National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
White Sands Test Facility
P.O. Box 20
Las Cruces, NM 88004-0020

April 2, 2013

Reply to Attn of: RE-13-037

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

Subject: Request for a "Contained-In Determination" for ETU Primary Liners

NASA is requesting a "contained-in determination" for the Evaporation Treatment Unit (ETU) primary liners. As part of the ETU closure activities, the primary liners of both East and West Tanks were inspected, removed, and stored as a hazardous waste. Approximately 8 yd^3 of primary liner material was removed and placed in 1 yd^3 super sacks.

The ETU primary liners are currently containerized and managed as hazardous waste per the "contained in policy" in accordance with 40 CFR Part 262.34. The 90-day time limit for the primary liners, which are currently being managed as listed hazardous wastes, will expire on April 16, 2013. NASA is requesting that NMED expedite the review of this request.

Background

In accordance with NASA's Hazardous Waste Permit (Permit No. NM8800019434), hazardous waste was stored and treated in the ETU. The media contained in the ETU was managed as listed hazardous waste carrying EPA Waste Codes F001, F002, F003, F007, P078 (ADGAS Treatment Residual), P082, P068, U098, U099, and U133.

Basis for Contained-In Determination

Based on the analytical results of samples, a demonstration can be made that the ETU primary liners "no longer contains" regulated hazard constituents meeting the description of a listed hazardous waste per 40 CFR Part 261 Subpart D or exhibit the characteristic of a hazardous waste per 40 CFR Part 261 Subpart C.

The demonstration of a "no longer contained-in" for the ETU primary liners meet the following criteria:

- Does not exhibit the characteristic of a hazardous waste per 40 CFR Part 261 Subpart C and does not contain underlying hazardous constituents as defined in §268.2(i), in excess of 40 CFR Part 268.48 regulatory limits.

- Meets the 40 CFR Part 268.40 Technology Based Standards for P078 and U134 (ADGAS and NEUTR, respectively).

- Does not contain P068, U098, U099, and U133 listed hazardous waste constituents above the laboratories reporting limits.

- Does not contain F001, F002, F003, F007, and P082 listed hazardous waste constituents above the 40 CFR Part 268.40 concentration based treatment standards.

- Does not contain P082 (N-nitrosodimethylamine) above the 40 CFR Part 268.40 concentration-based treatment standard.

On January 25, 2013, the ETU primary liners were sampled in accordance with the NASA Hazardous Waste Permit, Attachment 12- Waste Analysis Plan. The data obtained from this analysis supports the demonstration of a "no longer contained in" per this criteria. Upon receipt of the contained-in determination, NASA plans to dispose of the liners as a non-hazardous, solid waste at a landfill that can accept industrial wastes.

Enclosure 1 provides an executive summary as well as analytical summary tables from sampling conducted on January 25, 2013, which compares those results to the appropriate regulatory limits and treatment standards/limits. Enclosure 2 provides a CD-ROM containing copies of the full laboratory analytical reports, sampling and analysis plan with data quality assurance report, field notes, 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 Tim Davis of my staff at 575-524-5024.

for Radel Bunker-Farrah
Chief, Environmental Office

Enclosures (2)

cc (w/ enclosures):
Mr. Dan Comeau
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

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National Aeronautics and
Space Administration

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Lyndon B. Johnson Space Center
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Hazardous Waste Bureau
Attn: Mr. Dan Comeau
New Mexico Environmental Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

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Enclosure 1

On January 6, 2010, NASA notified the New Mexico Environment Department (NMED) of the selection of the option to phase out the operation of the WSTF Evaporation Treatment Unit (ETU) per Permit Section III.C.3 of the NASA/WSTF Hazardous Waste Permit (November, 2009). In support of the ETU Phase Out, the waste characterization for all waste streams (historical WIWPS) was reviewed and updated to the requirements of 40 CFR 262.11 and 40 CFR 268.9. The aggregated waste streams were segregated with respect to the individual points of generation and the waste generating processes and updated. During the update, the constituents discharged to the ETU were identified through a review of the historical documentation (MSDS's, etc.) or a literature search. The constituents were then screened by Chemical Abstracts Service registration number (CAS #) to identify the 40 CFR 261 Appendix VIII constituents, 40 CFR 264 Appendix IX constituents, and underlying hazardous constituents (UHC's). This information can be found in the ETU Closure Plan (March, 2012), Attachment 15, Tables 1-11.

The ETU operated under Interim Status in accordance with Permits dated February, 1993 and November, 2009. The unit first received waste in late 1988 (East Tank) and early 1989 (West Tank). This period coincided with the thirteen (13) year period when the RCRA Land Disposal Restrictions (LDR) regulations were implemented. These regulations imposed treatment standards and significantly changed the waste characterization and documentation requirements. The unit last received wastes on December 9, 2012, per the ETU Closure Plan (March, 2012).

The purpose of this document is to provide ETU Primary Liner sampling results, final analysis summarization, and waste characterization for the purposes of obtaining a No-Longer Contained-In Determination.

EPA Waste Codes F001 and F002

NASA routinely discharged significant amounts of contaminated groundwater (Investigation-Derived Waste (IDW)) to the ETU. The IDW carries EPA Waste Codes F001 and F002 (Constituents of Concern: trichloroethene (TCE), tetrachloroethene (PCE), trichlorofluoromethane (Freon 11), and 1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)). Based on review of the analytical report, which is summarized in Table Three: VOC- ETU Primary Liner Samples, none of the contaminants of concern were identified or are present in the ETU Primary Liners.

EPA Waste Codes P068 (methyl hydrazine), U098 (1,1-Dimethylhydrazine), U099 (1,2-Dimethylhydrazine), and U133 (Hydrazine)

Prior to NASA's permit renewal (November 3, 2009), NASA was permitted to discharge these waste codes in limited quantities to the ETU. After review of the analytical reports, which are summarized in Table Four: Hydrazines-ETU Primary Liner Samples, none of these constituents were detected above the laboratory's reporting limits. EPA Waste Code U099 (1,2-Dimethylhydrazine) was not included in the laboratories target analyte list. However, 1,2-Dimethylhydrazine was never used as a common propellant at NASA/WSTF. The discharges occurred in the 1980's and only included very limited discharges from analytical process wastes.

The chemical structure of 1,2-Dimethylhydrazine is very similar to the other species of hydrazines that were discharged to the ETU. Based on the analytical results (non-detectable) for the other hydrazine constituents discharged to the ETU, it can be assumed with a high degree of certainty, that 1,2-Dimethylhydrazine is not present in the ETU Primary Liners at detectable concentrations similar to the laboratory reporting for the other species of hydrazine constituents.

EPA Waste Code P078 (Dinitrogen Tetroxide)

NASA routinely discharged EPA Waste Code P078 (ADGAS Treatment Residual) to the ETU. Based on interpretive guidance provided in RO 13689, liquid P078 absorbed into a rinsate liquid meets the 40 CFR part 268.40 Treatment Standard for P078 waste code.

EPA Waste Code P082 (P082 N-Nitrosodimethylamine)

Inadvertent and infrequent discharges of very limited quantities of spent laboratory analytical standards were discharged to the ETU. After review of the analytical reports, which are summarized in Table Two: SVOC- ETU Primary Liner Samples, the constituent was not detected above the laboratory reporting limit.

EPA Waste Code F007 (Constituents of Concern: Cadmium, Chromium (Total) Cyanides (Total), cyanides (amenable), lead, nickel, and silver).

Very limited discharges of spent metal etching solutions occurred in the late 1980's. Based on the sampling and analysis, which are summarized in Table One: Metals- ETU Primary Liner Samples, there were no hazardous constituent detected above the laboratory reporting limit. The F007 for cyanides is determinant upon the waste exhibiting the hazard code of reactive waste (R) and Toxic Waste (T). Based on acceptable knowledge of the construction of the liner material and permeability of cyanides into the liner material, there is no reason to believe that the liner material meets the definition of reactive or toxic for cyanides. Therefore additional analysis for cyanides was not warranted.

Characteristic Hazardous Waste Codes (40 CFR Part 261.24)

Based on review of the analytical reports and the estimated maximum theoretical leachate concentrations, which are summarized in Table One: Metals- ETU Primary Liner Samples, there are no hazardous constituents detected above the regulatory levels published under 261.24, Table 1: Maximum Concentration of Contaminants for the Toxicity Characteristic, or do not exceed the 40 CFR Part 268.40 or 268.48 regulatory limits.

Tables

Table 1 Metals - ETU Primary Liner Samples Analytical Method: EPA Method 6010C/7471B									
ETU Primary Liner Constituents of Concern[1]	CAS No.	Potential RCRA Code(s)	Sample ID No.	Sample Date	Result/ Qualifier mg/Kg	Rule of 20[2] mg/L	MRL mg/Kg	MDL mg/Kg	Land Disposal Restrictions 40 CFR 268.40 and 268.48[3] mg/L as TCLP
Arsenic	7440-38-2	D004	1301251004	1/25/2013	ND	ND	1.00	0.30	5.00
			1301251005 (D)	1/25/2013	ND	ND	1.00	0.30	
Barium	7440-39-3	D005	1301251004	1/25/2013	18.9	0.95	2.00	0.05	21.0
			1301251005 (D)	1/25/2013	22	1.1	2.00	0.05	
Cadmium	7440-43-9	D006	1301251004	1/25/2013	ND	ND	0.50	0.02	0.11
			1301251005 (D)	1/25/2013	ND	ND	0.50	0.02	
Chromium	7440-47-3	D007	1301251004	1/25/2013	0.8 BJ	0.04 BJ	1.00	0.03	0.60
			1301251005 (D)	1/25/2013	1.4 B	0.07 B	1.00	0.03	
Lead	7439-92-1	D008	1301251004	1/25/2013	0.4 BJ	0.02 BJ	5.00	0.10	0.75
			1301251005 (D)	1/25/2013	0.5 BJ	0.025 BJ	5.00	0.10	
Mercury	7439-97-6	D009	1301251004	1/25/2013	ND	ND	0.10	0.01	0.20
			1301251005 (D)	1/25/2013	ND	ND	0.10	0.01	
Nickel	7440-02-0	NA	1301251004	1/25/2013	1.1 BJ	0.055 BJ	4.00	0.03	11.0
			1301251005 (D)	1/25/2013	1.0 BJ	0.05 BJ	4.00	0.03	
Selenium	7782-49-2	D010	1301251004	1/25/2013	0.7 J	0.035 BJ	1.00	0.30	5.70
			1301251005 (D)	1/25/2013	1.1	0.055	1.00	0.30	
Silver	7440-22-4	D011	1301251004	1/25/2013	2	0.100	1.00	0.09	0.14
			1301251005 (D)	1/25/2013	2.7	0.135	1.00	0.09	

Table 1 Metals - ETU Primary Liner Samples Analytical Method: EPA Method 6010C/7471B									
ETU Primary Liner Constituents of Concern[1]	CAS No.	Potential RCRA Code(s)	Sample ID No.	Sample Date	Result/ Qualifier mg/Kg	Rule of 20[2] mg/L	MRL mg/Kg	MDL mg/Kg	Land Disposal Restrictions 40 CFR 268.40 and 268.48[3] mg/L as TCLP
Vanadium	7440-62-2	NA	1301251004	1/25/2013	0.3 BJ	0.015 BJ	5.00	0.03	1.60
			1301251005 (D)	1/25/2013	0.3 BJ	0.015 BJ	5.00	0.03	
Zinc	7440-66-6	NA	1301251004	1/25/2013	24.3	1.22	2.00	1.00	4.30
			1301251005 (D)	1/25/2013	27.4	1.37	2.00	1.00	

[1]Constituents of Concern were derived from NMED Approved ETU Closure Plan (March, 2012) Attachment 15, Tables 1-12.

[2] The maximum theoretical leachate concentration limits for the TCLP can be calculated from the results of a total waste analysis using the 20:1 Rule. [RO 13647, 01/01/1994]

[3]EPA Treatment Standard for Nonwastewaters Concentrations; or Technology Code

D - Duplicate Sample

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.

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

MRL- Method Reporting Limit

MDL- Method Detection Limit

ND- Non Detect

Table 2 SVOC - ETU Primary Liner Samples Analytical Methods: EPA Method 8270D									
ETU Primary Liner Constituents of Concern[1]	CAS No.	Potential RCRA Code(s)	Sample ID No.	Sample Date	Result ug/Kg	MRL ug/Kg	MDL ug/Kg	Land Disposal Restrictions 40 CFR 268.40[2]	
								mg/Kg	ug/Kg
Di-n-butyl phthalate	84-74-2		1301251002	1/25/2013	ND	27000	7500	28.0	28000
			1301251003 (D)	1/25/2013	ND	27000	7800		
Naphthalene	91-20-3		1301251002	1/25/2013	ND	27000	2800	5.60	5600
			1301251003 (D)	1/25/2013	ND	27000	2900		
N-Nitrosodimethylamine (NDMA)	62-75-9	P082	1301251002	1/25/2013	ND	27000	3300	2.30	2300
			1301251003 (D)	1/25/2013	ND	27000	3500		
Phenol	108-95-2		1301251002	1/25/2013	14000J	27000	3000	6.20	6200
			1301251003 (D)	1/25/2013	13000J	27000	3100		

[1]Constituents of Concern were derived from NMED Approved ETU Closure Plan (March, 2012) Attachment 15, Tables 1-12.

[2] EPA Treatment Standard for Nonwastewaters Concentrations; or Technology Code

D - Duplicate Sample

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.

MRL- Method Reporting Limit

MDL- Method Detection Limit

ND- Non Detect

Table 3 VOC - ETU Primary Liner Samples Analytical Method: EPA Method 8260C									
ETU Primary Liner Constituents of Concern[1]	CAS No.	Potential RCRA Code(s)	Sample ID No.	Sample Date	Result ug/Kg	MRL ug/Kg	MDL ug/Kg	Land Disposal Restrictions 40 CFR 268.40[2]	
								mg/Kg	ug/Kg
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	76-13-1	F001	1301251001	1/25/2013	ND	5.0	1.3	30	30,000
2-Butanone (MEK)	78-93-3	D035, F005	1301251001	1/25/2013	ND	5.0	2.3	36	36,000
Acetone	67-64-1		1301251001	1/25/2013	5.4	5.0	2.9	160	160,000
Benzene	71-43-2	D018, F005	1301251001	1/25/2013	ND	5.0	0.29	10	10,000
Ethyl Benzene	100-41-4		1301251001	1/25/2013	0.51 J	5.0	0.23	10	10,000
Tetrachloroethene (PCE)	127-18-4	D039, F001, F002	1301251001	1/25/2013	ND	5.0	0.88	6.0	6,000
Toluene	108-88-3	F005	1301251001	1/25/2013	ND	5.0	0.67	10	10,000
Trichloroethene (TCE)	79-01-6	D040, F001, F002	1301251001	1/25/2013	ND	5.0	1.1	6.0	6,000

Table 3 VOC - ETU Primary Liner Samples Analytical Method: EPA Method 8260C									
ETU Primary Liner Constituents of Concern[1]	CAS No.	Potential RCRA Code(s)	Sample ID No.	Sample Date	Result ug/Kg	MRL ug/Kg	MDL ug/Kg	Land Disposal Restrictions 40 CFR 268.40[2]	
								mg/Kg	ug/Kg
Trichlorofluoromethane (Freon 11)	75-69-4	F001, F002	1301251001	1/25/2013	ND	5.0	0.66	30	30,000
m,p-Xylenes	179601-23-1		1301251001	1/25/2013	2.9 J	10.0	1.1	30	30,000
o-Xylene	95-47-6		1301251001	1/25/2013	0.99 J	5.0	0.48	30	30,000

[1]Constituents of Concern were derived from NMED Approved ETU Closure Plan (March, 2012) Attachment 15, Tables 1-12.

[2] EPA Treatment Standard for Nonwastewaters Concentrations; or Technology Code

D - Duplicate Sample

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.

MRL- Method Reporting Limit

MDL- Method Detection Limit

ND- Non Detect

Table 4 Hydrazine Analytes-ETU Primary Liner Samples Analytical Method: HPLC (Hydrazines)						
ETU Primary Liner Constituents of Concern[1]	**CAS No.**	**Sample ID No.**	**Sample Date**	**Result mg/Kg**	**LRL mg/Kg**	**Land Disposal Restrictions 40 CFR 268.40[2]**
1,1 Dimethylhydrazine	57-14-7	1301251006	1/25/2013	ND	0.044	CHOXD; CHRED; CARBN; BIODG; or CMBST
		1301251007 (D)	1/25/2013	ND	0.045	
Hydrazine	32-01-2	1301251006	1/25/2013	ND	0.044	CHOXD; CHRED; CARBN; BIODG; or CMBST
		1301251007 (D)	1/25/2013	ND	0.045	
Monomethyl Hydrazine	60-34-4	1301251006	1/25/2013	ND	0.044	CHOXD; CHRED; CARBN; BIODG; or CMBST
		1301251007 (D)	1/25/2013	ND	0.045	

[1]Constituents of Concern were derived from NMED Approved ETU Closure Plan (March, 2012) Attachment 15, Tables 1-12.

[2] EPA Treatment Standard for Nonwastewaters Concentrations; or Technology Code

D - Duplicate Sample

LRL- WSTF Laboratory Reporting Limit

ND- Non Detect

Enclosure 2

February 28, 2013 Service Request No: R1300596

Ms. Antonette Sanchez
NASA/WSTF/Navarro
P.O. Box 20
Las Cruces, NM 88004

Laboratory Results for: White Sands Test Facility/PO# 178

Dear Ms. Sanchez:

Enclosed are the results of the sample(s) submitted to our laboratory on January 29, 2013. For your reference, these analyses have been assigned our service request number **R1300596**.

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 Columbia Analytical Services, Inc. dba ALS Environmental (ALS) 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,

Columbia Analytical Services, Inc. dba ALS Environmental

Janice Jaeger
Client Services Manager

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PHONE 585-288-5380 | FAX 585-288-8475
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CASE NARRATIVE

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility	**Project Number:**	
Sample Matrix:	Solid	**Date Received:**	01/29/13

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier II deliverables. When appropriate to the method, method blank and LCS results have been reported with each analytical test. A review of the EDD to the signed report has been performed and the EDD is correct and complete. Where necessary, samples were diluted due to the foamy matrix.

Sample Receipt

Samples were collected on 01/25/13 and received at CAS on 01/29/13 at cooler temperatures of 3.6-5.4°C in good condition except as noted on the cooler receipt and preservation check form. The samples were stored in a refrigerator at 1 - 6 °C upon receipt at the laboratory.

Metals

Solid samples were analyzed for a site specific list of Metals off the TCLP extract by methods 1311/6010C/7000 from SW-846.

Site specific QC was not requested on these samples.

All LCS recoveries were acceptable.

All Method blanks were free of contamination except Arsenic, Barium, Beryllium, Chromium, Lead, Nickel, Thallium and Vanadium. All affected data has been flagged with a "B".

No other analytical or QC problems were encountered.

Volatile Organics

Solid samples were analyzed for a site list of Volatile Organics by Method 8260C from SW-846. Values detected between the MDL and MRL have been flagged with a "J" as estimated.

All Tuning criteria for BFB were within QC limits.

All the initial calibration criteria were met for all analytes. All Continuing Calibration Verification (CCV) standards were within 20% Difference (D) except as noted on the attached CCV summaries. All detected concentrations for these compounds associated with these CCV's should be considered as estimated.

All Internal Standard Areas were within QC limits.

All surrogate standard recoveries were within limits.

All Laboratory Control Sample/ Laboratory Control Sample Duplicate (LCS/LCSD) recoveries were acceptable.

Site specific QC was not requested on these samples.

The Method Blanks associated with these samples were free of contamination except for a low level detection of Naphthalene. No data was affected.

No other analytical or QC problems were encountered.

Semi-Volatile Organics

Solid samples were analyzed for a site list of Semi-Volatile Organics by Method 8270D from SW-846. Values detected between the MDL and MRL have been flagged with a "J" as estimated.

All Tuning criteria for DFTPP were within QC limits.

All the initial calibration criteria were met for all analytes. All Continuing Calibration Verification (CCV) standards were within 20% Difference (D) except as noted on the attached CCV summaries. All detected concentrations for these compounds associated with these CCV's should be considered as estimated.

All Internal Standard Areas were within QC limits.

All surrogate standard recoveries were diluted out and have been flagged with a "D".

All Laboratory Control Sample/ Laboratory Control Sample Duplicate (LCS/LCSD) recoveries and RPD's were within limits. All RPD's were acceptable.

Site specific QC was not requested on these samples.

The Method Blanks associated with these samples were free of contamination.

No other analytical or QC problems were encountered.

CASE NARRATIVE

This report contains analytical results for the following samples:
Service Request Number: R1300596

Lab ID	Client ID
R1300596-001	1301251004 200 ETU West Tank
R1300596-002	1301251002 200 ETU West Tank
R1300596-003	1301251001 200 ETU West Tank
R1300596-004	1301251005 200 ETU West Tank
R1300596-005	1301251003 200 ETU West Tank

Samples have been subcontracted to the following laboratory(ies). The subcontractor's analytical report is attached:

ALS Laboratory Group
Fort Collins, CO

ALS Environmental

REPORT QUALIFIERS

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 "Notes" 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 "immediate" 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 (≥100% Difference between two GC columns).
X	See Case Narrative for discussion.

ACCREDITED IN ACCORDANCE WITH nelac

Rochester Lab ID # for State Certifications[1]

NELAP Accredited	Maine ID #NY0032	New Hampshire ID # 294100 A/B
Connecticut ID # PH0556	Nebraska Accredited	
Delaware Accredited	Nevada ID # NY-00032	North Carolina #676
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		Virginia #460167

[1] Analyses were performed according to our laboratory's 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 laboratory case narrative provided. For a specific list of accredited analytes, refer to http://alsglobal.com/environmental/laboratories/rochester-environmental-lab.aspx

COLUMBIA ANALYTICAL SERVICES, INC.
Now part of the ALS Group
Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	1/25/13
Sample Matrix:	Soil	**Date Received:**	1/29/13
Sample Name:	1301251004 200 ETU West Tank		
Lab Code:	R1300596-001	**Basis:**	As Received

Inorganic Parameters

Analyte Name	Method	Result	Q	Units	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Note
Antimony, Total	6010C	**18.4**		mg/Kg	6.0	0.2	1	1/30/13	2/1/13 20:06	
Arsenic, Total	6010C	ND	U	mg/Kg	1.0	0.3	1	1/30/13	2/1/13 20:06	
Barium, Total	6010C	**18.9**		mg/Kg	2.0	0.05	1	1/30/13	2/1/13 20:06	
Beryllium, Total	6010C	ND	U	mg/Kg	0.50	0.02	1	1/30/13	2/1/13 20:06	
Cadmium, Total	6010C	ND	U	mg/Kg	0.50	0.02	1	1/30/13	2/1/13 20:06	
Chromium, Total	6010C	**0.8**	BJ	mg/Kg	1.0	0.03	1	1/30/13	2/1/13 20:06	
Lead, Total	6010C	**0.4**	BJ	mg/Kg	5.0	0.10	1	1/30/13	2/1/13 20:06	
Nickel, Total	6010C	**1.1**	BJ	mg/Kg	4.0	0.03	1	1/30/13	2/1/13 20:06	
Selenium, Total	6010C	**0.7**	J	mg/Kg	1.0	0.3	1	1/30/13	2/1/13 20:06	
Silver, Total	6010C	**2.0**		mg/Kg	1.0	0.09	1	1/30/13	2/1/13 20:06	
Thallium, Total	6010C	ND	U	mg/Kg	1.0	0.03	1	1/30/13	2/1/13 20:06	
Vanadium, Total	6010C	**0.3**	BJ	mg/Kg	5.0	0.03	1	1/30/13	2/1/13 20:06	
Zinc, Total	6010C	**24.3**		mg/Kg	2.0	1.0	1	1/30/13	2/1/13 20:06	

COLUMBIA ANALYTICAL SERVICES, INC.

Analyst Summary Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178		
Sample Name:	1301251004 200 ETU West Tank	**Date Collected:**	1/25/13
Lab Code:	R1300596-001	**Date Received:**	1/29/13
Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	JWILLY	DBOND

COLUMBIA ANALYTICAL SERVICES, INC.
Now part of the ALS Group
Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	1/25/13
Sample Matrix:	Soil	**Date Received:**	1/29/13
		Date Extracted:	2/5/13
		Date Analyzed:	2/5/13 15:38
Sample Name:	1301251002 200 ETU West Tank	**Units:**	µg/Kg
Lab Code:	R1300596-002	**Basis:**	As Received

Semivolatile Organic Compounds by GC/MS

Analytical Method:	8270D	**Analysis Lot:**	328204
Prep Method:	EPA 3541	**Extraction Lot:**	176302
Data File Name:	J:\ACQUDATA\5973A\DATA\020513\CP530.D\	**Instrument Name:**	R-MS-51
		Dilution Factor:	5

CAS No.	Analyte Name	Result	Q	MRL	MDL	Note
95-95-4	2,4,5-Trichlorophenol	ND	U	27000	4800	
88-06-2	2,4,6-Trichlorophenol	ND	U	27000	4000	
120-83-2	2,4-Dichlorophenol	ND	U	27000	3700	
105-67-9	2,4-Dimethylphenol	ND	U	27000	3100	
51-28-5	2,4-Dinitrophenol	ND	U	140000	12000	
121-14-2	2,4-Dinitrotoluene	ND	U	27000	5900	
606-20-2	2,6-Dinitrotoluene	ND	U	27000	4600	
91-58-7	2-Chloronaphthalene	ND	U	27000	2900	
95-57-8	2-Chlorophenol	ND	U	27000	2900	
91-57-6	2-Methylnaphthalene	ND	U	27000	2800	
95-48-7	2-Methylphenol	ND	U	27000	3600	
88-74-4	2-Nitroaniline	ND	U	140000	23000	
88-75-5	2-Nitrophenol	ND	U	27000	4100	
91-94-1	3,3'-Dichlorobenzidine	ND	U	27000	5000	
	3- and 4-Methylphenol Coelution	ND	U	27000	4200	
99-09-2	3-Nitroaniline	ND	U	140000	26000	
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	140000	40000	
101-55-3	4-Bromophenyl Phenyl Ether	ND	U	27000	4900	
59-50-7	4-Chloro-3-methylphenol	ND	U	27000	3000	
106-47-8	4-Chloroaniline	ND	U	27000	5300	
7005-72-3	4-Chlorophenyl Phenyl Ether	ND	U	27000	3900	
100-01-6	4-Nitroaniline	ND	U	140000	30000	
100-02-7	4-Nitrophenol	ND	U	140000	20000	
83-32-9	Acenaphthene	ND	U	27000	3900	
208-96-8	Acenaphthylene	ND	U	27000	3700	
98-86-2	Acetophenone	ND	U	27000	5400	
120-12-7	Anthracene	ND	U	27000	4300	
1912-24-9	Atrazine	ND	U	27000	11000	
56-55-3	Benz(a)anthracene	ND	U	27000	4200	
100-52-7	Benzaldehyde	ND	U	27000	7200	
50-32-8	Benzo(a)pyrene	ND	U	27000	4600	
205-99-2	Benzo(b)fluoranthene	ND	U	27000	6600	
191-24-2	Benzo(g,h,i)perylene	ND	U	27000	5200	

COLUMBIA ANALYTICAL SERVICES, INC.
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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	1/25/13
Sample Matrix:	Soil	**Date Received:**	1/29/13
		Date Extracted:	2/5/13
		Date Analyzed:	2/5/13 15:38
Sample Name:	1301251002 200 ETU West Tank	**Units:**	µg/Kg
Lab Code:	R1300596-002	**Basis:**	As Received

Semivolatile Organic Compounds by GC/MS

Analytical Method:	8270D	**Analysis Lot:**	328204
Prep Method:	EPA 3541	**Extraction Lot:**	176302
Data File Name:	J:\ACQUDATA\5973A\DATA\020513\CP530.D\	**Instrument Name:**	R-MS-51
		Dilution Factor:	5

CAS No.	Analyte Name	Result	Q	MRL	MDL	Note
207-08-9	Benzo(k)fluoranthene	ND	U	27000	4900	
92-52-4	Biphenyl	ND	U	27000	2900	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	U	27000	3300	
111-91-1	Bis(2-chloroethoxy)methane	ND	U	27000	3800	
111-44-4	Bis(2-chloroethyl) Ether	ND	U	27000	2800	
117-81-7	Bis(2-ethylhexyl) Phthalate	ND	U	27000	3800	
85-68-7	Butyl Benzyl Phthalate	ND	U	27000	4200	
105-60-2	Caprolactam	ND	U	27000	5000	
86-74-8	Carbazole	ND	U	27000	3800	
218-01-9	Chrysene	ND	U	27000	3900	
84-74-2	Di-n-butyl Phthalate	ND	U	27000	7500	
117-84-0	Di-n-octyl Phthalate	ND	U	27000	5300	
53-70-3	Dibenz(a,h)anthracene	ND	U	27000	7400	
132-64-9	Dibenzofuran	ND	U	27000	3000	
84-66-2	Diethyl Phthalate	ND	U	27000	3600	
131-11-3	Dimethyl Phthalate	ND	U	27000	3900	
206-44-0	Fluoranthene	ND	U	27000	4400	
86-73-7	Fluorene	ND	U	27000	3500	
118-74-1	Hexachlorobenzene	ND	U	27000	4200	
87-68-3	Hexachlorobutadiene	ND	U	27000	3100	
77-47-4	Hexachlorocyclopentadiene	ND	U	27000	4400	
67-72-1	Hexachloroethane	ND	U	27000	3800	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	U	27000	4500	
78-59-1	Isophorone	ND	U	27000	3700	
621-64-7	N-Nitrosodi-n-propylamine	ND	U	27000	3100	
62-75-9	N-Nitrosodimethylamine	ND	U	27000	3300	
86-30-6	N-Nitrosodiphenylamine	ND	U	27000	4300	
91-20-3	Naphthalene	ND	U	27000	2800	
98-95-3	Nitrobenzene	ND	U	27000	2900	
87-86-5	Pentachlorophenol (PCP)	ND	U	140000	23000	
85-01-8	Phenanthrene	ND	U	27000	3700	
108-95-2	Phenol	**14000**	J	27000	3000	
129-00-0	Pyrene	ND	U	27000	5300	

COLUMBIA ANALYTICAL SERVICES, INC.
Now part of the ALS Group
Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	1/25/13
Sample Matrix:	Soil	**Date Received:**	1/29/13
		Date Extracted:	2/5/13
		Date Analyzed:	2/5/13 15:38
Sample Name:	1301251002 200 ETU West Tank	**Units:**	µg/Kg
Lab Code:	R1300596-002	**Basis:**	As Received

Semivolatile Organic Compounds by GC/MS

Analytical Method:	8270D	**Analysis Lot:**	328204
Prep Method:	EPA 3541	**Extraction Lot:**	176302
Data File Name:	J:\ACQUDATA\5973A\DATA\020513\CP530.D\	**Instrument Name:**	R-MS-51
		Dilution Factor:	5

CAS No.	Analyte Name	Result	Q	MRL	MDL	Note

Surrogate Name	%Rec		Control Limits	Date Analyzed	Q
2,4,6-Tribromophenol	0	*	41-151	2/5/13 15:38	D
2-Fluorobiphenyl	0	*	49-115	2/5/13 15:38	D
2-Fluorophenol	0	*	22-117	2/5/13 15:38	D
Nitrobenzene-d5	0	*	40-112	2/5/13 15:38	D
Phenol-d6	0	*	10-145	2/5/13 15:38	D
Terphenyl-d14	0	*	38-137	2/5/13 15:38	D

COLUMBIA ANALYTICAL SERVICES, INC.
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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	1/25/13
Sample Matrix:	Soil	**Date Received:**	1/29/13
		Date Extracted:	2/5/13
		Date Analyzed:	2/5/13 16:16
Sample Name:	1301251003 200 ETU West Tank	**Units:**	µg/Kg
Lab Code:	R1300596-005	**Basis:**	As Received

Semivolatile Organic Compounds by GC/MS

Analytical Method:	8270D	**Analysis Lot:**	328204
Prep Method:	EPA 3541	**Extraction Lot:**	176302
Data File Name:	J:\ACQUDATA\5973A\DATA\020513\CP531.D\	**Instrument Name:**	R-MS-51
		Dilution Factor:	5

CAS No.	Analyte Name	Result	Q	MRL	MDL	Note
95-95-4	2,4,5-Trichlorophenol	ND	U	28000	5000	
88-06-2	2,4,6-Trichlorophenol	ND	U	28000	4200	
120-83-2	2,4-Dichlorophenol	ND	U	28000	3800	
105-67-9	2,4-Dimethylphenol	ND	U	28000	3200	
51-28-5	2,4-Dinitrophenol	ND	U	140000	12000	
121-14-2	2,4-Dinitrotoluene	ND	U	28000	6000	
606-20-2	2,6-Dinitrotoluene	ND	U	28000	4700	
91-58-7	2-Chloronaphthalene	ND	U	28000	3000	
95-57-8	2-Chlorophenol	ND	U	28000	3000	
91-57-6	2-Methylnaphthalene	ND	U	28000	2900	
95-48-7	2-Methylphenol	ND	U	28000	3700	
88-74-4	2-Nitroaniline	ND	U	140000	24000	
88-75-5	2-Nitrophenol	ND	U	28000	4200	
91-94-1	3,3'-Dichlorobenzidine	ND	U	28000	5200	
	3- and 4-Methylphenol Coelution	ND	U	28000	4300	
99-09-2	3-Nitroaniline	ND	U	140000	27000	
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	140000	41000	
101-55-3	4-Bromophenyl Phenyl Ether	ND	U	28000	5100	
59-50-7	4-Chloro-3-methylphenol	ND	U	28000	3100	
106-47-8	4-Chloroaniline	ND	U	28000	5500	
7005-72-3	4-Chlorophenyl Phenyl Ether	ND	U	28000	4000	
100-01-6	4-Nitroaniline	ND	U	140000	31000	
100-02-7	4-Nitrophenol	ND	U	140000	21000	
83-32-9	Acenaphthene	ND	U	28000	4100	
208-96-8	Acenaphthylene	ND	U	28000	3800	
98-86-2	Acetophenone	ND	U	28000	5600	
120-12-7	Anthracene	ND	U	28000	4400	
1912-24-9	Atrazine	ND	U	28000	12000	
56-55-3	Benz(a)anthracene	ND	U	28000	4400	
100-52-7	Benzaldehyde	ND	U	28000	7400	
50-32-8	Benzo(a)pyrene	ND	U	28000	4700	
205-99-2	Benzo(b)fluoranthene	ND	U	28000	6900	
191-24-2	Benzo(g,h,i)perylene	ND	U	28000	5400	

COLUMBIA ANALYTICAL SERVICES, INC.
Now part of the ALS Group
Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	1/25/13
Sample Matrix:	Soil	**Date Received:**	1/29/13
		Date Extracted:	2/5/13
		Date Analyzed:	2/5/13 16:16
Sample Name:	1301251003 200 ETU West Tank	**Units:**	µg/Kg
Lab Code:	R1300596-005	**Basis:**	As Received

Semivolatile Organic Compounds by GC/MS

Analytical Method:	8270D	**Analysis Lot:**	328204
Prep Method:	EPA 3541	**Extraction Lot:**	176302
Data File Name:	J:\ACQUDATA\5973A\DATA\020513\CP531.D\	**Instrument Name:**	R-MS-51
		Dilution Factor:	5

CAS No.	Analyte Name	Result	Q	MRL	MDL	Note
207-08-9	Benzo(k)fluoranthene	ND	U	28000	5100	
92-52-4	Biphenyl	ND	U	28000	2900	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	U	28000	3400	
111-91-1	Bis(2-chloroethoxy)methane	ND	U	28000	3900	
111-44-4	Bis(2-chloroethyl) Ether	ND	U	28000	2900	
117-81-7	Bis(2-ethylhexyl) Phthalate	ND	U	28000	3900	
85-68-7	Butyl Benzyl Phthalate	ND	U	28000	4300	
105-60-2	Caprolactam	ND	U	28000	5200	
86-74-8	Carbazole	ND	U	28000	3900	
218-01-9	Chrysene	ND	U	28000	4000	
84-74-2	Di-n-butyl Phthalate	ND	U	28000	7800	
117-84-0	Di-n-octyl Phthalate	ND	U	28000	5400	
53-70-3	Dibenz(a,h)anthracene	ND	U	28000	7600	
132-64-9	Dibenzofuran	ND	U	28000	3100	
84-66-2	Diethyl Phthalate	ND	U	28000	3700	
131-11-3	Dimethyl Phthalate	ND	U	28000	4100	
206-44-0	Fluoranthene	ND	U	28000	4500	
86-73-7	Fluorene	ND	U	28000	3600	
118-74-1	Hexachlorobenzene	ND	U	28000	4300	
87-68-3	Hexachlorobutadiene	ND	U	28000	3200	
77-47-4	Hexachlorocyclopentadiene	ND	U	28000	4500	
67-72-1	Hexachloroethane	ND	U	28000	3900	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	U	28000	4700	
78-59-1	Isophorone	ND	U	28000	3800	
621-64-7	N-Nitrosodi-n-propylamine	ND	U	28000	3200	
62-75-9	N-Nitrosodimethylamine	ND	U	28000	3500	
86-30-6	N-Nitrosodiphenylamine	ND	U	28000	4400	
91-20-3	Naphthalene	ND	U	28000	2900	
98-95-3	Nitrobenzene	ND	U	28000	3000	
87-86-5	Pentachlorophenol (PCP)	ND	U	140000	24000	
85-01-8	Phenanthrene	ND	U	28000	3800	
108-95-2	Phenol	**13000**	J	28000	3100	
129-00-0	Pyrene	ND	U	28000	5500	

COLUMBIA ANALYTICAL SERVICES, INC.
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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	1/25/13
Sample Matrix:	Soil	**Date Received:**	1/29/13
		Date Extracted:	2/5/13
		Date Analyzed:	2/5/13 16:16
Sample Name:	1301251003 200 ETU West Tank	**Units:**	µg/Kg
Lab Code:	R1300596-005	**Basis:**	As Received

Semivolatile Organic Compounds by GC/MS

Analytical Method:	8270D	**Analysis Lot:**	328204
Prep Method:	EPA 3541	**Extraction Lot:**	176302
Data File Name:	J:\ACQUDATA\5973A\DATA\020513\CP531.D\	**Instrument Name:**	R-MS-51
		Dilution Factor:	5

CAS No.	Analyte Name	Result	Q	MRL	MDL	Note

Surrogate Name	%Rec		Control Limits	Date Analyzed	Q
2,4,6-Tribromophenol	0	*	41-151	2/5/13 16:16	D
2-Fluorobiphenyl	0	*	49-115	2/5/13 16:16	D
2-Fluorophenol	0	*	22-117	2/5/13 16:16	D
Nitrobenzene-d5	0	*	40-112	2/5/13 16:16	D
Phenol-d6	0	*	10-145	2/5/13 16:16	D
Terphenyl-d14	0	*	38-137	2/5/13 16:16	D

COLUMBIA ANALYTICAL SERVICES, INC.
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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
		Date Extracted:	2/5/13
		Date Analyzed:	2/5/13 13:45
Sample Name:	Method Blank	**Units:**	µg/Kg
Lab Code:	RQ1301215-01	**Basis:**	As Received

Semivolatile Organic Compounds by GC/MS

Analytical Method:	8270D	**Analysis Lot:**	328204
Prep Method:	EPA 3541	**Extraction Lot:**	176302
Data File Name:	J:\ACQUDATA\5973A\DATA\020513\CP527.D\	**Instrument Name:**	R-MS-51
		Dilution Factor:	1

CAS No.	Analyte Name	Result	Q	MRL	MDL	Note
95-95-4	2,4,5-Trichlorophenol	ND	U	330	58	
88-06-2	2,4,6-Trichlorophenol	ND	U	330	49	
120-83-2	2,4-Dichlorophenol	ND	U	330	44	
105-67-9	2,4-Dimethylphenol	ND	U	330	37	
51-28-5	2,4-Dinitrophenol	ND	U	1700	140	
121-14-2	2,4-Dinitrotoluene	ND	U	330	71	
606-20-2	2,6-Dinitrotoluene	ND	U	330	55	
91-58-7	2-Chloronaphthalene	ND	U	330	35	
95-57-8	2-Chlorophenol	ND	U	330	35	
91-57-6	2-Methylnaphthalene	ND	U	330	33	
95-48-7	2-Methylphenol	ND	U	330	43	
88-74-4	2-Nitroaniline	ND	U	1700	280	
88-75-5	2-Nitrophenol	ND	U	330	49	
91-94-1	3,3'-Dichlorobenzidine	ND	U	330	60	
	3- and 4-Methylphenol Coelution	ND	U	330	50	
99-09-2	3-Nitroaniline	ND	U	1700	310	
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	1700	480	
101-55-3	4-Bromophenyl Phenyl Ether	ND	U	330	59	
59-50-7	4-Chloro-3-methylphenol	ND	U	330	37	
106-47-8	4-Chloroaniline	ND	U	330	64	
7005-72-3	4-Chlorophenyl Phenyl Ether	ND	U	330	47	
100-01-6	4-Nitroaniline	ND	U	1700	360	
100-02-7	4-Nitrophenol	ND	U	1700	240	
83-32-9	Acenaphthene	ND	U	330	48	
208-96-8	Acenaphthylene	ND	U	330	44	
98-86-2	Acetophenone	ND	U	330	65	
120-12-7	Anthracene	ND	U	330	52	
1912-24-9	Atrazine	ND	U	330	140	
56-55-3	Benz(a)anthracene	ND	U	330	51	
100-52-7	Benzaldehyde	ND	U	330	87	
50-32-8	Benzo(a)pyrene	ND	U	330	55	
205-99-2	Benzo(b)fluoranthene	ND	U	330	80	
191-24-2	Benzo(g,h,i)perylene	ND	U	330	63	

COLUMBIA ANALYTICAL SERVICES, INC.
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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
		Date Extracted:	2/5/13
		Date Analyzed:	2/5/13 13:45
Sample Name:	Method Blank	**Units:**	µg/Kg
Lab Code:	RQ1301215-01	**Basis:**	As Received

Semivolatile Organic Compounds by GC/MS

Analytical Method:	8270D	**Analysis Lot:**	328204
Prep Method:	EPA 3541	**Extraction Lot:**	176302
Data File Name:	J:\ACQUDATA\5973A\DATA\020513\CP527.D\	**Instrument Name:**	R-MS-51
		Dilution Factor:	1

CAS No.	Analyte Name	Result	Q	MRL	MDL	Note
207-08-9	Benzo(k)fluoranthene	ND	U	330	59	
92-52-4	Biphenyl	ND	U	330	34	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	U	330	40	
111-91-1	Bis(2-chloroethoxy)methane	ND	U	330	46	
111-44-4	Bis(2-chloroethyl) Ether	ND	U	330	33	
117-81-7	Bis(2-ethylhexyl) Phthalate	ND	U	330	46	
85-68-7	Butyl Benzyl Phthalate	ND	U	330	51	
105-60-2	Caprolactam	ND	U	330	61	
86-74-8	Carbazole	ND	U	330	46	
218-01-9	Chrysene	ND	U	330	47	
84-74-2	Di-n-butyl Phthalate	ND	U	330	91	
117-84-0	Di-n-octyl Phthalate	ND	U	330	64	
53-70-3	Dibenz(a,h)anthracene	ND	U	330	89	
132-64-9	Dibenzofuran	ND	U	330	37	
84-66-2	Diethyl Phthalate	ND	U	330	43	
131-11-3	Dimethyl Phthalate	ND	U	330	48	
206-44-0	Fluoranthene	ND	U	330	53	
86-73-7	Fluorene	ND	U	330	42	
118-74-1	Hexachlorobenzene	ND	U	330	51	
87-68-3	Hexachlorobutadiene	ND	U	330	37	
77-47-4	Hexachlorocyclopentadiene	ND	U	330	53	
67-72-1	Hexachloroethane	ND	U	330	46	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	U	330	55	
78-59-1	Isophorone	ND	U	330	44	
621-64-7	N-Nitrosodi-n-propylamine	ND	U	330	38	
62-75-9	N-Nitrosodimethylamine	ND	U	330	40	
86-30-6	N-Nitrosodiphenylamine	ND	U	330	52	
91-20-3	Naphthalene	ND	U	330	33	
98-95-3	Nitrobenzene	ND	U	330	35	
87-86-5	Pentachlorophenol (PCP)	ND	U	1700	280	
85-01-8	Phenanthrene	ND	U	330	45	
108-95-2	Phenol	ND	U	330	37	
129-00-0	Pyrene	ND	U	330	64	

COLUMBIA ANALYTICAL SERVICES, INC.
Now part of the ALS Group
Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
		Date Extracted:	2/5/13
		Date Analyzed:	2/5/13 13:45
Sample Name:	Method Blank	**Units:**	µg/Kg
Lab Code:	RQ1301215-01	**Basis:**	As Received

Semivolatile Organic Compounds by GC/MS

Analytical Method:	8270D	**Analysis Lot:**	328204
Prep Method:	EPA 3541	**Extraction Lot:**	176302
Data File Name:	J:\ACQUDATA\5973A\DATA\020513\CP527.D\	**Instrument Name:**	R-MS-51
		Dilution Factor:	1

CAS No.	Analyte Name	Result	Q	MRL	MDL	Note

Surrogate Name	%Rec	Control Limits	Date Analyzed	Q
2,4,6-Tribromophenol	94	41-151	2/5/13 13:45	
2-Fluorobiphenyl	79	49-115	2/5/13 13:45	
2-Fluorophenol	67	22-117	2/5/13 13:45	
Nitrobenzene-d5	78	40-112	2/5/13 13:45	
Phenol-d6	73	10-145	2/5/13 13:45	
Terphenyl-d14	73	38-137	2/5/13 13:45	

COLUMBIA ANALYTICAL SERVICES, INC.
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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	1/25/13
Sample Matrix:	Soil	**Date Received:**	1/29/13
		Date Analyzed:	1/31/13 18:21
Sample Name:	1301251001 200 ETU West Tank	**Units:**	µg/Kg
Lab Code:	R1300596-003	**Basis:**	As Received

Volatile Organic Compounds by GC/MS

Analytical Method:	8260C	**Analysis Lot:**	327574
Data File Name:	I:\ACQUDATA\MSVOA7\DATA\013113\K2844.D\	**Instrument Name:**	R-MS-07
		Dilution Factor:	1

CAS No.	Analyte Name	Result	Q	MRL	MDL	Note
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	5.0	0.83	
71-55-6	1,1,1-Trichloroethane (TCA)	ND	U	5.0	0.73	
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	5.0	0.81	
79-00-5	1,1,2-Trichloroethane	ND	U	5.0	0.73	
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	U	5.0	1.3	
75-35-4	1,1-Dichloroethene (1,1-DCE)	ND	U	5.0	1.3	
96-18-4	1,2,3-Trichloropropane	ND	U	5.0	1.4	
96-12-8	1,2-Dibromo-3-chloropropane (DBCP)	ND	U	5.0	1.9	
106-93-4	1,2-Dibromoethane	ND	U	5.0	1.3	
95-50-1	1,2-Dichlorobenzene	ND	U	5.0	0.61	
107-06-2	1,2-Dichloroethane	ND	U	5.0	0.61	
78-87-5	1,2-Dichloropropane	ND	U	5.0	0.97	
541-73-1	1,3-Dichlorobenzene	ND	U	5.0	0.63	
123-91-1	1,4-Dioxane	ND	U	100	20	
78-93-3	2-Butanone (MEK)	ND	U	5.0	2.3	
126-99-8	2-Chloro-1,3-butadiene	ND	U	5.0	1.6	
110-75-8	2-Chloroethyl Vinyl Ether	ND	U	5.0	1.8	
78-83-1	2-Methyl-1-propanol (Isobutyl Alcohol)	ND	U	100	23	
107-05-1	Allyl Chloride	ND	U	5.0	1.7	
108-10-1	4-Methyl-2-pentanone	ND	U	5.0	0.98	
67-64-1	Acetone	**5.4**		5.0	2.9	
75-05-8	Acetonitrile	ND	U	25	17	
107-02-8	Acrolein	ND	U	25	3.5	
107-13-1	Acrylonitrile	ND	U	25	6.5	
71-43-2	Benzene	ND	U	5.0	0.29	
75-27-4	Bromodichloromethane	ND	U	5.0	0.61	
75-25-2	Bromoform	ND	U	5.0	0.93	
74-83-9	Bromomethane	ND	U	5.0	1.4	
75-15-0	Carbon Disulfide	**5.4**		5.0	1.3	
56-23-5	Carbon Tetrachloride	ND	U	5.0	0.92	
108-90-7	Chlorobenzene	ND	U	5.0	0.29	
75-00-3	Chloroethane	ND	U	5.0	2.9	
67-66-3	Chloroform	ND	U	5.0	1.3	
74-87-3	Chloromethane	ND	U	5.0	0.40	
124-48-1	Dibromochloromethane	ND	U	5.0	0.73	

COLUMBIA ANALYTICAL SERVICES, INC.

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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	1/25/13
Sample Matrix:	Soil	**Date Received:**	1/29/13
		Date Analyzed:	1/31/13 18:21
Sample Name:	1301251001 200 ETU West Tank	**Units:**	µg/Kg
Lab Code:	R1300596-003	**Basis:**	As Received

Volatile Organic Compounds by GC/MS

Analytical Method:	8260C	**Analysis Lot:**	327574
Data File Name:	I:\ACQUDATA\MSVOA7\DATA\013113\K2844.D\	**Instrument Name:**	R-MS-07
		Dilution Factor:	1

CAS No.	Analyte Name	Result	Q	MRL	MDL	Note
74-95-3	Dibromomethane	ND	U	5.0	0.63	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	U	5.0	1.9	
75-09-2	Dichloromethane	**0.89**	J	5.0	0.57	
97-63-2	Ethyl Methacrylate	ND	U	5.0	0.75	
100-41-4	Ethylbenzene	**0.51**	J	5.0	0.23	
74-88-4	Iodomethane	ND	U	10	1.2	
126-98-7	Methacrylonitrile	ND	U	5.0	1.6	
80-62-6	Methyl Methacrylate	ND	U	5.0	0.73	
91-20-3	Naphthalene	**1.8**	BJ	5.0	0.51	
107-12-0	Propionitrile	ND	U	25	6.5	
127-18-4	Tetrachloroethene (PCE)	ND	U	5.0	0.88	
108-88-3	Toluene	ND	U	5.0	0.67	
79-01-6	Trichloroethene (TCE)	ND	U	5.0	1.1	
75-69-4	Trichlorofluoromethane (CFC 11)	ND	U	5.0	0.66	
75-01-4	Vinyl Chloride	ND	U	5.0	1.9	
10061-01-5	cis-1,3-Dichloropropene	ND	U	5.0	0.90	
179601-23-1	m,p-Xylenes	**2.9**	J	10	1.1	
95-47-6	o-Xylene	**0.99**	J	5.0	0.48	
156-60-5	trans-1,2-Dichloroethene	ND	U	5.0	0.86	
10061-02-6	trans-1,3-Dichloropropene	ND	U	5.0	0.20	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	77	28-150	1/31/13 18:21	
Dibromofluoromethane	116	63-138	1/31/13 18:21	
Toluene-d8	125	66-138	1/31/13 18:21	

COLUMBIA ANALYTICAL SERVICES, INC.
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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	1/25/13
Sample Matrix:	Soil	**Date Received:**	1/29/13
		Date Analyzed:	1/31/13 1821

Tentatively Identified Compounds (TIC)
Volatile Organic Compounds by GC/MS

Sample Name:	1301251001 200 ETU West Tank	**Units:**	µg/Kg
Lab Code:	R1300596-003	**Basis:**	As Received

Analytical Method: 8260C

CAS #	Analyte Name	RT	Result	Q
000066-25-1	Hexanal	16.60	**6.4**	JN
	unknown hydrocarbon	24.99	**8.6**	J
	unknown hydrocarbon	28.92	**5.2**	J

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analyst Summary Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178		
Sample Name:	1301251001 200 ETU West Tank	**Date Collected:**	1/25/13
Lab Code:	R1300596-003	**Date Received:**	1/29/13
Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
8260C		BBUSH

COLUMBIA ANALYTICAL SERVICES, INC.
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Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	1/25/13
Sample Matrix:	Soil	**Date Received:**	1/29/13
Sample Name:	1301251005 200 ETU West Tank		
Lab Code:	R1300596-004	**Basis:**	As Received

Inorganic Parameters

Analyte Name	Method	Result	Q	Units	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Note
Antimony, Total	6010C	**16.6**		mg/Kg	6.0	0.2	1	1/30/13	2/1/13 20:12	
Arsenic, Total	6010C	ND	U	mg/Kg	1.0	0.3	1	1/30/13	2/1/13 20:12	
Barium, Total	6010C	**22.0**		mg/Kg	2.0	0.05	1	1/30/13	2/1/13 20:12	
Beryllium, Total	6010C	ND	U	mg/Kg	0.50	0.02	1	1/30/13	2/1/13 20:12	
Cadmium, Total	6010C	ND	U	mg/Kg	0.50	0.02	1	1/30/13	2/1/13 20:12	
Chromium, Total	6010C	**1.4**	B	mg/Kg	1.0	0.03	1	1/30/13	2/1/13 20:12	
Lead, Total	6010C	**0.5**	BJ	mg/Kg	5.0	0.10	1	1/30/13	2/1/13 20:12	
Nickel, Total	6010C	**1.0**	BJ	mg/Kg	4.0	0.03	1	1/30/13	2/1/13 20:12	
Selenium, Total	6010C	**1.1**		mg/Kg	1.0	0.3	1	1/30/13	2/1/13 20:12	
Silver, Total	6010C	**2.7**		mg/Kg	1.0	0.09	1	1/30/13	2/1/13 20:12	
Thallium, Total	6010C	ND	U	mg/Kg	1.0	0.03	1	1/30/13	2/1/13 20:12	
Vanadium, Total	6010C	**0.3**	BJ	mg/Kg	5.0	0.03	1	1/30/13	2/1/13 20:12	
Zinc, Total	6010C	**27.4**		mg/Kg	2.0	1.0	1	1/30/13	2/1/13 20:12	

COLUMBIA ANALYTICAL SERVICES, INC.

Analyst Summary Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178		
Sample Name:	1301251005 200 ETU West Tank	**Date Collected:**	1/25/13
Lab Code:	R1300596-004	**Date Received:**	1/29/13
Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	JWILLY	DBOND

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	1/25/13
Sample Matrix:	Soil	**Date Received:**	1/29/13
		Date Extracted:	2/5/13
		Date Analyzed:	2/5/13 16:16
Sample Name:	1301251003 200 ETU West Tank	**Units:**	µg/Kg
Lab Code:	R1300596-005	**Basis:**	As Received

Semivolatile Organic Compounds by GC/MS

Analytical Method:	8270D	**Analysis Lot:**	328204
Prep Method:	EPA 3541	**Extraction Lot:**	176302
Data File Name:	J:\ACQUDATA\5973A\DATA\020513\CP531.D\	**Instrument Name:**	R-MS-51
		Dilution Factor:	5

CAS No.	Analyte Name	Result	Q	MRL	Note
95-95-4	2,4,5-Trichlorophenol	ND	U	28000	
88-06-2	2,4,6-Trichlorophenol	ND	U	28000	
120-83-2	2,4-Dichlorophenol	ND	U	28000	
105-67-9	2,4-Dimethylphenol	ND	U	28000	
51-28-5	2,4-Dinitrophenol	ND	U	140000	
121-14-2	2,4-Dinitrotoluene	ND	U	28000	
606-20-2	2,6-Dinitrotoluene	ND	U	28000	
91-58-7	2-Chloronaphthalene	ND	U	28000	
95-57-8	2-Chlorophenol	ND	U	28000	
91-57-6	2-Methylnaphthalene	ND	U	28000	
95-48-7	2-Methylphenol	ND	U	28000	
88-74-4	2-Nitroaniline	ND	U	140000	
88-75-5	2-Nitrophenol	ND	U	28000	
91-94-1	3,3'-Dichlorobenzidine	ND	U	28000	
	3- and 4-Methylphenol Coelution	ND	U	28000	
99-09-2	3-Nitroaniline	ND	U	140000	
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	140000	
101-55-3	4-Bromophenyl Phenyl Ether	ND	U	28000	
59-50-7	4-Chloro-3-methylphenol	ND	U	28000	
106-47-8	4-Chloroaniline	ND	U	28000	
7005-72-3	4-Chlorophenyl Phenyl Ether	ND	U	28000	
100-01-6	4-Nitroaniline	ND	U	140000	
100-02-7	4-Nitrophenol	ND	U	140000	
83-32-9	Acenaphthene	ND	U	28000	
208-96-8	Acenaphthylene	ND	U	28000	
98-86-2	Acetophenone	ND	U	28000	
120-12-7	Anthracene	ND	U	28000	
1912-24-9	Atrazine	ND	U	28000	
56-55-3	Benz(a)anthracene	ND	U	28000	
100-52-7	Benzaldehyde	ND	U	28000	
50-32-8	Benzo(a)pyrene	ND	U	28000	
205-99-2	Benzo(b)fluoranthene	ND	U	28000	
191-24-2	Benzo(g,h,i)perylene	ND	U	28000	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	1/25/13
Sample Matrix:	Soil	**Date Received:**	1/29/13
		Date Extracted:	2/5/13
		Date Analyzed:	2/5/13 16:16
Sample Name:	1301251003 200 ETU West Tank	**Units:**	µg/Kg
Lab Code:	R1300596-005	**Basis:**	As Received

Semivolatile Organic Compounds by GC/MS

Analytical Method:	8270D	**Analysis Lot:**	328204
Prep Method:	EPA 3541	**Extraction Lot:**	176302
Data File Name:	J:\ACQUDATA\5973A\DATA\020513\CP531.D\	**Instrument Name:**	R-MS-51
		Dilution Factor:	5

CAS No.	Analyte Name	Result	Q	MRL	Note
207-08-9	Benzo(k)fluoranthene	ND	U	28000	
92-52-4	Biphenyl	ND	U	28000	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	U	28000	
111-91-1	Bis(2-chloroethoxy)methane	ND	U	28000	
111-44-4	Bis(2-chloroethyl) Ether	ND	U	28000	
117-81-7	Bis(2-ethylhexyl) Phthalate	ND	U	28000	
85-68-7	Butyl Benzyl Phthalate	ND	U	28000	
105-60-2	Caprolactam	ND	U	28000	
86-74-8	Carbazole	ND	U	28000	
218-01-9	Chrysene	ND	U	28000	
84-74-2	Di-n-butyl Phthalate	ND	U	28000	
117-84-0	Di-n-octyl Phthalate	ND	U	28000	
53-70-3	Dibenz(a,h)anthracene	ND	U	28000	
132-64-9	Dibenzofuran	ND	U	28000	
84-66-2	Diethyl Phthalate	ND	U	28000	
131-11-3	Dimethyl Phthalate	ND	U	28000	
206-44-0	Fluoranthene	ND	U	28000	
86-73-7	Fluorene	ND	U	28000	
118-74-1	Hexachlorobenzene	ND	U	28000	
87-68-3	Hexachlorobutadiene	ND	U	28000	
77-47-4	Hexachlorocyclopentadiene	ND	U	28000	
67-72-1	Hexachloroethane	ND	U	28000	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	U	28000	
78-59-1	Isophorone	ND	U	28000	
621-64-7	N-Nitrosodi-n-propylamine	ND	U	28000	
86-30-6	N-Nitrosodiphenylamine	ND	U	28000	
91-20-3	Naphthalene	ND	U	28000	
98-95-3	Nitrobenzene	ND	U	28000	
87-86-5	Pentachlorophenol (PCP)	ND	U	140000	
85-01-8	Phenanthrene	ND	U	28000	
108-95-2	Phenol	ND	U	28000	
129-00-0	Pyrene	ND	U	28000	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	1/25/13
Sample Matrix:	Soil	**Date Received:**	1/29/13
		Date Extracted:	2/5/13
		Date Analyzed:	2/5/13 16:16
Sample Name:	1301251003 200 ETU West Tank	**Units:**	Percent
Lab Code:	R1300596-005	**Basis:**	As Received

Semivolatile Organic Compounds by GC/MS

Analytical Method:	8270D	**Analysis Lot:**	328204
Prep Method:	EPA 3541	**Extraction Lot:**	176302
Data File Name:	J:\ACQUDATA\5973A\DATA\020513\CP531.D\	**Instrument Name:**	R-MS-51
		Dilution Factor:	5

Surrogate Name	%Rec		Control Limits	Date Analyzed	Q
2,4,6-Tribromophenol	0	*	41-151	2/5/13 16:16	D
2-Fluorobiphenyl	0	*	49-115	2/5/13 16:16	D
2-Fluorophenol	0	*	22-117	2/5/13 16:16	D
Nitrobenzene-d5	0	*	40-112	2/5/13 16:16	D
Phenol-d6	0	*	10-145	2/5/13 16:16	D
Terphenyl-d14	0	*	38-137	2/5/13 16:16	D

COLUMBIA ANALYTICAL SERVICES, INC.

Analyst Summary Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178		
Sample Name:	1301251003 200 ETU West Tank	**Date Collected:**	1/25/13
Lab Code:	R1300596-005	**Date Received:**	1/29/13
Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
8270D	LPRUNOSKE	ZMIAO

COLUMBIA ANALYTICAL SERVICES, INC.
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Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank		
Lab Code:	R1300596-MB	**Basis:**	As Received

Inorganic Parameters

Analyte Name	Method	Result	Q	Units	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Note
Antimony, Total	6010C	ND	U	mg/Kg	6.0	0.2	1	1/30/13	2/1/13 17:34	
Arsenic, Total	6010C	**0.4**	J	mg/Kg	1.0	0.3	1	1/30/13	2/1/13 17:34	
Barium, Total	6010C	**0.7**	J	mg/Kg	2.0	0.05	1	1/30/13	2/1/13 17:34	
Beryllium, Total	6010C	**0.03**	J	mg/Kg	0.50	0.02	1	1/30/13	2/1/13 17:34	
Cadmium, Total	6010C	ND	U	mg/Kg	0.50	0.02	1	1/30/13	2/1/13 17:34	
Chromium, Total	6010C	**0.2**	J	mg/Kg	1.0	0.03	1	1/30/13	2/1/13 17:34	
Lead, Total	6010C	**0.1**	J	mg/Kg	5.0	0.10	1	1/30/13	2/1/13 17:34	
Nickel, Total	6010C	**0.1**	J	mg/Kg	4.0	0.03	1	1/30/13	2/1/13 17:34	
Selenium, Total	6010C	ND	U	mg/Kg	1.0	0.3	1	1/30/13	2/1/13 17:34	
Silver, Total	6010C	ND	U	mg/Kg	1.0	0.09	1	1/30/13	2/1/13 17:34	
Thallium, Total	6010C	**0.2**	J	mg/Kg	1.0	0.03	1	1/30/13	2/1/13 17:34	
Vanadium, Total	6010C	**0.08**	J	mg/Kg	5.0	0.03	1	1/30/13	2/1/13 17:34	
Zinc, Total	6010C	ND	U	mg/Kg	2.0	1.0	1	1/30/13	2/1/13 17:34	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
		Date Analyzed:	1/31/13 15:44
Sample Name:	Method Blank	**Units:**	µg/Kg
Lab Code:	RQ1301120-04	**Basis:**	As Received

Volatile Organic Compounds by GC/MS

Analytical Method:	8260C	**Analysis Lot:**	327574
Data File Name:	I:\ACQUDATA\MSVOA7\DATA\013113\K2841.D\	**Instrument Name:**	R-MS-07
		Dilution Factor:	1

CAS No.	Analyte Name	Result	Q	MRL	MDL	Note
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	5.0	0.83	
71-55-6	1,1,1-Trichloroethane (TCA)	ND	U	5.0	0.73	
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	5.0	0.81	
79-00-5	1,1,2-Trichloroethane	ND	U	5.0	0.73	
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	U	5.0	1.3	
75-35-4	1,1-Dichloroethene (1,1-DCE)	ND	U	5.0	1.3	
96-18-4	1,2,3-Trichloropropane	ND	U	5.0	1.4	
96-12-8	1,2-Dibromo-3-chloropropane (DBCP)	ND	U	5.0	1.9	
106-93-4	1,2-Dibromoethane	ND	U	5.0	1.3	
95-50-1	1,2-Dichlorobenzene	ND	U	5.0	0.61	
107-06-2	1,2-Dichloroethane	ND	U	5.0	0.61	
78-87-5	1,2-Dichloropropane	ND	U	5.0	0.97	
541-73-1	1,3-Dichlorobenzene	ND	U	5.0	0.63	
123-91-1	1,4-Dioxane	ND	U	100	20	
78-93-3	2-Butanone (MEK)	ND	U	5.0	2.3	
126-99-8	2-Chloro-1,3-butadiene	ND	U	5.0	1.6	
110-75-8	2-Chloroethyl Vinyl Ether	ND	U	5.0	1.8	
78-83-1	2-Methyl-1-propanol (Isobutyl Alcohol)	ND	U	100	23	
107-05-1	Allyl Chloride	ND	U	5.0	1.7	
108-10-1	4-Methyl-2-pentanone	ND	U	5.0	0.98	
67-64-1	Acetone	ND	U	5.0	2.9	
75-05-8	Acetonitrile	ND	U	25	17	
107-02-8	Acrolein	ND	U	25	3.5	
107-13-1	Acrylonitrile	ND	U	25	6.5	
71-43-2	Benzene	ND	U	5.0	0.29	
75-27-4	Bromodichloromethane	ND	U	5.0	0.61	
75-25-2	Bromoform	ND	U	5.0	0.93	
74-83-9	Bromomethane	ND	U	5.0	1.4	
75-15-0	Carbon Disulfide	ND	U	5.0	1.3	
56-23-5	Carbon Tetrachloride	ND	U	5.0	0.92	
108-90-7	Chlorobenzene	ND	U	5.0	0.29	
75-00-3	Chloroethane	ND	U	5.0	2.9	
67-66-3	Chloroform	ND	U	5.0	1.3	
74-87-3	Chloromethane	ND	U	5.0	0.40	
124-48-1	Dibromochloromethane	ND	U	5.0	0.73	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
		Date Analyzed:	1/31/13 15:44
Sample Name:	Method Blank	**Units:**	µg/Kg
Lab Code:	RQ1301120-04	**Basis:**	As Received

Volatile Organic Compounds by GC/MS

Analytical Method:	8260C	**Analysis Lot:**	327574
Data File Name:	I:\ACQUDATA\MSVOA7\DATA\013113\K2841.D\	**Instrument Name:**	R-MS-07
		Dilution Factor:	1

CAS No.	Analyte Name	Result	Q	MRL	MDL	Note
74-95-3	Dibromomethane	ND	U	5.0	0.63	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	U	5.0	1.9	
75-09-2	Dichloromethane	ND	U	5.0	0.57	
97-63-2	Ethyl Methacrylate	ND	U	5.0	0.75	
100-41-4	Ethylbenzene	ND	U	5.0	0.23	
74-88-4	Iodomethane	ND	U	10	1.2	
126-98-7	Methacrylonitrile	ND	U	5.0	1.6	
80-62-6	Methyl Methacrylate	ND	U	5.0	0.73	
91-20-3	Naphthalene	**0.95**	J	5.0	0.51	
107-12-0	Propionitrile	ND	U	25	6.5	
127-18-4	Tetrachloroethene (PCE)	ND	U	5.0	0.88	
108-88-3	Toluene	ND	U	5.0	0.67	
79-01-6	Trichloroethene (TCE)	ND	U	5.0	1.1	
75-69-4	Trichlorofluoromethane (CFC 11)	ND	U	5.0	0.66	
75-01-4	Vinyl Chloride	ND	U	5.0	1.9	
10061-01-5	cis-1,3-Dichloropropene	ND	U	5.0	0.90	
179601-23-1	m,p-Xylenes	ND	U	10	1.1	
95-47-6	o-Xylene	ND	U	5.0	0.48	
156-60-5	trans-1,2-Dichloroethene	ND	U	5.0	0.86	
10061-02-6	trans-1,3-Dichloropropene	ND	U	5.0	0.20	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	99	28-150	1/31/13 15:44	
Dibromofluoromethane	98	63-138	1/31/13 15:44	
Toluene-d8	95	66-138	1/31/13 15:44	

COLUMBIA ANALYTICAL SERVICES, INC.
Now part of the ALS Group
Analytical Report

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
		Date Analyzed:	1/31/13 1544

Tentatively Identified Compounds (TIC)
Volatile Organic Compounds by GC/MS

Sample Name:	Method Blank	**Units:**	µg/Kg
Lab Code:	RQ1301120-04	**Basis:**	As Received

Analytical Method: 8260C

CAS #	Analyte Name	RT	Result	Q
	No Tentatively Identified Compounds Detected.			

Comments:

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/PO# 178
Sample Matrix: Soil

Service Request: R1300596
Date Analyzed: 1/31/13 15:44

Method Blank Summary
Volatile Organic Compounds by GC/MS

Sample Name: Method Blank
Lab Code: RQ1301120-04
Instrument ID: R-MS-07
File ID: I:\ACQUDATA\MSVOA7\DATA\013113\K2841.D\

Analytical Method: 8260C

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed
Lab Control Sample	RQ1301120-03	I:\ACQUDATA\MSVOA7\DATA\013113\K2839.D\	1/31/13 14:09
1301251001 200 ETU West Tank	R1300596-003	I:\ACQUDATA\MSVOA7\DATA\013113\K2844.D\	1/31/13 18:21
1301251001 200 ETU West TankMS	RQ1301120-05	I:\ACQUDATA\MSVOA7\DATA\013113\K2845.D\	1/31/13 19:06
1301251001 200 ETU West TankDMS	RQ1301120-06	I:\ACQUDATA\MSVOA7\DATA\013113\K2846.D\	1/31/13 19:44

COLUMBIA ANALYTICAL SERVICES, INC.
Now part of the ALS Group
QA/QC Report

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/PO# 178

Service Request: R1300596
Date Analyzed: 1/31/13

Continuing Calibration Verification Summary
Volatile Organic Compounds by GC/MS

Analytical Method: 8260C

File ID: I:\ACQUDATA\MSVOA7\DATA\013113\K2838.D\

Calibration Date: 1/14/13
Calibration ID: RC1300006
Analysis Lot: 327574
Units: ppb

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
1,1,1,2-Tetrachloroethane	50.0	47.2	0.3906	0.3685	-5.7	NA	± 20 %	Average RF
1,1,1-Trichloroethane (TCA)	50.0	47.4	0.6622	0.6278	-5.2	NA	± 20 %	Average RF
1,1,2,2-Tetrachloroethane	50.0	41.5	1.288	1.069	-17.0	NA	± 20 %	Average RF
1,1,2-Trichloroethane	50.0	44.7	0.3535	0.3159	-10.6	NA	± 20 %	Average RF
1,1,2-Trichloro-1,2,2-Trifluoroethane	50.0	52.0	0.3800	0.3953	4.0	NA	± 20 %	Average RF
1,1-Dichloroethene (1,1-DCE)	50.0	50.9	0.3560	0.3624	1.8	NA	± 20 %	Average RF
1,2,3-Trichloropropane	50.0	40.1	0.3805	0.3054	-19.8	NA	± 20 %	Average RF
1,2-Dibromo-3-chloropropane (DBCP)	50.0	36.4	0.3112	0.2263	-27.3 *	NA	± 20 %	Average RF
1,2-Dibromoethane	50.0	43.0	0.4338	0.3731	-14.0	NA	± 20 %	Average RF
1,2-Dichlorobenzene	50.0	46.2	1.619	1.494	-7.7	NA	± 20 %	Average RF
1,2-Dichloroethane	50.0	47.2	0.4943	0.4661	-5.7	NA	± 20 %	Average RF
1,2-Dichloropropane	50.0	48.5	0.4006	0.3882	-3.1	NA	± 20 %	Average RF
1,3-Dichlorobenzene	50.0	48.3	1.673	1.617	-3.3	NA	± 20 %	Average RF
1,4-Dioxane	1000	731	0.006751	0.004932	-26.9 *	NA	± 20 %	Average RF
2-Butanone (MEK)	50.0	38.8	0.5055	0.3923	-22.4 *	NA	± 20 %	Average RF
2-Chloro-1,3-butadiene	50.0	50.8	0.7571	0.7689	1.6	NA	± 20 %	Average RF
2-Chloroethyl Vinyl Ether	50.0	44.0	0.1735	0.1526	-12.0	NA	± 20 %	Average RF
2-Methyl-1-propanol (Isobutyl Alcohol)	1000	746	0.04266	0.03183	-25.4 *	NA	± 20 %	Average RF
Allyl Chloride	50.0	47.4	0.9776	0.9261	-5.3	NA	± 20 %	Average RF
4-Methyl-2-pentanone	50.0	39.8	0.7740	0.6166	-20.3 *	NA	± 20 %	Average RF
Acetone	50.0	38.0	0.3790	0.2882	-24.0 *	NA	± 20 %	Average RF
Acetonitrile	250	202	0.1177	0.09502	-19.2	NA	± 20 %	Average RF
Acrolein	250	217	NA	NA	NA	-13.3	± 20 %	Linear
Acrylonitrile	250	202	0.3181	0.2570	-19.2	NA	± 20 %	Average RF
Benzene	50.0	48.4	1.351	1.309	-3.1	NA	± 20 %	Average RF
Bromodichloromethane	50.0	48.1	0.4942	0.4753	-3.8	NA	± 20 %	Average RF
Bromoform	50.0	46.0	0.3839	0.3531	-8.0	NA	± 20 %	Average RF
Bromomethane	50.0	47.7	0.3751	0.3579	-4.6	NA	± 20 %	Average RF
Carbon Disulfide	50.0	58.9	1.448	1.705	17.7	NA	± 20 %	Average RF
Carbon Tetrachloride	50.0	49.2	0.3582	0.3527	-1.5	NA	± 20 %	Average RF
Chlorobenzene	50.0	49.6	1.001	0.9930	-0.8	NA	± 20 %	Average RF
Chloroethane	50.0	48.7	0.4267	0.4157	-2.6	NA	± 20 %	Average RF
Chloroform	50.0	48.1	0.8900	0.8557	-3.9	NA	± 20 %	Average RF
Chloromethane	50.0	47.1	0.7881	0.7422	-5.8	NA	± 20 %	Average RF
Dibromochloromethane	50.0	45.6	0.4831	0.4406	-8.8	NA	± 20 %	Average RF
Dibromomethane	50.0	49.4	0.2474	0.2446	-1.1	NA	± 20 %	Average RF
Dichlorodifluoromethane (CFC 12)	50.0	47.0	0.5083	0.4783	-5.9	NA	± 20 %	Average RF
Dichloromethane	50.0	49.4	0.5582	0.5519	-1.1	NA	± 20 %	Average RF
Ethyl Methacrylate	50.0	42.3	0.7334	0.6211	-15.3	NA	± 20 %	Average RF

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/PO# 178

Service Request: R1300596
Date Analyzed: 1/31/13

Continuing Calibration Verification Summary
Volatile Organic Compounds by GC/MS

Analytical Method: 8260C

File ID: I:\ACQUDATA\MSVOA7\DATA\013113\K2838.D\

Calibration Date: 1/14/13
Calibration ID: RC1300006
Analysis Lot: 327574
Units: ppb

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Ethylbenzene	50.0	47.2	1.691	1.597	-5.6	NA	± 20 %	Average RF
Iodomethane	50.0	59.2	0.6055	0.7173	18.4	NA	± 20 %	Average RF
Methacrylonitrile	50.0	40.0	0.3098	0.2477	-20.0 *	NA	± 20 %	Average RF
Methyl Methacrylate	50.0	41.1	0.1510	0.1241	-17.8	NA	± 20 %	Average RF
Naphthalene	50.0	42.6	2.711	2.307	-14.9	NA	± 20 %	Average RF
Propionitrile	250	204	0.1181	0.09632	-18.4	NA	± 20 %	Average RF
Tetrachloroethene (PCE)	50.0	49.7	0.3962	0.3937	-0.6	NA	± 20 %	Average RF
Toluene	50.0	47.4	1.535	1.454	-5.3	NA	± 20 %	Average RF
Trichloroethene (TCE)	50.0	47.0	0.3404	0.3202	-5.9	NA	± 20 %	Average RF
Trichlorofluoromethane (CFC 11)	50.0	47.4	0.6342	0.6006	-5.3	NA	± 20 %	Average RF
Vinyl Chloride	50.0	47.1	0.6172	0.5811	-5.8	NA	± 20 %	Average RF
cis-1,3-Dichloropropene	50.0	49.0	0.5863	0.5743	-2.0	NA	± 20 %	Average RF
m,p-Xylenes	100	97.8	0.6078	0.5945	-2.2	NA	± 20 %	Average RF
o-Xylene	50.0	49.6	0.6045	0.5999	-0.8	NA	± 20 %	Average RF
trans-1,2-Dichloroethene	50.0	48.7	0.4748	0.4628	-2.5	NA	± 20 %	Average RF
trans-1,3-Dichloropropene	50.0	45.4	0.6222	0.5648	-9.2	NA	± 20 %	Average RF
4-Bromofluorobenzene	50.0	48.5	0.4999	0.4851	-3.0	NA	± 20 %	Average RF
Dibromofluoromethane	50.0	48.6	0.3430	0.3333	-2.8	NA	± 20 %	Average RF
Toluene-d8	50.0	46.4	1.293	1.201	-7.1	NA	± 20 %	Average RF

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
		Date Extracted:	2/5/13
		Date Analyzed:	2/5/13 13:45
Sample Name:	Method Blank	**Units:**	µg/Kg
Lab Code:	RQ1301215-01	**Basis:**	As Received

Semivolatile Organic Compounds by GC/MS

Analytical Method:	8270D	**Analysis Lot:**	328204
Prep Method:	EPA 3541	**Extraction Lot:**	176302
Data File Name:	J:\ACQUDATA\5973A\DATA\020513\CP527.D\	**Instrument Name:**	R-MS-51
		Dilution Factor:	1

CAS No.	Analyte Name	Result	Q	MRL	Note
95-95-4	2,4,5-Trichlorophenol	ND	U	330	
88-06-2	2,4,6-Trichlorophenol	ND	U	330	
120-83-2	2,4-Dichlorophenol	ND	U	330	
105-67-9	2,4-Dimethylphenol	ND	U	330	
51-28-5	2,4-Dinitrophenol	ND	U	1700	
121-14-2	2,4-Dinitrotoluene	ND	U	330	
606-20-2	2,6-Dinitrotoluene	ND	U	330	
91-58-7	2-Chloronaphthalene	ND	U	330	
95-57-8	2-Chlorophenol	ND	U	330	
91-57-6	2-Methylnaphthalene	ND	U	330	
95-48-7	2-Methylphenol	ND	U	330	
88-74-4	2-Nitroaniline	ND	U	1700	
88-75-5	2-Nitrophenol	ND	U	330	
91-94-1	3,3'-Dichlorobenzidine	ND	U	330	
	3- and 4-Methylphenol Coelution	ND	U	330	
99-09-2	3-Nitroaniline	ND	U	1700	
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	1700	
101-55-3	4-Bromophenyl Phenyl Ether	ND	U	330	
59-50-7	4-Chloro-3-methylphenol	ND	U	330	
106-47-8	4-Chloroaniline	ND	U	330	
7005-72-3	4-Chlorophenyl Phenyl Ether	ND	U	330	
100-01-6	4-Nitroaniline	ND	U	1700	
100-02-7	4-Nitrophenol	ND	U	1700	
83-32-9	Acenaphthene	ND	U	330	
208-96-8	Acenaphthylene	ND	U	330	
98-86-2	Acetophenone	ND	U	330	
120-12-7	Anthracene	ND	U	330	
1912-24-9	Atrazine	ND	U	330	
56-55-3	Benz(a)anthracene	ND	U	330	
100-52-7	Benzaldehyde	ND	U	330	
50-32-8	Benzo(a)pyrene	ND	U	330	
205-99-2	Benzo(b)fluoranthene	ND	U	330	
191-24-2	Benzo(g,h,i)perylene	ND	U	330	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
		Date Extracted:	2/5/13
		Date Analyzed:	2/5/13 13:45
Sample Name:	Method Blank	**Units:**	µg/Kg
Lab Code:	RQ1301215-01	**Basis:**	As Received

Semivolatile Organic Compounds by GC/MS

Analytical Method:	8270D	**Analysis Lot:**	328204
Prep Method:	EPA 3541	**Extraction Lot:**	176302
Data File Name:	J:\ACQUDATA\5973A\DATA\020513\CP527.D\	**Instrument Name:**	R-MS-51
		Dilution Factor:	1

CAS No.	Analyte Name	Result	Q	MRL	Note
207-08-9	Benzo(k)fluoranthene	ND	U	330	
92-52-4	Biphenyl	ND	U	330	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	U	330	
111-91-1	Bis(2-chloroethoxy)methane	ND	U	330	
111-44-4	Bis(2-chloroethyl) Ether	ND	U	330	
117-81-7	Bis(2-ethylhexyl) Phthalate	ND	U	330	
85-68-7	Butyl Benzyl Phthalate	ND	U	330	
105-60-2	Caprolactam	ND	U	330	
86-74-8	Carbazole	ND	U	330	
218-01-9	Chrysene	ND	U	330	
84-74-2	Di-n-butyl Phthalate	ND	U	330	
117-84-0	Di-n-octyl Phthalate	ND	U	330	
53-70-3	Dibenz(a,h)anthracene	ND	U	330	
132-64-9	Dibenzofuran	ND	U	330	
84-66-2	Diethyl Phthalate	ND	U	330	
131-11-3	Dimethyl Phthalate	ND	U	330	
206-44-0	Fluoranthene	ND	U	330	
86-73-7	Fluorene	ND	U	330	
118-74-1	Hexachlorobenzene	ND	U	330	
87-68-3	Hexachlorobutadiene	ND	U	330	
77-47-4	Hexachlorocyclopentadiene	ND	U	330	
67-72-1	Hexachloroethane	ND	U	330	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	U	330	
78-59-1	Isophorone	ND	U	330	
621-64-7	N-Nitrosodi-n-propylamine	ND	U	330	
86-30-6	N-Nitrosodiphenylamine	ND	U	330	
91-20-3	Naphthalene	ND	U	330	
98-95-3	Nitrobenzene	ND	U	330	
87-86-5	Pentachlorophenol (PCP)	ND	U	1700	
85-01-8	Phenanthrene	ND	U	330	
108-95-2	Phenol	ND	U	330	
129-00-0	Pyrene	ND	U	330	

Client:	NASA/WSTF/Navarro	**Service Request:**	R1300596
Project:	White Sands Test Facility/PO# 178	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
		Date Extracted:	2/5/13
		Date Analyzed:	2/5/13 13:45
Sample Name:	Method Blank	**Units:**	Percent
Lab Code:	RQ1301215-01	**Basis:**	As Received

Semivolatile Organic Compounds by GC/MS

Analytical Method:	8270D	**Analysis Lot:**	328204
Prep Method:	EPA 3541	**Extraction Lot:**	176302
Data File Name:	J:\ACQUDATA\5973A\DATA\020513\CP527.D\	**Instrument Name:**	R-MS-51
		Dilution Factor:	1

Surrogate Name	%Rec	Control Limits	Date Analyzed	Q
2,4,6-Tribromophenol	94	41-151	2/5/13 13:45	
2-Fluorobiphenyl	79	49-115	2/5/13 13:45	
2-Fluorophenol	67	22-117	2/5/13 13:45	
Nitrobenzene-d5	78	40-112	2/5/13 13:45	
Phenol-d6	73	10-145	2/5/13 13:45	
Terphenyl-d14	73	38-137	2/5/13 13:45	

Evaluate Continuing Calibration Report

Data File : I:\ACQUDATA\5973A\DATA\020513\CP526.D Vial: 1
Acq On : 5 Feb 2013 1:08 pm Operator: Z.Miao
Sample : CCV Inst : 5973-A
Misc : 80 PPM STD 8270/625 Multiplr: 1.00
MS Integration Params: RTEINT.P LR i# 40,52

Method : I:\ACQUDATA\5973A\METHODS\82700116.M (RTE Integrator)
Title : 8270 BNA ANALYSIS
Last Update : Thu Jan 31 17:30:54 2013
Response via : Multiple Level Calibration

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	IR	d4-1,4-Dichlorobenzene	1.000	1.000	0.0	101	0.00
2	TM	Pyridine	1.213	1.421	-17.1	111	-0.02
3	TM	N-Nitrosodimethylamine	0.696	0.806	-15.8	112	0.00
4	S	SURR1,2-FLUOROPHENOL	1.103	1.101	0.2	98	0.02
5	TM	Benzaldehyde	0.478	0.444	7.1	79	0.00
6	TM	Aniline	1.526	1.370	10.2	94	0.00
7	S	SURR2,PHENOL-D6	1.354	1.357	-0.2	97	0.03
8	TMC	Phenol	1.331	1.404	-5.5	110	0.03
9	TM	bis(2-Clethyl)Ether	1.093	0.988	9.6	90	0.00
10	TM	2-Chlorophenol	1.329	1.328	0.1	98	0.02
11	TM	1,3-Diclbenzene	1.561	1.498	4.0	95	0.00
12	TMC	1,4-Dichlorobenzene	1.527	1.479	3.1	96	0.00
13	TM	1,2-Diclbenzene	1.457	1.428	2.0	98	0.00
14	TM	Benzyl Alcohol	1.031	1.233	-19.6	111	0.02
15	TM	2,2'-oxybis(1-Chloropropane	0.898	0.792	11.8	89	0.00
16	TM	2-Methylphenol	1.142	1.109	2.9	97	0.02
17	TM	Acetophenone	1.630	1.686	-3.4	106	0.00
18	TMP	N-Nitroso-Di-n-propylamine	0.845	0.836	1.1	97	0.00
19	TM	Hexachloroethane	0.735	0.753	-2.4	101	0.00
20	TM	3+4-Methylphenol	1.173	1.172	0.1	98	0.02
21	T	1-Methyl-2-pyrrolidinone	0.704	0.726	-3.1	101	0.00
22	IR	d8-Naphthalene	1.000	1.000	0.0	104	0.00
23	S	SURR4,NITROBENZENE-D5	0.417	0.410	1.7	105	0.00
24	TM	Nitrobenzene	0.419	0.388	7.4	101	0.00
25	TM	Isophorone	0.637	0.622	2.4	101	0.00
26	TCM	2-Nitrophenol	0.204	0.202	1.0	101	0.00
27	TM	Benzoic Acid	0.209	0.193	7.7	98	0.04
28	TM	2,4-Dimethylphenol	0.370	0.378	-2.2	105	0.02
29	TM	bis(-2-Chloroethoxy)Methane	0.374	0.371	0.8	103	0.00
30	TCM	2,4-Dichlorophenol	0.348	0.329	5.5	96	0.00
31	TM	1,2,4-Trichlorobenzene	0.368	0.348	5.4	101	0.00
32	TM	Naphthalene	1.000	0.939	6.1	100	0.00
33	TM	4-Chloroaniline	0.423	0.391	7.6	98	0.00
34	TCM	Hexachlorobutadiene	0.239	0.240	-0.4	107	0.00
35	TMC	4-Chloro-3-methylphenol	0.314	0.341	-8.6	108	0.02
36	TM	Caprolactam	0.107	0.112	-4.7	111	0.00
37	TM	2-Methylnaphthalene	0.750	0.706	5.9	103	0.00
38	TM	1-Methylnaphthalene	0.683	0.629	7.9	100	0.00
39	IR	d10-Acenaphthene	1.000	1.000	0.0	105	-0.01
40	TPM	Hexachlorocyclopentadiene	0.241	0.238	1.2	87	-0.01
41	TCM	2,4,6-Trichlorophenol	0.354	0.383	-8.2	105	0.00
42	TM	2,4,5-Trichlorophenol	0.384	0.370	3.6	97	0.00
43	S	SURR5,2-FLUOROBIPHENYL	1.263	1.185	6.2	102	0.00
44	TM	1,1'-Biphenyl	1.363	1.291	5.3	101	0.00
45	TM	2-Chloronaphthalene	1.079	1.006	6.8	101	-0.01
46	TM	2-Nitroaniline	0.323	0.350	-8.4	111	0.00
47	TM	Acenaphthylene	1.646	1.623	1.4	108	-0.01
48	TM	Dimethyl phthalate	1.240	1.294	-4.4	109	-0.01

(#) = Out of Range

Evaluate Continuing Calibration Report

Data File : I:\ACQUDATA\5973A\DATA\020513\CP526.D
Acq On : 5 Feb 2013 1:08 pm
Sample : CCV
Misc : 80 PPM STD 8270/625
MS Integration Params: RTEINT.P

Vial: 1
Operator: Z.Miao
Inst : 5973-A
Multiplr: 1.00

Method : I:\ACQUDATA\5973A\METHODS\82700116.M (RTE Integrator)
Title : 8270 BNA ANALYSIS
Last Update : Thu Jan 31 17:30:54 2013
Response via : Multiple Level Calibration

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
49	TM	2,6-Dinitrotoluene	0.308	0.325	-5.5	106	0.00
50	TMC	Acenaphthene	1.074	1.040	3.2	102	-0.02
51	TM	3-Nitroaniline	0.300	0.328	-9.3	112	0.00
52	TPM	2,4-Dinitrophenol	0.110	0.112	-1.8	119	0.00
53	TM	Dibenzofuran	1.592	1.555	2.3	104	-0.01
54	TM	2,4-Dinitrotoluene	0.394	0.437	-10.9	112	0.00
55	TMP	4-Nitrophenol	0.221	0.236	-6.8	111	0.03
56	TM	Fluorene	1.304	1.282	1.7	105	-0.01
57	TM	4-Chlorophenyl-phenylether	0.646	0.658	-1.9	106	-0.01
58	TM	Diethylphthalate	1.238	1.371	-10.7	115	-0.01
59	TM	4-Nitroaniline	0.291	0.326	-12.0	118	0.00
60	S	SURR3,2,4,6-TRIBROMOPHENOL	0.124	0.152	-22.6#	127	0.00
61	IR	d10-Phenanthrene	1.000	1.000	0.0	109	-0.02
62	T	1-Phenyl-1(4-methyl-phenyl)	0.000	0.000#	0.0	84	0.05
63	TM	4,6-Dinitro-2-methylphenol	0.121	0.121	0.0	108	0.00
64	TM	1,2 Diphenylhydrazine	0.762	0.749	1.7	108	-0.01
65	TCM	N-Nitrosodiphenylamine	0.533	0.528	0.9	110	0.00
66	TM	4-Bromophenyl-phenylether	0.220	0.221	-0.5	113	-0.01
67	T	1-Phenyl-1(2,4-dimethylphen	0.000	0.000#	0.0	95	0.00
68	TM	Hexachlorobenzene	0.206	0.216	-4.9	119	-0.02
69	TM	Atrazine	0.113	0.098	13.3	92	-0.01
70	TCM	Pentachlorophenol	0.097	0.096	1.0	120	0.00
71	TM	Phenanthrene	1.016	0.971	4.4	109	-0.02
72	TM	Anthracene	1.052	1.041	1.0	109	-0.02
73	TM	Carbazole	1.001	0.990	1.1	110	0.00
74	TM	Di-n-butylphthalate	1.164	1.301	-11.8	126	-0.02
75	TCM	Fluoranthene	1.214	1.182	2.6	109	-0.02
76	IR	d12-Chrysene	1.000	1.000	0.0	111	-0.02
77	TM	Benzidine	0.338	0.310	8.3	96	-0.01
78	TM	Pyrene	1.308	1.284	1.8	112	-0.02
79	S	SURR6,TERPHENYL-D14	0.867	0.908	-4.7	120	-0.01
80	TM	Butyl benzyl phthalate	0.605	0.673	-11.2	124	-0.01
81	TM	3,3'-Dichlorobenzidine	0.425	0.454	-6.8	115	-0.02
82	TM	Benzo(a)anthracene	1.236	1.207	2.3	111	-0.02
83	TM	Chrysene	1.169	1.166	0.3	115	-0.02
84	TM	bis(2-Ethylhexyl)phthalate	0.803	0.888	-10.6	123	-0.02
85	IR	d12-Perylene	1.000	1.000	0.0	124	-0.05
86	TCM	Di-n-octyl phthalate	1.268	1.363	-7.5	129	-0.03
87	TM	Benzo(b)Fluoranthene	1.185	1.150	3.0	122	-0.04
88	TM	Benzo(k)fluoranthene	1.120	1.040	7.1	112	-0.04
89	TCM	Benzo(a)pyrene	1.133	1.101	2.8	119	-0.05
90	TM	Indeno(1,2,3-cd)Pyrene	1.169	1.242	-6.2	131	-0.08
91	TM	Dibenz(a,h)anthracene	0.966	1.014	-5.0	126	-0.10
92	TM	Benzo(g,h,i)perylene	1.004	1.068	-6.4	130	-0.10

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Evaluate Continuing Calibration Report

Data File : I:\ACQUDATA\5973A\DATA\020513\CP526.D Vial: 1
Acq On : 5 Feb 2013 1:08 pm Operator: Z.Miao
Sample : CCV Inst : 5973-A
Misc : 80 PPM STD 8270/625 Multiplr: 1.00
MS Integration Params: RTEINT.P

Method : I:\ACQUDATA\5973A\METHODS\82700116.M (RTE Integrator)
Title : 8270 BNA ANALYSIS
Last Update : Thu Jan 31 17:30:54 2013
Response via : Multiple Level Calibration

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

		Compound	Amount	Calc.	%Dev	Area%	Dev(min)
1	IR	d4-1,4-Dichlorobenzene	40.000	40.000	0.0	101	0.00
2	TM	Pyridine	80.000	93.661	-17.1	111	-0.02
3	TM	N-Nitrosodimethylamine	80.000	92.617	-15.8	112	0.00
4	S	SURR1,2-FLUOROPHENOL	80.000	79.846	0.2	98	0.02
5	TM	Benzaldehyde	80.000	74.265	7.2	79	0.00
6	TM	Aniline	80.000	71.807	10.2	94	0.00
7	S	SURR2,PHENOL-D6	80.000	80.159	-0.2	97	0.03
8	TMC	Phenol	80.000	84.390	-5.5	110	0.03
9	TM	bis(2-Clethyl)Ether	80.000	72.331	9.6	90	0.00
10	TM	2-Chlorophenol	80.000	79.943	0.1	98	0.02
11	TM	1,3-Diclbenzene	80.000	76.767	4.0	95	0.00
12	TMC	1,4-Dichlorobenzene	80.000	77.478	3.2	96	0.00
13	TM	1,2-Diclbenzene	80.000	78.385	2.0	98	0.00
14	TM	Benzyl Alcohol	80.000	95.690	-19.6	111	0.02
15	TM	2,2'-oxybis(1-Chloropropane	80.000	70.530	11.8	89	0.00
16	TM	2-Methylphenol	80.000	77.659	2.9	97	0.02
17	TM	Acetophenone	80.000	82.773	-3.5	106	0.00
18	TMP	N-Nitroso-Di-n-propylamine	80.000	79.072	1.2	97	0.00
19	TM	Hexachloroethane	80.000	81.865	-2.3	101	0.00
20	TM	3+4-Methylphenol	80.000	79.991	0.0	98	0.02
21	T	1-Methyl-2-pyrrolidinone	80.000	82.488	-3.1	101	0.00
22	IR	d8-Naphthalene	40.000	40.000	0.0	104	0.00
23	S	SURR4,NITROBENZENE-D5	80.000	78.613	1.7	105	0.00
24	TM	Nitrobenzene	80.000	74.200	7.2	101	0.00
25	TM	Isophorone	80.000	78.141	2.3	101	0.00
26	TCM	2-Nitrophenol	80.000	79.418	0.7	101	0.00
27	TM	Benzoic Acid	80.000	74.064	7.4	98	0.04
28	TM	2,4-Dimethylphenol	80.000	81.750	-2.2	105	0.02
29	TM	bis(-2-Chloroethoxy)Methane	80.000	79.428	0.7	103	0.00
30	TCM	2,4-Dichlorophenol	80.000	75.518	5.6	96	0.00
31	TM	1,2,4-Trichlorobenzene	80.000	75.638	5.5	101	0.00
32	TM	Naphthalene	80.000	75.073	6.2	100	0.00
33	TM	4-Chloroaniline	80.000	73.972	7.5	98	0.00
34	TCM	Hexachlorobutadiene	80.000	80.252	-0.3	107	0.00
35	TMC	4-Chloro-3-methylphenol	80.000	86.946	-8.7	108	0.02
36	TM	Caprolactam	80.000	83.958	-4.9	111	0.00
37	TM	2-Methylnaphthalene	80.000	75.335	5.8	103	0.00
38	TM	1-Methylnaphthalene	80.000	73.767	7.8	100	0.00
39	IR	d10-Acenaphthene	40.000	40.000	0.0	105	-0.01
40	TPM	Hexachlorocyclopentadiene	80.000	65.600	18.0	87	-0.01
41	TCM	2,4,6-Trichlorophenol	80.000	86.674	-8.3	105	0.00
42	TM	2,4,5-Trichlorophenol	80.000	77.120	3.6	97	0.00
43	S	SURR5,2-FLUOROBIPHENYL	80.000	75.063	6.2	102	0.00
44	TM	1,1'-Biphenyl	80.000	75.791	5.3	101	0.00
45	TM	2-Chloronaphthalene	80.000	74.583	6.8	101	-0.01
46	TM	2-Nitroaniline	80.000	86.781	-8.5	111	0.00
47	TM	Acenaphthylene	80.000	78.873	1.4	108	-0.01
48	TM	Dimethyl phthalate	80.000	83.541	-4.4	109	-0.01

(#) = Out of Range

Data File : I:\ACQUDATA\5973A\DATA\020513\CP526.D Vial: 1
Acq On : 5 Feb 2013 1:08 pm Operator: Z.Miao
Sample : CCV Inst : 5973-A
Misc : 80 PPM STD 8270/625 Multiplr: 1.00
MS Integration Params: RTEINT.P

Method : I:\ACQUDATA\5973A\METHODS\82700116.M (RTE Integrator)
Title : 8270 BNA ANALYSIS
Last Update : Thu Jan 31 17:30:54 2013
Response via : Multiple Level Calibration

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

		Compound	Amount	Calc.	%Dev	Area%	Dev(min)
49	TM	2,6-Dinitrotoluene	80.000	84.404	-5.5	106	0.00
50	TMC	Acenaphthene	80.000	77.431	3.2	102	-0.02
51	TM	3-Nitroaniline	80.000	87.405	-9.3	112	0.00
52	TPM	2,4-Dinitrophenol	80.000	83.733	-4.7	119	0.00
53	TM	Dibenzofuran	80.000	78.161	2.3	104	-0.01
54	TM	2,4-Dinitrotoluene	80.000	88.644	-10.8	112	0.00
55	TMP	4-Nitrophenol	80.000	85.138	-6.4	111	0.03
56	TM	Fluorene	80.000	78.613	1.7	105	-0.01
57	TM	4-Chlorophenyl-phenylether	80.000	81.493	-1.9	106	-0.01
58	TM	Diethylphthalate	80.000	88.609	-10.8	115	-0.01
59	TM	4-Nitroaniline	80.000	89.519	-11.9	118	0.00
60	S	SURR3,2,4,6-TRIBROMOPHENOL	80.000	97.743	-22.2#	127	0.00
61	IR	d10-Phenanthrene	40.000	40.000	0.0	109	-0.02
62	T	1-Phenyl-1(4-methyl-phenyl)	-1.000	0.000	0.0	84	0.05
63	TM	4,6-Dinitro-2-methylphenol	80.000	79.703	0.4	108	0.00
64	TM	1,2 Diphenylhydrazine	80.000	78.641	1.7	108	-0.01
65	TCM	N-Nitrosodiphenylamine	80.000	79.240	1.0	110	0.00
66	TM	4-Bromophenyl-phenylether	80.000	80.274	-0.3	113	-0.01
67	T	1-Phenyl-1(2,4-dimethylphen	-1.000	0.000	0.0	95	0.00
68	TM	Hexachlorobenzene	80.000	83.825	-4.8	119	-0.02
69	TM	Atrazine	80.000	69.370	13.3	92	-0.01
70	TCM	Pentachlorophenol	80.000	79.415	0.7	120	0.00
71	TM	Phenanthrene	80.000	76.463	4.4	109	-0.02
72	TM	Anthracene	80.000	79.137	1.1	109	-0.02
73	TM	Carbazole	80.000	79.157	1.1	110	0.00
74	TM	Di-n-butylphthalate	80.000	89.348	-11.7	126	-0.02
75	TCM	Fluoranthene	80.000	77.895	2.6	109	-0.02
76	IR	d12-Chrysene	40.000	40.000	0.0	111	-0.02
77	TM	Benzidine	80.000	73.592	8.0	96	-0.01
78	TM	Pyrene	80.000	78.530	1.8	112	-0.02
79	S	SURR6,TERPHENYL-D14	80.000	83.780	-4.7	120	-0.01
80	TM	Butyl benzyl phthalate	80.000	88.977	-11.2	124	-0.01
81	TM	3,3'-Dichlorobenzidine	80.000	85.547	-6.9	115	-0.02
82	TM	Benzo(a)anthracene	80.000	78.069	2.4	111	-0.02
83	TM	Chrysene	80.000	79.808	0.2	115	-0.02
84	TM	bis(2-Ethylhexyl)phthalate	80.000	88.423	-10.5	123	-0.02
85	IR	d12-Perylene	40.000	40.000	0.0	124	-0.05
86	TCM	Di-n-octyl phthalate	80.000	85.946	-7.4	129	-0.03
87	TM	Benzo(b)Fluoranthene	80.000	77.583	3.0	122	-0.04
88	TM	Benzo(k)fluoranthene	80.000	74.281	7.1	112	-0.04
89	TCM	Benzo(a)pyrene	80.000	77.711	2.9	119	-0.05
90	TM	Indeno(1,2,3-cd)Pyrene	80.000	85.019	-6.3	131	-0.08
91	TM	Dibenz(a,h)anthracene	80.000	83.934	-4.9	126	-0.10
92	TM	Benzo(g,h,i)perylene	80.000	85.053	-6.3	130	-0.10

(#) = Out of Range SPCC's out = 0 CCC's out = 0

COLUMBIA ANALYTICAL SERVICES, INC.
Now part of the ALS Group
QA/QC Report

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/PO# 178
Sample Matrix: Soil

Service Request: R1300596
Date Analyzed: 2/ 1/13

Lab Control Sample Summary
Inorganic Parameters

Units: mg/Kg
Basis: As Received

Analyte Name	Method	Lab Control Sample R1300596-LCS Result	Spike Amount	% Rec	% Rec Limits
Antimony, Total	6010C	120	93.3	129	0.0 - 199
Arsenic, Total	6010C	86.4	94.5	91	82.3 - 117
Barium, Total	6010C	162	167	97	83.8 - 115
Beryllium, Total	6010C	53.3	57.6	92	83.0 - 117
Cadmium, Total	6010C	58.3	60.5	96	83.1 - 116
Chromium, Total	6010C	69.0	70.4	98	81.8 - 118
Lead, Total	6010C	88.4	91.8	96	82.2 - 117
Nickel, Total	6010C	57.6	57.6	100	82.8 - 117
Selenium, Total	6010C	80.4	86.4	93	80.1 - 120
Silver, Total	6010C	33.2	34.4	96	66.3 - 134
Thallium, Total	6010C	117	120	98	78.2 - 120
Vanadium, Total	6010C	51.4	57.0	90	73.5 - 126
Zinc, Total	6010C	135	140	96	82.1 - 117

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

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

COLUMBIA ANALYTICAL SERVICES, INC.
Now part of the ALS Group
QA/QC Report

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/PO# 178
Sample Matrix: Soil

Service Request: R1300596
Date Analyzed: 1/31/13

Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Analytical Method: 8260C

Units: µg/Kg
Basis: As Received

Analysis Lot: 327574

Analyte Name	Lab Control Sample RQ1301120-03 Result	Spike Amount	% Rec	% Rec Limits
1,1,1,2-Tetrachloroethane	20.0	20.0	100	71 - 126
1,1,1-Trichloroethane (TCA)	19.3	20.0	96	65 - 127
1,1,2,2-Tetrachloroethane	17.7	20.0	89	71 - 134
1,1,2-Trichloroethane	19.7	20.0	98	76 - 123
1,1,2-Trichloro-1,2,2-Trifluoroethane	20.0	20.0	100	59 - 127
1,1-Dichloroethene (1,1-DCE)	22.8	20.0	114	64 - 124
1,2,3-Trichloropropane	17.2	20.0	86	71 - 134
1,2-Dibromo-3-chloropropane (DBCP)	15.1	20.0	76	56 - 138
1,2-Dibromoethane	18.5	20.0	92	73 - 125
1,2-Dichlorobenzene	19.9	20.0	100	77 - 125
1,2-Dichloroethane	21.3	20.0	107	75 - 132
1,2-Dichloropropane	21.5	20.0	107	79 - 124
1,3-Dichlorobenzene	20.7	20.0	103	74 - 130
1,4-Dioxane	327	400	82	59 - 152
2-Butanone (MEK)	16.0	20.0	80	70 - 131
2-Chloro-1,3-butadiene	24.9	20.0	124	67 - 138
2-Chloroethyl Vinyl Ether	17.5	20.0	87	15 - 171
2-Methyl-1-propanol (Isobutyl Alcohol)	329	400	82	45 - 150
Allyl Chloride	21.3	20.0	106	61 - 112
4-Methyl-2-pentanone	16.9	20.0	85	65 - 138
Acetone	15.9	20.0	79	55 - 143
Acetonitrile	84.5	100	84	50 - 161
Acrolein	32.6	40.0	82	25 - 166
Acrylonitrile	86.3	100	86	72 - 131
Benzene	21.1	20.0	106	75 - 124
Bromodichloromethane	21.3	20.0	106	77 - 127
Bromoform	18.5	20.0	92	61 - 144
Bromomethane	23.6	20.0	118	46 - 133
Carbon Disulfide	24.9	20.0	124	70 - 147
Carbon Tetrachloride	19.5	20.0	98	62 - 134
Chlorobenzene	21.4	20.0	107	77 - 124
Chloroethane	20.8	20.0	104	66 - 136

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

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

COLUMBIA ANALYTICAL SERVICES, INC.
Now part of the ALS Group
QA/QC Report

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/PO# 178
Sample Matrix: Soil

Service Request: R1300596
Date Analyzed: 1/31/13

Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Analytical Method: 8260C

Units: µg/Kg
Basis: As Received

Analysis Lot: 327574

Analyte Name	Lab Control Sample RQ1301120-03 Result	Spike Amount	% Rec	% Rec Limits
Chloroform	22.1	20.0	110	75 - 126
Chloromethane	20.2	20.0	101	52 - 145
Dibromochloromethane	19.7	20.0	99	69 - 133
Dibromomethane	21.2	20.0	106	76 - 122
Dichlorodifluoromethane (CFC 12)	18.6	20.0	93	46 - 146
Dichloromethane	22.2	20.0	111	75 - 122
Ethyl Methacrylate	18.5	20.0	93	61 - 137
Ethylbenzene	20.9	20.0	104	70 - 130
Iodomethane	24.0	20.0	120	42 - 168
Methacrylonitrile	18.8	20.0	94	68 - 128
Methyl Methacrylate	17.2	20.0	86	65 - 132
Naphthalene	20.3	20.0	101	69 - 149
Propionitrile	90.0	100	90	71 - 135
Tetrachloroethene (PCE)	20.9	20.0	104	67 - 133
Toluene	20.3	20.0	102	72 - 127
Trichloroethene (TCE)	20.1	20.0	100	72 - 128
Trichlorofluoromethane (CFC 11)	19.8	20.0	99	62 - 138
Vinyl Chloride	20.7	20.0	103	58 - 152
cis-1,3-Dichloropropene	20.8	20.0	104	73 - 120
m,p-Xylenes	41.9	40.0	105	70 - 131
o-Xylene	21.5	20.0	107	71 - 127
trans-1,2-Dichloroethene	22.3	20.0	111	69 - 125
trans-1,3-Dichloropropene	19.4	20.0	97	68 - 120

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

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

COLUMBIA ANALYTICAL SERVICES, INC.
Now part of the ALS Group
QA/QC Report

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/PO# 178
Sample Matrix: Soil

Service Request: R1300596
Date Analyzed: 2/ 5/13

Lab Control Sample Summary
Semivolatile Organic Compounds by GC/MS

Analytical Method: 8270D
Prep Method: EPA 3541

Units: µg/Kg
Basis: As Received

Extraction Lot: 176302

	Lab Control Sample RQ1301215-02			Duplicate Lab Control Sample RQ1301215-03					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
2,4,5-Trichlorophenol	2940	3330	88	2830	3330	85	34 - 121	4	30
2,4,6-Trichlorophenol	3120	3330	94	3120	3330	94	76 - 117	<1	30
2,4-Dichlorophenol	2800	3330	84	2850	3330	86	72 - 112	2	30
2,4-Dimethylphenol	2650	3330	79	2840	3330	85	41 - 106	7	30
2,4-Dinitrophenol	2340	3330	70	2250	3330	68	12 - 134	4	30
2,4-Dinitrotoluene	3250	3330	98	3170	3330	95	64 - 121	3	30
2,6-Dinitrotoluene	3200	3330	96	3130	3330	94	79 - 116	2	30
2-Chloronaphthalene	2730	3330	82	2670	3330	80	76 - 112	2	30
2-Chlorophenol	2860	3330	86	2670	3330	80	31 - 123	7	30
2-Methylnaphthalene	2720	3330	82	2840	3330	85	73 - 108	4	30
2-Methylphenol	2780	3330	84	2620	3330	79	62 - 105	6	30
2-Nitroaniline	3320	3330	100	3240	3330	97	77 - 115	3	30
2-Nitrophenol	2980	3330	89	3070	3330	92	69 - 115	3	30
3,3'-Dichlorobenzidine	2510	3330	75	2540	3330	76	55 - 109	1	30
3- and 4-Methylphenol Coelution	5620	6670	84	5250	6670	79	65 - 110	7	30
3-Nitroaniline	2170	3330	65	2290	3330	69	45 - 108	5	30
4,6-Dinitro-2-methylphenol	3060	3330	92	3050	3330	92	22 - 161	<1	30
4-Bromophenyl Phenyl Ether	3120	3330	93	3040	3330	91	73 - 120	2	30
4-Chloro-3-methylphenol	3010	3330	90	3020	3330	91	39 - 127	<1	30
4-Chloroaniline	1770	3330	53	1810	3330	54	37 - 119	2	30
4-Chlorophenyl Phenyl Ether	3030	3330	91	3010	3330	90	77 - 109	<1	30
4-Nitroaniline	3050	3330	91	3000	3330	90	69 - 117	1	30
4-Nitrophenol	3110	3330	93	3100	3330	93	43 - 133	<1	30
Acenaphthene	3040	3330	91	2970	3330	89	79 - 115	2	30
Acenaphthylene	3040	3330	91	2870	3330	86	84 - 120	6	30
Acetophenone	3090	3330	93	2910	3330	87	43 - 126	6	30
Anthracene	3090	3330	93	2950	3330	88	83 - 113	5	30
Atrazine	3730	3330	112	3860	3330	116	10 - 200	3	30
Benz(a)anthracene	2930	3330	88	2900	3330	87	72 - 128	<1	30
Benzaldehyde	5830	3330	175	5180	3330	155	62 - 200	12	30
Benzo(a)pyrene	2800	3330	84	2780	3330	83	66 - 127	<1	30
Benzo(b)fluoranthene	2870	3330	86	2810	3330	84	61 - 135	2	30

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COLUMBIA ANALYTICAL SERVICES, INC.
Now part of the ALS Group
QA/QC Report

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/PO# 178
Sample Matrix: Soil

Service Request: R1300596
Date Analyzed: 2/ 5/13

Lab Control Sample Summary
Semivolatile Organic Compounds by GC/MS

Analytical Method: 8270D
Prep Method: EPA 3541

Units: µg/Kg
Basis: As Received

Extraction Lot: 176302

	Lab Control Sample RQ1301215-02			Duplicate Lab Control Sample RQ1301215-03					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benzo(g,h,i)perylene	3120	3330	94	3110	3330	93	74 - 124	<1	30
Benzo(k)fluoranthene	2800	3330	84	2710	3330	81	70 - 112	3	30
Biphenyl	2930	3330	88	2860	3330	86	80 - 115	3	30
2,2'-Oxybis(1-chloropropane)	2790	3330	84	2620	3330	79	49 - 117	6	30
Bis(2-chloroethoxy)methane	2860	3330	86	2970	3330	89	52 - 131	4	30
Bis(2-chloroethyl) Ether	2700	3330	81	2420	3330	73	54 - 112	11	30
Bis(2-ethylhexyl) Phthalate	3410	3330	102	3290	3330	99	61 - 145	4	30
Butyl Benzyl Phthalate	3250	3330	98	3280	3330	98	59 - 115	<1	30
Caprolactam	2990	3330	90	3100	3330	93	64 - 121	4	30
Carbazole	2970	3330	89	2810	3330	84	66 - 111	5	30
Chrysene	3010	3330	90	2930	3330	88	63 - 136	3	30
Di-n-butyl Phthalate	3320	3330	100	3160	3330	95	65 - 140	5	30
Di-n-octyl Phthalate	3270	3330	98	3210	3330	96	60 - 142	2	30
Dibenz(a,h)anthracene	3150	3330	94	3160	3330	95	75 - 120	<1	30
Dibenzofuran	2930	3330	88	2810	3330	84	80 - 110	4	30
Diethyl Phthalate	3260	3330	98	3230	3330	97	65 - 115	<1	30
Dimethyl Phthalate	3130	3330	94	3090	3330	93	67 - 112	1	30
Fluoranthene	3040	3330	91	2840	3330	85	71 - 128	7	30
Fluorene	2950	3330	88	2910	3330	87	79 - 110	1	30
Hexachlorobenzene	3270	3330	98	3240	3330	97	68 - 115	<1	30
Hexachlorobutadiene	2960	3330	89	3080	3330	92	59 - 116	4	30
Hexachlorocyclopentadiene	2490	3330	75	2650	3330	80	10 - 155	6	30
Hexachloroethane	2730	3330	82	2540	3330	76	47 - 107	7	30
Indeno(1,2,3-cd)pyrene	2910	3330	87	2940	3330	88	76 - 121	<1	30
Isophorone	2740	3330	82	2760	3330	83	74 - 111	<1	30
N-Nitrosodi-n-propylamine	2960	3330	89	2800	3330	84	66 - 113	5	30
N-Nitrosodiphenylamine	3090	3330	93	3060	3330	92	78 - 119	1	30
Naphthalene	2740	3330	82	2800	3330	84	66 - 108	2	30
Nitrobenzene	2660	3330	80	2640	3330	79	64 - 111	<1	30
Pentachlorophenol (PCP)	3160	3330	95	3250	3330	98	22 - 160	3	30
Phenanthrene	3090	3330	93	2940	3330	88	81 - 115	5	30
Phenol	2890	3330	87	2820	3330	84	60 - 112	2	30

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COLUMBIA ANALYTICAL SERVICES, INC.
Now part of the ALS Group
QA/QC Report

Client: NASA/WSTF/Navarro
Project: White Sands Test Facility/PO# 178
Sample Matrix: Soil

Service Request: R1300596
Date Analyzed: 2/ 5/13

Lab Control Sample Summary
Semivolatile Organic Compounds by GC/MS

Analytical Method: 8270D
Prep Method: EPA 3541

Units: µg/Kg
Basis: As Received

Extraction Lot: 176302

	Lab Control Sample RQ1301215-02			Duplicate Lab Control Sample RQ1301215-03					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Pyrene	2930	3330	88	2910	3330	87	70 - 133	<1	30

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

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

Analysis: 8260 SOILS
Date: 1/31/13
Instr. MS #7

Analyst: Brian Bush
Data Path: j:\acqudata\msvoa 7\Data\013113

Tune Method: T011413
Run Method: S011413
LIMS Run#: 327574

Pos.	Sample	Diln.	Diln. Prep.	Client	RL	Tier	Vial	pH	File#	OK?	Comments
1	BLK								K2835		
2	↓								36		re-written
3	CCV								37		for
4	LCS								38		clarity
5	METBLK	1.0							39		
6	↓	1.0							40		BB 1/31/13
7	R1300581-003	1.0	BB 1/31/13 EE	[redacted]	6730	1			41		
8	R1300596-003	5.0	1g/5ml	[redacted]	6773	2			42		
9	-003 MS	1.0	5g/5ml	↓	↓	↓			43		
10	-003 MSD	1.0	↓						44		
11	-003 MSD	1.0							45		
12	BLK BB 1/31/13 EE								46		
1	BLK								K2835	N	
2	↓								36	N	
3	TUNE					BB 1/31/13	EE		37	YT	RQ1301120-01 (+5)(-77) (12:43)
4	CCV								38	YC	02
5	LCS								39	YQ	↓ 03
6	METBLK	1.0							40	N	
7	↓	1.0							41	YB	RQ1301120-04
8	R1300581-003	1.0		[redacted]	6730	1			42	Y	
9	R1300596-003	5.0	1g/5ml	[redacted]	6773	2			43	N	RPT using 5g
10	003	1.0	5g/						44	Y	3rd/4th IS ↓
11	003 MS	1.0	↓						45	Y	RQ1301120-05 3rd/4th IS ↓
12	003 MSD	1.0	↓	↓	↓	↓			46	Y	↓ 06 ↓ (19:06)
13	BLK								47	—	
14	↓								48	—	
			BB 1/31/13								

All samples = 5 mL/g + 1 uL Combined IS/Surr 10 mL purged

			CCV	LCS	MS/MSD
T/C Primary	500	:53918	5ul		
HSL Primary		:54118			
HBO Primary		:53619			
FRI Primary		:53614			
		DI	50ml		
T/C Secondary	500	:53637		2ul	5 ul
HSL Secondary		:53646			
HBO Secondary		:54081			
FRI Secondary	200	:53641		5	12.5
		DI		50ml	DI 50ml

Comb. IS/Surr. 250 : 53594
Surrogate 500 : 53393
Internal Std. :

Preparation Information Benchsheet

'rep Run#: 176302
'eam: Semivoa GCMS/LPRUNOSKE

Prep WorkFlow: OrgExtS(14)
Prep Method: EPA 3541

Status: Prepped
Prep Date/Time: 2/5/13 08:00 AM

#	Lab Code	Client ID	B#	Amt. Ext.	Method /Test	pH	AE	BN	Final Vol	Sample Desc. (Initial/Final)	SpikeAmt./Inv. ID	Comments
1	RQ1301215-01	MB		30.0g	8270D/SVO				1.00mL		1.0000 mL/52835	
2	RQ1301215-02	LCS		30.0g	8270D/SVO				1.00mL		1.0000 mL/52680; 1.0000 mL/52835; 1.0000 mL/53435	
3	RQ1301215-03	DLCS		30.0g	8270D/SVO				1.00mL		1.0000 mL/52680; 1.0000 mL/52835; 1.0000 mL/53435	
4	R1300440-01RE [redacted]	B148 4-8	.02	30.0g	8270D/SVO/TCL				1.00mL		1.0000 mL/52835	sample 4/7/13
5	RQ1301215-04	R1300440-011 MS	.02	30.0g	8270D/SVO				1.00mL		1.0000 mL/52680; 1.0000 mL/52835; 1.0000 mL/53435	
6	RQ1301215-05	R1300440-011 DMS	.02	30.0g	8270D/SVO				1.00mL		1.0000 mL/52680; 1.0000 mL/52835; 1.0000 mL/53435	
7	R1300596-002 [redacted]	1301251002 200 ETU West Tank	.01	18.1500g	8270D/SVO/TOM42				10.00mL		1.0000 mL/52835	I 2/12/13 YS
8	R1300596-005	1301251003 200 ETU West Tank	.01	17.6000g	8270D/SVO				10.00mL		1.0000 mL/52835	YS

iking Solutions

Name:	8270/625 Extra Compounds LCSS pike 1	Inventory ID	52680	Logbook Ref:	Expires On:	06/11/2013	
Name:	Color Coded BNA Surrogate Solution 10	Inventory ID	52835	Logbook Ref:	Expires On:	10/02/2014	Lot #: 192722
Name:	8270 LCS Mix1: 100 ug/mL	Inventory ID	53435	Logbook Ref:	Expires On:	12/31/2013	Lot #: LB96645

'reparation Materials

ppendorf Pipette Repeater	EXT #12 (26218)	2mL Graduated Vials	135 (54198)	Dichloromethane (Methylene Chloride) 99.9% MeCl2	(53214)
'epared Sodium Sulfate a2SO4	(54342)	SVOA BALANCE	R-BALANCE-05 (12939)		

reparation Steps

ep:	Extraction	Step:	Concentration	Step:	Extraction Complete
arted:	2/5/13 08:00	Started:	2/5/13 12:00	Started:	2/5/13 12:40
nished:	2/5/13 11:34	Finished:	2/5/13 12:40	Finished:	2/5/13 12:40
:	LPRUNOSKE	By:	LPRUNOSKE	By:	LPRUNOSKE
mments		Comments		Comments	

ments:

d 2/5/13 12:40

Preparation Information Benchsheet

Prep Run#: 176302
Team: Semivoa GCMS/LPRUNOSKE

Prep WorkFlow: OrgExtS(14)
Prep Method: EPA 3541

Status: Prepped
Prep Date/Time: 2/5/13 08:00 AM

Reviewed By: MS Date: 2/5/13 Spike Witness: MPEDRO MP 2/5/13 Date:

Chain of Custody

Relinquished By: Date:

Received By: Date:

Extracts Examined
Yes No

10/mL 4000 ppm ISTD 200.0mix
#52972

5973-A

-180
BOOK PAGE

TITLE 2/5/13 PROJECT #52999

Continued from page

	Tune	50 ng DFTPP	Tune01.m	CP523	N filed
	Check			24	✓
	Tune	50 ng DFTPP	Tune01.m	25	YT 12:43pm
1	CCV	80 ppm	82700116.m	26	YQ
2	[redacted]	R01301215-01 BLK	82700117.m 2/5/13 Sol Q	27	Ym
3		-02 LLS	R-440 82701011	28	YQ
4		-03 LLSD		29	YQ
5		R1300596-0052 Y/5	2m 2/5/13	30	Y
6		-0025		31	Y
7	[redacted]	R1300440-011	Re-ex 2/5/13 Sol Q 82701011	32	Y Sur#3 ✓
8		-011MS	R01301215-04	33	YQ
9		-011MSD	-05 cp534		YQ

Rm#: 328204

Continued to page

NATURE DATE

CLOSED TO AND UNDERSTOOD BY DATE

Date 1-28-13

WSTF CHAIN OF CUSTODY RECORD

Page ____ of ____

Laboratory / PO # NAV0000178

Return Address for Analytical Reports:

NASA WSTF Environmental Department
12600 NASA Road
Las Cruces, NM 88012
Attn: ☐ Lori Minnick ☒ Other Antonette Sanchez
(575) 524-5119 (575) 524-5497

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: Lori Minnick

Sample No.	Sample Location	# of Containers	Sample Type (Solid)	Volatile Organics TOTALS Ice (16 oz. glass jar) (8260B)	RCRA Metals TOTALS Ice (16 oz. glass jar) (6010C)	Semi Volatile Organics TOTALS Ice (16 oz. glass jar) (8270D)						Comments
1301251000 *	200 ETU West Tank	1	S	X								* Matrix Spike
1301251004		1	"		X							
1301251002		1	"			X						
1301251001		1	"	X								
1301251005		1	"		X							
1301251003		1	"			X						

Relinquished By:	Date/Time:	Accepted By:	Date/Time:
[signature]	1-28-13 1330	[signature]	1/29/13 0940

WSTF – 381B (02/09)

R1300596 5
NASA/WSTF/Navarro
White Sands Test Facility

Cooler Receipt and Preservation Check Form

Project/Client NASA Folder Number _____.

Cooler received on 1/29/13 by: DM/KM **COURIER:** ALS UPS FEDEX VELOCITY CLIENT

1. Were custody seals on outside of cooler? YES NO
2. Were custody papers properly filled out (ink, signed, etc.)? YES NO
3. Did all bottles arrive in good condition (unbroken)? YES NO
4. Did VOA vials, Alkalinity, or Sulfide have significant* air bubbles? YES NO N/A
5. Were **Ice** or **Ice packs** present? YES NO
6. Where did the bottles originate? ALS/ROC, CLIENT
7. Soil VOA samples received as: Bulk Jar Encore TerraCore Lab5035set N/A
8. Temperature of cooler(s) upon receipt: 3.6° 5.4° _____ _____ _____

Is the temperature within 0° - 6° C?: Y N Y N Y N Y N Y N

If No, Explain Below Date/Time Temperatures Taken: 1/29/13 / 0951

Thermometer ID: IR GUN#3 / IR GUN#4 Reading From: Temp Blank / Sample Bottle

If out of Temperature, note packing/ice condition &Client Approval to Run Samples:

All Samples held in storage location R-002 by DM/KM on 1/29/13 at 0951
5035 samples placed in storage location _____ by _____ on _____ at _____

PC Secondary Review: [illegible] 1/29/13

Cooler Breakdown: Date: 1/29/13 Time: 14:24 by: KM

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. 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 TCN Phenol and 522			If present, contact PM to add ascorbic acid Or sodium sulfite (522)					
	$Na_2S_2O_3$	-	-						
	Zn Aceta	-	-						
	HCl	*	*						

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

Yes = All samples OK

No = Samples were preserved at lab as listed

PM OK to Adjust: _____

Bottle lot numbers: Client

Other Comments:

PC Secondary Review: [illegible] 2/1/13

*significant air bubbles: VOA > 5-6 mm : WC >1 in. diameter

G:\SMODOCS\Cooler Receipt 6.doc 11/6/12

ALS Environmental

34 Dogwood Lane ▪ Middletown, PA 17057 ▪ Phone: 717-944-5541 ▪ Fax: 717-944-1430 ▪ www.alsglobal.com

NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

February 13, 2013

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

Certificate of Analysis

Project Name:	**2013-MERCURY TESTING**	Workorder:	**1011006**
Purchase Order:	**R1300596**	Workorder ID:	**R1300596**

Dear Ms. Jaeger,

Enclosed are the analytical results for samples received by the laboratory on Thursday, February 07, 2013.

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 Denise Brooks (Project Coordinator) or Anna G Milliken (Technical Manager) 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.

This laboratory report may not be reproduced, except in full, without the written approval of ALS Environmental.

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

Anna G Milliken
Technical Manager

ALS Environmental

34 Dogwood Lane ▪ Middletown, PA 17057 ▪ Phone: 717-944-5541 ▪ Fax: 717-944-1430 ▪ www.alsglobal.com

NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

SAMPLE SUMMARY

Workorder 1011006 R1300596

Discard Date: 02/27/2013

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
1011006001	R1300596-001	Solid	1/25/13 00:00	2/7/13 09:45	Customer
1011006002	R1300596-004	Solid	1/25/13 00:00	2/7/13 09:45	Customer

Workorder Comments:

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" not listed under the header "Field Parameters" are performed in the laboratory and are therefore analyzed out of hold time.

Standard Acronyms/Flags

J, B	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

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ANALYTICAL RESULTS

Workorder 1011006 R1300596

Lab ID: **1011006001** Date Collected: 1/25/2013 00:00 Matrix: Solid
Sample ID: **R1300596-001** Date Received: 2/7/2013 09:45

Parameters	Results	Units	Footnote	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
WET CHEMISTRY											
Moisture	0.5	%		0.1	0.01	SM20-2540 G			2/12/13 10:10	CF	A
Total Solids	99.5	%		0.1	0.01	SM20-2540 G			2/12/13 10:10	CF	A
METALS											
Mercury, Total	0.043 U	mg/kg		0.043	0.014	SW846 7471B	2/12/13	MNP	2/12/13 13:55	MNP	A1

Sample Comments:

Anna G Milliken
Technical Manager

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ANALYTICAL RESULTS

Workorder 1011006 R1300596

Lab ID: **1011006002** Date Collected: 1/25/2013 00:00 Matrix: Solid

Sample ID: **R1300596-004** Date Received: 2/7/2013 09:45

Parameters	Results	Units	Footnote	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
WET CHEMISTRY											
Moisture	0.7	%		0.1	0.01	SM20-2540 G			2/8/13 04:20	MPP	A
Total Solids	99.3	%		0.1	0.01	SM20-2540 G			2/8/13 04:20	MPP	A
METALS											
Mercury, Total	0.030 U	mg/kg		0.030	0.0097	SW846 7471B	2/12/13	MNP	2/12/13 13:56	MNP	A1

Sample Comments:

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Technical Manager

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QUALITY CONTROL DATA

Workorder 1011006 R1300596

QC Batch: MDIG/39863 Analysis Method: SW846 7471B

QC Batch Method: SW846 7471B

Associated Lab Samples: 1010994001, 1010995001, 1010995002, 1010995003, 1010998001, 1010998002, 1010998003, 1011000001, 1011000002, 1011000003, 1011000004, 1011000005, 1011000006, 1011006001, 1011006002

METHOD BLANK: 1093898

Parameter	Result	Qualifiers	Units	Reporting Limit
Mercury, Total	0.050 U		mg/kg	0.050

LABORATORY CONTROL SAMPLE: 1093899

Parameter	LCS Result	Qualifiers	Units	Spike Conc.	LCS % Rec	% Rec Limits
Mercury, Total	0.42		mg/kg	0.4	105	80-120

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:1093900 1093901 Original: 1010995001

*****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	Qualifiers	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Mercury, Total	0.44		mg/kg	0.94	1.6	1.6	103	98.5	80-120	3.13	20

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:1093902 1093903 Original: 1011000005

*****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	Qualifiers	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Mercury, Total	0		mg/kg	0.25	0.26	0.26	107	110	80-120	0.16	20

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QUALITY CONTROL DATA

Workorder 1011006 R1300596

QC Batch: WETC/122062 Analysis Method: SM20-2540 G

QC Batch Method: SM20-2540 G

Associated Lab Samples:	1010995001	1010995002	1010995003	1010998003	1011006002	1011036001
	1011036002	1011090001	1011090002	1011090003	1011090004	1011090005
	1011090006	1011090007	1011090008	1011090009	1011090010	1011090011
	1011090012	1011091001	1011091002	1011091003	1011091004	1011091005
Associated Lab Samples:	1011091007	1011091008	1011091009	1011091010	1011091011	1011091012
	1011093001	1011093002	1011093003	1011093004	1011093005	1011093006
	1011093007	1011093008	1011093009	1011093010	1011093011	1011093012
	1011115001	1011115002	1011217001			

SAMPLE DUPLICATE: 1093453 Original: 1011105001

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

Parameter	Original Result	Qualifiers	Units	DUP Result	RPD	Max RPD
Moisture	6.4002		%	5.0	25.2	10
Total Solids	93.5997		%	95.0	1.52	5

SAMPLE DUPLICATE: 1093454 Original: 1011109006

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

Parameter	Original Result	Qualifiers	Units	DUP Result	RPD	Max RPD
Moisture	9.4238		%	8.3	12.8	10
Total Solids	90.5761		%	91.7	1.24	5

SAMPLE DUPLICATE: 1093455 Original: 1011229001

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

Parameter	Original Result	Qualifiers	Units	DUP Result	RPD	Max RPD
Moisture	95.2925		%	95.2	0.14	10
Total Solids	4.7074		%	4.8	2.79	5

SAMPLE DUPLICATE: 1093456 Original: 1011090003

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

Parameter	Original Result	Qualifiers	Units	DUP Result	RPD	Max RPD
Moisture	13.3143		%	14.8	10.4	10
Total Solids	86.6856		%	85.2	1.69	5

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QUALITY CONTROL DATA

Workorder 1011006 R1300596

SAMPLE DUPLICATE: 1093457 Original: 1011091001

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

Parameter	Original Result	Qualifiers	Units	DUP Result	RPD	Max RPD
Moisture	12.5348		%	13.2	5.06	10
Total Solids	87.4651		%	86.8	0.75	5

SAMPLE DUPLICATE: 1093458 Original: 1011091011

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

Parameter	Original Result	Qualifiers	Units	DUP Result	RPD	Max RPD
Moisture	15.4584		%	15.4	0.08	10
Total Solids	84.5415		%	84.6	0.02	5

SAMPLE DUPLICATE: 1093459 Original: 1011093009

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

Parameter	Original Result	Qualifiers	Units	DUP Result	RPD	Max RPD
Moisture	13.8272		%	12.6	9.17	10
Total Solids	86.1727		%	87.4	1.4	5

SAMPLE DUPLICATE: 1093460 Original: 1011128005

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

Parameter	Original Result	Qualifiers	Units	DUP Result	RPD	Max RPD
Moisture	9.319		%	9.0	3.48	10
Total Solids	90.6809		%	91.0	0.35	5

SAMPLE DUPLICATE: 1093461 Original: 1011008006

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

Parameter	Original Result	Qualifiers	Units	DUP Result	RPD	Max RPD
Moisture	0.4077		%	0.4	4.37	10
Total Solids	99.5922		%	99.6	0.02	5

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QUALITY CONTROL DATA

Workorder 1011006 R1300596

QC Batch: WETC/122159 Analysis Method: SM20-2540 G

QC Batch Method: SM20-2540 G

Associated Lab Samples: 1010690001 1011006001 1011408001 1011409001 1011409002 1011409003 1011410001 1011545001 1011545002 1011545003 1011545004 1011545005

SAMPLE DUPLICATE: 1094460 Original: 1011372001

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

Parameter	Original Result	Qualifiers	Units	DUP Result	RPD	Max RPD
Moisture	31.7803		%	30.6	3.68	10
Total Solids	68.2196		%	69.4	1.67	5

SAMPLE DUPLICATE: 1094461 Original: 1011545002

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

Parameter	Original Result	Qualifiers	Units	DUP Result	RPD	Max RPD
Moisture	22.5137		%	22.9	1.49	10
Total Solids	77.4862		%	77.1	0.44	5

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder 1011006 R1300596

Lab ID	Sample ID	Prep Batch Method	Prep Batch	Analytical Method	Analytical Batch
1011006001	R1300596-001	SW846 7471B	MDIG/39863	SW846 7471B	META/40010
1011006002	R1300596-004	SW846 7471B	MDIG/39863	SW846 7471B	META/40010
1011006002	R1300596-004			SM20-2540 G	WETC/12206
1011006001	R1300596-001			SM20-2540 G	WETC/12215

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ALS Environmental Chain of Custody

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

ALS Co

1011006

Project Number: R1300596
Project Manager: Janice Jaeger

Lab Code	Sample ID	# of Cont.	Matrix	Sample Date	Sample Time	Lab ID	Hg 245.1/B
R1300596-001	1301251004 200 ETU West	1	Soil solid	1/25/13		Fort Collins	X
R1300596-004	1301251005 200 ETU West	↓	Soil ↓	1/25/13		Fort Collins	X

Middletown

Raw 1 P100ml (yellow lid) HS

Folder Comments:
May be high in PCB's

	Y	N	Initials
Custody Seals Present?			
(If present) Seals Intact?			
Received on Ice?			
COC/Lbls Complete/Accurate			
Cont in Good Cond?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Cooler Temp:
Cooler #:
Therm ID:
Ship Carrier:
FedEx UPS
DHL
Tracking #: 1Z7W438014977708

ENTERED DS
KS 2/7/13
1534

Special Instructions/Comments	Turnaround Requirements	Report Requirements	Invoice Information
Tier 2 report NASA/WSTF EDD report between MRL & MDL	___RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 X STANDARD Requested FAX Date: ___ Requested Report Date: 02/12/13	___I. Results Only X II. Results + QC Summaries ___III. Results + QC and Calibration Summaries ___IV. Data Validation Report with Raw Data PQL/MDL/J Y EDD Y	PO# R1300596 Bill to

Relinquished By: 2/6/13
Received By: 2.7.13 DS
Airbill Number:

Page 1

Sampling and Analysis Plan 2013-001
ETU Liner

Antonette Sanchez	January 16, 2013
Author	Date

Tom Hall	January 23, 2013
Reviewer/Approver	Date March 27, 2013

Antonette Sanchez	March 21, 2013
Data Reviewer (To be completed after sampling event)	Date

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1 INTRODUCTION

This Sampling and Analysis Plan (SAP) has been developed for NASA WSTF to document the sampling and analysis approach that will be used to support the disposal of the primary liner from the Evaporation Treatment Tanks (ETU) per the requirements of the NMED-approved Closure Plan (March, 2012).

2 SCOPE

This SAP has been prepared to support the collection and analysis of a sample of primary liner sample from the ETU during RCRA Closure. The analytical data generated by implementation of this SAP will be used to support disposal of the East and West Tank Primary liners. It may also be used to support the characterization and disposal of wastes generated by the closure activities during the sampling and removal of the primary liner (i.e., spent personal protective equipment and plastic equipment/materials).

3 BACKGROUND

The Evaporation Treatment Unit (ETU) is a permitted unit under the NASA/WSTF Resource Conservation and Recovery Act (RCRA) Hazardous Waste Permit (No. NM8800029434). The NMED-approved permit (dated November 2009) identified the following two options for the ongoing operation of the ETU:

1. Permit Section III.C.4 allowed continued use of the ETU but required installation of two angled monitoring wells beneath each of the tanks.
2. Permit Section III.C.3 provided an ETU phase-out option that eliminated all waste discharges to the ETU within 3 years of the effective date of the permit and closure of the ETU.

On January 6, 2010, NASA notified NMED that they had selected to phase out and close the ETU in accordance with option #2. An initial WSTF ETU Phase Out Plan was submitted to the NMED on January 6, 2010. An Amended ETU Closure Plan and Sampling and Analysis Plan was submitted on January 17, 2012 and it was approved by the NMED on June 19, 2012. Closure activities for the ETU were started in August 2012.

4 Data Quality Objectives

Summary of DQOs	
Investigation Question(s):	Are residual contaminants of potential concern, as identified in the NMED approved Closure Plan Attachments 15 Table 12, present in the ETU primary liner?
Information Need(s):	Presence and/or concentrations of residual contaminants of potential concern, as identified in the NMED approved Closure Plan, Attachment 15 - Table 12.
Study Boundaries:	Time = prior to removal of the ETU primary liner for disposal. Location = 200 Area ETU
Decision Rules:	The analytical data from the ETU primary liner must meet the following criteria to successfully demonstrate that a "no longer contained-in" is appropriate for submittal to the NMED, per section 7.6 of the ETU Closure Plan:

Summary of DQOs	
	• This determination addresses characteristic hazardous waste, ~~listed~~ waste and underlying hazardous constituents, which are known to have been managed in the ETU as identified by Table 1 through Table 3 and Table 12 of Attachment 15. The determination will be based on detections of the hazardous constituents that do not exceed the 40 CFR Part 268.40 or 268.48 regulatory limits. Therefore, the liners (primary, felt, and secondary) when discarded as a solid waste do not exhibit the characteristics of a hazardous waste per 40 CFR Part 261 Subpart C and do not contain underlying hazardous constituents as defined by §268.2(i), in excess of 40 CFR Part 268.48 regulatory limits. • For listed waste codes P078 and U134, the wastes meet the 40 CFR Part 268.40 Technology Based Standards (ADGAS and NEUTR, respectively).With respect to listed hazardous waste managed in the ETU that ~~has~~ have a treatment based technology standard (P068, U098, U099, U133), as identified in Table 5 through Table 10 of Attachment 15, the determination that the liners "no longer contained-in" listed hazardous waste (P068, U098, U099, and U133) will be based on no detections of the hazardous constituents ~~that do not exceed~~ above the laboratories reporting limits. Therefore, the liners when discarded as a solid waste do not contain hazardous waste and do not meet the listing description of a listed hazardous waste per 40 CFR Part 261 Subpart D. • The determination that the liners "no longer contained-in" F001, F002, F003, F007, and P082 listed hazardous waste as identified by Table 4 and Table 10 of Attachment 15, will be based on detections of the hazardous constituents that do not exceed the 40 CFR Part 268.40 concentration based treatment standards. With respect to F001, F002, F003, and F007 listed hazardous waste, the determination will be based on detections of constituents of concern that do not exceed the 40 CFR Part 268.40 concentration based treatment standard. For P082 (N-nitrosodimethylamine), the determination that the media "no longer contained-in" hazardous waste will be based on detections of the hazardous constituent that do not exceed the 40 CFR Part 268.40 concentration based treatment standards. Therefore, the liners when discarded as a solid waste do not contain hazardous waste and do not meet the listing description of a listed hazardous waste per 40 CFR Part 261 Subpart D.
Acceptance Criteria & Data Requirements	Sampling and Analysis and Quality Assurance Plan incorporating standard lab QC parameters and procedures.

~~meet the listing descriptor of a listed hazardous waste per 40 CFR Part 261, Subpart D~~

Summary of DQOs	
Design Rationale:	The NLCI determination will be based on an evaluation of the analytical data from the ETU primary liner samples with respect to the decision rules.

5 Sampling Approach

5.1 Representative Sample

The ETU primary liner will be sampled for VOC, SVOC, Hydrazines, and RCRA metals. Table 1 identifies the number of samples that will be collected, the required analysis, and the rationale behind why that analysis is required.

Table 1
ETU Primary Liner Samples for the ETU Closure

Event	Type	Associated Location (s)	No. Suites	Purpose	Analytes
YYM MDDT TTT	Primary liner	ETU-East Tank	1	• Analytical data to support a "no longer contained in determination" for the ETU primary liner. • Waste Characterization.	Hydrazines VOC SVOC Metals
	Waste	Field SAMPLE Duplicate	1	• QA sample.	

Samples will be taken under "authoritative sampling" (per RCRA Waste Sampling Technical Guide). This is due to the fact that the samples will be used to provide case support development to a governing agency such as NMED, to prove the positive. The potential concentrations of any constituents present are expected to be well below the regulatory limits. Therefore, a sample, sample duplicate, and matrix spike adequately address any variability associated with this authoritative sampling event.

How does this address variability with respect to what section/portion or location where the samples are collected from

The ETU are identical in construction and both contained the same waste that was discharged from the 200 and 800 area laboratories. Based on generator knowledge, there is no variability in the waste that was contained in the East and West Tanks, therefore samples will be taken from the West Tank Primary Liner.

6 Analytical Requirements

6.1 Analytical Methods

Table 2
Analytical Methods and Rationale

Analysis	Method	Analytical Laboratory	Rationale
Hydrazines	HPLC	WSTF	• ETU Hazardous Constituents as identified in Attachment 15, Table 12 of the ETU Closure Plan.

VOC	EPA SW-846 Method 8260C, GC/MS	ALS/Columbia Analytical Laboratory	• ETU Hazardous Constituents as identified in Attachment 15, Table 12 of the ETU Closure Plan.
Metals	EPA SW-846 Method 6010C/6020A, 7470	ALS/Columbia Analytical Laboratory	• ETU Hazardous Constituents as identified in Attachment 15, Table 12 of the ETU Closure Plan.
SVOC	EPA SW-846 Method 8270D, GC/MS	ALS/Columbia Analytical Laboratory	• ETU Hazardous Constituents as identified in Attachment 15, Table 12 of the ETU Closure Plan.

6.2 Analytical Laboratory

NASA contracts to off-site analytical laboratories accredited by the National Environmental Laboratory Accreditation Program (NELAP). The analytical tasks required to achieve the project objectives are awarded to the laboratory that is successful in the competitive bid process. Potential laboratories must respond to comprehensive statements of work (SOWs) developed to meet the project objectives. Analytical standard operating procedures (SOPs), laboratory quality manuals, and other laboratory-specific documentation are provided by the analytical laboratory following award of the contract.

The analytical laboratories contracted for the analysis of the samples collected under this SAP is identified as follows:

Columbia Analytical Services
1565 Jefferson Road
Bldg. 300, STE 360
Rochester, NY 14623-3190

NASA WSTF Chemical Laboratory
12600 NASA Rd., Bldg. 200
Las Cruces, NM 88012

7 Field Methods and Procedures

7.1 Equipment and Materials

The equipment list for implementation of this SAP includes the following:

- Nitrile or equivalent plastic gloves
- Paper towels
- Industrial-strength shears
- DI water
- Ice
- Sample labels, sample seals, chain of custody, logbook

7.2 Sample Collection

Based on the methods described in section 7.1.4 *Sample Collection Device,* of the RCRA Waste Sampling Technique Guide, samples will be collected from the liner based on the analytical test method being sampled. The samples will be collected in the following manner:

16 oz glass Jars

1. Obtain 4 representative sample coupons from the liner (approximately 1 square foot each).
2. Place sample coupons separately into zip-lock bags, label bags, seal the bags tightly, and place into an iced cooler. Collect for VOA, SVOA, Metals, and hydrazines.
3. Repeat for the sample duplicate and matrix spike.

7.3 Sample Handling, Containers, Preservation, and Storage

Based on guidance from the contracted analytical laboratory, preservatives are not required for this sampling event.

Table 3
Handling, Containers, Preservation, and Hold Times

Analysis	Method	Volumes[3] & Containers	Preservation	Holding Times
Hydrazines[2]	HPLC	15 grams/16 oz. glass soil jar	≤ 6 °C	14 Days
VOC[1]	EPA SW-846 Method 8260C, GC/MS	15 grams/ 16 oz. glass soil jar	≤ 6 °C	14 Days
Metals[1]	EPA SW-846 Method 6010C/6020A, 7470	100 grams/ 16 oz. glass soil jar	≤ 6 °C	180 days (Except 28 days for mercury)
SVOC [1]	EPA SW-846 Method 8270D, GC/MS	30 grams/ 16 oz. glass soil jar	≤ 6 °C	7 Days

[1] Analysis will be performed by Columbia Analytical Services
[2] Analysis will be performed by NASA/WSTF Chemistry Laboratory
[3] Volumes are recommended by the contracting analytical laboratory

Sample containers will be obtained from a sampling equipment vendor or from the laboratory performing analyses. All lab-supplied sample containers will be certified pre-cleaned by the supplier.

7.4 Decontamination Procedures

Sampling equipment will be either single-use pre-cleaned (per EPA protocol as with sample containers) or decontaminated as indicated in a project-specific Field Decontamination Plan or WSTF procedure.

8 Sample Documentation and Shipment

8.1 Logbook

All pertinent information on the sampling effort must be recorded in a bound logbook. Information must be recorded in ink and any cross-outs must be made with a single line and the change initialed and dated by the author. The sample logbook will include the following information:

a. the sample location;
b. suspected composition;
c. sample identification number;
d. volume/mass of sample taken;
e. purpose of sampling;
f. description of sample point and sampling methodology;
g. date and time of collection;
h. name of the sample collector;
i. sample destination and how it will be transported;
j. observations;

k. name(s) of personnel responsible for the observations
l. sample analytical method.

8.2 Labels

NASA has developed a comprehensive internal standard operating procedure for sample custody, packaging, and shipment. WSTF Job Instruction (WJI) ENV-0084, "Environmental Sample Management," provides specific information on sample collection documentation. The WJI contains instructions for sample custody (internal to WSTF and external during shipment), storage, packaging, shipment, delivery tracking, and related recordkeeping. All personnel involved in sample management will follow this procedure.

8.3 Sample Numbering

All samples will be named based on the date and time on which they were collected. Sample names will follow the format:

- YYMMDDTTTT

Where, YY is the two digit year, MM is the two digit month, DD is the two digit day, and TTTT is the four digit sample collection time (military time). For example, a sample collected on November 1, 2012 at 2:15 PM would be identified as "1211011415".

8.4 Chain of Custody

When applicable, sampling operations will be performed per the procedures and requirements outlined in Permit Attachment 12, "Waste Analysis Plan" of the NASA/WSTF Hazardous Waste Operating Permit. Strict chain of custody controls are utilized for all samples collected at WSTF. Each sample will be recorded on a designated chain of custody form or work order that includes chain of custody data. Chain of custody forms are used to track possession of samples from the time of collection through sample analysis and the reporting of analytical results to NASA by on-site and offsite laboratories. Chain of custody forms provide legal documentation of possession throughout the entire sampling and analysis process. Each form will contain the following information as applicable to on-site and off-site laboratories:

- Sample shipment information.
- Unique sample number of each sample.
- Sample type/matrix.
- Sample collection location.
- Number of containers for each sample.
- Required chemical analyses.
- Date of sample shipment.
- Signature(s) with date(s) and time(s) of all personnel involved in sample custody.

A chain of custody form is completed for each shipment of samples and is included in the ice chest during shipment or delivery to the analytical laboratory. A copy of the form is retained at WSTF with the shipping documentation. The original chain of custody accompanies the samples to the analytical laboratory, and is eventually returned with the analytical report from the laboratory to become a part of the permanent sampling and analytical records maintained at WSTF.

9 Quality Control Requirements

Sampling and analysis will be performed in accordance with the instructions provided in this SAP and the analytical methods SW-846 Methods listed in the Table 2. Any deviation that occurs or anomalies that are observed during sampling activities will be annotated in the applicable Field Sampling note book.

9.1 ~~Field~~ Duplicate Samples

~~Field~~ Duplicate samples will be collected at the time of the sampling event. The duplicate sample will be analyzed for the same media and parameters as the primary samples to verify the sampling methods used in the field by sampling personnel. The duplicate sample location will be recorded in the field, but will not be disclosed to the laboratory.

9.2 Laboratory Quality Control Samples

The overall objective for laboratory analysis is to produce data of known and sufficient quality. Appropriate procedures and QC checks will be used so that known and acceptable levels of accuracy and precision are maintained for each data set. All samples will be analyzed by a NELAP-accredited laboratory in accordance with the laboratory quality assurance plan. The use of a NELAP-accredited laboratory ensures that the contract laboratory adheres to standardized analytical protocols and reporting requirements and is capable of producing accurate analytical data.

Method blanks and laboratory quality control samples are prepared and analyzed in accordance with the laboratory's method-specific standard operating procedures. The analytical results of method blanks shall be reviewed to evaluate the possibility of contamination caused by analytical procedures. At a minimum, the laboratory will analyze method blanks and laboratory control samples at a frequency of one in 20 for all batch runs.

10 Waste Management

All wastes generated due to sampling activities will be packaged and managed as hazardous waste pending the receipt of the analytical results. It is anticipated that this sampling effort will generate a small volume (<2 gallons) of contaminated debris consisting of the gloves, paper towels, and plastic used to support the collection of the samples. Excess rinsate water and/or decontamination rinse water generated during the sampling activity will be discharged directly to the ETU through the decontamination pad located at the ETU.

11 Assessment

An Environmental Department Representative shall perform a review of this SAP prior to implementation. The sampling logbook and the Chain of Custody will be reviewed at the conclusion of the sampling event. Upon receipt of the analytical data reports from the site laboratories, the reports will be reviewed. Any deviations along with a summary of possible impact shall be noted in a ~~Section 7~~ Section 12, Data Review Summary.

12 Data Review Summary

Data Reviewer Title/Position:	Antonette Sanchez/Scientist
Date:	March 21, 2013

The Field Notes and Chain of Custodies have been reviewed and no issues were identified that would affect waste characterization. Analysis for EPA Method 6010C- Metals, SW-846 Method 8260C-Volatile Organics and SW-846 Method 8270D-Semi Volatile Organics were performed.

Columba Analytical Services Report (CAS R1300596) has been reviewed and there were no other data qualification issues identified other than the data qualifications as described in the Analytical Report Case Narrative. Therefore, the data are accepted without further qualification, are acceptable for performing waste characterization per 40 CFR Part 261 Subpart C, and to support a "no longer contains- in" determination with respect to 40 CFR Part 261 Subpart D.

NASA/WSTF Analytical Report (LWO #728345) has been reviewed and the laboratory did not identify any data quality issues and no issues were identified as part of the report review process. Therefore, the data are accepted without further qualification and support a "no longer contains- in" determination with respect to 40 CFR Part 261 Subpart D.

13 References

NASA/WSTF Hazardous Waste Permit No. NM8800019434, December, 2009

40 CFR Part 261 - Identification and Listing of Hazardous Waste

40 CFR Part 268 - Land Disposal Restrictions

SW-846 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods

McCoy's 2010 RCRA Unraveled-Chapter 18 Waste Characterization/Sampling

NMED approved ETU Closure Plan (March, 2012)

NASA WSTF TPS Tracking # 102392

RCRA Waste Sampling Draft Technical Guidance (EPA530-D-02-002), August 2002

Analytical Reports

Appendix I: List of Constituents of Concern

CAS #	CONSTITUENT
100-41-4	Ethyl Benzene ✓
108-88-3	Toluene ✓
108-95-2	Phenol
127-18-4	Tetrachloroethene. ✓
1330-20-7	Xylene ✓
57-12-5	Cyanides (Total)
57-12-5	Cyanides (Amenable)
62-75-9	N-Nitrosodimethylamine (NDMA) ✓
67-64-1	Acetone ✓
71-43-2	Benzene ✓
7439-92-1	Lead ✓
7439-97-6	Mercury ✓
7440-02-0	Nickel ✓
7440-22-0	Silver ✓
7440-36-0	Antimony ✓
7440-38-2	Arsenic ✓
7440-39-3	Barium ✓
7440-41-7	Beryllium ✓
7440-43-9	Cadmium ✓
7440-47-3	Chromium ✓
7440-62-2	Vanadium ✓
7440-66-6	Zinc ✓
75-69-4	Trichlorofluoromethane (Freon 11)
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
7782-49-2	Selenium ✓
78-93-3	2-Butanone (MEK) ✓
79-01-6	Trichloroethene (TCE) ✓
84-74-2	Di-n-n-butyl phthalate
91-20-3	Naphthenes
57-14-7	1,1 Dimethylhydrazine ✓
32-01-2	Hydrazine ✓
60-34-4	Monomethylhydrazine ✓

Project EVAP TANK UNIT Notebook No. ETU CLOSURE II

Continues from Page

A. MONTES & E. GALLEGOS PRESENT. WEATHER IS COOL AND CALM. SAMPLE WILL BE CUT OUT FROM PRIMARY LINER AND PUT IN JARS, WEST TANK LINER.

SAMPLE #	ANALYSIS	PRESERV	CONTAINER	LOT #	LAB
1301251000	VOA 8260c*	ICE	4oz	NA	CAS
1301251001	VOA 8260c	ICE	4oz	NA	CAS
1301251002	SVOA 8270D	ICE	16oz	7021012	CAS
1301251003	SVOA 8270D	ICE	16oz	7021012	CAS
1301251004	METALS 6010c	ICE	16oz	7021012	CAS
1301251005	METALS 6010c	ICE	16oz	7021012	CAS
1301251006	HYDRAZINE/HPLC	ICE	4oz	NA	WSTF
1301251007	HYDRAZINE/HPLC	ICE	4oz	NA	WSTF

*. MATRIX SPIKE

1/25/13

Continued on Page

Read and Understood By

Signed 1.25.13 Date Signed 1/25/13 Date

CHEMISTRY/METALLURGY
LABORATORY WORK ORDER

REQUESTED BY	RECEIVED BY	DATE OF REQUEST	NEED DATE
Antonette Sanchez		January 29, 2013	February 14, 2013
ORGANIZATION	PHONE	TASK ORDER TM 1/30/13	PROMISED DATE
Environmental	x5497	R 13JEECRS - 352 - ~~005~~ 015 1/31/13	2/14/13
SUPERVISOR	DELIVER RESULTS TO/PHONE/MAIL CODE		LW0 NO.
Amanda Skarsgard	Antonette Sanchez : x5497/ antonette.l.sanchez@nasa.gov		728345

SAMPLE ID

130125 1006 → Dup → (MS 1ml Sample 1ml 10ppm Dil 10 100ml 100ppm 10mls)

130125 1007 → Dup → MS

ESTIMATE: ND

TM NO DILUTION 1/30/13

SAMPLE RELINQUISHED BY	DATE/TIME	ACCEPTED BY	DATE/TIME
AL MONTES	1-29-13 08:50am		1/29/13 8:50

SERVICES REQUESTED

1) Hydrazines by HPLC for sample and sample duplicate.

2) Matrix Spike on extraction for sample.

ETU LINER SAMPLES

TM 1/30/13

APPLICABLE DOCUMENTS/SPECS/WJI/TPS WJI-CHEMLAB-026B

☒ RESULTS BELOW ☒ REFER TO ATTACHED REPORT

Wt of Material →

1006 / 22.9774

1007 / 22.2808 = 10mls HPLC Eluent

ANALYST	REVIEWER	SUPERVISOR
	TM 1/30/13	

WSTF Form 122 (Rev. 9-95)

Hydrazines by HPLC
White Sands Test Facility
Chemistry and Materials Section
Laboratory Work Order No. 728345

Sample Analysis Data

Location: ETU Liner Sample
Sample ID: 1301251006
Date Received: 1/29/2013
Date Extracted: 1/30/2013
Date Analyzed: 1/30/2013

Name	Result (mg/kg)	Reporting Limit (mg/kg)	QA Flag
Hydrazine	ND	0.044	
Methylhydrazine	ND	0.044	
1,1-Dimethylhydrazine	ND	0.044	

Location: ETU Liner Sample
Sample ID: 1301251006 (Duplicate)
Date Received: 1/29/2013
Date Extracted: 1/30/2013
Date Analyzed: 1/30/2013

Name	Result (mg/kg)	Reporting Limit (mg/kg)	QA Flag
Hydrazine	ND	0.044	
Methylhydrazine	ND	0.044	
1,1-Dimethylhydrazine	ND	0.044	

Location: ETU Liner Sample
Sample ID: 1301251007
Date Received: 1/29/2013
Date Extracted: 1/30/2013
Date Analyzed: 1/30/2013

Name	Result (mg/kg)	Reporting Limit (mg/kg)	QA Flag
Hydrazine	ND	0.045	
Methylhydrazine	ND	0.045	
1,1-Dimethylhydrazine	ND	0.045	

Location: ETU Liner Sample
Sample ID: 1301251007 (Duplicate)
Date Received: 1/29/2013
Date Extracted: 1/30/2013
Date Analyzed: 1/30/2013

Name	Result (mg/kg)	Reporting Limit (mg/kg)	QA Flag
Hydrazine	ND	0.045	
Methylhydrazine	ND	0.045	
1,1-Dimethylhydrazine	ND	0.045	

Spike Analysis Data

Location: ETU Liner Sample
Sample ID: 1301251006 Extract Matrix Spike
Date Received: 1/29/2013
Date Extracted: 1/30/2013
Date Spiked: 1/30/2013
Date Analyzed: 1/30/2013

Name	Sample Result (mg/kg)	Spike Concentration (mg/kg)	Spike Result (mg/kg)	Percent Recovery	QA Flag
Hydrazine	ND	4.3	3.9	91%	
Methylhydrazine	ND	4.3	4.0	93%	
1,1-Dimethylhydrazine	ND	4.3	4.7	109%	

Spike Analysis Data
Location: ETU Liner Sample
Sample ID: 1301251007 Extract Matrix Spike
Date Received: 1/29/2013
Date Extracted: 1/30/2013
Date Spiked: 1/30/2013
Date Analyzed: 1/30/2013

Name	Sample Result (mg/kg)	Spike Concentration (mg/kg)	Spike Result (mg/kg)	Percent Recovery	QA Flag
Hydrazine	ND	4.5	4.2	93%	
Methylhydrazine	ND	4.5	4.3	96%	
1,1-Dimethylhydrazine	ND	4.5	4.8	106%	

ND = Not Detected
Spike recovery limits = 75-125%

Chemist: Tom Mussinger Approved: BCL

Date: 1/31/2013 Date: 1/31/2013

Date 1-28-13

WSTF CHAIN OF CUSTODY RECORD

Page ____ of ____

Laboratory / PO # NAV0000178

Return Address for Analytical Reports:

NASA WSTF Environmental Department
12600 NASA Road
Las Cruces, NM 88012
Attn: ☐ Lori Minnick ☒ Other Antonette Sanchez
(575) 524-5119 (575) 524-5497

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: Lori Minnick

Sample No.	Sample Location	# of Containers	Sample Type (Solid)	Volatile Organics TOTALS Ice (16 oz. glass jar) (8260B)	RCRA Metals TOTALS Ice (16 oz. glass jar) (6010C)	Semi Volatile Organics TOTALS Ice (16 oz. glass jar) (8270D)						Comments
1301251000 *	200 ETU West Tank	1	S	X								* Matrix Spike
1301251004		1	"		X							
1301251002		1	"			X						
1301251001		1	"	X								
1301251005		1	"		X							
1301251003		1	"			X						

Relinquished By:	Date/Time:	Accepted By:	Date/Time:
[signature]	1-28-13 1330	[signature]	1/29/13 0940

WSTF – 381B (02/09)

R1300596 5
NASA/WSTF/Navarro
White Sands Test Facility