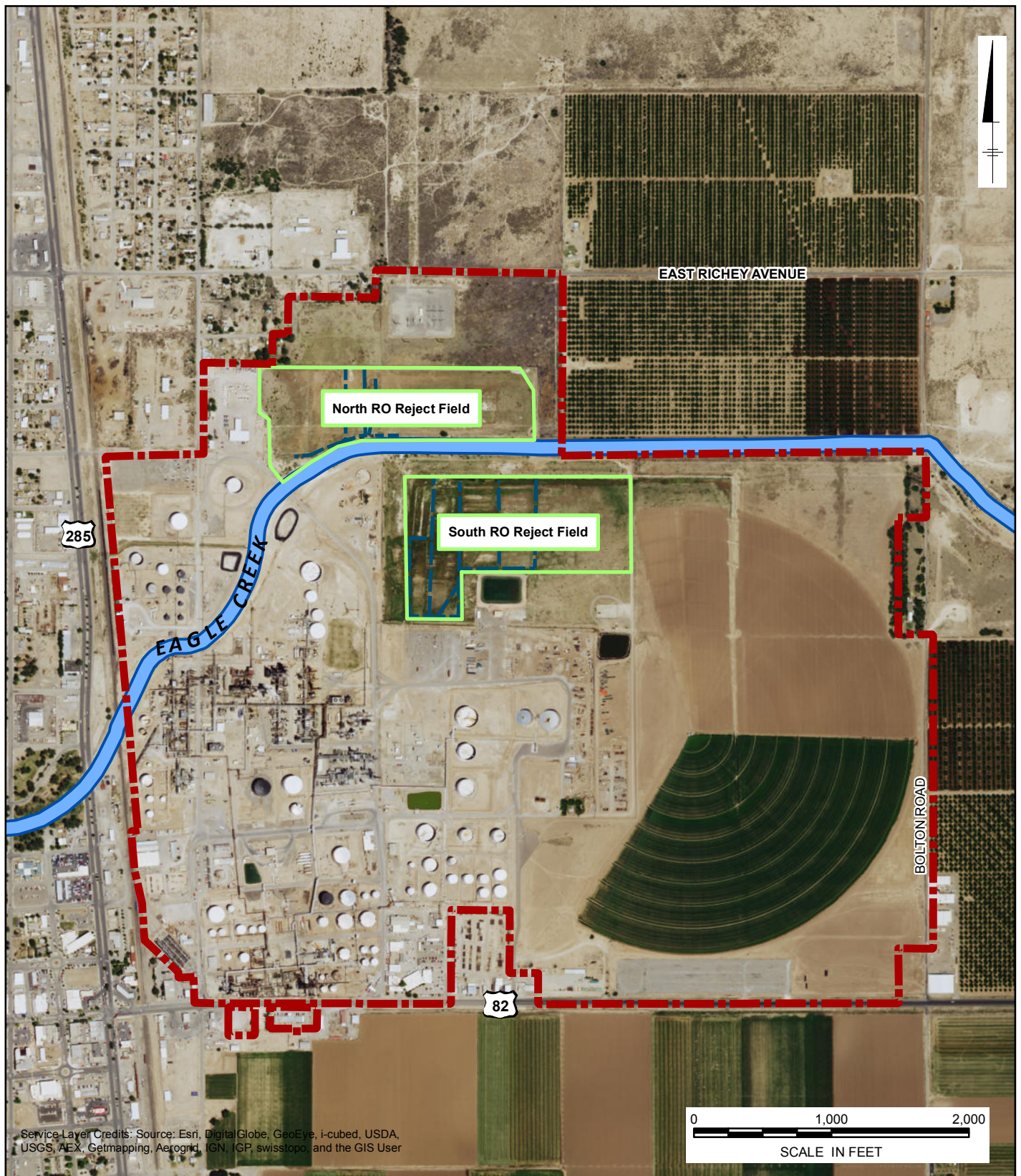


GW – 028

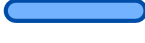
**Background
Groundwater
Investigation Report**

PART 2 OF 9

September 2015



LEGEND:

-  RO REJECT WATER DISCHARGE FIELD
-  NAVAJO PROPERTY BOUNDARY
-  REJECT FIELD IRRIGATION TRENCHES
-  WATERWAYS

NAVAJO REFINING COMPANY
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO
BACKGROUND GROUNDWATER INVESTIGATION REPORT

SITE FEATURES



FIGURE

3

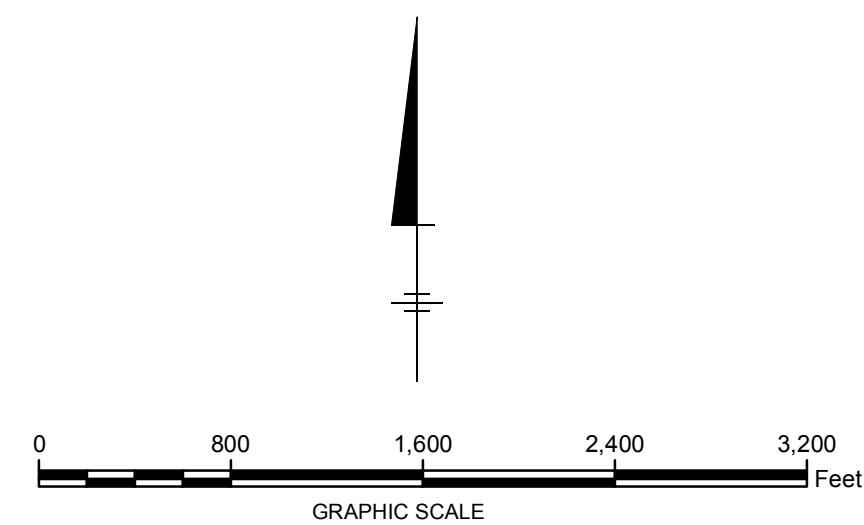


LEGEND:

- ◆ MONITORING WELL
- RECOVERY WELL
- SHALLOW SATURATED ZONE POTENTIOMETRIC SURFACE CONTOURS (HASHED WHERE DEPRESSED)

NOTES:

- POTENTIOMETRIC SURFACE ELEVATION IN FEET ABOVE MEAN SEA LEVEL.
- * = NOT USED TO CONSTRUCT CONTOURS.
- ** = INACCESSIBLE WELL.



NAVAJO REFINING COMPANY
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO
BACKGROUND GROUNDWATER INVESTIGATION REPORT

SHALLOW SATURATED ZONE POTENTIOMETRIC SURFACE MAP 2014 SECOND SEMIANNUAL EVENT (NOV)



FIGURE
4



Appendix A

Soil Boring and Well
Completion Logs

Date Start/Finish: 7/28/2014
Drilling Company: National EWP
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon
Rig Type: CME-85
Auger Size: 8 1/4"

Northing: 675343.45 ft
Easting: 522975.40
Casing Elevation: 3360.83 ft amsl
Borehole Depth: 25 ft bgs
Surface Elevation: 3358.62 ft amsl
Descriptions By: Eric Bergersen

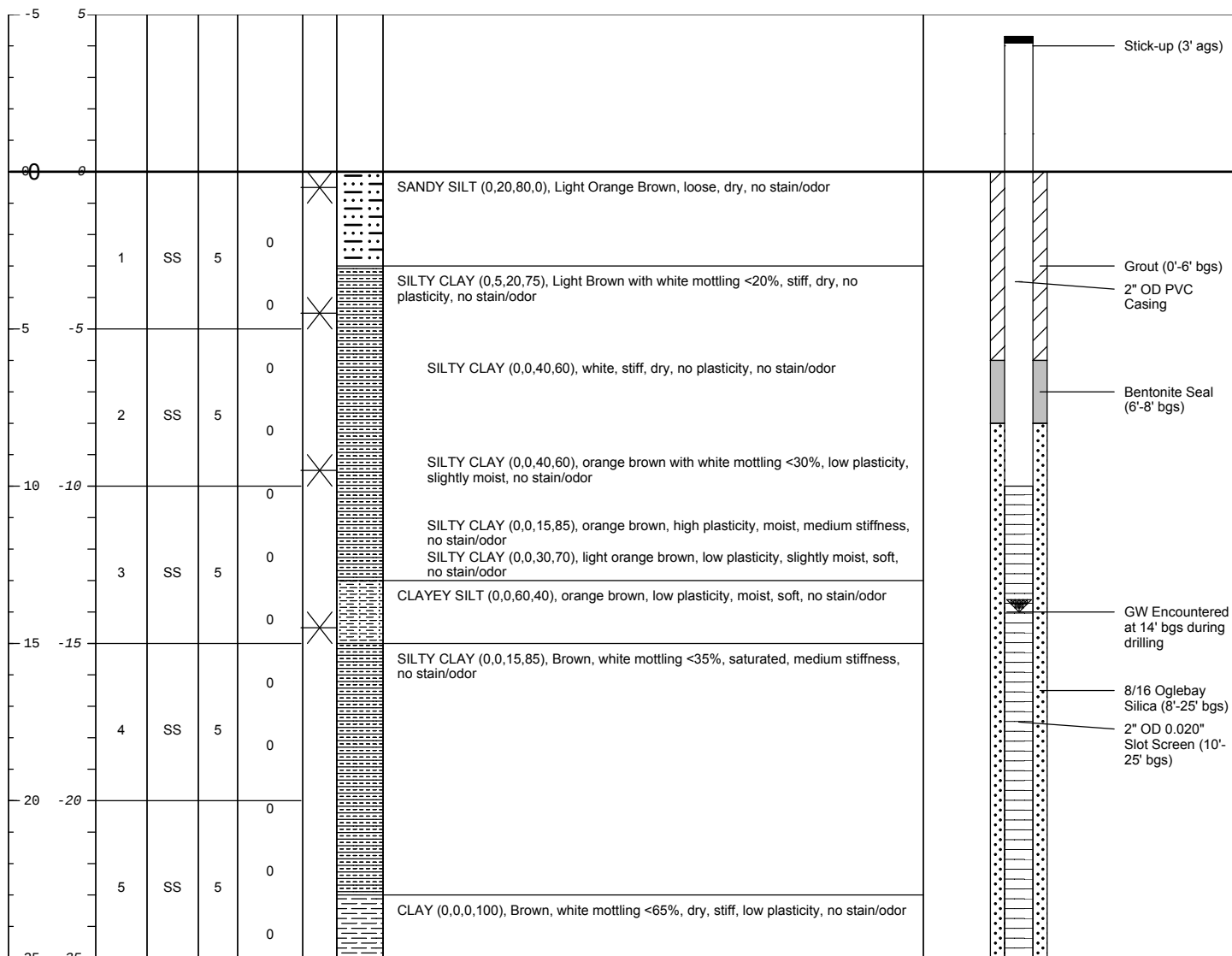
Well/Boring ID: MW-136

Client:



Location: Artesia, NM

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
-------	-----------	-------------------	-----------------	-----------------	-----------	-------------------	-----------------	---------------------------	--------------------------



Remarks: ' = feet; ags = above ground surface; amsl = above mean sea level; bgs = below ground surface; ft = feet; ppm = parts per million; NA = not applicable/available; SS = split spoon

Well completed as a stick up well with 4 bollards

Date Start/Finish: 9/2/2014
Drilling Company: National EWP
Driller's Name: Matt Cain
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon
Rig Type: CME-85

Northing: 674087.85
Easting: 520541.74
Casing Elevation: 3377.36 ft amsl

Borehole Depth: 39.5 ft bgs
Surface Elevation: 3377.78 ft amsl

Descriptions By: Ben McKenna

Well/Boring ID: UG-4

Client: Navajo Refining Company

Location: Navajo Refinery
 Artesia, New Mexico

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
-------	-----------	-------------------	-----------------	-----------------	---------------------	-------------------	-----------------	---------------------------	--------------------------

5	-5	1	SS	5	0			SANDY SILT (0,25,75,0), Light Orange Brown, loose, dry, no stain/odor, very fine grained	
					0				2" OD PVC Casing
		2	SS	5	0			SILTY CLAY (0,0,30,70), Light Brown, salt precipitation present, medium to low plasticity, stiff, no stain/odor	Grout (0'-15.5' bgs)
10	-10				0				
		3	SS	5	0			SILTY CLAY (0,0,15,85), Light Brown with white mottling, stiff, dry, no plasticity, no stain/odor	
					0				
15	-15				0			CLAY (0,0,0,100), Reddish Brown, wet, stiff, high plasticity, no stain/odor	Bentonite Seal (15.5'-17.5' bgs)
		4	SS	5	0				
					0				
20	-20				0			Same as above, dry, low plasticity	
		5	SS	5	0				
					0				
25	-25				0			SILTY CLAY (0,0,20,80), Light Brown (7.5YR 6/4), dry, stiff, low plasticity, no odor.	



Remarks: ' = feet; ags = above ground surface; amsl = above mean sea level; bgs = below ground surface; ft = feet; ppm = parts per million; NA = not applicable/available; SS = split spoon

Well completed as a flush mount

Date Start/Finish: 9/2/2014 Drilling Company: National EWP Driller's Name: Matt Cain Drilling Method: Hollow Stem Auger Sampling Method: Split Spoon Rig Type: CME-85	Northing: 674087.85 Easting: 520541.74 Casing Elevation: 3377.36 ft amsl Borehole Depth: 39.5 ft bgs Surface Elevation: 3377.78 ft amsl Descriptions By: Ben McKenna	Well/Boring ID: UG-4 Client: Navajo Refining Company Location: Navajo Refinery Artesia, New Mexico
--	---	--

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
-------	-----------	-------------------	-----------------	-----------------	---------------------	-------------------	-----------------	---------------------------	--------------------------

		6	SS	5	0				
					0				
30	-30				0			CLAY (0,0,0,100), Light Brown (7.5YR 6/4), firm, dry, low plasticity, no odor.	
		7	SS	5	0			SILTY CLAY with Gravel (10,0,20,70), Light Brownish Red (5YR 6/4), dry, firm, low plasticity, no odor, nodules of caliche.	
					0				
35	-35				0			SILTY CLAY (0,0,20,80), Light Brownish Red (5YR 6/4), moist, firm, low-medium plasticity, no odor.	
		8	SS	5	0			SILTY SAND (0.70,20,10), Light Brownish Red (5YR 6/4), wet, loose, medium-fine grained, mid-sorted.	
					0			CLAY (0,0,0,100), Light Brownish Red (5YR 6/4), stiff, dry, low plasticity, no odor.	8/16 Oglebay Silica (17.5'-39.5' bgs) 2" OD 0.020" Slot Screen (19.5'-39.5' bgs)
40	-40							End of boring at 39.5' bgs.	

	Remarks: ' = feet; ags = above ground surface; amsl = above mean sea level; bgs = below ground surface; ft = feet; ppm = parts per million; NA = not applicable/available; SS = split spoon Well completed as a flush mount
--	---



Appendix B

Laboratory Analytical
Reports and Data
Validation (on CD)



B.1

Soil Analytical Data

Quality Control Summary

SDG: L712745

For: ARCADIS US - TX

Project: Navajo Refining Company - Artesia,

September 03, 2014

Sample Receiving and Handling

All sample aliquots were received at the correct temperature, in the proper containers, and with the appropriate preservatives. All method specified holding times were met.

Anions by Method 9056MOD

Laboratory Control Sample

Samples L712745-01, -02, -03, and -04 were analyzed in analytical batch WG734710. The laboratory control sample associated with these samples was within the laboratory control limits for all target analytes reported from this batch. The relative percent difference was within laboratory limits for all target analytes reported from this batch.

Sample Duplicate Analysis

For analytical batch WG734710 sample duplicate analysis was performed on sample L712892-02. The relative percent difference exceeded the method limits for Sulfate.

For analytical batch WG734710 sample duplicate analysis was performed on sample L712892-08. The relative percent differences were within the method limits for target analytes reported from this batch.

Matrix Spike/Matrix Spike Duplicate

For analytical batch WG734710 matrix spike/matrix spike duplicate analysis was performed on sample L712892-05. The matrix spike recoveries and relative percent differences were within laboratory control limits for all target analytes reported from this batch.

Blank Analysis

The method blank, the initial, and all continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

Total Solids by Method 2540 G-2011

Laboratory Control Sample

Samples L712745-01, -02, -03, and -04 were analyzed in analytical batch WG734696. The laboratory control sample associated with these samples was within the laboratory control limits for all target analytes reported from this batch.

Sample Duplicate Analysis

For analytical batch WG734696 sample duplicate analysis was performed on sample L712745-04. The relative percent differences were within the method limits for target analytes reported from this batch.

Blank Analysis

The method blank, the initial, and all continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

Mercury by Method 7471

Laboratory Control Sample

Samples L712745-01, -02, and -03 were analyzed in analytical batch WG734468. The laboratory control sample associated with these samples was within the laboratory control limits for all target analytes reported from this batch.

Sample L712745-04 was analyzed in analytical batch WG734525. The laboratory control sample associated with this sample was within the laboratory control limits for all target analytes reported from this batch.

Quality Control Summary

SDG: L712745

For: ARCADIS US - TX

Project: Navajo Refining Company - Artesia,

September 03, 2014

Sample Duplicate Analysis

For analytical batch WG734468 sample duplicate analysis was performed on sample L712745-02. The relative percent differences were within the method limits for target analytes reported from this batch.

For analytical batch WG734525 sample duplicate analysis was performed on sample L712745-04. The relative percent differences were within the method limits for target analytes reported from this batch.

Matrix Spike/Matrix Spike Duplicate

For analytical batch WG734468 matrix spike/matrix spike duplicate analysis was performed on sample L712745-02. The matrix spike recoveries were below laboratory control limits for Mercury. The relative percent difference was within laboratory limits for all target analytes reported from this batch. Mercury did not meet the method limit criteria for the post digest spike.

For analytical batch WG734525 matrix spike/matrix spike duplicate analysis was performed on sample L712745-04. The matrix spike recoveries and relative percent differences were within laboratory control limits for all target analytes reported from this batch.

Blank Analysis

The method blank, the initial, and all continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

Trace Metals by Method 6020

Laboratory Control Sample

Samples L712745-01, -02, -03, and -04 were analyzed in analytical batch WG736271. The laboratory control sample associated with these samples was within the laboratory control limits for all target analytes reported from this batch. The relative percent difference was within laboratory limits for all target analytes reported from this batch.

Matrix Spike/Matrix Spike Duplicate

For analytical batch WG736271 matrix spike/matrix spike duplicate analysis was performed on sample L712745-02. The matrix spike recoveries were above laboratory control limits for Aluminum, Calcium, and Iron. The matrix spike recoveries were below laboratory control limits for Arsenic, Barium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Vanadium, and Zinc. The spike recoveries were within limits for the remaining target compounds reported from this batch. The relative percent difference exceeded laboratory limits for Calcium and Silver. Aluminum, Boron, Chromium, Cobalt, Iron, Manganese, Nickel, and Vanadium did not meet the method limit criteria for the serial dilution. Arsenic, Barium, Cadmium, Cobalt, Copper, Iron, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Vanadium, and Zinc did not meet the method limit criteria for the post digest spike. Cobalt, Iron, Manganese, Nickel, and Vanadium exceeded the method limit criteria for both the serial dilution and the post digest spike. This exceedance indicates matrix interference.

Blank Analysis

The method blank, the initial, and all continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

Volatile TPH by Method 8015D/GRO

Laboratory Control Sample

Samples L712745-01, -02, -03, and -04 were analyzed in analytical batch WG734557. The laboratory control sample associated with these samples was within the laboratory control limits for all target analytes reported from this batch. The

Quality Control Summary SDG: L712745

For: ARCADIS US - TX

**Project: Navajo Refining Company - Artesia,
September 03, 2014**

relative percent difference was within laboratory limits for all target analytes reported from this batch.

Matrix Spike/Matrix Spike Duplicate

For analytical batch WG734557 matrix spike/matrix spike duplicate analysis was performed on sample L712396-03. The matrix spike recoveries and relative percent differences were within laboratory control limits for all target analytes reported from this batch.

Blank Analysis

The method blank, the initial, and all continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

Diesel and Oil Ranges by Method 8015

Laboratory Control Sample

Samples L712745-01, -02, -03, and -04 were analyzed in analytical batch WG734580. The laboratory control sample associated with these samples was within the laboratory control limits for all target analytes reported from this batch. The relative percent difference was within laboratory limits for all target analytes reported from this batch.

Matrix Spike/Matrix Spike Duplicate

For analytical batch WG734580 matrix spike/matrix spike duplicate analysis was performed on sample L712745-02. The matrix spike recoveries and relative percent differences were within laboratory control limits for all target analytes reported from this batch.

Blank Analysis

The method blank, the initial, and all continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

Nancy F. McLain
ESC Representative
ESC Lab Sciences



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Pam Krueger
ARCADIS US - TX
2929 Briarpark Dr., Suite 300
Houston, TX 77042

Report Summary

Thursday September 04, 2014

Report Number: L712745

Samples Received: 07/30/14

Client Project: TX000836.0008.00004

Description: Navajo Refining Company - Artesia, NM

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

Pam Langford , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197,
FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016,
NC - ENV375/DW21704/B10041, ND - R-140, NJ - TN002, NJ NELAP - TN002,
SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612,
MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1,
TX - T104704245-11-3, OK - 9915, PA - 68-02979, IA Lab #364, EPA - TN002

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REPORT OF ANALYSIS

Pam Krueger
ARCADIS US - TX
2929 Briarpark Dr., Suite 300
Houston, TX 77042

September 04, 2014

Date Received : July 30, 2014
Description : Navajo Refining Company - Artesia, NM
Sample ID : MW-136(0-1)
Collected By :
Collection Date : 07/28/14 15:00

ESC Sample # : L712745-01

Site ID :

Project # : TX000836.0008.00004

Parameter	Dry Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Chloride	76.	1.1	14.	mg/kg		9056MOD	08/01/14	1
Fluoride	18.	0.36	1.4	mg/kg		9056MOD	08/01/14	1
Nitrate	1.9	0.017	1.4	mg/kg		9056MOD	08/01/14	1
Nitrite	U	0.13	1.4	mg/kg		9056MOD	08/01/14	1
Sulfate	18000	15.	1400	mg/kg		9056MOD	08/01/14	20
Total Solids	71.9	0.0330		%		2540 G-2	08/04/14	1
Calcium	110000	120	3500	mg/kg		6020	08/11/14	50
Aluminum	4600	6.4	35.	mg/kg		6020	08/11/14	10
Arsenic	3.8	0.035	0.70	mg/kg		6020	08/11/14	10
Barium	140	0.44	1.4	mg/kg		6020	08/11/14	10
Boron	15.	1.0	14.	mg/kg		6020	08/19/14	10
Cadmium	0.24	0.22	0.35	mg/kg	J	6020	08/11/14	10
Chromium	5.6	0.70	0.70	mg/kg		6020	08/11/14	10
Cobalt	3.2	0.36	0.70	mg/kg		6020	08/11/14	10
Copper	7.8	0.70	0.70	mg/kg		6020	08/11/14	10
Iron	3300	35.	35.	mg/kg		6020	08/11/14	10
Lead	8.9	0.33	0.70	mg/kg		6020	08/11/14	10
Manganese	150	0.35	1.4	mg/kg		6020	08/11/14	10
Molybdenum	0.32	0.19	1.4	mg/kg	J	6020	08/11/14	10
Nickel	5.6	0.49	0.70	mg/kg		6020	08/11/14	10
Potassium	1700	25.	700	mg/kg		6020	08/11/14	10
Selenium	0.65	0.53	1.4	mg/kg	J	6020	08/11/14	10
Silver	U	0.35	0.35	mg/kg		6020	08/11/14	10
Sodium	110	85.	700	mg/kg	J	6020	08/11/14	10
Uranium	0.70	0.22	7.0	mg/kg	J	6020	08/11/14	10
Vanadium	13.	0.25	0.70	mg/kg		6020	08/11/14	10
Zinc	21.	3.6	7.0	mg/kg		6020	08/11/14	10
Mercury	0.0096	0.0039	0.028	mg/kg	J	7471	07/31/14	1
TPH (GC/FID) Low Fraction	U	0.15	0.70	mg/kg		8015D/GR	07/31/14	5
Surrogate Recovery (70-130) a,a,a-Trifluorotoluene(FID)	96.2			% Rec.		8015D/GR	07/31/14	5
Diesel and Oil Ranges								
C10-C28 Diesel Range	U	2.2	5.6	mg/kg		8015	07/31/14	1
C28-C40 Oil Range	U	0.38	5.6	mg/kg		8015	07/31/14	1
Surrogate Recovery o-Terphenyl	75.4			% Rec.		8015	07/31/14	1

Results listed are dry weight basis.
U = ND (Not Detected) = Less than MDL

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REPORT OF ANALYSIS

Pam Krueger
ARCADIS US - TX
2929 Briarpark Dr., Suite 300
Houston, TX 77042

September 04, 2014

Date Received : July 30, 2014
Description : Navajo Refining Company - Artesia, NM
Sample ID : MW-136(4-5)
Collected By :
Collection Date : 07/28/14 15:05

ESC Sample # : L712745-02

Site ID :

Project # : TX000836.0008.00004

Parameter	Dry Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Chloride	240	0.88	11.	mg/kg		9056MOD	08/01/14	1
Fluoride	34.	0.29	1.1	mg/kg		9056MOD	08/01/14	1
Nitrate	0.24	0.013	1.1	mg/kg	J	9056MOD	08/01/14	1
Nitrite	U	0.11	1.1	mg/kg		9056MOD	08/01/14	1
Sulfate	5500	12.	1100	mg/kg		9056MOD	08/01/14	20
Total Solids	90.5	0.0330		%		2540 G-2	08/04/14	1
Calcium	160000	120	2800	mg/kg	VJ3	6020	08/11/14	50
Aluminum	4800	5.1	28.	mg/kg	01V	6020	08/11/14	10
Arsenic	2.8	0.028	0.55	mg/kg	01J6	6020	08/11/14	10
Barium	240	0.35	1.1	mg/kg	01V	6020	08/11/14	10
Boron	16.	0.84	11.	mg/kg	01J6	6020	08/19/14	10
Cadmium	U	0.18	0.28	mg/kg	01J6	6020	08/11/14	10
Chromium	6.3	0.55	0.55	mg/kg	01J6	6020	08/11/14	10
Cobalt	2.3	0.29	0.55	mg/kg	01J6	6020	08/11/14	10
Copper	2.6	0.55	0.55	mg/kg	01J6	6020	08/11/14	10
Iron	3800	28.	28.	mg/kg	01V	6020	08/11/14	10
Lead	4.2	0.26	0.55	mg/kg	01J6	6020	08/11/14	10
Manganese	70.	0.28	1.1	mg/kg	01J6	6020	08/11/14	10
Molybdenum	0.31	0.15	1.1	mg/kg	J01J	6020	08/11/14	10
Nickel	4.1	0.39	0.55	mg/kg	01J6	6020	08/11/14	10
Potassium	1100	20.	550	mg/kg		6020	08/11/14	10
Selenium	U	0.42	1.1	mg/kg	01J6	6020	08/11/14	10
Silver	U	0.28	0.28	mg/kg	01J6	6020	08/11/14	10
Sodium	480	67.	550	mg/kg	J	6020	08/11/14	10
Uranium	1.3	0.18	5.5	mg/kg	J	6020	08/11/14	10
Vanadium	14.	0.20	0.55	mg/kg	01J6	6020	08/11/14	10
Zinc	10.	2.9	5.5	mg/kg	01J6	6020	08/11/14	10
Mercury	0.0065	0.0031	0.022	mg/kg	JJ60	7471	07/31/14	1
TPH (GC/FID) Low Fraction	U	0.12	0.55	mg/kg		8015D/GR	07/31/14	5
Surrogate Recovery (70-130) a,a,a-Trifluorotoluene(FID)	96.4			% Rec.		8015D/GR	07/31/14	5
Diesel and Oil Ranges								
C10-C28 Diesel Range	U	1.8	4.4	mg/kg		8015	07/31/14	1
C28-C40 Oil Range	U	0.30	4.4	mg/kg		8015	07/31/14	1
Surrogate Recovery o-Terphenyl	73.0			% Rec.		8015	07/31/14	1

Results listed are dry weight basis.
U = ND (Not Detected) = Less than MDL

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REPORT OF ANALYSIS

Pam Krueger
ARCADIS US - TX
2929 Briarpark Dr., Suite 300
Houston, TX 77042

September 04, 2014

Date Received : July 30, 2014
Description : Navajo Refining Company - Artesia, NM
Sample ID : MW-136(9-10)
Collected By :
Collection Date : 07/28/14 15:10

ESC Sample # : L712745-03

Site ID :

Project # : TX000836.0008.00004

Parameter	Dry Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Chloride	46.	1.2	16.	mg/kg		9056MOD	08/01/14	1
Fluoride	19.	0.40	1.6	mg/kg		9056MOD	08/01/14	1
Nitrate	0.40	0.019	1.6	mg/kg	J	9056MOD	08/01/14	1
Nitrite	U	0.15	1.6	mg/kg		9056MOD	08/01/14	1
Sulfate	14000	17.	1600	mg/kg		9056MOD	08/01/14	20
Total Solids	64.4	0.0330		%		2540 G-2	08/04/14	1
Calcium	190000	120	3900	mg/kg		6020	08/11/14	50
Aluminum	6700	7.1	39.	mg/kg		6020	08/11/14	10
Arsenic	2.6	0.039	0.78	mg/kg		6020	08/11/14	10
Barium	1100	0.50	1.6	mg/kg		6020	08/11/14	10
Boron	9.0	1.2	16.	mg/kg	J	6020	08/19/14	10
Cadmium	U	0.25	0.39	mg/kg		6020	08/11/14	10
Chromium	9.0	0.78	0.78	mg/kg		6020	08/11/14	10
Cobalt	5.6	0.40	0.78	mg/kg		6020	08/11/14	10
Copper	1.5	0.78	0.78	mg/kg		6020	08/11/14	10
Iron	4200	39.	39.	mg/kg		6020	08/11/14	10
Lead	8.4	0.37	0.78	mg/kg		6020	08/11/14	10
Manganese	140	0.39	1.6	mg/kg		6020	08/11/14	10
Molybdenum	0.28	0.22	1.6	mg/kg	J	6020	08/11/14	10
Nickel	7.6	0.54	0.78	mg/kg		6020	08/11/14	10
Potassium	1700	28.	780	mg/kg		6020	08/11/14	10
Selenium	0.74	0.59	1.6	mg/kg	J	6020	08/11/14	10
Silver	U	0.39	0.39	mg/kg		6020	08/11/14	10
Sodium	U	95.	780	mg/kg		6020	08/11/14	10
Uranium	0.79	0.25	7.8	mg/kg	J	6020	08/11/14	10
Vanadium	19.	0.28	0.78	mg/kg		6020	08/11/14	10
Zinc	10.	4.0	7.8	mg/kg		6020	08/11/14	10
Mercury	0.0065	0.0043	0.031	mg/kg	J	7471	07/31/14	1
TPH (GC/FID) Low Fraction	U	0.17	0.78	mg/kg		8015D/GR	07/31/14	5
Surrogate Recovery (70-130) a,a,a-Trifluorotoluene(FID)	96.4			% Rec.		8015D/GR	07/31/14	5
Diesel and Oil Ranges								
C10-C28 Diesel Range	U	2.5	6.2	mg/kg		8015	07/31/14	1
C28-C40 Oil Range	U	0.42	6.2	mg/kg		8015	07/31/14	1
Surrogate Recovery o-Terphenyl	85.0			% Rec.		8015	07/31/14	1

Results listed are dry weight basis.
U = ND (Not Detected) = Less than MDL

Note:

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The reported analytical results relate only to the sample submitted

Reported: 09/02/14 14:09 Revised: 09/04/14 16:34



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REPORT OF ANALYSIS

Pam Krueger
ARCADIS US - TX
2929 Briarpark Dr., Suite 300
Houston, TX 77042

September 04, 2014

Date Received : July 30, 2014
Description : Navajo Refining Company - Artesia, NM

ESC Sample # : L712745-04

Sample ID : MW-136(14-15)

Site ID :

Collected By :
Collection Date : 07/28/14 15:15

Project # : TX000836.0008.00004

Parameter	Dry Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
Chloride	50.	0.96	12.	mg/kg		9056MOD	08/01/14	1
Fluoride	17.	0.31	1.2	mg/kg		9056MOD	08/01/14	1
Nitrate	0.29	0.014	1.2	mg/kg	J	9056MOD	08/01/14	1
Nitrite	U	0.12	1.2	mg/kg		9056MOD	08/01/14	1
Sulfate	580	0.68	60.	mg/kg		9056MOD	08/01/14	1
Total Solids	83.3	0.0333		%		2540 G-2	08/04/14	1
Calcium	140000	120	3000	mg/kg		6020	08/11/14	50
Aluminum	3800	5.5	30.	mg/kg		6020	08/11/14	10
Arsenic	1.4	0.030	0.60	mg/kg		6020	08/11/14	10
Barium	13.	0.38	1.2	mg/kg		6020	08/11/14	10
Boron	3.1	0.91	12.	mg/kg	J	6020	08/19/14	10
Cadmium	U	0.19	0.30	mg/kg		6020	08/11/14	10
Chromium	2.9	0.60	0.60	mg/kg		6020	08/11/14	10
Cobalt	1.9	0.31	0.60	mg/kg		6020	08/11/14	10
Copper	1.2	0.60	0.60	mg/kg		6020	08/11/14	10
Iron	1800	30.	30.	mg/kg		6020	08/11/14	10
Lead	6.8	0.29	0.60	mg/kg		6020	08/11/14	10
Manganese	44.	0.30	1.2	mg/kg		6020	08/11/14	10
Molybdenum	U	0.17	1.2	mg/kg		6020	08/11/14	10
Nickel	3.4	0.42	0.60	mg/kg		6020	08/11/14	10
Potassium	770	22.	600	mg/kg		6020	08/11/14	10
Selenium	0.84	0.46	1.2	mg/kg	J	6020	08/11/14	10
Silver	U	0.30	0.30	mg/kg		6020	08/11/14	10
Sodium	U	73.	600	mg/kg		6020	08/11/14	10
Uranium	0.41	0.19	6.0	mg/kg	J	6020	08/11/14	10
Vanadium	7.1	0.22	0.60	mg/kg		6020	08/11/14	10
Zinc	6.7	3.1	6.0	mg/kg		6020	08/11/14	10
Mercury	0.0054	0.0034	0.024	mg/kg	J	7471	07/31/14	1
TPH (GC/FID) Low Fraction	U	0.13	0.60	mg/kg		8015D/GR	07/31/14	5
Surrogate Recovery (70-130) a,a,a-Trifluorotoluene(FID)	96.5			% Rec.		8015D/GR	07/31/14	5
Diesel and Oil Ranges								
C10-C28 Diesel Range	U	1.9	4.8	mg/kg		8015	07/31/14	1
C28-C40 Oil Range	U	0.32	4.8	mg/kg		8015	07/31/14	1
Surrogate Recovery o-Terphenyl	84.4			% Rec.		8015	07/31/14	1

Results listed are dry weight basis.

U = ND (Not Detected)

MDL = Minimum Detection Limit = LOD = TRRP SDL

RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL

Note:

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The reported analytical results relate only to the sample submitted

Reported: 09/02/14 14:09 Revised: 09/04/14 16:34

Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L712745-01	WG734468	SAMP	Mercury	R2970502	J
	WG736271	SAMP	Cadmium	R2977364	J
	WG736271	SAMP	Molybdenum	R2977364	J
	WG736271	SAMP	Selenium	R2977364	J
	WG736271	SAMP	Sodium	R2977364	J
	WG736271	SAMP	Uranium	R2977364	J
L712745-02	WG734468	SAMP	Mercury	R2970502	JJ601
	WG734710	SAMP	Nitrate	R2971133	J
	WG736271	SAMP	Calcium	R2977364	VJ3
	WG736271	SAMP	Aluminum	R2977364	01V
	WG736271	SAMP	Arsenic	R2977364	01J6
	WG736271	SAMP	Barium	R2977364	01V
	WG736271	SAMP	Boron	R2978666	01J6
	WG736271	SAMP	Cadmium	R2977364	01J6
	WG736271	SAMP	Chromium	R2977364	01J6
	WG736271	SAMP	Cobalt	R2977364	01J6
	WG736271	SAMP	Copper	R2977364	01J6
	WG736271	SAMP	Iron	R2977364	01V
	WG736271	SAMP	Lead	R2977364	01J6
	WG736271	SAMP	Manganese	R2977364	01J6
	WG736271	SAMP	Molybdenum	R2977364	J01J6
	WG736271	SAMP	Nickel	R2977364	01J6
	WG736271	SAMP	Selenium	R2977364	01J6
	WG736271	SAMP	Silver	R2977364	01J6J3
	WG736271	SAMP	Sodium	R2977364	J
	WG736271	SAMP	Uranium	R2977364	J
	WG736271	SAMP	Vanadium	R2977364	01J6
	WG736271	SAMP	Zinc	R2977364	01J6
L712745-03	WG734468	SAMP	Mercury	R2970502	J
	WG734710	SAMP	Nitrate	R2971133	J
	WG736271	SAMP	Boron	R2978666	J
	WG736271	SAMP	Molybdenum	R2977364	J
	WG736271	SAMP	Selenium	R2977364	J
	WG736271	SAMP	Uranium	R2977364	J
L712745-04	WG734525	SAMP	Mercury	R2970503	J
	WG734710	SAMP	Nitrate	R2971133	J
	WG736271	SAMP	Boron	R2978666	J
	WG736271	SAMP	Selenium	R2977364	J
	WG736271	SAMP	Uranium	R2977364	J

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
J	(EPA) - Estimated value below the lowest calibration point. Confidence correlates with concentration.
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low
01	(ESC) The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.
V	(ESC) - Additional QC Info: The sample concentration is too high to evaluate accurate spike recoveries.

Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods, it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable "unless qualified as 'R' (Rejected)."

Definitions

- Accuracy** - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.
- Precision** - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Difference.
- Surrogate** - Organic compounds that are similar in chemical composition, extraction, and chromatography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.
- TIC** - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Anions by Method 9056MOD		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	7/28/2014	Analytic Batch:	WG734710
Analysis Date:	8/1/2014 12:10:00 PM	Analyst:	577
Instrument ID:	IC-11		
Sample Numbers:	L712745-01, -02, -03, -04		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
Chloride	16887-00-6	< 10.0	< 0.795	
Fluoride	16984-48-8	< 1.00	< 0.261	
Nitrate	14797-55-8	< 1.00	< 0.0116	
Nitrite	14797-65-0	< 1.00	< 0.0958	
Sulfate	14808-79-8	< 50.0	< 0.570	

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Anions by Method 9056MOD			Matrix:	Soil - mg/kg
Project No:	TX000836.0008.00004			EPA ID:	TN00003
Project:	Navajo Refining Company - Artesia, NM			Analytic Batch:	WG734710
Collection Date:	7/28/2014			Analyst:	577
Analysis Date:	8/1/2014 12:10:00 PM				
Instrument ID:	IC-11				
Sample Numbers:	L712745-01, -02, -03, -04				

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Chloride	1	200	219.05	110	80 - 120	
Fluoride	1	20	21.839	109	80 - 120	
Nitrate	1	20	20.273	101	80 - 120	
Nitrite	1	20	21.837	109	80 - 120	
Sulfate	1	200	220.17	110	80 - 120	

Laboratory Control Sample Duplicate (LCSD)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Chloride	1	200	217.16	109	80 - 120	
Fluoride	1	20	21.681	108	80 - 120	
Nitrate	1	20	20.142	101	80 - 120	
Nitrite	1	20	21.723	109	80 - 120	
Sulfate	1	200	217.93	109	80 - 120	

Laboratory Control Sample / Laboratory Control Sample Duplicate

Analyte	Dil	Spike	LCS	% Rec	LCSD	% Rec	Control Limits	% Rec	Control RPD
Chloride	1	200	219.05	110	217.16	109	80 - 120	1	20
Fluoride	1	20	21.839	109	21.681	108	80 - 120	1	20
Nitrate	1	20	20.273	101	20.142	101	80 - 120	1	20
Nitrite	1	20	21.837	109	21.723	109	80 - 120	1	20
Sulfate	1	200	220.17	110	217.93	109	80 - 120	1	20

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Anions by Method 9056MOD			Matrix:	Soil - mg/kg
Project No:	TX000836.0008.00004			EPA ID:	TN00003
Project:	Navajo Refining Company - Artesia, NM			Analytic Batch:	WG734710
Collection Date:	7/28/2014			Analyst:	577
Analysis Date:	8/1/2014 12:10:00 PM				
Instrument ID:	IC-11				
Sample Numbers:	L712745-01, -02, -03, -04				

Sample Duplicate

L712892-02

Analyte	Dil	Sample Result	DUP Result	% RPD	Limit	Qualifier
Chloride	1	97.681	94.558	3	20	
Sulfate	1	448.22	558.72	22	20	J3

Sample Duplicate

L712892-08

Analyte	Dil	Sample Result	DUP Result	% RPD	Limit	Qualifier
Chloride	1	156.96	147.63	6	20	
Sulfate	1	160.61	135.86	17	20	

Matrix Spike / Matrix Spike Duplicate

L712892-05

Analyte	Dil	Spike Value	Sample	MS	% Rec	MSD	% Rec	Control Limits	% Rec Qual	RPD	Control Limits	RPD Qual
Chloride	1	500	174.45	731.10	111	690.79	103	80 - 120		6	20	
Sulfate	1	500	71.582	593.29	104	587.67	103	80 - 120		1	20	

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Total Solids by Method 2540 G-2011		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	7/28/2014	Analytic Batch:	WG734696
Analysis Date:	8/4/2014 8:54:00 AM	Analyst:	475
Instrument ID:	LOGBAL1		
Sample Numbers:	L712745-01, -02, -03, -04		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
Total Solids	TSOLIDS	< 0.100	< 0.0333	

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Total Solids	1	50	50.004	100	85 - 115	

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Total Solids by Method 2540 G-2011		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	7/28/2014	Analytic Batch:	WG734696
Analysis Date:	8/4/2014 8:54:00 AM	Analyst:	475
Instrument ID:	LOGBAL1		
Sample Numbers:	L712745-01, -02, -03, -04		

Sample Duplicate

L712745-04

Analyte	Dil	Sample Result	DUP Result	% RPD	Limit	Qualifier
Total Solids	1	83.304	83.124	0.22	5	

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Mercury by Method 7471		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	7/28/2014	Analytic Batch:	WG734468
Analysis Date:	7/31/2014 11:09:00 AM	Analyst:	572
Instrument ID:	CVAA4	Prep Date:	7/30/2014
Sample Numbers:	L712745-01, -02, -03		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
Mercury	7439-97-6	< 0.0200	0.00450	

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Mercury	50	12.4	9.3312	75	71.6 - 128	

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Mercury by Method 7471		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	7/28/2014	Analytic Batch:	WG734525
Analysis Date:	7/31/2014 11:23:00 AM	Analyst:	572
Instrument ID:	CVAA4	Prep Date:	7/30/2014
Sample Numbers:	L712745-04		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
Mercury	7439-97-6	< 0.0200	0.00433	

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Mercury	50	12.4	12.677	102	71.6 - 128	

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Mercury by Method 7471	Matrix:	Soil - mg/kg
Project No:	TX000836.0008.00004	EPA ID:	TN00003
Project:	Navajo Refining Company - Artesia, NM	Analytic Batch:	WG734468
Collection Date:	7/28/2014	Analyst:	572
Analysis Date:	7/31/2014 11:09:00 AM	Prep Date:	7/30/2014
Instrument ID:	CVAA4		
Sample Numbers:	L712745-01, -02, -03		

Sample Duplicate

L712745-02

Analyte	Dil	Sample Result	DUP Result	% RPD	Limit	Qualifier
Mercury	1	0.0059	0.0062	4	20	

Serial Dilution

L712745-02

Analyte	Dil	Sample Result	SD Result	% RPD	Limit	Qualifier
Mercury	5	0.0059	0.0181	207	10	

Matrix Spike / Matrix Spike Duplicate

L712745-02

Analyte	Dil	Spike Value	Sample	MS	% Rec	MSD	% Rec	Control Limits	% Rec Qual	RPD	Control Limits	RPD Qual
Mercury	1	0.5	0.0059	0.3347	66	0.3067	60	80 - 120	J6	9	20	

Post Digest Spike

L712745-02

Analyte	Dil	Spike Value	Sample	Result	% Rec	Control Limits	Qualifier
Mercury	1	0.15	0.0059	0.2732	178	85-115	O1

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Mercury by Method 7471			Matrix:	Soil - mg/kg
Project No:	TX000836.0008.00004			EPA ID:	TN00003
Project:	Navajo Refining Company - Artesia, NM			Analytic Batch:	WG734525
Collection Date:	7/28/2014			Analyst:	572
Analysis Date:	7/31/2014 11:23:00 AM			Prep Date:	7/30/2014
Instrument ID:	CVAA4				
Sample Numbers:	L712745-04				

Sample Duplicate

L712745-04

Analyte	Dil	Sample Result	DUP Result	% RPD	Limit	Qualifier
Mercury	1	0.0045	0.0049	8	20	

Serial Dilution

L712745-04

Analyte	Dil	Sample Result	SD Result	% RPD	Limit	Qualifier
Mercury	5	0.0045	0.0132	193	10	

Matrix Spike / Matrix Spike Duplicate

L712745-04

Analyte	Dil	Spike Value	Sample	MS	% Rec	MSD	% Rec	Control Limits	% Rec Qual	RPD	Control Limits	RPD Qual
Mercury	1	0.5	0.0045	0.5026	100	0.4598	91	80 - 120		9	20	

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Trace Metals by Method 6020		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	7/28/2014	Analytic Batch:	WG736271
Analysis Date:	8/11/2014 4:09:00 PM	Analyst:	664
Instrument ID:	ICPMS8	Prep Date:	8/8/2014
Sample Numbers:	L712745-01, -02, -03, -04		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
Aluminum	7429-90-5	< 25.0	< 4.6	
Arsenic	7440-38-2	< 0.500	< 0.0250	
Barium	7440-39-3	< 1.00	< 0.320	
Boron	7440-42-8	< 1.00	0.159	
Cadmium	7440-43-9	< 0.250	< 0.160	
Calcium	7440-70-2	< 500	< 23.0	
Chromium	7440-47-3	< 0.500	< 0.500	
Cobalt	7440-48-4	< 0.500	< 0.260	
Copper	7440-50-8	< 0.500	< 0.500	
Iron	7439-89-6	< 25.0	< 25.0	
Lead	7439-92-1	< 0.500	< 0.240	
Manganese	7439-96-5	< 1.00	< 0.250	
Molybdenum	7439-98-7	< 1.00	< 0.140	
Nickel	7440-02-0	< 0.500	< 0.350	
Potassium	7440-09-7	< 500	< 18.0	
Selenium	7782-49-2	< 1.00	< 0.380	
Silver	7440-22-4	< 0.250	< 0.250	
Sodium	7440-23-5	< 500	< 61.0	
Uranium	7440-61-1	< 5.00	< 0.160	
Vanadium	7440-62-2	< 0.500	< 0.180	
Zinc	7440-66-6	< 5.00	< 2.56	

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Trace Metals by Method 6020		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	7/28/2014	Analytic Batch:	WG736271
Analysis Date:	8/11/2014 4:09:00 PM	Analyst:	664
Instrument ID:	ICPMS8	Prep Date:	8/8/2014
Sample Numbers:	L712745-01, -02, -03, -04		

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Aluminum	10	50	50.376	101	70 - 130	
Arsenic	10	5	5.2498	105	83.1 - 117	
Barium	10	5	5.0597	101	84.1 - 117	
Boron	1	5	5.4635	109	70 - 130	
Cadmium	10	5	4.9507	99	83.2 - 117	
Calcium	10	500	551.52	110	70 - 130	
Chromium	10	5	5.0788	102	81.3 - 118	
Cobalt	10	5	5.1698	103	83.7 - 116	
Copper	10	5	5.1970	104	83.7 - 116	
Iron	10	50	51.449	103	50.8 - 150	
Lead	10	5	5.1614	103	83.1 - 117	
Manganese	10	5	5.1507	103	82.3 - 117	
Molybdenum	10	5	5.1285	103	81.4 - 119	
Nickel	10	5	5.3036	106	82 - 118	
Potassium	10	500	520.82	104	70 - 130	
Selenium	10	5	5.2034	104	78.7 - 122	
Silver	10	5	4.3503	87	66.2 - 134	
Sodium	10	500	521.27	104	70 - 130	
Uranium	10	5	4.9007	98	70 - 130	
Vanadium	10	5	5.1611	103	79.7 - 120	
Zinc	10	5	5.1605	103	82 - 118	

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Trace Metals by Method 6020		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	7/28/2014	Analytic Batch:	WG736271
Analysis Date:	8/11/2014 4:09:00 PM	Analyst:	664
Instrument ID:	ICPMS8	Prep Date:	8/8/2014
Sample Numbers:	L712745-01, -02, -03, -04		

Laboratory Control Sample Duplicate (LCSD)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Aluminum	10	50	56.037	112	70 - 130	
Arsenic	10	5	5.5963	112	83.1 - 117	
Barium	10	5	5.5218	110	84.1 - 117	
Boron	1	5	5.3448	107	70 - 130	
Cadmium	10	5	5.3934	108	83.2 - 117	
Calcium	10	500	578.12	116	70 - 130	
Chromium	10	5	5.6048	112	81.3 - 118	
Cobalt	10	5	5.6377	113	83.7 - 116	
Copper	10	5	5.6749	113	83.7 - 116	
Iron	10	50	56.836	114	50.8 - 150	
Lead	10	5	5.4722	109	83.1 - 117	
Manganese	10	5	5.5888	112	82.3 - 117	
Molybdenum	10	5	5.6934	114	81.4 - 119	
Nickel	10	5	5.7144	114	82 - 118	
Potassium	10	500	549.99	110	70 - 130	
Selenium	10	5	5.6625	113	78.7 - 122	
Silver	10	5	4.5869	92	66.2 - 134	
Sodium	10	500	551.51	110	70 - 130	
Uranium	10	5	5.3241	106	70 - 130	
Vanadium	10	5	5.4730	109	79.7 - 120	
Zinc	10	5	5.6265	113	82 - 118	

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Trace Metals by Method 6020			Matrix:	Soil - mg/kg
Project No:	TX000836.0008.00004			EPA ID:	TN00003
Project:	Navajo Refining Company - Artesia, NM			Analytic Batch:	WG736271
Collection Date:	7/28/2014			Analyst:	664
Analysis Date:	8/11/2014 4:09:00 PM			Prep Date:	8/8/2014
Instrument ID:	ICPMS8				
Sample Numbers:	L712745-01, -02, -03, -04				

Laboratory Control Sample / Laboratory Control Sample Duplicate

Analyte	Dil	Spike	LCS	% Rec	LCSD	% Rec	Control	% Rec	Control RPD	
							Limits	Qual	% RPD	Limits Qual
Aluminum	10	50	50.376	101	56.037	112	70 - 130		11	20
Arsenic	10	5	5.2498	105	5.5963	112	83.1 - 117		6	20
Barium	10	5	5.0597	101	5.5218	110	84.1 - 117		9	20
Boron	1	5	5.4635	109	5.3448	107	70 - 130		2	20
Cadmium	10	5	4.9507	99	5.3934	108	83.2 - 117		9	20
Calcium	10	500	551.52	110	578.12	116	70 - 130		5	20
Chromium	10	5	5.0788	102	5.6048	112	81.3 - 118		10	20
Cobalt	10	5	5.1698	103	5.6377	113	83.7 - 116		9	20
Copper	10	5	5.1970	104	5.6749	113	83.7 - 116		9	20
Iron	10	50	51.449	103	56.836	114	50.8 - 150		10	20
Lead	10	5	5.1614	103	5.4722	109	83.1 - 117		6	20
Manganese	10	5	5.1507	103	5.5888	112	82.3 - 117		8	20
Molybdenum	10	5	5.1285	103	5.6934	114	81.4 - 119		10	20
Nickel	10	5	5.3036	106	5.7144	114	82 - 118		7	20
Potassium	10	500	520.82	104	549.99	110	70 - 130		5	20
Selenium	10	5	5.2034	104	5.6625	113	78.7 - 122		8	20
Silver	10	5	4.3503	87	4.5869	92	66.2 - 134		5	20
Sodium	10	500	521.27	104	551.51	110	70 - 130		6	20
Uranium	10	5	4.9007	98	5.3241	106	70 - 130		8	20
Vanadium	10	5	5.1611	103	5.4730	109	79.7 - 120		6	20
Zinc	10	5	5.1605	103	5.6265	113	82 - 118		9	20

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Trace Metals by Method 6020		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	7/28/2014	Analytic Batch:	WG736271
Analysis Date:	8/11/2014 4:09:00 PM	Analyst:	664
Instrument ID:	ICPMS8	Prep Date:	8/8/2014
Sample Numbers:	L712745-01, -02, -03, -04		

Serial Dilution

L712745-02

Analyte	Dil	Sample Result	SD Result	% RPD	Limit	Qualifier
Aluminum	50	4332.4	4982.8	15	10	O1
Arsenic	50	2.5135	2.7627	10	10	
Barium	50	221.26	239.08	8	10	
Boron	50	15.135	11.258	26	20	O1
Cadmium	50	<0.16	<0.8		10	
Chromium	50	5.6872	6.4512	13	10	O1
Cobalt	50	2.0752	2.3191	12	10	O1
Copper	50	2.3911	2.3407	2	10	
Iron	50	3351.0	3843.2	15	10	O1
Lead	50	3.8344	4.2164	10	10	
Manganese	50	63.091	71.530	13	10	O1
Molybdenum	50	0.2756	0.2687	2	10	
Nickel	50	3.7500	4.4358	18	10	O1
Potassium	50	1022.5	1162.1	14	20	
Selenium	50	<0.38	<1.9		10	
Silver	50	<0.25	<1.25		10	
Sodium	50	430.66	412.50	4	20	
Uranium	50	1.2181	1.3100	8	20	
Vanadium	50	12.947	14.708	14	10	O1
Zinc	50	9.3125	10.772	16	10	

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Trace Metals by Method 6020			Matrix:	Soil - mg/kg
Project No:	TX000836.0008.00004			EPA ID:	TN00003
Project:	Navajo Refining Company - Artesia, NM			Analytic Batch:	WG736271
Collection Date:	7/28/2014			Analyst:	664
Analysis Date:	8/11/2014 4:09:00 PM			Prep Date:	8/8/2014
Instrument ID:	ICPMS8				
Sample Numbers:	L712745-01, -02, -03, -04				

Matrix Spike / Matrix Spike Duplicate

L712745-02

Analyte	Dil	Spike Value	Sample MS	% Rec	MSD	% Rec	Control Limits	% Rec Qual	RPD	Control Limits	RPD
Aluminum	10	5	4332.4	4543.8	423	4425.3	186	70 - 130	V	3	20
Arsenic	10	5	2.5135	7.3285	10	7.7227	10	75 - 125	J6	5	20
Barium	10	5	221.26	222.50	2	223.27	4	75 - 125	V	0	20
Boron	10	0.5	15.135	18.266	63	21.236	122	70 - 130	J6	15	20
Cadmium	10	5	0.1433	5.2497	10	5.3874	10	75 - 125	J6	3	20
Calcium	50	10	148575	153538	993	124679	0	70 - 130	V	21	20
Chromium	10	5	5.6872	10.714	10	10.480	10	75 - 125	J6	2	20
Cobalt	10	5	2.0752	6.8834	10	7.0370	10	75 - 125	J6	2	20
Copper	10	5	2.3911	6.9052	9	7.1545	10	75 - 125	J6	4	20
Iron	10	5	3351.0	3504.3	307	3521.4	341	75 - 125	V	0	20
Lead	10	5	3.8344	8.5307	9	8.8421	10	75 - 125	J6	4	20
Manganese	10	5	63.091	65.893	6	69.218	12	75 - 125	J6	5	20
Molybdenum	10	5	0.2756	4.5696	9	4.4166	8	75 - 125	J6	3	20
Nickel	10	5	3.7500	8.5153	10	8.7057	10	75 - 125	J6	2	20
Potassium	10	50	1022.5	1513.3	98	1516.4	99	70 - 130		0	20
Selenium	10	5	0.3541	4.9095	9	5.2749	10	75 - 125	J6	7	20
Silver	10	5	-0.044	3.0962	6	2.0705	4	75 - 125	J6	40	20
Sodium	10	50	430.66	938.94	102	958.92	106	70 - 130		2	20
Uranium	10	0.5	1.2181	6.1124	98	6.2238	100	70 - 130		2	20
Vanadium	10	5	12.947	17.702	10	17.572	9	75 - 125	J6	1	20
Zinc	10	5	9.3125	14.186	10	14.686	11	75 - 125	J6	3	20

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Trace Metals by Method 6020		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	7/28/2014	Analytic Batch:	WG736271
Analysis Date:	8/11/2014 4:09:00 PM	Analyst:	664
Instrument ID:	ICPMS8	Prep Date:	8/8/2014
Sample Numbers:	L712745-01, -02, -03, -04		

Post Digest Spike

L712745-02

Analyte	Dil	Spike Value	Sample	Result	% Rec	Control Limits	Qualifier
Aluminum	10	50	4332.4	4976.8	129	70-130	
Arsenic	10	5	2.5135	63.533	122	85-115	O1
Barium	10	5	221.26	288.51	135	85-115	O1
Boron	10	5	15.135	52.917	76	70-130	
Cadmium	10	5	0.1433	61.944	124	85-115	O1
Chromium	10	5	5.6872	62.951	115	85-115	
Cobalt	10	5	2.0752	60.748	117	85-115	O1
Copper	10	5	2.3911	60.527	116	85-115	O1
Iron	10	50	3351.0	4037.0	137	85-115	O1
Lead	10	5	3.8344	63.353	119	85-115	O1
Manganese	10	5	63.091	126.10	126	85-115	O1
Molybdenum	10	5	0.2756	61.614	123	85-115	O1
Nickel	10	5	3.7500	62.653	118	85-115	O1
Potassium	10	500	1022.5	7234.8	124	70-130	
Selenium	10	5	0.3541	60.676	121	85-115	O1
Silver	10	5	-0.044	59.747	119	85-115	O1
Sodium	10	500	430.66	6649.2	124	70-130	
Uranium	10	5	1.2181	61.272	120	70-130	
Vanadium	10	5	12.947	71.565	117	85-115	O1
Zinc	10	5	9.3125	68.401	118	85-115	O1

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Volatile TPH by Method 8015D/GRO		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	7/28/2014	Analytic Batch:	WG734557
Analysis Date:	7/31/2014 6:13:00 AM	Analyst:	621
Instrument ID:	VOCGC7		
Sample Numbers:	L712745-01, -02, -03, -04		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
TPH (GC/FID) Low Fraction	8006-61-9	< 0.100	< 0.0217	

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
TPH (GC/FID) Low Fraction	1	5.5	5.3935	98.1	63.5 - 137	

Laboratory Control Sample Duplicate (LCSD)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
TPH (GC/FID) Low Fraction	1	5.5	5.6863	103	63.5 - 137	

Laboratory Control Sample / Laboratory Control Sample Duplicate

Analyte	Dil	Spike	LCS	% Rec	LCSD	% Rec	Control Limits	% Rec Qual	Control RPD Limits	Qual
TPH (GC/FID) Low Fraction	1	5.5	5.3935	98.1	5.6863	103	63.5 - 137	5.28	20	

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Volatile TPH by Method 8015D/GRO		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	7/28/2014	Analytic Batch:	WG734557
Analysis Date:	7/31/2014 6:13:00 AM	Analyst:	621
Instrument ID:	VOCGC7		
Sample Numbers:	L712745-01, -02, -03, -04		

Matrix Spike / Matrix Spike Duplicate

L712396-03

Analyte	Dil	Spike Value	Sample	MS	% Rec	MSD	% Rec	Control Limits	% Rec Qual	RPD	Control Limits	RPD
TPH (GC/FID) Low Fraction	1	5.5	0.0126	5.6077	102	5.5715	101	28.5 - 138		0.65	23.6	

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Volatile TPH by Method 8015D/GRO		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	7/28/2014	Analytic Batch:	WG734557
Analysis Date:	7/31/2014 6:13:00 AM	Analyst:	621
Instrument ID:	VOCGC7		
Sample Numbers:	L712745-01, -02, -03, -04		

Surrogate Summary

Laboratory

Sample ID	Instrument	File ID	ppm	% Rec
L712745-01 5x	VOCGC7	0730_30	0.192	96.2
L712745-02 5x	VOCGC7	0730_31	0.193	96.4
L712745-03 5x	VOCGC7	0730_32	0.193	96.4
L712745-04 5x	VOCGC7	0730_33	0.193	96.5
LCS WG734557	VOCGC7	0730_04	0.210	105
LCSD WG734557	VOCGC7	0730_05	0.209	105
MS WG734557	VOCGC7	0730_06	0.209	104
MSD WG734557	VOCGC7	0730_07	0.209	104
BLANK WG734557	VOCGC7	0730_09	0.195	97.3

--A,A,A-TRIFLUOROTOLUENE(FID)

True Value: 0.2 ppm Limits: 59 - 128

--A,A,A-TRIFLUOROTOLUENE(PID)

True Value: 0.2 ppm Limits: 54 - 144

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Diesel and Oil Ranges by Method 8015		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	7/28/2014	Analytic Batch:	WG734580
Analysis Date:	7/31/2014 1:51:00 PM	Analyst:	187
Instrument ID:	SVGC2	Prep Date:	7/30/2014
Sample Numbers:	L712745-01, -02, -03, -04		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
C10-C28 Diesel Range		< 4.00	< 1.61	
C28-C40 Oil Range		< 4.00	< 0.274	
Extractable Petroleum Hydrocarbon		< 4.00	< 1.32	

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Extractable Petroleum Hydrocarbon	1	60	51.638	86.1	50 - 100	

Laboratory Control Sample Duplicate (LCSD)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Extractable Petroleum Hydrocarbon	1	60	53.280	88.8	50 - 100	

Laboratory Control Sample / Laboratory Control Sample Duplicate

Analyte	Dil	Spike	LCS	% Rec	LCSD	% Rec	Control Limits	% Rec Qual	Control RPD Limits	Qual
Extractable Petroleum Hydrocarbon	1	60	51.638	86.1	53.280	88.8	50 - 100	3.13	20	

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test:	Diesel and Oil Ranges by Method 8015		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	7/28/2014	Analytic Batch:	WG734580
Analysis Date:	7/31/2014 1:51:00 PM	Analyst:	187
Instrument ID:	SVGC2	Prep Date:	7/30/2014
Sample Numbers:	L712745-01, -02, -03, -04		

Matrix Spike / Matrix Spike Duplicate

L712745-02

Analyte	Dil	Spike Value	Sample	MS	% Rec	MSD	% Rec	Control Limits	% Rec Qual	RPD	Control Limits	RPD
Extractable Petroleum Hydrocarbon	1	60	0.0	53.322	88.9	51.683	86.1	50 - 100		3.12	20	



YOUR LAB OF CHOICE

12065 Lebanon Rd
Mt. Juliet, TN 37122
(615) 758-5858
(800) 767-5859
Fax (615) 758-5859
Tax I.D 62-0814289
Est. 1970

Quality Control Summary

SDG: L712745

ARCADIS US - TX

Test: Diesel and Oil Ranges by Method 8015
Project No: TX000836.0008.00004
Project: Navajo Refining Company - Artesia, NM
Collection Date: 7/28/2014
Analysis Date: 7/31/2014 1:51:00 PM
Instrument ID: SVGC2
Sample Numbers: L712745-01, -02, -03, -04

Matrix: Soil - mg/kg
EPA ID: TN00003
Analytic Batch: WG734580
Analyst: 187
Prep Date: 7/30/2014

Surrogate Summary

o-Terphenyl

Laboratory

Sample ID	Instrument	File ID	ppm	% Rec
L712745-01	SVGC2	0731_22	0.604	75.4
L712745-02	SVGC2	0731_23	0.584	73.0
L712745-03	SVGC2	0731_13	0.680	85.0
L712745-04	SVGC2	0731_16	0.675	84.4
BLANK WG734580	SVGC2	0731_05	0.680	85.0
LCS WG734580	SVGC2	0731_06	0.703	87.8
LCSD WG734580	SVGC2	0731_07	0.704	88.0
MS WG734580	SVGC2	0731_24	0.723	90.4
MSD WG734580	SVGC2	0731_25	0.694	86.8

o-Terphenyl --O-TERPHENYL

True Value: 0.8 ppm Limits: 50 - 150

ARCADIS US - TX

2929 Briarpark Dr., Suite 300
Houston, TX 77042

Billing Information:

Attn: Accounts Payable
630 Plaza Drive, Suite 600
Highlands Ranch, CO 80129

Email To: pam.krueger@arcadis-us.com

Report to:
Project Manager

Project
Description: Navajo Refining Company - Artesia, NM

City/State
Collected:

Phone: 713-953-4800
Fax:

Client Project #
TX000836.0008.00004

Lab Project #
ARCADHTX-NAVAJO

Collected by (print):

Site/Facility ID #

P.O. #

Collected by (signature):

Rush? (Lab MUST Be Notified)
 _____ Same Day200%
 _____ Next Day100%
 _____ Two Day50%
 _____ Three Day25%

Date Results Needed

Email? ☐ No ☒ Yes
FAX? ☐ No ☐ Yes

No.
of
Cntrs

Packed on ice N ☐ Y ☐

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	CI,F,NO2,NO3,S04 4ozClr-NoPres	DRORLA, TS 4ozClr-NoPres	GRO 4ozClr-NoPres	Metals, CN 4ozClr-NoPres										
MW-136 (0-1)	GT	SS	(0-1)	7/28/14	1500	4	X	X	X	X										
MW-136 (4-5)		SS	4-5	1	1505	4	X	X	X	X										
MW-136 (9-10)		SS	9-10		1510	4	X	X	X	X										
MW-136 (14-15)		SS	14-15		1515	4	X	X	X	X										
		SS				4	X	X	X	X										
		SS				4	X	X	X	X										
		SS				4	X	X	X	X										
		SS				4	X	X	X	X										
		SS				4	X	X	X	X										
		SS				4	X	X	X	X										
		SS				4	X	X	X	X										

* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other

Remarks:****Add Uranium (in house)****

pH _____ Temp _____

Flow _____ Other _____

Relinquished by: (Signature)

Date: 7/29/14 Time: 1500

Received by: (Signature)

Samples returned via: ☐ UPS

☒ FedEx ☐ Courier ☐ _____

Relinquished by: (Signature)

Date: Time:

Received by: (Signature)

Temp: 3.1 °C Bottles Received: 16 402

Relinquished by: (Signature)

Date: Time:

Received for lab by: (Signature)

Date: 7-30-14 Time: 0900

Hold #

Condition: (lab use only)

COC Seal Intact: ☒ Y ☐ N ☐ NA

pH Checked: NCF:

33 of 33

Chain of Custody Page 1 of 2



L.A.B S.C.I.E.N.C.E.S

YOUR LAB OF CHOICE

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859



L # L712745

B168

Acctnum: ARCADHTX

Template: T95741

Prelogin: P476837

TSR: 633 - Pam Langford

PB: 72478

Shipped Via: FedEx Ground

Rem./Contaminant Sample # (lab only)

-01
-02
-03
-04

608971744390

Quality Control Summary

SDG: L716797

For: ARCADIS US - TX

Project: Navajo Refining Company - Artesia,

September 02, 2014

Sample Receiving and Handling

All sample aliquots were received at the correct temperature, in the proper containers, and with the appropriate preservatives. All method specified holding times were met.

Anions by Method 9056MOD

Laboratory Control Sample

Samples L716797-01, -02, -03, -04, and -05 were analyzed in analytical batch WG738424. The laboratory control sample associated with these samples was within the laboratory control limits for all target analytes reported from this batch. The relative percent difference was within laboratory limits for all target analytes reported from this batch.

Samples L716797-01, -02, -03, and -04 were analyzed in analytical batch WG738889. The laboratory control sample associated with these samples was within the laboratory control limits for all target analytes reported from this batch. The relative percent difference was within laboratory limits for all target analytes reported from this batch.

Sample Duplicate Analysis

For analytical batch WG738424 sample duplicate analysis was performed on sample L716831-05. The relative percent differences were within the method limits for target analytes reported from this batch.

For analytical batch WG738424 sample duplicate analysis was performed on sample L716828-02. The relative percent differences were within the method limits for target analytes reported from this batch.

For analytical batch WG738889 sample duplicate analysis was performed on sample L717032-07. The relative percent differences were within the method limits for target analytes reported from this batch.

Matrix Spike/Matrix Spike Duplicate

For analytical batch WG738424 matrix spike/matrix spike duplicate analysis was performed on sample L716828-01. The matrix spike recoveries and relative percent differences were within laboratory control limits for all target analytes reported from this batch.

For analytical batch WG738889 matrix spike/matrix spike duplicate analysis was performed on sample L717032-05. The matrix spike recoveries and relative percent differences were within laboratory control limits for all target analytes reported from this batch.

Blank Analysis

The method blank, the initial, and all continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

Total Solids by Method 2540 G-2011

Laboratory Control Sample

Samples L716797-01, -02, -03, and -04 were analyzed in analytical batch WG738657. The laboratory control sample associated with these samples was within the laboratory control limits for all target analytes reported from this batch.

Sample L716797-05 was analyzed in analytical batch WG738789. The laboratory control sample associated with this sample was within the laboratory control limits for all target analytes reported from this batch.

Quality Control Summary

SDG: L716797

For: ARCADIS US - TX

**Project: Navajo Refining Company - Artesia,
September 02, 2014**

Sample Duplicate Analysis

For analytical batch WG738657 sample duplicate analysis was performed on sample L716782-03. The relative percent differences were within the method limits for target analytes reported from this batch.

For analytical batch WG738789 sample duplicate analysis was performed on sample L717324-02. The relative percent differences were within the method limits for target analytes reported from this batch.

Blank Analysis

The method blank, the initial, and all continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

Mercury by Method 7471

Laboratory Control Sample

Samples L716797-01, -02, -03, -04, and -05 were analyzed in analytical batch WG738797. The laboratory control sample associated with these samples was within the laboratory control limits for all target analytes reported from this batch.

Sample Duplicate Analysis

For analytical batch WG738797 sample duplicate analysis was performed on sample L716791-05. The relative percent differences were within the method limits for target analytes reported from this batch.

Matrix Spike/Matrix Spike Duplicate

For analytical batch WG738797 matrix spike/matrix spike duplicate analysis was performed on sample L716791-05. The matrix spike recoveries and relative percent differences were within laboratory control limits for all target analytes reported from this batch.

Blank Analysis

The method blank, the initial, and all continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

Trace Metals by Method 6020

Laboratory Control Sample

Samples L716797-01, -02, -03, -04, and -05 were analyzed in analytical batch WG738282. The laboratory control sample associated with these samples was within the laboratory control limits for all target analytes reported from this batch. The relative percent difference was within laboratory limits for all target analytes reported from this batch.

Matrix Spike/Matrix Spike Duplicate

For analytical batch WG738282 matrix spike/matrix spike duplicate analysis was performed on sample L716797-01. The matrix spike recoveries were above laboratory control limits for Aluminum, Calcium, Iron, Potassium, and Uranium. The matrix spike recoveries were below laboratory control limits for Aluminum, Arsenic, Barium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silver, Vanadium, and Zinc. The relative percent difference exceeded laboratory limits for Aluminum, Arsenic, Barium, Boron, Calcium, Chromium, Copper, Potassium, Selenium, Sodium, Vanadium, and Zinc. Aluminum, Arsenic, Barium, Boron, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Nickel, Potassium, Sodium, Vanadium, and Zinc did not meet the method limit criteria for the serial dilution. Aluminum, Barium, Boron, Calcium, Chromium, Iron, Manganese, Potassium, Sodium, and Vanadium did not meet the method limit criteria for the post digest spike. Aluminum, Barium, Boron, Calcium, Chromium, Iron, Manganese, Potassium, Sodium, and Vanadium exceeded the method limit criteria for both the serial dilution and the post digest spike. This exceedance indicates matrix interference.

Quality Control Summary

SDG: L716797

For: ARCADIS US - TX

Project: Navajo Refining Company - Artesia,

September 02, 2014

Blank Analysis

For batch WG738282, the concentration of Barium was above the method reporting limit.

The initial and continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

Volatile TPH by Method 8015D/GRO

Laboratory Control Sample

Samples L716797-01, -02, -03, -04, and -05 were analyzed in analytical batch WG738473. The laboratory control sample associated with these samples was within the laboratory control limits for all target analytes reported from this batch. The relative percent difference was within laboratory limits for all target analytes reported from this batch.

Matrix Spike/Matrix Spike Duplicate

For analytical batch WG738473 matrix spike/matrix spike duplicate analysis was performed on sample L716797-01. The matrix spike recoveries and relative percent differences were within laboratory control limits for all target analytes reported from this batch.

Blank Analysis

The method blank, the initial, and all continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

Diesel and Oil Ranges by Method 8015

Laboratory Control Sample

Samples L716797-01, -02, -03, -04, and -05 were analyzed in analytical batch WG738371. The laboratory control sample associated with these samples was within the laboratory control limits for all target analytes reported from this batch. The relative percent difference was within laboratory limits for all target analytes reported from this batch.

Matrix Spike/Matrix Spike Duplicate

For analytical batch WG738371 matrix spike/matrix spike duplicate analysis was performed on sample L716990-24. The matrix spike recoveries and relative percent differences were within laboratory control limits for all target analytes reported from this batch.

Blank Analysis

The method blank, the initial, and all continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

Nancy F. McLain
ESC Representative
ESC Lab Sciences



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Pam Krueger
ARCADIS US - TX
2929 Briarpark Dr., Suite 300
Houston, TX 77042

Report Summary

Thursday August 28, 2014

Report Number: L716797

Samples Received: 08/19/14

Client Project: TX000836.0008.00004

Description: Navajo Refining Company - Artesia, NM

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

Pam Langford , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197,
FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016,
NC - ENV375/DW21704/BI0041, ND - R-140, NJ - TN002, NJ NELAP - TN002,
SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612,
MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1,
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REPORT OF ANALYSIS

Pam Krueger
ARCADIS US - TX
2929 Briarpark Dr., Suite 300
Houston, TX 77042

August 28, 2014

Date Received : August 19, 2014
Description : Navajo Refining Company - Artesia, NM
Sample ID : UG-4(0-1)
Collected By : Eric Bergersen
Collection Date : 08/18/14 11:55

ESC Sample # : L716797-01

Site ID :

Project # : TX000836.0008.00004

Parameter	Dry Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Chloride	7.0	0.86	11.	mg/kg	J	9056MOD	08/21/14	1
Fluoride	19.	0.28	1.1	mg/kg		9056MOD	08/21/14	1
Nitrate	0.41	0.013	1.1	mg/kg	J	9056MOD	08/21/14	1
Nitrite	U	0.10	1.1	mg/kg		9056MOD	08/21/14	1
Sulfate	2400	6.1	540	mg/kg		9056MOD	08/24/14	10
Total Solids	93.2	0.0330		%		2540 G-2	08/23/14	1
Aluminum	18000	25.	130	mg/kg	01VJ	6020	08/21/14	50
Arsenic	4.7	0.027	0.54	mg/kg	01J6	6020	08/21/14	10
Barium	260	0.34	1.1	mg/kg	B01V	6020	08/21/14	10
Boron	19.	4.1	54.	mg/kg	J01J	6020	08/21/14	50
Cadmium	0.30	0.17	0.27	mg/kg	J6	6020	08/21/14	10
Calcium	130000	130	2700	mg/kg	01VJ	6020	08/21/14	50
Chromium	18.	2.7	2.7	mg/kg	01J6	6020	08/21/14	50
Cobalt	5.6	0.28	0.54	mg/kg	01J6	6020	08/21/14	10
Copper	9.0	0.54	0.54	mg/kg	01J6	6020	08/21/14	10
Iron	13000	27.	27.	mg/kg	01V	6020	08/21/14	10
Lead	14.	0.26	0.54	mg/kg	01J6	6020	08/21/14	10
Manganese	280	0.27	1.1	mg/kg	01V	6020	08/21/14	10
Molybdenum	0.55	0.15	1.1	mg/kg	JJ6	6020	08/21/14	10
Nickel	12.	0.38	0.54	mg/kg	01J6	6020	08/21/14	10
Potassium	4700	96.	2700	mg/kg	01VJ	6020	08/21/14	50
Selenium	1.4	0.41	1.1	mg/kg	J6J3	6020	08/21/14	10
Silver	U	0.27	0.27	mg/kg	J6	6020	08/21/14	10
Sodium	350	320	2700	mg/kg	J01J	6020	08/21/14	50
Uranium	0.65	0.17	5.4	mg/kg	JJ5	6020	08/21/14	10
Vanadium	33.	0.96	2.7	mg/kg	01J6	6020	08/21/14	50
Zinc	43.	2.8	5.4	mg/kg	01J6	6020	08/21/14	10
Mercury	0.0042	0.0030	0.021	mg/kg	J	7471	08/25/14	1
TPH (GC/FID) Low Fraction	U	0.12	0.54	mg/kg		8015D/GR	08/21/14	5
Surrogate Recovery (70-130) a,a,a-Trifluorotoluene(FID)	102.			% Rec.		8015D/GR	08/21/14	5
Diesel and Oil Ranges								
C10-C28 Diesel Range	1.9	1.7	4.3	mg/kg	J	8015	08/21/14	1
C28-C40 Oil Range	9.9	0.29	4.3	mg/kg		8015	08/21/14	1
Surrogate Recovery o-Terphenyl	80.2			% Rec.		8015	08/21/14	1

Results listed are dry weight basis.
U = ND (Not Detected) = Less than MDL

Note:

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REPORT OF ANALYSIS

Pam Krueger
ARCADIS US - TX
2929 Briarpark Dr., Suite 300
Houston, TX 77042

August 28, 2014

Date Received : August 19, 2014
Description : Navajo Refining Company - Artesia, NM
Sample ID : DUP-01
Collected By : Eric Bergersen
Collection Date : 08/18/14 00:00

ESC Sample # : L716797-02

Site ID :

Project # : TX000836.0008.00004

Parameter	Dry Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Chloride	17.	0.96	12.	mg/kg		9056MOD	08/21/14	1
Fluoride	16.	0.31	1.2	mg/kg		9056MOD	08/21/14	1
Nitrate	1.1	0.014	1.2	mg/kg	J	9056MOD	08/21/14	1
Nitrite	0.14	0.11	1.2	mg/kg	J	9056MOD	08/21/14	1
Sulfate	2900	6.8	600	mg/kg		9056MOD	08/24/14	10
Total Solids	83.7	0.0330		%		2540 G-2	08/23/14	1
Aluminum	22000	27.	150	mg/kg		6020	08/21/14	50
Arsenic	5.2	0.030	0.60	mg/kg		6020	08/21/14	10
Barium	240	0.38	1.2	mg/kg	B	6020	08/21/14	10
Boron	17.	4.5	60.	mg/kg	J	6020	08/21/14	50
Cadmium	0.25	0.19	0.30	mg/kg	J	6020	08/21/14	10
Calcium	180000	140	3000	mg/kg		6020	08/21/14	50
Chromium	19.	3.0	3.0	mg/kg		6020	08/21/14	50
Cobalt	4.9	0.31	0.60	mg/kg		6020	08/21/14	10
Copper	6.3	0.60	0.60	mg/kg		6020	08/21/14	10
Iron	12000	30.	30.	mg/kg		6020	08/21/14	10
Lead	9.6	0.29	0.60	mg/kg		6020	08/21/14	10
Manganese	200	0.30	1.2	mg/kg		6020	08/21/14	10
Molybdenum	0.52	0.17	1.2	mg/kg	J	6020	08/21/14	10
Nickel	9.9	0.42	0.60	mg/kg		6020	08/21/14	10
Potassium	5000	110	3000	mg/kg		6020	08/21/14	50
Selenium	1.1	0.45	1.2	mg/kg	J	6020	08/21/14	10
Silver	U	0.30	0.30	mg/kg		6020	08/21/14	10
Sodium	U	360	3000	mg/kg		6020	08/21/14	50
Uranium	0.85	0.19	6.0	mg/kg	J	6020	08/21/14	10
Vanadium	48.	1.1	3.0	mg/kg		6020	08/21/14	50
Zinc	35.	3.1	6.0	mg/kg		6020	08/21/14	10
Mercury	0.0090	0.0033	0.024	mg/kg	J	7471	08/25/14	1
TPH (GC/FID) Low Fraction	U	0.13	0.60	mg/kg		8015D/GR	08/21/14	5
Surrogate Recovery (70-130) a,a,a-Trifluorotoluene(FID)	102.			% Rec.		8015D/GR	08/21/14	5
Diesel and Oil Ranges								
C10-C28 Diesel Range	U	1.9	4.8	mg/kg		8015	08/21/14	1
C28-C40 Oil Range	4.3	0.32	4.8	mg/kg	J	8015	08/21/14	1
Surrogate Recovery o-Terphenyl	74.7			% Rec.		8015	08/21/14	1

Results listed are dry weight basis.
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REPORT OF ANALYSIS

Pam Krueger
ARCADIS US - TX
2929 Briarpark Dr., Suite 300
Houston, TX 77042

August 28, 2014

Date Received : August 19, 2014
Description : Navajo Refining Company - Artesia, NM
Sample ID : UG-4(9-10)
Collected By : Eric Bergersen
Collection Date : 08/18/14 12:20

ESC Sample # : L716797-03

Site ID :

Project # : TX000836.0008.00004

Parameter	Dry Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Chloride	23.	0.93	12.	mg/kg		9056MOD	08/21/14	1
Fluoride	21.	0.30	1.2	mg/kg		9056MOD	08/21/14	1
Nitrate	U	0.014	1.2	mg/kg		9056MOD	08/21/14	1
Nitrite	U	0.11	1.2	mg/kg		9056MOD	08/21/14	1
Sulfate	660	6.6	580	mg/kg		9056MOD	08/24/14	10
Total Solids	86.1	0.0330		%		2540 G-2	08/23/14	1
Aluminum	15000	27.	140	mg/kg		6020	08/21/14	50
Arsenic	2.7	0.029	0.58	mg/kg		6020	08/21/14	10
Barium	20.	0.37	1.2	mg/kg	B	6020	08/21/14	10
Boron	U	4.4	58.	mg/kg		6020	08/21/14	50
Cadmium	U	0.18	0.29	mg/kg		6020	08/21/14	10
Calcium	260000	270	5800	mg/kg		6020	08/22/14	100
Chromium	14.	2.9	2.9	mg/kg		6020	08/21/14	50
Cobalt	2.6	0.30	0.58	mg/kg		6020	08/21/14	10
Copper	3.5	0.58	0.58	mg/kg		6020	08/21/14	10
Iron	8200	29.	29.	mg/kg		6020	08/21/14	10
Lead	4.8	0.28	0.58	mg/kg		6020	08/21/14	10
Manganese	73.	0.29	1.2	mg/kg		6020	08/21/14	10
Molybdenum	0.31	0.16	1.2	mg/kg	J	6020	08/21/14	10
Nickel	5.7	0.41	0.58	mg/kg		6020	08/21/14	10
Potassium	2300	100	2900	mg/kg	J	6020	08/21/14	50
Selenium	0.74	0.44	1.2	mg/kg	J	6020	08/21/14	10
Silver	U	0.29	0.29	mg/kg		6020	08/21/14	10
Sodium	U	350	2900	mg/kg		6020	08/21/14	50
Uranium	0.88	0.18	5.8	mg/kg	J	6020	08/21/14	10
Vanadium	21.	1.0	2.9	mg/kg		6020	08/21/14	50
Zinc	22.	3.0	5.8	mg/kg		6020	08/21/14	10
Mercury	U	0.0032	0.023	mg/kg		7471	08/25/14	1
TPH (GC/FID) Low Fraction	U	0.13	0.58	mg/kg		8015D/GR	08/21/14	5
Surrogate Recovery (70-130) a,a,a-Trifluorotoluene(FID)	102.			% Rec.		8015D/GR	08/21/14	5
Diesel and Oil Ranges								
C10-C28 Diesel Range	U	1.8	4.6	mg/kg		8015	08/21/14	1
C28-C40 Oil Range	U	0.31	4.6	mg/kg		8015	08/21/14	1
Surrogate Recovery o-Terphenyl	77.5			% Rec.		8015	08/21/14	1

Results listed are dry weight basis.
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REPORT OF ANALYSIS

Pam Krueger
ARCADIS US - TX
2929 Briarpark Dr., Suite 300
Houston, TX 77042

August 28, 2014

Date Received : August 19, 2014
Description : Navajo Refining Company - Artesia, NM

ESC Sample # : L716797-04

Sample ID : UG-4(15)

Site ID :

Collected By : Eric Bergersen
Collection Date : 08/18/14 12:30

Project # : TX000836.0008.00004

Parameter	Dry Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Chloride	13.	0.94	12.	mg/kg		9056MOD	08/21/14	1
Fluoride	7.4	0.30	1.2	mg/kg		9056MOD	08/21/14	1
Nitrate	U	0.014	1.2	mg/kg		9056MOD	08/21/14	1
Nitrite	U	0.11	1.2	mg/kg		9056MOD	08/21/14	1
Sulfate	1100	6.7	590	mg/kg		9056MOD	08/24/14	10
Total Solids	85.2	0.0330		%		2540 G-2	08/23/14	1
Aluminum	23000	27.	150	mg/kg		6020	08/21/14	50
Arsenic	2.2	0.029	0.59	mg/kg		6020	08/21/14	10
Barium	620	0.38	1.2	mg/kg	B	6020	08/21/14	10
Boron	12.	4.5	59.	mg/kg	J	6020	08/21/14	50
Cadmium	0.28	0.19	0.29	mg/kg	J	6020	08/21/14	10
Calcium	210000	140	2900	mg/kg		6020	08/21/14	50
Chromium	22.	2.9	2.9	mg/kg		6020	08/21/14	50
Cobalt	3.6	0.30	0.59	mg/kg		6020	08/21/14	10
Copper	28.	0.59	0.59	mg/kg		6020	08/21/14	10
Iron	13000	29.	29.	mg/kg		6020	08/21/14	10
Lead	6.0	0.28	0.59	mg/kg		6020	08/21/14	10
Manganese	130	0.29	1.2	mg/kg		6020	08/21/14	10
Molybdenum	0.50	0.16	1.2	mg/kg	J	6020	08/21/14	10
Nickel	15.	0.41	0.59	mg/kg		6020	08/21/14	10
Potassium	3600	100	2900	mg/kg		6020	08/21/14	50
Selenium	0.87	0.45	1.2	mg/kg	J	6020	08/21/14	10
Silver	U	0.29	0.29	mg/kg		6020	08/21/14	10
Sodium	730	350	2900	mg/kg	J	6020	08/21/14	50
Uranium	0.79	0.19	5.9	mg/kg	J	6020	08/21/14	10
Vanadium	26.	1.0	2.9	mg/kg		6020	08/21/14	50
Zinc	140	3.0	5.9	mg/kg		6020	08/21/14	10
Mercury	U	0.0033	0.023	mg/kg		7471	08/25/14	1
TPH (GC/FID) Low Fraction	U	0.13	0.59	mg/kg		8015D/GR	08/21/14	5
Surrogate Recovery (70-130) a,a,a-Trifluorotoluene(FID)	102.			% Rec.		8015D/GR	08/21/14	5
Diesel and Oil Ranges								
C10-C28 Diesel Range	U	1.9	4.7	mg/kg		8015	08/21/14	1
C28-C40 Oil Range	U	0.32	4.7	mg/kg		8015	08/21/14	1
Surrogate Recovery o-Terphenyl	76.7			% Rec.		8015	08/21/14	1

Results listed are dry weight basis.
U = ND (Not Detected) = Less than MDL

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REPORT OF ANALYSIS

Pam Krueger
ARCADIS US - TX
2929 Briarpark Dr., Suite 300
Houston, TX 77042

August 28, 2014

Date Received : August 19, 2014
Description : Navajo Refining Company - Artesia, NM
Sample ID : UG-4(25)
Collected By : Eric Bergersen
Collection Date : 08/18/14 13:00

ESC Sample # : L716797-05

Site ID :

Project # : TX000836.0008.00004

Parameter	Dry Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Chloride	23.	0.92	12.	mg/kg		9056MOD	08/21/14	1
Fluoride	3.9	0.30	1.2	mg/kg		9056MOD	08/21/14	1
Nitrate	0.36	0.014	1.2	mg/kg	J	9056MOD	08/21/14	1
Nitrite	U	0.11	1.2	mg/kg		9056MOD	08/21/14	1
Sulfate	790	0.66	58.	mg/kg		9056MOD	08/21/14	1
Total Solids	86.5	0.0330		%		2540 G-2	08/22/14	1
Aluminum	21000	26.	140	mg/kg		6020	08/21/14	50
Arsenic	3.0	0.029	0.58	mg/kg		6020	08/21/14	10
Barium	220	0.37	1.2	mg/kg	B	6020	08/21/14	10
Boron	6.1	4.4	58.	mg/kg	J	6020	08/21/14	50
Cadmium	0.38	0.18	0.29	mg/kg		6020	08/21/14	10
Calcium	200000	140	2900	mg/kg		6020	08/21/14	50
Chromium	21.	2.9	2.9	mg/kg		6020	08/21/14	50
Cobalt	4.7	0.30	0.58	mg/kg		6020	08/21/14	10
Copper	8.6	0.58	0.58	mg/kg		6020	08/21/14	10
Iron	14000	29.	29.	mg/kg		6020	08/21/14	10
Lead	8.8	0.28	0.58	mg/kg		6020	08/21/14	10
Manganese	210	0.29	1.2	mg/kg		6020	08/21/14	10
Molybdenum	1.3	0.16	1.2	mg/kg		6020	08/21/14	10
Nickel	11.	0.40	0.58	mg/kg		6020	08/21/14	10
Potassium	3200	100	2900	mg/kg		6020	08/21/14	50
Selenium	1.3	0.44	1.2	mg/kg		6020	08/21/14	10
Silver	U	0.29	0.29	mg/kg		6020	08/21/14	10
Sodium	450	350	2900	mg/kg	J	6020	08/21/14	50
Uranium	0.82	0.18	5.8	mg/kg	J	6020	08/21/14	10
Vanadium	25.	1.0	2.9	mg/kg		6020	08/21/14	50
Zinc	210	3.0	5.8	mg/kg		6020	08/21/14	10
Mercury	U	0.0032	0.023	mg/kg		7471	08/25/14	1
TPH (GC/FID) Low Fraction	U	0.13	0.58	mg/kg		8015D/GR	08/21/14	5
Surrogate Recovery (70-130) a,a,a-Trifluorotoluene(FID)	101.			% Rec.		8015D/GR	08/21/14	5
Diesel and Oil Ranges								
C10-C28 Diesel Range	U	1.8	4.6	mg/kg		8015	08/21/14	1
C28-C40 Oil Range	0.65	0.31	4.6	mg/kg	J	8015	08/21/14	1
Surrogate Recovery o-Terphenyl	69.5			% Rec.		8015	08/21/14	1

Results listed are dry weight basis.
U = ND (Not Detected) = Less than MDL

Note:

This report shall not be reproduced, except in full, without the written approval from ESC.
The reported analytical results relate only to the sample submitted

Reported: 08/28/14 12:06 Printed: 08/28/14 12:07

Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L716797-01	WG738371	SAMP	C10-C28 Diesel Range	R2979324	J
	WG738797	SAMP	Mercury	R2980751	J
	WG738424	SAMP	Chloride	R2979566	J
	WG738424	SAMP	Nitrate	R2979566	J
	WG738282	SAMP	Aluminum	R2979146	01VJ3
	WG738282	SAMP	Arsenic	R2979146	01J6J3
	WG738282	SAMP	Barium	R2979146	B01VJ3
	WG738282	SAMP	Boron	R2979146	J01J6J3
	WG738282	SAMP	Cadmium	R2979146	J6
	WG738282	SAMP	Calcium	R2979146	01VJ3
	WG738282	SAMP	Chromium	R2979146	01J6J3
	WG738282	SAMP	Cobalt	R2979146	01J6
	WG738282	SAMP	Copper	R2979146	01J6J3
	WG738282	SAMP	Iron	R2979146	01V
	WG738282	SAMP	Lead	R2979146	01J6
	WG738282	SAMP	Manganese	R2979146	01V
	WG738282	SAMP	Molybdenum	R2979146	JJ6
	WG738282	SAMP	Nickel	R2979146	01J6
	WG738282	SAMP	Potassium	R2979146	01VJ3
	WG738282	SAMP	Selenium	R2979146	J6J3
	WG738282	SAMP	Silver	R2979146	J6
	WG738282	SAMP	Sodium	R2979146	J01J3
	WG738282	SAMP	Uranium	R2979146	JJ5
	WG738282	SAMP	Vanadium	R2979146	01J6J3
	WG738282	SAMP	Zinc	R2979146	01J6J3
L716797-02	WG738371	SAMP	C28-C40 Oil Range	R2979324	J
	WG738797	SAMP	Mercury	R2980751	J
	WG738424	SAMP	Nitrate	R2979566	J
	WG738424	SAMP	Nitrite	R2979566	J
	WG738282	SAMP	Barium	R2979146	B
	WG738282	SAMP	Boron	R2979146	J
	WG738282	SAMP	Cadmium	R2979146	J
	WG738282	SAMP	Molybdenum	R2979146	J
	WG738282	SAMP	Selenium	R2979146	J
	WG738282	SAMP	Uranium	R2979146	J
L716797-03	WG738282	SAMP	Barium	R2979146	B
	WG738282	SAMP	Molybdenum	R2979146	J
	WG738282	SAMP	Potassium	R2979146	J
	WG738282	SAMP	Selenium	R2979146	J
	WG738282	SAMP	Uranium	R2979146	J
L716797-04	WG738282	SAMP	Barium	R2979146	B
	WG738282	SAMP	Boron	R2979146	J
	WG738282	SAMP	Cadmium	R2979146	J
	WG738282	SAMP	Molybdenum	R2979146	J
	WG738282	SAMP	Selenium	R2979146	J
	WG738282	SAMP	Sodium	R2979146	J
	WG738282	SAMP	Uranium	R2979146	J
L716797-05	WG738371	SAMP	C28-C40 Oil Range	R2979324	J
	WG738424	SAMP	Nitrate	R2979566	J
	WG738282	SAMP	Barium	R2979146	B
	WG738282	SAMP	Boron	R2979146	J
	WG738282	SAMP	Sodium	R2979146	J
	WG738282	SAMP	Uranium	R2979146	J
	WG738282	SAMP	Uranium	R2979146	J

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
B	(EPA) - The indicated compound was found in the associated method blank as well as the laboratory sample.
J	(EPA) - Estimated value below the lowest calibration point. Confidence correlates with concentration.
J3	The associated batch QC was outside the established quality control range for precision.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low
01	(ESC) The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.
V	(ESC) - Additional QC Info: The sample concentration is too high to evaluate accurate spike recoveries.

Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods, it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable "unless qualified as 'R' (Rejected)."

Definitions

- Accuracy** - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.
- Precision** - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Difference.
- Surrogate** - Organic compounds that are similar in chemical composition, extraction, and chromatography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.
- TIC** - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.

Summary of Remarks For Samples Printed
08/28/14 at 12:07:32

TSR Signing Reports: 633
R5 - Desired TAT

Sample: L716797-01 Account: ARCADHTX Received: 08/19/14 09:00 Due Date: 08/26/14 00:00 RPT Date: 08/28/14 12:06
Sample: L716797-02 Account: ARCADHTX Received: 08/19/14 09:00 Due Date: 08/26/14 00:00 RPT Date: 08/28/14 12:06
Sample: L716797-03 Account: ARCADHTX Received: 08/19/14 09:00 Due Date: 08/26/14 00:00 RPT Date: 08/28/14 12:06
Sample: L716797-04 Account: ARCADHTX Received: 08/19/14 09:00 Due Date: 08/26/14 00:00 RPT Date: 08/28/14 12:06
Sample: L716797-05 Account: ARCADHTX Received: 08/19/14 09:00 Due Date: 08/26/14 00:00 RPT Date: 08/28/14 12:06

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Anions by Method 9056MOD		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	8/18/2014	Analytic Batch:	WG738424
Analysis Date:	8/21/2014 10:21:00 PM	Analyst:	236
Instrument ID:	IC-11		
Sample Numbers:	L716797-01, -02, -03, -04, -05		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
Chloride	16887-00-6	< 10.0	< 0.795	
Fluoride	16984-48-8	< 1.00	< 0.261	
Nitrate	14797-55-8	< 1.00	< 0.0116	
Nitrite	14797-65-0	< 1.00	< 0.0958	
Sulfate	14808-79-8	< 50.0	< 0.570	

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Anions by Method 9056MOD			Matrix:	Soil - mg/kg
Project No:	TX000836.0008.00004			EPA ID:	TN00003
Project:	Navajo Refining Company - Artesia, NM			Analytic Batch:	WG738889
Collection Date:	8/18/2014			Analyst:	236
Analysis Date:	8/24/2014 2:03:00 PM				
Instrument ID:	IC-11				
Sample Numbers:	L716797-01, -02, -03, -04				

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
Chloride	16887-00-6	< 10.0	< 0.795	
Sulfate	14808-79-8	< 50.0	< 0.570	

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Chloride	1	200	202.84	101	80 - 120	
Sulfate	1	200	205.26	103	80 - 120	

Laboratory Control Sample Duplicate (LCSD)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Chloride	1	200	205.96	103	80 - 120	
Sulfate	1	200	208.88	104	80 - 120	

Laboratory Control Sample / Laboratory Control Sample Duplicate

Analyte	Dil	Spike	LCS	% Rec	LCSD	% Rec	Control Limits	% Rec	Control RPD	Qual
Chloride	1	200	202.84	101	205.96	103	80 - 120	2	20	
Sulfate	1	200	205.26	103	208.88	104	80 - 120	2	20	

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Anions by Method 9056MOD			Matrix:	Soil - mg/kg
Project No:	TX000836.0008.00004			EPA ID:	TN00003
Project:	Navajo Refining Company - Artesia, NM			Analytic Batch:	WG738424
Collection Date:	8/18/2014			Analyst:	236
Analysis Date:	8/21/2014 10:21:00 PM				
Instrument ID:	IC-11				
Sample Numbers:	L716797-01, -02, -03, -04, -05				

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Chloride	1	200	209.27	105	80 - 120	
Fluoride	1	20	21.048	105	80 - 120	
Nitrate	1	20	19.25	96	80 - 120	
Nitrite	1	20	21.222	106	80 - 120	
Sulfate	1	200	208.76	104	80 - 120	

Laboratory Control Sample Duplicate (LCSD)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Chloride	1	200	208.25	104	80 - 120	
Fluoride	1	20	20.837	104	80 - 120	
Nitrate	1	20	19.221	96	80 - 120	
Nitrite	1	20	21.073	105	80 - 120	
Sulfate	1	200	206.79	103	80 - 120	

Laboratory Control Sample / Laboratory Control Sample Duplicate

Analyte	Dil	Spike	LCS	% Rec	LCSD	% Rec	Control Limits	% Rec Qual	Control RPD Limits	Qual
Chloride	1	200	209.27	105	208.25	104	80 - 120	0	20	
Fluoride	1	20	21.048	105	20.837	104	80 - 120	1	20	
Nitrate	1	20	19.25	96	19.221	96	80 - 120	0	20	
Nitrite	1	20	21.222	106	21.073	105	80 - 120	1	20	
Sulfate	1	200	208.76	104	206.79	103	80 - 120	1	20	

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Anions by Method 9056MOD			Matrix:	Soil - mg/kg
Project No:	TX000836.0008.00004			EPA ID:	TN00003
Project:	Navajo Refining Company - Artesia, NM			Analytic Batch:	WG738424
Collection Date:	8/18/2014			Analyst:	236
Analysis Date:	8/21/2014 10:21:00 PM				
Instrument ID:	IC-11				
Sample Numbers:	L716797-01, -02, -03, -04, -05				

Sample Duplicate

L716831-05

Analyte	Dil	Sample Result	DUP Result	% RPD	Limit	Qualifier
Chloride	5	343.43	338.40	1	20	
Sulfate	5	216.81	219.06	0	20	

Sample Duplicate

L716828-02

Analyte	Dil	Sample Result	DUP Result	% RPD	Limit	Qualifier
Chloride	1	54.994	57.427	4	20	

Matrix Spike / Matrix Spike Duplicate

L716828-01

Analyte	Dil	Spike Value	Sample	MS	% Rec	MSD	% Rec	Control Limits	% Rec Qual	RPD	Control Limits	RPD Qual
Chloride	1	500	65.878	552.68	97	564.11	100	80 - 120		2	20	

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Anions by Method 9056MOD		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	8/18/2014	Analytic Batch:	WG738889
Analysis Date:	8/24/2014 2:03:00 PM	Analyst:	236
Instrument ID:	IC-11		
Sample Numbers:	L716797-01, -02, -03, -04		

Sample Duplicate

L717032-07

Analyte	Dil	Sample Result	DUP Result	% RPD	Limit	Qualifier
Chloride	1	117.46	106.07	10	20	
Sulfate	1	91.410	91.693	0	20	

Matrix Spike / Matrix Spike Duplicate

L717032-05

Analyte	Dil	Spike Value	Sample	MS	% Rec	MSD	% Rec	Control Limits	% Rec Qual	RPD	Control Limits	RPD
Chloride	1	500	80.550	604.62	105	596.80	103	80 - 120		1	20	
Sulfate	1	500	177.55	653.96	95	663.91	97	80 - 120		2	20	

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Total Solids by Method 2540 G-2011		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	8/18/2014	Analytic Batch:	WG738657
Analysis Date:	8/23/2014 8:44:00 AM	Analyst:	607
Instrument ID:	LOGBAL3		
Sample Numbers:	L716797-01, -02, -03, -04		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
Total Solids	TSOLIDS	< 0.100	< 0.0333	

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Total Solids	1	50	49.996	100	85 - 115	

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Total Solids by Method 2540 G-2011		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	8/18/2014	Analytic Batch:	WG738789
Analysis Date:	8/22/2014 8:37:00 AM	Analyst:	475
Instrument ID:	LOGBAL1		
Sample Numbers:	L716797-05		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
Total Solids	TSOLIDS	< 0.100	< 0.0333	

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Total Solids	1	50	50.029	100	85 - 115	

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Total Solids by Method 2540 G-2011		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	8/18/2014	Analytic Batch:	WG738657
Analysis Date:	8/23/2014 8:44:00 AM	Analyst:	607
Instrument ID:	LOGBAL3		
Sample Numbers:	L716797-01, -02, -03, -04		

Sample Duplicate

L716782-03

Analyte	Dil	Sample Result	DUP Result	% RPD	Limit	Qualifier
Total Solids	1	80.895	80.803	0.11	5	

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Total Solids by Method 2540 G-2011		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	8/18/2014	Analytic Batch:	WG738789
Analysis Date:	8/22/2014 8:37:00 AM	Analyst:	475
Instrument ID:	LOGBAL1		
Sample Numbers:	L716797-05		

Sample Duplicate

L717324-02

Analyte	Dil	Sample Result	DUP Result	% RPD	Limit	Qualifier
Total Solids	1	80.382	80.528	0.18	5	

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Mercury by Method 7471		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	8/18/2014	Analytic Batch:	WG738797
Analysis Date:	8/25/2014 9:44:00 AM	Analyst:	628
Instrument ID:	CVAA4	Prep Date:	8/21/2014
Sample Numbers:	L716797-01, -02, -03, -04, -05		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
Mercury	7439-97-6	< 0.0200	0.00311	

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Mercury	50	12.4	10.493	85	71.6 - 128	

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Mercury by Method 7471			Matrix:	Soil - mg/kg
Project No:	TX000836.0008.00004			EPA ID:	TN00003
Project:	Navajo Refining Company - Artesia, NM			Analytic Batch:	WG738797
Collection Date:	8/18/2014			Analyst:	628
Analysis Date:	8/25/2014 9:44:00 AM			Prep Date:	8/21/2014
Instrument ID:	CVAA4				
Sample Numbers:	L716797-01, -02, -03, -04, -05				

Sample Duplicate

L716791-05

Analyte	Dil	Sample Result	DUP Result	% RPD	Limit	Qualifier
Mercury	1	0.0114	0.0108	5	20	

Serial Dilution

L716791-05

Analyte	Dil	Sample Result	SD Result	% RPD	Limit	Qualifier
Mercury	5	0.0114	-0.008	166	10	

Matrix Spike / Matrix Spike Duplicate

L716791-05

Analyte	Dil	Spike Value	Sample MS	% Rec	MSD	% Rec	Control Limits	% Rec Qual	RPD	Control Limits	RPD Qual
Mercury	1	0.5	0.0114	0.4778	93	0.4659	91	80 - 120	3	20	

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Trace Metals by Method 6020		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	8/18/2014	Analytic Batch:	WG738282
Analysis Date:	8/21/2014 5:24:00 PM	Analyst:	664
Instrument ID:	ICPMS8	Prep Date:	8/19/2014
Sample Numbers:	L716797-01, -02, -03, -04, -05		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
Aluminum	7429-90-5	< 2.5	< 0.460	
Arsenic	7440-38-2	< 0.0500	0.00538	
Barium	7440-39-3	0.140	0.140	B
Boron	7440-42-8	< 1.00	< 0.0760	
Cadmium	7440-43-9	< 0.0250	< 0.0160	
Calcium	7440-70-2	< 50.0	3.08	
Chromium	7440-47-3	< 0.0500	< 0.0500	
Cobalt	7440-48-4	< 0.0500	< 0.0260	
Copper	7440-50-8	< 0.0500	< 0.0500	
Iron	7439-89-6	< 2.5	< 2.5	
Lead	7439-92-1	< 0.0500	< 0.0240	
Manganese	7439-96-5	< 0.100	0.0262	
Molybdenum	7439-98-7	< 0.100	< 0.0140	
Nickel	7440-02-0	< 0.0500	< 0.0350	
Potassium	7440-09-7	< 50.0	< 1.8	
Selenium	7782-49-2	< 0.100	< 0.0380	
Silver	7440-22-4	< 0.0250	< 0.0250	
Sodium	7440-23-5	< 50.0	14.1	
Uranium	7440-61-1	< 0.500	< 0.0160	
Vanadium	7440-62-2	< 0.0500	0.0182	
Zinc	7440-66-6	< 0.500	< 0.256	

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Trace Metals by Method 6020		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	8/18/2014	Analytic Batch:	WG738282
Analysis Date:	8/21/2014 5:24:00 PM	Analyst:	664
Instrument ID:	ICPMS8	Prep Date:	8/19/2014
Sample Numbers:	L716797-01, -02, -03, -04, -05		

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Aluminum	1	50	48.089	96	70 - 130	
Arsenic	1	5	4.8179	96	83.1 - 117	
Barium	1	5	5.0041	100	84.1 - 117	
Boron	1	5	4.8828	98	70 - 130	
Cadmium	1	5	4.9516	99	83.2 - 117	
Calcium	1	500	540.10	108	70 - 130	
Chromium	1	5	5.1229	102	81.3 - 118	
Cobalt	1	5	5.0799	102	83.7 - 116	
Copper	1	5	5.0626	101	83.7 - 116	
Iron	1	50	52.753	106	50.8 - 150	
Lead	1	5	4.9300	99	83.1 - 117	
Manganese	1	5	5.1942	104	82.3 - 117	
Molybdenum	1	5	4.9402	99	81.4 - 119	
Nickel	1	5	5.0544	101	82 - 118	
Potassium	1	500	497.26	99	70 - 130	
Selenium	1	5	4.7662	95	78.7 - 122	
Silver	1	5	5.1343	103	66.2 - 134	
Sodium	1	500	526.59	105	70 - 130	
Uranium	1	5	4.8840	98	70 - 130	
Vanadium	1	5	5.1727	103	79.7 - 120	
Zinc	1	5	4.8991	98	82 - 118	

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Trace Metals by Method 6020		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	8/18/2014	Analytic Batch:	WG738282
Analysis Date:	8/21/2014 5:24:00 PM	Analyst:	664
Instrument ID:	ICPMS8	Prep Date:	8/19/2014
Sample Numbers:	L716797-01, -02, -03, -04, -05		

Laboratory Control Sample Duplicate (LCSD)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Aluminum	1	50	47.818	96	70 - 130	
Arsenic	1	5	4.8119	96	83.1 - 117	
Barium	1	5	5.0922	102	84.1 - 117	
Boron	1	5	5.0561	101	70 - 130	
Cadmium	1	5	4.9472	99	83.2 - 117	
Calcium	1	500	543.37	109	70 - 130	
Chromium	1	5	5.1911	104	81.3 - 118	
Cobalt	1	5	5.0511	101	83.7 - 116	
Copper	1	5	5.0489	101	83.7 - 116	
Iron	1	50	52.491	105	50.8 - 150	
Lead	1	5	4.9447	99	83.1 - 117	
Manganese	1	5	5.1675	103	82.3 - 117	
Molybdenum	1	5	4.9777	100	81.4 - 119	
Nickel	1	5	5.0115	100	82 - 118	
Potassium	1	500	500.42	100	70 - 130	
Selenium	1	5	4.7070	94	78.7 - 122	
Silver	1	5	5.1828	104	66.2 - 134	
Sodium	1	500	526.52	105	70 - 130	
Uranium	1	5	4.9229	98	70 - 130	
Vanadium	1	5	5.2426	105	79.7 - 120	
Zinc	1	5	4.8987	98	82 - 118	

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Trace Metals by Method 6020			Matrix:	Soil - mg/kg
Project No:	TX000836.0008.00004			EPA ID:	TN00003
Project:	Navajo Refining Company - Artesia, NM			Analytic Batch:	WG738282
Collection Date:	8/18/2014			Analyst:	664
Analysis Date:	8/21/2014 5:24:00 PM			Prep Date:	8/19/2014
Instrument ID:	ICPMS8				
Sample Numbers:	L716797-01, -02, -03, -04, -05				

Laboratory Control Sample / Laboratory Control Sample Duplicate

Analyte	Dil	Spike	LCS	% Rec	LCSD	% Rec	Control Limits	% Rec Qual	Control RPD Limits	Qual
Aluminum	1	50	48.089	96	47.818	96	70 - 130	1	20	
Arsenic	1	5	4.8179	96	4.8119	96	83.1 - 117	0	20	
Barium	1	5	5.0041	100	5.0922	102	84.1 - 117	2	20	
Boron	1	5	4.8828	98	5.0561	101	70 - 130	3	20	
Cadmium	1	5	4.9516	99	4.9472	99	83.2 - 117	0	20	
Calcium	1	500	540.10	108	543.37	109	70 - 130	1	20	
Chromium	1	5	5.1229	102	5.1911	104	81.3 - 118	1	20	
Cobalt	1	5	5.0799	102	5.0511	101	83.7 - 116	1	20	
Copper	1	5	5.0626	101	5.0489	101	83.7 - 116	0	20	
Iron	1	50	52.753	106	52.491	105	50.8 - 150	0	20	
Lead	1	5	4.9300	99	4.9447	99	83.1 - 117	0	20	
Manganese	1	5	5.1942	104	5.1675	103	82.3 - 117	1	20	
Molybdenum	1	5	4.9402	99	4.9777	100	81.4 - 119	1	20	
Nickel	1	5	5.0544	101	5.0115	100	82 - 118	1	20	
Potassium	1	500	497.26	99	500.42	100	70 - 130	1	20	
Selenium	1	5	4.7662	95	4.7070	94	78.7 - 122	1	20	
Silver	1	5	5.1343	103	5.1828	104	66.2 - 134	1	20	
Sodium	1	500	526.59	105	526.52	105	70 - 130	0	20	
Uranium	1	5	4.8840	98	4.9229	98	70 - 130	1	20	
Vanadium	1	5	5.1727	103	5.2426	105	79.7 - 120	1	20	
Zinc	1	5	4.8991	98	4.8987	98	82 - 118	0	20	

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Trace Metals by Method 6020		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	8/18/2014	Analytic Batch:	WG738282
Analysis Date:	8/21/2014 5:24:00 PM	Analyst:	664
Instrument ID:	ICPMS8	Prep Date:	8/19/2014
Sample Numbers:	L716797-01, -02, -03, -04, -05		

Serial Dilution

L716797-01

Analyte	Dil	Sample Result	SD Result	% RPD	Limit	Qualifier
Aluminum	250	17245	-61.62	100	10	O1
Arsenic	50	4.4587	3.7467	16	10	O1
Barium	50	241.19	191.46	21	10	O1
Boron	250	17.702	25.119	42	20	O1
Cadmium	50	0.2799	0.2049	27	10	
Calcium	250	115123	30134	74	20	O1
Chromium	250	16.699	0.7018	96	10	O1
Cobalt	50	5.2555	4.4353	16	10	O1
Copper	50	8.3806	7.1755	14	10	O1
Iron	50	12355	10464	15	10	O1
Lead	50	12.847	10.747	16	10	O1
Manganese	50	264.20	221.86	16	10	O1
Molybdenum	50	0.5069	0.4224	17	10	
Nickel	50	10.765	9.3289	13	10	O1
Potassium	250	4367.8	-44.56	101	20	O1
Selenium	50	1.2910	0.7808	40	10	
Silver	50	<0.25	<1.25		10	
Sodium	250	333.79	64662	19272	20	O1
Uranium	50	0.6082	0.4951	19	20	
Vanadium	250	31.121	0.0826	100	10	O1
Zinc	50	39.724	33.879	15	10	O1

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Trace Metals by Method 6020			Matrix:	Soil - mg/kg
Project No:	TX000836.0008.00004			EPA ID:	TN00003
Project:	Navajo Refining Company - Artesia, NM			Analytic Batch:	WG738282
Collection Date:	8/18/2014			Analyst:	664
Analysis Date:	8/21/2014 5:24:00 PM			Prep Date:	8/19/2014
Instrument ID:	ICPMS8				
Sample Numbers:	L716797-01, -02, -03, -04, -05				

Matrix Spike / Matrix Spike Duplicate

L716797-01

Analyte	Dil	Spike Value	Sample	MS	% Rec	MSD	% Rec	Control Limits	% Rec Qual	RPD	Control Limits	RPD
Aluminum	50	1	17245	13272	0	18587	2685	70 - 130	V	33	20	J3
Arsenic	10	5	4.4587	11.060	13	8.9897	9	75 - 125	J6	21	20	J3
Barium	10	5	241.19	272.70	63	179.24	0	75 - 125	V	41	20	J3
Boron	50	0.1	17.702	9.8396	0	14.222	0	70 - 130	J6	36	20	J3
Cadmium	10	5	0.2799	7.3964	14	6.0401	12	75 - 125	J6	20	20	
Calcium	50	10	115123	93848	0	126408	2257	70 - 130	V	30	20	J3
Chromium	50	1	16.699	17.768	2	24.855	16	75 - 125	J6	33	20	J3
Cobalt	10	5	5.2555	12.045	14	9.9750	9	75 - 125	J6	19	20	
Copper	10	5	8.3806	15.439	14	12.481	8	75 - 125	J6	21	20	J3
Iron	10	5	12355	12838	967	10497	0	75 - 125	V	20	20	
Lead	10	5	12.847	20.916	16	19.068	12	75 - 125	J6	9	20	
Manganese	10	5	264.20	286.90	45	238.10	0	75 - 125	V	19	20	
Molybdenum	10	5	0.5069	6.4659	12	5.4011	10	75 - 125	J6	18	20	
Nickel	10	5	10.765	17.550	14	14.380	7	75 - 125	J6	20	20	
Potassium	50	10	4367.8	3954.8	0	5250.5	177	70 - 130	V	28	20	J3
Selenium	10	5	1.2910	7.8749	13	6.2100	10	75 - 125	J6	24	20	J3
Silver	10	5	0.0471	7.0598	14	5.8207	12	75 - 125	J6	19	20	
Sodium	50	10	333.79	776.00	88	985.54	130	70 - 130		24	20	J3
Uranium	10	0.5	0.6082	7.2567	133	5.9407	107	70 - 130	J5	20	20	
Vanadium	50	1	31.121	27.982	0	39.252	16	75 - 125	J6	34	20	J3
Zinc	10	5	39.724	51.747	24	40.187	1	75 - 125	J6	25	20	J3

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Trace Metals by Method 6020		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	8/18/2014	Analytic Batch:	WG738282
Analysis Date:	8/21/2014 5:24:00 PM	Analyst:	664
Instrument ID:	ICPMS8	Prep Date:	8/19/2014
Sample Numbers:	L716797-01, -02, -03, -04, -05		

Post Digest Spike

L716797-01

Analyte	Dil	Spike Value	Sample	Result	% Rec	Control Limits	Qualifier
Aluminum	50	50	17245	16624	0	70-130	O1
Arsenic	10	5	4.4587	56.038	103	85-115	
Barium	10	5	241.19	273.09	64	85-115	O1
Boron	50	5	17.702	49.232	13	70-130	O1
Cadmium	10	5	0.2799	55.684	111	85-115	
Calcium	50	500	115123	113185	0	70-130	O1
Chromium	50	5	16.699	71.672	22	85-115	O1
Cobalt	10	5	5.2555	56.499	102	85-115	
Copper	10	5	8.3806	57.998	99	85-115	
Iron	10	50	12355	11456	0	85-115	O1
Lead	10	5	12.847	63.813	102	85-115	
Manganese	10	5	264.20	286.86	45	85-115	O1
Molybdenum	10	5	0.5069	52.282	104	85-115	
Nickel	10	5	10.765	60.112	99	85-115	
Potassium	50	500	4367.8	9553.8	21	70-130	O1
Selenium	10	5	1.2910	53.333	104	85-115	
Silver	10	5	0.0471	50.761	101	85-115	
Sodium	50	500	333.79	5958.1	22	70-130	O1
Uranium	10	5	0.6082	52.942	105	70-130	
Vanadium	50	5	31.121	85.346	22	85-115	O1
Zinc	10	5	39.724	85.904	92	85-115	

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Volatile TPH by Method 8015D/GRO		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	8/18/2014	Analytic Batch:	WG738473
Analysis Date:	8/21/2014 2:36:00 AM	Analyst:	621
Instrument ID:	VOCGC12		
Sample Numbers:	L716797-01, -02, -03, -04, -05		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
TPH (GC/FID) Low Fraction	8006-61-9	< 0.100	< 0.0217	

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
TPH (GC/FID) Low Fraction	1	5.5	5.3663	97.6	63.5 - 137	

Laboratory Control Sample Duplicate (LCSD)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
TPH (GC/FID) Low Fraction	1	5.5	5.1841	94.3	63.5 - 137	

Laboratory Control Sample / Laboratory Control Sample Duplicate

Analyte	Dil	Spike	LCS	% Rec	LCSD	% Rec	Control Limits	% Rec	Control RPD	% RPD	Control RPD	Qual
TPH (GC/FID) Low Fraction	1	5.5	5.3663	97.6	5.1841	94.3	63.5 - 137	3.45	20			

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Volatile TPH by Method 8015D/GRO		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	8/18/2014	Analytic Batch:	WG738473
Analysis Date:	8/21/2014 2:36:00 AM	Analyst:	621
Instrument ID:	VOCGC12		
Sample Numbers:	L716797-01, -02, -03, -04, -05		

Matrix Spike / Matrix Spike Duplicate

L716797-01

Analyte	Dil	Spike Value	Sample	MS	% Rec	MSD	% Rec	Control Limits	% Rec Qual	RPD	Control Limits	RPD
TPH (GC/FID) Low Fraction	5	5.5	0.0	23.914	87	22.218	80.8	28.5 - 138		7.35		23.6

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Volatile TPH by Method 8015D/GRO		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	8/18/2014	Analytic Batch:	WG738473
Analysis Date:	8/21/2014 2:36:00 AM	Analyst:	621
Instrument ID:	VOCGC12		
Sample Numbers:	L716797-01, -02, -03, -04, -05		

Surrogate Summary

Laboratory

Sample ID	Instrument	File ID	ppm	% Rec
L716797-01 5x	VOCGC12	0821_10	0.204	102
L716797-02 5x	VOCGC12	0821_17	0.204	102
L716797-03 5x	VOCGC12	0821_18	0.203	102
L716797-04 5x	VOCGC12	0821_19	0.205	102
L716797-05 5x	VOCGC12	0821_24	0.203	101
LCS WG738473	VOCGC12	0821_04	0.201	101
LCSD WG738473	VOCGC12	0821_05	0.201	100
MS WG738473 5x	VOCGC12	0821_06	0.200	100
MSD WG738473 5x	VOCGC12	0821_07	0.200	100
BLANK WG738473	VOCGC12	0821_09	0.204	102

--A,A,A-TRIFLUOROTOLUENE(FID)

True Value: 0.2 ppm Limits: 59 - 128

--A,A,A-TRIFLUOROTOLUENE(PID)

True Value: 0.2 ppm Limits: 54 - 144

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Diesel and Oil Ranges by Method 8015		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	8/18/2014	Analytic Batch:	WG738371
Analysis Date:	8/21/2014 5:17:00 PM	Analyst:	543
Instrument ID:	SVGC13	Prep Date:	8/20/2014
Sample Numbers:	L716797-01, -02, -03, -04, -05		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
C10-C28 Diesel Range		< 4.00	< 1.61	
C28-C40 Oil Range		< 4.00	< 0.274	
Extractable Petroleum Hydrocarbon		< 4.00	< 1.32	

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Extractable Petroleum Hydrocarbon	1	60	45.669	76.1	50 - 100	

Laboratory Control Sample Duplicate (LCSD)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Extractable Petroleum Hydrocarbon	1	60	53.198	88.7	50 - 100	

Laboratory Control Sample / Laboratory Control Sample Duplicate

Analyte	Dil	Spike	LCS	% Rec	LCSD	% Rec	Control Limits	% Rec Qual	Control RPD Limits	Qual
Extractable Petroleum Hydrocarbon	1	60	45.669	76.1	53.198	88.7	50 - 100	15.2	20	

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Diesel and Oil Ranges by Method 8015		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	8/18/2014	Analytic Batch:	WG738371
Analysis Date:	8/21/2014 5:17:00 PM	Analyst:	543
Instrument ID:	SVGC13	Prep Date:	8/20/2014
Sample Numbers:	L716797-01, -02, -03, -04, -05		

Matrix Spike / Matrix Spike Duplicate

L716990-24

Analyte	Dil	Spike Value	Sample	MS	% Rec	MSD	% Rec	Control Limits	% Rec Qual	RPD	Control Limits	RPD
Extractable Petroleum Hydrocarbon	1	60	10.171	64.982	91.4	69.191	98.4	50 - 100		6.27	20	

Quality Control Summary

SDG: L716797

ARCADIS US - TX

Test:	Diesel and Oil Ranges by Method 8015		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	8/18/2014	Analytic Batch:	WG738371
Analysis Date:	8/21/2014 5:17:00 PM	Analyst:	543
Instrument ID:	SVGC13	Prep Date:	8/20/2014
Sample Numbers:	L716797-01, -02, -03, -04, -05		

Surrogate Summary

o-Terphenyl

Laboratory

Sample ID	Instrument	File ID	ppm	% Rec
L716797-01	SVGC13	0821_33	0.641	80.2
L716797-02	SVGC13	0821_17	0.597	74.7
L716797-03	SVGC13	0821_08	0.620	77.5
L716797-04	SVGC13	0821_09	0.614	76.7
L716797-05	SVGC13	0821_10	0.556	69.5
BLANK WG738371	SVGC13	0821_05	0.668	83.5
LCS WG738371	SVGC13	0821_06	0.612	76.5
LCSD WG738371	SVGC13	0821_07	0.664	83.0
MS WG738371	SVGC13	0821_14	0.570	71.3
MSD WG738371	SVGC13	0821_15	0.595	74.3

o-Terphenyl --O-TERPHENYL

True Value: 0.8 ppm Limits: 50 - 150

ARCADIS US - TX 2929 Briarpark Dr., Suite 300 Houston, TX 77042				Billing Information:				Analysis / Container / Preservative										Chain of Custody Page of							
				Attn: Accounts Payable 630 Plaza Drive, Suite 600 Highlands Ranch, CO 80129														 L.A.B S.C.I.E.N.C.E.S YOUR LAB OF CHOICE 12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859							
Report to: Pam Krueger				Email To: pam.krueger@arcadis-us.com; maisha.turner@arcadis-us.com;				**CLF, NO2, NO3, SO4** 125mlHDPE-NoPres 8270 100ml Amb NoPres CN 250mlHDPEAmb-NaOH DROOROLVI 40mlAmb-HCl-BT Diss. Metals (Field) 500mlHDPE-HNO3 GRO 40mlAmb HCl RA226/RA228 1L-HDPE-Add HNO3 TDS 250mlHDPE-NoPres Total Hg 500mlHDPE-HNO3 Total Metals 500mlHDPE-HNO3										L# L716797 C123							
Project Description: Navajo Refining Company - Artesia, NM				City/State Collected:														Acctnum: ARCADHTX Template: T96164 Prelogin: P479194 TSR: 633-Pam Langford PB: 8/13/14 mto		Shipped Via: FedEX Ground					
Phone: 713-953-4800		Client Project # TX000836.0008.00004		Lab Project # ARCADHTX-NAVAJO																					
Fax:		Site/Facility ID #		P.O. #																					
Collected by (print): ERIC BERGERSEN		Rush? (Lab MUST Be Notified)		Date Results Needed																					
Collected by (signature): 		Same Day200% Next Day100% Two Day50% Three Day25%		Email? ☐ No ☒ Yes		FAX? ☐ No ☐ Yes		No. of Cntrs																	
Packed on Ice N ☐ Y ☒																									
Sample ID	Comp/Grab	Matrix *	Depth	Date	Time																				
UG-4 (0-1)	Grab	SOIL DW	0-1	8/18/14	1155	4.15	X	X	X	X	X	X	X	X	-01										
DUP-01		SOIL DW	-	-	-	4.15	X	X	X	X	X	X	X	X	02										
UG-4 (9-10)		SOIL DW	9-10	8/18/14	1220	4.15	X	X	X	X	X	X	X	X	03										
UG-4 (15)		SOIL DW	15	8/18/14	1230	4.15	X	X	X	X	X	X	X	X	04										
UG-4 (25)		SOIL DW	25	8/18/14	1300	4.15	X	X	X	X	X	X	X	X	05										
		GW				15	X	X	X	X	X	X	X	X											
		DW				15	X	X	X	X	X	X	X	X											
		GW				15	X	X	X	X	X	X	X	X											
		GW				15	X	X	X	X	X	X	X	X											
		GW				15	X	X	X	X	X	X	X	X											

* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other

Remarks: _____

pH _____ Temp _____
Flow _____ Other _____

Relinquished by: (Signature) 	Date: 8/18/14	Time: 1500	Received by: (Signature) 	Samples returned via: ☒ UPS ☒ FedEx ☐ Courier ☐ _____	Condition: (lab use only) JWS
Relinquished by: (Signature) 	Date:	Time:	Received by: (Signature) 6089 7177 8880	Temp: 3.6 °C Bottles Received: 20 (402)	COC Seal Intact: ☒ Y ☐ N ☐ NA
Relinquished by: (Signature) 	Date:	Time:	Received for lab by: (Signature) 	Date: 8/19/14 Time: 09:00	pH Checked: _____ NCF: 37 of 39

Andy Vann

From: Mark Beasley
Sent: Tuesday, August 19, 2014 9:04 AM
To: Login
Subject: *ARCADHTX-NAVAJO* samples arriving today 8/19
Attachments: SHARPENV@HOLLYFRONTIER.COM_20140818_143857.pdf; ATT00001.htm

Login:

See below... soil samples will be on a water COC. Refer to template T95741 when logging.

Thanks
Mark

From: Krueger, Pamela [<mailto:pam.krueger@arcadis-us.com>]
Sent: Monday, August 18, 2014 3:50 PM
To: Mark Beasley
Cc: Turner, Maisha; Osborne, Melissa
Subject: FW: UG-4 Soil CoC

Mark – apparently they only had the groundwater chain of custody forms available today when they packed the soil samples. The proper set of analyses that should be on the COC are:

- TPH GRO - 8015 Modified
- DRO - 8015 Modified
- VOCs - 8260 ONLY IF GRO is above the laboratory detection limit
- SVOCs – 8270 ONLY IF DRO is detected at greater than 1,000 mg/kg
- Aluminum, arsenic, barium, boron, cadmium, calcium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, potassium, selenium, silver, sodium, uranium, vanadium, and zinc - 6020 and 7470
- Chloride, fluoride, sulfate, nitrate/nitrite – 300

You should receive 3 x 4 oz jars for each of the 5 samples. Please stress that the VOCs and SVOCs are contingent on TPH results and so we need the TPH results before the extraction hold time has passed.

Sample IDs should have no spaces and should be:

- UG-4(0-1)
- DUP-01
- UG-4(9-10)
- UG-4(15)
- UG-4(25)

Pamela R. Krueger | Senior Project Manager | pam.krueger@arcadis-us.com

ARCADIS U.S., Inc. | 2929 Briarpark Dr. Suite 300 | Houston, TX 77043
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Connect with us! www.arcadis-us.com | [LinkedIn](#) | [Twitter](#) | [Facebook](#)

38 of 39 ARCADIS, Imagine the result

Please consider the environment before printing this email.

From: Bergersen, Eric
Sent: Monday, August 18, 2014 3:41 PM
To: Krueger, Pamela
Subject: UG-4 Soil CoC

Sent from my iPhone

Begin forwarded message:

From: "SHARPENV@" <[HOLLYFRONTIER.COM](mailto:SHARPENV@HOLLYFRONTIER.COM)
SHARPENV@HOLLYFRONTIER.COM>
Date: August 18, 2014 at 1:38:57 PM MDT
To: <eric.bergersen@arcadis-us.com>
Subject: Scanned image from MX-M503N
Reply-To: <SHARPENV@HOLLYFRONTIER.COM>

Reply to: SHARPENV@HOLLYFRONTIER.COM
<SHARPENV@HOLLYFRONTIER.COM>
Device Name: Not Set
Device Model: MX-M503N
Location: Not Set

File Format: PDF MMR(G4)
Resolution: 200dpi x 200dpi

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Quality Control Summary

SDG: L719669

For: ARCADIS US - TX

Project: Navajo Refining Company - Artesia,

September 26, 2014

Sample Receiving and Handling

All sample aliquots were received at the correct temperature, in the proper containers, and with the appropriate preservatives. All method specified holding times were met.

Anions by Method 9056MOD

Laboratory Control Sample

Samples L719669-01 and 02 were analyzed in analytical batch WG741485. The laboratory control sample associated with these samples was within the laboratory control limits for all target analytes reported from this batch. The relative percent difference was within laboratory limits for all target analytes reported from this batch.

Sample Duplicate Analysis

For analytical batch WG741485 sample duplicate analysis was performed on sample L719047-05. The relative percent differences were within the method limits for target analytes reported from this batch.

Matrix Spike/Matrix Spike Duplicate

For analytical batch WG741485 matrix spike/matrix spike duplicate analysis was performed on sample L719047-03. The matrix spike recoveries and relative percent differences were within laboratory control limits for all target analytes reported from this batch.

Blank Analysis

The method blank, the initial, and all continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

Total Solids by Method 2540 G-2011

Laboratory Control Sample

Samples L719669-01 and 02 were analyzed in analytical batch WG741247. The laboratory control sample associated with these samples was within the laboratory control limits for all target analytes reported from this batch.

Sample Duplicate Analysis

For analytical batch WG741247 sample duplicate analysis was performed on sample L719669-02. The relative percent differences were within the method limits for target analytes reported from this batch.

Blank Analysis

The method blank, the initial, and all continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

Trace Metals by Method 6020

Laboratory Control Sample

Samples L719669-01 and 02 were analyzed in analytical batch WG741360. The laboratory control sample associated with these samples was within the laboratory control limits for all target analytes reported from this batch. The relative percent difference was within laboratory limits for all target analytes reported from this batch.

Matrix Spike/Matrix Spike Duplicate

For analytical batch WG741360 matrix spike/matrix spike duplicate analysis was performed on sample L719669-01. The matrix spike recoveries were above laboratory control limits for Calcium. The matrix spike recoveries were below laboratory control limits for Aluminum, Arsenic, Barium, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Lead,

Quality Control Summary

SDG: L719669

For: ARCADIS US - TX

**Project: Navajo Refining Company - Artesia,
September 26, 2014**

Manganese, Nickel, Potassium, Selenium, Silver, Vanadium, and Zinc. The spike recoveries were within limits for the remaining target compounds reported from this batch. The relative percent difference was within laboratory limits for all target analytes reported from this batch. Boron and Selenium did not meet the method limit criteria for the serial dilution. Aluminum, Calcium, Iron, and Manganese did not meet the method limit criteria for the post digest spike.

Blank Analysis

For batch WG741360, the concentrations of Aluminum and Chromium were above the method reporting limit.

The initial and continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

Volatile TPH by Method 8015D/GRO

Laboratory Control Sample

Samples L719669-01 and 02 were analyzed in analytical batch WG741344. The laboratory control sample associated with these samples was within the laboratory control limits for all target analytes reported from this batch. The relative percent difference was within laboratory limits for all target analytes reported from this batch.

Matrix Spike/Matrix Spike Duplicate

For analytical batch WG741344 matrix spike/matrix spike duplicate analysis was performed on sample L719926-01. The matrix spike recoveries were below laboratory control limits for TPH (GC/FID) Low Fraction. The relative percent difference exceeded laboratory limits for TPH (GC/FID) Low Fraction.

Blank Analysis

The method blank, the initial, and all continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

Diesel Range Organics by Method 3546/DRO

Laboratory Control Sample

Samples L719669-01 and 02 were analyzed in analytical batch WG741028. The laboratory control sample associated with these samples was within the laboratory control limits for all target analytes reported from this batch. The relative percent difference was within laboratory limits for all target analytes reported from this batch.

Samples L719669-01 and 02 were analyzed in analytical batch WG741771. The laboratory control sample associated with these samples was within the laboratory control limits for all target analytes reported from this batch. The relative percent difference was within laboratory limits for all target analytes reported from this batch.

Matrix Spike/Matrix Spike Duplicate

For analytical batch WG741028 matrix spike/matrix spike duplicate analysis was performed on sample L719274-02. The matrix spike recoveries and relative percent differences were within laboratory control limits for all target analytes reported from this batch.

For analytical batch WG741771 matrix spike/matrix spike duplicate analysis was performed on sample L719926-03. The matrix spike recoveries were above laboratory control limits for Extractable Petroleum Hydrocarbon. The spike recoveries were within limits for the remaining target compounds reported from this batch. The relative percent difference was within laboratory limits for all target analytes reported from this batch.



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Quality Control Summary SDG: L719669

For: ARCADIS US - TX

Project: Navajo Refining Company - Artesia,

September 26, 2014

Blank Analysis

The method blank, the initial, and all continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

Nancy F. McLain
ESC Representative
ESC Lab Sciences



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Project Manager
ARCADIS US - TX
2929 Briarpark Dr., Suite 300
Houston, TX 77042

Report Summary

Friday September 26, 2014

Report Number: L719669

Samples Received: 09/04/14

Client Project: TX000836.0008.00004

Description: Navajo Refining Company - Artesia, NM

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

Pam Langford , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197,
FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016,
NC - ENV375/DW21704/B10041, ND - R-140, NJ - TN002, NJ NELAP - TN002,
SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612,
MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1,
TX - T104704245-11-3, OK - 9915, PA - 68-02979, IA Lab #364, EPA - TN002

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REPORT OF ANALYSIS

Project Manager
ARCADIS US - TX
2929 Briarpark Dr., Suite 300
Houston, TX 77042

September 26, 2014

Date Received : September 04, 2014
Description : Navajo Refining Company - Artesia, NM

ESC Sample # : L719669-01

Sample ID : UG4R(39.0-39.5)-0914-BG

Site ID :

Collected By :
Collection Date : 09/02/14 16:35

Project # : TX000836.0008.00004

Parameter	Dry Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Chloride	12.	1.1	14.	mg/kg	J	9056MOD	09/08/14	1
Fluoride	12.	0.35	1.4	mg/kg		9056MOD	09/08/14	1
Nitrate	0.50	0.016	1.4	mg/kg	J	9056MOD	09/08/14	1
Nitrite	U	0.13	1.4	mg/kg		9056MOD	09/08/14	1
Sulfate	770	0.77	68.	mg/kg		9056MOD	09/08/14	1
Total Solids	73.6	0.0330		%		2540 G-2	09/06/14	1
Aluminum	5000	6.2	34.	mg/kg	B01V	6020	09/10/14	10
Arsenic	7.3	0.034	0.68	mg/kg	J6	6020	09/10/14	10
Barium	49.	0.43	1.4	mg/kg	J6	6020	09/10/14	10
Boron	6.9	1.0	14.	mg/kg	J01J	6020	09/10/14	10
Cadmium	U	0.22	0.34	mg/kg	J6	6020	09/10/14	10
Calcium	100000	160	3400	mg/kg	01V	6020	09/11/14	50
Chromium	9.6	0.68	0.68	mg/kg	BJ6	6020	09/10/14	10
Cobalt	6.2	0.35	0.68	mg/kg	J6	6020	09/10/14	10
Copper	16.	0.68	0.68	mg/kg	J6	6020	09/10/14	10
Iron	14000	34.	34.	mg/kg	01V	6020	09/10/14	10
Lead	8.7	0.33	0.68	mg/kg	J6	6020	09/10/14	10
Manganese	300	0.34	1.4	mg/kg	01V	6020	09/10/14	10
Nickel	18.	0.48	0.68	mg/kg	J6	6020	09/10/14	10
Potassium	1000	24.	680	mg/kg	J6	6020	09/10/14	10
Selenium	3.1	0.52	1.4	mg/kg	01J6	6020	09/10/14	10
Silver	U	0.34	0.34	mg/kg	J6	6020	09/10/14	10
Sodium	130	83.	680	mg/kg	J	6020	09/10/14	10
Uranium	0.95	0.22	6.8	mg/kg	J	6020	09/10/14	10
Vanadium	12.	0.24	0.68	mg/kg	J6	6020	09/10/14	10
Zinc	45.	3.5	6.8	mg/kg	J6	6020	09/10/14	10
TPH (GC/FID) Low Fraction	U	0.15	0.68	mg/kg		8015D/GR	09/10/14	5
Surrogate Recovery (70-130) a,a,a-Trifluorotoluene(FID)	101.			% Rec.		8015D/GR	09/10/14	5
Diesel and Oil Ranges								
C10-C28 Diesel Range	U	2.2	5.4	mg/kg		8015	09/09/14	1
C28-C40 Oil Range	U	0.37	5.4	mg/kg		8015	09/09/14	1
Surrogate Recovery o-Terphenyl	86.8			% Rec.		8015	09/09/14	1

Results listed are dry weight basis.
U = ND (Not Detected) = Less than MDL

Note:

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Reported: 09/11/14 15:53 Revised: 09/26/14 08:25



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REPORT OF ANALYSIS

Project Manager
ARCADIS US - TX
2929 Briarpark Dr., Suite 300
Houston, TX 77042

September 26, 2014

Date Received : September 04, 2014
Description : Navajo Refining Company - Artesia, NM

ESC Sample # : L719669-02

Sample ID : DUP-1

Site ID :

Collected By :
Collection Date : 09/02/14 16:35

Project # : TX000836.0008.00004

Parameter	Dry Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Chloride	85.	1.0	13.	mg/kg		9056MOD	09/08/14	1
Fluoride	16.	0.34	1.3	mg/kg		9056MOD	09/08/14	1
Nitrate	0.48	0.016	1.3	mg/kg	J	9056MOD	09/08/14	1
Nitrite	U	0.13	1.3	mg/kg		9056MOD	09/08/14	1
Sulfate	940	0.75	66.	mg/kg		9056MOD	09/08/14	1
Total Solids	75.6	0.0330		%		2540 G-2	09/06/14	1
Aluminum	4000	6.1	33.	mg/kg	B	6020	09/10/14	10
Arsenic	3.8	0.033	0.66	mg/kg		6020	09/10/14	10
Barium	37.	0.42	1.3	mg/kg		6020	09/10/14	10
Boron	4.4	1.0	13.	mg/kg	J	6020	09/10/14	10
Cadmium	U	0.21	0.33	mg/kg		6020	09/10/14	10
Calcium	100000	160	3300	mg/kg		6020	09/11/14	50
Chromium	7.7	0.66	0.66	mg/kg	B	6020	09/10/14	10
Cobalt	5.2	0.34	0.66	mg/kg		6020	09/10/14	10
Copper	12.	0.66	0.66	mg/kg		6020	09/10/14	10
Iron	11000	33.	33.	mg/kg		6020	09/10/14	10
Lead	6.9	0.32	0.66	mg/kg		6020	09/10/14	10
Manganese	280	0.33	1.3	mg/kg		6020	09/10/14	10
Nickel	14.	0.46	0.66	mg/kg		6020	09/10/14	10
Potassium	820	24.	660	mg/kg		6020	09/10/14	10
Selenium	3.0	0.50	1.3	mg/kg		6020	09/10/14	10
Silver	U	0.33	0.33	mg/kg		6020	09/10/14	10
Sodium	120	81.	660	mg/kg	J	6020	09/10/14	10
Uranium	0.78	0.21	6.6	mg/kg	J	6020	09/10/14	10
Vanadium	10.	0.24	0.66	mg/kg		6020	09/10/14	10
Zinc	41.	3.4	6.6	mg/kg		6020	09/10/14	10
TPH (GC/FID) Low Fraction	U	0.14	0.66	mg/kg		8015D/GR	09/10/14	5
Surrogate Recovery (70-130) a,a,a-Trifluorotoluene(FID)	101.			% Rec.		8015D/GR	09/10/14	5
Diesel and Oil Ranges								
C10-C28 Diesel Range	U	2.1	5.3	mg/kg		8015	09/09/14	1
C28-C40 Oil Range	U	0.36	5.3	mg/kg		8015	09/09/14	1
Surrogate Recovery o-Terphenyl	82.7			% Rec.		8015	09/09/14	1

Results listed are dry weight basis.
U = ND (Not Detected) = Less than MDL

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Reported: 09/11/14 15:53 Revised: 09/26/14 08:25

Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L719669-01	WG741485	SAMP	Chloride	R2986791	J
	WG741485	SAMP	Nitrate	R2986791	J
	WG741360	SAMP	Aluminum	R2988072	B01V
	WG741360	SAMP	Arsenic	R2988072	J6
	WG741360	SAMP	Barium	R2988072	J6
	WG741360	SAMP	Boron	R2988072	J01J6
	WG741360	SAMP	Cadmium	R2988072	J6
	WG741360	SAMP	Calcium	R2988228	01V
	WG741360	SAMP	Chromium	R2988072	BJ6
	WG741360	SAMP	Cobalt	R2988072	J6
	WG741360	SAMP	Copper	R2988072	J6
	WG741360	SAMP	Iron	R2988072	01V
	WG741360	SAMP	Lead	R2988072	J6
	WG741360	SAMP	Manganese	R2988072	01V
	WG741360	SAMP	Nickel	R2988072	J6
	WG741360	SAMP	Potassium	R2988072	J6
	WG741360	SAMP	Selenium	R2988072	01J6
	WG741360	SAMP	Silver	R2988072	J6
	WG741360	SAMP	Sodium	R2988072	J
	WG741360	SAMP	Uranium	R2988072	J
	WG741360	SAMP	Vanadium	R2988072	J6
	WG741360	SAMP	Zinc	R2988072	J6
L719669-02	WG741485	SAMP	Nitrate	R2986791	J
	WG741360	SAMP	Aluminum	R2988072	B
	WG741360	SAMP	Boron	R2988072	J
	WG741360	SAMP	Chromium	R2988072	B
	WG741360	SAMP	Sodium	R2988072	J
	WG741360	SAMP	Uranium	R2988072	J

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
B	(EPA) - The indicated compound was found in the associated method blank as well as the laboratory sample.
J	(EPA) - Estimated value below the lowest calibration point. Confidence correlates with concentration.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low
01	(ESC) The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.
V	(ESC) - Additional QC Info: The sample concentration is too high to evaluate accurate spike recoveries.

Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods, it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable "unless qualified as 'R' (Rejected)."

Definitions

- Accuracy** - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.
- Precision** - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Difference.
- Surrogate** - Organic compounds that are similar in chemical composition, extraction, and chromatography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.
- TIC** - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.

Summary of Remarks For Samples Printed
09/11/14 at 15:53:32

TSR Signing Reports: 633
R5 - Desired TAT

Sample: L719669-01 Account: ARCADHTX Received: 09/04/14 09:00 Due Date: 09/11/14 00:00 RPT Date: 09/11/14 15:53
Changed DR0 to DR0RLA per PL. AV 9/8
Sample: L719669-02 Account: ARCADHTX Received: 09/04/14 09:00 Due Date: 09/11/14 00:00 RPT Date: 09/11/14 15:53
Changed DR0 to DR0RLA per PL. AV 9/8

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Anions by Method 9056MOD		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	9/2/2014	Analytic Batch:	WG741485
Analysis Date:	9/8/2014 4:36:00 PM	Analyst:	236
Instrument ID:	IC-11		
Sample Numbers:	L719669-01, -02		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
Chloride	16887-00-6	< 10.0	< 0.795	
Fluoride	16984-48-8	< 1.00	< 0.261	
Nitrate	14797-55-8	< 1.00	< 0.0116	
Nitrite	14797-65-0	< 1.00	< 0.0958	
Sulfate	14808-79-8	< 50.0	< 0.570	

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Anions by Method 9056MOD		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	9/2/2014	Analytic Batch:	WG741485
Analysis Date:	9/8/2014 4:36:00 PM	Analyst:	236
Instrument ID:	IC-11		
Sample Numbers:	L719669-01, -02		

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Chloride	1	200	209.94	105	80 - 120	
Fluoride	1	20	21.003	105	80 - 120	
Nitrate	1	20	20.439	102	80 - 120	
Nitrite	1	20	21.762	109	80 - 120	
Sulfate	1	200	207.36	104	80 - 120	

Laboratory Control Sample Duplicate (LCSD)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Chloride	1	200	205.95	103	80 - 120	
Fluoride	1	20	20.638	103	80 - 120	
Nitrate	1	20	20.044	100	80 - 120	
Nitrite	1	20	21.340	107	80 - 120	
Sulfate	1	200	203.54	102	80 - 120	

Laboratory Control Sample / Laboratory Control Sample Duplicate

Analyte	Dil	Spike	LCS	% Rec	LCSD	% Rec	Control Limits	% Rec Qual	Control RPD Limits	Qual
Chloride	1	200	209.94	105	205.95	103	80 - 120	2	20	
Fluoride	1	20	21.003	105	20.638	103	80 - 120	2	20	
Nitrate	1	20	20.439	102	20.044	100	80 - 120	2	20	
Nitrite	1	20	21.762	109	21.340	107	80 - 120	2	20	
Sulfate	1	200	207.36	104	203.54	102	80 - 120	2	20	

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Anions by Method 9056MOD			Matrix:	Soil - mg/kg
Project No:	TX000836.0008.00004			EPA ID:	TN00003
Project:	Navajo Refining Company - Artesia, NM			Analytic Batch:	WG741485
Collection Date:	9/2/2014			Analyst:	236
Analysis Date:	9/8/2014 4:36:00 PM				
Instrument ID:	IC-11				
Sample Numbers:	L719669-01, -02				

Sample Duplicate

L719047-05

Analyte	Dil	Sample Result	DUP Result	% RPD	Limit	Qualifier
Sulfate	1	76.161	71.853	6	20	

Matrix Spike / Matrix Spike Duplicate

L719047-03

Analyte	Dil	Spike Value	Sample	MS	% Rec	MSD	% Rec	Control Limits	% Rec Qual	RPD	Control Limits	RPD
Sulfate	1	500	244.26	730.51	97	742.16	100	80 - 120		2	20	

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Total Solids by Method 2540 G-2011		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	9/2/2014	Analytic Batch:	WG741247
Analysis Date:	9/6/2014 8:33:00 AM	Analyst:	475
Instrument ID:	LOGBAL1		
Sample Numbers:	L719669-01, -02		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
Total Solids	TSOLIDS	< 0.100	< 0.0333	

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Total Solids	1	50	49.994	100	85 - 115	

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Total Solids by Method 2540 G-2011		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	9/2/2014	Analytic Batch:	WG741247
Analysis Date:	9/6/2014 8:33:00 AM	Analyst:	475
Instrument ID:	LOGBAL1		
Sample Numbers:	L719669-01, -02		

Sample Duplicate

L719669-02

Analyte	Dil	Sample Result	DUP Result	% RPD	Limit	Qualifier
Total Solids	1	75.611	74.273	1.79	5	

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Trace Metals by Method 6020		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	9/2/2014	Analytic Batch:	WG741360
Analysis Date:	9/10/2014 8:53:00 PM	Analyst:	664
Instrument ID:	ICPMS8	Prep Date:	9/5/2014
Sample Numbers:	L719669-01, -02		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
Aluminum	7429-90-5	< 2.5	2.23	B
Arsenic	7440-38-2	< 0.0500	< 0.00250	
Barium	7440-39-3	< 0.100	< 0.0320	
Boron	7440-42-8	< 1.00	0.171	
Cadmium	7440-43-9	< 0.0250	< 0.0160	
Calcium	7440-70-2	< 50.0	< 2.3	
Chromium	7440-47-3	0.0557	0.0557	B
Cobalt	7440-48-4	< 0.0500	< 0.0260	
Copper	7440-50-8	< 0.0500	< 0.0500	
Iron	7439-89-6	< 2.5	< 2.5	
Lead	7439-92-1	< 0.0500	< 0.0240	
Manganese	7439-96-5	< 0.100	< 0.0250	
Nickel	7440-02-0	< 0.0500	< 0.0350	
Potassium	7440-09-7	< 50.0	2.02	
Selenium	7782-49-2	< 0.100	< 0.0380	
Silver	7440-22-4	< 0.0250	< 0.0250	
Sodium	7440-23-5	< 50.0	6.18	
Uranium	7440-61-1	< 0.500	< 0.0160	
Vanadium	7440-62-2	< 0.0500	< 0.0180	
Zinc	7440-66-6	< 0.500	< 0.256	

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Trace Metals by Method 6020		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	9/2/2014	Analytic Batch:	WG741360
Analysis Date:	9/10/2014 8:53:00 PM	Analyst:	664
Instrument ID:	ICPMS8	Prep Date:	9/5/2014
Sample Numbers:	L719669-01, -02		

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Aluminum	1	50	51.059	102	70 - 130	
Arsenic	1	5	4.9391	99	83.1 - 117	
Barium	1	5	5.2308	105	84.1 - 117	
Boron	1	5	5.4096	108	70 - 130	
Cadmium	1	5	4.9341	99	83.2 - 117	
Calcium	1	500	502.10	100	70 - 130	
Chromium	1	5	5.0903	102	81.3 - 118	
Cobalt	1	5	5.0591	101	83.7 - 116	
Copper	1	5	5.0415	101	83.7 - 116	
Iron	1	50	50.634	101	50.8 - 150	
Lead	1	5	5.0519	101	83.1 - 117	
Manganese	1	5	5.0777	102	82.3 - 117	
Nickel	1	5	5.0752	102	82 - 118	
Potassium	1	500	501.46	100	70 - 130	
Selenium	1	5	4.8503	97	78.7 - 122	
Silver	1	5	5.2165	104	66.2 - 134	
Sodium	1	500	507.01	101	70 - 130	
Uranium	1	5	4.9824	100	70 - 130	
Vanadium	1	5	5.0132	100	79.7 - 120	
Zinc	1	5	4.8015	96	82 - 118	

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Trace Metals by Method 6020		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	9/2/2014	Analytic Batch:	WG741360
Analysis Date:	9/10/2014 8:53:00 PM	Analyst:	664
Instrument ID:	ICPMS8	Prep Date:	9/5/2014
Sample Numbers:	L719669-01, -02		

Laboratory Control Sample Duplicate (LCSD)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Aluminum	1	50	48.367	97	70 - 130	
Arsenic	1	5	4.7936	96	83.1 - 117	
Barium	1	5	5.0946	102	84.1 - 117	
Boron	1	5	5.2637	105	70 - 130	
Cadmium	1	5	4.7798	96	83.2 - 117	
Calcium	1	500	493.92	99	70 - 130	
Chromium	1	5	4.8589	97	81.3 - 118	
Cobalt	1	5	4.8969	98	83.7 - 116	
Copper	1	5	4.8898	98	83.7 - 116	
Iron	1	50	49.081	98	50.8 - 150	
Lead	1	5	4.9136	98	83.1 - 117	
Manganese	1	5	4.9363	99	82.3 - 117	
Nickel	1	5	4.9618	99	82 - 118	
Potassium	1	500	485.31	97	70 - 130	
Selenium	1	5	4.7042	94	78.7 - 122	
Silver	1	5	5.0500	101	66.2 - 134	
Sodium	1	500	489.90	98	70 - 130	
Uranium	1	5	4.8227	96	70 - 130	
Vanadium	1	5	4.8003	96	79.7 - 120	
Zinc	1	5	4.8303	97	82 - 118	

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Trace Metals by Method 6020			Matrix:	Soil - mg/kg
Project No:	TX000836.0008.00004			EPA ID:	TN00003
Project:	Navajo Refining Company - Artesia, NM			Analytic Batch:	WG741360
Collection Date:	9/2/2014			Analyst:	664
Analysis Date:	9/10/2014 8:53:00 PM			Prep Date:	9/5/2014
Instrument ID:	ICPMS8				
Sample Numbers:	L719669-01, -02				

Laboratory Control Sample / Laboratory Control Sample Duplicate

Analyte	Dil	Spike	LCS	% Rec	LCSD	% Rec	Control Limits	% Rec Qual	Control RPD Limits	Qual
Aluminum	1	50	51.059	102	48.367	97	70 - 130		5	20
Arsenic	1	5	4.9391	99	4.7936	96	83.1 - 117		3	20
Barium	1	5	5.2308	105	5.0946	102	84.1 - 117		3	20
Boron	1	5	5.4096	108	5.2637	105	70 - 130		3	20
Cadmium	1	5	4.9341	99	4.7798	96	83.2 - 117		3	20
Calcium	1	500	502.10	100	493.92	99	70 - 130		2	20
Chromium	1	5	5.0903	102	4.8589	97	81.3 - 118		5	20
Cobalt	1	5	5.0591	101	4.8969	98	83.7 - 116		3	20
Copper	1	5	5.0415	101	4.8898	98	83.7 - 116		3	20
Iron	1	50	50.634	101	49.081	98	50.8 - 150		3	20
Lead	1	5	5.0519	101	4.9136	98	83.1 - 117		3	20
Manganese	1	5	5.0777	102	4.9363	99	82.3 - 117		3	20
Nickel	1	5	5.0752	102	4.9618	99	82 - 118		2	20
Potassium	1	500	501.46	100	485.31	97	70 - 130		3	20
Selenium	1	5	4.8503	97	4.7042	94	78.7 - 122		3	20
Silver	1	5	5.2165	104	5.0500	101	66.2 - 134		3	20
Sodium	1	500	507.01	101	489.90	98	70 - 130		3	20
Uranium	1	5	4.9824	100	4.8227	96	70 - 130		3	20
Vanadium	1	5	5.0132	100	4.8003	96	79.7 - 120		4	20
Zinc	1	5	4.8015	96	4.8303	97	82 - 118		1	20

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Trace Metals by Method 6020		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	9/2/2014	Analytic Batch:	WG741360
Analysis Date:	9/10/2014 8:53:00 PM	Analyst:	664
Instrument ID:	ICPMS8	Prep Date:	9/5/2014
Sample Numbers:	L719669-01, -02		

Serial Dilution

L719669-01

Analyte	Dil	Sample Result	SD Result	% RPD	Limit	Qualifier
Aluminum	50	3667.5	3851.3	5	10	
Arsenic	50	5.4236	5.2550	3	10	
Barium	50	35.784	34.399	4	10	
Boron	50	5.1305	0.6770	87	20	O1
Cadmium	50	<0.16	<0.8		10	
Calcium	250	78152	79728	2	20	
Chromium	50	7.0632	7.5029	6	10	
Cobalt	50	4.5729	4.5031	2	10	
Copper	50	11.697	11.900	2	10	
Iron	50	10114	10106	0	10	
Lead	50	6.4392	6.3510	1	10	
Manganese	50	219.51	217.02	1	10	
Nickel	50	12.916	12.727	1	10	
Potassium	50	757.78	799.21	5	20	
Selenium	50	2.3261	3.2199	38	10	O1
Silver	50	<0.25	<1.25		10	
Sodium	50	92.899	112.31	21	20	
Uranium	50	0.7038	0.6732	4	20	
Vanadium	50	9.2225	10.073	9	10	
Zinc	50	33.443	33.762	1	10	

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Trace Metals by Method 6020			Matrix:	Soil - mg/kg
Project No:	TX000836.0008.00004			EPA ID:	TN00003
Project:	Navajo Refining Company - Artesia, NM			Analytic Batch:	WG741360
Collection Date:	9/2/2014			Analyst:	664
Analysis Date:	9/10/2014 8:53:00 PM			Prep Date:	9/5/2014
Instrument ID:	ICPMS8				
Sample Numbers:	L719669-01, -02				

Matrix Spike / Matrix Spike Duplicate

L719669-01

Analyte	Dil	Spike Value	Sample	MS	% Rec	MSD	% Rec	Control Limits	% Rec Qual	RPD	Control Limits	RPD
Aluminum	10	5	3667.5	3506.8	0	3260.3	0	70 - 130	V	7	20	
Arsenic	10	5	5.4236	9.7404	9	9.2419	8	75 - 125	J6	5	20	
Barium	10	5	35.784	35.918	0	35.373	0	75 - 125	J6	2	20	
Boron	10	0.5	5.1305	9.1631	81	8.1559	61	70 - 130	J6	12	20	
Cadmium	10	5	0.1483	5.3409	10	5.0920	10	75 - 125	J6	5	20	
Calcium	50	10	78152	83061	982	80778	525	70 - 130	V	3	20	
Chromium	10	5	7.0632	11.244	8	10.775	7	75 - 125	J6	4	20	
Cobalt	10	5	4.5729	8.9425	9	8.5761	8	75 - 125	J6	4	20	
Copper	10	5	11.697	15.800	8	15.062	7	75 - 125	J6	5	20	
Iron	10	5	10114	9350.3	0	8746.9	0	75 - 125	V	7	20	
Lead	10	5	6.4392	10.687	8	11.778	11	75 - 125	J6	10	20	
Manganese	10	5	219.51	213.47	0	204.98	0	75 - 125	V	4	20	
Nickel	10	5	12.916	16.600	7	16.160	6	75 - 125	J6	3	20	
Potassium	10	50	757.78	1083.3	65	987.02	46	70 - 130	J6	9	20	
Selenium	10	5	2.3261	7.0406	9	6.1665	8	75 - 125	J6	13	20	
Silver	10	5	0.0445	5.3679	11	5.1012	10	75 - 125	J6	5	20	
Sodium	10	50	92.899	541.63	90	517.28	85	70 - 130		5	20	
Uranium	10	0.5	0.7038	5.7381	101	5.3974	94	70 - 130		6	20	
Vanadium	10	5	9.2225	13.418	8	12.815	7	75 - 125	J6	5	20	
Zinc	10	5	33.443	36.637	6	35.847	5	75 - 125	J6	2	20	

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Trace Metals by Method 6020		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	9/2/2014	Analytic Batch:	WG741360
Analysis Date:	9/10/2014 8:53:00 PM	Analyst:	664
Instrument ID:	ICPMS8	Prep Date:	9/5/2014
Sample Numbers:	L719669-01, -02		

Post Digest Spike

L719669-01

Analyte	Dil	Spike Value	Sample	Result	% Rec	Control Limits	Qualifier
Aluminum	10	50	3667.5	3925.7	52	70-130	O1
Arsenic	10	5	5.4236	53.180	96	85-115	
Barium	10	5	35.784	84.920	98	85-115	
Boron	10	5	5.1305	49.524	89	70-130	
Cadmium	10	5	0.1483	49.313	98	85-115	
Calcium	50	500	78152	82001	15	70-130	O1
Chromium	10	5	7.0632	50.127	86	85-115	
Cobalt	10	5	4.5729	51.221	93	85-115	
Copper	10	5	11.697	57.863	92	85-115	
Iron	10	50	10114	10330	43	85-115	O1
Lead	10	5	6.4392	54.909	97	85-115	
Manganese	10	5	219.51	261.72	84	85-115	O1
Nickel	10	5	12.916	59.163	92	85-115	
Potassium	10	500	757.78	5066.4	86	70-130	
Selenium	10	5	2.3261	50.903	97	85-115	
Silver	10	5	0.0445	51.283	102	85-115	
Sodium	10	500	92.899	4462.7	87	70-130	
Uranium	10	5	0.7038	48.522	96	70-130	
Vanadium	10	5	9.2225	52.684	87	85-115	
Zinc	10	5	33.443	78.955	91	85-115	

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Volatile TPH by Method 8015D/GRO		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	9/2/2014	Analytic Batch:	WG741344
Analysis Date:	9/10/2014 3:48:00 AM	Analyst:	621
Instrument ID:	VOCGC12		
Sample Numbers:	L719669-01, -02		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
TPH (GC/FID) Low Fraction	8006-61-9	< 0.100	< 0.0217	

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
TPH (GC/FID) Low Fraction	1	5.5	5.7953	105	63.5 - 137	

Laboratory Control Sample Duplicate (LCSD)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
TPH (GC/FID) Low Fraction	1	5.5	5.6813	103	63.5 - 137	

Laboratory Control Sample / Laboratory Control Sample Duplicate

Analyte	Dil	Spike	LCS	% Rec	LCSD	% Rec	Control Limits	% Rec	Control RPD	% RPD	Control RPD	Qual
TPH (GC/FID) Low Fraction	1	5.5	5.7953	105	5.6813	103	63.5 - 137	1.99	20			

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Volatile TPH by Method 8015D/GRO		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	9/2/2014	Analytic Batch:	WG741344
Analysis Date:	9/10/2014 3:48:00 AM	Analyst:	621
Instrument ID:	VOCGC12		
Sample Numbers:	L719669-01, -02		

Matrix Spike / Matrix Spike Duplicate

L719926-01

Analyte	Dil	Spike Value	Sample	MS	% Rec	MSD	% Rec	Control Limits	% Rec Qual	RPD	Control Limits	RPD
TPH (GC/FID) Low Fraction	5	5.5	0.0	8.8324	32.1	6.7531	24.6	28.5 - 138	J6	26.7	23.6	J3

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Volatile TPH by Method 8015D/GRO		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	9/2/2014	Analytic Batch:	WG741344
Analysis Date:	9/10/2014 3:48:00 AM	Analyst:	621
Instrument ID:	VOCGC12		
Sample Numbers:	L719669-01, -02		

Surrogate Summary

Laboratory

Sample ID	Instrument	File ID	ppm	% Rec	ppm	% Rec
L719669-01 5x	VOCGC12	0910_17	0.201	101		
L719669-02 5x	VOCGC12	0910_18	0.201	101		
LCS WG741344	VOCGC12	0910_04	0.199	99.5	0.210	105
LCSD WG741344	VOCGC12	0910_05	0.198	98.9	0.209	105
MS WG741344 5x	VOCGC12	0910_06	0.198	98.9	0.207	103
MSD WG741344 5x	VOCGC12	0910_07	0.199	99.4	0.204	102
BLANK WG741344	VOCGC12	0910_09	0.203	101	0.207	103

--A,A,A-TRIFLUOROTOLUENE(FID)

True Value: 0.2 ppm Limits: 59 - 128

--A,A,A-TRIFLUOROTOLUENE(PID)

True Value: 0.2 ppm Limits: 54 - 144

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Diesel Range Organics by Method 3546/DRO		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	9/2/2014	Analytic Batch:	WG741028
Analysis Date:	9/5/2014 11:49:00 PM	Analyst:	574
Instrument ID:	SVGC7	Prep Date:	9/4/2014
Sample Numbers:	L719669-01, -02		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
TPH (GC/FID) High Fraction	68334-30-5	< 4.00	< 0.769	

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
TPH (GC/FID) High Fraction	1	60	55.816	93	50 - 150	

Laboratory Control Sample Duplicate (LCSD)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
TPH (GC/FID) High Fraction	1	60	53.921	89.9	50 - 150	

Laboratory Control Sample / Laboratory Control Sample Duplicate

Analyte	Dil	Spike	LCS	% Rec	LCSD	% Rec	Control Limits	% Rec	Control RPD
TPH (GC/FID) High Fraction	1	60	55.816	93	53.921	89.9	50 - 150	3.45	20

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Diesel and Oil Ranges by Method 8015		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	9/2/2014	Analytic Batch:	WG741771
Analysis Date:	9/9/2014 8:27:00 PM	Analyst:	543
Instrument ID:	SVGC13	Prep Date:	9/8/2014
Sample Numbers:	L719669-01, -02		

Method Blank

Analyte	CAS	RDL	MDL	Qualifier
C10-C28 Diesel Range		< 4.00	< 1.61	
C28-C40 Oil Range		< 4.00	< 0.274	
Extractable Petroleum Hydrocarbon		< 4.00	< 1.32	

Laboratory Control Sample (LCS)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Extractable Petroleum Hydrocarbon	1	60	53.534	89.2	50 - 100	

Laboratory Control Sample Duplicate (LCSD)

Analyte	Dil	True Value	Found	% Rec	Control Limits	Qual
Extractable Petroleum Hydrocarbon	1	60	54.656	91.1	50 - 100	

Laboratory Control Sample / Laboratory Control Sample Duplicate

Analyte	Dil	Spike	LCS	% Rec	LCSD	% Rec	Control Limits	% Rec Qual	Control RPD Limits	Qual
Extractable Petroleum Hydrocarbon	1	60	53.534	89.2	54.656	91.1	50 - 100	2.07	20	

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Diesel Range Organics by Method 3546/DRO		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	9/2/2014	Analytic Batch:	WG741028
Analysis Date:	9/5/2014 11:49:00 PM	Analyst:	574
Instrument ID:	SVGC7	Prep Date:	9/4/2014
Sample Numbers:	L719669-01, -02		

Matrix Spike / Matrix Spike Duplicate

L719274-02

Analyte	Dil	Spike Value	Sample	MS	% Rec	MSD	% Rec	Control Limits	% Rec Qual	RPD	Control Limits	RPD
TPH (GC/FID) High Fraction	1	60	0.5052	51.185	84.5	52.921	87.4	50 - 150		3.33	20	

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Diesel and Oil Ranges by Method 8015		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	9/2/2014	Analytic Batch:	WG741771
Analysis Date:	9/9/2014 8:27:00 PM	Analyst:	543
Instrument ID:	SVGC13	Prep Date:	9/8/2014
Sample Numbers:	L719669-01, -02		

Matrix Spike / Matrix Spike Duplicate

L719926-03

Analyte	Dil	Spike Value	Sample	MS	% Rec	MSD	% Rec	Control Limits	% Rec Qual	RPD	Control Limits	RPD
Extractable Petroleum Hydrocarbon	10	6	17537	18569	1720	20318	4630	50 - 100	V	9	20	

Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test:	Diesel Range Organics by Method 3546/DRO		
Project No:	TX000836.0008.00004	Matrix:	Soil - mg/kg
Project:	Navajo Refining Company - Artesia, NM	EPA ID:	TN00003
Collection Date:	9/2/2014	Analytic Batch:	WG741028
Analysis Date:	9/5/2014 11:49:00 PM	Analyst:	574
Instrument ID:	SVGC7	Prep Date:	9/4/2014
Sample Numbers:	L719669-01, -02		

Surrogate Summary

o-Terphenyl

Laboratory

Sample ID	Instrument	File ID	ppm	% Rec
L719669-01	SVGC7	0905_72	0.673	84.1
L719669-02	SVGC7	0905_73	0.494	61.8
BLANK WG741028	SVGC7	0905_49	0.680	85.0
LCS WG741028	SVGC7	0905_50	0.686	85.8
LCSD WG741028	SVGC7	0905_51	0.655	81.9
MS WG741028	SVGC7	0905_62	0.618	77.2
MSD WG741028	SVGC7	0905_63	0.665	83.1

o-Terphenyl --O-TERPHENYL

True Value: 0.8 ppm Limits: 50 - 150



YOUR LAB OF CHOICE

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Quality Control Summary

SDG: L719669

ARCADIS US - TX

Test: Diesel and Oil Ranges by Method 8015
Project No: TX000836.0008.00004
Project: Navajo Refining Company - Artesia, NM
Collection Date: 9/2/2014
Analysis Date: 9/9/2014 8:27:00 PM
Instrument ID: SVGC13
Sample Numbers: L719669-01, -02

Matrix: Soil - mg/kg
EPA ID: TN00003
Analytic Batch: WG741771
Analyst: 543
Prep Date: 9/8/2014

Surrogate Summary

o-Terphenyl

Laboratory

Sample ID	Instrument	File ID	ppm	% Rec
L719669-01	SVGC13	0909A_22	0.694	86.8
L719669-02	SVGC13	0909A_23	0.662	82.7
BLANK WG741771	SVGC13	0909A_05	0.724	90.5
LCS WG741771	SVGC13	0909A_06	0.671	83.9
LCSD WG741771	SVGC13	0909A_07	0.690	86.3
MS WG741771 10x	SVGC13	0909A_25	0.00	0.00 J2
MSD WG741771 10x	SVGC13	0909A_26	0.00	0.00 J2

o-Terphenyl --O-TERPHENYL

True Value: 0.8 ppm Limits: 50 - 150