AP - 008

STAGE 1 & 2 REPORTS

DATE: Aug. 21, 2001

ARCADIS GERAGHTY & MILLER

Revised Stage 2 Abatement Plan Proposal, Junction I-9 Release Site

Rice Operating Company
121 N. Taylor
Hobbs, NM 88241

Prepared for:
Rice Operating Company

Prepared by:
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Our Ref.:
MT000643.0001

Date:
21 August 2001

ARCADIS GERAGHTY & MILLER

Revised Stage 2 Abatement Plan Proposal, Junction I-9 Release Site

August 21, 2001

Prepared by ARCADIS GERAGHTY & MILLER, INC.

Sharon E. Hall

Sharon Hall
Project Manager

Steven P. Tischer

Steven P. Tischer
Remediation Business Practice Manager

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Revised Stage 2 Abatement Plan Proposal, Junction I-9 Release Site

Rice Operating Company
Hobbs, New Mexico

1. INTRODUCTION

The subject site is a former pipeline connection point on the Rice Operating Company Hobbs Salt Water Disposal System. The pipeline transports produced water from oil and gas leases to a permitted well for disposal by subsurface injection. The site is located in southwest Hobbs, New Mexico approximately 0.6 miles south of the intersection of Grimes Street and Stanolind Road (NE ¼ of the NE ¼ of Section 4, T19S-R38E, Lea County).

2. SUMMARY OF STAGE 1 ABATEMENT ACTIVITIES

Stage 1 Abatement activities as approved by the New Mexico Oil Conservation Division (NMOCD) were conducted during the period of June 1998 through September 1999.

A pipeline leak was discovered and repaired at the subject site on June 5, 1998. Notification of an unauthorized release was submitted to the NMOCD District I Office located in Hobbs, New Mexico. A Stage I Abatement Plan was submitted to NMOCD on January 19, 1999. Interim abatement site activities including assessment of impacts to soil and groundwater and excavation of impacted soil were conducted from August 24, 1998 to September 2, 1999. Recovery of phase-separated hydrocarbons from groundwater has been conducted from January 18 to May 7, 1999. A total of four monitor wells, one recovery well and nine boreholes were installed at the subject site.

A detailed description of site activities and results can be found in the report submitted to NMOCD dated September 10, 1999 entitled *Junction I-9 Release Site, Stage 1 Abatement Report (Site Assessment Investigation)*.

NMOCD approved the Stage 1 site investigation report on November 15, 1999.

3. REVISED STAGE 2 ABATEMENT PLAN PROPOSAL

The Stage 2 Abatement Plan Proposal was submitted to the NMOCD on March 31, 2000 and approved May 30, 2000. On October 26, 2000, ARCADIS G&M, Inc. (ARCADIS) on behalf of Rice Operating Company (ROC), submitted a letter of clarification of the Stage 2 Abatement Plan Proposal to the NMOCD. The letter provided clarification concerning the definition of clean soil as proposed in the Stage 2 Abatement Plan Proposal, and requested modification of the original work plan by

using blended excavated soil as backfill, and an extension for submission of the remediation results. The letter further proposed the installation of a liner.

Following review of the October 26, 2000 clarification letter, the NMOCD requested that ROC submit a detailed workplan describing proposed modifications to the Stage 2 Abatement Plan proposal. ROC submitted a revised Stage 2 Abatement Plan Proposal workplan detailing proposed modifications to the Stage 2 Abatement Plan proposal on December 13, 2000. In a letter dated March 2, 2001, the OCD requested that ROC provide additional information concerning public notice, monitor well location and design, liner design, oxygen release socks and concentrations of metals and general chemistry to be placed back into the excavation and delineated. Additional information was provided to the OCD in a letter dated March 30, 2001. Following review of ROC's letter dated March 30, 2001, the OCD requested further information concerning protection of the liner and concentrations of metals and general chemistry to be placed back into the excavation and delineated (April 16, 2001 letter). Additional information was provided to the OCD in a letter dated May 15, 2001. The May 15, 2001 letter proposed modeling of any compound that was detected at a concentration exceeding background or backfill concentrations using a leaching model to determine the concentration of the compound to be placed back in the excavation or remain unexcavated. In a letter dated July 12, 2001, the OCD approved the use of a leaching model, requested use of additional methods to protect the buried liner, and requested that up gradient monitor well MW-7 be located 300 feet up-gradient of the proposed location. OCD further requested that the results of the findings, leaching model information and results, and final Stage 2 Abatement Plan proposal be submitted by August 15, 2001. An extension to submit the requested information by August 22, 2001 was approved by the OCD. The preceding referenced correspondence between the OCD and ROC is included in Appendix A.

The proposed amendments involve Section 3 of the Stage 2 Abatement Plan Proposal: Subsections 3.1 Soil Remediation and 3.2 Groundwater Remediation and Monitoring. The proposed amendments are as follows:

3.1 Soil Remediation: August 2001 Amended Proposal

The selected remedial option will be the excavation of soils, blending of impacted soils with clean overburden, isolation of contaminants with compacted clay layers to prevent/inhibit any downward migration of moisture or contaminants, and natural attenuation and biodegradation of hydrocarbons remaining in place.

The excavation activities at the Junction I-9 Release Site have identified impacted soils extending horizontally and vertically more than the Stage I Assessment predicted. The current extent of the excavation is shown in Figure 1. The extent of sub-surface soil impacts will be further delineated with excavation activities.

Soil excavation will continue until no visible staining of soils and no photo ionization detector readings are observed. Excavation activities will be continued in the area where hydrocarbons were detected on the groundwater until the soil associated with the phase-separated hydrocarbons (PSH) is removed. Soil in this area will be excavated to 30-32' below ground surface (BGS.) When groundwater is encountered, excavation will be discontinued just below the depth where groundwater is encountered in order to maintain safe and practical excavation of soils. PSH will be recovered with absorbent material where possible. Remaining soils at the groundwater/soil interface will be treated with naturally occurring hydrocarbon degrading organisms and nutrients to promote biodegradation.

A 12-15" compacted clay layer will be installed according to NMOCD clay layer specifications (meet or exceed 95% of a Proctor Test ASTM-D-698 and permeability equal to or less than 1 x 10^{-7} cm/sec) over the area excavated to the groundwater interface in order to inhibit downward migration of constituents and to protect the groundwater interface that was exposed. When the excavation has been backfilled, an additional compacted clay layer will be installed (to NMOCD specifications) approximately three feet below ground surface over the entire excavation in order to inhibit downward migration of potential constituents in soils below the compacted clay layer. Liner design specifications were submitted to the OCD on March 30, 2001.

Approximately 11,000 loose cubic yards of impacted soil has been already disposed at an NMOCD-approved facility. All remaining excavated soils (predicted to be 4,000-5,000 loose cubic yards) will be blended with overburden/replacement soils (approximately 40,000 loose cubic yards) and returned to the excavation as backfill. Total petroleum hydrocarbon (TPH) and benzene, toluene, ethylbenzene and xylenes (BTEX) concentrations will be verified by laboratory analysis for each 3' thick backfill lift. TPH and BTEX concentrations of blended soils used for backfill material will not exceed

NMOCD standards concentrations of 100 milligrams per kilogram (mg/kg) TPH, 10 mg/kg benzene and 50 mg/kg BTEX.

Resource Conservation and Recovery Act (RCRA) metals and chlorides that were detected at a concentration exceeding background or proposed backfill concentrations were evaluated using a leaching model as approved by OCD in their letter dated July 12, 2001. Three compounds; barium, chromium and chlorides; were detected in soil samples collected from the excavation at a concentration exceeding the range of background or proposed backfill concentrations. Sample locations are shown in Appendix B, Figure 2 and analytical results are summarized in Appendix B, Table 1. Soil sampling, analysis and evaluation of compounds using a leaching model are discussed in Appendix B. Based on the soil sampling analytical results and the leaching model evaluation performed on the compounds exceeding background and proposed backfill concentrations, ROC proposes the following:

1. Only barium, trivalent chromium and chlorides were detected at a concentration exceeding background or proposed backfill concentrations. Since the soil samples collected from the excavation were collected from sidewall and bottom samples that were most visibly impacted by hydrocarbons, it is not expected that higher concentrations of RCRA metals and chlorides will be detected in soil samples. Barium concentrations are representative of background conditions (see item 2 which follows), and therefore will not require confirmation sampling and analysis of blended soils and un-excavated soils. Since the soil action level concentrations for chromium (see item 3 which follows) is so high, sampling and analysis of blended soils and un-excavated soils for chromium is not required. Confirmation sampling and analysis for chlorides will be required.

2. Barium was detected at a maximum concentration of 122 mg/kg in the soil sample collected from the east sidewall. The range of barium concentrations in the sidewall and bottom samples is 48 mg/kg to 122 mg/kg, and the average barium concentration in the excavation samples is 79.6 mg/kg. Barium concentrations in the background samples range from 83 mg/kg to 106 mg/kg, with an average of 91.6 mg/kg. Proposed backfill barium concentrations range from 25 mg/kg to 123 mg/kg, with an average of 82.3 mg/kg. Based on the results of

the analysis, barium concentrations detected in the excavation sidewall and bottom samples are interpreted to be naturally occurring, and representative of background conditions. Therefore, confirmation sampling and analysis of blended soils and un-excavated soiis for barium is not required.

3. Background concentrations of chromium, in the form of trivalent chromium, range from 9 mg/kg to 11 mg/kg. Proposed backfill concentrations range from <5 mg/kg to 9 mg/kg. Chromium concentrations detected in sidewall and bottom samples range from <5 mg/kg to 12 mg/kg. Based on the results of the leaching model as described in Appendix B, the concentration of chromium that can be placed back into the excavation in blended soils and can remain in place without leaching to groundwater at a concentration that will result in a groundwater concentration exceeding the New Mexico Water Quality Control Commission Standard of 0.05 milligrams per liter (mg/L) is 186,363 mg/kg. Since this soil action level concentrations is so high, and chromium was detected in sidewall and bottom samples at a maximum concentration of 12 mg/kg, confirmation sampling and analysis of blended soils and un-excavated soils for chromium is not required.

4. Chloride concentrations detected in the sidewall and bottom samples range from <10 mg/kg to 400 mg/kg, in excess of both background and proposed backfill concentrations. Based on the results of the leaching model as described in Appendix B, the concentration of chlorides that can be placed back into the excavation in blended soils and can remain in place without leaching to groundwater at a concentration that will result in a groundwater concentration exceeding the New Mexico Water Quality Control Commission Standard of 250 milligrams per liter (mg/L) is 2,920 mg/kg.

Five-point composite samples will be collected from the floor of each level of excavation and from each wall of the excavation. The samples will be analyzed for TPH, and BTEX using USEPA Methods 8015 and 8260, respectively. The composite samples will also be analyzed for chlorides.

3.2 Groundwater Remediation and Monitoring: August, 2001 Amended Proposal

Recovery well RW1 will be replaced since the excavation activity resulted in removal of the well. RW1R will be the designated name of the replacement recovery well.

Free product will be removed weekly from recovery well RW1R. Either the well will be bailed or pumped to remove product, or a downhole passive hydrocarbon skimmer will be installed. Product level, groundwater level, product thickness, and recovered fluid volumes will be recorded weekly and submitted to the NMOCD annually on June 15 in table form. Recovered fluids will be disposed at OCD approved facility.

Figure 1 is a site plan that depicts the locations of the existing recovery well (RW-1) and monitor wells (MW-1, MW-2, MW-3 and MW-4.) Proposed monitor well locations are also shown (MW-5, MW-6 and MW-7). If any wells are removed as a result of excavation activities, they will be replaced in the original location as shown on Figure 1. Additional monitor wells and replacement wells will be drilled and installed following backfilling and capping of the excavation. The monitor wells will be constructed using 2-inch inside-diameter Schedule 40 PVC casing. The recovery well will be constructed of 4-inch inside-diameter Schedule 40 PVC casing. The wells will be constructed with fifteen feet of slotted PVC casing, 10 feet below top of groundwater and five feet above top of groundwater. The wells will be sand-packed with a five-foot bentonite plug placed immediately above the sand pack. The wells will be grouted above the bentonite plug with cement containing 3-5% bentonite and completed with a flush mounted cover.

Socks containing oxygen release compounds will be placed in monitor wells MW-1 and MW-2 to promote natural biodegradation of hydrocarbons in the groundwater.

All monitor wells will be sampled quarterly for four quarters and groundwater samples will be analyzed for BTEX, General Chemistry and WQCC metals. Based on sample results for one year (four quarters), sampling frequency will be reviewed and may be revised.

Sampling will be discontinued when eight quarters of sample results indicate BTEX concentration are below New Mexico Water Quality Control Commission, Title 20, Chapter 6, Part 2 standards. Sample results will be submitted to the NMOCD annually on June 15. Recovered fluids will be disposed at an OCD approved facility.

Sections 1, 2, 4, 5, 6 and 7 of the original Stage 2 Plan remain as previously submitted.

4. HEALTH AND SAFETY

All site activities will be performed in accordance with Occupational Safety and Health Administration (OSHA) standards. All on-site personnel will be required to wear a hardhat, safety glasses and steel-toe shoes during work activities. A daily tailgate safety meeting will be performed and a safety meeting record will be signed by all attendees and kept on file. Emergency phone numbers are as follows:

Carolyn Haynes	Rice Operating Company	505 393-9174
Police, Fire, Ambulance		911
Columbia Lea Regional Medical Center		505 392-9212

5. PUBLIC NOTIFICATION

Written notification of submittal of the Stage 2 Abatement Plan Proposal and site activities will be sent to all surface owners of record within a one-mile radius of the site. The NMOCD will be supplied with a list of parties to be notified. Publication of notice of activities will be published in a state-wide circulated newspaper, the *Albuquerque Journal*, and two county newspapers, the *Hobbs-Daily News Sun* and the *Lovington Leader*.

6. REMEDIATION WORK SCHEDULE

Soil remediation activities are expected to be completed in 15 working days (Monday through Friday). Groundwater remediation activities will be ongoing. An estimated completion date for groundwater remediation is not available.

7. REFERENCES

Groundwater Handbook; United States Environmental Protection Agency, Office of Research and Development, Center for Environmental Research Information; 1992

Hydrogeology and Hydrochemistry of the Ogallala Aquifer, Southern High Plains, Texas Panhandle and Eastern New Mexico; Report of Investigations No. 177; Bureau of Economic Geology; 1988

Junction I-9 Release Site, Stage 1 Abatement Report (Site Assessment Investigation); ARCADIS Geraghty & Miller; September 10, 1999

Stage 2 Abatement Plan Proposal, Junction I-9 Release Site; ARCADIS Geraghty & Miller; January 5, 2000

New Mexico Water Quality Control Commission, Title 20 Chapter 6, Part 2, Subpart I

ARCADIS GERAGHTY & MILLER

Table 1. Summary of the laboratory measured concentrations of the samples taken from background and the excavation area.

Units mg/kg

Metal	Sample Location (CLEAN)										
	Background 1	Background 2	Background 3	Backfill 1	Backfill 2	Backfill 3	North Sidewall	South Sidewall	East Sidewall	West Sidewall	Bottom
As	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ba	83	106	86	99	123	25	105	75	122	48	48
Cd	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Pb	9	12	9	<5	6	<5	<5	<5	<5	6	<5
Ni	8	11	8	6	10	<5	6	<5	11	11	<5
Se	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Hg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total Cr	9	11	9	<5	9	<5	9	8	7	12	<5
Cr (III)	9	11	9	<5	9	<5	9	8	7	12	<5
Cr (VI)	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Chloride	<10	<10	<10	70	60	<10	130	230	400	<10	210
Soil pH	8.1	7.9	8.2	8.2	8.1	8.2	8.2	8.3	8.4	8.8	9.6

Table 2. Equilibrium soil concentrations and pore water concentrations of the average background sample concentrations and the average backfill sample concentrations.

Metal	Average Background Laboratory Soil Concentration (mg/kg)	Average Backfill Laboratory Soil Concentration (mg/kg)	K_d* (L/kg)	Backfill Soils		Background Soils		WQCC Groundwater Standards (mg/L)
				Equilibrium Soil Concentration (mg/kg)	Equilibrium Pore Water Concentration (mg/L)	Equilibrium Soil Concentration (mg/kg)	Equilibrium Pore Water Concentration (mg/L)	
Barium	92.7	82.3	42	55.2	1.314	62.2	1.480	1.00
Chromium (III)	9.67	6	2.50E+06	4.0	1.61E-06	6.5	2.60E-06	0.050
Chloride	<10	56.7	0	0.0	883	NA	NA	250

Bulk Density of Sediment = 1.49

Water Content of Sediment = 0.0642

*K_d values are from the Technical Background Document for Soil Screening Guidance (US EPA)

BLENDED SOILS ARE NOT BACKFILL?

Table 3. Equilibrium soil concentrations and pore water concentrations of the average background sample concentrations and the average sidewall and bottom sample concentrations.

Metal	Average Background Laboratory Soil Concentration (mg/kg)	Average Sidewall and Bottom Laboratory Soil Concentration (mg/kg)	K_d* (L/kg)	Sidewall and Bottom Soils		Background Soils		WQCC Groundwater Standards (mg/L)
				Equilibrium Soil Concentration (mg/kg)	Equilibrium Pore Water Concentration (mg/L)	Equilibrium Soil Concentration (mg/kg)	Equilibrium Pore Water Concentration (mg/L)	
Barium	92.7	79.6	42	53.4	1.271	62.2	1.480	1.00
Chromium (III)	9.7	8.2	2.50E+06	5.5	2.20E-06	6.5	2.60E-06	0.050
Chloride	<10	178.6	1	115.1	115	NA	NA	250

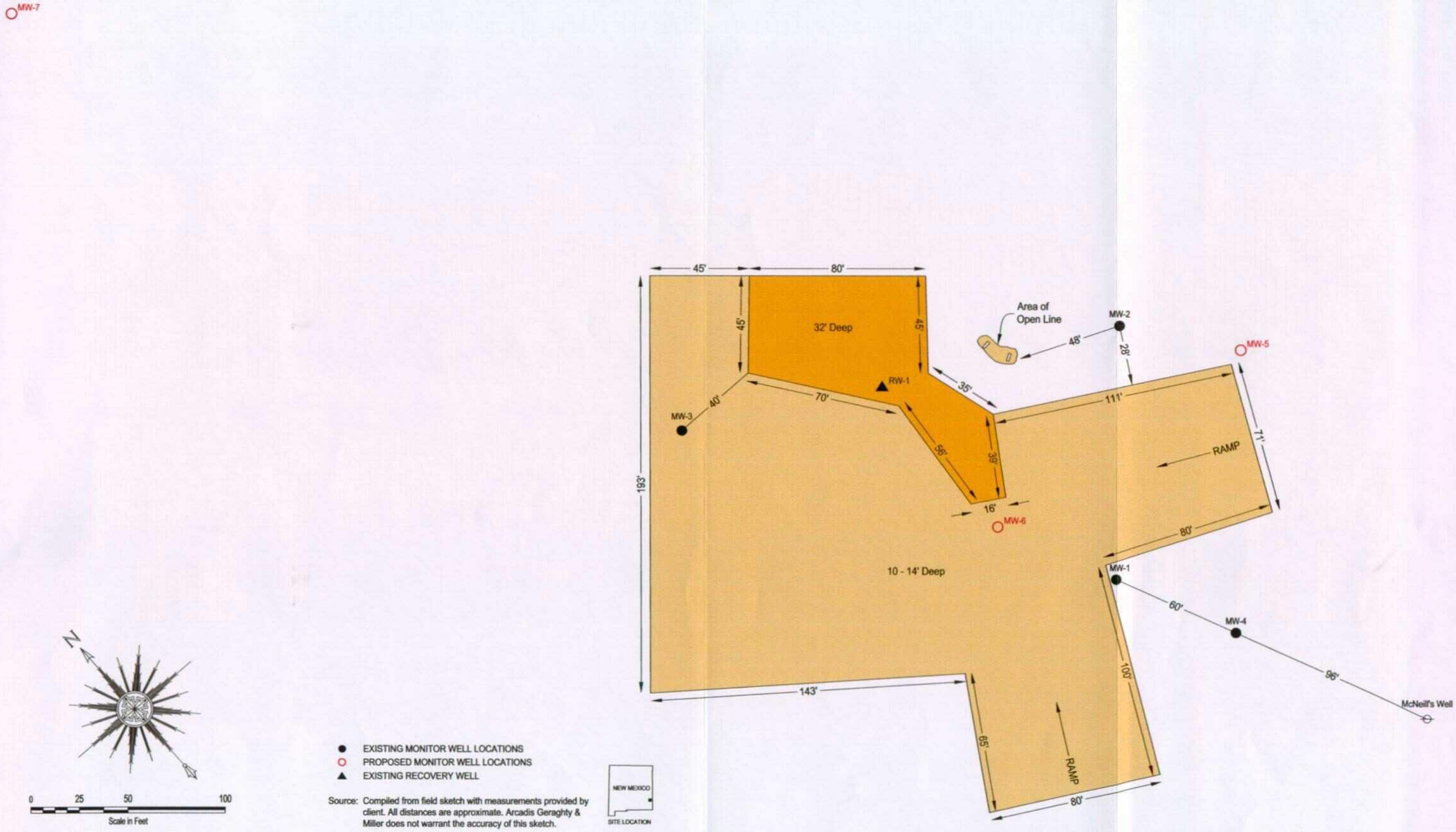
Bulk Density of Sediment = 1.49

Water Content of Sediment = 0.0642

*K_d values are from the Technical Background Document for Soil Screening Guidance (US EPA)

Table 4. Maximum soil concentrations of detected constituents that would cause an increase of groundwater concentrations above New Mexico action levels.

Metal	WQCC Groundwater Standards (mg/L)	Average Site Groundwater Concentrations (mg/L)	Maximum Pore Water Concentration (mg/L)	Maximum Soil Concentrations (mg/kg)
Barium	1.00	1.47	1.47	92.7
Chromium(III)	0.050	0.0125	11.4	186,363
Chloride	250	100	45454	2920



Source: Compiled from field sketch with measurements provided by client. All distances are approximate. Arcadis Geraghty & Miller does not warrant the accuracy of this sketch.

NO.	DATE	REVISION DESCRIPTION	BY	CKD

ARCADIS GERAGHTY & MILLER
1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

DATE	FILE NAME	FILE LOCATION	UNIQUE NUMBER	PROJECT MANAGER	AREA MANAGER
AUGUST, 2001	MT643106.DWG	\DWG\RICE OPERATING\MT000643.001	31-014-00250	S. HALL	A. SCHMIDT

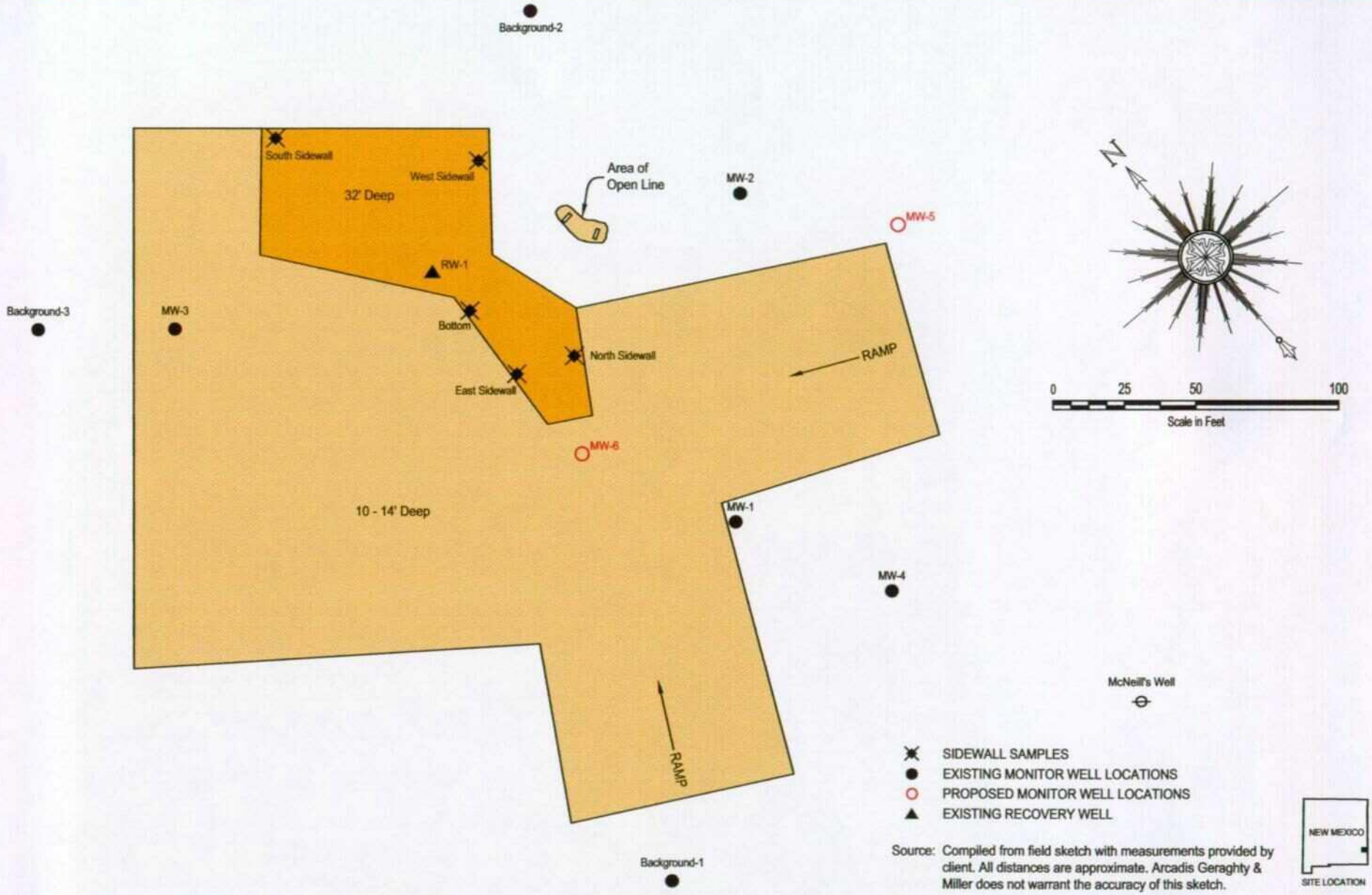
RICE OPERATING COMPANY
JUNCTION I-9 STAGE 2 REMEDIATION

EXTENT AND DEPTH OF EXCAVATION AND MONITOR WELL LOCATIONS

LEA COUNTY, NEW MEXICO

COMPILER	CHECKED
S. HALL	S. TISCHER

PROJECT NUMBER	FIGURE
MT000643.0001	1



ARCADIS GERAGHTY & MILLER
1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

DATE	FILE NAME	FILE LOCATION	COMPILER	PROJECT MANAGER	AREA MANAGER
AUGUST, 2001	MT643105.DWG	\DWG\RICE OPERATING\MT000643.001	S. HALL	S. HALL	A. SCHMIDT

RICE OPERATING COMPANY
JUNCTION I-9 STAGE 2 REMEDIATION

SOIL SAMPLE LOCATIONS

LEA COUNTY, NEW MEXICO

CHECKED	UNIQUE NUMBER
S. TISCHER	31-014-00249
PROJECT NUMBER	FIGURE
MT000643.0001	2

APPENDIX A

OIL CONSERVATION DIVISION AND RICE OPERATING COMPANY CORRESPONDENCE

March 2, 2001

CERTIFIED MAIL
RETURN RECEIPT NO. 3771 7132

Carolyn Doran Haynes
Operations Engineer
Rice Operating Company
122 West Taylor
Hobbs, New Mexico 88240

RE: Revised Stage 2 Abatement Plan (AP-8)
Junction I-9 Release Site
NE 1/4 SE 1/4 Section 09-Ts19s-R38e
Hobbs Salt Water Disposal System
Lea County, New Mexico

Dear Ms. Haynes:

The New Mexico Oil Conservation Division (OCD) is in receipt of Rice Operating Company's (ROC) Revised Stage 2 Abatement Plan Proposal, Junction I-9 Release Site dated December 13, 2000. The OCD considers this proposal to be a significant modification of the previously approved Stage 2 abatement plan. **In order for the plan to be administratively complete OCD requires the following information to be submitted by April 2, 2001:**

1. Provide a copy of the public notice for OCD pre-approval as required in 19 NMAC 15.A.19E.4.b.vii.

2. Provide a plot plan map depicting the location of all recovery and monitor wells. Describe how all wells will be designed and completed.

3. Provide a cross-section view showing the location of all liner(s). Provide information concerning the design, construction, and hydrogeologic properties, etc. Also provide a plan describing how the liner(s) will be protected in the foreseeable future.

4. Provide information pertaining to the socks that will release oxygen compounds.

5. The plan does not provide sufficient information pertaining to what levels of metals and general chemistry contaminants that will be placed back in the hole. Please provide.

6. The plan does not provide delineation levels for metals or general chemistry. Please provide.

7. Please propose another location for the up-gradient monitor well that is outside of any disturbed area.

If you have any questions please do not hesitate to contact me at 505-476-3487.

Sincerely;

Wayne Price-Pet. Engr. Spec.

Cc; OCD Hobbs District
Branch Law Firm-James P. Lyle
Bill McNeill-landowner
Arcadis Geraghty & Miller- Sharon Hall

Carolyn Doran Haynes
Operations Engineer
Rice Operating Company
122 West Taylor
Hobbs, New Mexico 88240

Mr. James P. Lyle
Branch Law Firm
2025 Rio Grande Boulevard, NW
Albuquerque, New Mexico 87104

Sharon Hall
Arcadis Geraghty & Miller
1030 Andrews Highway Suite 120
Midland, Texas 79701-3872

Bill McNeill
P.O. Box 1058
Hobbs, NM 88241

ARCADIS GERAGHTY & MILLER

ARCADIS Geraghty & Miller, Inc.
1030 Andrews Hwy.
Suite 120
Midland
Texas 79701
Tel 915-699-1381
Fax 915-699-1978

ENVIRONMENTAL

Wayne Price
New Mexico Energy, Minerals,
and Natural Resources Department
1220 South Saint Francis Drive
Santa Fe, New Mexico 87505

Subject:
Revised Stage 2 Abatement Plan Additional Information Request, Junction I-9 Site; Hobbs, New Mexico

Midland, Texas,
30 March 2001

Contact:
Sharon E. Hall

Extension:
915 699-1381

Dear Mr. Price:

Rice Operating Company and ARCADIS Geraghty and Miller (ARCADIS) are in receipt of your letter dated March 2, 2001, requesting that additional information concerning the above-referenced Stage 2 Abatement Plan be submitted to the New Mexico Oil Conservation Division (OCD) by April 2, 2001. On behalf of Rice Operating Company, ARCADIS would like to request clarification of your request and would like to respond to your request. We would like clarification as to why the OCD considers the Revised Stage 2 Abatement Plan proposal to be what you describe as a *significant* modification of the previously approved Stage 2 Abatement Plan. The installation of an additional liner enhances the protection of human health and the environment. In response to your requests:

1. Provide copy of public notice.

   A copy of the public notice is included in Appendix A for pre-approval by the OCD. Public notice will be sent to the parties who received original public notice and all parties designated by OCD.

2. Provide plot plan map with well locations.

   Figure 1 is a site plan that depicts the locations of the existing recovery well (RW-1) and monitor wells (MW-1, MW-2, MW-3 and MW-4.) Proposed monitor well locations are also shown (MW-5, MW-6 and MW-7). If any wells are removed as a result of excavation activities, they will be replaced in the original location as shown on Figure 1. Additional monitor wells and replacement wells will be drilled and installed following backfilling and capping of the excavation. The monitor wells will be constructed using 2-

inch inside-diameter Schedule 40 PVC casing. The recovery well will be constructed of 4-inch inside-diameter Schedule 40 PVC casing. The wells will be constructed with fifteen feet of slotted PVC casing, 10 feet below top of groundwater and five feet above top of groundwater. The wells will be sand-packed with a five-foot bentonite plug placed immediately above the sand pack. The wells will be grouted above the bentonite plug with cement containing 3-5% bentonite and completed with a flush mounted cover.

3. Provide cross section view showing liner locations.

   Figure 2 is a schematic cross section showing the location of the liners proposed at this site. One liner will be placed at the base of the excavation in any areas where the groundwater has been encountered by excavation activities. A second liner will be placed approximately three feet below ground surface across the entire excavated area. Each liner will consist of a 12-15-inch compacted clay layer installed according to NMOCD clay layer specifications (meet or exceed 95% of a Proctor Test ASTM-D-698 and permeability equal to or less than 1×10^{-7} cm/sec).

4. Provide information pertaining to oxygen release socks.

   Information pertaining to the proposed oxygen release socks is included in Appendix B.

5. Provide information pertaining to levels of metals and geochemistry compounds to be placed back in the excavation.

   The plan does not provide information pertaining to what levels of metals and general chemistry compounds will be placed back in the hole because the double liner is designed to prevent leaching of these compounds to groundwater, and therefore they have not been addressed. It is expected that if elevated concentrations of these compounds were present, they would be found in hydrocarbon-impacted soils. Hydrocarbon-impacted soils with concentrations in excess of OCD total petroleum hydrocarbon (TPH), benzene and benzene, toluene, ethylbenzene and xylenes (BTEX) guidelines will be removed and blended to OCD guideline concentrations. Additionally, sampling and analysis of groundwater from the existing and proposed monitor wells will provide sufficient data to identify if these compounds are leaching to groundwater and impacting groundwater above New Mexico Water Quality Control Commission standards.

6. Provide delineation levels for metals and general chemistry.

   Hydrocarbon impacted soils with concentrations in excess of OCD total petroleum hydrocarbon (TPH), benzene and benzene, toluene, ethylbenzene and xylenes (BTEX) guidelines will be removed and blended to OCD guideline concentrations. Following completion of the excavation, soil samples will be obtained from the bottom and sidewalls of the excavation and will be analyzed for metals and general chemistry. Additionally, sampling and analysis of groundwater from the existing and proposed monitor wells will provide sufficient data to identify if these compounds are leaching to groundwater and impacting groundwater above New Mexico Water Quality Control Commission standards.

7. Propose another location for the up-gradient monitor well outside of the disturbed area.

   The location for the up-gradient monitor well outside of the disturbed area is shown as MW-7 in Figure 1.

If you have any questions, please call Carolyn Haynes of Rice Operating Company at (505) 393-9174 or me at (915) 699-1381.

Very truly yours,

ARCADIS Geraghty & Miller, Inc.

Sharon E. Hall

Sharon E. Hall
Project Manager

Copies:
Carolyn Haynes, Rice Operating Company
Chris Williams, OCD Hobbs District

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

GARY E. JOHNSON
Governor
Jennifer A. Salisbury
Cabinet Secretary

Lori Wrotenbery
Director
Oil Conservation Division

April 16, 2001

CERTIFIED MAIL
RETURN RECEIPT NO. 3771 7262

RECEIVED
APR 18 2001
RICE OPERATING
HOBBS, NM

Carolyn Doran Haynes
Operations Engineer
Rice Operating Company
122 West Taylor
Hobbs, New Mexico 88240

RE: Revised Stage 2 Abatement Plan (AP-8) Additional Information Request
Junction I-9 Release Site
NE 1/4 SE 1/4 Section 09-Ts19s-R38e
Hobbs Salt Water Disposal System
Lea County, New Mexico

Dear Ms. Haynes:

The New Mexico Oil Conservation Division (OCD) is in receipt of Rice Operating Company's (ROC) Revised Stage 2 Abatement Plan Proposal Additional Information Request, Junction I-9 Release Site dated March 30, 2001. The OCD considers this revised proposal to be a significant modification because there were considerable deviations from the originally approved plan. **The submitted plan is deficient and in order for OCD to continue its evaluation process please provide the following information by May 18, 2001.**

Item 1. OCD defers comment on public notice until additional information is submitted.

Item 2. Please provide the design and completion of wells.

Item 3. Please provide a plan for OCD approval describing how the liners will be protected in the future.

Item 4. Complete.

Item 5. Please provide the information requested.

Item 6. Please provide the information requested.

Item 7. Complete.

If you have any questions please do not hesitate to contact me at 505-476-3487.

Sincerely;

Wayne Price-Pet. Engr. Spec.

Cc; OCD Hobbs District
Branch Law Firm-James P. Lyle
Bill McNeill-landowner
Arcadis Geraghty & Miller- Sharon Hall

ARCADIS GERAGHTY&MILLER

ARCADIS G&M Inc.
1030 Andrews Hwy.
Suite 120
Midland
Texas 79701
Tel 915-699-1381
Fax 915-699-1978

ENVIRONMENTAL

Wayne Price
New Mexico Energy, Minerals,
and Natural Resources Department
1220 South Saint Francis Drive
Santa Fe, New Mexico 87505

Subject:
Revised Stage 2 Abatement Plan Additional Information Request, Junction I-9 Site; Hobbs, New Mexico

Midland, Texas,
15 May 2001

Contact:
Sharon E. Hall

Extension:
915 699-1381

Dear Mr. Price:

Rice Operating Company (ROC) and ARCADIS G&M (ARCADIS) are in receipt of your letter dated April 16, 2001, requesting that additional information concerning the above-referenced Stage 2 Abatement Plan be submitted to the New Mexico Oil Conservation Division (OCD) by May 18, 2001. In response to your requests:

1. Public Notice

   ROC and ARCADIS understand that the OCD defers comment on public notice until additional information is submitted.

2. Provide the design and completion of wells.

   The monitor wells will be constructed using 2-inch inside-diameter Schedule 40 PVC casing. The recovery well will be constructed of 4-inch inside-diameter Schedule 40 PVC casing. The wells will be constructed with fifteen feet of slotted PVC casing, 10 feet below top of groundwater and five feet above top of groundwater. The wells will be sand-packed with a five-foot bentonite plug placed immediately above the sand pack. The wells will be grouted above the bentonite plug with cement containing 3-5% bentonite and completed with a flush mounted cover. An example of the well completion is shown on the attached Well Completion Diagram.

3. Provide a plan for OCD approval describing how the liners will be protected in the future.

Access to the site is limited to the current landowner and ROC. ROC will provide the landowner with global positioning system (GPS) coordinates and will request that the landowner deed record the location in the event that the land is sold in the future.

4. Complete

5. Provide information pertaining to levels of metals and geochemistry compounds to be placed back in the excavation.

   A leaching model will be performed in order to determine levels of metals and geochemistry compounds to be placed back in the excavation. Three background samples and three samples from the backfill soils to be used at the site will be collected and submitted for analysis for Resource Conservation and Recovery Act (RCRA) metals (arsenic, barium, cadmium, chromium, lead, mercury, nickel and selenium) and chlorides. One soil sample will be collected from each of the four sides of the excavation at a location that is the most visibly impacted. One soil sample will be collected from the floor of the excavation at a location that is the most visibly impacted. Any compound that is detected at a concentration exceeding background or backfill concentrations will be evaluated using a leaching model to determine the concentration of the compound to be placed back in the excavation. The soils will be sampled within one week (7 days) of OCD approval of this proposed evaluation and the results of the leaching model will be submitted to the OCD within 45 days of OCD approval of this proposed evaluation.

6. Provide delineation levels for metals and general chemistry.

   A leaching model will be performed in order to determine the delineation levels for metals and geochemistry compounds. Three background samples and three samples from the backfill soils to be used at the site will be collected and will be submitted for analysis for RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, nickel and selenium) and chlorides. One soil sample will be collected from each of the four sides of the excavation at a location that is the most visibly impacted. One soil sample will be collected from the floor of the excavation at a location that is the most visibly impacted. Any compound that is detected at a concentration exceeding background or backfill concentrations will be evaluated using a leaching model to determine the concentration of the compound to be placed back in the excavation. The soils will be sampled within one week (7 days) of OCD approval of this proposed evaluation and the results of the leaching

ARCADIS GERAGHTY & MILLER

model will be submitted to the OCD within 45 days of OCD approval of this proposed evaluation.

7. Complete

If you have any questions, please call Carolyn Haynes of Rice Operating Company at (505) 393-9174 or me at (915) 699-1381.

Very truly yours,

ARCADIS G&M, Inc.

Sharon E. Hall

Sharon E. Hall
Project Manager

Copies:
Carolyn Haynes, Rice Operating Company
Chris Williams, OCD Hobbs District
Frank McCallum, 2 copies

July 12, 2001

CERTIFIED MAIL
RETURN RECEIPT NO. 5357 7713

Carolyn Doran Haynes
Operations Engineer
Rice Operating Company
122 West Taylor
Hobbs, New Mexico 88240

RE: Revised Stage 2 Abatement Plan Additional Informational Request
Stage 2 Abatement Plan (AP-8)
Junction I-9 Release Site
NE 1/4 SE 1/4 Section 09-Ts19s-R38e
Hobbs Salt Water Disposal System
Lea County, New Mexico

Dear Ms. Haynes:

The New Mexico Oil Conservation Division (OCD) is in receipt of Arcadis Geraghty & Miller's letter dated May 15, 2001 submitted on behalf of Rice Operating Company (ROC). OCD has the following comments specific to each item and approves of the interim plan with the following conditions:

Item 1. OCD defers comment on the public notice.

Item 2. OCD approves of the design and completion of wells as proposed.

Item 3. OCD defers approval on ROC's plan to protect the proposed buried liners. OCD approves of deed recording to notify future land owners, however recommends ROC to propose additional methods such as fencing, signs, permanent markers, etc.

Item 4. Complete.

Item 5. and Item 6.

The proposal requested that OCD approve an interim sampling plan in order to provide technical data to assist ROC in determining the final levels of metals and geochemistry compounds that may be placed back in the excavation and provide delineation information. OCD hereby approves of ROC's request with the following conditions:

1. ROC will notify the OCD Santa Fe office and the OCD District office at least 72 hours in advance of all scheduled activities such that the OCD has the opportunity to witness the events and/or split samples during OCD's normal business hours.

2. Samples collected shall be analyzed for total values pursuant to EPA approved methods and approved by OCD.

3. ROC shall also receive written approval before covering any excavated area.

Item 7. The proposed up-gradient Monitor Well (MW-7) location shall be located an additional 300 feet up-gradient from the location as proposed in the March 30, 2001 Proposal figure 1.

ROC shall submit the results of the findings, leaching model information and results, and submit a final stage 2 abatement plan proposal for OCD approval by August 15, 2001.

Please be advised that OCD approval of this interim plan does not relieve ROC of liability should their operations fail to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve ROC of responsibility for compliance with any other federal, state, or local laws and/or regulations.

If you have any questions please do not hesitate to contact me at 505-476-3487 or e-mail WPRICE@state.nm.us.

Sincerely;

Wayne Price-Pet. Engr. Spec.

cc: OCD Hobbs Office
Bill McNeill-Land Owner
James P. Lyle-Branch Law Firm
Arcadis Geraghty & Miller- Sharon Hall e-mail

Bill McNeill
P.O. Box 1058
Hobbs, NM 88241

Hall, Sharon E.

From: Price, Wayne [WPrice@state.nm.us]
Sent: Friday, July 20, 2001 9:18 AM
To: 'Hall, Sharon E.'
Subject: RE: Rice AP-8 I-9

Approved!

> ----------
> From: Hall, Sharon E.[SMTP:SHall@arcadis-us.com]
> Sent: Friday, July 20, 2001 8:14 AM
> To: Price, Wayne
> Cc: Frank McCallum (E-mail)
> Subject: RE: Rice AP-8 I-9
>
> Thank you for your prompt response to my request for an extension. I
> understand your need to keep the project moving in a timely fashion. In
> order to complete the work we have proposed and ensure a the proper
> quality
> assurance, I would like to request a one week extension of the August 15
> deadline. With your approval the requested information will be submitted
> to
> you on August 22, 2001. Regards, Sharon Hall
>
> -----Original Message-----
> From: Price, Wayne [mailto:WPrice@state.nm.us]
> Sent: Wednesday, July 18, 2001 5:01 PM
> To: 'Hall, Sharon E.'
> Cc: 'Frank McCallum (E-mail)'
> Subject: RE: Rice AP-8 I-9
>
>
>
>
> > ----------
> > From: Price, Wayne
> > Sent: Wednesday, July 18, 2001 4:00 PM
> > To: Price, Wayne; 'Hall, Sharon E.'
> > Cc: Frank McCallum (E-mail)
> > Subject: RE: Rice AP-8 I-9
> >
> > Dear Sharon:
> >
> > Due to the amount of time this project has taken and the fact that OCD
> has
> > been very liberal with previous extensions, I do not feel that an
> > extension is in order at this time.
> > I want to see this project keep moving in a timely fashion.
> >
> > Thank You.
> > ----------
> > From: Hall, Sharon E.[SMTP:SHall@arcadis-us.com]
> > Sent: Wednesday, July 18, 2001 3:54 PM
> > To: Price, Wayne
> > Cc: Frank McCallum (E-mail)
> > Subject: RE: Rice AP-8 I-9
> >
> > Thank you for the attached letter. I would like to request an
> > extension of

> > the August 15, 2001 submittal of the results of the findings,
> > leaching model
> > and final Stage 2 Abatement Plan proposal to October 1, 2001. The
> > extension
> > is necessary in order to complete the sampling, receive and evaluate
> > the
> > analytical results, perform the leaching model and prepare the final
> > Stage 2
> > Abatement Plan Proposal. Your approval of this request for an
> > extension will
> > be appreciated. If you have any questions or need additional
> > information,
> > please call me at (915) 699-1381. Regards, Sharon Hall
> >
> >
> > -----Original Message-----
> > From: Price, Wayne [mailto:WPrice@state.nm.us]
> > Sent: Friday, July 13, 2001 12:08 PM
> > To: 'shall@gmgw.com'
> > Subject: Rice AP-8 I-9
> >
> >
> > Signed copy went out today!
> >
> > <<Revapp.doc>>
> >
> >
>

AP-8

APPENDIX B

SAMPLING, ANALYSIS AND LEACHING MODEL RESULTS

Sampling and analysis of soils was performed in order to provide technical data to determine the final levels of Resource Conservation and Recovery act (RCRA) metals and chlorides that can be placed into the excavation, and to provide delineation information. Three background samples, three samples from collected from proposed backfill materials, and the four sidewall and one bottom sample were collected from the excavation. The sidewall and and bottom samples were collected from locations that were most visibly impacted by hydrocarbons. Sample locations are shown in Appendix B, Figure 2. Each of the samples was analyzed for arsenic, barium, cadmium, total chromium, chromium (III), chromium (VI), lead, nickel, selenium, mercury, chloride, and soil pH.

The results of the soil analyses are summarized in Table 1 and laboratory reports are included in Appendix B. Based on the analytical results, barium, chromium (III), and chloride were detected at levels above background concentrations. These constituents are the focus of the remaining discussion to evaluate the potential for leaching and impacting groundwater.

The laboratory sample method uses acid to extract the metals in sediment. The "acid digest" method assumes that all of the metals are extracted from the solid phase and does not account for the fraction of the metals that are dissolved in the liquid phase of soil moisture when the sample was collected in the field. Therefore, the laboratory analysis overestimates the actual solid phase concentration. The important implication of this observation will occur after the soil is placed at the site. Soil moisture levels will gradually increase to field capacity if there is any groundwater recharge at the site (a necessary assumption for there to exist the potential for constituents to leach). As the soil moisture increases, the total mass quantified in the soil samples will reach a new equilibrium between the dissolved and adsorbed phases. This redistribution of constituents in the replacement soils was evaluated for each constituent exceeding background levels.

SOIL PARTITIONING CALCULATIONS

The total mass of a particular metal is distributed between two phases in soil, one fraction in the soil moisture and the other fraction adsorbed to the solid phase. The distribution of the concentration of the metal in the two phases is described by the distribution coefficient (K_d). The distribution coefficient is defined as follows:

$$K_d = \frac{C_s}{C_w} \qquad (1)$$

where: C_s= the fraction of the metal sorbed to the soil phase (mg/g) and

C_w= the fraction of the metal in the dissolved phase (mg/ml).

Equation 1 assumes a linear relationship between the processes of sorption and desorption.

The total mass in the adsorbed phase is computed by multiplying the soil concentration (C_s) by the bulk density of the soil (ρ_b, g/cm^3). The total mass in the dissolved phase in unsaturated conditions is determined by multiplying the pore water concentration (C_w) by the volumetric water content at field capacity of the soil (θ_v, %). Therefore, the total mass in both phases is determined by the following equation:

$$C_T = C_S \cdot \rho_B + C_W \cdot \theta_V \qquad (2)$$

where: C_T = to the total mass of the system (mg/cm^3) and is equivalent to the laboratory measured concentration.

Substitution and rearranging Equation 2 yields Equation 3:

$$C_T = C_W[\rho_B \cdot K_d + \theta_V] \qquad C_W = \frac{C_T(\rho_B + C_W \theta_V)}{\rho_B K_d + \theta_V} \qquad (3) = C_T$$

Using the relationship described by Equation 1, the adjusted equilibrium solid phase concentration of the metal was determined by Equation 4:

$$C_T = \frac{C_{es}}{K_d}[\rho_B \cdot K_d + \theta_V] \qquad (4)$$

where: C_{es} = the adjusted equilibrium soil concentration (mg/g).

The concentration of the metal in the pore water of the soil was then determined using the distribution constant:

$$C_{ew} = \frac{C_{es}}{K_d} = \frac{C_T K_d}{K_d(\rho_B K_d + \theta)} = \frac{C_T}{\rho_B K_d + \theta} \qquad (5)$$

where: C_{ew} = to the adjusted pore water equilibrium concentration (mg/ml)

Soils are heterogeneous with respect to the distribution of inorganic constituents. Therefore, the soil data were averaged to determine concentration values more representative of site conditions. Table 2 compares the soil and pore water equilibrium concentrations of background samples to the average concentration of the backfill samples. Table 3 compares the equilibrium concentrations of background samples to the average concentration from the sidewall and bottom samples. These tables show that the only constituent to exceed background soil concentrations and pore water concentrations is chloride.

$$C_{ew} = \frac{C_{es}}{K_d} =$$

LECHATE POTENTIAL

The Hydrologic Evaluation of Landfill Performance (HELP) model (**REFERNCE**) was used to calculate the water flux though the backfilled portion of the site in order to evaluate the potential effects of chloride on the groundwater system. The HELP model design for the site consisted of three layers: a soil cover, a compacted clay layer, and the blended backfill soils. The compacted clay liner was assumed to have a permeability no greater than 1 x 10^{-8}cm/sec. The entire excavation area was assumed have the potential to generate runoff. The final grade of the soil surface was assumed to be 4 percent, consistent with landfill closure regulations. The HELP model predicted a flux rate of 0.015 in/yr through the backfill. It should be noted that this value is conservative overestimate of the true recharge value. The HELP model was developed to ensure that engineering components were adequately designed and to evaluate the merits of engineered alternatives. Due to the presence of significant caliche in undisturbed soils adjacent to the site, it is unlikely that measurable recharge occurs at the site or that there is a significant potential for constituents to be leached from placement soils.

GROUNDWATER DILUTION FACTOR

The potential impact of the constituents on the groundwater system was determined by mixing the potential flux through the replacement soils with ambient groundwater. The potential concentration increase in the local groundwater system directly beneath the site was determined from the following equation:

$$C_X = \frac{Q_{GW} \cdot C_{GW} + Q_F \cdot C_{CW}}{Q_T} \qquad (6)$$

where; C_x = the increase in concentration

Q_{GW} = flux of the groundwater through the mixing zone (ft^3/yr),

C_{GW} = ambient concentration in groundwater (mg/L; assigned a value of zero to assess concentration increases),

Q_F = water flux through the landfill area (ft^3/yr),

Q_T = total groundwater flux = $Q_{GW} + Q_F$ (ft^3/yr), and

C_{CW} = constituent concentration in the pore water of the backfill soils (mg/L).

The mass loading to the groundwater flow system from the backfill soils is determined from the following equation:

$$Q_F \cdot C_{CW} \cdot 6.24x10^{-5} = M \qquad (7)$$

where: 6.24×10^{-5} = conversion factor (lbs/mg/L/ft^3) and

M = the total mass loading to the groundwater system (lbs/yr).

The groundwater flux through the mixing zone was computed from Darcy's Law:

$$Q_{GW} = K \cdot i \cdot A \qquad (8)$$

where: K = is the hydraulic conductivity (ft/yr),

i = the hydraulic gradient (ft/ft), and

A = is the cross-sectional area of the aquifer within the mixing zone perpendicular to groundwater flow.

Groundwater beneath the site is approximately 30 feet below land surface. There is no site-specific data on the hydraulic conductivity for the aquifer; however, there is published hydraulic conductivity data for this aquifer of greater than 2.0 ft/day . The hydraulic gradient was computed from observed water levels to be 0.00917 ft/ft. The cross-sectional area of the aquifer within the mixing zone was computed to be 2500 ft^2; the width of the placement area was approximately 250 feet and the mixing thickness was estimated to be ten feet (screen length). The flux of groundwater through this zone beneath the site is computed to be 16,735 ft^3/yr (0.24 gpm). The flow of water through the backfill was computed fro the HELP model results to be 55.5 ft^3/yr. Inputting the water balance data into Equation 6, the dilution factor from pore water to groundwater is computed to be 0.0033=[55.5/(55.5+16,735)].

POTENTIAL GROUNDWATER IMPACTS

Review of Tables 2 and 3 indicate that three constituents (barium, chromium (III) and chloride) are of potential concern because they were detected either in or in sidewall or bottom sample soils at levels exceeding background concentrations. The data were evaluated first by computing future equilibrium pore water concentrations and comparing the values to New Mexico action levels. This comparison is very conservative as it does not account for dilution that will occur after pore water mixes with groundwater. This comparison showed that barium and chromium (III) in both soil and pore water are the same as background levels. Of these constituents, chromium (III) is less than New Mexico action levels, and barium is slightly above. This concentration exceedence for barium is not associated with remedial activities, but is because barium is naturally abundant in the soils surrounding the site. This observation is supported by the groundwater data (average levels are 1.47 mg/L consistent with background pore water concentrations of 1.48 mg/L) and by the physical properties of barium in soils. The physical properties of barium cause it to be strongly adsorbed to soil (K_d is equal to 42), which limits its mobility in both soil water and groundwater; barium will move 900 times slower than water in soils and 150 times slower in groundwater. Therefore, the barium that has been detected in groundwater is not correlated to a recent release but is the result

2782 mg/L ?

of long-term leaching from natural soils.

Chloride has been detected in both the replacement soils, and the sidewall soils and bottom soils at levels above background soils. Chloride is highly soluble and can be expected to dissolve in pore water after the soils have been replaced. Dissolved concentrations in the pore water may range from 883 to 2782 mg/L. The dissolved concentration increase at these levels was determined using the groundwater dilution factor computed above to be 2.9 to 9.2 mg/L. This is a small incremental change in concentration relative to the New Mexico action levels.

ACCEPTABLE MAXIMUM SOIL CONCENTRATION LEVELS

The maximum site-specific soil concentrations were also computed. These values were computed from the difference between average groundwater concentrations and the New Mexico action levels. They also reflect the size of the site, the anticipated percolation rate and the ambient groundwater flow conditions. These results are summarized in Table 4. Barium indicates that soils should have concentrations consistent with background levels to ensure no further concentration increases. Chromium (III) is a very stable compound at pH levels above 7.0 (with increasing stability at increasing pHs) and will not partition into pore water at significant concentrations if the soil were 100% Cr. Given the high than neutral pHs of the soils samples and the buffering capacity of the underlying limestone the chromium will not leach from the soil under anticipated site conditions. The maximum acceptable chloride level in soils is 2920 mg/L as shown in Figure 4.

SEVERN TRENT SERVICES

STL Corpus Christi

ANALYTICAL REPORT

JOB NUMBER: 208029

Prepared For:

ARCADIS / G&M
1030 Andrews Highway
Suite 120
Midland, TX 79701

Attention: Sharon Hall

Date: 08/13/2001

RECEIVED

AUG 15 2001

ARCADIS Geraghty & Miller

Signature

Name: Chip Meador

Title: Laboratory Director

8/13/01

Date

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

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

SEVERN TRENT SERVICES

STL Corpus Christi

SAMPLE INFORMATION
Date: 08/13/2001

Job Number.: 208029
Customer...: ARCADIS / G&M
Attn.....: Sharon Hall

Project Number.....: 98000085
Customer Project ID....: MT000643.0001
Project Description....: Project - CRS

Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampled	Time Sampled	Date Received	Time Received
208029-1	BACKGROUND 1	Soil	07/27/2001	10:00	07/31/2001	10:00
208029-2	BACKGROUND 2	Soil	07/27/2001	10:15	07/31/2001	10:00
208029-3	BACKGROUND 3	Soil	07/27/2001	10:30	07/31/2001	10:00
208029-4	BACKFILL 1	Soil	07/27/2001	12:00	07/31/2001	10:00
208029-5	BACKFILL 2	Soil	07/27/2001	12:15	07/31/2001	10:00
208029-6	BACKFILL 3	Soil	07/27/2001	12:30	07/31/2001	10:00
208029-7	NORTH SIDEWALL	Soil	07/27/2001	10:45	07/31/2001	10:00
208029-8	SOUTH SIDEWALL	Soil	07/27/2001	11:00	07/31/2001	10:00
208029-9	EAST SIDEWALL	Soil	07/27/2001	11:15	07/31/2001	10:00
208029-10	WEST SIDEWALL	Soil	07/27/2001	11:30	07/31/2001	10:00
208029-11	BOTTOM	Soil	07/27/2001	11:45	07/31/2001	10:00

SEVERN TRENT SERVICES

STL Corpus Christi

LABORATORY TEST RESULTS

Job Number: 208029

Date: 08/13/2001

CUSTOMER: ARCADIS / G&M | PROJECT: MT000643.0001 | ATTN: Sharon Hall

Customer Sample ID: BACKGROUND 1
Date Sampled.....: 07/27/2001
Time Sampled.....: 10:00
Sample Matrix.....: Soil

Laboratory Sample ID: 208029-1
Date Received.....: 07/31/2001
Time Received.....: 10:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
SW-846 9045C	Corrosivity (pH - Solids & Wastes)	8.1	0.1	pH Units	08/01/01	cnw
EPA 300.0	Chloride, Solid	<10	10	mg/Kg	08/03/01	cnw
ASTM D 2974	Fraction Organic Carbon	4.1	0.1	%	08/01/01	deh
SW-846 6010B	Arsenic (As), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Barium (Ba), Solid	83	5	mg/Kg	08/03/01	jem
SW-846 6010B	Cadmium (Cd), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Chromium (Cr), Solid	9	5	mg/Kg	08/03/01	jem
SW-846 6010B	Lead (Pb), Solid	9	5	mg/Kg	08/03/01	jem
SW-846 6010B	Nickel (Ni), Solid	8	5	mg/Kg	08/03/01	jem
SW-846 6010B	Selenium (Se), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 7196A	Hexavalent Chromium, Solid	<2	2	mg/Kg	08/07/01	dnw
SW-846 7196A	Trivalent Chromium, Solid	9	5	mg/Kg	08/07/01	daj
SW-846 7471A	Mercury (Hg), Solid	<0.5	0.5	mg/Kg	08/02/01	edr
SW-846 3050B	Acid Digestion, Solids and Sludges	Complete			08/02/01	crw
SW-846 3060A	Alkaline Digestion for Cr+6	Complete			08/07/01	dnw

SEVERN TRENT SERVICES

STL Corpus Christi

LABORATORY TEST RESULTS

Job Number: 208029 Date: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Customer Sample ID: BACKGROUND 2
Date Sampled.....: 07/27/2001
Time Sampled.....: 10:15
Sample Matrix.....: Soil

Laboratory Sample ID: 208029-2
Date Received.....: 07/31/2001
Time Received.....: 10:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
SW-846 9045C	Corrosivity (pH - Solids & Wastes)	7.9	0.1	pH Units	08/01/01	cnw
EPA 300.0	Chloride, Solid	<10	10	mg/Kg	08/03/01	cnw
ASTM D 2974	Fraction Organic Carbon	4.5	0.1	%	08/02/01	deh
SW-846 6010B	Arsenic (As), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Barium (Ba), Solid	106	5	mg/Kg	08/03/01	jem
SW-846 6010B	Cadmium (Cd), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Chromium (Cr), Solid	11	5	mg/Kg	08/03/01	jem
SW-846 6010B	Lead (Pb), Solid	12	5	mg/Kg	08/03/01	jem
SW-846 6010B	Nickel (Ni), Solid	11	5	mg/Kg	08/03/01	jem
SW-846 6010B	Selenium (Se), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 7196A	Hexavalent Chromium, Solid	<2	2	mg/Kg	08/07/01	dnw
SW-846 7196A	Trivalent Chromium, Solid	11	5	mg/Kg	08/07/01	daj
SW-846 7471A	Mercury (Hg), Solid	<0.5	0.5	mg/Kg	08/02/01	edr
SW-846 3050B	Acid Digestion, Solids and Sludges	Complete			08/02/01	crw
SW-846 3060A	Alkaline Digestion for Cr+6	Complete			08/07/01	dnw

SEVERN TRENT SERVICES

STL Corpus Christi

LABORATORY TEST RESULTS

Job Number: 208029 Date: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Customer Sample ID: BACKGROUND 3
Date Sampled.....: 07/27/2001
Time Sampled.....: 10:30
Sample Matrix.....: Soil

Laboratory Sample ID: 208029-3
Date Received.....: 07/31/2001
Time Received.....: 10:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
SW-846 9045C	Corrosivity (pH - Solids & Wastes)	8.2	0.1	pH Units	08/01/01	cnw
EPA 300.0	Chloride, Solid	<10	10	mg/Kg	08/03/01	cnw
ASTM D 2974	Fraction Organic Carbon	3.6	0.1	%	08/01/01	deh
SW-846 6010B	Arsenic (As), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Barium (Ba), Solid	86	5	mg/Kg	08/03/01	jem
SW-846 6010B	Cadmium (Cd), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Chromium (Cr), Solid	9	5	mg/Kg	08/03/01	jem
SW-846 6010B	Lead (Pb), Solid	9	5	mg/Kg	08/03/01	jem
SW-846 6010B	Nickel (Ni), Solid	8	5	mg/Kg	08/03/01	jem
SW-846 6010B	Selenium (Se), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 7196A	Hexavalent Chromium, Solid	<2	2	mg/Kg	08/07/01	dnw
SW-846 7196A	Trivalent Chromium, Solid	9	5	mg/Kg	08/07/01	daj
SW-846 7471A	Mercury (Hg), Solid	<0.5	0.5	mg/Kg	08/02/01	edr
SW-846 3050B	Acid Digestion, Solids and Sludges	Complete			08/02/01	crw
SW-846 3060A	Alkaline Digestion for Cr+6	Complete			08/07/01	dnw

SEVERN TRENT SERVICES

STL Corpus Christi

LABORATORY TEST RESULTS

Job Number: 208029

Date: 08/13/2001

CUSTOMER: ARCADIS / G&M | PROJECT: MT000643.0001 | ATTN: Sharon Hall

Customer Sample ID: BACKFILL 1
Date Sampled.....: 07/27/2001
Time Sampled.....: 12:00
Sample Matrix.....: Soil

Laboratory Sample ID: 208029-4
Date Received.....: 07/31/2001
Time Received.....: 10:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
SW-846 9045C	Corrosivity (pH - Solids & Wastes)	8.2	0.1	pH Units	08/01/01	cnw
EPA 300.0	Chloride, Solid	70	10	mg/Kg	08/03/01	cnw
ASTM D 2974	Fraction Organic Carbon	2.1	0.1	%	08/01/01	deh
SW-846 6010B	Arsenic (As), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Barium (Ba), Solid	99	5	mg/Kg	08/03/01	jem
SW-846 6010B	Cadmium (Cd), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Chromium (Cr), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Lead (Pb), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Nickel (Ni), Solid	6	5	mg/Kg	08/03/01	jem
SW-846 6010B	Selenium (Se), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 7196A	Hexavalent Chromium, Solid	<2	2	mg/Kg	08/07/01	dnw
SW-846 7196A	Trivalent Chromium, Solid	<5	5	mg/Kg	08/07/01	daj
SW-846 7471A	Mercury (Hg), Solid	<0.5	0.5	mg/Kg	08/02/01	edr
SW-846 3050B	Acid Digestion, Solids and Sludges	Complete			08/02/01	crw
SW-846 3060A	Alkaline Digestion for Cr+6	Complete			08/07/01	dnw

SEVERN TRENT SERVICES

STL Corpus Christi

LABORATORY TEST RESULTS

Job Number: 208029 Date: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Customer Sample ID: BACKFILL 2
Date Sampled.....: 07/27/2001
Time Sampled.....: 12:15
Sample Matrix.....: Soil

Laboratory Sample ID: 208029-5
Date Received.....: 07/31/2001
Time Received.....: 10:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
SW-846 9045C	Corrosivity (pH - Solids & Wastes)	8.1	0.1	pH Units	08/01/01	cnw
EPA 300.0	Chloride, Solid	60	10	mg/Kg	08/03/01	cnw
ASTM D 2974	Fraction Organic Carbon	2.2	0.1	%	08/01/01	deh
SW-846 6010B	Arsenic (As), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Barium (Ba), Solid	123	5	mg/Kg	08/03/01	jem
SW-846 6010B	Cadmium (Cd), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Chromium (Cr), Solid	9	5	mg/Kg	08/03/01	jem
SW-846 6010B	Lead (Pb), Solid	6	5	mg/Kg	08/03/01	jem
SW-846 6010B	Nickel (Ni), Solid	10	5	mg/Kg	08/03/01	jem
SW-846 6010B	Selenium (Se), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 7196A	Hexavalent Chromium, Solid	<2	2	mg/Kg	08/07/01	dnw
SW-846 7196A	Trivalent Chromium, Solid	9	5	mg/Kg	08/07/01	daj
SW-846 7471A	Mercury (Hg), Solid	<0.5	0.5	mg/Kg	08/02/01	edr
SW-846 3050B	Acid Digestion, Solids and Sludges	Complete			08/02/01	crw
SW-846 3060A	Alkaline Digestion for Cr+6	Complete			08/07/01	dnw

SEVERN TRENT SERVICES

STL Corpus Christi

LABORATORY TEST RESULTS

Job Number: 208029 Date: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Customer Sample ID: BACKFILL 3
Date Sampled.....: 07/27/2001
Time Sampled.....: 12:30
Sample Matrix.....: Soil

Laboratory Sample ID: 208029-6
Date Received.....: 07/31/2001
Time Received.....: 10:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
SW-846 9045C	Corrosivity (pH - Solids & Wastes)	8.2	0.1	pH Units	08/01/01	cnw
EPA 300.0	Chloride, Solid	<10	10	mg/Kg	08/03/01	cnw
ASTM D 2974	Fraction Organic Carbon	1.6	0.1	%	08/01/01	deh
SW-846 6010B	Arsenic (As), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Barium (Ba), Solid	25	5	mg/Kg	08/03/01	jem
SW-846 6010B	Cadmium (Cd), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Chromium (Cr), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Lead (Pb), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Nickel (Ni), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Selenium (Se), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 7196A	Hexavalent Chromium, Solid	<2	2	mg/Kg	08/07/01	dnw
SW-846 7196A	Trivalent Chromium, Solid	<5	5	mg/Kg	08/07/01	daj
SW-846 7471A	Mercury (Hg), Solid	<0.5	0.5	mg/Kg	08/02/01	edr
SW-846 3050B	Acid Digestion, Solids and Sludges	Complete			08/02/01	crw
SW-846 3060A	Alkaline Digestion for Cr+6	Complete			08/07/01	dnw

SEVERN TRENT SERVICES

STL Corpus Christi

LABORATORY TEST RESULTS

Job Number: 208029 Date: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Customer Sample ID: NORTH SIDEWALL
Date Sampled.....: 07/27/2001
Time Sampled.....: 10:45
Sample Matrix.....: Soil

Laboratory Sample ID: 208029-7
Date Received.....: 07/31/2001
Time Received.....: 10:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
SW-846 9045C	Corrosivity (pH - Solids & Wastes)	8.2	0.1	pH Units	08/01/01	cnw
EPA 300.0	Chloride, Solid	130	10	mg/Kg	08/03/01	cnw
ASTM D 2974	Fraction Organic Carbon	2.1	0.1	%	08/01/01	deh
SW-846 6010B	Arsenic (As), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Barium (Ba), Solid	105	5	mg/Kg	08/03/01	jem
SW-846 6010B	Cadmium (Cd), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Chromium (Cr), Solid	9	5	mg/Kg	08/03/01	jem
SW-846 6010B	Lead (Pb), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Nickel (Ni), Solid	6	5	mg/Kg	08/03/01	jem
SW-846 6010B	Selenium (Se), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 7196A	Hexavalent Chromium, Solid	<2	2	mg/Kg	08/07/01	dnw
SW-846 7196A	Trivalent Chromium, Solid	9	5	mg/Kg	08/07/01	daj
SW-846 7471A	Mercury (Hg), Solid	<0.5	0.5	mg/Kg	08/02/01	edr
SW-846 3050B	Acid Digestion, Solids and Sludges	Complete			08/02/01	crw
SW-846 3060A	Alkaline Digestion for Cr+6	Complete			08/07/01	dnw

SEVERN TRENT SERVICES

STL Corpus Christi

LABORATORY TEST RESULTS

Job Number: 208029 Date: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Customer Sample ID: SOUTH SIDEWALL
Date Sampled.....: 07/27/2001
Time Sampled.....: 11:00
Sample Matrix.....: Soil

Laboratory Sample ID: 208029-8
Date Received.....: 07/31/2001
Time Received.....: 10:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
SW-846 9045C	Corrosivity (pH - Solids & Wastes)	8.3	0.1	pH Units	08/01/01	cnw
EPA 300.0	Chloride, Solid	230	10	mg/Kg	08/03/01	cnw
ASTM D 2974	Fraction Organic Carbon	1.7	0.1	%	08/01/01	deh
SW-846 6010B	Arsenic (As), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Barium (Ba), Solid	75	5	mg/Kg	08/03/01	jem
SW-846 6010B	Cadmium (Cd), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Chromium (Cr), Solid	8	5	mg/Kg	08/03/01	jem
SW-846 6010B	Lead (Pb), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Nickel (Ni), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Selenium (Se), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 7196A	Hexavalent Chromium, Solid	<2	2	mg/Kg	08/07/01	dnw
SW-846 7196A	Trivalent Chromium, Solid	8	5	mg/Kg	08/07/01	daj
SW-846 7471A	Mercury (Hg), Solid	<0.5	0.5	mg/Kg	08/02/01	edr
SW-846 3050B	Acid Digestion, Solids and Sludges	Complete			08/02/01	crw
SW-846 3060A	Alkaline Digestion for Cr+6	Complete			08/07/01	dnw

SEVERN TRENT SERVICES

STL Corpus Christi

LABORATORY TEST RESULTS

Job Number: 208029 Date: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Customer Sample ID: EAST SIDEWALL
Date Sampled.....: 07/27/2001
Time Sampled.....: 11:15
Sample Matrix.....: Soil

Laboratory Sample ID: 208029-9
Date Received.....: 07/31/2001
Time Received.....: 10:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
SW-846 9045C	Corrosivity (pH - Solids & Wastes)	8.4	0.1	pH Units	08/01/01	cnw
EPA 300.0	Chloride, Solid	400	100	mg/Kg	08/03/01	cnw
ASTM D 2974	Fraction Organic Carbon	2.5	0.1	%	08/01/01	deh
SW-846 6010B	Arsenic (As), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Barium (Ba), Solid	122	5	mg/Kg	08/03/01	jem
SW-846 6010B	Cadmium (Cd), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Chromium (Cr), Solid	7	5	mg/Kg	08/03/01	jem
SW-846 6010B	Lead (Pb), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Nickel (Ni), Solid	11	5	mg/Kg	08/03/01	jem
SW-846 6010B	Selenium (Se), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 7196A	Hexavalent Chromium, Solid	<2	2	mg/Kg	08/07/01	dnw
SW-846 7196A	Trivalent Chromium, Solid	7	5	mg/Kg	08/07/01	daj
SW-846 7471A	Mercury (Hg), Solid	<0.5	0.5	mg/Kg	08/02/01	edr
SW-846 3050B	Acid Digestion, Solids and Sludges	Complete			08/02/01	crw
SW-846 3060A	Alkaline Digestion for Cr+6	Complete			08/07/01	dnw

SEVERN TRENT SERVICES

STL Corpus Christi

LABORATORY TEST RESULTS

Job Number: 208029 Date: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Customer Sample ID: WEST SIDEWALL
Date Sampled.....: 07/27/2001
Time Sampled.....: 11:30
Sample Matrix.....: Soil

Laboratory Sample ID: 208029-10
Date Received.....: 07/31/2001
Time Received.....: 10:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
SW-846 9045C	Corrosivity (pH - Solids & Wastes)	8.8	0.1	pH Units	08/01/01	cnw
EPA 300.0	Chloride, Solid	<10	10	mg/Kg	08/03/01	cnw
ASTM D 2974	Fraction Organic Carbon	2.4	0.1	%	08/01/01	deh
SW-846 6010B	Arsenic (As), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Barium (Ba), Solid	48	5	mg/Kg	08/03/01	jem
SW-846 6010B	Cadmium (Cd), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Chromium (Cr), Solid	12	5	mg/Kg	08/03/01	jem
SW-846 6010B	Lead (Pb), Solid	6	5	mg/Kg	08/03/01	jem
SW-846 6010B	Nickel (Ni), Solid	11	5	mg/Kg	08/03/01	jem
SW-846 6010B	Selenium (Se), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 7196A	Hexavalent Chromium, Solid	<2	2	mg/Kg	08/07/01	dnw
SW-846 7196A	Trivalent Chromium, Solid	12	5	mg/Kg	08/07/01	daj
SW-846 7471A	Mercury (Hg), Solid	<0.5	0.5	mg/Kg	08/02/01	edr
SW-846 3050B	Acid Digestion, Solids and Sludges	Complete			08/02/01	crw
SW-846 3060A	Alkaline Digestion for Cr+6	Complete			08/07/01	dnw

SEVERN TRENT SERVICES

STL Corpus Christi

LABORATORY TEST RESULTS

Job Number: 208029 Date: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Customer Sample ID: BOTTOM
Date Sampled.....: 07/27/2001
Time Sampled.....: 11:45
Sample Matrix.....: Soil

Laboratory Sample ID: 208029-11
Date Received.....: 07/31/2001
Time Received.....: 10:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
SW-846 9045C	Corrosivity (pH - Solids & Wastes)	9.6	0.1	pH Units	08/01/01	cnw
EPA 300.0	Chloride, Solid	210	10	mg/Kg	08/03/01	cnw
ASTM D 2974	Fraction Organic Carbon	1.7	0.1	%	08/02/01	deh
SW-846 6010B	Arsenic (As), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Barium (Ba), Solid	48	5	mg/Kg	08/03/01	jem
SW-846 6010B	Cadmium (Cd), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Chromium (Cr), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Lead (Pb), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Nickel (Ni), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 6010B	Selenium (Se), Solid	<5	5	mg/Kg	08/03/01	jem
SW-846 7196A	Hexavalent Chromium, Solid	<2	2	mg/Kg	08/07/01	dnw
SW-846 7196A	Trivalent Chromium, Solid	<5	5	mg/Kg	08/07/01	daj
SW-846 7471A	Mercury (Hg), Solid	<0.5	0.5	mg/Kg	08/02/01	edr
SW-846 3050B	Acid Digestion, Solids and Sludges	Complete			08/02/01	crw
SW-846 3060A	Alkaline Digestion for Cr+6	Complete			08/07/01	dnw

SEVERN TRENT SERVICES

STL Corpus Christi

QUALITY CONTROL RESULTS

Job Number.: 208029 Report Date.: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Test Method.....: SW-846 9045C Batch.....: 60238 Analyst...: cnw
Method Description.: Corrosivity (pH-Solids) Units.....: pH Units Test Code.: CORSOL
Parameter.....: Corrosivity (pH - Solids & Wastes)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
ICV		C10122A	7.03		7.00		100.4	%	90-110	08/01/2001	1700
LCS		CW10723Z	7.00		7.00		100.0	%	90-110	08/01/2001	1702
MD	208019-1		8.66			7.94	8.7	R	20	08/01/2001	1706
CCV		C10122A	7.04		7.00		100.6	%	80-120	08/01/2001	1726
MD	208029-11		9.59			9.58	0.1	R	20	08/01/2001	1748
CCV		C10122A	7.04		7.00		100.6	%	80-120	08/01/2001	1750

Test Method.....: EPA 300.0 Batch.....: 60314 Analyst...: cnw
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
ICB		080301	0.37							08/03/2001	1000
MB		080301	0.32							08/03/2001	1019
ICV		IC10803G	9.72		10.00		97.2	%	90-110	08/03/2001	1037
LCS		IC10803H	9.33		10.00		93.3	%	90-110	08/03/2001	1056
MS	208029-5	IC10803E	15.30		10.00	6.04	92.6	%	75-125	08/03/2001	1248
MSD	208029-5	IC10803E	15.17	15.30	10.00	6.04	91.3	%	75-125	08/03/2001	1307
							0.9	R	20		
CCB		080301	0.28							08/03/2001	1440
CCV		IC10803G	9.45		10.00		94.5	%	90-110	08/03/2001	1459
MS	208019-2	IC10803E	21.62		10.00	11.11	105.1	%	75-125	08/03/2001	1805
MSD	208019-2	IC10803E	21.52	21.62	10.00	11.11	104.1	%	75-125	08/03/2001	1824
							0.5	R	20		
CCB		080301	0.30							08/03/2001	1901
CCV		IC10803G	9.52		10.00		95.2	%	90-110	08/03/2001	1920

Test Method.....: ASTM D 2974 Batch.....: 60297 Analyst...: deh
Method Description.: Fraction Organic Carbon Units.....: % Test Code.: FOC
Parameter.....: Fraction Organic Carbon

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
MB		080101	0							08/01/2001	1630
MD	208029-1		4.0950			4.1165	0.5	R	20	08/01/2001	1638

Test Method.....: ASTM D 2974 Batch.....: 60346 Analyst...: deh
Method Description.: Fraction Organic Carbon Units.....: % Test Code.: FOC
Parameter.....: Fraction Organic Carbon

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
MB		080201	0.00097							08/02/2001	1300
MD	208029-2		4.7058			4.4674	5.2	R	20	08/02/2001	1310

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

SEVERN TRENT SERVICES

STL Corpus Christi

QUALITY CONTROL RESULTS

Job Number.: 208029 Report Date.: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Test Method.....: SW-846 6010B Batch.....: 60306 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: AS
Parameter.....: Arsenic (As)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
RS		M0312	2.00869143		2.00		100.4	%	90-110	08/03/2001	1028
ICV		M0303	0.99601478		1.00		99.6	%	90-110	08/03/2001	1045
ICV		M0310	0.98907193		1.00		98.9	%	90-110	08/03/2001	1056
ICB			0.00301977							08/03/2001	1110
CCV		M0322	0.99291512		1.00		99.3	%	90-110	08/03/2001	1127
CCB			0.00253982							08/03/2001	1138
MB		3050	0.00417649							08/03/2001	1141
LCS		M320	0.48829051		0.500		97.7	%	80-110	08/03/2001	1145
MS	208029-4	M320	0.50959626		0.500	0.01792931	98.3	%	69-119	08/03/2001	1215
MSD	208029-4	M320	0.51724509	0.50959626	0.500	0.01792931	99.9	%	69-119	08/03/2001	1222
							1.5	R	20		
PDS	208029-4	M320B	0.97313612		1.00	0.01792931	95.5	%	75-125	08/03/2001	1229
PSD	208029-4	M320B	0.98231157	0.97313612	1.00	0.01792931	96.4	%	75-125	08/03/2001	1236
							0.9	R	20		
CCV		M0322	0.98669684		1.00		98.7	%	90-110	08/03/2001	1243
CCB			0.00441208							08/03/2001	1257
CCV		M0322	0.98786334		1.00		98.8	%	90-110	08/03/2001	1338
CCB			0.00131749							08/03/2001	1352

Test Method.....: SW-846 6010B Batch.....: 60323 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: AS
Parameter.....: Arsenic (As)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
RS		M0312	2.00869143		2.00		100.4	%	90-110	08/03/2001	1028
ICV		M0303	0.99601478		1.00		99.6	%	90-110	08/03/2001	1045
ICV		M0310	0.98907193		1.00		98.9	%	90-110	08/03/2001	1056
ICB			0.00301977							08/03/2001	1110
CCV		M0322	0.99291512		1.00		99.3	%	90-110	08/03/2001	1127
CCB			0.00253982							08/03/2001	1138
MB		3050	0.00417649							08/03/2001	1141
LCS		M320	0.48829051		0.500		97.7	%	80-110	08/03/2001	1145
MS	208029-4	M320	0.50959626		0.500	0.01792931	98.3	%	69-119	08/03/2001	1215
MSD	208029-4	M320	0.51724509	0.50959626	0.500	0.01792931	99.9	%	69-119	08/03/2001	1222
							1.5	R	20		
PDS	208029-4	M320B	0.97313612		1.00	0.01792931	95.5	%	75-125	08/03/2001	1229
PSD	208029-4	M320B	0.98231157	0.97313612	1.00	0.01792931	96.4	%	75-125	08/03/2001	1236
							0.9	R	20		
CCV		M0322	0.98669684		1.00		98.7	%	90-110	08/03/2001	1243
CCB			0.00441208							08/03/2001	1257
CCV		M0322	0.98786334		1.00		98.8	%	90-110	08/03/2001	1338
CCB			0.00131749							08/03/2001	1352
CCB			-0.0155303							08/03/2001	1511
MB		3015	-0.0173645							08/03/2001	1515
LCS		M319	0.44279047		0.500		88.6	%	80-110	08/03/2001	1519
CCV		M0322	0.97917206		1.00		97.9	%	90-110	08/03/2001	1553
CCB			-0.0167773							08/03/2001	1607
MS	208067-12	M320	0.42792461		0.500	-0.0216732	89.9	%	77-121	08/03/2001	1623
MSD	208067-12	M320	0.44418278	0.42792461	0.500	-0.0216732	93.2	%	77-121	08/03/2001	1627
							3.7	R	20		
	208067-12	M320B	0.94429242		1.00	-0.0216732	96.6	%	75-125	08/03/2001	1631

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

SEVERN TRENT SERVICES

STL Corpus Christi

QUALITY CONTROL RESULTS

Job Number.: 208029 Report Date.: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Test Method.....: SW-846 6010B Batch.....: 60323 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: AS
Parameter.....: Arsenic (As)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
PSD	208067-12	M320B	0.94534342	0.94429242	1.00	-0.0216732	96.7	%	75-125	08/03/2001	1638
							0.1	R	20		
CCV		M0322	0.96830782		1.00		96.8	%	90-110	08/03/2001	1656
CCB			-0.0156985							08/03/2001	1707
MB		3050	-0.0172232							08/03/2001	1721
LCS		M320	0.46413704		0.500		92.8	%	80-110	08/03/2001	1725
CCV		M0322	0.96367863		1.00		96.4	%	90-110	08/03/2001	1812
CCB			-0.0164583							08/03/2001	1822
MS	208083-12	M320	0.44554727		0.500	0.00534837	88.0	%	69-119	08/03/2001	1854
MSD	208083-12	M320	0.41602893	0.44554727	0.500	0.00534837	82.1	%	69-119	08/03/2001	1902
							6.9	R	20		
PDS	208083-12	M320B	0.93800674		1.00	0.00534837	93.3	%	75-125	08/03/2001	1909
PSD	208083-12	M320B	0.94098227	0.93800674	1.00	0.00534837	93.6	%	75-125	08/03/2001	1916
							0.3	R	20		
CCV		M0322	0.95580077		1.00		95.6	%	90-110	08/03/2001	1931
CCB			-0.0158291							08/03/2001	1942
MB		3015	-0.0207307							08/03/2001	2013
LCS		M320	0.46271364		0.500		92.5	%	80-110	08/03/2001	2017
[illegible]V		M0322	0.95515162		1.00		95.5	%	90-110	08/03/2001	2024
[illegible]			-0.0144584							08/03/2001	2035
MB		3015	-0.0194653							08/03/2001	2046
LCS		M320	0.39977369		0.500		80.0	%	80-110	08/03/2001	2050
CCV		M0322	0.95535404		1.00		95.5	%	90-110	08/03/2001	2118
CCB			-0.0151105							08/03/2001	2128
CCV		M0322	0.96045064		1.00		96.0	%	90-110	08/03/2001	2155
CCB			-0.0149780							08/03/2001	2209

Test Method.....: SW-846 6010B Batch.....: 60306 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: BA
Parameter.....: Barium (Ba)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
RS		M0312	1.95614644		2.00		97.8	%	90-110	08/03/2001	1028
ICV		M0305	0.98011672		1.00		98.0	%	90-110	08/03/2001	1052
ICV		M0310	0.96236166		1.00		96.2	%	90-110	08/03/2001	1056
ICB			-0.0001822							08/03/2001	1110
CCV		M0322	0.95718028		1.00		95.7	%	90-110	08/03/2001	1127
CCB			-0.0002714							08/03/2001	1138
MB		3050	0.00148885							08/03/2001	1141
LCS		M320	0.49066868		0.500		98.1	%	86-111	08/03/2001	1145
MS	208029-4	M320	1.44451038		0.500	0.98975473	91.0	%	59-137	08/03/2001	1215
MSD	208029-4	M320	1.91312345	1.44451038	0.500	0.98975473	184.7	%	59-137	08/03/2001	1222
							27.9	R	20		
PDS	208029-4	M320B	1.79753437		1.00	0.98975473	80.8	%	75-125	08/03/2001	1229
PSD	208029-4	M320B	1.81425684	1.79753437	1.00	0.98975473	82.5	%	75-125	08/03/2001	1236
							0.9	R	20		
CCV		M0322	0.95821336		1.00		95.8	%	90-110	08/03/2001	1243
CCB			-0.0002097							08/03/2001	1257
CCV		M0322	0.95541862		1.00		95.5	%	90-110	08/03/2001	1338
CCB			-0.0001856							08/03/2001	1352

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

SEVERN TRENT SERVICES

STL Corpus Christi

QUALITY CONTROL RESULTS

Job Number.: 208029 Report Date.: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Test Method.....: SW-846 6010B Batch.....: 60323 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: BA
Parameter.....: Barium (Ba)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
RS		M0312	1.95614644		2.00		97.8	%	90-110	08/03/2001	1028
ICV		M0305	0.98011672		1.00		98.0	%	90-110	08/03/2001	1052
ICV		M0310	0.96236166		1.00		96.2	%	90-110	08/03/2001	1056
ICB			-0.0001822							08/03/2001	1110
CCV		M0322	0.95718028		1.00		95.7	%	90-110	08/03/2001	1127
CCB			-0.0002714							08/03/2001	1138
MB		3050	0.00148885							08/03/2001	1141
LCS		M320	0.49066868		0.500		98.1	%	86-111	08/03/2001	1145
MS	208029-4	M320	1.44451038		0.500	0.98975473	91.0	%	59-137	08/03/2001	1215
MSD	208029-4	M320	1.91312345	1.44451038	0.500	0.98975473	184.7	%	59-137	08/03/2001	1222
							27.9	R	20		
PDS	208029-4	M320B	1.79753437		1.00	0.98975473	80.8	%	75-125	08/03/2001	1229
PSD	208029-4	M320B	1.81425684	1.79753437	1.00	0.98975473	82.5	%	75-125	08/03/2001	1236
							0.9	R	20		
CCV		M0322	0.95821336		1.00		95.8	%	90-110	08/03/2001	1243
CCB			-0.0002097							08/03/2001	1257
CCV		M0322	0.95541862		1.00		95.5	%	90-110	08/03/2001	1338
CCB			-0.0001856							08/03/2001	1352
[illegible]			-0.0005728							08/03/2001	1511
		3015	-0.0005544							08/03/2001	1515
LCS		M319	0.46810603		0.500		93.6	%	86-111	08/03/2001	1519
CCV		M0322	0.96807272		1.00		96.8	%	90-110	08/03/2001	1553
CCB			-0.0005629							08/03/2001	1607
MS	208067-12	M320	0.44190132		0.500	0.02532079	83.3	%	77-111	08/03/2001	1623
MSD	208067-12	M320	0.46310138	0.44190132	0.500	0.02532079	87.6	%	77-111	08/03/2001	1627
							4.7	R	20		
PDS	208067-12	M320B	0.91983472		1.00	0.02532079	89.5	%	75-125	08/03/2001	1631
PSD	208067-12	M320B	0.91899983	0.91983472	1.00	0.02532079	89.4	%	75-125	08/03/2001	1638
							0.1	R	20		
CCV		M0322	0.96955066		1.00		97.0	%	90-110	08/03/2001	1656
CCB			-0.0004486							08/03/2001	1707
MB		3050	0.00209750							08/03/2001	1721
LCS		M320	0.50062002		0.500		100.1	%	86-111	08/03/2001	1725
CCV		M0322	0.98388736		1.00		98.4	%	90-110	08/03/2001	1812
CCB			-0.0004795							08/03/2001	1822
PDS	208083-12	M320B	1.88214973		1.00	1.03875366	84.3	%	75-125	08/03/2001	1909
PSD	208083-12	M320B	1.88960679	1.88214973	1.00	1.03875366	85.1	%	75-125	08/03/2001	1916
							0.4	R	20		
CCV		M0322	0.97463088		1.00		97.5	%	90-110	08/03/2001	1931
CCB			-0.0005438							08/03/2001	1942
MB		3015	-0.0003625							08/03/2001	1945
MB		3015	-0.0003431							08/03/2001	2013
LCS		M320	0.49701407		0.500		99.4	%	86-111	08/03/2001	2017
CCV		M0322	0.98604770		1.00		98.6	%	90-110	08/03/2001	2024
CCB			-0.0005788							08/03/2001	2035
CCV		M0322	0.99535679		1.00		99.5	%	90-110	08/03/2001	2118
CCB			-0.0003912							08/03/2001	2128
CCV		M0322	0.99401666		1.00		99.4	%	90-110	08/03/2001	2155
CCB			-0.0005317							08/03/2001	2209

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

SEVERN TRENT SERVICES

STL Corpus Christi

QUALITY CONTROL RESULTS

Job Number.: 208029 Report Date.: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Test Method.....: SW-846 6010B Batch.....: 60306 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: CD
Parameter.....: Cadmium (Cd)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
RS		M0312	2.03193282		2.00		101.6	%	90-110	08/03/2001	1028
ICV		M0303	1.06671888		1.00		106.7	%	90-110	08/03/2001	1045
ICV		M0310	1.07490693		1.00		107.5	%	90-110	08/03/2001	1056
ICB			0.00012160							08/03/2001	1110
CCV		M0322	1.07971376		1.00		108.0	%	90-110	08/03/2001	1127
CCB			0.00046536							08/03/2001	1138
MB		3050	0.00108383							08/03/2001	1141
LCS		M320	0.52765867		0.500		105.5	%	78-109	08/03/2001	1145
MS	208029-4	M320	0.49318245		0.500	-0.0014245	98.9	%	73-108	08/03/2001	1215
MSD	208029-4	M320	0.49168240	0.49318245	0.500	-0.0014245	98.6	%	73-108	08/03/2001	1222
							0.3	R	20		
PDS	208029-4	M320B	0.95390702		1.00	-0.0014245	95.5	%	75-125	08/03/2001	1229
PSD	208029-4	M320B	0.95828694	0.95390702	1.00	-0.0014245	96.0	%	75-125	08/03/2001	1236
							0.5	R	20		
CCV		M0322	1.07585491		1.00		107.6	%	90-110	08/03/2001	1243
CCB			0.00020484							08/03/2001	1257
CCV		M0322	1.06275643		1.00		106.3	%	90-110	08/03/2001	1338
CCB			0.00022037							08/03/2001	1352

Test Method.....: SW-846 6010B Batch.....: 60323 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: CD
Parameter.....: Cadmium (Cd)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
RS		M0312	2.03193282		2.00		101.6	%	90-110	08/03/2001	1028
ICV		M0303	1.06671888		1.00		106.7	%	90-110	08/03/2001	1045
ICV		M0310	1.07490693		1.00		107.5	%	90-110	08/03/2001	1056
ICB			0.00012160							08/03/2001	1110
CCV		M0322	1.07971376		1.00		108.0	%	90-110	08/03/2001	1127
CCB			0.00046536							08/03/2001	1138
MB		3050	0.00108383							08/03/2001	1141
LCS		M320	0.52765867		0.500		105.5	%	78-109	08/03/2001	1145
MS	208029-4	M320	0.49318245		0.500	-0.0014245	98.9	%	73-108	08/03/2001	1215
MSD	208029-4	M320	0.49168240	0.49318245	0.500	-0.0014245	98.6	%	73-108	08/03/2001	1222
							0.3	R	20		
PDS	208029-4	M320B	0.95390702		1.00	-0.0014245	95.5	%	75-125	08/03/2001	1229
PSD	208029-4	M320B	0.95828694	0.95390702	1.00	-0.0014245	96.0	%	75-125	08/03/2001	1236
							0.5	R	20		
CCV		M0322	1.07585491		1.00		107.6	%	90-110	08/03/2001	1243
CCB			0.00020484							08/03/2001	1257
CCV		M0322	1.06275643		1.00		106.3	%	90-110	08/03/2001	1338
CCB			0.00022037							08/03/2001	1352
CCB			-0.0038572							08/03/2001	1511
MB		3015	-0.0040739							08/03/2001	1515
LCS		M319	0.49796750		0.500		99.6	%	78-109	08/03/2001	1519
CCV		M0322	1.06542670		1.00		106.5	%	90-110	08/03/2001	1553
CCB			-0.0037518							08/03/2001	1607
MS	208067-12	M320	0.45956171		0.500	-0.0035554	92.6	%	79-110	08/03/2001	1623
MSD	208067-12	M320	0.47802345	0.45956171	0.500	-0.0035554	96.3	%	79-110	08/03/2001	1627
							3.9	R	20		
[illegible]	208067-12	M320B	1.00041905		1.00	-0.0035554	100.4	%	75-125	08/03/2001	1631

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

SEVERN TRENT SERVICES

STL Corpus Christi

QUALITY CONTROL RESULTS

Job Number.: 208029 Report Date.: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Test Method.....: SW-846 6010B Batch.....: 60323 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: CD
Parameter.....: Cadmium (Cd)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
PSD	208067-12	M320B	0.98953158	1.00041905	1.00	-0.0035554	99.3	%	75-125	08/03/2001	1638
							1.1	R	20		
CCV		M0322	1.05071492		1.00		105.1	%	90-110	08/03/2001	1656
CCB			-0.0036369							08/03/2001	1707
MB		3050	-0.0037182							08/03/2001	1721
LCS		M320	0.52275301		0.500		104.6	%	78-109	08/03/2001	1725
CCV		M0322	1.04208119		1.00		104.2	%	90-110	08/03/2001	1812
CCB			-0.0037164							08/03/2001	1822
MS	208083-12	M320	0.44289153		0.500	-0.0053456	89.6	%	73-108	08/03/2001	1854
MSD	208083-12	M320	0.40480472	0.44289153	0.500	-0.0053456	82.0	%	73-108	08/03/2001	1902
							9.0	R	20		
PDS	208083-12	M320B	0.90582701		1.00	-0.0053456	91.1	%	75-125	08/03/2001	1909
PSD	208083-12	M320B	0.91208081	0.90582701	1.00	-0.0053456	91.7	%	75-125	08/03/2001	1916
							0.7	R	20		
CCV		M0322	1.04544395		1.00		104.5	%	90-110	08/03/2001	1931
CCB			-0.0037996							08/03/2001	1942
MB		3015	-0.0041221							08/03/2001	1945
LCS		M320	0.44400063		0.500		88.8	%	78-109	08/03/2001	1949
		3015	-0.0040894							08/03/2001	2013
		M320	0.50775169		0.500		101.6	%	78-109	08/03/2001	2017
CCV		M0322	1.01814668		1.00		101.8	%	90-110	08/03/2001	2024
CCB			-0.0035023							08/03/2001	2035
MB		3015	-0.0039154							08/03/2001	2046
LCS		M320	0.45091741		0.500		90.2	%	78-109	08/03/2001	2050
CCV		M0322	1.03810572		1.00		103.8	%	90-110	08/03/2001	2118
CCB			-0.0035039							08/03/2001	2128
CCV		M0322	1.05163243		1.00		105.2	%	90-110	08/03/2001	2155
CCB			-0.0037279							08/03/2001	2209

Test Method.....: SW-846 6010B Batch.....: 60306 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: CR
Parameter.....: Chromium (Cr)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
RS		M0312	2.00524605		2.00		100.3	%	90-110	08/03/2001	1028
ICV		M0303	1.03334225		1.00		103.3	%	90-110	08/03/2001	1045
ICV		M0310	1.02228031		1.00		102.2	%	90-110	08/03/2001	1056
ICB			-0.0005921							08/03/2001	1110
CCV		M0322	1.03515665		1.00		103.5	%	90-110	08/03/2001	1127
CCB			-0.0008636							08/03/2001	1138
MB		3050	0.00087783							08/03/2001	1141
LCS		M320	0.51660803		0.500		103.3	%	83-111	08/03/2001	1145
MS	208029-4	M320	0.57102639		0.500	0.04792068	104.6	%	80-111	08/03/2001	1215
MSD	208029-4	M320	0.57166962	0.57102639	0.500	0.04792068	104.7	%	80-111	08/03/2001	1222
							0.1	R	20		
PDS	208029-4	M320B	1.00746660		1.00	0.04792068	96.0	%	75-125	08/03/2001	1229
PSD	208029-4	M320B	1.01001223	1.00746660	1.00	0.04792068	96.2	%	75-125	08/03/2001	1236
							0.3	R	20		
CCV		M0322	1.03942538		1.00		103.9	%	90-110	08/03/2001	1243
CCB			-0.0010714							08/03/2001	1257
		M0322	1.02552782		1.00		102.6	%	90-110	08/03/2001	1338

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

QUALITY CONTROL RESULTS

Job Number.: 208029 Report Date.: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Test Method.....: SW-846 6010B Batch.....: 60306 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: CR
Parameter.....: Chromium (Cr)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CCB			-0.0009802							08/03/2001	1352

Test Method.....: SW-846 6010B Batch.....: 60323 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: CR
Parameter.....: Chromium (Cr)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
RS		M0312	2.00524605		2.00		100.3	%	90-110	08/03/2001	1028
ICV		M0303	1.03334225		1.00		103.3	%	90-110	08/03/2001	1045
ICV		M0310	1.02228031		1.00		102.2	%	90-110	08/03/2001	1056
ICB			-0.0005921							08/03/2001	1110
CCV		M0322	1.03515665		1.00		103.5	%	90-110	08/03/2001	1127
CCB			-0.0008636							08/03/2001	1138
MB		3050	0.00087783							08/03/2001	1141
LCS		M320	0.51660803		0.500		103.3	%	83-111	08/03/2001	1145
MS	208029-4	M320	0.57102639		0.500	0.04792068	104.6	%	80-111	08/03/2001	1215
[illegible]	208029-4	M320	0.57166962	0.57102639	0.500	0.04792068	104.7	%	80-111	08/03/2001	1222
							0.1	R	20		
PDS	208029-4	M320B	1.00746660		1.00	0.04792068	96.0	%	75-125	08/03/2001	1229
PSD	208029-4	M320B	1.01001223	1.00746660	1.00	0.04792068	96.2	%	75-125	08/03/2001	1236
							0.3	R	20		
CCV		M0322	1.03942538		1.00		103.9	%	90-110	08/03/2001	1243
CCB			-0.0010714							08/03/2001	1257
CCV		M0322	1.02552782		1.00		102.6	%	90-110	08/03/2001	1338
CCB			-0.0009802							08/03/2001	1352
CCB			0.00384548							08/03/2001	1511
MB		3015	0.00472937							08/03/2001	1515
LCS		M319	0.49517403		0.500		99.0	%	83-111	08/03/2001	1519
CCV		M0322	1.04072609		1.00		104.1	%	90-110	08/03/2001	1553
CCB			0.00378768							08/03/2001	1607
MS	208067-12	M320	0.46036901		0.500	0.00492079	91.1	%	77-112	08/03/2001	1623
MSD	208067-12	M320	0.47663722	0.46036901	0.500	0.00492079	94.3	%	77-112	08/03/2001	1627
							3.5	R	20		
PDS	208067-12	M320B	0.98644731		1.00	0.00492079	98.2	%	75-125	08/03/2001	1631
PSD	208067-12	M320B	0.97680483	0.98644731	1.00	0.00492079	97.2	%	75-125	08/03/2001	1638
							1.0	R	20		
CCV		M0322	1.03343548		1.00		103.3	%	90-110	08/03/2001	1656
CCB			0.00376156							08/03/2001	1707
MB		3050	0.00539435							08/03/2001	1721
LCS		M320	0.53243096		0.500		106.5	%	83-111	08/03/2001	1725
CCV		M0322	1.03410928		1.00		103.4	%	90-110	08/03/2001	1812
CCB			0.00372406							08/03/2001	1822
MS	208083-12	M320	0.64886970		0.500	0.15312195	99.1	%	80-111	08/03/2001	1854
MSD	208083-12	M320	0.57179849	0.64886970	0.500	0.15312195	83.7	%	80-111	08/03/2001	1902
							12.6	R	20		
PDS	208083-12	M320B	1.08571116		1.00	0.15312195	93.3	%	75-125	08/03/2001	1909
PSD	208083-12	M320B	1.08883130	1.08571116	1.00	0.15312195	93.6	%	75-125	08/03/2001	1916
							0.3	R	20		
CCV		M0322	1.03382777		1.00		103.4	%	90-110	08/03/2001	1931
CCB			0.00376955							08/03/2001	1942
		3015	0.00488291							08/03/2001	1945

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

SEVERN TRENT SERVICES

STL Corpus Christi

QUALITY CONTROL RESULTS

Job Number.: 208029 Report Date.: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Test Method.....: SW-846 6010B Batch.....: 60323 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: CR
Parameter.....: Chromium (Cr)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
LCS		M320	0.45243560		0.500		90.5	%	83-111	08/03/2001	1949
MB		3015	0.00497608							08/03/2001	2013
LCS		M320	0.52345891		0.500		104.7	%	83-111	08/03/2001	2017
CCV		M0322	1.02202667		1.00		102.2	%	90-110	08/03/2001	2024
CCB			0.00378569							08/03/2001	2035
MB		3015	0.00483331							08/03/2001	2046
LCS		M320	0.46068784		0.500		92.1	%	83-111	08/03/2001	2050
CCV		M0322	1.03478306		1.00		103.5	%	90-110	08/03/2001	2118
CCB			0.00371501							08/03/2001	2128
CCV		M0322	1.04205190		1.00		104.2	%	90-110	08/03/2001	2155
CCB			0.00380576							08/03/2001	2209

Test Method.....: SW-846 7196A Batch.....: 60418 Analyst...: dnw
Method Description.: Hexavalent Chromium Units.....: mg/L Test Code.: CR6
Parameter.....: Hexavalent Chromium

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
			-0.01							08/07/2001	1400
ICV		M080701E	20.40		20.00		102.0	%	90-110	08/07/2001	1403
LCS		M080701A	40.90		40.00		102.2	%	80-120	08/07/2001	1407
MB			-0.00							08/07/2001	1410
MS	208029-1	M080701B	37.41		40.00	-0.029	93.6	%	75-125	08/07/2001	1416
MSD	208029-1	M080701B	36.74	37.41	40.00	-0.029	91.9	%	75-125	08/07/2001	1420
							1.8	R	20		
MS	208029-1	M080701C	844.60		1030	-0.029	82.0	%	75-125	08/07/2001	1423
MSD	208029-1	M080701D	577.70		708	-0.029	81.6	%	75-125	08/07/2001	1426
CCV		M080701E	20.49		20.00		102.5	%	80-120	08/07/2001	1433
CCB			-0.00							08/07/2001	1436
CCV		M080701E	20.31		20.00		101.5	%	80-120	08/07/2001	1512
CCB			-0.01							08/07/2001	1515

Test Method.....: SW-846 6010B Batch.....: 60306 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: PB
Parameter.....: Lead (Pb)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
RS		M0312	2.00878281		2.00		100.4	%	90-110	08/03/2001	1028
ICV		M0303	1.05467607		1.00		105.5	%	90-110	08/03/2001	1045
ICV		M0310	1.05638201		1.00		105.6	%	90-110	08/03/2001	1056
ICB			0.00087170							08/03/2001	1110
CCV		M0322	1.04766726		1.00		104.8	%	90-110	08/03/2001	1127
CCB			0.00140163							08/03/2001	1138
MB		3050	0.00029470							08/03/2001	1141
LCS		M320	0.51770372		0.500		103.5	%	78-113	08/03/2001	1145
MS	208029-4	M320	0.53884764		0.500	0.03992383	99.8	%	69-111	08/03/2001	1215
MSD	208029-4	M320	0.53959093	0.53884764	0.500	0.03992383	99.9	%	69-111	08/03/2001	1222
							0.1	R	20		
PDS	208029-4	M320B	0.97932024		1.00	0.03992383	93.9	%	75-125	08/03/2001	1229
	208029-4	M320B	0.98920843	0.97932024	1.00	0.03992383	94.9	%	75-125	08/03/2001	1236
							1.0	R	20		

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

SEVERN TRENT SERVICES

STL Corpus Christi

QUALITY CONTROL RESULTS

Job Number.: 208029

Report Date.: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Test Method.....: SW-846 6010B
Method Description.: Metals Analysis (ICAP)
Parameter.....: Lead (Pb)

Batch.....: 60306
Units.....: mg/L

Analyst...: jem
Test Code.: PB

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CCV		M0322	1.04355701		1.00		104.4	%	90-110	08/03/2001	1243
CCB			0.00274337							08/03/2001	1257
CCV		M0322	1.04113277		1.00		104.1	%	90-110	08/03/2001	1338
CCB			0.00174956							08/03/2001	1352

Test Method.....: SW-846 6010B
Method Description.: Metals Analysis (ICAP)
Parameter.....: Lead (Pb)

Batch.....: 60323
Units.....: mg/L

Analyst...: jem
Test Code.: PB

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
RS		M0312	2.00878281		2.00		100.4	%	90-110	08/03/2001	1028
ICV		M0303	1.05467607		1.00		105.5	%	90-110	08/03/2001	1045
ICV		M0310	1.05638201		1.00		105.6	%	90-110	08/03/2001	1056
ICB			0.00087170							08/03/2001	1110
CCV		M0322	1.04766726		1.00		104.8	%	90-110	08/03/2001	1127
CCB			0.00140163							08/03/2001	1138
		3050	0.00029470							08/03/2001	1141
		M320	0.51770372		0.500		103.5	%	78-113	08/03/2001	1145
MS	208029-4	M320	0.53884764		0.500	0.03992383	99.8	%	69-111	08/03/2001	1215
MSD	208029-4	M320	0.53959093	0.53884764	0.500	0.03992383	99.9	%	69-111	08/03/2001	1222
							0.1	R	20		
PDS	208029-4	M320B	0.97932024		1.00	0.03992383	93.9	%	75-125	08/03/2001	1229
PSD	208029-4	M320B	0.98920843	0.97932024	1.00	0.03992383	94.9	%	75-125	08/03/2001	1236
							1.0	R	20		
CCV		M0322	1.04355701		1.00		104.4	%	90-110	08/03/2001	1243
CCB			0.00274337							08/03/2001	1257
CCV		M0322	1.04113277		1.00		104.1	%	90-110	08/03/2001	1338
CCB			0.00174956							08/03/2001	1352
CCB			0.00835189							08/03/2001	1511
MB		3015	0.00717881							08/03/2001	1515
LCS		M319	0.50538377		0.500		101.1	%	78-113	08/03/2001	1519
CCV		M0322	1.06580272		1.00		106.6	%	90-110	08/03/2001	1553
CCB			0.00874183							08/03/2001	1607
MS	208067-12	M320	0.46856068		0.500	0.01524703	90.7	%	76-111	08/03/2001	1623
MSD	208067-12	M320	0.48855380	0.46856068	0.500	0.01524703	94.7	%	76-111	08/03/2001	1627
							4.2	R	20		
PDS	208067-12	M320B	0.99325895		1.00	0.01524703	97.8	%	75-125	08/03/2001	1631
PSD	208067-12	M320B	0.99018657	0.99325895	1.00	0.01524703	97.5	%	75-125	08/03/2001	1638
							0.3	R	20		
CCV		M0322	1.04505860		1.00		104.5	%	90-110	08/03/2001	1656
CCB			0.00804545							08/03/2001	1707
MB		3050	0.00717971							08/03/2001	1721
LCS		M320	0.51700432		0.500		103.4	%	78-113	08/03/2001	1725
CCV		M0322	1.04457345		1.00		104.5	%	90-110	08/03/2001	1812
CCB			0.00803228							08/03/2001	1822
CCV		M0322	1.03892590		1.00		103.9	%	90-110	08/03/2001	1931
CCB			0.00926038							08/03/2001	1942
MB		3015	0.00683506							08/03/2001	1945
LCS		M320	0.45611414		0.500		91.2	%	78-113	08/03/2001	1949
MB		3015	0.00577117							08/03/2001	2013
		M320	0.51088827		0.500		102.2	%	78-113	08/03/2001	2017

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

SEVERN TRENT SERVICES

STL Corpus Christi

QUALITY CONTROL RESULTS

Job Number.: 208029 Report Date.: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Test Method.....: SW-846 6010B Batch.....: 60323 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: PB
Parameter.....: Lead (Pb)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CCV		M0322	1.03660326		1.00		103.7	%	90-110	08/03/2001	2024
CCB			0.00819118							08/03/2001	2035
MB		3015	0.00744239							08/03/2001	2046
LCS		M320	0.45451815		0.500		90.9	%	78-113	08/03/2001	2050
CCV		M0322	1.04267287		1.00		104.3	%	90-110	08/03/2001	2118
CCB			0.00717172							08/03/2001	2128
CCV		M0322	1.05066306		1.00		105.1	%	90-110	08/03/2001	2155
CCB			0.00758184							08/03/2001	2209

Test Method.....: SW-846 7471A Batch.....: 60264 Analyst...: edr
Method Description.: Mercury (CVAA) Units.....: mg/Kg Test Code.: HG
Parameter.....: Mercury (Hg)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
ICV		M080201HG	0.00489		0.005000		97.8	%	90-110	08/02/2001	1326
ICB			-0.00003							08/02/2001	1328
[illegible]		M080201LG	0.00446		0.005000					08/02/2001	1329
			-0.00005							08/02/2001	1331
MS	208003-2	M080201HG	0.00609		0.005000	0.00003	121.2	%	75-130	08/02/2001	1336
MSD	208003-2	M080201HG	0.00589	0.00609	0.005000	0.00003	117.2	%	75-130	08/02/2001	1338
							3.3	R	20		
CCV		M080201HG	0.00529		0.005000		105.8	%	80-120	08/02/2001	1343
CCB			0.00016							08/02/2001	1345
CCV		M080201HG	0.00465		0.005000		93.0	%	80-120	08/02/2001	1400
CCB			0.00005							08/02/2001	1401
LCS		M080201LG	0.00460		0.005000					08/02/2001	1403
MB			0.00016							08/02/2001	1404
MB			0.00008							08/02/2001	1405
MS	208029-11	M080201HG	0.00522		0.005000	0.00001	104.2	%	75-130	08/02/2001	1408
MSD	208029-11	M080201HG	0.00531	0.00522	0.005000	0.00001	106.0	%	75-130	08/02/2001	1410
							1.7	R	20		
CCV		M080201HG	0.00532		0.005000		106.4	%	80-120	08/02/2001	1421
CCB			-0.00006							08/02/2001	1422

Test Method.....: SW-846 6010B Batch.....: 60306 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: NI
Parameter.....: Nickel (Ni)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
RS		M0312	2.01534193		2.00		100.8	%	90-110	08/03/2001	1028
ICV		M0303	1.04394555		1.00		104.4	%	90-110	08/03/2001	1045
ICV		M0310	1.03362412		1.00		103.4	%	90-110	08/03/2001	1056
ICB			-0.0005433							08/03/2001	1110
CCV		M0322	1.04310059		1.00		104.3	%	90-110	08/03/2001	1127
CCB			-0.0009915							08/03/2001	1138
MB		3050	0.00094469							08/03/2001	1141
LCS		M320	0.52681370		0.500		105.4	%	82-113	08/03/2001	1145
MS	208029-4	M320	0.55868774		0.500	0.05966237	99.8	%	69-118	08/03/2001	1215
[illegible]	208029-4	M320	0.56035929	0.55868774	0.500	0.05966237	100.1	%	69-118	08/03/2001	1222
							0.3	R	20		

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

SEVERN TRENT SERVICES

STL Corpus Christi

QUALITY CONTROL RESULTS

Job Number.: 208029 Report Date.: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Test Method.....: SW-846 6010B Batch.....: 60306 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: NI
Parameter.....: Nickel (Ni)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
PDS	208029-4	M320B	0.98066713		1.00	0.05966237	92.1	%	75-125	08/03/2001	1229
PSD	208029-4	M320B	0.98833249	0.98066713	1.00	0.05966237	92.9	%	75-125	08/03/2001	1236
							0.8	R	20		
CCV		M0322	1.05245924		1.00		105.2	%	90-110	08/03/2001	1243
CCB			-0.0011426							08/03/2001	1257
CCV		M0322	1.04614402		1.00		104.6	%	90-110	08/03/2001	1338
CCB			-0.0010309							08/03/2001	1352

Test Method.....: SW-846 6010B Batch.....: 60323 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: NI
Parameter.....: Nickel (Ni)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
RS		M0312	2.01534193		2.00		100.8	%	90-110	08/03/2001	1028
ICV		M0303	1.04394555		1.00		104.4	%	90-110	08/03/2001	1045
ICV		M0310	1.03362412		1.00		103.4	%	90-110	08/03/2001	1056
			-0.0005433							08/03/2001	1110
		M0322	1.04310059		1.00		104.3	%	90-110	08/03/2001	1127
CCB			-0.0009915							08/03/2001	1138
MB		3050	0.00094469							08/03/2001	1141
LCS		M320	0.52681370		0.500		105.4	%	82-113	08/03/2001	1145
MS	208029-4	M320	0.55868774		0.500	0.05966237	99.8	%	69-118	08/03/2001	1215
MSD	208029-4	M320	0.56035929	0.55868774	0.500	0.05966237	100.1	%	69-118	08/03/2001	1222
							0.3	R	20		
PDS	208029-4	M320B	0.98066713		1.00	0.05966237	92.1	%	75-125	08/03/2001	1229
PSD	208029-4	M320B	0.98833249	0.98066713	1.00	0.05966237	92.9	%	75-125	08/03/2001	1236
							0.8	R	20		
CCV		M0322	1.05245924		1.00		105.2	%	90-110	08/03/2001	1243
CCB			-0.0011426							08/03/2001	1257
CCV		M0322	1.04614402		1.00		104.6	%	90-110	08/03/2001	1338
CCB			-0.0010309							08/03/2001	1352
CCB			0.00310494							08/03/2001	1511
MB		3015	0.00381630							08/03/2001	1515
LCS		M319	0.49931484		0.500		99.9	%	82-113	08/03/2001	1519
CCV		M0322	1.05008565		1.00		105.0	%	90-110	08/03/2001	1553
CCB			0.00364263							08/03/2001	1607
MS	208067-12	M320	0.46331325		0.500	0.00568321	91.5	%	73-115	08/03/2001	1623
MSD	208067-12	M320	0.48189548	0.46331325	0.500	0.00568321	95.2	%	73-115	08/03/2001	1627
							3.9	R	20		
PDS	208067-12	M320B	0.98673346		1.00	0.00568321	98.1	%	75-125	08/03/2001	1631
PSD	208067-12	M320B	0.98611228	0.98673346	1.00	0.00568321	98.0	%	75-125	08/03/2001	1638
							0.1	R	20		
CCV		M0322	1.04711117		1.00		104.7	%	90-110	08/03/2001	1656
CCB			0.00396397							08/03/2001	1707
MB		3050	0.00468829							08/03/2001	1721
LCS		M320	0.52923829		0.500		105.8	%	82-113	08/03/2001	1725
CCV		M0322	1.03994677		1.00		104.0	%	90-110	08/03/2001	1812
CCB			0.00357679							08/03/2001	1822
MS	208083-12	M320	0.63089647		0.500	0.14087195	98.0	%	69-118	08/03/2001	1854
MSD	208083-12	M320	0.52201859	0.63089647	0.500	0.14087195	76.2	%	69-118	08/03/2001	1902
							18.9	R	20		

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

SEVERN TRENT SERVICES

STL Corpus Christi

QUALITY CONTROL RESULTS

Job Number.: 208029 Report Date.: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Test Method.....: SW-846 6010B Batch.....: 60323 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: NI
Parameter.....: Nickel (Ni)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
PDS	208083-12	M320B	1.03722828		1.00	0.14087195	89.6	%	75-125	08/03/2001	1909
PSD	208083-12	M320B	1.04349202	1.03722828	1.00	0.14087195	90.3	%	75-125	08/03/2001	1916
							0.6	R	20		
CCV		M0322	1.04724758		1.00		104.7	%	90-110	08/03/2001	1931
CCB			0.00363776							08/03/2001	1942
MB		3015	0.00390024							08/03/2001	1945
LCS		M320	0.45339428		0.500		90.7	%	82-113	08/03/2001	1949
MB		3015	0.00377593							08/03/2001	2013
LCS		M320	0.52201173		0.500		104.4	%	82-113	08/03/2001	2017
CCV		M0322	1.02834281		1.00		102.8	%	90-110	08/03/2001	2024
CCB			0.00375987							08/03/2001	2035
MB		3015	0.00359172							08/03/2001	2046
LCS		M320	0.45693516		0.500		91.4	%	82-113	08/03/2001	2050
CCV		M0322	1.04033442		1.00		104.0	%	90-110	08/03/2001	2118
CCB			0.00357757							08/03/2001	2128
CCV		M0322	1.04883365		1.00		104.9	%	90-110	08/03/2001	2155
CCB			0.00384908							08/03/2001	2209

Test Method.....: SW-846 6010B Batch.....: 60306 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: SE
Parameter.....: Selenium (Se)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
RS		M0312	2.05486533		2.00		102.7	%	90-110	08/03/2001	1028
ICV		M0303	1.04427995		1.00		104.4	%	90-110	08/03/2001	1045
ICV		M0310	1.02861696		1.00		102.9	%	90-110	08/03/2001	1056
ICB			0.00201047							08/03/2001	1110
CCV		M0322	1.04648965		1.00		104.6	%	90-110	08/03/2001	1127
CCB			0.00231176							08/03/2001	1138
MB		3050	-0.0021269							08/03/2001	1141
LCS		M320	0.50186097		0.500		100.4	%	76-111	08/03/2001	1145
MS	208029-4	M320	0.48124737		0.500	-0.0209559	100.4	%	69-112	08/03/2001	1215
MSD	208029-4	M320	0.48794281	0.48124737	0.500	-0.0209559	101.8	%	69-112	08/03/2001	1222
							1.4	R	20		
PDS	208029-4	M320B	0.97058955		1.00	-0.0209559	99.2	%	75-125	08/03/2001	1229
PSD	208029-4	M320B	0.96926824	0.97058955	1.00	-0.0209559	99.0	%	75-125	08/03/2001	1236
							0.1	R	20		
CCV		M0322	1.04700585		1.00		104.7	%	90-110	08/03/2001	1243
CCB			-0.0010473							08/03/2001	1257
CCV		M0322	1.03431878		1.00		103.4	%	90-110	08/03/2001	1338
CCB			-0.0021991							08/03/2001	1352

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

SEVERN TRENT SERVICES

STL Corpus Christi

QUALITY CONTROL RESULTS

Job Number.: 208029 Report Date.: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Test Method.....: SW-846 6010B Batch.....: 60323 Analyst...: jem
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: SE
Parameter.....: Selenium (Se)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
RS		M0312	2.05486533		2.00		102.7	%	90-110	08/03/2001	1028
ICV		M0303	1.04427995		1.00		104.4	%	90-110	08/03/2001	1045
ICV		M0310	1.02861696		1.00		102.9	%	90-110	08/03/2001	1056
ICB			0.00201047							08/03/2001	1110
CCV		M0322	1.04648965		1.00		104.6	%	90-110	08/03/2001	1127
CCB			0.00231176							08/03/2001	1138
MB		3050	-0.0021269							08/03/2001	1141
LCS		M320	0.50186097		0.500		100.4	%	76-111	08/03/2001	1145
MS	208029-4	M320	0.48124737		0.500	-0.0209559	100.4	%	69-112	08/03/2001	1215
MSD	208029-4	M320	0.48794281	0.48124737	0.500	-0.0209559	101.8	%	69-112	08/03/2001	1222
							1.4	R	20		
PDS	208029-4	M320B	0.97058955		1.00	-0.0209559	99.2	%	75-125	08/03/2001	1229
PSD	208029-4	M320B	0.96926824	0.97058955	1.00	-0.0209559	99.0	%	75-125	08/03/2001	1236
							0.1	R	20		
CCV		M0322	1.04700585		1.00		104.7	%	90-110	08/03/2001	1243
CCB			-0.0010473							08/03/2001	1257
CCV		M0322	1.03431878		1.00		103.4	%	90-110	08/03/2001	1338
CCB			-0.0021991							08/03/2001	1352
			0.02081856							08/03/2001	1511
		3015	0.02484947							08/03/2001	1515
LCS		M319	0.49254247		0.500		98.5	%	76-111	08/03/2001	1519
CCV		M0322	1.07330982		1.00		107.3	%	90-110	08/03/2001	1553
CCB			0.01798446							08/03/2001	1607
MS	208067-12	M320	0.44891811		0.500	-0.0011655	90.0	%	75-119	08/03/2001	1623
MSD	208067-12	M320	0.46783662	0.44891811	0.500	-0.0011655	93.8	%	75-119	08/03/2001	1627
							4.1	R	20		
PDS	208067-12	M320B	0.95154309		1.00	-0.0011655	95.3	%	75-125	08/03/2001	1631
PSD	208067-12	M320B	0.95338398	0.95154309	1.00	-0.0011655	95.5	%	75-125	08/03/2001	1638
							0.2	R	20		
CCV		M0322	1.04124672		1.00		104.1	%	90-110	08/03/2001	1656
CCB			0.02409967							08/03/2001	1707
MB		3050	0.02423539							08/03/2001	1721
LCS		M320	0.51412952		0.500		102.8	%	76-111	08/03/2001	1725
CCV		M0322	1.04060432		1.00		104.1	%	90-110	08/03/2001	1812
CCB			0.01539272							08/03/2001	1822
MS	208083-12	M320	0.42848619		0.500	-0.0031555	86.3	%	69-112	08/03/2001	1854
MSD	208083-12	M320	0.40565387	0.42848619	0.500	-0.0031555	81.8	%	69-112	08/03/2001	1902
							5.5	R	20		
PDS	208083-12	M320B	0.92387950		1.00	-0.0031555	92.7	%	75-125	08/03/2001	1909
PSD	208083-12	M320B	0.93331378	0.92387950	1.00	-0.0031555	93.6	%	75-125	08/03/2001	1916
							1.0	R	20		
CCV		M0322	1.02591874		1.00		102.6	%	90-110	08/03/2001	1931
CCB			0.02508932							08/03/2001	1942
MB		3015	0.02288413							08/03/2001	1945
LCS		M320	0.43944754		0.500		87.9	%	76-111	08/03/2001	1949
MB		3015	0.02411544							08/03/2001	2013
LCS		M320	0.49853844		0.500		99.7	%	76-111	08/03/2001	2017
CCV		M0322	1.01790511		1.00		101.8	%	90-110	08/03/2001	2024
CCB			0.01742788							08/03/2001	2035
MB		3015	0.02400788							08/03/2001	2046
LCS		M320	0.44633833		0.500		89.3	%	76-111	08/03/2001	2050
CCV		M0322	1.02400935		1.00		102.4	%	90-110	08/03/2001	2118
			0.01798702							08/03/2001	2128

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

SEVERN TRENT SERVICES

STL Corpus Christi

QUALITY CONTROL RESULTS

Job Number.: 208029

Report Date.: 08/13/2001

CUSTOMER: ARCADIS / G&M PROJECT: MT000643.0001 ATTN: Sharon Hall

Test Method.....: SW-846 6010B
Method Description.: Metals Analysis (ICAP)
Parameter.....: Selenium (Se)

Batch.....: 60323
Units.....: mg/L

Analyst...: jem
Test Code.: SE

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CCV		M0322	1.02887468		1.00		102.9	%	90-110	08/03/2001	2155
CCB			0.01946041							08/03/2001	2209

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

QUALITY ASSURANCE METHODS

REFERENCES AND NOTES

Report Date: 08/13/2001

(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

QUALITY ASSURANCE METHODS

REFERENCES AND NOTES

Report Date: 08/13/2001

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

Other:

Client provided data	*cp	Core Laboratories	*hp
Peak Analytical, Inc.	*pk	Jordan Laboratories	*jl
Enviro-Test Labs	*et	Fugro South, Inc.	*fg
LCRA Austin	*lr		

EXPLANATION OF DATA FLAGS

B - This flag is used to indicate that an analyte is present 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 but at a concentration less than the quantitaion 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.

ARCADIS GERAGHTY & MILLER Laboratory Task Order No./P.O. No. 0 **CHAIN-OF-CUSTODY RECORD** Page 1 of 1

Project Number/Name MT000643.0001

Project Location Junction I-9

Laboratory STL

Project Manager S. Hall

Sampler(s)/Affiliation

FedEx 8244 8603 1222 onice coolerseal 208029

Sample ID/Location	Matrix	Date/~~Time~~ Sampled	TIME ~~Lab ID~~	ANALYSIS / METHOD / SIZE: Chlorides	Fraction organic carbon, pH, % moisture	Arsenic; barium; cadmium; chromium; lead; mercury; nickel; selenium				Remarks	Total
Background 1	S	7-27-01	1000	✓	✓	✓					2
Background 2	S		1015	✓	✓	✓					2
Background 3	S		1030	✓	✓	✓					2
Backfill 1	S		1200	✓	✓	✓					2
Backfill 2	S		1215	✓	✓	✓					2
Backfill 3	S		1230	✓	✓	✓					2
North Sidewall	S		1045	✓	✓	✓					2
South Sidewall	S		1100	✓	✓	✓					2
East Sidewall	S		1115	✓	✓	✓					2
West Sidewall	S		1130	✓	✓	✓					2
Bottom	S	7-27-01	1145	✓	✓	✓					2

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

Total No. of Bottles/ Containers 22

						Seal Intact?
Relinquished by: Tom Lauser	Organization: ARCADIS G&M	Date 7/30/01	Time 1100			
Received by: Emily A. Bauer	Organization: STL	Date 7/31/01	Time 1000			Yes No N/A
Relinquished by:	Organization:	Date / /	Time			Seal Intact?
Received by:	Organization:	Date / /	Time			(Yes) No N/A

Special Instructions/Remarks:

Need 3-5 day turnaround time !!!. Analyze chromium for: total, Cr^{+3} Cr^{+6} and arsenic: total As^{3}, As^{5}, send results to Judy Reeves + Scott Potter (both ARCADIS)

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

AG 05 0597

rpjsckl | Job Sample Receipt Checklist Report 07/31/2001 | V2

Job Number.....: 208029 Location.: 57203 Customer Job ID.....: Job Check List Date.: 07/31/2001
Project Number.: 99999995 Project Description.: Walk in Projects Project Manager.....: rem
Customer.....: ARCADIS / G&M Contact.: Sharon Hall

Questions ?	(Y/N)	Comments
How did samples arrive?.....		FEDEX
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?.....	N	
Temp of cooler acceptable? (0.05 to 6.00 deg C)	Y	ON ICE
Samples received intact (good condition)?.....	Y	
Volatile samples acceptable? (no headspace).....		N/A
Correct containers used?.....	Y	
Adequate sample volume provided?.....	Y	
Samples preserved correctly?.....	Y	
Samples received within holding-time?.....	Y	
Agreement between COC and sample labels?.....	Y	
Additional.....		
Comments.....		
Sample Custodian Signature.....		CAB 7/31/01