1R - 248

REPORTS

DATE:

2006

Hansen, Edward J., EMNRD

From: Price, Wayne, EMNRD
Sent: Thursday, April 24, 2008 2:57 PM
To: Hansen, Edward J., EMNRD
Subject: FW: 1R0248 Sunoco Lea Crude Station

Attachments: 2006 Ltr Rpt.pdf

2006 Ltr Rpt.pdf (2 MB)

Please handle. No rush

-----Original Message-----
From: Gates, Mike [mailto:Mike.Gates@arcadis-us.com]
Sent: Friday, April 18, 2008 1:35 PM
To: Price, Wayne, EMNRD
Cc: FISH, BRADFORD L
Subject: FW: 1R0248 Sunoco Lea Crude Station

Wayne,

Attached is a copy of the last annual report for site 1R0248 where we documented regional water quality and requested closure of this former crude release site (See the e-mail train below). Please send closure letter to the following:

Sunoco, Inc.
Atten: Brad Fish
AutoLab
Blueball Ave & Post Road
P.O. Box 1135
Marcus Hook, PA 19061

Please copy me on the closure information.

Thank you for your assistance.

Michael Gates
ARCADIS
5100 East Skelly Drive, Suite 1000
Tulsa, OK 74135
918.850.1052 (Cell)
918.664.9900 (Office)

-----Original Message-----
From: Gates, Mike
Sent: Tuesday, February 19, 2008 9:33 AM
To: 'wayne.price@state.nm.us'
Subject: FW: 1R0248 Sunoco Lea Crude Station

Wayne,

Here is the PDF version of the last annual report on this site that was dated August 24, 2007.

See the e-mail trail below. There is correspondence from you indicating the site is 1R0248 where you asked for documentation on regional water quality that would justify closure of this site. The reference we provided is from a New Mexico Bureau of Mines & Mineral Resources Publication dated 1952 that shows groundwater quality (sulfate and chloride) throughout this region and including this site that demonstrates that the water quality at this site is consistent with regional quality dating back to 1952.

We would like to request closure of this incident. Let me know if you have any questions.

Thanks
Mike

Michael Gates
ARCADIS
5100 East Skelly Drive, Suite 1000
Tulsa, OK 74135
918.850.1052 (Cell)
918.664.9900 (Office)

-----Original Message-----
From: Gates, Mike
Sent: Wednesday, January 09, 2008 2:28 PM
To: 'wayne.price@state.nm.us'
Cc: 'FISH, BRADFORD L'
Subject: RE: 1R0248 Sunoco Lea Crude Station

Wayne,

In case your copy of the subject report has been misplaced, I am attaching a copy for your review.

Please call me at your convenience to discuss.

Thanks
Mike

Michael Gates
ARCADIS
5100 East Skelly Drive, Suite 1000
Tulsa, OK 74135
918.850.1052 (Cell)
918.664.9900 (Office)

-----Original Message-----
From: Gates, Mike
Sent: Tuesday, January 08, 2008 5:17 PM
To: 'wayne.price@state.nm.us'
Cc: FISH, BRADFORD L
Subject: RE: 1R0248 Sunoco Lea Crude Station

Wayne,

ARCADIS prepared a response to your e-mail below and submitted it to you in a letter report dated August 24, 2007. We believe the information provided in the report substantiates the conclusion that the chloride measurements in groundwater at this site are associated with regional groundwater quality and not the crude oil release in which we are requesting closure. Only crude oil was released for this incident and all of the hydrocarbon issues have been resolved for some time.

ARCADIS is requesting that OCD issue a closure for this site.

Please let me know if you have any questions.

Thanks
Mike

Michael Gates
ARCADIS
5100 East Skelly Drive, Suite 1000

Tulsa, OK 74135
918.850.1052 (Cell)
918.664.9900 (Office)

-----Original Message-----
From: Price, Wayne, EMNRD <wayne.price@state.nm.us>
To: Hall, Sharon E.
Sent: Fri Apr 28 14:26:55 2006
Subject: 1R0248 Sunoco Lea Crude Station

Dear Mr. Gates:

OCD is in receipt of the closure request dated April 06, 2006 for the above subject site. The report indicates there is chloride levels that exceed the groundwater standard are a result of a regional issue. In order for OCD to issue closure please provide information on the chloride regional issue.

Wayne Price
Oil Conservation Div.
1220 S. Saint Francis
Santa Fe New Mexico 87505

phone: 505-476-3490
fax: 505-476-3462

ARCADIS

Infrastructure, environment, facilities

ARCADIS U.S., Inc.
5100 E Skelly Drive
Suite 1000
Tulsa
Oklahoma 74135
Tel 918 664 9900
Fax 918 664 9925

ENVIRONMENTAL

Mr. Wayne Price
New Mexico Energy, Mineral and Natural Resources Department
Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Subject:
2006 Annual Groundwater Sampling and Reporting and Request for Site Closure;
Lea Crude Oil Station, Lea County, New Mexico

Tulsa, Oklahoma
24 August 2007

Contact:
Michael M. Gates

Contact Number:
(918) 664-9900

Dear Mr. Price:

Sunoco, Inc. has been conducting annual groundwater sampling at their former Lea Crude Oil Station near Eunice in Lea County, New Mexico in response to a suspected former crude oil release. Six years of annual groundwater monitoring has demonstrated that groundwater quality conditions are stable and natural attenuation has completed the remediation of residual impacts from the suspected crude oil release. Therefore, Sunoco is requesting a site closure and No Further Action Status for this release.

Groundwater Sampling Activities

ARCADIS conducted the 2006 annual groundwater sampling at the former Sunoco Crude Oil Station in Lea County, New Mexico. The sampling event was conducted to comply with requirements outlined by the New Mexico Oil Conservation Division (OCD) in a letter dated July 5, 2001.

Specifically, the OCD scope of work requires Sunoco to (1) sample and analyze groundwater from each monitor well on an annual basis for concentrations of benzene, toluene, ethylbenzene, and xylenes (BTEX); total dissolved solids; and major cations and anions using USEPA approved methods and quality assurance/quality control (QA/QC) procedures; and (2) submit an annual report to the OCD each year that includes the following:

a) A description of the sampling activities, which occurred during the past calendar year.
b) A water-table map showing the location of the station, excavated areas, monitor wells, and any other pertinent site features as well as the direction and magnitude of the hydraulic gradient created using the water-table elevation from each monitor well.

c) Summary tables of all groundwater quality sampling results and copies of all recent laboratory analytical data sheets and associated QA/QC data.
d) The disposition of all wastes generated.

This letter report summarizes the 2006 annual sampling event and provides the information required for annual reporting to the OCD.

On December 1, 2006, ARCADIS collected groundwater samples from the three monitor wells located at the former Crude Oil Station (SE1/4, NW1/4 Section 28, Township 20 South, Range 37 East). A site map showing the location of the monitor wells and other pertinent site features is attached as Figure 1. Prior to sampling, the water level in each well was measured using an electronic interface probe. Liquid hydrocarbons were not present in any site monitor well and the depth to groundwater averaged 28.82 feet below the top of casing. The groundwater elevation and general groundwater flow direction are shown on Figure 1. The gauging data are provided in Table 3. The general groundwater flow direction remains to the east and is consistent with past measurements.

Prior to collecting groundwater samples each monitor well was purged of three well volumes of water. Purging and sampling was conducted with disposable bailers dedicated for each well. Groundwater samples were collected in approved laboratory containers, labeled and preserved on ice and shipped to Severn Trent Laboratory in Corpus Christi, Texas under appropriate chain of custody.

Groundwater Sample Results

All groundwater samples were submitted to Severn Trent Laboratory in Corpus Christi, Texas for analysis of BTEX, total dissolved solids, and major cations and anions. The BTEX results are summarized in the attached Table 1. BTEX concentrations were not detected above laboratory reporting limits.

The results of the general water chemistry are summarized in the attached Table 2. The analyses include major cations and anions, and total dissolved solids. The results for this sampling event are consistent with historical water quality data and no significant deviations or trends have been established.

Conclusions

Since groundwater monitoring began in December 2000, BTEX concentrations have remained at non-detectable to trace amounts below New Mexico Water Quality Control Commission groundwater standards. The general water quality has been stable over this monitoring time period with no significant trends observed. Chloride levels in all monitoring wells, including the upgradient well, remain elevated above New Mexico Water Quality Control Commission groundwater standards but have shown no increasing or decreasing trends over the years. ARCADIS conducted research on the background groundwater quality in this area of Lea County. Based on a New Mexico Bureau of Mines & Mineral Resources publication regarding Lea County, the groundwater quality over a large area, including the former Sunoco site, has had evidence of brine impacts to groundwater from activities dating at least to 1952. As shown on Figure 2, the groundwater quality in the area of the former Sunoco site is consistent with the historical background quality of this area. This further confirms that the Sunoco release was crude oil only and the release did not impact groundwater with brine.

Based on six years of annual groundwater monitoring, and the information regarding background groundwater quality in this area, impacts from the Sunoco release have been remediated to applicable standards and Sunoco is requesting a site closure and No Further Action Status for this release.

Please call me at 918-664-9900 if you have any questions concerning this report or our annual sampling. Thank you for you assistance.

Sincerely,

ARCADIS U.S., Inc.

Michael M. Gates
Project Advisor

cc: Brad Fish Sunoco

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Table 1. Groundwater Analytical Results, Sunoco, Inc., Lea Truck Station.

Sample Number	Date Collected	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)
MW99-1	12/1/06	<2.0	<2.0	<2.0	<6.0
	12/19/05	<2.0	<2.0	<2.0	<6.0
	12/9/04	<2.0	<2.0	<2.0	<6.0
	11/13/03	<2.0	<2.0	<2.0	<6.0
	12/9/02	<1.0	<1.0	<1.0	<3.0
	12/12/01	<1.0	<1.0	<1.0	<3.0
	12/5/00	<1.0	<1.0	<1.0	<3.0
MW99-2	12/1/06	<2.0	<2.0	<2.0	<6.0
	12/19/05	<2.0	<2.0	<2.0	<6.0
	12/9/04	<2.0	<2.0	5.0	<6.0
	11/13/03	<2.0	<2.0	3.0	<6.0
	12/9/02	<1.0	<1.0	<1.0	<3.0
	12/12/01	1.3	<1.0	2.2	<3.0
	12/5/00	2.6	1.5	3.7	<3.0
MW99-3	12/1/06	<2.0	<2.0	<2.0	<6.0
	12/19/05	<2.0	<2.0	3.0	<6.0
	12/9/04	<2.0	<2.0	3.0	<6.0
	11/13/03	<2.0	<2.0	12.0	<6.0
	12/9/02	<1.0	<1.0	37.0	4.0
	12/12/01	<1.0	<1.0	6.0	<3.0
	12/5/00	<1.0	<1.0	22.0	<3.0

(mg/L) micrograms per liter.
< less than.

G:\Aproject\SUNPIPE\OK13510005\TABLES\[TBL1.XLS]BTEX

Table 2. General Chemistry and Total Metals, Sunoco, Inc., Lea Truck Station

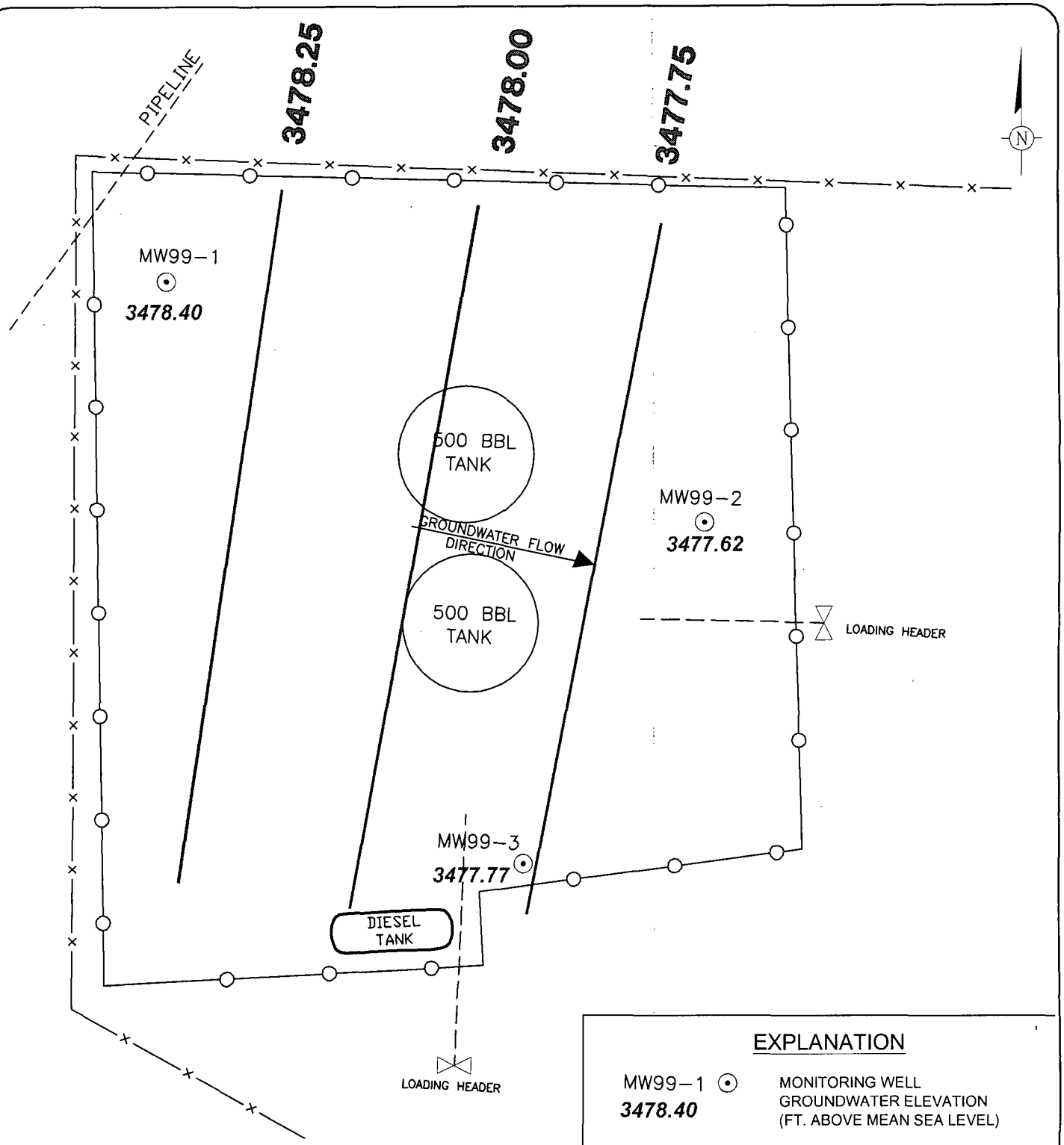
Sample Number	Date Collected	Bicarbonate Alkalinity (mg/l)	Bromide (mg/l)	Carbonate Alkalinity (mg/l)	Chloride (mg/l)	Fluoride (mg/l)	Nitrate (mg/l)	Sulfate (mg/l)	Total Dissolved Solids (mg/l)	Calcium (mg/l)	Iron (mg/l)	Potassium (mg/l)	Magnesium (mg/l)	Sodium (mg/l)
MW99-1	12/1/06	350	2.3	<5.0	350	7	0.51 H	290	1,400	79	<0.5	14	70	300
	12/19/05	329	3	ND	350	4.4	ND	200	1,400	74.4	ND	13.8	60.4	259
	12/10/04	379	3	ND	350	5	ND	200	1,400	86	<4.1	<101	69	314
	11/13/03	352	3	ND	380	5.4	0.4	250	1,350	73.3	0.28	14.8	59.7	341
	12/9/02	336	6.1	ND	359	6	ND	237	1,390	81	0.86	17.9	66.2	305
	12/12/01	332	3.1	ND	387	5.5	ND	244	1,360	102	17.2	21.3	80.6	ND
	12/5/00	185	3.4	ND	344	4.6	46.4	237	1,530	80.5	2.79	14.2	65.5	285
MW99-2	12/1/06	380	<2.0	<5.0	360	5.9	0.52 H	390	1,700	78	0.5	18	79	370
	12/19/05	394	3	ND	410	5.0	0.6	500	1,870	85.9	ND	19.1	86.9	391
	12/9/04	370	3	ND	360	1.2	ND	300	1,550	87	<4.0	<100	69	314
	11/13/03	344	3	ND	370	5.9	0.4	251	1,380	69.6	<0.25	14.9	55.8	32.2
	12/9/02	341	7.1	ND	361	6.2	ND	238	1,720	82.7	0.82	19.1	65.3	327
	12/12/01	352	3.0	ND	364	5.9	ND	237	1,300	91.7	56.8	21.8	71.9	280
	12/5/00	227	3.2	ND	344	5.1	48.6	245	1,580	93.8	13.1	17.9	72.5	295
MW99-3	12/1/06	730	5.2	<5.0	790	11	4.2 H	860	3,700	220	<0.5	56	230	570
	12/19/05	637	10	ND	1,520	9.5	2.6	600	3,880	324	ND	74.6	376	321
	12/9/04	610	9	ND	1,720	10	3.5	800	4,760	404	0.53	83.4	458	202
	11/13/03	532	9	ND	1,250	6.7	1.2	500	3,310	231	0.47	49.4	240	578
	12/9/02	640	17.8	ND	1,480	10.5	ND	513	3,760	285	0.99	70.4	336	509
	12/12/01	525	7.7	ND	1,120	7.7	ND	366	2,790	208	19.2	68	220	495
	12/5/00	445	9.9	ND	1,210	3.6	45.6	367	3,460	288	52.6	70	301	550

ND Non detect.
H Sample was prepped or analyzed beyond the specified holding tim
mg/L Milligrams per liter.
G:\Aproject\SUNPIPE\OK13510005\TABLES\[TBL2.XLS]Table 2

Table 3. Summary of Fluid Level Measurements, Sunoco, Inc., Lea Truck Station.

Well Number	Date Measured	Measuring Point Elevation (i.e. TOC) (ft)	Depth to Water (ft bTOC)	Water Level Elevation (ft)	Depth to Product (ft bTOC)	Product Level Elevation (ft)	Product Thickness (ft)	Corrected Water Level Elevation (ft)
MW99-1	12/01/06	3507.15	28.75	3478.40	--	--	--	3478.40
	12/19/05		28.84	3478.31	--	--	--	3478.31
	12/9/04		30.06	3477.09	--	--	--	3477.09
	11/13/03		33.51	3473.64	--	--	--	3473.64
	12/9/02		32.06	3475.09	--	--	--	3475.09
	12/12/01		33.1	3474.05	--	--	--	3474.05
MW99-2	12/01/06	3506.51	28.89	3477.62	--	--	--	3477.62
	12/19/05		28.95	3477.56	--	--	--	3477.56
	12/9/04		30.14	3476.37	--	--	--	3476.37
	11/13/03		33.63	3472.88	--	--	--	3472.88
	12/9/02		32.21	3474.30	--	--	--	3474.30
	12/12/01		32.94	3473.57	--	--	--	3473.57
MW99-3	12/01/06	3506.59	28.82	3477.77	--	--	--	3477.77
	12/19/05		28.87	3477.72	--	--	--	3477.72
	12/9/04		29.94	3476.65	--	--	--	3476.65
	11/13/03		33.56	3473.03	--	--	--	3473.03
	12/9/02		32.14	3474.45	--	--	--	3474.45
	12/12/01		33.06	3473.53	--	--	--	3473.53

TOC Top of Casing.
ft bTOC Feet below top of casing.
G:\Aproject\SUNPIPE\OK13510005\TABLES\[GWELE.XLS]TIER 2



EXPLANATION

MW99-1 3478.40 — MONITORING WELL GROUNDWATER ELEVATION (FT. ABOVE MEAN SEA LEVEL)

3477.75 — GROUNDWATER ELEVATION CONTOURS (DASHED WHERE INFERRED) CONTOUR INTERVAL = 0.25 FT

GROUNDWATER FLOW DIRECTION

ARCADIS
5100 EAST SKELLY DRIVE SUITE 1000
TULSA, OKLAHOMA 74135
Tel: (918) 664-9900 Fax: (918) 664-9925

NOT TO SCALE

GROUNDWATER ELEVATION CONTOURS DECEMBER 2006

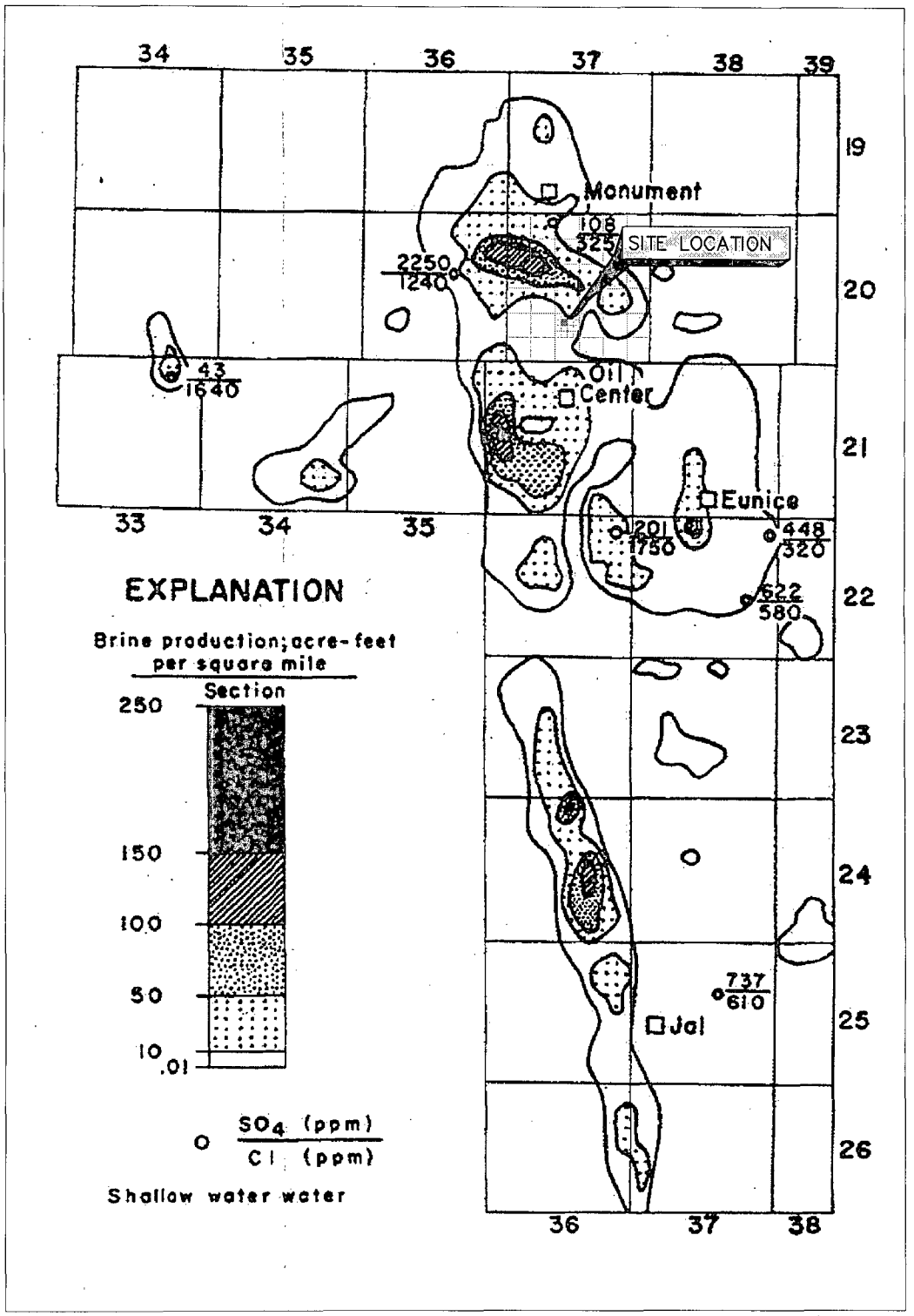
SUN PIPE LINE COMPANY
LEA CRUDE OIL STATION
LEA CO. NEW MEXICO

PROJECT NUMBER
OK001351.0005

FIGURE NUMBER
1

DRAWN BY: BRIAN DEHAY | PROJECT MANAGER: MIKE GATES | COMPILED BY: MIKE GATES | FILE NAME: DEC2006 GW | DATE:

G:\Aproject\SUNPIPE\OK1351000S\CADD\DEC2006 GW.dwg, 8/27/2007 9:26:51 AM



NOTE:

Site location plotted on Figure 25, Oil-Field Brine Production in Southern Lea County, N. Mex., 1952 extracted from New Mexico Bureau of Mines & Mineral Resources' *Groundwater: Lea County*. Figure shows locations of selected wells that have been contaminated by brine. Upper figure adjacent to well symbol is sulfate concentration; lower figure is chloride concentration.

ARCADIS
5100 EAST SKELLY DRIVE SUITE 1000
TULSA, OKLAHOMA 74135
Tel: (918) 664-9900 Fax: (918) 664-9925

NOT TO SCALE

OIL FIELD BRINE PRODUCTION IN SOUTHERN LEA CO., NEW MEXICO

SUN PIPE LINE COMPANY
LEA CRUDE OIL STATION
LEA CO. NEW MEXICO

PROJECT NUMBER
OK001351.0005

FIGURE NUMBER
2

DRAWN BY: BRIAN DEHAY | PROJECT MANAGER: MIKE GATES | COMPILED BY: MIKE GATES | FILE NAME: Oil Field Brine Map | DATE:

G:\Aproject\SUNPIPE\OK135100O5\CADD\Oil Field Brine Map.dwg, 8/27/2007 9:25:05 AM

ANALYTICAL REPORT

Job Number: 560-2723-1

Job Description: Sunoco-Lea County / OK1351

For:
ARCADIS G&M, Inc.
5100 East Skelly Drive
Suite 1000
Tulsa, OK 74135

Attention: Mr. Mike Gates

Olga Veronica McDonald

Olga McDonald
Project Manager I
omcdonald@stl-inc.com
12/22/2006

Project Manager: Olga McDonald

The test results entered in this report meet all NELAC requirements for accredited parameters. Any exceptions to NELAC requirements are noted in the report. Pursuant to NELAC, this report may not be reproduced except in full, and with written approval from the laboratory. STL Corpus Christi Certifications and Approvals: NELAC TX T104704210-06-TX, NELAC KS E-10362, NELAC LA 03034, Oklahoma 9968, USDA Soil Permit S-42935 Revised.

Case Narrative for job: 560-J2723-1

Client: ARCADIS G&M, Inc.
Date: 12/22/2006

Total Metals Analysis

Sample 560-2723-1 was analyzed for the major cation metals using EPA Method 6020. The percent recovery results for the matrix spikes associated wiht this sample were outside the acceptance criteria due to the concentration of these metals in the sample. The associated LCS was within acceptable limits and the data are therefore reported.

Nitrate Analysis

Samples 560-2723-1 through 3 were analyzed for nitrate using EPA Method 9056. The method specified holding time for this analysis is 48-hours from time of collection. These samples were received on Saturday, Dec. 2, 2006. The analysis was therefore done after the method specified holding time had expired. Results from expired analyses should be flagged accordingly and used at the client's discretion.

EXECUTIVE SUMMARY - Detections

Client: ARCADIS G&M, Inc. Job Number: 560-2723-1

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier		Reporting Limit	Units	Method
560-2723-1	**MW99-3**					
Ca		220000		500	ug/L	6020
K		56000		500	ug/L	6020
Mg		230000		500	ug/L	6020
Na		570000		5000	ug/L	6020
Total Dissolved Solids		3700		10	mg/L	160.1
Bicarbonate Alkalinity as CaCO3		730		5.0	mg/L	2320B
Fluoride		11		1.0	mg/L	340.2
Bromide		5.2		2.0	mg/L	9056
Nitrogen, Nitrate		4.2	H	0.50	mg/L	9056
Chloride		790		50	mg/L	9056
Sulfate		860		100	mg/L	9056
560-2723-2	**MW99-2**					
Ca		78000		500	ug/L	6020
K		18000		500	ug/L	6020
Mg		79000		500	ug/L	6020
Na		370000		5000	ug/L	6020
Fe		500		500	ug/L	6020
Total Dissolved Solids		1700		10	mg/L	160.1
Bicarbonate Alkalinity as CaCO3		380		5.0	mg/L	2320B
Fluoride		5.9		1.0	mg/L	340.2
Nitrogen, Nitrate		0.52	H	0.50	mg/L	9056
Chloride		360		50	mg/L	9056
Sulfate		390		100	mg/L	9056
560-2723-3	**MW99-1**					
Ca		79000		500	ug/L	6020
K		14000		500	ug/L	6020
Mg		70000		500	ug/L	6020
Na		300000		5000	ug/L	6020
Total Dissolved Solids		1400		10	mg/L	160.1
Bicarbonate Alkalinity as CaCO3		350		5.0	mg/L	2320B
Fluoride		7.0		1.0	mg/L	340.2
Bromide		2.3		2.0	mg/L	9056
Nitrogen, Nitrate		0.51	H	0.50	mg/L	9056
Chloride		350		50	mg/L	9056
Sulfate		290		100	mg/L	9056

METHOD SUMMARY

Client: ARCADIS G&M, Inc. Job Number: 560-2723-1

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Aromatic and Halogenated VOCs by Gas Chromatography using PID or ECD	STL CC	SW846 8021B	
Purge-and-Trap	STL CC		SW846 5030B
Inductively Coupled Plasma - Mass Spectrometry	STL CC	SW846 6020	
Acid Digestion of Aqueous Samples and Extracts	STL CC		SW846 3010A
Residue, Filterable, Gravimetric, Dried at 180°C (TDS)	STL CC	MCAWW 160.1	
Alkalinity, Titration Method	STL CC	SM18 2320B	
Fluoride (Potentiometric, Ion Selective Electrode)	STL CC	MCAWW 340.2	
Anions by Ion Chromatography	STL CC	SW846 9056	
Anions by Ion Chromatography	STL CC	SW846 9056	

LAB REFERENCES:

STL CC = STL Corpus Christi

METHOD REFERENCES:

MCAWW - "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM18 - "Standard Methods For The Examination Of Water And Wastewater", 18th Edition, 1992.

SW846 - "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: ARCADIS G&M, Inc. Job Number: 560-2723-1

Method	Analyst	Analyst ID
SW846 8021B	Haas, Richard	RH
SW846 6020	Theriault, Ray	RT
MCAWW 160.1	Chandler, Anna	AC
SM18 2320B	Zwierzykowski, Hanna M	HMZ
MCAWW 340.2	Zwierzykowski, Hanna M	HMZ
SW846 9056	Alvarez, Tracy L	TLA

SAMPLE SUMMARY

Client: ARCADIS G&M, Inc. Job Number: 560-2723-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
560-2723-1	MW99-3	Water	12/01/2006 0959	12/02/2006 0941
560-2723-2	MW99-2	Water	12/01/2006 1047	12/02/2006 0941
560-2723-3	MW99-1	Water	12/01/2006 1113	12/02/2006 0941
560-2723-4TB	TRIP BLANK	Water	12/01/2006 0000	12/02/2006 0941

SAMPLE RESULTS

Mr. Mike Gates
ARCADIS G&M, Inc.
5100 East Skelly Drive
Suite 1000
Tulsa, OK 74135

Job Number: 560-2723-1

Client Sample ID: MW99-3
Lab Sample ID: 560-2723-1

Date Sampled: 12/01/2006 0959
Date Received: 12/02/2006 0941
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	Dilution
Method: 8021B	Date Analyzed:	12/06/2006 1958		
Prep Method: 5030B	Date Prepared:	12/06/2006 1958		
Benzene	<2.0	ug/L	2.0	1.0
Toluene	<2.0	ug/L	2.0	1.0
Ethylbenzene	<2.0	ug/L	2.0	1.0
Xylenes, Total	<6.0	ug/L	6.0	1.0
Surrogate			Acceptance Limits	
4-Bromofluorobenzene (Surr)	75	%	64 - 120	
Trifluorotoluene (Surr)	93	%	68 - 120	
Method: 6020	Date Analyzed:	12/07/2006 1821		
Prep Method: 3010A	Date Prepared:	12/05/2006 0945		
Ca	220000	ug/L	500	10
K	56000	ug/L	500	10
Mg	230000	ug/L	500	10
Fe	<500	ug/L	500	10
Method: 6020	Date Analyzed:	12/07/2006 1922		
Prep Method: 3010A	Date Prepared:	12/05/2006 0945		
Na	570000	ug/L	5000	50
Method: 160.1	Date Analyzed:	12/04/2006 1155		
Total Dissolved Solids	3700	mg/L	10	1.0
Method: 2320B	Date Analyzed:	12/06/2006 1300		
Bicarbonate Alkalinity as CaCO3	730	mg/L	5.0	1.0
Carbonate Alkalinity as CaCO3	<5.0	mg/L	5.0	1.0
Method: 340.2	Date Analyzed:	12/06/2006 1430		
Fluoride	11	mg/L	1.0	10
Method: 9056	Date Analyzed:	12/05/2006 1121		
Chloride	790	mg/L	50	100
Sulfate	860	mg/L	100	100

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Job Number: 560-2723-1

Client Sample ID: **MW99-3**
Lab Sample ID: **560-2723-1**

Date Sampled: 12/01/2006 0959
Date Received: 12/02/2006 0941
Client Matrix: Water

Analyte	Result/Qualifier		Unit	RL	Dilution
Method: 9056	Date Analyzed:		12/06/2006 0909		
Bromide	5.2		mg/L	2.0	1.0
Method: 9056	Date Analyzed:		12/04/2006 0922		
Nitrogen, Nitrate	4.2	H	mg/L	0.50	1.0

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Job Number: 560-2723-1

Client Sample ID: MW99-2
Lab Sample ID: 560-2723-2

Date Sampled: 12/01/2006 1047
Date Received: 12/02/2006 0941
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	Dilution
Method: 8021B	Date Analyzed:	12/06/2006 2024		
Prep Method: 5030B	Date Prepared:	12/06/2006 2024		
Benzene	<2.0	ug/L	2.0	1.0
Toluene	<2.0	ug/L	2.0	1.0
Ethylbenzene	<2.0	ug/L	2.0	1.0
Xylenes, Total	<6.0	ug/L	6.0	1.0
Surrogate			Acceptance Limits	
4-Bromofluorobenzene (Surr)	80	%	64 - 120	
Trifluorotoluene (Surr)	96	%	68 - 120	
Method: 6020	Date Analyzed:	12/07/2006 1839		
Prep Method: 3010A	Date Prepared:	12/05/2006 0945		
Ca	78000	ug/L	500	10
K	18000	ug/L	500	10
Mg	79000	ug/L	500	10
Fe	500	ug/L	500	10
Method: 6020	Date Analyzed:	12/07/2006 1928		
Prep Method: 3010A	Date Prepared:	12/05/2006 0945		
Na	370000	ug/L	5000	50
Method: 160.1	Date Analyzed:	12/04/2006 1155		
Total Dissolved Solids	1700	mg/L	10	1.0
Method: 2320B	Date Analyzed:	12/06/2006 1300		
Bicarbonate Alkalinity as CaCO3	380	mg/L	5.0	1.0
Carbonate Alkalinity as CaCO3	<5.0	mg/L	5.0	1.0
Method: 340.2	Date Analyzed:	12/06/2006 1430		
Fluoride	5.9	mg/L	1.0	10
Method: 9056	Date Analyzed:	12/05/2006 1121		
Chloride	360	mg/L	50	100
Sulfate	390	mg/L	100	100

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Job Number: 560-2723-1

Client Sample ID: **MW99-2**
Lab Sample ID: **560-2723-2**

Date Sampled: 12/01/2006 1047
Date Received: 12/02/2006 0941
Client Matrix: Water

Analyte	Result/Qualifier		Unit	RL	Dilution
Method: 9056	Date Analyzed:		12/06/2006 0909		
Bromide	<2.0		mg/L	2.0	1.0
Method: 9056	Date Analyzed:		12/04/2006 0922		
Nitrogen, Nitrate	0.52	H	mg/L	0.50	1.0

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Job Number: 560-2723-1

Client Sample ID: MW99-1
Lab Sample ID: 560-2723-3

Date Sampled: 12/01/2006 1113
Date Received: 12/02/2006 0941
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	Dilution
Method: 8021B	Date Analyzed:	12/06/2006 2049		
Prep Method: 5030B	Date Prepared:	12/06/2006 2049		
Benzene	<2.0	ug/L	2.0	1.0
Toluene	<2.0	ug/L	2.0	1.0
Ethylbenzene	<2.0	ug/L	2.0	1.0
Xylenes, Total	<6.0	ug/L	6.0	1.0
Surrogate			Acceptance Limits	
4-Bromofluorobenzene (Surr)	76	%	64 - 120	
Trifluorotoluene (Surr)	99	%	68 - 120	
Method: 6020	Date Analyzed:	12/07/2006 1845		
Prep Method: 3010A	Date Prepared:	12/05/2006 0945		
Ca	79000	ug/L	500	10
K	14000	ug/L	500	10
Mg	70000	ug/L	500	10
Fe	<500	ug/L	500	10
Method: 6020	Date Analyzed:	12/07/2006 1934		
Prep Method: 3010A	Date Prepared:	12/05/2006 0945		
Na	300000	ug/L	5000	50
Method: 160.1	Date Analyzed:	12/04/2006 1155		
Total Dissolved Solids	1400	mg/L	10	1.0
Method: 2320B	Date Analyzed:	12/06/2006 1300		
Bicarbonate Alkalinity as CaCO3	350	mg/L	5.0	1.0
Carbonate Alkalinity as CaCO3	<5.0	mg/L	5.0	1.0
Method: 340.2	Date Analyzed:	12/06/2006 1430		
Fluoride	7.0	mg/L	1.0	10
Method: 9056	Date Analyzed:	12/05/2006 1121		
Chloride	350	mg/L	50	100
Sulfate	290	mg/L	100	100

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Job Number: 560-2723-1

Client Sample ID: MW99-1
Lab Sample ID: 560-2723-3

Date Sampled: 12/01/2006 1113
Date Received: 12/02/2006 0941
Client Matrix: Water

Analyte	Result/Qualifier		Unit	RL	Dilution
Method: 9056	Date Analyzed:		12/06/2006 0909		
Bromide	2.3		mg/L	2.0	1.0
Method: 9056	Date Analyzed:		12/04/2006 0922		
Nitrogen, Nitrate	0.51	H	mg/L	0.50	1.0

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Job Number: 560-2723-1

Client Sample ID: TRIP BLANK
Lab Sample ID: 560-2723-4

Date Sampled: 12/01/2006 0000
Date Received: 12/02/2006 0941
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	Dilution
Method: 8021B	Date Analyzed:	12/06/2006 2114		
Prep Method: 5030B	Date Prepared:	12/06/2006 2114		
Benzene	<2.0	ug/L	2.0	1.0
Toluene	<2.0	ug/L	2.0	1.0
Ethylbenzene	<2.0	ug/L	2.0	1.0
Xylenes, Total	<6.0	ug/L	6.0	1.0
Surrogate			Acceptance Limits	
4-Bromofluorobenzene (Surr)	79	%	64 - 120	
Trifluorotoluene (Surr)	98	%	68 - 120	

DATA REPORTING QUALIFIERS

Client: ARCADIS G&M, Inc. Job Number: 560-2723-1

Lab Section	Qualifier	Description
Metals		
	F	MS or MSD exceeds the control limits
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.
General Chemistry		
	H	Sample was prepped or analyzed beyond the specified holding time

QUALITY CONTROL RESULTS

Client: ARCADIS G&M, Inc.

Job Number: 560-2723-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
GC VOA					
Analysis Batch:560-6951					
LCS 560-6951/22	Lab Control Spike	T	Water	8021B	
MB 560-6951/1	Method Blank	T	Water	8021B	
MB 560-6951/9	Method Blank	T	Water	8021B	
560-2723-1	MW99-3	T	Water	8021B	
560-2723-2	MW99-2	T	Water	8021B	
560-2723-3	MW99-1	T	Water	8021B	
560-2723-4TB	TRIP BLANK	T	Water	8021B	

Report Basis
T = Total

Metals

Prep Batch: 560-6861					
LCS 560-6861/2-AA	Lab Control Spike	T	Water	3010A	
MB 560-6861/1-AA	Method Blank	T	Water	3010A	
560-2723-1	MW99-3	T	Water	3010A	
560-2723-1MS	Matrix Spike	T	Water	3010A	
560-2723-1MSD	Matrix Spike Duplicate	T	Water	3010A	
560-2723-2	MW99-2	T	Water	3010A	
560-2723-3	MW99-1	T	Water	3010A	
Analysis Batch:560-7002					
LCS 560-6861/2-AA	Lab Control Spike	T	Water	6020	560-6861
MB 560-6861/1-AA	Method Blank	T	Water	6020	560-6861
560-2723-1	MW99-3	T	Water	6020	560-6861
560-2723-1MS	Matrix Spike	T	Water	6020	560-6861
560-2723-1MSD	Matrix Spike Duplicate	T	Water	6020	560-6861
560-2723-2	MW99-2	T	Water	6020	560-6861
560-2723-3	MW99-1	T	Water	6020	560-6861

Report Basis
T = Total

Client: ARCADIS G&M, Inc.

Job Number: 560-2723-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:560-6829					
LCS 560-6829/2	Lab Control Spike	T	Water	160.1	
MB 560-6829/1	Method Blank	T	Water	160.1	
560-2723-1	MW99-3	T	Water	160.1	
560-2723-2	MW99-2	T	Water	160.1	
560-2723-3	MW99-1	T	Water	160.1	
Analysis Batch:560-6867					
LCS 560-6867/4	Lab Control Spike	T	Water	9056	
MB 560-6867/3	Method Blank	T	Water	9056	
560-2723-1	MW99-3	T	Water	9056	
560-2723-1MS	Matrix Spike	T	Water	9056	
560-2723-1MSD	Matrix Spike Duplicate	T	Water	9056	
560-2723-2	MW99-2	T	Water	9056	
560-2723-3	MW99-1	T	Water	9056	
Analysis Batch:560-6920					
LCS 560-6920/4	Lab Control Spike	T	Water	9056	
MB 560-6920/3	Method Blank	T	Water	9056	
560-2723-1	MW99-3	T	Water	9056	
560-2723-2	MW99-2	T	Water	9056	
560-2723-3	MW99-1	T	Water	9056	
Analysis Batch:560-6950					
LCS 560-6950/4	Lab Control Spike	T	Water	340.2	
MB 560-6950/3	Method Blank	T	Water	340.2	
560-2723-1	MW99-3	T	Water	340.2	
560-2723-2	MW99-2	T	Water	340.2	
560-2723-3	MW99-1	T	Water	340.2	
Analysis Batch:560-6970					
LCS 560-6970/4	Lab Control Spike	T	Water	9056	
MB 560-6970/3	Method Blank	T	Water	9056	
560-2723-1	MW99-3	T	Water	9056	
560-2723-2	MW99-2	T	Water	9056	
560-2723-3	MW99-1	T	Water	9056	
560-2723-3MS	Matrix Spike	T	Water	9056	
560-2723-3MSD	Matrix Spike Duplicate	T	Water	9056	
Analysis Batch:560-6973					
LCS 560-6973/4	Lab Control Spike	T	Water	9056	
MB 560-6973/3	Method Blank	T	Water	9056	
560-2723-3MS	Matrix Spike	T	Water	9056	
560-2723-3MSD	Matrix Spike Duplicate	T	Water	9056	

Client: ARCADIS G&M, Inc.

Job Number: 560-2723-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:560-6986					
LCS 560-6986/1	Lab Control Spike	T	Water	2320B	
LCS 560-6986/14	Lab Control Spike	T	Water	2320B	
560-2723-1	MW99-3	T	Water	2320B	
560-2723-2	MW99-2	T	Water	2320B	
Analysis Batch:560-6992					
LCS 560-6992/1	Lab Control Spike	T	Water	2320B	
LCS 560-6992/13	Lab Control Spike	T	Water	2320B	
560-2723-3	MW99-1	T	Water	2320B	
560-2723-3MS	Matrix Spike	T	Water	2320B	
560-2723-3MSD	Matrix Spike Duplicate	T	Water	2320B	

Report Basis
T = Total

Client: ARCADIS G&M, Inc.

Job Number: 560-2723-1

Method Blank - Batch: 560-6951

Method: 8021B
Preparation: 5030B

Lab Sample ID: MB 560-6951/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/06/2006 0932
Date Prepared: 12/06/2006 0932

Analysis Batch: 560-6951
Prep Batch: N/A
Units: ug/L

Instrument ID: HP GC [Method 8021]
Lab File ID: 12060603.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

Analyte	Result	Qual	RL
Benzene	<2.0		2.0
Toluene	<2.0		2.0
Ethylbenzene	<2.0		2.0
Xylenes, Total	<6.0		6.0

Surrogate	% Rec	Acceptance Limits
4-Bromofluorobenzene (Surr)	84	64 - 120
Trifluorotoluene (Surr)	95	68 - 120

Method Blank - Batch: 560-6951

Method: 8021B
Preparation: 5030B

Lab Sample ID: MB 560-6951/9
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/06/2006 1701
Date Prepared: 12/06/2006 1701

Analysis Batch: 560-6951
Prep Batch: N/A
Units: ug/L

Instrument ID: HP GC [Method 8021]
Lab File ID: 12060615.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

Analyte	Result	Qual	RL
Benzene	<2.0		2.0
Toluene	<2.0		2.0
Ethylbenzene	<2.0		2.0
Xylenes, Total	<6.0		6.0

Surrogate	% Rec	Acceptance Limits
4-Bromofluorobenzene (Surr)	76	64 - 120
Trifluorotoluene (Surr)	96	68 - 120

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: ARCADIS G&M, Inc.

Job Number: 560-2723-1

Lab Control Spike - Batch: 560-6951

Method: 8021B
Preparation: 5030B

Lab Sample ID: LCS 560-6951/22
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/06/2006 0906
Date Prepared: 12/06/2006 0906

Analysis Batch: 560-6951
Prep Batch: N/A
Units: ug/L

Instrument ID: HP GC [Method 8021]
Lab File ID: 12060602.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Benzene	20.0	21.1	106	74 - 132	
Toluene	20.0	20.0	100	73 - 123	
Ethylbenzene	20.0	20.0	100	80.0 - 120	
Xylenes, Total	40.0	43.6	109	80 - 127	

Surrogate	% Rec	Acceptance Limits
4-Bromofluorobenzene (Surr)	89	64 - 120
Trifluorotoluene (Surr)	100	68 - 120

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: ARCADIS G&M, Inc.

Job Number: 560-2723-1

Method Blank - Batch: 560-6861

Method: 6020
Preparation: 3010A

Lab Sample ID: MB 560-6861/1-AA
Client Matrix: Water
Dilution: 10
Date Analyzed: 12/07/2006 1809
Date Prepared: 12/05/2006 0945

Analysis Batch: 560-7002
Prep Batch: 560-6861
Units: ug/L

Instrument ID: Agilent ICPMS
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL
Ca	<500		500
K	<500		500
Mg	<500		500
Na	<1000		1000
Fe	<500		500

Lab Control Spike - Batch: 560-6861

Method: 6020
Preparation: 3010A

Lab Sample ID: LCS 560-6861/2-AA
Client Matrix: Water
Dilution: 10
Date Analyzed: 12/07/2006 1815
Date Prepared: 12/05/2006 0945

Analysis Batch: 560-7002
Prep Batch: 560-6861
Units: ug/L

Instrument ID: Agilent ICPMS
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ca	40000	36600	91	80 - 120	
K	40000	36300	91	80 - 120	
Mg	40000	37100	93	80 - 120	
Na	40000	40300	101	80 - 120	
Fe	40000	41900	105	80 - 120	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: ARCADIS G&M, Inc.

Job Number: 560-2723-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 560-6861

Method: 6020
Preparation: 3010A

MS Lab Sample ID:	560-2723-1	Analysis Batch: 560-7002	Instrument ID: Agilent ICPMS
Client Matrix:	Water	Prep Batch: 560-6861	Lab File ID: N/A
Dilution:	10		Initial Weight/Volume: 50 mL
Date Analyzed:	12/07/2006 1827		Final Weight/Volume: 50 mL
Date Prepared:	12/05/2006 0945		

MSD Lab Sample ID:	560-2723-1	Analysis Batch: 560-7002	Instrument ID: Agilent ICPMS
Client Matrix:	Water	Prep Batch: 560-6861	Lab File ID: N/A
Dilution:	10		Initial Weight/Volume: 50 mL
Date Analyzed:	12/07/2006 1833		Final Weight/Volume: 50 mL
Date Prepared:	12/05/2006 0945		

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Ca	113	97	80 - 120	3	20	4	4
K	125	112	80 - 120	5	20	F	
Mg	116	103	80 - 120	2	20	4	4
Na	128	110	80 - 120	1	20	4	4
Fe	108	105	80 - 120	3	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: ARCADIS G&M, Inc.

Job Number: 560-2723-1

Method Blank - Batch: 560-6829

Method: 160.1
Preparation: N/A

Lab Sample ID: MB 560-6829/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/04/2006 1155
Date Prepared: N/A

Analysis Batch: 560-6829
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 100 mL
Final Weight/Volume: 100 mL

Analyte	Result	Qual	RL
Total Dissolved Solids	<10		10

Lab Control Spike - Batch: 560-6829

Method: 160.1
Preparation: N/A

Lab Sample ID: LCS 560-6829/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/04/2006 1155
Date Prepared: N/A

Analysis Batch: 560-6829
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 25 mL
Final Weight/Volume: 25 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Total Dissolved Solids	2250	2500	111	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: ARCADIS G&M, Inc.

Job Number: 560-2723-1

Lab Control Spike - Batch: 560-6986

Method: 2320B
Preparation: N/A

Lab Sample ID: LCS 560-6986/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/06/2006 1300
Date Prepared: N/A

Analysis Batch: 560-6986
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Alkalinity	100	95.8	96	85 - 115	

Lab Control Spike - Batch: 560-6986

Method: 2320B
Preparation: N/A

Lab Sample ID: LCS 560-6986/14
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/06/2006 1300
Date Prepared: N/A

Analysis Batch: 560-6986
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Alkalinity	100	96.2	96	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: ARCADIS G&M, Inc.

Job Number: 560-2723-1

Lab Control Spike - Batch: 560-6992

Method: 2320B
Preparation: N/A

Lab Sample ID: LCS 560-6992/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/06/2006 1300
Date Prepared: N/A

Analysis Batch: 560-6992
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Alkalinity	100	96.2	96	85 - 115	

Lab Control Spike - Batch: 560-6992

Method: 2320B
Preparation: N/A

Lab Sample ID: LCS 560-6992/13
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/06/2006 1300
Date Prepared: N/A

Analysis Batch: 560-6992
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Alkalinity	100	95.0	95	85 - 115	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 560-6992

Method: 2320B
Preparation: N/A

MS Lab Sample ID: 560-2723-3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/06/2006 1300
Date Prepared: N/A

Analysis Batch: 560-6992
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 50 mL

MSD Lab Sample ID: 560-2723-3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/06/2006 1300
Date Prepared: N/A

Analysis Batch: 560-6992
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 50 mL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Alkalinity	94	97	75 - 125	1	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: ARCADIS G&M, Inc.

Job Number: 560-2723-1

Method Blank - Batch: 560-6950

Method: 340.2
Preparation: N/A

Lab Sample ID: MB 560-6950/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/06/2006 1430
Date Prepared: N/A

Analysis Batch: 560-6950
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL
Fluoride	<0.10		0.10

Lab Control Spike - Batch: 560-6950

Method: 340.2
Preparation: N/A

Lab Sample ID: LCS 560-6950/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/06/2006 1430
Date Prepared: N/A

Analysis Batch: 560-6950
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Fluoride	0.800	0.786	98	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: ARCADIS G&M, Inc.

Job Number: 560-2723-1

Method Blank - Batch: 560-6867

Method: 9056
Preparation: N/A

Lab Sample ID: MB 560-6867/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/04/2006 0922
Date Prepared: N/A

Analysis Batch: 560-6867
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	RL
Nitrogen, Nitrate	<0.50		0.50

Lab Control Spike - Batch: 560-6867

Method: 9056
Preparation: N/A

Lab Sample ID: LCS 560-6867/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/04/2006 0922
Date Prepared: N/A

Analysis Batch: 560-6867
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Nitrogen, Nitrate	6.00	6.02	100	85 - 115	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 560-6867

Method: 9056
Preparation: N/A

MS Lab Sample ID: 560-2723-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/04/2006 0922
Date Prepared: N/A

Analysis Batch: 560-6867
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

MSD Lab Sample ID: 560-2723-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/04/2006 0922
Date Prepared: N/A

Analysis Batch: 560-6867
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Nitrogen, Nitrate	109	107	75 - 125	1	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: ARCADIS G&M, Inc.

Job Number: 560-2723-1

Method Blank - Batch: 560-6920

Method: 9056
Preparation: N/A

Lab Sample ID: MB 560-6920/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/05/2006 1121
Date Prepared: N/A

Analysis Batch: 560-6920
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	RL
Chloride	<0.50		0.50
Sulfate	<1.0		1.0

Lab Control Spike - Batch: 560-6920

Method: 9056
Preparation: N/A

Lab Sample ID: LCS 560-6920/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/05/2006 1121
Date Prepared: N/A

Analysis Batch: 560-6920
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Chloride	10.0	9.23	92	85 - 115	
Sulfate	40.0	42.5	106	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: ARCADIS G&M, Inc.

Job Number: 560-2723-1

Method Blank - Batch: 560-6970

Method: 9056
Preparation: N/A

Lab Sample ID: MB 560-6970/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/06/2006 0909
Date Prepared: N/A

Analysis Batch: 560-6970
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	RL
Bromide	<2.0		2.0

Lab Control Spike - Batch: 560-6970

Method: 9056
Preparation: N/A

Lab Sample ID: LCS 560-6970/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/06/2006 0909
Date Prepared: N/A

Analysis Batch: 560-6970
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Bromide	10.0	9.93	99	85 - 115	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 560-6970

Method: 9056
Preparation: N/A

MS Lab Sample ID: 560-2723-3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/06/2006 0909
Date Prepared: N/A

Analysis Batch: 560-6970
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

MSD Lab Sample ID: 560-2723-3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/06/2006 0909
Date Prepared: N/A

Analysis Batch: 560-6970
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Bromide	93	87	75 - 125	5	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: ARCADIS G&M, Inc.

Job Number: 560-2723-1

Method Blank - Batch: 560-6973

Method: 9056
Preparation: N/A

Lab Sample ID: MB 560-6973/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/06/2006 0909
Date Prepared: N/A

Analysis Batch: 560-6973
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	RL
Bromide	<2.0		2.0

Lab Control Spike - Batch: 560-6973

Method: 9056
Preparation: N/A

Lab Sample ID: LCS 560-6973/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/06/2006 0909
Date Prepared: N/A

Analysis Batch: 560-6973
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Bromide	10.0	9.93	99	85 - 115	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 560-6973

Method: 9056
Preparation: N/A

MS Lab Sample ID: 560-2723-3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/06/2006 0909
Date Prepared: N/A

Analysis Batch: 560-6973
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

MSD Lab Sample ID: 560-2723-3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/06/2006 0909
Date Prepared: N/A

Analysis Batch: 560-6973
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Bromide	93	87	75 - 125	5	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

ARCADIS GERAGHTY & MILLER

Laboratory Task Order No./P.O. No.

CHAIN-OF-CUSTODY RECORD

Project Number/Name OK001351.0004 Lea County Truck Station
Project Location New Mexico
Laboratory STL - CC
Project Manager Mike Gates
Sampler(s)/Affiliation Terry Slansweell / ARCADIS

1.3°C - IR#1
SEALED - 48QT
2723

Sample ID/Location	Matrix	Date Sampled	Time	(3) 40ml VOA BTEX HCl	(1) Liter Na, K, Cl, Alk, HCO3, CO3, Br, SO4, TDS, Ca, Mg, Fe				Remarks	Total
MW99-3	L	12-1-06	0959	3	1					4
MW99-2	L	12-1-06	1047	3	1					4
MW99-1	L	12-1-06	1113	3	1					4
Trip Blank	L	—	—	1						1
Temp Blank	L	—	—							1

Sample Matrix: (L = Liquid) S = Solid; A = Air

Total No. of Bottles/Containers 14

Relinquished by: [signature]	Organization: ARCADIS	Date 12/1/06	Time 1630	Seal Intact? (Yes) No N/A
Received by: Fed Ex	Organization: Fed Ex	Date / /	Time	
Relinquished by: Fed Ex	Organization: Fed Ex	Date 12/2/06	Time 0941	Seal Intact? (Yes) No N/A
Received by: J. Dunn [signature]	Organization: STL	Date 12/2/06	Time 0941	

Special Instructions/Remarks: Send Report to Mike Gates w/ questions call 918-664-8200

Delivery Method: ☐ In Person ☒ Common Carrier Fed Ex (SPECIFY) 8568 1688 5187 ☐ Lab Courier ☐ Other ______ (SPECIFY)

AG 05-0597

LOGIN SAMPLE RECEIPT CHECK LIST

Client: ARCADIS G&M, Inc.

Job Number: 560-2723-1

Login Number: 2723

Question	T/F/NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	NA	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	1.3 degrees C - IR #1
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	False	No nitric bottle for metals; per client preserve at lab.
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	False	trip blank contains headspace-only one vial sent
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

ARCADIS GERAGHTY & MILLER

Laboratory Task Order No./P.O. No. ______

CHAIN-OF-CUSTODY RECORD

1.3°C - IR
Sampled - 486
2723

Project Number/Name OK001351.0004 Lea County Truck Station

Project Location New Mexico

Laboratory STL - CC

Project Manager Mike Gates

Sampler(s)/Affiliation Terry Shoneswell / ARCADIS

Sample ID/Location	Matrix	Date Sampled	Time	(3) VOA BTEX HCl	(1) Chloride, HCO3, CO3, SO4, TDS, Cal, Mg, K, Na				Remarks	Total
MW99-3	L	12-1-06	0959	3	1					4
MW99-2	L	12-1-06	1047	3	1					4
MW99-1	L	12-1-06	1113	3	1					4
Trip Blank	L	—	—	1						1
Temp Blank	L	—	—							1

Total No. of Bottles/Containers: 14

Sample Matrix: L = Liquid (circled); S = Solid; A = Air

Relinquished by: [signature]	Organization: ARCADIS	Date 12/1/06	Time 1630	Seal Intact? Yes (circled) No N/A
Received by: Fed Ex	Organization: Fed Ex	Date / /	Time	
Relinquished by: Fed Ex	Organization: Fed Ex	Date 12/2/06	Time 0941	Seal Intact? Yes (circled) No N/A
Received by: J. Dammeier	Organization: STL	Date 12/2/06	Time 0941	

Special Instructions/Remarks: Send Report to Mike Gates w/ questions cell 918-664-8800

Delivery Method: ☐ In Person ☒ Common Carrier Fed Ex. ☐ Lab Courier ☐ Other