0	89	45.7	50.0	91	65-137	3	30
1,2-Dibromoethane	ND U	47.2	50.0	94	47.0	50.0	94	80-117	<1	30
1,2-Dichlorobenzene	ND U	47.4	50.0	95	47.4	50.0	95	77-120	<1	30
1,2-Dichloroethane	ND U	54.5	50.0	109	52.5	50.0	105	68-130	4	30
1,2-Dichloropropane	ND U	54.2	50.0	108	52.4	50.0	105	79-124	3	30
1,3-Dichlorobenzene	ND U	47.8	50.0	96	48.3	50.0	97	74-125	1	30
1,4-Dioxane	ND U	986	1000	99	885	1000	88	48-143	11	30
2-Butanone (MEK)	ND U	56.0	50.0	112	53.8	50.0	108	46-141	4	30
2-Chloro-1,3-butadiene	ND U	66.0	50.0	132	63.5	50.0	127	44-165	4	30
2-Chloroethyl Vinyl Ether	ND U	59.7	50.0	119	56.3	50.0	113	10-179	6	30
Isobutyl Alcohol	ND U	1220	1000	122	1130	1000	113	50-141	8	30
Allyl Chloride	ND U	47.9	50.0	96	46.3	50.0	93	49-156	4	30
4-Methyl-2-pentanone	ND U	59.9	50.0	120	57.1	50.0	114	60-141	5	30
Acetone	26	90.3	50.0	129	89.7	50.0	128	29-151	<1	30
Acetonitrile	ND U	305	250	122	293	250	117	39-155	4	30
Acrolein	ND U	118	100	118	114	100	114	10-156	3	30
Acrylonitrile	ND U	281	250	112	283	250	113	69-131	<1	30
Benzene	ND U	55.7	50.0	111	52.1	50.0	104	76-129	7	30
Bromodichloromethane	ND U	46.5	50.0	93	45.1	50.0	90	76-127	3	30
Bromoform	ND U	44.7	50.0	89	44.2	50.0	88	58-133	<1	30
Bromomethane	ND U	35.1	50.0	70	34.1	50.0	68	10-162	3	30
Carbon Disulfide	ND U	47.8	50.0	96	46.9	50.0	94	34-162	2	30
Carbon Tetrachloride	ND U	50.3	50.0	101	47.6	50.0	95	65-135	6	30
Chlorobenzene	ND U	51.4	50.0	103	49.2	50.0	98	76-125	4	30
Chloroethane	ND U	51.1	50.0	102	46.6	50.0	93	70-140	9	30
Chloroform	ND U	50.4	50.0	101	48.6	50.0	97	75-130	4	30
Chloromethane	ND U	53.4	50.0	107	49.0	50.0	98	55-160	9	30
Dibromochloromethane	ND U	46.6	50.0	93	47.3	50.0	95	72-128	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.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Water	**Date Received:**	12/02/16
		Date Analyzed:	12/7/16

Duplicate Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name:	1611301400 400-SB-12	**Units:**	ug/L
Lab Code:	R1612673-005	**Basis:**	NA
Analysis Method:	8260C		

		Matrix Spike RQ1614938-05			Duplicate Matrix Spike RQ1614938-06					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Dibromomethane	ND U	49.7	50.0	99	47.1	50.0	94	77-119	6	30
Dichlorodifluoromethane (CFC 12)	ND U	45.6	50.0	91	42.8	50.0	86	49-154	7	30
Dichloromethane	ND U	48.8	50.0	98	47.0	50.0	94	75-121	4	30
Ethyl Methacrylate	ND U	52.1	50.0	104	50.9	50.0	102	63-138	2	30
Ethylbenzene	ND U	53.0	50.0	106	50.6	50.0	101	72-134	5	30
Iodomethane	ND U	55.7	50.0	111	54.3	50.0	109	14-159	3	30
Methacrylonitrile	ND U	49.4	50.0	99	48.6	50.0	97	67-131	2	30
Methyl Methacrylate	ND U	51.8	50.0	104	49.9	50.0	100	74-130	4	30
Naphthalene	ND U	47.1	50.0	94	46.6	50.0	93	57-153	1	30
Propionitrile	ND U	305	250	122	295	250	118	63-146	3	30
Tetrachloroethene (PCE)	ND U	48.8	50.0	98	47.3	50.0	95	67-137	3	30
Toluene	ND U	53.6	50.0	107	51.2	50.0	102	79-125	5	30
Trichloroethene (TCE)	ND U	53.7	50.0	107	51.0	50.0	102	62-142	5	30
Trichlorofluoromethane (CFC 11)	ND U	49.0	50.0	98	46.9	50.0	94	72-142	4	30
Vinyl Chloride	ND U	62.9	50.0	126	58.9	50.0	118	60-157	6	30
cis-1,3-Dichloropropene	ND U	49.1	50.0	98	47.7	50.0	95	52-134	3	30
m,p-Xylenes	ND U	108	100	108	101	100	101	68-138	6	30
o-Xylene	ND U	54.0	50.0	108	50.5	50.0	101	68-134	7	30
trans-1,2-Dichloroethene	ND U	53.1	50.0	106	52.4	50.0	105	77-125	1	30
trans-1,3-Dichloropropene	ND U	46.4	50.0	93	45.1	50.0	90	50-142	3	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:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	RQ1614938-01	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
1,1,1,2-Tetrachloroethane	ND U	1.0	0.22	1	12/07/16 13:11	
1,1,1-Trichloroethane (TCA)	ND U	1.0	0.36	1	12/07/16 13:11	
1,1,2,2-Tetrachloroethane	ND U	1.0	0.25	1	12/07/16 13:11	
1,1,2-Trichloroethane	ND U	1.0	0.34	1	12/07/16 13:11	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND U	1.0	0.31	1	12/07/16 13:11	
1,1-Dichloroethene (1,1-DCE)	ND U	1.0	0.57	1	12/07/16 13:11	
1,2,3-Trichloropropane	ND U	1.0	0.70	1	12/07/16 13:11	
1,2-Dibromo-3-chloropropane (DBCP)	ND U	2.0	0.74	1	12/07/16 13:11	
1,2-Dibromoethane	ND U	1.0	0.24	1	12/07/16 13:11	
1,2-Dichlorobenzene	ND U	1.0	0.21	1	12/07/16 13:11	
1,2-Dichloroethane	ND U	1.0	0.36	1	12/07/16 13:11	
1,2-Dichloropropane	ND U	1.0	0.20	1	12/07/16 13:11	
1,3-Dichlorobenzene	ND U	1.0	0.20	1	12/07/16 13:11	
1,4-Dioxane	ND U	40	20	1	12/07/16 13:11	
2-Butanone (MEK)	ND U	5.0	0.81	1	12/07/16 13:11	
2-Chloro-1,3-butadiene	ND U	1.0	0.27	1	12/07/16 13:11	
2-Chloroethyl Vinyl Ether	ND U	1.0	0.44	1	12/07/16 13:11	
Isobutyl Alcohol	ND U	40	11	1	12/07/16 13:11	
Allyl Chloride	ND U	1.0	0.26	1	12/07/16 13:11	
4-Methyl-2-pentanone	ND U	5.0	0.67	1	12/07/16 13:11	
Acetone	ND U	5.0	1.3	1	12/07/16 13:11	
Acetonitrile	ND U	10	4.7	1	12/07/16 13:11	
Acrolein	ND U	10	3.0	1	12/07/16 13:11	
Acrylonitrile	ND U	10	1.4	1	12/07/16 13:11	
Benzene	ND U	1.0	0.20	1	12/07/16 13:11	
Bromodichloromethane	ND U	1.0	0.32	1	12/07/16 13:11	
Bromoform	ND U	1.0	0.42	1	12/07/16 13:11	
Bromomethane	ND U	1.0	0.29	1	12/07/16 13:11	
Carbon Disulfide	ND U	1.0	0.22	1	12/07/16 13:11	
Carbon Tetrachloride	ND U	1.0	0.45	1	12/07/16 13:11	
Chlorobenzene	ND U	1.0	0.29	1	12/07/16 13:11	
Chloroethane	ND U	1.0	0.24	1	12/07/16 13:11	
Chloroform	ND U	1.0	0.25	1	12/07/16 13:11	
Chloromethane	ND U	1.0	0.21	1	12/07/16 13:11	
Dibromochloromethane	ND U	1.0	0.31	1	12/07/16 13:11	
Dibromomethane	ND U	1.0	0.32	1	12/07/16 13:11	
Dichlorodifluoromethane (CFC 12)	ND U	1.0	0.46	1	12/07/16 13:11	
Dichloromethane	ND U	1.0	0.60	1	12/07/16 13:11	
Ethyl Methacrylate	ND U	2.0	0.44	1	12/07/16 13:11	
Ethylbenzene	ND U	1.0	0.20	1	12/07/16 13:11	
Iodomethane	ND U	2.0	0.98	1	12/07/16 13:11	
Methacrylonitrile	ND U	2.0	0.50	1	12/07/16 13:11	
Methyl Methacrylate	ND U	2.0	0.62	1	12/07/16 13:11	

Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project:	White Sands Test Facility/15EC007B	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	RQ1614938-01	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Naphthalene	ND	U	1.0	0.20	1	12/07/16 13:11	
Propionitrile	ND	U	5.0	3.1	1	12/07/16 13:11	
Tetrachloroethene (PCE)	ND	U	1.0	0.30	1	12/07/16 13:11	
Toluene	ND	U	1.0	0.20	1	12/07/16 13:11	
Trichloroethene (TCE)	ND	U	1.0	0.22	1	12/07/16 13:11	
Trichlorofluoromethane (CFC 11)	ND	U	1.0	0.20	1	12/07/16 13:11	
Vinyl Chloride	ND	U	1.0	0.32	1	12/07/16 13:11	
cis-1,3-Dichloropropene	ND	U	1.0	0.24	1	12/07/16 13:11	
m,p-Xylenes	ND	U	2.0	0.33	1	12/07/16 13:11	
o-Xylene	ND	U	1.0	0.20	1	12/07/16 13:11	
trans-1,2-Dichloroethene	ND	U	1.0	0.33	1	12/07/16 13:11	
trans-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/07/16 13:11	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	98	85 - 122	12/07/16 13:11	
Dibromofluoromethane	95	89 - 119	12/07/16 13:11	
Toluene-d8	102	87 - 121	12/07/16 13:11	

Tentatively Identified Compounds

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

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

Service Request: R1612673
Date Analyzed: 12/07/16

Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Units:ug/L
Basis:NA

Lab Control Sample
RQ1614938-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
1,1,1,2-Tetrachloroethane	8260C	20.0	20.0	100	80-119
1,1,1-Trichloroethane (TCA)	8260C	20.4	20.0	102	74-120
1,1,2,2-Tetrachloroethane	8260C	20.8	20.0	104	78-122
1,1,2-Trichloroethane	8260C	20.7	20.0	104	82-118
1,1,2-Trichloro-1,2,2-trifluoroethane	8260C	20.6	20.0	103	75-124
1,1-Dichloroethene (1,1-DCE)	8260C	21.4	20.0	107	74-135
1,2,3-Trichloropropane	8260C	17.5	20.0	87	68-136
1,2-Dibromo-3-chloropropane (DBCP)	8260C	18.7	20.0	94	55-149
1,2-Dibromoethane	8260C	19.5	20.0	97	81-125
1,2-Dichlorobenzene	8260C	20.0	20.0	100	80-119
1,2-Dichloroethane	8260C	22.3	20.0	111	71-127
1,2-Dichloropropane	8260C	21.5	20.0	107	80-119
1,3-Dichlorobenzene	8260C	20.7	20.0	104	79-121
1,4-Dioxane	8260C	376	400	94	69-151
2-Butanone (MEK)	8260C	20.7	20.0	104	61-137
2-Chloro-1,3-butadiene	8260C	22.8	20.0	114	67-127
2-Chloroethyl Vinyl Ether	8260C	22.9	20.0	115	49-145
Isobutyl Alcohol	8260C	429	400	107	60-132
Allyl Chloride	8260C	19.3	20.0	96	69-140
4-Methyl-2-pentanone	8260C	20.7	20.0	103	66-124
Acetone	8260C	18.6	20.0	93	40-161
Acetonitrile	8260C	109	100	109	46-154
Acrolein	8260C	53.7	40.0	134	10-200
Acrylonitrile	8260C	116	100	116	71-130
Benzene	8260C	21.9	20.0	110	76-118
Bromodichloromethane	8260C	19.3	20.0	97	78-126
Bromoform	8260C	19.8	20.0	99	71-136
Bromomethane	8260C	14.9	20.0	75	42-166
Carbon Disulfide	8260C	18.0	20.0	90	65-127
Carbon Tetrachloride	8260C	19.4	20.0	97	68-125
Chlorobenzene	8260C	20.7	20.0	103	80-121
Chloroethane	8260C	18.2	20.0	91	70-127
Chloroform	8260C	19.8	20.0	99	76-120

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

Service Request: R1612673
Date Analyzed: 12/07/16

Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Units:ug/L
Basis:NA

Lab Control Sample
RQ1614938-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Chloromethane	8260C	22.1	20.0	110	69-145
Dibromochloromethane	8260C	19.6	20.0	98	77-128
Dibromomethane	8260C	20.3	20.0	102	79-120
Dichlorodifluoromethane (CFC 12)	8260C	17.8	20.0	89	65-152
Dichloromethane	8260C	19.6	20.0	98	73-122
Ethyl Methacrylate	8260C	20.6	20.0	103	69-126
Ethylbenzene	8260C	20.7	20.0	104	76-120
Iodomethane	8260C	21.4	20.0	107	18-160
Methacrylonitrile	8260C	19.8	20.0	99	72-131
Methyl Methacrylate	8260C	20.0	20.0	100	71-127
Naphthalene	8260C	17.8	20.0	89	55-166
Propionitrile	8260C	118	100	118	69-133
Tetrachloroethene (PCE)	8260C	20.0	20.0	100	78-124
Toluene	8260C	21.2	20.0	106	77-120
Trichloroethene (TCE)	8260C	21.7	20.0	108	78-123
Trichlorofluoromethane (CFC 11)	8260C	20.0	20.0	100	68-126
Vinyl Chloride	8260C	24.9	20.0	125	69-133
cis-1,3-Dichloropropene	8260C	20.0	20.0	100	74-126
m,p-Xylenes	8260C	43.0	40.0	108	78-123
o-Xylene	8260C	20.4	20.0	102	80-120
trans-1,2-Dichloroethene	8260C	21.2	20.0	106	80-120
trans-1,3-Dichloropropene	8260C	19.2	20.0	96	67-135

General Chemistry

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

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Soil	**Date Received:**	12/02/16
		Date Analyzed:	12/05/16

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	1611301343 400-SB-10	**Units:**	Percent
Lab Code:	R1612673-003	**Basis:**	As Received

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample R1612673-003DUP Result	Average	RPD	RPD Limit
Total Solids	ALS SOP	-	73.6	75.3	74.5	2	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.

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1612673
Project	White Sands Test Facility/15EC007B	**Date Collected:**	11/30/16
Sample Matrix:	Soil	**Date Received:**	12/02/16
		Date Analyzed:	12/05/16

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	1611301403 400-SB-12	**Units:**	Percent
Lab Code:	R1612673-007	**Basis:**	As Received

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample R1612673-007DUP Result	Average	RPD	RPD Limit
Total Solids	ALS SOP	-	74.7	75.3	75.0	<1	20

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

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

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

SOUTHWEST RESEARCH INSTITUTE®

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Chemistry and Chemical Engineering Division
Department of Analytical & Environmental Chemistry

November 22, 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-#723-IBC for NDMA/DMN Analysis of Soil Samples
SwRI Project #: 01.16988.103
SwRI Task Orders: **161111-7**
Navarro P.O. #: 15EC092B

Dear Tom,

Enclosed please find the analytical reports for Batch-607- #723-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: 161111-7
NAVARRO PO #: 15EC092B

NARRATIVE

(M-607 - #723-Navarro-IBC)

CLIENT: NAVARRO
SwRI PROJECT: 01.16988.01.103
BATCH #: Batch-607-#723-IBC
TASK ORDER: 161111-7
CLIENT PO#: 15EC092B
REPORT DATA: 11/22/2016

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: 161111-7
NAVARRO PO #: 15EC092B

TASK ORDER AND CHAIN OF CUSTODY

Southwest Research Institute

Laboratory Task Order

TO #: 161111-7 Revision: 0

Project(s): 16988.01.10X
Manager(s): SUN, GANG
To Client: 12/02/16

SDG: 606740

SRR #'s: 58674
Client(s): Navarro

Instructions

Documents Related to this task order: 210959[COC for SRR 58674], 210960[Paperwork for SRR 58674], 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
606740		1	Soil	1611090903 (IBC 7393 400-SB-14(0-153.5))	09 Nov 16	23 Nov 16
606741		1	Soil	1611090904 (IBC 7393 400-SB-14(0-153.5))	09 Nov 16	23 Nov 16
606742	MS	1	Soil	1611090905(MS) (IBC 7393 400-SB-14(0-153.5))	09 Nov 16	23 Nov 16
606743		1	Soil	1611090921 (IBC 7392 400-SB-14(0'-62'))	09 Nov 16	23 Nov 16
606744		1	Soil	1611090931 (IBC 7394 400-SB-14(62-153.5))	09 Nov 16	23 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
606740		1	Soil	1611090903 (IBC 7393 400-SB-14(0-153.5))	11 Nov 16	21 Dec 16
606741		1	Soil	1611090904 (IBC 7393 400-SB-14(0-153.5))	11 Nov 16	21 Dec 16
606742	MS	1	Soil	1611090905(MS) (IBC 7393 400-SB-14(0-153.5))	11 Nov 16	21 Dec 16
606743		1	Soil	1611090921 (IBC 7392 400-SB-14(0'-62'))	11 Nov 16	21 Dec 16
606744		1	Soil	1611090931 (IBC 7394 400-SB-14(62-153.5))	11 Nov 16	21 Dec 16

010005

WSTF CHAIN OF CUSTODY RECORD

Date 11-9-2016

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
161109 0903	IBC 7393 400-SB-14 (0-1535)	1	S	X	4IFW	
— 0904	"	1	S	X	4IFW	
— 0905 (MS)	"	1	S	X	"	MATRIX SPIKE FOR 161109 0903
161109 0921	IBC 7392 400-SB-14 (0-62')	1	S	X	"	
161109 0931	IBC 7394 400-SB-14 (62-153.5)	1	S	X	"	

Relinquished By:	Date/Time:	Accepted By:	Date/Time:
	11-9-2016 (1030)		11-11-16 / 08:30

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

Client: Navarro
SRR # 58674
Project # 16988.01.10X
Case: 15EC092B
VTSR: 11/11/16
Sample(s) Received: Intact
Temperature: 2.0 SN # 021055

010006

NASA-WSTF SHIPPING DOCUMENT

Blue # XB47

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 11-10-16 / 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.	

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 Hain
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
SRR # 58674
Project # 16988.01.10X
Case: 15EC092B
VTSR: 11/11/16
Sample(s) Received: Intact
Temperature: 2.0 SN # 021055

CLIENT: Navarro Research and Engineering Inc.
SwRI PROJECT: 01.16988
TASK ORDER: 161111-7
NAVARRO PO #: 15EC092B

ANALYTICAL DATA REPORT SHEETS

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1611090903 (IBC 7393 400-SB-14(0-153.5))

Client: Navarro
Batch: M607-#723
Task Order: 161111-7
Matrix: Soil
Sample Wt/Vol: 30.01 g

Project: 16988.01.103
Date Received: 11/11/16
Date Extracted: 11/15/16
Date Analyzed: 11/22/16
Date Reported: 11/22/16

Lab Sample ID: 606740
Lab File Name: A1121628.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

1611090904 (IBC 7393 400-SB-14(0-153.5))

Client: Navarro
Batch: M607-#723
Task Order: 161111-7
Matrix: Soil
Sample Wt/Vol: 30.05 g

Project: 16988.01.103
Date Received: 11/11/16
Date Extracted: 11/15/16
Date Analyzed: 11/22/16
Date Reported: 11/22/16

Lab Sample ID: 606741
Lab File Name: A1121629.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

1611090921 (IBC 7392 400-SB-14(0'-62'))

Client: Navarro
Batch: M607-#723
Task Order: 161111-7
Matrix: Soil
Sample Wt/Vol: 30.07 g

Project: 16988.01.103
Date Received: 11/11/16
Date Extracted: 11/15/16
Date Analyzed: 11/22/16
Date Reported: 11/22/16

Lab Sample ID: 606743
Lab File Name: A1121631.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

1611090931 (IBC 7394 400-SB-14(62-153.5))

Client: Navarro
Batch: M607-#722
Task Order: 161111-7
Matrix: Soil
Sample Wt/Vol: 30.02 g

Project: 16988.01.103
Date Received: 11/11/16
Date Extracted: 11/15/16
Date Analyzed: 11/22/16
Date Reported: 11/22/16

Lab Sample ID: 606744
Lab File Name: A1121632.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: 161111-7
NAVARRO PO #: 15EC092B

QA DATA SHEETS

(BLANK, MATRIX SPIKE, SURROGATE, CALIBRATION)

Southwest Research Institute

Method 607 Internal Standard Summary

Filename: A11216S2.txt
Standard ID: IS=1NG/UL
Project: 16988.01.103

Date Analyzed: 11/22/2016
Time Analyzed: 01:58:00
Client: Navarro

		IS1		IS2	
		Area	RT	Area	RT
	Mid Point Standard	304973	8.4	187784	15.01
	Upper Limit	609946	8.73	375568	15.34
	Lower Limit	152486.5	8.07	93892	14.68
Client Sample ID	**Lab Sample ID**				
BLANK_15NOV16	606816	266562	8.40	167405	15.02
LCS_15NOV16 LCS	606817 LCS	270975	8.40	167733	15.01
1611090903 (IBC 7393 400-SB-14(0-153.5))	606740	274552	8.40	170078	15.02
1611090904 (IBC 7393 400-SB-14(0-153.5))	606741	279375	8.40	174051	15.02
1611090905(MS) (IBC 7393 400-SB-14(0-153.5)) M	606742 MS	267674	8.40	163837	15.01
1611090921 (IBC 7392 400-SB-14(0'-62'))	606743	274276	8.40	168536	15.01
1611090931 (IBC 7394 400-SB-14(62-153.5))	606744	297256	8.40	173710	15.02

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_15NOV16
Client: Navarro
Matrix: Soil

Project: 16988.01.103
SDG: 606740, 606419, 606689

This method blank applies to the following samples, MS, and MSD's

Client Sample ID	Lab Sample ID	Date Acquired	Time Acquired
LCS_15NOV16	606817 LCS	11/22/16	03:05:00
1611090903 (IBC 7393 400-SB-14(0-153.5))	606740	11/22/16	03:39:00
1611090904 (IBC 7393 400-SB-14(0-153.5))	606741	11/22/16	04:13:00
1611090905(MS) (IBC 7393 400-SB-14(0-153.5))	606742 MS	11/22/16	04:47:00
1611090921 (IBC 7392 400-SB-14(0'-62'))	606743	11/22/16	05:21:00
1611090931 (IBC 7394 400-SB-14(62-153.5))	606744	11/22/16	05:55:00

Southwest Research Institute

Method 607 Surrogate Recovery Summary

Client: Navarro

Matrix: water & Soil SDG: 606419, 606429, 606539, 606540, 606682, 606689, 606712, 606800, 606740

Project: 16988.01.103

	Client Sample ID	Lab Sample ID	N-Nitroso-di-n-propylamine	
			% Recovery	Recovery Limits
28	BLANK_15NOV16	606816	115	40-160
29	LCS_15NOV16	606817 LCS	116	40-160
30	1611090903 (IBC 7393 400-SB-14(0-153.5))	606740	107	40-160
31	1611090904 (IBC 7393 400-SB-14(0-153.5))	606741	104	40-160
32	1611090905(MS) (IBC 7393 400-SB-14(0-153.5))	606742 MS	105	40-160
33	1611090921 (IBC 7392 400-SB-14(0'-62'))	606743	100	40-160
34	1611090931 (IBC 7394 400-SB-14(62-153.5))	606744	100	40-160

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

BLANK_15NOV16

Client: Navarro
Batch: M607-#723
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.02 g

Project: 16988.01.103
Date Received: NA
Date Extracted: 11/15/16
Date Analyzed: 11/22/16
Date Reported: 11/22/16

Lab Sample ID: 606816
Lab File Name: A1121626.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_15NOV16**

Client: Navarro
Batch: M607-#723
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.05 g

Project: 16988.01.103
Date Received: NA
Date Extracted: 11/15/16
Date Analyzed: 11/22/16
Date Reported: 11/22/16

Lab Sample ID: 606817 LCS
Lab File Name: A1121627.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	14.51	
4164-28-7	N-Nitrodimethylamine	17.40	
314-40-9	Bromacil	23.13	

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_15NOV16

Client: Navarro
Batch: M607-#723
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.05 g

Project: 16988.01.103
Date Received: NA
Date Extracted: 11/15/16
Date Analyzed: 11/22/16
Date Reported: 11/22/16

Lab Sample ID: 606817 LCS
Blank ID: BLANK_15NOV16

ANALYTE	Spike Added ng/g	Blank Conc ng/g	LCS Conc ng/g	% Recovery	QC % Recovery Limits
N-Nitrosodimethylamine	17	0	15	88	13 - 110
N-Nitrodimethylamine	17	0	17	100	30 - 150
Bromacil	17	0	23	135	40 - 190

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1611090905(MS) (IBC 7393 400-SB-14(0-153.5)) MS

Client: Navarro
Batch: M607-#723
Task Order: 161111-7
Matrix: Soil
Sample Wt/Vol: 30.02 g
Compared Sample: 1611090903 (IBC 7393 400-SB-14(0-153.5))

Project: 16988.01.103
Date Received: 11/11/16
Date Extracted: 11/15/16
Date Analyzed: 11/22/16
Date Reported: 11/22/16

Lab Sample ID: 606742 MS
Lab File Name: A1121630.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	14.89	17.00	88%	13-110%
4164-28-7	N-Nitrodimethylamine	17.39	17.00	102%	30-150%
314-40-9	Bromacil	24.18	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:	11/22/16
Sponsor:	Navarro	Analytical Method:	TAP-01-0408-031
SwRI Standard ID:	202-04-120408017	Std Concentration:	1 µg/mL
File ID #:	A11216S2	Initial Calibration Date:	10/17/16

ANALYTE	Mean RRF	RRF	% Dif.
N-Nitrosodimethylamine	0.361	0.388	-7.6
N-Nitrodimethylamine	0.13	0.138	-6.4
N-Nitroso-di-n-propylamine-d14	0.127	0.133	-4.1
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: 161111-7
NAVARRO PO #: 15EC092B

EXTRACTION AND INJECTION LOG

(E607S) SOIL Extraction By Soxhlet 3540C (Navarro)

X36445

SwRI Labs
Client: Navarro
Project: 16988.01.10X
Case: 15EC092B

Sample Receipt: 58674
TO#: 161111-7

DATE EXTRACTED	11/15/16
ANALYSTS INVOLVED	Hamed Edrisi (SU,SP) Christina Menn (SU,BD,QT,FV) Marina Lebron (SU,SW,Conc,QT)
SURROGATE SOL ID	203-01-120408017@5.0ng/uL
MTX SPK SOL ID	201-01-120408017@10.0ng/uL
EXTRACTS LOCATION	Tracked by LIMS (11/18/16 CM)
CHEMICAL,BRAND &LOT#	Sodium Sulfate ID:04-0402-004p27A DCM Fisher Optima Lot #164214
NOTES	Hamilton Co. Syringes: 100uL ID:462905(SURR) 50uL ID:462898(MS) Balance #14 was used.

ADDITIONAL NOTES	1.Soxhlet extraction began at 4:00pm and ended the following day at 10:00am. 2.BLANK(606816) and LCS(606817) are shared with page 503 of this book.
EXTRACTION FLOWCHART	Xg >>> FV 1000uL DCM
REFRENCE BOOK &PAGE	16-0402-032 P46
TAP(S) USED	01-0402-152

	System ID	Type	Customer ID	SOLVENT VOL DCM (ML)	SAMPLE WT
1	606740		1611090903 (IBC 7393 400-SB-14(	250	30.01 g
2	606741		1611090904 (IBC 7393 400-SB-14(	250	30.05 g
3	606742	MS	1611090905(MS) (IBC 7393 400-SB	250	30.02 g
4	606743		1611090921 (IBC 7392 400-SB-14(	250	30.07 g
5	606744		1611090931 (IBC 7394 400-SB-14(	250	30.02 g
6	606816		BLANK_15NOV16	250	30.02 g
7	606817		LCS_15NOV16	250	30.05 g

	System ID	Type	Customer ID	SURROGATE SOL VOL	MTX SPK SOL VOL
1	606740		1611090903 (IBC 7393 400-SB-14(	100 uL	0 uL
2	606741		1611090904 (IBC 7393 400-SB-14(	100 uL	0 uL
3	606742	MS	1611090905(MS) (IBC 7393 400-SB	100 uL	50 uL
4	606743		1611090921 (IBC 7392 400-SB-14(	100 uL	0 uL
5	606744		1611090931 (IBC 7394 400-SB-14(	100 uL	0 uL
6	606816		BLANK_15NOV16	100 uL	0 uL
7	606817		LCS_15NOV16	100 uL	50 uL

	System ID	Type	Customer ID	FV DCM
1	606740		1611090903 (IBC 7393 400-SB-14(	1000 uL
2	606741		1611090904 (IBC 7393 400-SB-14(	1000 uL
3	606742	MS	1611090905(MS) (IBC 7393 400-SB	1000 uL
4	606743		1611090921 (IBC 7392 400-SB-14(	1000 uL
5	606744		1611090931 (IBC 7394 400-SB-14(	1000 uL
6	606816		BLANK_15NOV16	1000 uL
7	606817		LCS_15NOV16	1000 uL

Work continued from Page

injlog

Southwest Research Institute GC/MS Injection Log

OPERATOR: GS SEQUENCE DATE: 11/21/16, 11/22/16INSTRUMENT: 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: 58634,58636,58646,58647,58664,58665,58670,58682,58674 METHOD: M-607
DATA PATH: C:\MSDChem\1\DATA\2016\A112116 MATRIX: water & soil

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

REVIEWED BY: Alice Yan

DATE: 11/22/16

11/22/16

FILENAME	VIAL	DATE/TIME	METHOD	SAMPLE DESCRIPTION
A11216c1	100	11/21/16 10:35	MET_607C	SLUG
A11216c2	1	11/21/16 11:09	MET_607C	DCM
A11216s1	2	11/21/16 11:17	MET_607C	NDMA/DMN/BROMACIL STD 1NG/UL IS=1NG/UL
A1121601	3	11/21/16 11:51	MET_607C	BLANK_08NOV16 IS=0.2NG/L 606643
A1121602	4	11/21/16 12:25	MET_607C	LCS_08NOV16 IS=0.2NG/L 606644
A1121603	5	11/21/16 12:58	MET_607C	1611020929 (400-SB-14) IS=0.2NG/L 606419
A1121604	6	11/21/16 13:32	MET_607C	1611030824 (400-SB-14) IS=0.2NG/L 606423
A1121605	7	11/21/16 14:06	MET_607C	1611020903B (WW-5-809) IS=0.2NG/L 606429
A1121606	8	11/21/16 14:40	MET_607C	1611020918B (WW-5-909) IS=0.2NG/L 606430
A1121607	9	11/21/16 15:14	MET_607C	1611070816 (400-SB-14) IS=0.2NG/L 606539
A1121608	10	11/21/16 15:47	MET_607C	1611031034Z (200-I-795) IS=0.2NG/L 606540
A1121609	11	11/21/16 16:21	MET_607C	1611031438A (BLM-14-493) IS=0.2NG/L 606541
A1121610	12	11/21/16 16:55	MET_607C	BLANK_14NOV16 IS=0.2NG/L 606813
A1121611	13	11/21/16 17:29	MET_607C	LCS_14NOV16 IS=0.2NG/L 606814
A1121612	14	11/21/16 18:03	MET_607C	1611070946Z (200-I-675) IS=0.2NG/L 606682
A1121613	15	11/21/16 18:37	MET_607C	1611071336Z (200-I-490) IS=0.2NG/L 606683
A1121614	16	11/21/16 19:10	MET_607C	1611071417B (BLM-1-435) IS=0.2NG/L 606684
A1121615	17	11/21/16 19:44	MET_607C	1611080926Z (200-I-375) IS=0.2NG/L 606685
A1121616	18	11/21/16 20:18	MET_607C	1611080933B (100-D-176) IS=0.2NG/L 606686
A1121617	19	11/21/16 20:52	MET_607C	1611080934B (100-D-176) IS=0.2NG/L 606687
A1121618	20	11/21/16 21:26	MET_607C	1611081426Z (200-I-300) IS=0.2NG/L 606688
A1121619	21	11/21/16 22:00	MET_607C	1611080826L (200-Rinsate Lagoons) 606689
A1121620	22	11/21/16 22:34	MET_607C	1611091412B (BLM-24-565) IS=0.2NG/L 606712
A1121621	23	11/21/16 23:08	MET_607C	BLANK_16NOV16 IS=0.2NG/L 606919
A1121622	24	11/21/16 23:42	MET_607C	LCS_16NOV16 IS=0.2NG/L 606920
A1121623	25	11/22/16 00:16	MET_607C	1611091401Z (200-I-185) IS=0.2NG/L 606800
A1121624	26	11/22/16 00:50	MET_607C	1611101002B (ST-5-481) IS=0.2NG/L 606801
A1121625	27	11/22/16 01:24	MET_607C	1611101003B (ST-5-481) IS=0.2NG/L 606802MS
A11216s2	2	11/22/16 01:58	MET_607C	NDMA/DMN/BROMACIL STD 1NG/UL IS=1NG/UL
A1121626	28	11/22/16 02:32	MET_607C	BLANK_15NOV16 IS=0.2NG/L 606816
A1121627	29	11/22/16 03:05	MET_607C	LCS_15NOV16 IS=0.2NG/L 606817
A1121628	30	11/22/16 03:39	MET_607C	1611090903 (IBC 7393 400-SB-14(0-153.5)) 606740
A1121629	31	11/22/16 04:13	MET_607C	1611090904 (IBC 7393 400-SB-14(0-153.5)) 606741
A1121630	32	11/22/16 04:47	MET_607C	1611090905(MS) (IBC 7393 400-SB-14(0-153.5))606742MS
A1121631	33	11/22/16 05:21	MET_607C	1611090921 (IBC 7392 400-SB-14(0-62')) 606743
A1121632	34	11/22/16 05:55	MET_607C	1611090931 (IBC 7394 400-SB-14(62-153.5)) 606744
A1121633	35	11/22/16 06:29	MET_607C	1611021244 ((400-SB-14) 11'-12') 606420
A1121634	36	11/22/16 07:03	MET_607C	1611021534 ((400-SB-14) 43'-44') 606421
A1121635	37	11/22/16 07:37	MET_607C	1611021549 ((400-SB-14) 43'-44') 606422
A1121636	38	11/22/16 08:11	MET_607C	1611031004 ((400-SB-14) 83'-84') 606424
A1121637	39	11/22/16 08:45	MET_607C	1611081001L (200-S-06) IS=0.2NG/L 606690
A1121638	40	11/22/16 09:19	MET_607C	1611081044L (200-S-04) IS=0.2NG/L 606691
A1121639	41	11/22/16 09:53	MET_607C	1611081045L (200-S-04) IS=0.2NG/L 606692
A1121640	42	11/22/16 10:27	MET_607C	1611081114L (200-S-01) IS=0.2NG/L 606693
A1121641	43	11/22/16 11:01	MET_607C	1611081115L (200-S-01) IS=0.2NG/L 606694MS
A1121642	44	11/22/16 11:35	MET_607C	1611081319L (200-N-06) IS=0.2NG/L 606695
A1121643	45	11/22/16 12:09	MET_607C	1611081320L (200-N-06) IS=0.2NG/L 606696
A1121644	46	11/22/16 12:43	MET_607C	1611081408L (200-N-04) IS=0.2NG/L 606697
A1121645	47	11/22/16 13:17	MET_607C	1611081437L (200-N-02) IS=0.2NG/L 606698

Work continued to Page

SIGNATURE

DATE 11/22/16

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

December 8, 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-#725-T for NDMA/DMN Analysis of water & Soil Samples

SwRI Project #: 01.16988.103
SwRI Task Orders: **161122-9, 161122-10**
Navarro P.O. #: 15EC092B, 16EC034-C1

Dear Tom,

Enclosed please find the analytical reports for Batch-607- #725-T-Navarro of water & 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: 161122-9, 161122-10
NAVARRO PO #: 15EC092B,16EC034-C1

NARRATIVE

(M-607 - #725-T-Navarro)

CLIENT: NAVARRO
SwRI PROJECT: 01.16988.01.103
BATCH #: Batch-607-#725-T
TASK ORDER: 161122-9, 161122-10
CLIENT PO#: 15EC092B, 16EC034-C1
REPORT DATA: 12/08/2016

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), N-Nitrodimethylamine (DMN) and Bromacil according to the modified Method 607.

2. All water samples were extracted within 7 days and soil samples within 14 days of sample collection and were analyzed within 40 days of 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 water sample reporting limit is 0.01 ppb for 1-L extraction of aqueous samples. The sample reporting limit is 0.33 ng/g for 30g extraction of soil samples.

4. Lab control spike for aqueous samples at 0.50 µg/L level were extracted and analyzed. Lab control spike for soil samples at 17 µg/g level were 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.

4. Surrogate compound was spiked into all samples before sample extraction at 0.50 µg/L level for final extracts. The surrogate recoveries for all samples were within method recovery criteria of 40-160%.

5. Laboratory solvent blanks were extracted and analyzed for every sample batch. No analytes were detected above report limits from the blanks.

6. A "J" value was reported if the associated value was below reporting limits but above the MDL value.

7. All analyte concentrations are expressed in µg/L (*ppb*). Sample calculation:

$$\text{Concentration } (\mu g/L) = \frac{C\ (ng/\mu L) \times V_{extr}\ (\mu L) \times DF}{V_{samp}(mL)} \times \frac{1000\ mL}{1\ L} \times \frac{1\ \mu g}{1000\ ng}$$

where:
- C = result of GC/MS analysis, in ng/µL
- V_{extr} = final volume of sample extract, in µL
- V_{samp} = sample volume taken for extraction, in mL
- DF = dilution factor, if any

CLIENT:	**Navarro Research and Engineering Inc.**
SwRI PROJECT:	**01.16988**
TASK ORDER:	**161122-9, 161122-10**
NAVARRO PO #:	**15EC092B,16EC034-C1**

TASK ORDER AND CHAIN OF CUSTODY

Southwest Research Institute

Laboratory Task Order

TO #: 161122-9 Revision: 1

Project(s): 16988.01.10X
Manager(s): SUN, GANG
To Client: 12/13/16

SDG: 607071

SRR #'s: 58711
Client(s): Navarro

Instructions

Documents Related to this task order: 211505[COC for SRR 58711], 211506[Paperwork for SRR 58711], 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: E607W
Section: EXTLAB

Holding: 7 days from CED

EXTRACTION BY METHOD 607

Cnt: 6

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
607071		1	Aqueous	1611181118 (400-SB-10)	18 Nov 16	25 Nov 16
607072		1	Aqueous	1611181119 (400-SB-10)	18 Nov 16	25 Nov 16
607073	MS	1	Aqueous	1611181120 (400-SB-10)	18 Nov 16	25 Nov 16
607074		1	Aqueous	1611181143 (400-SB-12)	18 Nov 16	25 Nov 16
607075		1	Aqueous	1611181144 (400-SB-12)	18 Nov 16	25 Nov 16
607076	MS	1	Aqueous	1611181145 (400-SB-12)	18 Nov 16	25 Nov 16

Test: T607W
Section: TDG

Holding: 40 days from VTSR

NDMA/DMN ANALYSIS BY GC/MS/SIM

Cnt: 6

System ID	Type	Cont	Matrix	Customer ID	VTSR	Method Date
607071		1	Aqueous	1611181118 (400-SB-10)	22 Nov 16	01 Jan 17
607072		1	Aqueous	1611181119 (400-SB-10)	22 Nov 16	01 Jan 17
607073	MS	1	Aqueous	1611181120 (400-SB-10)	22 Nov 16	01 Jan 17
607074		1	Aqueous	1611181143 (400-SB-12)	22 Nov 16	01 Jan 17
607075		1	Aqueous	1611181144 (400-SB-12)	22 Nov 16	01 Jan 17
607076	MS	1	Aqueous	1611181145 (400-SB-12)	22 Nov 16	01 Jan 17

Date: November 18, 2016

Laboratory PO #15EC092B & 16ECO34

Return Address for Analytical Reports

NASA WSTF Environmental Department
12,600 NASA Road
Las Cruces, NM 88012

Attn: ☒ Tom Hall ☒
Other_____
(575) 524-5453

Analytical Requirements

Special Instructions
Please return coolers and reusable packaging materials as soon as possible.

Return Address:

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

Sample No.	Sample Location	# of Containers	Sample Type: Aqueous (A); Slurry (S)	EPA method 607M 1 liter glass amber bottle Ice	EPA method 607M 8 oz Amber Glass Jar, Ice			Comments
								* Bill to 15EC092B ** Bill to 16ECO34
1611181118*	400-SB-10	1	A	X				
1611181119*	400-SB-10	1	A	X				
1611181120*	400-SB-10	1	A	X				Matrix Spike for 1611181118
1611181127**	400-SB-10	1	S		X			
1611181128**	400-SB-10	1	S		X			
1611181129**	400-SB-10	1	S		X			Matrix Spike for 1611181127
1611181143*	400-SB-12	1	A	X				
1611181144*	400-SB-12	1	A	X				
1611181145*	400-SB-12	1	A	X				Matrix Spike for 1611181143
1611181152**	400-SB-12	1	S		X			
1611181153**	400-SB-12	1	S		X			
1611181154**	400-SB-12	1	S		X			Matrix Spike for 1611181152

Relinquished By:	*Date/Time:*	*Accepted By:*	*Date/Time*
Steven Morales	11/21/16 1100	David Lam	11-22-16/08:30

WSTF – 381C (02/15)

Client: Navarro
SRR # 58711
Project # 16988.01.10X
Case: 15EC092B
VTSR: 11/22/16
Sample(s) Received: Intact
Temperature: 2.0 SN # 021055

NASA-WSTF SHIPPING DOCUMENT

1 Box # XB13

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		SHIP VIA **Fed Ex Air**
	Contain Batteries NO	NO. PKG. 1	DATE SHIPPE 11/212016
	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.
			Navarro PO #15EC092B:		
			Line Item #1 NDMA and Bromacil for Aquesous samples by method 607M	ea.	6
			Navarro PO #16ECO34:		
			Line Item #1 NDMA and Bromacil for Mixed Media samples by method 607M	ea.	6

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!	6	Glass	1 liter Glass Bottle	
☐ FRAGILE	6	Glass	8 oz. Glass Jar	
☑ GLASS				
☐ DELICATE				
☐ DO NOT XRAY				
☑ REFRIGERATE				
☐ OTHER	TOTAL CONTAINERS			TOTAL WEIGHT
☑ BUBBLEWRAP				
☑ FOAM	12			

RECEIVED BY: David Hamm

REPRESENTING: Swift

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
SRR # 58711
Project # 16988.01.10X
Case: 15EC092B
VTSR: 11/22/16
Sample(s) Received: Intact
Temperature: 2.0 SN # 021055

Southwest Research Institute

Laboratory Task Order

TO #: 161122-10 Revision: 0

SDG: 607081

SRR #'s: 58713
Client(s): Navarro

Project(s): 16988.01.10X
Manager(s): SUN, GANG
To Client: 12/13/16

Instructions

Documents Related to this task order: 211512[COC for SRR 58713], 211513[Paperwork for SRR 58713], 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: 6

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
607081		1	Soil	1611181127 (400-SB-10)	18 Nov 16	02 Dec 16
607082		1	Soil	1611181128 (400-SB-10)	18 Nov 16	02 Dec 16
607083	MS	1	Soil	1611181129 (400-SB-10)	18 Nov 16	02 Dec 16
607084		1	Soil	1611181152 (400-SB 12)	18 Nov 16	02 Dec 16
607085		1	Soil	1611181153 (400-SB-12)	18 Nov 16	02 Dec 16
607086	MS	1	Soil	1611181154 (400-SB-12)	18 Nov 16	02 Dec 16

Test: E607W
Section: EXTLAB

Holding: 7 days from CED

EXTRACTION BY METHOD 607

Cnt: 6

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
607081		1	Soil	1611181127 (400-SB-10)	18 Nov 16	25 Nov 16
607082		1	Soil	1611181128 (400-SB-10)	18 Nov 16	25 Nov 16
607083	MS	1	Soil	1611181129 (400-SB-10)	18 Nov 16	25 Nov 16
607084		1	Soil	1611181152 (400-SB 12)	18 Nov 16	25 Nov 16
607085		1	Soil	1611181153 (400-SB-12)	18 Nov 16	25 Nov 16
607086	MS	1	Soil	1611181154 (400-SB-12)	18 Nov 16	25 Nov 16

Test: T607W
Section: TDG

Holding: 40 days from VTSR

NDMA/DMN ANALYSIS BY GC/MS/SIM

Cnt: 6

System ID	Type	Cont	Matrix	Customer ID	VTSR	Method Date
607081		1	Soil	1611181127 (400-SB-10)	22 Nov 16	01 Jan 17
607082		1	Soil	1611181128 (400-SB-10)	22 Nov 16	01 Jan 17
607083	MS	1	Soil	1611181129 (400-SB-10)	22 Nov 16	01 Jan 17
607084		1	Soil	1611181152 (400-SB 12)	22 Nov 16	01 Jan 17
607085		1	Soil	1611181153 (400-SB-12)	22 Nov 16	01 Jan 17
607086	MS	1	Soil	1611181154 (400-SB-12)	22 Nov 16	01 Jan 17

Date: November 18, 2016

Laboratory PO #15EC092B & 16ECO34 . 16ECO34-C1

Return Address for Analytical Reports

NASA WSTF Environmental Department
12,600 NASA Road
Las Cruces, NM 88012

Attn: ☒ Tom Hall ☒
Other _____
(575) 524-5453

Analytical Requirements

Special Instructions
Please return coolers and reusable packaging materials as soon as possible.

Return Address:

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

Sample No.	Sample Location	# of Containers	Sample Type: Aqueous (A); Slurry (S)	EPA method 607M 1 liter glass amber bottle Ice	EPA method 607M 8 oz Amber Glass Jar, Ice			Comments
								* Bill to 15EC092B ** Bill to 16ECO34
1611181118*	400-SB-10	1	A	X				
1611181119*	400-SB-10	1	A	X				
1611181120*	400-SB-10	1	A	X				Matrix Spike for 1611181118
1611181127**	400-SB-10	1	S		X			
1611181128**	400-SB-10	1	S		X			
1611181129**	400-SB-10	1	S		X			Matrix Spike for 1611181127
1611181143*	400-SB-12	1	A	X				
1611181144*	400-SB-12	1	A	X				
1611181145*	400-SB-12	1	A	X				Matrix Spike for 1611181143
1611181152**	400-SB-12	1	S		X			
1611181153**	400-SB-12	1	S		X			
1611181154**	400-SB-12	1	S		X			Matrix Spike for 1611181152

Relinquished By:	*Date/Time:*	*Accepted By:*	*Date/Time:*
Steve Meadows	11/21/16 11:00	David Damm	11-22-16 / 08:30

WSTF – 381C (02/15)

Client: Navarro
SRR # 58713
Project # 16988.01.10X
Case: 16EC034
VTSR: 11/22/16
Sample(s) Received: Intact
Temperature: 2.0 SN # 021055

010009

NASA-WSTF SHIPPING DOCUMENT

Blue #XB13

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		SHIP VIA Fed Ex Air	
	Contain Batteries NO	NO. PKG. 1	DATE SHIPPE 11/212016	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.
			~~Navarro PO #15EC092B:~~ Line Item #1 NDMA and Bromacil for Aquesous samples by method 607M	ea.	6
			Navarro PO #16ECO34: Line Item #1 NDMA and Bromacil for Mixed Media samples by method 607M	ea.	6

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	6	Glass	1 liter Glass Bottle	
☐ FRAGILE	6	Glass	8 oz. Glass Jar	
☑ GLASS				
☐ DELICATE				
☐ DO NOT XRAY				
☑ REFRIGERATE				
☐ OTHER	TOTAL CONTAINERS			TOTAL WEIGHT
☑ BUBBLEWRAP	12			
☑ FOAM				

RECEIVED BY: Daniel 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
SRR # 58713
Project # 16988.01.10X
Case: 16EC034
VTSR: 11/22/16
Sample(s) Received: Intact
Temperature: 2.0 SN # 021055

CLIENT:	Navarro Research and Engineering Inc.
SwRI PROJECT:	01.16988
TASK ORDER:	161122-9, 161122-10
NAVARRO PO #:	15EC092B,16EC034-C1

ANALYTICAL DATA REPORT SHEETS

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1611181118 (400-SB-10)

Client: Navarro
Batch: M607-#725-T
Task Order: 161122-9
Matrix: Aqueous
Sample Wt/Vol: 1000 mL

Project: 16988.01.103
Date Received: 11/22/16
Date Extracted: 11/23/16
Date Analyzed: 12/07/16
Date Reported: 12/08/16

Lab Sample ID: 607071
Lab File Name: A1206625.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: µg/L
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.01	U
4164-28-7	N-Nitrodimethylamine	0.10	
314-40-9	Bromacil	<0.01	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

1611181119 (400-SB-10)

Client: Navarro
Batch: M607-#725-T
Task Order: 161122-9
Matrix: Aqueous
Sample Wt/Vol: 1000 mL

Project: 16988.01.103
Date Received: 11/22/16
Date Extracted: 11/23/16
Date Analyzed: 12/07/16
Date Reported: 12/08/16

Lab Sample ID: 607072
Lab File Name: A1206626.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: µg/L
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.01	U
4164-28-7	N-Nitrodimethylamine	0.10	
314-40-9	Bromacil	<0.01	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

1611181143 (400-SB-12)

Client: Navarro
Batch: M607-#725-T
Task Order: 161122-9
Matrix: Aqueous
Sample Wt/Vol: 990 mL

Project: 16988.01.103
Date Received: 11/22/16
Date Extracted: 11/23/16
Date Analyzed: 12/07/16
Date Reported: 12/08/16

Lab Sample ID: 607074
Lab File Name: A1206628.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: µg/L
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.01	U
4164-28-7	N-Nitrodimethylamine	<0.01	U
314-40-9	Bromacil	<0.01	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

1611181144 (400-SB-12)

Client: Navarro
Batch: M607-#725-T
Task Order: 161122-9
Matrix: Aqueous
Sample Wt/Vol: 990 mL

Project: 16988.01.103
Date Received: 11/22/16
Date Extracted: 11/23/16
Date Analyzed: 12/07/16
Date Reported: 12/08/16

Lab Sample ID: 607075
Lab File Name: A1206629.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: µg/L
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.01	U
4164-28-7	N-Nitrodimethylamine	<0.01	U
314-40-9	Bromacil	<0.01	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

1611181127 (400-SB-10)

Client: Navarro
Batch: M607-#725-T
Task Order: 161122-10
Matrix: Soil
Sample Wt/Vol: 31.39 g

Project: 16988.01.103
Date Received: 11/22/16
Date Extracted: 11/23/16
Date Analyzed: 12/07/16
Date Reported: 12/08/16

Lab Sample ID: 607081
Lab File Name: A1206647.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	<0.32	U
4164-28-7	N-Nitrodimethylamine	<0.32	U
314-40-9	Bromacil	<0.32	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

1611181128 (400-SB-10)

Client: Navarro
Batch: M607-#725-T
Task Order: 161122-10
Matrix: Soil
Sample Wt/Vol: 30.57 g

Project: 16988.01.103
Date Received: 11/22/16
Date Extracted: 11/23/16
Date Analyzed: 12/07/16
Date Reported: 12/08/16

Lab Sample ID: 607082
Lab File Name: A1206648.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

1611181152 (400-SB 12)

Client: Navarro
Batch: M607-#725-T
Task Order: 161122-10
Matrix: Soil
Sample Wt/Vol: 31.94 g

Project: 16988.01.103
Date Received: 11/22/16
Date Extracted: 11/23/16
Date Analyzed: 12/07/16
Date Reported: 12/08/16

Lab Sample ID: 607084
Lab File Name: A1206650.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	<0.31	U
4164-28-7	N-Nitrodimethylamine	<0.31	U
314-40-9	Bromacil	<0.31	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

1611181153 (400-SB-12)

Client: Navarro
Batch: M607-#725-T
Task Order: 161122-10
Matrix: Soil
Sample Wt/Vol: 31.80 g

Project: 16988.01.103
Date Received: 11/22/16
Date Extracted: 11/23/16
Date Analyzed: 12/07/16
Date Reported: 12/08/16

Lab Sample ID: 607085
Lab File Name: A1206651.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	0.16	J
4164-28-7	N-Nitrodimethylamine	<0.31	U
314-40-9	Bromacil	<0.31	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: 161122-9, 161122-10
NAVARRO PO #: 15EC092B,16EC034-C1

QA DATA SHEETS

(BLANK, MATRIX SPIKE, SURROGATE, CALIBRATION)

Southwest Research Institute

Method 607 Internal Standard Summary

Filename: A12066S2.txt
Standard ID: IS=1NG/UL
Project: 16988.01.103

Date Analyzed: 12/07/2016
Time Analyzed: 08:37:00
Client: Navarro

		IS1		IS2	
		Area	RT	Area	RT
	Mid Point Standard	281636	8.41	156295	15.02
	Upper Limit	563272	8.74	312590	15.35
	Lower Limit	140818	8.08	78147.5	14.69
Client Sample ID	**Lab Sample ID**				
BLANK_23NOV16	607195	233575	8.40	131352	15.02
LCS_23NOV16 LCS	607196 LCS	239160	8.40	132664	15.01
1611181127 (400-SB-10)	607081	242856	8.40	134971	15.02
1611181128 (400-SB-10)	607082	248413	8.40	138853	15.02
1611181129 (400-SB-10) MS	607083 MS	260217	8.40	137466	15.02
1611181152 (400-SB 12)	607084	260927	8.40	143055	15.02
1611181153 (400-SB-12)	607085	249156	8.40	142073	15.02
1611181154 (400-SB-12) MS	607086 MS	261328	8.40	139117	15.02

IS1 = 1,4-Dichlorobenzene-D4
IS2 = Atrazine-D5

* Flag indicating value is outside QC limits

Southwest Research Institute

Method 607 Internal Standard Summary

Filename: A12066S1.txt
Standard ID: IS=1NG/UL
Project: 16988.01.103

Date Analyzed: 12/06/2016
Time Analyzed: 02:58:00
Client: Navarro

		IS1		IS2	
		Area	RT	Area	RT
	Mid Point Standard	292136	8.42	156851	15.03
	Upper Limit	584272	8.75	313702	15.36
	Lower Limit	146068	8.09	78425.5	14.7
Client Sample ID	**Lab Sample ID**				
BLANK_23NOV16	607159	222943	8.41	125186	15.02
LCS_23NOV16 LCS	607160 LCS	226859	8.41	124143	15.02
1611181118 (400-SB-10)	607071	230203	8.41	123356	15.02
1611181119 (400-SB-10)	607072	242024	8.41	126552	15.02
1611181120 (400-SB-10) MS	607073 MS	247169	8.41	138246	15.02
1611181143 (400-SB-12)	607074	253628	8.41	133983	15.03
1611181144 (400-SB-12)	607075	240599	8.41	125396	15.03
1611181145 (400-SB-12) MS	607076 MS	261321	8.41	143279	15.03

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_23NOV16
Client: Navarro
Matrix: Soil

Project: 16988.01.103
SDG: 607081

This method blank applies to the following samples, MS, and MSD's

Client Sample ID	Lab Sample ID	Date Acquired	Time Acquired
LCS_23NOV16	607196 LCS	12/07/16	17:42:00
1611181127 (400-SB-10)	607081	12/07/16	18:16:00
1611181128 (400-SB-10)	607082	12/07/16	18:50:00
1611181129 (400-SB-10)	607083 MS	12/07/16	19:24:00
1611181152 (400-SB 12)	607084	12/07/16	19:58:00
1611181153 (400-SB-12)	607085	12/07/16	20:32:00
1611181154 (400-SB-12)	607086 MS	12/07/16	21:06:00

Southwest Research Institute

Method 607 Blank Summary

Blank ID: BLANK_23NOV16 Project: 16988.01.103

Client: Navarro SDG: 607071

Matrix: Aqueous

This method blank applies to the following samples, MS, and MSD's

Client Sample ID	Lab Sample ID	Date Acquired	Time Acquired
LCS_23NOV16	607160 LCS	12/06/16	19:29:00
1611181118 (400-SB-10)	607071	12/07/16	05:11:00
1611181119 (400-SB-10)	607072	12/07/16	05:46:00
1611181120 (400-SB-10)	607073 MS	12/07/16	06:20:00
1611181143 (400-SB-12)	607074	12/07/16	06:54:00
1611181144 (400-SB-12)	607075	12/07/16	07:29:00
1611181145 (400-SB-12)	607076 MS	12/07/16	08:03:00

Southwest Research Institute

Method 607 Surrogate Recovery Summary

Client: Navarro
Matrix: Soil, Aqueous
Project: 16988.01.103

SDG: 607071, 607081

	Client Sample ID	Lab Sample ID	N-Nitroso-di-n-propylamine	
			% Recovery	Recovery Limits
3	BLANK_23NOV16	607159	106	40-160
4	LCS_23NOV16	607160 LCS	108	40-160
5	1611181118 (400-SB-10)	607071	111	40-160
6	1611181119 (400-SB-10)	607072	111	40-160
7	1611181120 (400-SB-10)	607073 MS	110	40-160
8	1611181143 (400-SB-12)	607074	105	40-160
9	1611181144 (400-SB-12)	607075	117	40-160
10	1611181145 (400-SB-12)	607076 MS	104	40-160
11	BLANK_23NOV16	607195	116	40-160
12	LCS_23NOV16	607196 LCS	108	40-160
13	1611181127 (400-SB-10)	607081	108	40-160
14	1611181128 (400-SB-10)	607082	107	40-160
15	1611181129 (400-SB-10)	607083 MS	109	40-160
16	1611181152 (400-SB 12)	607084	101	40-160
17	1611181153 (400-SB-12)	607085	101	40-160
18	1611181154 (400-SB-12)	607086 MS	98	40-160

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

BLANK_23NOV16

Client: Navarro
Batch: M607-#725-T
Task Order: NA
Matrix: Aqueous
Sample Wt/Vol: 1000 mL

Project: 16988.01.103
Date Received: NA
Date Extracted: 11/23/16
Date Analyzed: 12/06/16
Date Reported: 12/08/16

Lab Sample ID: 607159
Lab File Name: A1206607.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: µg/L
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	<0.01	U
4164-28-7	N-Nitrodimethylamine	<0.01	U
314-40-9	Bromacil	<0.01	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_23NOV16

Client: Navarro
Batch: M607-#725-T
Task Order: NA
Matrix: Aqueous
Sample Wt/Vol: 1000 mL

Project: 16988.01.103
Date Received: NA
Date Extracted: 11/23/16
Date Analyzed: 12/06/16
Date Reported: 12/08/16

Lab Sample ID: 607160 LCS
Lab File Name: A1206608.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: µg/L
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Q
62-75-9	N-Nitrosodimethylamine	0.20	
4164-28-7	N-Nitrodimethylamine	0.38	
314-40-9	Bromacil	0.64	

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_23NOV16

Client: Navarro
Batch: M607-#725-T
Task Order: NA
Matrix: Aqueous
Sample Wt/Vol: 1000 mL

Project: 16988.01.103
Date Received: NA
Date Extracted: 11/23/16
Date Analyzed: 12/06/16
Date Reported: 12/08/16

Lab Sample ID: 607160 LCS
Blank ID: BLANK_23NOV16

ANALYTE	Spike Added µg/L	Blank Conc µg/L	LCS Conc µg/L	% Recovery	QC % Recovery Limits
N-Nitrosodimethylamine	0.50	0	0.20	40	13 - 110
N-Nitrodimethylamine	0.50	0	0.38	76	30 - 150
Bromacil	0.50	0	0.64	128	40 - 190

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID
1611181120 (400-SB-10) MS

Client: Navarro
Batch: M607-#725-T
Task Order: 161122-9
Matrix: Aqueous
Sample Wt/Vol: 1000 mL
Compared Sample: 1611181118 (400-SB-10)

Project: 16988.01.103
Date Received: 11/22/16
Date Extracted: 11/23/16
Date Analyzed: 12/07/16
Date Reported: 12/08/16

Lab Sample ID: 607073 MS
Lab File Name: A1206627.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: µg/L
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Spike	Recovery	Recovery Limit
62-75-9	N-Nitrosodimethylamine	0.17	0.50	34%	13-110%
4164-28-7	N-Nitrodimethylamine	0.46	0.50	73%	30-150%
314-40-9	Bromacil	0.66	0.50	132%	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

Method 607 Analysis Data Sheet

Sample ID
1611181145 (400-SB-12) MS

Client: Navarro
Batch: M607-#725-T
Task Order: 161122-9
Matrix: Aqueous
Sample Wt/Vol: 1000 mL
Compared Sample: 1611181143 (400-SB-12)

Project: 16988.01.103
Date Received: 11/22/16
Date Extracted: 11/23/16
Date Analyzed: 12/07/16
Date Reported: 12/08/16

Lab Sample ID: 607076 MS
Lab File Name: A1206630.txt
Final Extraction Vol: 1000 uL
Dilution Factor: 1
Reporting Unit: µg/L
Method: TAP 01-0408-031

CAS No.	ANALYTE	RESULT	Spike	Recovery	Recovery Limit
62-75-9	N-Nitrosodimethylamine	0.17	0.50	33%	13-110%
4164-28-7	N-Nitrodimethylamine	0.35	0.50	71%	30-150%
314-40-9	Bromacil	0.66	0.50	133%	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

Method 607 Analysis Data Sheet

Sample ID

BLANK_23NOV16

Client: Navarro
Batch: M607-#725-T
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.55 g

Project: 16988.01.103
Date Received: NA
Date Extracted: 11/23/16
Date Analyzed: 12/07/16
Date Reported: 12/08/16

Lab Sample ID: 607195
Lab File Name: A1206645.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_23NOV16

Client: Navarro
Batch: M607-#725-T
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.30 g

Project: 16988.01.103
Date Received: NA
Date Extracted: 11/23/16
Date Analyzed: 12/07/16
Date Reported: 12/08/16

Lab Sample ID: 607196 LCS
Lab File Name: A1206646.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	16.80	
4164-28-7	N-Nitrodimethylamine	18.48	
314-40-9	Bromacil	22.64	

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_23NOV16

Client: Navarro
Batch: M607-#725-T
Task Order: NA
Matrix: Soil
Sample Wt/Vol: 30.30 g

Project: 16988.01.103
Date Received: NA
Date Extracted: 11/23/16
Date Analyzed: 12/07/16
Date Reported: 12/08/16

Lab Sample ID: 607196 LCS
Blank ID: BLANK_23NOV16

ANALYTE	Spike Added ng/g	Blank Conc ng/g	LCS Conc ng/g	% Recovery	QC % Recovery Limits
N-Nitrosodimethylamine	17	0	17	100	13 - 110
N-Nitrodimethylamine	17	0	18	106	30 - 150
Bromacil	17	0	23	135	40 - 190

Southwest Research Institute

Method 607 Analysis Data Sheet

Sample ID

1611181129 (400-SB-10) MS

Client: Navarro
Batch: M607-#725-T
Task Order: 161122-10
Matrix: Soil
Sample Wt/Vol: 30.68 g
Compared Sample: 1611181127 (400-SB-10)

Project: 16988.01.103
Date Received: 11/22/16
Date Extracted: 11/23/16
Date Analyzed: 12/07/16
Date Reported: 12/08/16

Lab Sample ID: 607083 MS
Lab File Name: A1206649.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	15.25	0.50	90%	13-110%
4164-28-7	N-Nitrodimethylamine	16.72	0.50	98%	30-150%
314-40-9	Bromacil	23.76	0.50	140%	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

Method 607 Analysis Data Sheet

Sample ID

1611181154 (400-SB-12) MS

Client: Navarro
Batch: M607-#725-T
Task Order: 161122-10
Matrix: Soil
Sample Wt/Vol: 30.90 g
Compared Sample: 1611181152 (400-SB 12)

Project: 16988.01.103
Date Received: 11/22/16
Date Extracted: 11/23/16
Date Analyzed: 12/07/16
Date Reported: 12/08/16

Lab Sample ID: 607086 MS
Lab File Name: A1206652.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	13.72	0.50	81%	13-110%
4164-28-7	N-Nitrodimethylamine	15.57	0.50	92%	30-150%
314-40-9	Bromacil	20.74	0.50	122%	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:	12/06/16
Sponsor:	Navarro	Analytical Method:	TAP-01-0408-031
SwRI Standard ID:	202-04-120408017	Std Concentration:	1 µg/mL
File ID #:	A12066S1	Initial Calibration Date:	10/17/16

ANALYTE	Mean RRF	RRF	% Dif.
N-Nitrosodimethylamine	0.361	0.381	-5.4
N-Nitrodimethylamine	0.13	0.131	-1
N-Nitroso-di-n-propylamine-d14	0.127	0.129	-1.4
Bromacil	1.161	0.992	14.5

Southwest Research Institute

Continuing Calibration Check Sheet

SwRI Project #:	01.16988.01.103	Calibration Date:	12/07/16
Sponsor:	Navarro	Analytical Method:	TAP-01-0408-031
SwRI Standard ID:	202-04-120408017	Std Concentration:	1 µg/mL
File ID #:	A12066S2	Initial Calibration Date:	10/17/16

ANALYTE	Mean RRF	RRF	% Dif.
N-Nitrosodimethylamine	0.361	0.39	-7.9
N-Nitrodimethylamine	0.13	0.134	-3.1
N-Nitroso-di-n-propylamine-d14	0.127	0.131	-2.6
Bromacil	1.161	1.013	12.7

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: 161122-9, 161122-10
NAVARRO PO #: 15EC092B,16EC034-C1

EXTRACTION AND INJECTION LOG

(E607W) Water Extraction By Sep-Funnel 3510C (Navarro)

SwRI Labs
Client: Navarro
Project: 16988.01.10X
Case: 15EC043B, 15EC092B

Sample Receipt: 58707, 58709, 58711
TO#'s: 161122-8, 161122-9, 161122-7

DATE EXTRACTED	11/23/16
ANALYSTS INVOLVED	Hamed Edrisi(SU,SW,EXT,KD) Christina Menn (SU,SP,EXT,KD,QT,BD,FV)
SURROGATE SOL. ID	203-01-120408017 @5.0ng/uL
MTX SPK SOL. ID	201-01-120408017 @10ng/uL
EXTRACTS LOCATION	Tracked by LIMS (12/01/16 CM)
CHEMICAL,BRAND &LOT#	Ozarka water ID:04-0402-003p22B7 Sodium Sulfate ID:04-0402-004p27B DCM Fisher Optima Lot#164214

NOTES	Hamilton Co. Syringes: 100uL ID:462905(SURR) 50uL ID:462898(MS)
ADDITIONAL NOTES	pH Paper ID:511507 Thermometer ID: G-076
EMULSION	C= Centrifuged,W= Wired,T= Tilted
EXTRACTION FLOWCHART	XmL H2O-->>FV 1000uL DCM
REFRENCE BOOK &PAGE	16-0402-032 p51
TAP(S) USED	01-0402-074

	System ID	Type	Customer ID	PH	SAMPLE VOL	SURROGATE SOL VOL
1	607039		1611181649 (400-SB-13)	6.0	1060 mL	100 uL
2	607041		1611200809 (400-SB-08)	6.0	1060 mL	100 uL
3	607046		1611210832 (400-SB-13)	6.4	1050 mL	100 uL
4	607057		1611180700 (B655-EFF-2)	6.8	960 mL	100 uL
5	607058		1611180721 (B655-INF-2)	6.8	970 mL	100 uL
6	607059		1611180752 (MPE-1)	6.4	950 mL	100 uL
7	607060		1611180812 (MPE-8)	6.4	970 mL	100 uL
8	607061		1611180834 (MPE-9)	6.4	970 mL	100 uL
9	607062		1611180835 (MPE-9)	6.4	950 mL	100 uL
10	607063		1611180903 (MPE-10)	6.4	920 mL	100 uL
11	607064		1611180904 (MPE-10)	6.4	950 mL	100 uL
12	607065		1611180928 (MPE-11)	6.4	970 mL	100 uL
13	607066		1611190857B (BLM-3-182)	6.0	960 mL	100 uL
14	607067		1611210756Y (200-F-370)	6.4	960 mL	100 uL
15	607068		1611210901Y (200-F-420)	6.0	950 mL	100 uL
16	607069		1611211011Y (200-F-420)	6.4	950 mL	100 uL
17	607071		1611181118 (400-SB-10)	6.4	1000 mL	100 uL
18	607072		1611181119 (400-SB-10)	6.4	1000 mL	100 uL
19	607073	MS	1611181120 (400-SB-10)	6.4	1000 mL	100 uL
20	607074		1611181143 (400-SB-12)	6.8	990 mL	100 uL
21	607075		1611181144 (400-SB-12)	6.8	990 mL	100 uL
22	607076	MS	1611181145 (400-SB-12)	6.8	1000 mL	100 uL
23	607159		BLANK_23NOV16	6.4	1000 mL	100 uL
24	607160		LCS_23NOV16	6.4	1000 mL	100 uL

System ID	Type	Customer ID	MTX SPK SOL VOL	FV DCM	EMULSION

(E607W) Water Extraction By Sep-Funnel 3510C (Navarro)

SwRI Labs
Client: Navarro
Project: 16988.01.10X
Case: 15EC043B, 15EC092B

Sample Receipt: 58707, 58709, 58711
TO#'s: 161122-8, 161122-9, 161122-7

	System ID	Type	Customer ID	MTX SPK SOL VOL	FV DCM	EMULSION
1	607039		1611181649 (400-SB-13)	0 uL	1000 uL	no
2	607041		1611200809 (400-SB-08)	0 uL	1000 uL	no
3	607046		1611210832 (400-SB-13)	0 uL	1000 uL	no
4	607057		1611180700 (B655-EFF-2)	0 uL	1000 uL	yes-t
5	607058		1611180721 (B655-INF-2)	0 uL	1000 uL	no
6	607059		1611180752 (MPE-1)	0 uL	1000 uL	no
7	607060		1611180812 (MPE-8)	0 uL	1000 uL	no
8	607061		1611180834 (MPE-9)	0 uL	1000 uL	no
9	607062		1611180835 (MPE-9)	0 uL	1000 uL	no
10	607063		1611180903 (MPE-10)	0 uL	1000 uL	no
11	607064		1611180904 (MPE-10)	0 uL	1000 uL	no
12	607065		1611180928 (MPE-11)	0 uL	1000 uL	no
13	607066		1611190857B (BLM-3-182)	0 uL	1000 uL	no
14	607067		1611210756Y (200-F-370)	0 uL	1000 uL	no
15	607068		1611210901Y (200-F-420)	0 uL	1000 uL	no
16	607069		1611211011Y (200-F-420)	0 uL	1000 uL	no
17	607071		1611181118 (400-SB-10)	0 uL	1000 uL	yes-t
18	607072		1611181119 (400-SB-10)	0 uL	1000 uL	yes-t
19	607073	MS	1611181120 (400-SB-10)	50 uL	1000 uL	yes-t
20	607074		1611181143 (400-SB-12)	0 uL	1000 uL	yes
21	607075		1611181144 (400-SB-12)	0 uL	1000 uL	yes
22	607076	MS	1611181145 (400-SB-12)	50 uL	1000 uL	yes
23	607159		BLANK_23NOV16	0 uL	1000 uL	no
24	607160		LCS_23NOV16	50 uL	1000 uL	no

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Book: EXTRACTION LAB, Volume: EXT-2016, Page: 516 (Section 2 of 2)
Approved by CHRISTINA MENN on Dec 8 2016 10:39AM

Date Printed: 12/08/2016

(E607S) SOIL/Water Ext By Sep-Funnel / Soxhlet 3540 C (Navarro)

X36474

SwRI Labs
Client: Navarro
Project: 16988.01.10X
Case: 16EC034

Sample Receipt: 58713
TO#: 161122-10

DATE EXTRACTED	11/23/16
ANALYSTS INVOLVED	Hamed Edrisi(SU,SW,EXT,KD) Christina Menn (SU,SP,EXT,KD,QT,BD,FV)
SURROGATE SOL ID	203-01-120408017 @5.0ng/uL
MTX SPK SOL ID	201-01-120408017 @10ng/uL
EXTRACTS LOCATION	Tracked by LIMS (12/05/16 CM)
CHEMICAL,BRAND &LOT#	Ozarka water ID:04-0402-003p22B7 Sodium Sulfate ID:04-0402-004p27B DCM Fisher Optima Lot#164214
NOTES	Hamilton Co. Syringes: 100uL ID:462905(SURR) 50uL ID:462898(MS) pH Paper ID:511507 Thermometer ID: G-076
ADDITIONAL NOTES I	These samples contained approximately 6 to 14% water. As per PM's instructions,approximately 30 g of the water/soil sample mixture was weighed and separated into its aqueous and solid phase. The aqueous phase was extracted by sep-funnel method three times, and the solid phase was extracted by Soxhlet, extracts from both phases were combine and concentrated to FV for GC/MS analysis.

ADDITIONAL NOTES II	1.Soxhlet extraction began at 5:00pm and ended the following day at 11:00am. 2.The aqueous portion was spiked with 20% and the solid portion was spike with 80% of surrogate, MS'S and LCS also spiked with 20% in aqueous and 80% in solid of matrix spike prior to extraction.
EMULSION	C= Centrifuged,W= Wired,T= Tilted
REFRENCE BOOK &PAGE	16-0402-032 p52
TAP(S) USED	Water 01-0402-074 Soil 01-0402-152

	System ID	Type	Customer ID	SOLVENT VOL DCM (ML)	SAMPLE WT	SURROGATE SOL VOL
1	607081		1611181127 (400-SB-10)	300	31.39 g	100 uL
2	607082		1611181128 (400-SB-10)	300	30.57 g	100 uL
3	607083	MS	1611181129 (400-SB-10)	300	30.68 g	100 uL
4	607084		1611181152 (400-SB 12)	300	31.94 g	100 uL
5	607085		1611181153 (400-SB-12)	300	31.80 g	100 uL
6	607086	MS	1611181154 (400-SB-12)	300	30.90 g	100 uL
7	607195		BLANK_23NOV16	300	30.55 g	100 uL
8	607196		LCS_23NOV16	300	30.30 g	100 uL

	System ID	Type	Customer ID	MTX SPK SOL VOL	FV DCM
1	607081		1611181127 (400-SB-10)	0 uL	1000 uL
2	607082		1611181128 (400-SB-10)	0 uL	1000 uL
3	607083	MS	1611181129 (400-SB-10)	50 uL	1000 uL
4	607084		1611181152 (400-SB 12)	0 uL	1000 uL
5	607085		1611181153 (400-SB-12)	0 uL	1000 uL
6	607086	MS	1611181154 (400-SB-12)	50 uL	1000 uL
7	607195		BLANK_23NOV16	0 uL	1000 uL
8	607196		LCS_23NOV16	50 uL	1000 uL

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Approved by CHRISTINA MENN on Dec 8 2016 10:39AM

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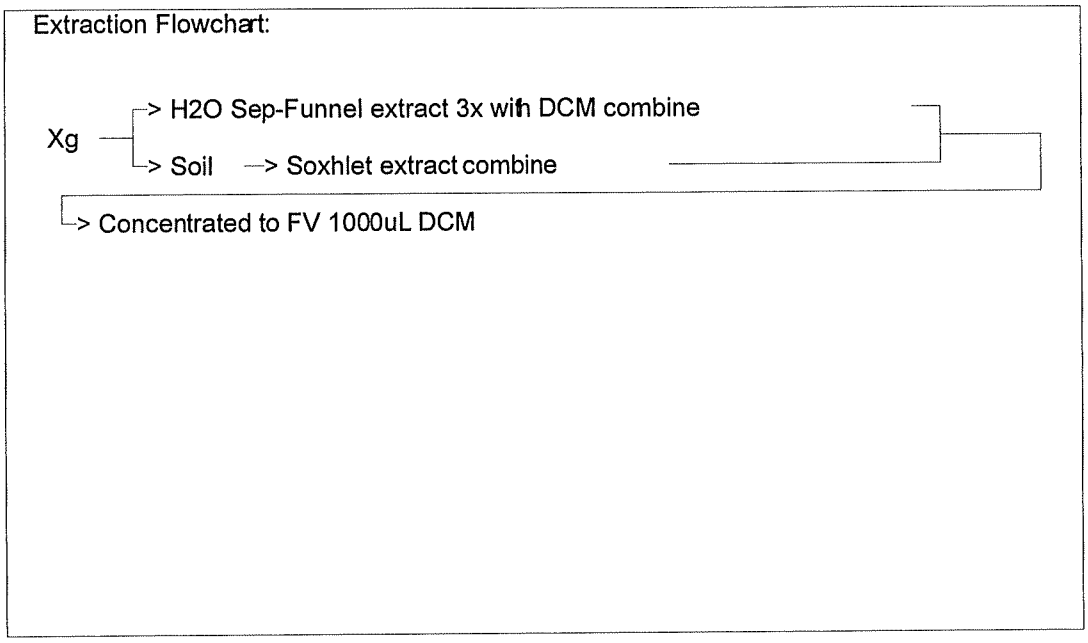
(E607S) SOIL/Water Ext By Sep-Funnel / Soxhlet 3540 C (Navarro)

SwRI Labs
Client: Navarro
Project: 16988.01.10X
Case: 16EC034

Sample Receipt: 58713
TO#: 161122-10

Extraction Flowchart:



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Work

injlog

Southwest Research Institute GC/MS Injection Log

OPERATOR: GS SEQUENCE DATE: 12/06/16, 12/07/16, 12/08/16INSTRUMENT: 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: 58695,58700,58707,58709,58711,58713,58729,58751,58752,58762 METHOD: M-607
DATA PATH: C:\MSDChem\1\DATA\2016\A120616 MATRIX: water & soil

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

REVIEWED BY: Alice Yan
DATE: 12/08/16

FILENAME	VIAL	DATE/TIME	METHOD	SAMPLE DESCRIPTION
A12066C1	100	12/06/16 14:16	MET_607C	SLUG
A12066C2	1	12/06/16 14:50	MET_607C	DCM
A12066S1	2	12/06/16 14:58	MET_607C	NDMA/DMN/BROMACIL STD 1NG/UL IS=1NG/UL
A1206601	3	12/06/16 15:32	MET_607C	BLANK_22NOV16 IS=0.2NG/L 607133
A1206602	4	12/06/16 16:06	MET_607C	LCS_22NOV16 IS=0.2NG/L 607134
A1206603	5	12/06/16 16:39	MET_607C	1611170916B (BLM-26-404) IS=0.2NG/L 606930
A1206604	6	12/06/16 17:13	MET_607C	1611151248 (400-SB-9) IS=0.2NG/L 606990
A1206605	7	12/06/16 17:47	MET_607C	1611160828 (400-SB-09) IS=0.2NG/L 606992
A1206606	8	12/06/16 18:21	MET_607C	1611170949 (400-SB-13) IS=0.2NG/L 606996
A1206607	9	12/06/16 18:55	MET_607C	BLANK_23NOV16 IS=0.2NG/L 607159
A1206608	10	12/06/16 19:29	MET_607C	LCS_23NOV16 IS=0.2NG/L 607160
A1206609	11	12/06/16 20:03	MET_607C	1611181649 (400-SB-13) IS=0.2NG/L 607039
A1206610	12	12/06/16 20:37	MET_607C	1611200809 (400-SB-08) IS=0.2NG/L 607041
A1206611	13	12/06/16 21:11	MET_607C	1611210832 (400-SB-13) IS=0.2NG/L 607046
A1206612	14	12/06/16 21:46	MET_607C	1611180700 (B655-EFF-2) IS=0.2NG/L 607057
A1206613	15	12/06/16 22:20	MET_607C	1611180721 (B655-INF-2) IS=0.2NG/L 607058
A1206614	16	12/06/16 22:54	MET_607C	1611180752 (MPE-1) IS=0.2NG/L 607059
A1206615	17	12/06/16 23:28	MET_607C	1611180812 (MPE-8) IS=0.2NG/L 607060
A1206616	18	12/07/16 00:02	MET_607C	1611180834 (MPE-9) IS=0.2NG/L 607061
A1206617	19	12/07/16 00:36	MET_607C	1611180835 (MPE-9) IS=0.2NG/L 607062
A1206618	20	12/07/16 01:11	MET_607C	1611180903 (MPE-10) IS=0.2NG/L 607063
A1206619	21	12/07/16 01:45	MET_607C	1611180904 (MPE-10) IS=0.2NG/L 607064
A1206620	22	12/07/16 02:19	MET_607C	1611180928 (MPE-11) IS=0.2NG/L 607065
A1206621	23	12/07/16 02:54	MET_607C	1611190857B (BLM-3-182) IS=0.2NG/L 607066
A1206622	24	12/07/16 03:28	MET_607C	1611210756Y (200-F-370) IS=0.2NG/L 607067
A1206623	25	12/07/16 04:02	MET_607C	1611210901Y (200-F-420) IS=0.2NG/L 607068
A1206624	26	12/07/16 04:37	MET_607C	1611211011Y (200-F-420) IS=0.2NG/L 607069
A1206625	27	12/07/16 05:11	MET_607C	1611181118 (400-SB-10) IS=0.2NG/L 607071
A1206626	28	12/07/16 05:46	MET_607C	1611181119 (400-SB-10) IS=0.2NG/L 607072
A1206627	29	12/07/16 06:20	MET_607C	1611181120 (400-SB-10) IS=0.2NG/L 607073MS
A1206628	30	12/07/16 06:54	MET_607C	1611181143 (400-SB-12) IS=0.2NG/L 607074
A1206629	31	12/07/16 07:29	MET_607C	1611181144 (400-SB-12) IS=0.2NG/L 607075
A1206630	32	12/07/16 08:03	MET_607C	1611181145 (400-SB-12) IS=0.2NG/L 607076MS
A12066S2	2	12/07/16 08:37	MET_607C	NDMA/DMN/BROMACIL STD 1NG/UL IS=1NG/UL
A1206631	33	12/07/16 09:12	MET_607C	BLANK_29NOV16 IS=0.2NG/L 607356
A1206632	34	12/07/16 09:46	MET_607C	LCS_29NOV16 IS=0.2NG/L 607357
A1206633	35	12/07/16 10:20	MET_607C	1611151614 (400-SB-9)2.5-3.5)) 606991
A1206634	36	12/07/16 10:54	MET_607C	1611161004 (400-SB-09)52.5'-53.5')) 606993
A1206635	37	12/07/16 11:28	MET_607C	1611161010 (400-SB-09)52.5'-53.5')) 606994MS
A1206636	38	12/07/16 12:02	MET_607C	1611161509 (400-SB-09)86.5'-87.5')) 606995
A1206637	39	12/07/16 12:36	MET_607C	1611171144 (400-SB-13)9'-10')) 607036
A1206638	40	12/07/16 13:10	MET_607C	1611181334 (400-SB-13)47.7-48.5')) 607037
A1206639	41	12/07/16 13:45	MET_607C	1611181340 (400-SB-13)47.5'-48.5')) 607038MS
A1206640	42	12/07/16 14:18	MET_607C	1611181704 (400-SB-13)75'-77')) 607040
A1206641	43	12/07/16 14:53	MET_607C	1611201134 (400-SB-08)1'-2')) 607042
A1206642	44	12/07/16 15:26	MET_607C	1611201419 (400-SB-08)41'-42')) 607043
A1206643	45	12/07/16 16:00	MET_607C	1611201425 (400-SB-08)41'-42')) 607044MS
A1206644	46	12/07/16 16:34	MET_607C	1611201624 (400-SB-08)77'-77.5')) 607045
A1206645	47	12/07/16 17:08	MET_607C	BLANK_23NOV16 IS=0.2NG/L 607195
A1206646	48	12/07/16 17:42	MET_607C	LCS_23NOV16 IS=0.2NG/L 607196
A1206647	49	12/07/16 18:16	MET_607C	1611181127 (400-SB-10) IS=0.2NG/L 607081
A1206648	50	12/07/16 18:50	MET_607C	1611181128 (400-SB-10) IS=0.2NG/L 607082
A1206649	51	12/07/16 19:24	MET_607C	1611181129 (400-SB-10) IS=0.2NG/L 607083MS
A1206650	52	12/07/16 19:58	MET_607C	1611181152 (400-SB-12) IS=0.2NG/L 607084
A1206651	53	12/07/16 20:32	MET_607C	1611181153 (400-SB-12) IS=0.2NG/L 607085

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A1206652	54	12/07/16	21:06 MET_607C	1611181154 (400-SB-12) IS=0.2NG/L 607086MS
A1206653	55	12/07/16	21:40 MET_607C	BLANK_02DEC16 IS=0.2NG/L 607579
A1206654	56	12/07/16	22:14 MET_607C	LCS_02DEC16 IS=0.2NG/L 607580
A1206655	57	12/07/16	22:48 MET_607C	1611250754 (B650-EFF-1) IS=0.2NG/L 607199
A1206656	58	12/07/16	23:22 MET_607C	1611250815 (B650-INF-1) IS=0.2NG/L 607200
A1206657	59	12/07/16	23:56 MET_607C	1611250816 (B650-INF-1) IS=0.2NG/L 607201
A1206658	60	12/08/16	00:30 MET_607C	1611281036Y (200-F-225) IS=0.2NG/L 607426
A1206659	61	12/08/16	01:04 MET_607C	1611281347B (100-C-365) IS=0.2NG/L 607427
A1206660	62	12/08/16	01:38 MET_607C	1611290931 (400-SB-08) IS=0.2NG/L 607428
A1206661	63	12/08/16	02:12 MET_607C	1611300954A (BLM-32-543) IS=0.2NG/L 607544
A1206662	64	12/08/16	02:46 MET_607C	1611301006A (BLM-32-571) IS=0.2NG/L 607545
A1206663	65	12/08/16	03:20 MET_607C	1611301421A (BLM-36-610) IS=0.2NG/L 607546
A1206664	66	12/08/16	12:00 MET_607C	1611201624 (400-SB-08)77'-77.5')) DL2 607045
A1206665	67	12/08/16	12:34 MET_607C	1611290931 (400-SB-08) DL20 IS=0.2NG/L 607428

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12/08/16

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