1R - 248

REPORTS

DATE:

2003

ARCADIS

Infrastructure, buildings, environment, communications

RECEIVED

FEB 27 2004

1R248

Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505

ARCADIS G&M, Inc.
5100 E Skelly Drive
Suite 1000
Tulsa
Oklahoma 74135
Tel 918 664 9900
Fax 918 664 9925

ENVIRONMENTAL

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

Subject:
Annual Groundwater Sampling and Reporting; Lea Crude Oil Station, Lea County, New Mexico

Tulsa, Oklahoma
25 February 2004

Contact:
Michael M. Gates

Contact Number:
(918) 664-9900

Dear Mr. Olson:

On November 13, 2003, ARCADIS conducted the 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 your 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 by April 1 of 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 annual sampling event and provides the information required for annual reporting to the OCD.

Groundwater Sampling Activities

On November 13, 2003, ARCADIS collected groundwater samples from the three monitor wells located at the Lea Crude Oil Station. 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 33.5 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-southeast 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 except for traces of ethylbenzene, which are well below New Mexico Water Quality Control Commission groundwater standards.

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. No significant deviations or trends were observed.

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 MW-3 remain elevated above New Mexico Water Quality Control Commission groundwater standards but have shown no increasing or decreasing trends. However, it should be noted that chloride levels up-gradient of the station exceed these water quality standards as well.

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 G&M, Inc.

Michael M. Gates
Project Advisor

cc: Brad Fish Sunoco

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

Sample Number	Date Collected	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)
	11/13/03	<2.0	<2.0	<2.0	<6.0
MW99-1	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	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	11/13/03	<2.0	<2.0	12	<6.0
	12/9/02	<1.0	<1.0	37	4.0
	12/12/01	<1.0	<1.0	6	<3.0
	12/5/00	<1.0	<1.0	22	<3.0

(µg/L) micrograms per liter.
< less than.
G:\Aproject\SUNPIPE\OK1351001\[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	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	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	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.
mg/L Milligrams per liter.
G:\Aproject\SUNPIPE\OK1351001\[TBL2.XLS]Table 2

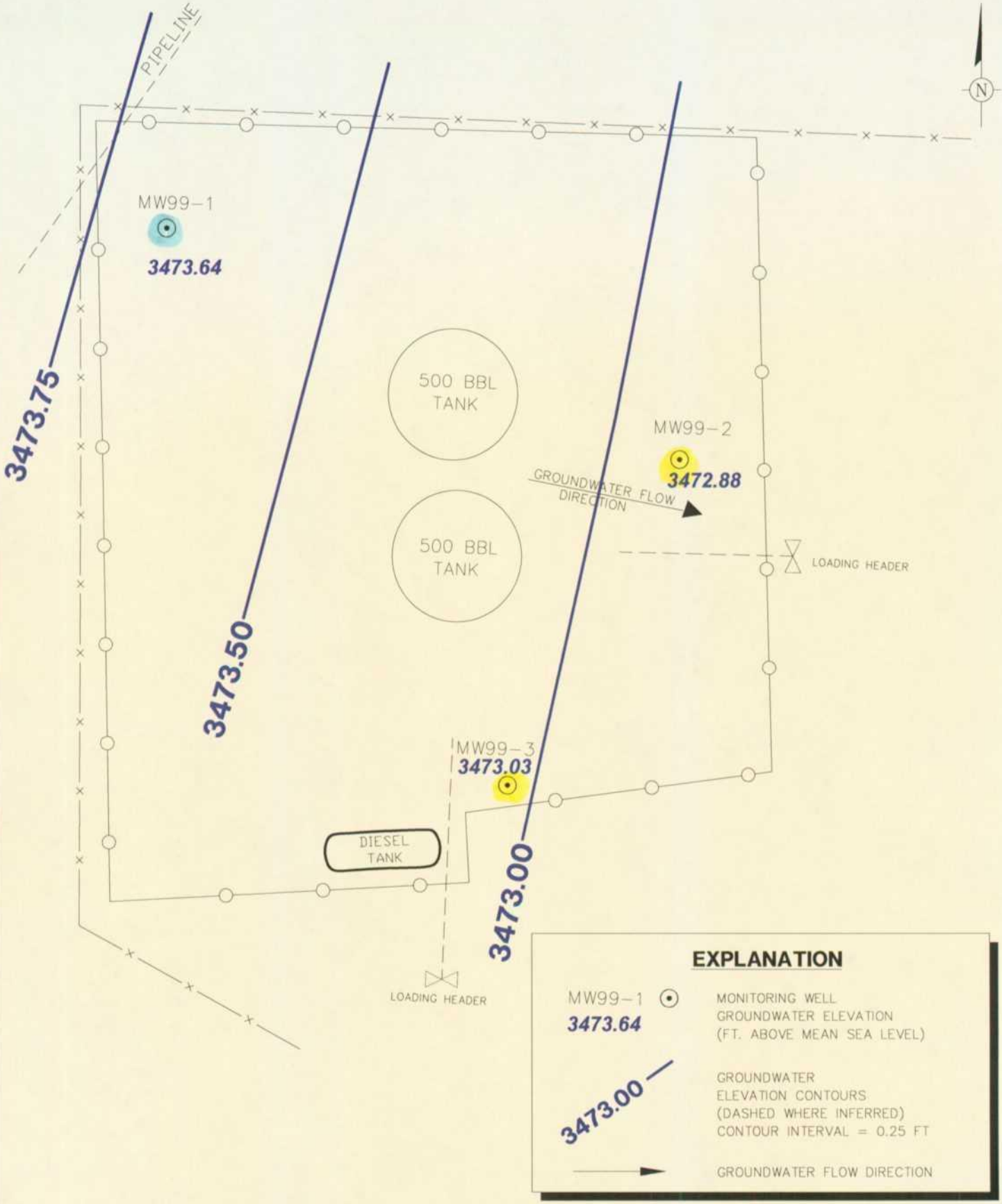
Table 3. Summary of Fluid Level Measurements, Sunoco, Inc., Lea Truck Station.

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	11/13/03	3507.15	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	11/13/03	3506.51	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	11/13/03	3506.59	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.
NA Not applicable.

G:\Aproject\SUNPIPE\OK1351001\[GWELE.XLS]TIER 2

G:\Aproject\SUNPIPE\OK120101\cadd\NOV2003 GW.dwg, 01/29/2004 03:46:16 PM



DATE: | FILE NAME: NOV2003 GW | COMPILED BY: SCOTT ROSE | PROJECT MANAGER: MIKE GATES | DRAWN BY: SHANON WALKER

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

NOT TO SCALE

GROUNDWATER ELEVATION CONTOURS NOVEMBER 2003

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

PROJECT NUMBER
OK001201001

FIGURE NUMBER
1

SEVERN TRENT STL

RECEIVED
DEC 15 2003
ARCADIS G & M

ANALYTICAL REPORT

JOB NUMBER: 221804

Prepared For:

ARCADIS / G&M
5100 East Skelly Drive
Suite 1000
Tulsa, OK 74135

Attention: Mike Gates

Date: 12/03/2003

Signature

12/8/03
Date

Name: Chip Meador

Title: Laboratory Director

E-Mail: cmeador@stl-inc.com

Severn Trent Laboratories
1733 N. Padre Island Drive
Corpus Christi, TX 78408

PHONE: 361/289-2673
FAX..: 361/289-2471

TOTAL # OF PAGES 22

SEVERN TRENT STL

CASE NARRATIVE

Job Number 221804

December 3, 2003

Aromatic Volatile Organics Analysis

Samples 221804-1 through 4 were analyzed for aromatic volatile organics using EPA Method 8021B. The recovery result for the m&p-xylenes spiked blank was outside the laboratory acceptance criteria. However, the spiked blank was within EPA limits and therefore the data is reported.

Sulfate Analysis

Sample 221804-1 was analyzed for sulfate using EPA Method 300.0. The percent recovery result for the matrix spikes was outside the laboratory acceptance criteria. However, this sample was reanalyzed in a later batch and the matrix spikes were within acceptance criteria. Therefore the data are reported.

Metals Analysis

Sample 221804-3 was digested and analyzed for metals using EPA Method 6010B. This recovery result for the magnesium matrix spikes, the potassium matrix spikes and the sodium matrix spikes was outside the laboratory acceptance criteria. The associated LSC was within acceptance limits and therefore the data is reported.

Nitrate Analysis

Samples 221804-1 through 3 were analyzed for nitrate using EPA Method 300.0. These samples were received at the laboratory after the method specified holding time had expired. Results from expired analyses should be flagged accordingly and used at the client's discretion.

SEVERN TRENT STL

Total Dissolved Solids (TDS) Analysis

Sample 221804-1 was analyzed for TDS using EPA Method 160.1. This sample was analyzed after the method specified holding time had expired due to the incorrect sample volume of the residue recovered during the initial analysis. Results from expired analyses should be flagged accordingly and used at the client's discretion.

Please call if you have any questions regarding this report or if we can be of further assistance.

Amber McCoig
Project Manager Assistant

SEVERN TRENT STL

SAMPLE INFORMATION Date: 12/03/2003	
Job Number.: 221804	Project Number.....: 98000203
Customer...: ARCADIS / G&M	Customer Project ID....: OK001351.0001.00001 SUNO
Attn.....: Mike Gates	Project Description....: Project-EAB

Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampled	Time Sampled	Date Received	Time Received
221804-1	~~WELL~~ 1 MW-99-3	Water	11/13/2003	13:45	11/15/2003	09:55
221804-2	~~WELL~~ 2 MW99-1 MB 1-26-04	Water	11/13/2003	14:05	11/15/2003	09:55
221804-3	~~WELL~~ 3 MW99-2	Water	11/13/2003	14:25	11/15/2003	09:55
221804-4	TRIP BLANK	Water	11/13/2003	00:00	11/15/2003	09:55

1733 North Padre Island Drive • Corpus Christi, TX 78408 • Tel: 361 289 2673 • Fax: 361 289 2471 • www.stl-inc.com

SEVERN TRENT STL

LABORATORY TEST RESULTS

Job Number: 221804 Date: 12/03/2003

CUSTOMER: ARCADIS / G&M PROJECT: OK001351.0001.00001 ATTN: Mike Gates

Customer Sample ID: ~~WELL~~ 1 MW99-3 MG 1-26-04
Date Sampled.....: 11/13/2003
Time Sampled.....: 13:45
Sample Matrix.....: Water

Laboratory Sample ID: 221804-1
Date Received.....: 11/15/2003
Time Received.....: 09:55

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 160.1	Solids, Total Dissolved (TDS)	3310	10	mg/L	11/24/03	tjo
SM 2320 B	Bicarbonate (HCO3)	532	5.0	mg/L CaCO3	11/19/03	hmz
SM 2320 B	Carbonate (CO3)	<5.0	5.0	mg/L CaCO3	11/19/03	hmz
EPA 300.0	Bromide (Br)	9	2	mg/L	12/01/03	tjo
EPA 300.0	Chloride	1250	50	mg/L	11/19/03	tjo
EPA 300.0	Nitrogen, Nitrate as N (NO3-N)	1.2	0.2	mg/L	11/17/03	cnw
EPA 300.0	Sulfate (SO4)	500	10	mg/L	11/19/03	tjo
EPA 340.2	Fluoride (F)	6.7	0.5	mg/L	11/18/03	akp
SW-846 6010B	Calcium (Ca), Total	231	6.25	mg/L	11/24/03	jem
SW-846 6010B	Iron (Fe), Total	0.47	0.25	mg/L	11/24/03	jem
SW-846 6010B	Magnesium (Mg), Total	240	6.25	mg/L	11/24/03	jem
SW-846 6010B	Potassium (K), Total	49.4	6.25	mg/L	11/24/03	jem
SW-846 6010B	Sodium (Na), Total	578	6.25	mg/L	11/24/03	jem
SW-846 3010A	Acid Dig., Total Metals, 2X Concentrate	Complete			11/17/03	ac
SW-846 8021B	Volatile Organics - Aromatics					
	Benzene	ND	2	ug/L	11/22/03	den
	Ethylbenzene	12	2	ug/L	11/22/03	den
	Toluene	ND	2	ug/L	11/22/03	den
	Xylenes (total)	ND	6	ug/L	11/22/03	den

1733 North Padre Island Drive • Corpus Christi, TX 78408 • Tel: 361 289 2673 • Fax: 361 289 2471 • www.stl-inc.com

SEVERN TRENT STL

LABORATORY TEST RESULTS

Job Number: 221804 Date: 12/03/2003

CUSTOMER: ARCADIS / G&M PROJECT: OK001351.0001.00001 ATTN: Mike Gates

Customer Sample ID: ~~WELL~~ 2 MW99-1 MG 1-26-04
Date Sampled.....: 11/13/2003
Time Sampled.....: 14:05
Sample Matrix.....: Water

Laboratory Sample ID: 221804-2
Date Received.....: 11/15/2003
Time Received.....: 09:55

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 160.1	Solids, Total Dissolved (TDS)	1350	10	mg/L	11/19/03	tjo
SM 2320 B	Bicarbonate (HCO3)	352	5.0	mg/L CaCO3	11/19/03	hmz
SM 2320 B	Carbonate (CO3)	<5.0	5.0	mg/L CaCO3	11/19/03	hmz
EPA 300.0	Bromide (Br)	3	2	mg/L	12/01/03	tjo
EPA 300.0	Chloride	380	10	mg/L	11/18/03	tjo
EPA 300.0	Nitrogen, Nitrate as N (NO3-N)	0.4	0.2	mg/L	11/17/03	cnw
EPA 300.0	Sulfate (SO4)	250	5	mg/L	11/18/03	tjo
EPA 340.2	Fluoride (F)	5.4	0.5	mg/L	11/18/03	akp
SW-846 6010B	Calcium (Ca), Total	73.3	0.625	mg/L	11/24/03	jem
SW-846 6010B	Iron (Fe), Total	0.28	0.25	mg/L	11/24/03	jem
SW-846 6010B	Magnesium (Mg), Total	59.7	0.625	mg/L	11/24/03	jem
SW-846 6010B	Potassium (K), Total	14.8	0.625	mg/L	11/24/03	jem
SW-846 6010B	Sodium (Na), Total	341	6.25	mg/L	11/24/03	jem
SW-846 3010A	Acid Dig., Total Metals, 2X Concentrate	Complete			11/17/03	ac
SW-846 8021B	Volatile Organics - Aromatics					
	Benzene	ND	2	ug/L	11/22/03	den
	Ethylbenzene	ND	2	ug/L	11/22/03	den
	Toluene	ND	2	ug/L	11/22/03	den
	Xylenes (total)	ND	6	ug/L	11/22/03	den

1733 North Padre Island Drive • Corpus Christi, TX 78408 • Tel: 361 289 2673 • Fax: 361 289 2471 • www.stl-inc.com

SEVERN TRENT STL

LABORATORY TEST RESULTS

Job Number: 221804 Date: 12/03/2003

CUSTOMER: ARCADIS / G&M PROJECT: OK001351.0001.00001 ATTN: Mike Gates

Customer Sample ID: WELL 3 MW99-2 MG 1-26-04
Date Sampled.....: 11/13/2003
Time Sampled.....: 14:25
Sample Matrix.....: Water

Laboratory Sample ID: 221804-3
Date Received.....: 11/15/2003
Time Received.....: 09:55

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 160.1	Solids, Total Dissolved (TDS)	1380	10	mg/L	11/19/03	tjo
SM 2320 B	Bicarbonate (HCO3)	344	5.0	mg/L CaCO3	11/19/03	hmz
SM 2320 B	Carbonate (CO3)	<5.0	5.0	mg/L CaCO3	11/19/03	hmz
EPA 300.0	Bromide (Br)	3	2	mg/L	12/01/03	tjo
EPA 300.0	Chloride	370	10	mg/L	11/18/03	tjo
EPA 300.0	Nitrogen, Nitrate as N (NO3-N)	0.4	0.2	mg/L	11/17/03	cnw
EPA 300.0	Sulfate (SO4)	251	5	mg/L	11/18/03	tjo
EPA 340.2	Fluoride (F)	5.9	0.5	mg/L	11/18/03	akp
SW-846 6010B	Calcium (Ca), Total	69.6	0.625	mg/L	11/24/03	jem
SW-846 6010B	Iron (Fe), Total	<0.25	0.25	mg/L	11/24/03	jem
SW-846 6010B	Magnesium (Mg), Total	55.8	0.625	mg/L	11/24/03	jem
SW-846 6010B	Potassium (K), Total	14.9	0.625	mg/L	11/24/03	jem
SW-846 6010B	Sodium (Na), Total	32.2	6.25	mg/L	11/24/03	jem
SW-846 3010A	Acid Dig., Total Metals, 2X Concentrate	Complete			11/17/03	ac
SW-846 8021B	Volatile Organics - Aromatics					
	Benzene	ND	2	ug/L	11/22/03	den
	Ethylbenzene	3	2	ug/L	11/22/03	den
	Toluene	ND	2	ug/L	11/22/03	den
	Xylenes (total)	ND	6	ug/L	11/22/03	den

1733 North Padre Island Drive • Corpus Christi, TX 78408 • Tel: 361 289 2673 • Fax: 361 289 2471 • www.stl-inc.com

SEVERN TRENT STL

LABORATORY TEST RESULTS

Job Number: 221804 Date: 12/03/2003

CUSTOMER: ARCADIS / G&M PROJECT: OK001351.0001.00001 ATTN: Mike Gates

Customer Sample ID: TRIP BLANK
Date Sampled.....: 11/13/2003
Time Sampled.....: 00:00
Sample Matrix.....: Water

Laboratory Sample ID: 221804-4
Date Received.....: 11/15/2003
Time Received.....: 09:55

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
SW-846 8021B	Volatile Organics - Aromatics					
	Benzene	ND	2	ug/L	11/22/03	den
	Ethylbenzene	ND	2	ug/L	11/22/03	den
	Toluene	ND	2	ug/L	11/22/03	den
	Xylenes (total)	ND	6	ug/L	11/22/03	den

1733 North Padre Island Drive • Corpus Christi, TX 78408 • Tel: 361 289 2673 • Fax: 361 289 2471 • www.stl-inc.com

SEVERN TRENT STL

QUALITY CONTROL RESULTS

Job Number.: 221804 Report Date.: 12/03/2003

CUSTOMER: ARCADIS / G&M PROJECT: OK001351.0001.00001 SUNO ATTN: Mike Gates

Test Method.....: EPA 300.0 Batch.....: 87686 Analyst...: tjo
Method Description.: Ion Chromatography Analysis Units.....: mg/L Test Code.: BR
Parameter.....: Bromide (Br)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
ICB		120103	0							12/01/2003	1325
ICV		IC31201E	9.4735		10.00		94.7	%	90-110	12/01/2003	1337
MB		120103	0							12/01/2003	1350
LCS		IC31201F	9.9453		10.00		99.5	%	90-110	12/01/2003	1402
MS	221804-1	IC31201G	19.3151		10.00	9.1254	101.9	%	75-125	12/01/2003	1517
MSD	221804-1	IC31201G	19.3690	19.3151	10.00	9.1254	102.4	%	75-125	12/01/2003	1529
							0.3	R	20		
CCB		120103	0							12/01/2003	1606
CCV		IC31201E	9.4878		10.00		94.9	%	90-110	12/01/2003	1619

Test Method.....: EPA 300.0 Batch.....: 87207 Analyst...: tjo
Method Description.: Ion Chromatography Analysis Units.....: mg/L Test Code.: CHL
Parameter.....: Chloride

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CCB		111803	0.0190							11/18/2003	0930
CCV		IC31118A	9.3189		10.00		93.2	%	90-110	11/18/2003	0943
MB		111803	0.0140							11/18/2003	0956
LCS		IC31118B	9.5338		10.00		95.3	%	90-110	11/18/2003	1009
MS	221811-1	IC31118C	17.6497		10.00	7.8536	98.0	%	75-125	11/18/2003	1035
MSD	221811-1	IC31118C	17.6168	17.6497	10.00	7.8536	97.6	%	75-125	11/18/2003	1048
							0.2	R	20		
CCB		111803	0.0257							11/18/2003	1257
CCV		IC31118A	9.5578		10.00		95.6	%	90-110	11/18/2003	1310

Test Method.....: EPA 300.0 Batch.....: 87286 Analyst...: tjo
Method Description.: Ion Chromatography Analysis Units.....: mg/L Test Code.: CHL
Parameter.....: Chloride

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CCB		111903	0.0202							11/19/2003	1000
CCV		IC31119A	9.3084		10.00		93.1	%	90-110	11/19/2003	1012
MB		111903	0.0127							11/19/2003	1024
LCS		IC31119B	9.1675		10.00		91.7	%	90-110	11/19/2003	1036
MS	221807-1	IC31119C	24.7212		10.00	24.4180	3.0	%	75-125	11/19/2003	1314
MSD	221807-1	IC31119C	26.4135	24.7212	10.00	24.4180	20.0	%	75-125	11/19/2003	1326
							6.6	R	20		
CCB		111903	0.0622							11/19/2003	1403
CCV		IC31119A	9.1283		10.00		91.3	%	90-110	11/19/2003	1415
MS	221766-1	IC31119C	52.6920		10.00	44.7687	79.2	%	75-125	11/19/2003	1704
MSD	221766-1	IC31119C	54.2156	52.6920	10.00	44.7687	94.5	%	75-125	11/19/2003	1717
							2.9	R	20		
CCB		111903	0.0277							11/19/2003	1729
CCV		IC31119A	9.0942		10.00		90.9	%	90-110	11/19/2003	1741
MB		111903	0.0507							11/19/2003	1753
LCS		IC31119B	9.1943		10.00		91.9	%	90-110	11/19/2003	1805
CCB		111903	0.0528							11/19/2003	1918
CCV		IC31119A	9.2497		10.00		92.5	%	90-110	11/19/2003	1930

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

1733 North Padre Island Drive • Corpus Christi, TX 78408 • Tel: 361 289 2673 • Fax: 361 289 2471 • www.stl-inc.com

SEVERN TRENT STL

QUALITY CONTROL RESULTS

Job Number.: 221804 Report Date.: 12/03/2003

CUSTOMER: ARCADIS / G&M PROJECT: OK001351.0001.00001 SUNO ATTN: Mike Gates

Test Method.....: EPA 340.2 Batch.....: 87337 Analyst...: akp
Method Description.: Fluoride (ISE) Units.....: mg/L Test Code.: FL
Parameter.....: Fluoride (F)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
ICB		111803	0.000							11/18/2003	1431
ICV		A111803H	1.00		1.000		100.0	%	90-110	11/18/2003	1439
MB		111803	0.000							11/18/2003	1448
LCS		A111803I	0.501		0.5000		100.2	%	89-110	11/18/2003	1456
MS	221804-3	A111803J	1.63		0.5000	1.18	90.0	%	75-125	11/18/2003	1538
MSD	221804-3	A111803J	1.66	1.63	0.5000	1.18	96.0	%	75-125	11/18/2003	1546
							1.8	R	20		
CCB		111803	0.000							11/18/2003	1555
CCV		A111803H	1.00		1.000		100.0	%	90-110	11/18/2003	1603

Test Method.....: EPA 300.0 Batch.....: 87166 Analyst...: cnw
Method Description.: Ion Chromatography Analysis Units.....: mg/L Test Code.: NO3
Parameter.....: Nitrogen, Nitrate as N (NO3-N)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CCB		111703	0.0032							11/17/2003	1230
CCV		IC31117A	5.4593		5.0000		109.2	%	90-110	11/17/2003	1245
MB		111703	0							11/17/2003	1301
LCS		IC31117B	5.7994		6.0000		96.7	%	90-110	11/17/2003	1316
MS	221804-3	IC31117C	4.9532		5.0000	0.0556	98.0	%	75-125	11/17/2003	1418
MSD	221804-3	IC31117C	4.9576	4.9532	5.0000	0.0556	98.0	%	75-125	11/17/2003	1434
							0.1	R	20		
CCB		111703	0							11/17/2003	1505
CCV		IC31117A	5.0381		5.0000		100.8	%	90-110	11/17/2003	1520

Test Method.....: EPA 160.1 Batch.....: 87377 Analyst...: tjo
Method Description.: Solids, Total Dissolved (TDS) Units.....: mg/L Test Code.: TDS
Parameter.....: Solids, Total Dissolved (TDS)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
MB		111903	0							11/19/2003	1415
LCS		T31119L	2400		2250		106.7	%	90-113	11/19/2003	1418
LCD		T31119L	2416	2400	2250		107.4	%	90-113	11/19/2003	1422
							0.7	R	20		
MS	221807-2	T31113S	4860		2250	2484	105.6	%	75-125	11/19/2003	1453
MSD	221807-2	T31113S	4900	4860	2250	2484	107.4	%	75-125	11/19/2003	1457
							0.8	R	20		
MS	221807-6	T31113S	4824		2250	2360	109.5	%	75-125	11/19/2003	1514
MSD	221807-6	T31113S	4908	4824	2250	2360	113.2	%	75-125	11/19/2003	1518
							1.7	R	20		

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

1733 North Padre Island Drive • Corpus Christi, TX 78408 • Tel: 361 289 2673 • Fax: 361 289 2471 • www.stl-inc.com

SEVERN TRENT STL

QUALITY CONTROL RESULTS

Job Number.: 221804 Report Date.: 12/03/2003

CUSTOMER: ARCADIS / G&M PROJECT: OK001351.0001.00001 SUNO ATTN: Mike Gates

Test Method.....: EPA 160.1 Batch.....: 87555 Analyst...: tjo
Method Description.: Solids, Total Dissolved (TDS) Units.....: mg/L Test Code.: TDS
Parameter.....: Solids, Total Dissolved (TDS)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
MB		112403	6							11/24/2003	1600
LCS		T31119L	2388		2250		106.1	%	90-113	11/24/2003	1602
LCD		T31119L	2404	2388	2250		106.8	%	90-113	11/24/2003	1604
							0.7	R	20		
MS	221888-2	T31113S	7870		2250	5830	90.7	%	75-125	11/24/2003	1610
MSD	221888-2	T31113S	8950	7870	2250	5830	138.7	%	75-125	11/24/2003	1612
							12.8	R	20		
MS	221888-9	T31113S	2682		2250	236	108.7	%	75-125	11/24/2003	1629
MSD	221888-9	T31113S	2646	2682	2250	236	107.1	%	75-125	11/24/2003	1631
							1.4	R	20		

Test Method.....: EPA 300.0 Batch.....: 87207 Analyst...: tjo
Method Description.: Ion Chromatography Analysis Units.....: mg/L Test Code.: SO4
Parameter.....: Sulfate (SO4)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CCB		111803	0							11/18/2003	0930
CCV		IC31118A	39.0433		40.0032		97.6	%	90-110	11/18/2003	0943
MB		111803	-0.1299							11/18/2003	0956
LCS		IC31118B	39.5111		40.0032		98.8	%	90-110	11/18/2003	1009
MS	221804-1	IC31118C	125.9200		40.0032	99.35814	66.4	%	75-125	11/18/2003	1152
MSD	221804-1	IC31118C	126.1316	125.9200	40.0032	99.35814	66.9	%	75-125	11/18/2003	1205
							0.2	R	20		
CCB		111803	0							11/18/2003	1257
CCV		IC31118A	38.6812		40.0032		96.7	%	90-110	11/18/2003	1310

Test Method.....: EPA 300.0 Batch.....: 87286 Analyst...: tjo
Method Description.: Ion Chromatography Analysis Units.....: mg/L Test Code.: SO4
Parameter.....: Sulfate (SO4)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CCB		111903	0							11/19/2003	1000
CCV		IC31119A	39.4553		40.0032		98.6	%	90-110	11/19/2003	1012
MB		111903	0							11/19/2003	1024
LCS		IC31119B	39.4823		40.0032		98.7	%	90-110	11/19/2003	1036
MS	221804-1	IC31119C	86.1201		40.0032	50.2778	89.6	%	75-125	11/19/2003	1226
MSD	221804-1	IC31119C	85.8848	86.1201	40.0032	50.2778	89.0	%	75-125	11/19/2003	1238
							0.3	R	20		
CCB		111903	0							11/19/2003	1403
CCV		IC31119A	38.8613		40.0032		97.1	%	90-110	11/19/2003	1415
CCB		111903	0							11/19/2003	1729
CCV		IC31119A	38.8942		40.0032		97.2	%	90-110	11/19/2003	1741
MB		111903	0							11/19/2003	1753
LCS		IC31119B	39.1694		40.0032		97.9	%	90-110	11/19/2003	1805
CCB		111903	0							11/19/2003	1918
CCV		IC31119A	38.8610		40.0032		97.1	%	90-110	11/19/2003	1930

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

1733 North Padre Island Drive • Corpus Christi, TX 78408 • Tel: 361 289 2673 • Fax: 361 289 2471 • www.stl-inc.com

SEVERN TRENT STL

QUALITY CONTROL RESULTS

Job Number.: 221804 Report Date.: 12/03/2003

CUSTOMER: ARCADIS / G&M PROJECT: OK001351.0001.00001 SUNO ATTN: Mike Gates

Test Method.....: SW-846 6010B Batch.....: 87514 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: CA
Parameter.....: Calcium (Ca)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
RS		M0375	50.4179		50.0		100.8	%	90-110	11/24/2003	1121
ICV		M0368	1.0269		1.00		102.7	%	90-110	11/24/2003	1129
ICV		M0356	1.0218		1.00		102.2	%	90-110	11/24/2003	1136
ICB			0.0025							11/24/2003	1155
CCV		M0378	25.2770		25.0		101.1	%	90-110	11/24/2003	1247
CCB			0.0219							11/24/2003	1249
MB		200.7	0.0074							11/24/2003	1306
LCS		M348	2.6573		2.50		106.3	%	90-110	11/24/2003	1311
MB		3010	0.0309							11/24/2003	1355
LCS		M348	2.6558		2.50		106.2	%	90-110	11/24/2003	1358
PDS	221804-3	M348D	9.5126		10.0	1.6816	78.3	%	75-125	11/24/2003	1421
PSD	221804-3	M348D	9.5822	9.5126	10.0	1.6816	79.0	%	75-125	11/24/2003	1422
							0.7	R	20		
MB		3050	0.0751							11/24/2003	1426
LCS		M348	2.6167		2.50		104.7	%	90-110	11/24/2003	1427
CCV		M0378	26.3484		25.0		105.4	%	90-110	11/24/2003	1444
CCB			0.0520							11/24/2003	1456
PDS	221876-8	M348D	21.4841		10.0	5.8703	156.1	%	75-125	11/24/2003	1558
PSD	221876-8	M348D	21.1368	21.4841	10.0	5.8703	152.7	%	75-125	11/24/2003	1600
							1.6	R	20		
CCV		M0378	25.4735		25.0		101.9	%	90-110	11/24/2003	1634
CCB			0.0855							11/24/2003	1639
MB		3050	0.3829							11/24/2003	1656
LCS		M348	2.6610		2.50		106.4	%	90-110	11/24/2003	1702
CCV		M0378	24.8410		25.0		99.4	%	90-110	11/24/2003	1741
CCB			0.0718							11/24/2003	1749
CCV		M0378	24.3211		25.0		97.3	%	90-110	11/24/2003	1802
CCB			0.0972							11/24/2003	1804

Test Method.....: SW-846 6010B Batch.....: 87514 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: FE
Parameter.....: Iron (Fe)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
RS		M0375	20.0412		20.0		100.2	%	90-110	11/24/2003	1121
ICV		M0368	1.0187		1.00		101.9	%	90-110	11/24/2003	1129
ICV		M0356	1.0125		1.00		101.2	%	90-110	11/24/2003	1136
ICB			-0.0264							11/24/2003	1155
CCV		M0378	10.0314		10.0		100.3	%	90-110	11/24/2003	1247
CCB			-0.0248							11/24/2003	1249
MB		200.7	0.0165							11/24/2003	1306
LCS		M348	1.0524		1.00		105.2	%	85-113	11/24/2003	1311
PDS	221782-1	M348D	3.5120		4.00	0.4791	75.8	%	75-125	11/24/2003	1322
PSD	221782-1	M348D	3.5401	3.5120	4.00	0.4791	76.5	%	75-125	11/24/2003	1324
							0.8	R	20		
MB		3010	0.0055							11/24/2003	1355
LCS		M348	1.0436		1.00		104.4	%	85-113	11/24/2003	1358
PDS	221804-3	M348D	3.1070		4.00	-0.0191	78.2	%	75-125	11/24/2003	1421
PSD	221804-3	M348D	3.1362	3.1070	4.00	-0.0191	78.9	%	75-125	11/24/2003	1422
							0.9	R	20		
MB		3050	0.0032							11/24/2003	1426

1733 North Padre Island Drive • Corpus Christi, TX 78408 • Tel: 361 289 2673 • Fax: 361 289 2471 • www.stl-inc.com

SEVERN TRENT STL

QUALITY CONTROL RESULTS

Job Number.: 221804 Report Date.: 12/03/2003

CUSTOMER: ARCADIS / G&M PROJECT: OK001351.0001.00001 SUNO ATTN: Mike Gates

Test Method.....: SW-846 6010B Batch.....: 87514 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: FE
Parameter.....: Iron (Fe)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
LCS		M348	1.0166		1.00		101.7	%	85-113	11/24/2003	1427
CCV		M0378	10.7036		10.0		107.0	%	90-110	11/24/2003	1444
CCB			-0.0167							11/24/2003	1456
PDS	221876-8	M348D	3.8557		4.00	0.1622	92.3	%	75-125	11/24/2003	1558
PSD	221876-8	M348D	3.7992	3.8557	4.00	0.1622	90.9	%	75-125	11/24/2003	1600
							1.5	R	20		
CCV		M0378	10.1576		10.0		101.6	%	90-110	11/24/2003	1634
CCB			-0.0170							11/24/2003	1639
MB		3050	0.1913							11/24/2003	1656
LCS		M348	1.0557		1.00		105.6	%	85-113	11/24/2003	1702
CCV		M0378	9.9765		10.0		99.8	%	90-110	11/24/2003	1741
CCB			-0.0184							11/24/2003	1749
CCV		M0378	9.6003		10.0		96.0	%	90-110	11/24/2003	1802
CCB			-0.0159							11/24/2003	1804

Test Method.....: SW-846 6010B Batch.....: 87514 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: MG
Parameter.....: Magnesium (Mg)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
RS		M0375	49.8585		50.0		99.7	%	90-110	11/24/2003	1121
ICV		M0368	1.0082		1.00		100.8	%	90-110	11/24/2003	1129
ICV		M0356	0.9913		1.00		99.1	%	90-110	11/24/2003	1136
ICB			-0.0203							11/24/2003	1155
CCV		M0378	24.9700		25.0		99.9	%	90-110	11/24/2003	1247
CCB			-0.0235							11/24/2003	1249
MB		200.7	0.0061							11/24/2003	1306
LCS		M348	2.5919		2.50		103.7	%	88-110	11/24/2003	1311
MB		3010	-0.0383							11/24/2003	1355
LCS		M348	2.5686		2.50		102.7	%	88-110	11/24/2003	1358
PDS	221804-3	M348D	8.7443		10.0	1.3169	74.3	%	75-125	11/24/2003	1421
PSD	221804-3	M348D	8.7899	8.7443	10.0	1.3169	74.7	%	75-125	11/24/2003	1422
							0.5	R	20		
MB		3050	-0.0446							11/24/2003	1426
LCS		M348	2.4691		2.50		98.8	%	88-110	11/24/2003	1427
CCV		M0378	25.8188		25.0		103.3	%	90-110	11/24/2003	1444
CCB			0.0716							11/24/2003	1456
PDS	221876-8	M348D	8.7906		10.0	0.1704	86.2	%	75-125	11/24/2003	1558
PSD	221876-8	M348D	8.6425	8.7906	10.0	0.1704	84.7	%	75-125	11/24/2003	1600
							1.7	R	20		
CCV		M0378	24.9266		25.0		99.7	%	90-110	11/24/2003	1634
CCB			-0.0307							11/24/2003	1639
MB		3050	0.1071							11/24/2003	1656
LCS		M348	2.5537		2.50		102.1	%	88-110	11/24/2003	1702
CCV		M0378	23.8151		25.0		95.3	%	90-110	11/24/2003	1741
CCB			0.0294							11/24/2003	1749
CCV		M0378	23.4532		25.0		93.8	%	90-110	11/24/2003	1802
CCB			0.0703							11/24/2003	1804

1733 North Padre Island Drive • Corpus Christi, TX 78408 • Tel: 361 289 2673 • Fax: 361 289 2471 • www.stl-inc.com

SEVERN TRENT STL

QUALITY CONTROL RESULTS

Job Number.: 221804 Report Date.: 12/03/2003

CUSTOMER: ARCADIS / G&M PROJECT: OK001351.0001.00001 SUNO ATTN: Mike Gates

Test Method.....: SW-846 6010B Batch.....: 87514 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: K
Parameter.....: Potassium (K)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
RS		M0375	50.4690		50.0		100.9	%	90-110	11/24/2003	1121
ICV		M0369	10.3731		10.00		103.7	%	90-110	11/24/2003	1132
ICB			0.6596							11/24/2003	1155
CCV		M0378	24.7432		25.0		99.0	%	90-110	11/24/2003	1247
CCB			0.4434							11/24/2003	1249
MB		200.7	0.0968							11/24/2003	1306
LCS		M348	2.6923		2.50		107.7	%	45-142	11/24/2003	1311
MB		3010	-0.7397							11/24/2003	1355
LCS		M348	2.3210		2.50		92.8	%	45-142	11/24/2003	1358
PDS	221804-3	M348D	7.6630		10.0	0.1861	74.8	%	75-125	11/24/2003	1421
PSD	221804-3	M348D	7.3029	7.6630	10.0	0.1861	71.2	%	75-125	11/24/2003	1422
							4.8	R	20		
MB		3050	0.8600							11/24/2003	1426
LCS		M348	2.5072		2.50		100.3	%	45-142	11/24/2003	1427
CCV		M0378	25.5137		25.0		102.1	%	90-110	11/24/2003	1444
CCB			0.2299							11/24/2003	1456
PDS	221876-8	M348D	8.5994		10.0	0.3754	82.2	%	75-125	11/24/2003	1558
PSD	221876-8	M348D	8.1812	8.5994	10.0	0.3754	78.1	%	75-125	11/24/2003	1600
							5.0	R	20		
CCV		M0378	24.7182		25.0		98.9	%	90-110	11/24/2003	1634
CCB			-0.6114							11/24/2003	1639
MB		3050	0.0182							11/24/2003	1656
LCS		M348	2.9510		2.50		118.0	%	45-142	11/24/2003	1702
PDS	221882-4	M348D	10.9908		10.0	4.1056	68.9	%	75-125	11/24/2003	1735
PSD	221882-4	M348D	8.7190	10.9908	10.0	4.1056	46.1	%	75-125	11/24/2003	1737
							23.1	R	20		
CCV		M0378	22.7693		25.0		91.1	%	90-110	11/24/2003	1741
CCB			-0.3769							11/24/2003	1749
CCV		M0378	22.8762		25.0		91.5	%	90-110	11/24/2003	1802
CCB			0.8008							11/24/2003	1804

Test Method.....: SW-846 6010B Batch.....: 87514 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: NA
Parameter.....: Sodium (Na)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
RS		M0375	50.1241		50.0		100.2	%	90-110	11/24/2003	1121
ICV		M0369	0.9583		1.00		95.8	%	90-110	11/24/2003	1132
ICB			-0.0341							11/24/2003	1155
CCV		M0378	24.6296		25.0		98.5	%	90-110	11/24/2003	1247
CCB			-0.0281							11/24/2003	1249
MB		200.7	-0.0311							11/24/2003	1306
LCS		M348	2.5483		2.50		101.9	%	82-110	11/24/2003	1311
MB		3010	-0.0356							11/24/2003	1355
LCS		M348	2.4730		2.50		98.9	%	82-110	11/24/2003	1358
PDS	221804-3	M348D	13.3748		10.0	6.4438	69.3	%	75-125	11/24/2003	1421
PSD	221804-3	M348D	13.4170	13.3748	10.0	6.4438	69.7	%	75-125	11/24/2003	1422
							0.3	R	20		
MB		3050	0.1095							11/24/2003	1426
LCS		M348	2.4504		2.50		98.0	%	82-110	11/24/2003	1427
CCV		M0378	25.6533		25.0		102.6	%	90-110	11/24/2003	1444

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

1733 North Padre Island Drive • Corpus Christi, TX 78408 • Tel: 361 289 2673 • Fax: 361 289 2471 • www.stl-inc.com

SEVERN TRENT STL

QUALITY CONTROL RESULTS

Job Number.: 221804 Report Date.: 12/03/2003

CUSTOMER: ARCADIS / G&M PROJECT: OK001351.0001.00001 SUNO ATTN: Mike Gates

Test Method.....: SW-846 6010B Batch.....: 87514 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: NA
Parameter.....: Sodium (Na)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CCB			-0.0329							11/24/2003	1456
PDS	221876-8	M348D	8.3468		10.0	-0.0226	83.7	%	75-125	11/24/2003	1558
PSD	221876-8	M348D	8.2629	8.3468	10.0	-0.0226	82.9	%	75-125	11/24/2003	1600
							1.0	R	20		
CCV		M0378	24.7850		25.0		99.1	%	90-110	11/24/2003	1634
CCB			-0.0642							11/24/2003	1639
MB		3050	-0.0196							11/24/2003	1656
LCS		M348	2.4371		2.50		97.5	%	82-110	11/24/2003	1702
CCV		M0378	23.7912		25.0		95.2	%	90-110	11/24/2003	1741
CCB			-0.0475							11/24/2003	1749
CCV		M0378	23.3257		25.0		93.3	%	90-110	11/24/2003	1802
CCB			-0.0430							11/24/2003	1804

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

1733 North Padre Island Drive • Corpus Christi, TX 78408 • Tel: 361 289 2673 • Fax: 361 289 2471 • www.stl-inc.com

SEVERN TRENT STL

QUALITY CONTROL RESULTS

Job Number.: 221804 Report Date.: 12/03/2003

CUSTOMER: ARCADIS / G&M PROJECT: OK001351.0001.00001 SUNO ATTN: Mike Gates

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: SW-846 8021B Units.....: ug/L Analyst...: den
Method Description.: Volatile Organics - Aromatics Batch.....: 87438

CCV	Continuing Calibration Verification	V110103CCV			11/22/2003	1433

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	18.454		20.000000		92.3	%	85-115
Ethylbenzene	20.117		20.000000		100.6	%	85-115
tert-Butyl Methyl Ether (MTBE)	107.770		100.000000		107.8	%	85-115
Toluene	18.719		20.000000		93.6	%	85-115
Xylenes (total)	59.886		60.000000		99.8	%	85-115
m&p-Xylenes	40.258		40.000000		100.6	%	85-115
o-Xylene	19.628		20.000000		98.1	%	85-115

MB	Method Blank	112203			11/22/2003	1545

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	0.000						
Ethylbenzene	0.000						
tert-Butyl Methyl Ether (MTBE)	0.000						
Toluene	0.000						
Xylenes (total)	ND						
m&p-Xylenes	0.000						
o-Xylene	0.000						

MS	Matrix Spike	V110103SBW	221830-1		11/23/2003	0417

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	143.851		20.000000	135.041	44.0	%	79-119
Ethylbenzene	25.919		20.000000	6.803	95.6	%	80-116
tert-Butyl Methyl Ether (MTBE)	107.619		100.000000	26.257	81.4	%	74-120
Toluene	27.032		20.000000	0.000	135.2	%	78-115
Xylenes (total)	42.943		40.000000	0.696	105.6	%	85-123
m&p-Xylenes	22.286		20.000000	0.696	108.0	%	82-116
o-Xylene	20.657		20.000000	0.000	103.3	%	85-119

MSD	Matrix Spike Duplicate	V110103SBW	221830-1		11/23/2003	0453

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	145.143	143.851	20.000000	135.041	50.5	%	79-119
					0.9	R	20
Ethylbenzene	27.337	25.919	20.000000	6.803	102.7	%	80-116
					5.3	R	20
tert-Butyl Methyl Ether (MTBE)	112.348	107.619	100.000000	26.257	86.1	%	74-120
					4.3	R	20
Toluene	27.542	27.032	20.000000	0.000	137.7	%	78-115
					1.9	R	20
Xylenes (total)	45.198	42.943	40.000000	0.696	111.3	%	85-123
					5.1	R	20
m&p-Xylenes	23.380	22.286	20.000000	0.696	113.4	%	82-116
					4.8	R	20

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

1733 North Padre Island Drive • Corpus Christi, TX 78408 • Tel: 361 289 2673 • Fax: 361 289 2471 • www.stl-inc.com

SEVERN TRENT STL

QUALITY CONTROL RESULTS

Job Number.: 221804 Report Date.: 12/03/2003

CUSTOMER: ARCADIS / G&M PROJECT: OK001351.0001.00001 SUNO ATTN: Mike Gates

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
MSD	Matrix Spike Duplicate	V110103SBW	221830-1		11/23/2003	0453

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
o-Xylene	21.818	20.657	20.000000	0.000	109.1	%	85-119
					5.5	R	20

SB	Spiked Blank	V110103SBW			11/22/2003	1509

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	19.753		20.000000		98.8	%	79-119
Ethylbenzene	22.128		20.000000		110.6	%	80-116
tert-Butyl Methyl Ether (MTBE)	94.872		100.000000		94.9	%	74-120
Toluene	19.598		20.000000		98.0	%	78-115
Xylenes (total)	46.688		40.000000		116.7	%	85-123
m&p-Xylenes	24.370		20.000000		121.8	%	82-116
o-Xylene	22.318		20.000000		111.6	%	85-119

1733 North Padre Island Drive • Corpus Christi, TX 78408 • Tel: 361 289 2673 • Fax: 361 289 2471 • www.stl-inc.com

SEVERN TRENT STL

SURROGATE RECOVERIES REPORT

Job Number.: 221804 Report Date.: 12/03/2003

CUSTOMER: ARCADIS / G&M PROJECT: OK001351.0001.00001 SUNO ATTN: Mike Gates

Method.....: Volatile Organics - Aromatics Method Code.....: 8020
Batch.....: 87438 Analyst.....: den Equipment Code: BTEX#1GC

Surrogate	Units
BFB (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		CCV	1.00	19.644	20.00000	98.2	77-115		11/22/2003	1433
		SB	1.00	20.205	20.00000	101.0	77-115		11/22/2003	1509
		MB	1.00	19.565	20.00000	97.8	77-115		11/22/2003	1545
221804-1			1.00	20.679	20.00000	103.4	77-115		11/22/2003	1620
221804-2			1.00	19.502	20.00000	97.5	77-115		11/22/2003	1656
221804-3			1.00	19.564	20.00000	97.8	77-115		11/22/2003	1732
221804-4			1.00	19.438	20.00000	97.2	77-115		11/22/2003	1808
221818-2			10.00	22.587	20.00000	112.9	77-115		11/22/2003	1844
221818-3			10.00	21.837	20.00000	109.2	77-115		11/22/2003	1920
221818-4			1.00	19.381	20.00000	96.9	77-115		11/22/2003	1955
221818-5			5.00	20.659	20.00000	103.3	77-115		11/22/2003	2031
221818-6			2.00	20.545	20.00000	102.7	77-115		11/22/2003	2107
221818-7			2.00	20.782	20.00000	103.9	77-115		11/22/2003	2219
221818-8			1.00	19.260	20.00000	96.3	77-115		11/22/2003	2255
221818-9			1.00	19.500	20.00000	97.5	77-115		11/22/2003	2330
221818-10			1.00	19.156	20.00000	95.8	77-115		11/23/2003	0006
221818-11			1.00	19.146	20.00000	95.7	77-115		11/23/2003	0042
221818-12			1.00	19.196	20.00000	96.0	77-115		11/23/2003	0118
221818-13			1.00	19.186	20.00000	95.9	77-115		11/23/2003	0154
221830-1			1.00	19.715	20.00000	98.6	77-115		11/23/2003	0230
221830-2			1.00	19.217	20.00000	96.1	77-115		11/23/2003	0305
221830-3			1.00	19.168	20.00000	95.8	77-115		11/23/2003	0341
221830-1		MS	1.00	19.623	20.00000	98.1	77-115		11/23/2003	0417
221830-1		MSD	1.00	19.600	20.00000	98.0	77-115		11/23/2003	0453

Surrogate	Units
Trifluorotoluene	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		CCV	1.00	18.613	20.00000	93.1	68-118		11/22/2003	1433
		SB	1.00	18.448	20.00000	92.2	68-118		11/22/2003	1509
		MB	1.00	18.427	20.00000	92.1	68-118		11/22/2003	1545
221804-1			1.00	21.824	20.00000	109.1	68-118		11/22/2003	1620
221804-2			1.00	18.271	20.00000	91.4	68-118		11/22/2003	1656
221804-3			1.00	18.312	20.00000	91.6	68-118		11/22/2003	1732
221804-4			1.00	18.097	20.00000	90.5	68-118		11/22/2003	1808
221818-2			10.00	20.183	20.00000	100.9	68-118		11/22/2003	1844
221818-3			10.00	19.363	20.00000	96.8	68-118		11/22/2003	1920
221818-4			1.00	18.172	20.00000	90.9	68-118		11/22/2003	1955
221818-5			5.00	28.291	20.00000	141.5	68-118	X	11/22/2003	2031
221818-6			2.00	22.416	20.00000	112.1	68-118		11/22/2003	2107
221818-7			2.00	21.141	20.00000	105.7	68-118		11/22/2003	2219
221818-8			1.00	18.055	20.00000	90.3	68-118		11/22/2003	2255
221818-9			1.00	18.039	20.00000	90.2	68-118		11/22/2003	2330

1733 North Padre Island Drive • Corpus Christi, TX 78408 • Tel: 361 289 2673 • Fax: 361 289 2471 • www.stl-inc.com

SEVERN TRENT STL

SURROGATE RECOVERIES REPORT

Job Number.: 221804 Report Date.: 12/03/2003

CUSTOMER: ARCADIS / G&M PROJECT: OK001351.0001.00001 SUNO ATTN: Mike Gates

Surrogate	Units
Trifluorotoluene	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
221818-10			1.00	17.965	20.00000	89.8	68-118		11/23/2003	0006
221818-11			1.00	17.853	20.00000	89.3	68-118		11/23/2003	0042
221818-12			1.00	17.887	20.00000	89.4	68-118		11/23/2003	0118
221818-13			1.00	17.773	20.00000	88.9	68-118		11/23/2003	0154
221830-1			1.00	25.292	20.00000	126.5	68-118	X	11/23/2003	0230
221830-2			1.00	21.073	20.00000	105.4	68-118		11/23/2003	0305
221830-3			1.00	20.627	20.00000	103.1	68-118		11/23/2003	0341
221830-1		MS	1.00	21.532	20.00000	107.7	68-118		11/23/2003	0417
221830-1		MSD	1.00	21.441	20.00000	107.2	68-118		11/23/2003	0453

1733 North Padre Island Drive • Corpus Christi, TX 78408 • Tel: 361 289 2673 • Fax: 361 289 2471 • www.stl-inc.com

QUALITY ASSURANCE METHODS

REFERENCES AND NOTES

Report Date: 12/03/2003

(1) EPA 600/4-79-020, Methods for Chemical Analysis of Water and Wastes, March 1983
(2) EPA SW-846, Test Methods for Evaluating Solid Waste, Third Edition, September 1986, and Updates I, II, IIA, IIB, and III
(3) Standard Methods for the Examination of Water and Wastewater, 18th Edition, 1992
(4) Methods of Organic Chemical Analysis of Municipal and Industrial Wastewater, Federal Register, Vol. 49, No. 209, October 1984 and 40 CFR Part 136 amendments
(5) EPA 600/2-78-054, Field and Laboratory Methods Applicable to Overburdens and Minesoils
(6) Methods of Soil Analysis, American Society of Agronomy, Agronomy No. 9, 1965
(7) ASTM, Section 11 Water and Environmental Technology, Volume 11.01 Water (1), 1991
(8) American Society for Testing and Materials, Petroleum Products, Lubricants, and Fossil Fuels, Section 5, Volumes 05.01 - 05.05
(9) Hach Handbook of Water Analysis, 1979

Comments:
Data in the QC report may differ from final results due to digestion and/or dilution of sample into analytical ranges. The "Time Analyzed" may not be the actual time of analysis. The "Date Analyzed" is the actual date of analysis. Sludge samples are reported on a wet weight basis (i.e., not corrected for percent moisture) unless otherwise indicated.

Quality Control acceptance criteria are based either on limits specified in the referenced method or on actual laboratory performance.

All data is reported on sample "as received" unless noted.

Sample IDs with a "-00" at the end indicate a blank spike or blank spike duplicate associated with the numbered sample.

SAMPLE RESULT IDENTIFICATION

ND	= Not detected at a value greater than the reporting limit
TNTC	= Too numerous to count

BLANK QC SAMPLE IDENTIFICATION

MB	Method Blank
ICB	Initial Calibration Blank
CCB	Continuing Calibration Blank

SPIKE QC SAMPLE IDENTIFICATION

MS	Method (Matrix) Spike
MSD	Method (Matrix) Spike Duplicate
PDS	Post Digestion/Distillation Spike
SB	Spiked Blank
SBD	Spiked Blank Duplicate

REFERENCE STANDARD QC SAMPLE IDENTIFICATION

LCS	Laboratory Control Standard
RS	Reference Standard
ICV	Initial Calibration Verification Standard
CCV	Continuing Calibration Verification Standard
ISA/ISB	ICP Interference Check Sample
DSC	Distilled Standard Check

1733 North Padre Island Drive • Corpus Christi, TX 78408 • Tel: 361 289 2673 • Fax: 361 289 2471 • www.stl-inc.com

QUALITY ASSURANCE METHODS

REFERENCES AND NOTES

Report Date: 12/03/2003

DUPLICATE QC SAMPLE IDENTIFICATION

MD	Method (Matrix) Duplicate
ED	Extraction Duplicate
DD	Digestion Duplicate
PDD	Post Digestion Duplicate
PSD	Post Digestion/Distillation Spike Duplicate

Analyses performed by a subcontract laboratory are indicated on the analytical and/or quality control reports under "technician" using the following codes:

SUBCONTRACT LABORATORIES

Severn Trent Laboratories:

Los Angeles, CA	*la	Houston, TX	*he
Aurora, CO	*au	North Canton, OH	*nc
Tampa, FL	*ta	Valparaiso, IN	*vp
Sacramento, CA	*sa	Chicago, IL	*ch
Pensacola, FL	*pe	Tallahassee, FL	*tl

Other:

Client provided data	*cp	Non-STL Subcontract Lab	*xx

EXPLANATION OF DATA FLAGS

B - This flag is used to indicate that an analyte is present in the method blank as well as in the sample. It indicates that the client should consider this when evaluating the results.
D - This flag indicates that surrogates were diluted out of calibration range and cannot be quantified.
E - Indicates that a sample result is an estimate because the concentration exceeded the calibration range of the instrument.
I - Used to indicate matrix interference.
X - Indicates that a surrogate recovery is outside the specified quality control limits.
Y - Used to identify a spike or spike duplicate recovery is outside the specified quality control limits.
* - Indicates a relative percent difference for a duplicate analysis is outside the specified quality control limits.
^ - Used to indicate that a standard is outside specified quality control limits.

EXPLANATION OF DATA QUALIFIERS

B - Indicates that a value for an inorganic analysis is an estimate. It is used when a compound is determined to be present but at a concentration less than the quantitation limit of the method.
J - Indicates that a value for an organic analysis is an estimate. It is used when a compound is determined to be present based on chromatographic pattern or mass spectral data, but at a concentration less than the quantitation limit of the method. This flag is also used when estimating the concentration of a tentatively identified compound.
U - Indicates that a value is less than the MDL or was not detected.

1733 North Padre Island Drive • Corpus Christi, TX 78408 • Tel: 361 289 2673 • Fax: 361 289 2471 • www.stl-inc.com

[redacted] on ice [redacted] Custody Seal [redacted]

ARCADIS

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

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Project Number/Name: OK001351.0001.00001

Project Location: Sunoco

Laboratory: STL - Corpus

Project Manager: Mike Gates

Sampler(s)/Affiliation: ARCADIS

22804

Sample ID/Location	Matrix	Date Sampled	Time	(2) BTEX 40 ml VOA HCl	HCO3, CO3, Br, Cl, Fl, NO3, SO4, TDS, Ca, Fe, K, Mg, Na Neat						Remarks	Total
Well 1	L	11-13-03	1345	2	1							3
Well 2	L	11-13-03	1405	2	1							3
Well 3	L	11-13-03	1425	2	1							3
Temp Blank	L	—	—									1
Trip Blank	L	—	—	1								1

Sample Matrix: L = Liquid S = Solid A = Air

Total No. of Bottles/ Containers: 11

Relinquished by: [redacted]	Organization: ARCADIS	Date 11/13/03	Time 1715	Seal Intact?	Yes No N/A
Received by: Fedex	Organization: Fedex	Date / /	Time		
Relinquished by: Fedex	Organization:	Date / /	Time	Seal Intact?	
Received by: [redacted]	Organization: STL	Date 11/15/03	Time 0955		Yes No N/A

Special Instructions/Remarks: Fedex 8392 0284 9595

Delivery Method: ☐ In Person ☒ Common Carrier Fed-Ex (SPECIFY) ☐ Lab Courier ☐ Other _____ (SPECIFY)

AG 05-12/01

rpjsckl | Job Sample Receipt Checklist Report | V2

Job Number.: 221804 Location.: 57203 Check List Number.: 1 Description.:
Customer Job ID.....: Job Check List Date.: 11/17/2003 Date of the Report..: 11/18/2003
Project Number.: 98000203 Project Description.: Project-EAB Project Manager.....: eab
Customer.....: ARCADIS / G&M Contact.: Mike Gates

Questions ?	(Y/N)	Comments
How did samples arrive?	Y	FED EX DELIVERED
Chain-of-Custody Present?	Y	
Custody seal on shipping container?	Y	
...If "yes", custody seal intact?	Y	
Custody seals on sample containers?	N	
...If "yes", custody seal intact?		
Samples chilled?	Y	
Temperature blank in cooler?	Y	
Temp of cooler acceptable? (0.05 to 6.00 deg C)	Y	1.2 DEGREES C
Samples received intact (good condition)?	Y	
Volatile samples acceptable? (no headspace)	Y	
Correct containers used?	Y	
Adequate sample volume provided?	Y	
Samples preserved correctly?	N	NO HNO3 PRESERVED SX SENT, HAD TO BE SPLIT & PRESERVED
Samples received within holding-time?	N	NITRATE RECEIVED PAST HOLD---NOTIFIED MIKE GATES @ ARCADIS
Agreement between COC and sample labels?	Y	
Additional		
Comments		
Sample Custodian Signature		EAB 11/18/03