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OIL CONSERVATION
DIVISION

September 1, 2004

Mr. Wayne Price
NM Oil Conservation District
P.O. Box 6429
Santa Fe, New Mexico 87505

Re: Key's Saltwater Facility in Hobbs, Lea County, New Mexico and
Key's Truck Wash Pad and Sump in Eunice, Lea County, New Mexico

Dear Mr. Price:

Enclosed for your files you will find two reports from Brown and Caldwell dated August 26, 2004 and August 27, 2004 on the above two referenced sites.

If you have any questions, please let me know.

Sincerely,

Daniel K. Gibson, P.G.
Environmental Manager

Enclosures

1415 Louisiana
Suite 2500
Houston, Texas 77002

Tel: (713) 759-0999
Fax: (713) 308-3886

www.brownandcaldwell.com

August 26, 2004

BROWN AND CALDWELL

Mr. Daniel K. Gibson
Key Energy Services, Inc.
6 Desta Drive, Suite 4400
Midland, Texas 79705

Subject: **Documentation of Monitoring Well Installation and Sampling**
Key Energy Services, Inc. Truck Wash Pad and Sump
Eunice, Lea County, New Mexico

Dear Mr. Gibson:

Brown and Caldwell completed the installation and sampling of one permanent groundwater monitoring well at the Key Energy Services, Inc. (Key) truck wash pad and sump facility in Eunice, New Mexico on June 9-11, 2004. Key currently operates the truck wash facility at 2105 Avenue O (New Mexico Highway 176) in Eunice, New Mexico (Figure 1). Soil assessment activities were previously performed by ARCADIS G&M, Inc. (ARCADIS) on November 19, 2002 to determine potential soil impact associated with the Key truck wash pad and sump. Findings from the November 19, 2002 field investigation indicated elevated concentrations of chlorides in soil surrounding the cement truck wash pad, detected in the range between 1,060 and 4,520 milligrams per kilogram (mg/kg). Benzene, toluene, ethylbenzene or xylene (BTEX) were not detected above the respective detection limits in samples collected by ARCADIS; consequently, further sampling of soils for BTEX was not performed. Metals concentrations from the investigation conducted by ARCADIS were screened against the New Mexico Environment Department (NMED) Soil Screening Levels (SSLs), February 2004, Revision 2. No metals concentrations were found to exceed the Industrial/Occupational SSLs; consequently, further sampling of soils for metals was not performed. The groundwater assessment was performed to establish groundwater quality and determine if chlorides in soil had potentially caused impact to groundwater in the vicinity of the apparent downgradient, southeast corner of the truck wash pad. Field activities for the June 2004 investigation included monitoring well installation, groundwater sampling, and laboratory analytical results and are discussed in the following paragraphs.

Field Activities

One monitoring well (MW-1) was installed at the southeast corner of the truck wash pad where elevated levels of chlorides in soils were detected during the November 19, 2002 investigation conducted by ARCADIS. One groundwater sample and one duplicate groundwater sample were collected from monitoring well MW-1 for laboratory analysis. Prior to drilling activities, utility clearance was obtained through coordination with site personnel and by contacting New Mexico One-Call. The New Mexico Oil Control Division (OCD) was notified in advance of commencement of field activities.

Monitoring Well Installation

Brown and Caldwell installed permanent groundwater monitoring well MW-1 using an air rotary rig. Soil cores were continuously sampled to a depth of 10 feet and sampled at least once every 10 feet thereafter using decontaminated 2-foot split-spoons and/or shovels for cuttings. Each sample interval was logged for recovery length and lithology, visually observed for impacts, and field screened with a photo-ionization detector (PID). No PID readings were observed from ground surface to the total depth of the borehole. Soil cores and cuttings were logged by a field geologist. The lithologic description and moisture content were described in accordance with ASTM International Standard D 2488, Standard Practice for Description and Identification of Soils (Visual Manual Procedure), and classified in accordance with the Unified Soil Classification System (USCS). The soil boring/monitoring well log for monitoring well MW-1 is included in Attachment 1. The lithology consisted predominantly of fine to medium-grained, rounded, well sorted, brownish-red sand. A significant increase in moisture content was observed at 62 feet below ground surface (bgs), and saturation was observed at approximately 79 feet bgs. The monitoring well borehole was initially drilled to 90 feet bgs, but collapsed in to 80 feet bgs. The borehole was cleaned out, and re-drilled to 100 feet bgs to ensure an adequate water column; however, the hole collapsed a second time due to wet formation sands. The monitoring well was installed to a total depth of 90 feet bgs and was constructed with 30 feet of 2-inch diameter, 0.010 machine slot, flush-threaded, Schedule 40 polyvinyl chloride (PVC) screen, and 2-inch diameter Schedule 40 PVC casing to ground surface. The screened interval intersects the first area where increased moisture was observed, though the water table was found to equilibrate at approximately 80 feet bgs. The monitoring well was completed a few inches bgs and protected with a flush-to-grade manhole set in a 3-foot square concrete pad that is 4 inches thick.

Brown and Caldwell developed the monitoring well using a 1.5-inch disposable PVC bailer. Monitoring well development was considered complete when produced fluids were relatively free of suspended material. Approximately 20 gallons of groundwater was bailed from monitoring well MW-1 during development.

Brown and Caldwell used a handheld Global Positioning System (GPS) device to determine the location of the monitoring well, as required by the New Mexico OCD. The monitoring well location is depicted on Figure 2 and the GPS coordinates are listed on Table 1.

Collection and Analysis of Groundwater Samples

Brown and Caldwell measured the static water level in the monitoring well immediately prior to sampling and purging using a decontaminated oil/water interface probe. The monitoring well was purged using low flow/low stress purging procedures with a 2-inch submersible stainless steel Fultz pump and disposable polyethylene tubing. The oil/water interface probe and pump were decontaminated in the field before and after use by washing with a non-phosphate detergent (Liquinox) and distilled water wash, followed by a distilled water rinse.

The intake of the Fultz pump was placed at 85 feet bgs. A pumping rate of 0.25 liters per minute was sustained while field parameter measurements for pH, specific conductivity, turbidity, and temperature were collected during the purging process. A YSI 600 XL flow cell was used to measure these parameters at approximate 3 minute increments. A total of 6.25 liters of groundwater were produced before parameters indicated groundwater stabilization had occurred. The field data sheet for purging and sampling of monitoring well MW-1 is included as Attachment 2.

Upon completion of purging operations, a groundwater sample and a duplicate groundwater sample were immediately collected from the monitoring well at the pump discharge line after the flow cell had been disconnected. The samples were transferred into laboratory-supplied, 500-milliliter plastic containers, labeled, and placed on ice in an insulated cooler using standard chain-of-custody procedures. The samples were hand delivered to Severn Trent Laboratories, Inc. in Houston, Texas the following morning. The groundwater samples were analyzed for:

- Total Dissolved Solids (TDS) by EPA Method 160.1 and
- Chlorides by EPA Method 300.0

Groundwater Analytical Results

The groundwater sample collected from monitoring well MW-1 indicates a chlorides content of 196 milligrams per liter (mg/L) and a TDS content of 1,010 mg/L. The chloride content is below the 250 mg/L domestic water supply standard for chloride established in the New Mexico Water Quality Control Commission (WQCC) Regulations, Section 20.6.2.3103, Subsection A-C. The New Mexico WQCC has established a limit of 1,000 mg/L for TDS; however, in the event that previous TDS data for the site is not available, the first measured concentration becomes the new groundwater standard by default. Therefore, site activities may not indicate TDS impact to groundwater above approximately 1,010 mg/L during any subsequent monitoring event. Duplicate sample results were comparable to the original sample results. The analytical results are presented in Table 2 and the laboratory analytical report is included as Attachment 3.

Waste Management

Soil cuttings generated during the well installation activities were placed in clean, 55-gallon steel drums. Decontamination water, well development water, and purge water produced during well installation and sampling activities were also placed in a clean, 55-gallon steel drum. Non-hazardous waste labels were affixed to each drum. A total of three drums containing soil and one drum containing water were produced during investigation activities and staged near the southeast corner of the concrete pad pending offsite disposal.

Conclusions and Recommendations

Analytical results indicate the elevated levels of chlorides present in near surface soils potentially due to truck washing operations do not appear to have impacted groundwater at the southeast corner of the truck wash pad. Further investigation of groundwater in the area is not necessary at this time.

If you have any additional questions regarding the information contained in this correspondence, please contact Madeline Mauk at (713)-646-1119.

Sincerely,

BROWN AND CALDWELL

Madeline S. Mauk, P.E.
Supervising Engineer

BROWN AND CALDWELL

Lynn M. Wright, P.G.
Supervising Geologist

cc: Brown and Caldwell project file

Figures

1 Site Location Map
2 Monitoring Well Location Map

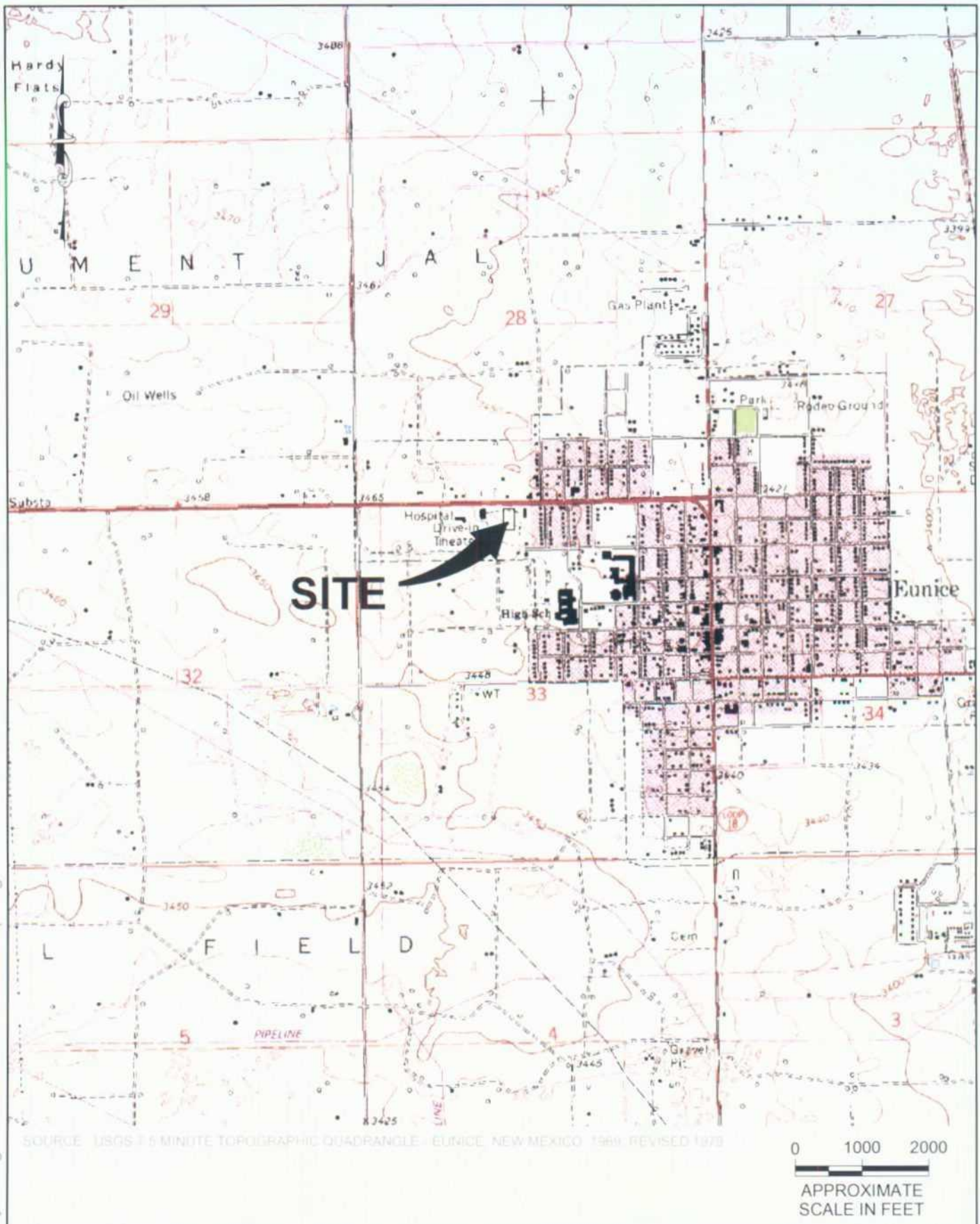
Tables

1 GPS Coordinates for Monitoring Well
2 Groundwater Analytical Results

Attachments

Soil Boring/Monitoring Well Log
Groundwater Sampling Field Data Sheet
Laboratory Analytical Report

FIGURES



Aug 26, 2004 - 2:43pm ckelly
P:\Cad\JOBS\KeyEnerg\25934\EuniceSiteLocMap.dwg

BROWN AND CALDWELL 1415 Louisiana Suite 2500 Houston, Texas 77002 Tel: (713) 759-0999 Fax: (713) 308-3886	KEY ENERGY SERVICES, INC. SITE LOCATION MAP EUNICE, NEW MEXICO FIGURE 1

REFERENCE: NEW MEXICO RESOURCE GEOGRAPHIC INFORMATION SYSTEM PROGRAM, EUNICE - 7.5 MINUTE DIGITAL ORTHOPHOTO QUAD NE QUATER, UTM NAD 83

LEGEND

MW-1 MONITOR WELL LOCATION (BROWN AND CALDWELL, JUNE 2004)

SOIL BORING (ARCADIS, NOVEMBER 2002)

PROPERTY BOUNDARY

0 50 100

APPROXIMATE SCALE IN FEET

BROWN AND CALDWELL

1415 Louisiana
Suite 2500
Houston, Texas 77002
Tel: (713) 759-0999
Fax: (713) 308-3886

KEY ENERGY SERVICES, INC.

TRUCK WASH PAD AND SUMP FACILITY MONITORING WELL LOCATION MAP EUNICE, NEW MEXICO FIGURE 2

Aug 26, 2004 - 2:44pm ckelly
P:\Cad\JOBS\KeyEnerg\25934\EuniceSiteMap.dwg

TABLES

Table 1
Coordinates for Monitoring Well
Key Energy Services, Inc. - Eunice Truck Wash Pad and Sump Facility
Eunice, New Mexico

Monitoring Well	Latitude	Longitude
MW-1	32°26.493'	-103°10.140'

Notes:

1) GARMIN brand handheld Global Positioning System unit. North American Datum (1983). (dd°mm.mmm')
2) GPS was not getting adequate satellite coverage during marking of coordinates.

Table 2
Groundwater Analytical Results
Key Energy Services, Inc. - Eunice Truck Wash Pad and Sump Facility
Eunice, New Mexico

Laboratory Analysis			Total Dissolved Solids (mg/L) [EPA Method 160.1]	Chlorides (mg/L) [EPA Method 300.0]
NMWQCC[1] Groundwater Protection Limit			1,000[2]	250
Sample Location	Sample ID	Sample Date		
MW-1	MW-1	6/11/2004	1,010	196
MW-1	DUP-01	6/11/2004	1,050	195

Notes:

1) NMWQCC = New Mexico Water Quality Control Commission (Regulation 20.6.2.3103, Subsections A-C).

2) Total Dissolved Solids limit established by NMWQCC; default value is first measured value established for site in the event that previous groundwater data for site is unavailable.

ATTACHMENT 1

Soil Boring/Monitoring Well Log

Monitoring Well: **MW-1**

Project Name: **Eunice Truck Wash and Sump Facility Monitor Well** Project Number: **25934.001** Sheet **1** of **3**

Project Location: **2105 Avenue O, Eunice, New Mexico**		Logged By: **C. Putney**	Approved:
Drilling Contractor: **Harrison and Cooper**		Date Started: **6/9/04**	Date Finished: **6/9/04**
Drilling Equipment: **IR TH-60**	Driller: **Leonard**	Total Boring Depth: (feet) **100.0**	Depth to Static Water: (feet)
Drilling Method: **Air Rotary**	Borehole Diameter: **8"**	TOC Elevation:	Ground Elevation:
Sampling Method: **split-spoon/shovel**		Diameter and Type of Well Casing: **2" PVC**	
Comments: **Water level measured from top of casing.**		Slot Size: **0.010 "**	Filter Material: **20/40 silica**
		Development Method: **bailer**	

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID	Monitoring Well Remarks
2				Cleared for utlities to 2'. Fill material and fine to medium sand with gravel.	0		0		Flush mount completion
4					0		.6		
6		SP SM		Silty sand, fine, trace hard caliche/calcareous cementation at 10 feet, dry.	0		.5		
8					0		.5		
10					0		.2		
12					0		0		
14									
16				Caliche/calcareous cementation and nodules increase, brown to light grayish brown with interlayered fine to medium sand seams, dry. Very hard cemented sand in split-spoon shoe at 22'.	0		.2		
18									
20					0		.5		
22									
24									
26		SP SM		Silty sand, fine to medium, light reddish-brown, trace caliche, mostly loose, dry. Calcarous nodules at 42'.	0		0		
28									
30					0		.3		
32									

Monitoring Well: **MW-1**

Project Name: **Eunice Truck Wash and Sump Facility Monitor Well** Project Number: **25934.001** Sheet **2** of **3**

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID	Monitoring Well Remarks
34									
36					0		.5		
38									
40					0		1.4		
42									
44									
46					0		0		
48									
50					0		0		
52									
54									
56		SP		Sand, slight increase in grain size, grading to darker reddish-brown in color. Slightly cemented portion at 59.5'.	0		.3		56.0
58									
60					0		.9		Top of screened interval at 60 ft.
62									
64									
66		SP		Sand, very moist, lt. reddish-brown, trace calcareous/cemented fragments, no odor.	0		0		
68									
70					0		1		
72									
74									

Monitoring Well: **MW-1**

Project Name: **Eunice Truck Wash and Sump Facility Monitor Well** Project Number: **25934.001** Sheet **3** of **3**

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID	Monitoring Well Remarks
76		SP		Sand, wet, reddish-brown, loose, unconsolidated, no odor.	0		.9		
78									
80	▼				0		0		
82									Drilled to 100'; hole sluffed in to 80 feet. Cleaned out and redrilled; hole sluffed in to 90 feet due to wet formation sands. Set screen at 90'.
84									
86					0		0		
88									
90					0		.2		90.0
92									
94									
96									
98									
100									100.0

ATTACHMENT 2

Groundwater Sampling Field Data Sheet

BROWN AND CALDWELL

GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-1

1. PROJECT INFORMATION

Project Number: 25934 Task Number: 001 Date: 6-11-04 Time: 1545

Client: KEY ENERGY Personnel: C. PUTNEY

Project Location: EUNICE, NM Weather: WINDY, 85'F, SUNNY

2. WELL DATA

Casing Diameter: 2 inches	Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other:
Screen Diameter: 2 inches	Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other:
Total Depth of Well: 90 feet	From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:
Depth to Static Water: 80.81 feet	From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:
Depth to Product: — feet	From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:

Length of Water Column: 9.19 feet Well Volume: _____ gal Screened Interval (from GS): 60' - 90'

Pump intake depth 85' (from GS)

Note: 2-inch well = 0.16 gal/ft 4-inch well = 0.65 gal/ft

3. PURGE DATA

Purge Method: ☐ Bailer, Size: ____ ☐ Bladder Pump ☒ 2" Submersible Pump ☐ 4" Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer ☒ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____ ☐ Dedicated ☐ Prepared Off-Site ☒ Field Cleaned ☐ Disposable

Materials: Rope/Tubing ☒ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____ ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Was well purged dry? ☐ Yes ☒ No Pumping Rate: 0.25 liters/min

Equipment Model(s)

1. YSI 1600 XL
2. HACH TURBIDITY
3. 2" FULTZ PUMP

Time	Cum. Liters Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Depth to Water (TOC)	Comments
1600	0.25	7.27	27.12	1.207	-48.9	3.02	320	80.88	VERY CLOUDY
1603	1.0	7.31	27.41	1.220	-44.9	3.30	328	80.88	"
1606	1.75	7.30	27.16	1.279	-43.6	3.59	292	80.87	"
1609	2.5	7.29	27.13	1.230	-36.7	3.76	273	80.86	SL. CLOUDY
1612	3.25	7.29	26.85	1.214	-31.8	4.01	181	80.86	"
1615	4.0	7.32	26.41	1.184	-31.9	4.35	99.2	80.85	"
1618	4.75	7.33	26.09	1.171	-32	4.58	70.6	80.85	CLEARING UP
1621	5.5	7.32	26.15	1.175	-33	4.50	40.5	80.84	"
1624	6.25	7.33	26.10	1.180	-32	4.42	35.9	80.83	"

4. SAMPLING DATA

Method(s): ☐ Bailer, Size: ____ ☐ Bladder Pump ☒ 2" Submersible Pump ☐ 4" Submersible Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other:

Materials: Pump/Bailer ☒ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____ ☐ Dedicated ☐ Prepared Off-Site ☒ Field Cleaned ☐ Disposable

Materials: Tubing/Rope ☒ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____ ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Depth to Water at Time of Sampling: 80.82 Field Filtered? ☐ Yes ☐ No

Sample ID: MW-1 Sample Time: 1625 # of Containers: 1

Duplicate Sample Collected? ☐ Yes ☐ No ID: DUP-01

Geochemical Analyses

Ferrous Iron: _____ mg/L

DO: _____ mg/L

Nitrate: _____ mg/L

Sulfate: _____ mg/L

Alkalinity: _____ mg/L

5. COMMENTS

TDS + CHLORIDES

Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.

Gen\non-proj\forms\Field Data Sheet.xls\BC-liters

FORM GW-1 (Rev 2/26/02 - dg)

Signature

ATTACHMENT 3

Laboratory Analytical Report

SEVERN TRENT STL

Eunice

ANALYTICAL REPORT

JOB NUMBER: 275517

Prepared For:

Brown and Caldwell
1415 Louisiana
Suite 2500
Houston, TX 77002

Attention: Madeline Mauk

Date: 07/08/2004

Signature

Name: Ed B. Fry

Title: Project Manager III

E-Mail: efry@stl-inc.com

7/8/04
Date

Severn Trent Laboratories
6310 Rothway Drive
Houston, TX 77040

PHONE: (713) 690-4444

SEVERN TRENT STL

07/08/2004

Madeline Mauk
Brown and Caldwell
1415 Louisiana
Suite 2500
Houston, TX 77002

Reference:
Project : Brown and Caldwell-Hobbs Eunice
Project No. : 275517
Date Received : 06/12/2004
STL Job : 275517

Dear Madeline Mauk:

Enclosed are the analytical results for your project referenced above. The following samples are included in the report.

1. MW-1
2. DUP-01

All holding times were met for the tests performed on these samples.

Enclosed, please find the Quality Control Summary. All quality control results for the QC batch that are applicable to the sample(s) are acceptable except as noted in the QC batch reports.

The test results in this report meet all NELAP requirements for STL Houston's NELAP accredited parameters. Any exceptions to NELAP requirements will be noted and included in a case narrative as a part of this report.

If the report is acceptable, please approve the enclosed invoice and forward it for payment.

Thank you for selecting Severn-Trent Laboratories to serve as your analytical laboratory on this project. If you have any questions concerning these results, please feel free to contact me at any time.

We look forward to working with you on future projects.

Sincerely,

Ed B. Fry
Project Manager

SEVERN TRENT STL

SAMPLE INFORMATION
Date: 07/08/2004

Job Number.: 275517
Customer...: Brown and Caldwell
Attn.....: Madeline Mauk

Project Number.....: 99004969
Customer Project ID....: KEY ENERGY
Project Description....: Brown and Caldwell-Hobbs Eunice

Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampled	Time Sampled	Date Received	Time Received
275517-1	MW-1	Water	06/11/2004	16:25	06/12/2004	11:52
275517-2	DUP-01	Water	06/11/2004	00:00	06/12/2004	11:52

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SEVERN TRENT STL

LABORATORY TEST RESULTS

Job Number: 275517

Date:07/08/2004

CUSTOMER: Brown and Caldwell | PROJECT: KEY ENERGY | ATTN: Madeline Mauk

Customer Sample ID: MW-1
Date Sampled.....: 06/11/2004
Time Sampled.....: 16:25
Sample Matrix.....: Water

Laboratory Sample ID: 275517-1
Date Received.....: 06/12/2004
Time Received.....: 11:52

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
EPA 160.1	Solids, Total Dissolved (TDS), Water	1010			2.99	10	1	mg/L	102935		06/14/04 1800	sur
EPA 300.0	Chloride, Water	196			0.70	4.0	10	mg/L	103052		06/15/04 2029	cas

* In Description = Dry Wgt.

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SEVERN TRENT STL

LABORATORY TEST RESULTS

Job Number: 275517

Date:07/08/2004

CUSTOMER: Brown and Caldwell | PROJECT: KEY ENERGY | ATTN: Madeline Mauk

Customer Sample ID: DUP-01
Date Sampled.....: 06/11/2004
Time Sampled.....: 00:00
Sample Matrix.....: Water

Laboratory Sample ID: 275517-2
Date Received.....: 06/12/2004
Time Received.....: 11:52

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
EPA 160.1	Solids, Total Dissolved (TDS), Water	1050			2.99	10	1	mg/L	102935		06/14/04 1800	sur
EPA 300.0	Chloride, Water	195			0.70	4.0	10	mg/L	103052		06/15/04 2044	cas

* In Description = Dry Wgt.

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SEVERN TRENT STL

QUALITY CONTROL RESULTS

Job Number.: 275517 Report Date.: 07/08/2004

STOMER: Brown and Caldwell PROJECT: KEY ENERGY ATTN: Madeline Mauk

st Method.....: EPA 300.0 Analyst...: cas
thod Description.: Ion Chromatography Analysis Units.....: mg/L Test Code.: CHL
rameter.....: Chloride Batch(s)...: 103052

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result *	Limits	F	Date	Time
I		WCS31126	19.932		20.00		99.7	90.0-110.		06/15/2004	1200
ICB			0							06/15/2004	1215
MB			0							06/15/2004	1230
LCS		WCS31126	19.729		20.00		98.6	90.0-110.		06/15/2004	1245
C		WCS31126	20.712		20.00		103.6	90.0-110.		06/15/2004	1501
C			0.2720							06/15/2004	1516
DU	275458-1		5.6227			5.4458	3.2	20		06/15/2004	1712
MS	275458-1	WCS30882	15.894		10.000000	5.4458	104.5	80-120		06/15/2004	1727
D	275590-1		3.4219			3.4423	0.6	20		06/15/2004	1757
C		WCS31126	19.725		20.00		98.6	90.0-110.		06/15/2004	1813
CCB			0.2434							06/15/2004	1828
MS	275590-1	WCS30882	13.806		10.000000	3.4423	103.6	80-120		06/15/2004	1843
CCV		WCS31126	19.795		20.00		99.0	90.0-110.		06/15/2004	2114
C			0.2501							06/15/2004	2129
D	275517-3		5.1628			5.2670	2.0	20		06/15/2004	2144
MS	275517-3	WCS30882	15.791		10.000000	5.2670	105.2	80-120		06/15/2004	2159
CCV		WCS31126	20.097		20.00		100.5	90.0-110.		06/16/2004	0015
C			0.2435							06/16/2004	0031
M			0							06/16/2004	0046
LCS		WCS31126	19.804		20.00		99.0	90.0-110.		06/16/2004	0101
DU	275334-2		7.5941			7.2345	4.9	20		06/16/2004	0146
MS	275334-2	WCS30882	18.024		10.000000	7.2345	107.9	80-120		06/16/2004	0201
C		WCS31126	19.584		20.00		97.9	90.0-110.		06/16/2004	0317
C			0							06/16/2004	0332
DU	275407-2		4.2093			4.1746	0.8	20		06/16/2004	0533
MS	275407-2	WCS30882	14.703		10.000000	4.1746	105.3	80-120		06/16/2004	0548
C		WCS31126	19.758		20.00		98.8	90.0-110.		06/16/2004	0618
C			0.2345							06/16/2004	0633
CCV		WCS31126	19.904		20.00		99.5	90.0-110.		06/16/2004	0704
CCB			0.2642							06/16/2004	0719

st Method.....: EPA 160.1 Analyst...: sur
Method Description.: Solids, Total Dissolved (TDS) Units.....: mg/L Test Code.: TDS
Parameter.....: Solids, Total Dissolved (TDS) Batch(s)...: 102935

Q	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result *	Limits	F	Date	Time
DU	275338-10		1359.00			1388.00	2.1	10.0		06/14/2004	1800
DU	275487-6		1311.00			1256.00	4.3	10.0		06/14/2004	1800
M			1.00							06/14/2004	1800
L		WCS31351	3506.00		3600		97.4	90.0-110.		06/14/2004	1800
DU	275517-2		1052.00			1012.00	3.9	10.0		06/14/2004	1800
LCS		WCS31351	3520.00		3600		97.8	90.0-110.		06/14/2004	1800
M			1.00							06/14/2004	1800

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QUALITY ASSURANCE METHODS

REFERENCES AND NOTES

Report Date: 07/08/2004

REPORT COMMENTS

1) All pages of this report are integral parts of the analytical data. Therefore, this report should be reproduced only in its entirety.
2) Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.
3) According to 40CFR Part 136.3, pH, Chlorine Residual, and Dissolved Oxygen analyses are to be performed immediately after aqueous sample collection. When these parameters are not indicated as field,(e.g. pH Field) they were not analyzed immediately, but as soon as possible on laboratory receipt.
4) For all USACE projects, the QC limits are based on "mean +/- 2 sigma", which are the warning limits.

General Information:

- Cresylic Acid is the combination of o,m and p-Cresol. The combination is reportesd as the final result.
- m-Cresol and p-Cresol co-elute. The result of the two is reported as either m&p-cresol or as p-cresol.
- m-Xylene and p-Xylene co-elute. The result of the two is reported as m,p-Xylene.
- N-Nitrosodiphenylamine decomposes in the gas chromatograph inlet forming dipheylamine and, consequently, may be detected as diphenylamine.
- Methylene Chloride and Acetone are recognized potential laboratory contaminants. Its presence in the sample up to five times the amount reported in the blank may be attributed to laboratory contamination.
- Trimethysilyl(Diazomethane) is used to esterify acid herbicides in Method SW-846 8151A.
- For Inorganic analyses, duplicate QC limits are determined as follows: If the sample result is less than or equal to 5 times the reporting limit, the RPD limit is equal to the reporting limit. If the sample result is greater than 5 times the reporting limit, the RPD limit is the method defined RPD.

Explanation of Qualifiers:

U - This qualifier indicates that the analyte was analyzed but not detected.
J - (Organics only) This qualifier indicates that the analyte is an estimated value between the RL and the MDL.
B - (Inorganics only) This Qualifier indicates that the analyte is an estimated value between the RL and the MDL.
N - (Organics only) This flag indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic charachterization of a TIC, such as "chlorinated hydrocarbon", the "N" flag is not used.

Explanation of General QC Outliers:

A - Matrix interference present in sample.
a - MS/MSD analyses yielded comparable poor recoveries, indicating a possible matrix interference. Method performance is demonstrated by acceptable LCS recoveries.
b - Target analyte was found in the method blank.
M - QC sample analysis yielded recoveries outside QC acceptance criteria. This sample was reanalyzed.
L - LCS analysis yielded high recoveries, indicating a potential high bias. No target analytes were observed above the RL in the associated samples.
G - Marginal outlier within 1% of acceptance criteria.
r - RPD value is outside method acceptance criteria.
C - Poor RPD values observed due to the non-homogenous nature of the sample.
O - Sample required dilution due to matrix interference.
D - Sample reported from a dilution.
d - Spike and/or surrogate diluted.
P - The recovery of this analyte is outside default QC limits. The data is accepted and will be used to calculate in-house statistical limits.
E - The reported concentration exceeds the instrument calibration.
F - The analyte is outside QC limits. The sample data is accepted since this analyte is not reported in associated samples.
H - Continuing Calibration Verification (CCV) standard is not associated with the samples reported.
q - See the subcontract final report for qualifier explanation.

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QUALITY ASSURANCE METHODS

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W - The MS/MSD recoveries are outside QC acceptance criteria because the amount spiked is much less than the amount found in the sample.
K - High recovery will not affect the quality of reported results.
Z - See case narrative.

Explanation of Organic QC Outliers:

e - Method blank analysis yielded phthalate concentrations above the RL. Phthlates are recognized potential laboratory contaminants. Its presence in the sample up to five times the amount reported in the blank may be attributed to laboratory contamination.
S - Sample reanalyzed/reextracted due to poor surrogate recovery. Reanalysis confirmed original analysis indicating a possible matrix interference.
T - Sample analysis yielded poor surrogate recovery.
R - The RPD between the two GC columns is greater than 40% and no anomalies are present. The higher result is reported as per EPA Method 8000B.
I - The RPD between the two GC columns is greater than 40% and anomalies are present. The lower of the two results has been reported.
X - Gaseous compound. In-house QC limits are advisory.
Y - Ketone compounds have poor purge efficiency. In-house QC limits are advisory.
f - Surrogate not associated with reported analytes.

Explanation of Inorganic QC Outliers:

Q - Method blank analysis yielded target analytes above the RL. Associated sample results are greater than 10 times the concentrations observed in the method blank.
V - The RPD control limit for sample results less than 5 times the RL is +/- the RL value. Sample and duplicate results are within method acceptance criteria.
e - Serial dilution failed due to matrix interference.
g - Sample result quantitated by Method of Standard Additions (MSA) due to the analytical spike recovery being below 85 percent. The correlation coefficent for the MSA is greater than or equal to 0.995.
s - BOD/cBOD seed value is not within method acceptance criteria. Due to the nature of the test method, the sample cannot be reanalyzed.
l - BOD/cBOD LCS value is not within method acceptance criteria. Due to the nature of the test method, sample cannot be reanalyzed.
n - Sample result quantitated by Method of Standard Additions (MSA) due to the analytical spike recovery being below 85 percent. The correlation coefficient for the MSA is less than 0.995.

Abbreviations:

Batch - Designation given to identify a specific extraction, digestion, preparation, or analysis set.
CCV - Continuing Calibration Verification
CRA - Low level standard check - GFAA, Mercury
CRI - Low level standard check - ICP
Dil Fac - Dilution Factor - Secondary dilution analysis
DLFac - Detection Limit Factor
EB - Extraction Blank (TCLP, SPLP, etc.)
ICAL - Initial Calibration
ICB - Initial Calibration Blank
ICV - Initial Calibration Verification
ISA - Interference Check Sample A - ICP
ISB - Interference Check Sample B - ICP
LCD - Laboratory Control Duplicate
LCS - Laboratory Control Sample
MB - Method Blank
MD - Method Duplicate
MDL - Method Detection Limit
MS - Matrix Spike

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QUALITY ASSURANCE METHODS

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MSD - Matrix Spike Duplicate
ND - Not Detected
PB - Preparation Blank
PREPF - Preparation Factor
RL - Reporting Limit
RPD - Relative Percent Difference
RRF - Relative Response Factor
RT - Retention Time
DU - Duplicate

Method References:

(1) EPA 600/4-79-020 Methods for the Analysis of Water and Wastes, March 1983.
(2) EPA 600/R-94-111 Methods for the Determination of MEtals in Environmental Samples, Supplement I, May 1994.
(3) EPA SW846 Test Methods for Evaluating Solid Waste, Third Edition, September 1986; Update I July 1992; Update II, September 1994, Update IIA August 1993; Update IIB, January 1995; Update III, December 1996, Update IVA January 1998, Update IVB November 2000.
(4) Standard Methods for the Examination of Water and Wastewater, 16th Edition (1985), 17th Edition (1989), 18th Edition (1992), 19th Edition (1995), 20th Edition (1998).
(5) HACH Water Analysis Handbook 3rd Edition (1997).
(6) Federal Register, July 1, 1990 (40 CFR Part 136 Appendix A).
(7) Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, 2nd Edition, January 1997.
(8) ASTM Annual Book of Methods (Various Years)
(9) Diagnosis and Improvement of Saline and Alkali Soils, Agriculture Handbook No. 60, United States Department of Agriculture, 1954.

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SEVERN TRENT STL

LABORATORY CHRONICLE

Job Number: 275517

Date: 07/08/2004

CUSTOMER: Brown and Caldwell | PROJECT: KEY ENERGY | ATTN: Madeline Mauk

Lab ID: 275517-1 Client ID: MW-1 Date Recvd: 06/12/2004 Sample Date: 06/11/2004

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED		DILUTION
EPA 300.0	Ion Chromatography Analysis	1	103052		06/15/2004	2029	10
EPA 160.1	Solids, Total Dissolved (TDS)	1	102935		06/14/2004	1800	

Lab ID: 275517-2 Client ID: DUP-01 Date Recvd: 06/12/2004 Sample Date: 06/11/2004

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED		DILUTION
EPA 300.0	Ion Chromatography Analysis	1	103052		06/15/2004	2044	10
EPA 160.1	Solids, Total Dissolved (TDS)	1	102935		06/14/2004	1800	

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SEVERN TRENT SERVICES

STL Houston
6310 Rothway Drive
Houston, TX 77040

No. 002086

CHAIN OF CUSTODY RECORD

CUSTOMER INFORMATION		PROJECT INFORMATION	
COMPANY:	BROWN & CALDWELL	PROJECT NAME/NUMBER:	REY ENERGY Eunice & Hobbs
SEND REPORT TO:	MADLINE MAUK	BILLING INFORMATION	
ADDRESS:	1415 LOUISIANA STE 2500	BILL TO:	
		ADDRESS:	
PHONE:	713-759-0999	PHONE:	
FAX:	713-308-3886	FAX: PO NO.:	

LAB JOB NO. 215511

SAMPLE NO.	SAMPLE ID	DATE	TIME	MATRIX			TDS	Chlorides	REMARKS/PRECAUTIONS
1	MW-1	6-11-04	1625	W			X	X	EUNICE
2	DUP-01	6-11-04	—	W			X	X	EUNICE
3	MW-2	6-11-04	1322	W			X	X	HOBBS

SAMPLER: Chris Petty

SHIPMENT METHOD: DROP-OFF

AIRBILL NO.:

REQUIRED TURNAROUND* ☐ SAME DAY ☐ 24 HOURS ☐ 48 HOURS ☐ 72 HOURS ☐ 5 DAYS ☐ 10 DAYS ☒ ROUTINE ☐ OTHER _____

RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
SIGNATURE: Chris Petty	6/14/04		SIGNATURE:			SIGNATURE:			SIGNATURE:		
PRINTED NAME/COMPANY:	TIME 1145		PRINTED NAME/COMPANY:			PRINTED NAME/COMPANY:			PRINTED NAME/COMPANY:		
SIGNATURE:	DATE 6/14/04		SIGNATURE:			SIGNATURE:			SIGNATURE:		
PRINTED NAME/COMPANY: SR	TIME 1152		PRINTED NAME/COMPANY:			PRINTED NAME/COMPANY:			PRINTED NAME/COMPANY:		

STL Houston is a part of Severn Trent Laboratories, Inc.

STL-8222-H (0700)

rpjsckl | Job Sample Receipt Checklist Report | V2

Job Number.: 275517 Location.: 57216 Check List Number.: 1 Description.:
Customer Job ID.....: Job Check List Date.: 06/12/2004 Date of the Report..: 06/12/2004
Project Number.: 99004969 Project Description.: Brown and Caldwell-Hobbs Eunice Project Manager.....: ebf
Customer.....: Brown and Caldwell Contact.: Madeline Mauk

Questions ?	(Y/N)	Comments
Chain of Custody Received?	Y	
...If "yes", completed properly?	Y	
Custody seal on shipping container?	N	
...If "yes", custody seal intact?		
Custody seals on sample containers?	N	
...If "yes", custody seal intact?		
Samples chilled?	Y	
Temperature of cooler acceptable? (4 deg C +/- 2).	Y	2.2
...If "no", is sample an air matrix?(no temp req.)		
Thermometer ID	Y	368
Samples received intact (good condition)?	Y	
Volatile samples acceptable? (no headspace)		
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	
Radioactivity at or below background levels?	Y	
Additional		
Comments		
Sample Custodian Signature/Date	Y	TES

STL HOUSTON - SAMPLE RECEIPT CHECKLIST

CLIENT NAME: Braun and Caldwell CARRIER/DRIVER NAME: Client

PROJECT: _____ UNPACKED BY: RP

DATE RECEIVED: 2009 JUN 12 AM 11:52 UNPACKED STAMP: 2009 JUN 12 PM 1:26

TOTAL # COOLERS RECEIVED: 1

COOLER CHECKLIST

COOLER ID	COC PRESENT (Y/N)	CUSTODY TAPE		COOLER TEMP (°C)	THERM ID	TEMP BLK PRESENT (Y/N)	List Sample Bottles in Each Cooler if out of Temperature
		PRESENT (Y/N)	INTACT (Y/N)				
w/Purple 7	Y	C N	N	2-2	300	Y	
		B N	N				
		C					
		B					
		C					
		B					

C = COOLER B = BOTTLES

COOLER(S) SCREENED FOR RADIATION? Yes ✓ No ____ IF TEMP BLK N; HOW WAS TEMP TAKEN: _____

SHORT HOLD / RUSH SAMPLES (include department delivered to and time delivered)

_____

_____

==========

SPECIFIC PROJECT INFORMATION

JOB NUMBER: 275511

VOLATILE HEADSPACE ACCEPTABLE? Yes ____ No ____ NA ✓

(If ANY headspace is present, list details in INCONSISTENCIES section)

Marked As Preserved? Yes ____ No ____

Number of VOA Vials: _____

pH OF WATER SAMPLES

PRESERVATION	# BOTTLES	CORRECT pH (Y/N)	If N, List sample ID and Corresponding pH
H2SO4 (<2)			
HNO3 (<2)			
HCL (<2) (Not VOA Vials)			
NaOH – Cyanide (>12)			
NaOH/Zn Acetate – Sulfide (>9)			
Other			

OF NEAT BOTTLES: 3 # OF SOIL JARS: _____

INCONSISTENCIES – Place in Job Notes as well (CTRL F-12)

_____

_____

_____

_____

ACTION TAKEN

PERSON CONTACTED: _____ DATE: _____

RESOLUTION _____

_____

_____

NOTES _____

_____

_____

(Use back of sheet if necessary)

Project Manager _____

1415 Louisiana
Suite 2500
Houston, Texas 77002

Tel: (713) 759-0999
Fax: (713) 308-3886

www.brownandcaldwell.com

August 27, 2004

BROWN AND CALDWELL

Mr. Daniel K. Gibson
Key Energy Services, Inc.
6 Desta Drive, Suite 4400
Midland, Texas 79705

Subject: **Documentation of Monitoring Well Installation, Soil Boring and Sampling Activities at Key Energy Services, Inc. Saltwater Facility in Hobbs, Lea County, New Mexico**

Dear Mr. Gibson:

Brown and Caldwell completed the installation and sampling of one permanent groundwater monitoring well and an additional shallow soil boring at the Key Energy Services, Inc. (Key) saltwater facility in Hobbs, Lea County, New Mexico from June 9-11, 2004. Key currently operates the saltwater facility at 1502 West Broadway Place in Hobbs, New Mexico (Figure 1). Soil and groundwater assessment activities were previously performed by ARCADIS G&M, Inc. (ARCADIS) from March 25-28, 2003, to determine potential soil and groundwater impact associated with the Key brine pit and truck loading dock. Findings from the March 2003 field investigation indicated petroleum hydrocarbon impact to surface soil, and elevated concentrations of chlorides in soil surrounding the brine pit and in groundwater samples collected from existing monitoring well MW-1. MW-1, however, is screened across the entire saturated zone from 46 feet to 196 feet below ground surface (bgs). It is unclear where in this interval the sample was collected, and if the sample is representative of chloride impact due to historic facility operations. Benzene, toluene, ethylbenzene, and xylene (BTEX) were not detected above the respective detection limits in samples collected by ARCADIS; consequently, further sampling of soil or groundwater for BTEX was not performed.

This groundwater assessment was performed to establish background groundwater quality and to determine if chlorides from historic operations have potentially impacted groundwater at the site. The soil assessment was performed to delineate TPH in surface soils between 0 and 10 feet of ground surface near the truck loading dock. Monitoring well and soil boring installation activities, groundwater sampling, and laboratory analytical results are discussed in the following paragraphs.

Field Activities

Brown and Caldwell advanced two (2) soil borings using air rotary drilling. One boring was installed for conversion into a permanent monitoring well, MW-2, at

the apparent upgradient and northwest corner of the property, to determine background water quality for the site. The second boring was advanced to 15 feet bgs just south of the truck loading pad area where TPH concentrations were detected previously. One groundwater sample was collected from the upgradient monitoring well MW-2 for laboratory analysis. One groundwater sample and a duplicate groundwater sample from existing monitoring well MW-1 were collected at 70 feet bgs corresponding to the same depth interval as monitoring well MW-2, and one groundwater sample was collected at 95 feet bgs. Prior to drilling activities, utility clearance was obtained through coordination with site personnel and by contacting New Mexico One-Call. The New Mexico Oil Control Division (OCD) was notified in advance of commencement of field activities.

The monitoring wells were surveyed using rental equipment from a local retailer relative to an arbitrary site elevation datum of 100 feet. The survey indicated that MW-2 is located topographically upgradient, which is consistent with local observations from monitoring wells in the area.

Soil Borings

Soil cores were sampled continuously to approximately 10 feet bgs and at least once every 10 feet thereafter using decontaminated, 2-foot split-spoons and/or shovels for cuttings. All sample cores and soil cuttings were continuously field screened with a photo-ionization detector (PID), logged by a qualified field geologist for recovery length and lithology, and observed for impact. The lithologic description and moisture content were described in accordance with ASTM International Standard D 2488, Standard Practice for Description and Identification of Soils (Visual Manual Procedure), and classified in accordance with the Unified Soil Classification System (USCS). The soil boring/monitoring well log for monitoring well MW-2 is included in Attachment 1. The lithology consisted predominantly of fine to medium grained, rounded, well sorted, light grayish-brown to brown sand with moderate caliche cementation and interlayed sandstone beds.

The soil boring to be converted into monitoring well MW-2 was advanced to a total depth of 76 feet below ground surface. Overhead utilities ran parallel to the western and northern fence lines, thus the boring was placed as far northwest and upgradient of the brine pit as possible within the Key property boundary. No soil samples from monitoring well MW-2 boring were submitted to the laboratory for analysis.

Soil boring SB-3 was installed to a total depth of 15 feet bgs in an area adjacent to the truck loading pad. Previous soil investigation results (ARCADIS, March 2003) indicated TPH concentrations in the diesel range of 114 milligrams per kilogram (mg/kg) at a depth of 2 feet bgs in the area. The subsequent sample collected from the bottom of the boring, at 35 feet bgs, indicated TPH to be non-detect at that depth. Three soil samples from soil boring SB-3 were collected for the purpose of delineating TPH between 2 feet and 10 feet bgs in the area. The first five feet of material in the area was determined to be caliche fill material/road base. Therefore, soil samples were collected from the 5-5.5 feet bgs, 9-9.8 feet bgs and 14-14.5 feet bgs depth intervals. There were no PID detections from ground surface to the total depth of the boring. Partial recovery while using the split-spoons prevented a duplicate sample from being collected at the same times and same depth intervals as the original samples. The soil sample from 5-5.5 feet bgs was submitted to the laboratory for analysis of TPH using Method 8015M. The subsequent samples from 9-9.8 feet bgs and 14-14.5 feet bgs were submitted to the laboratory to be archived pending analysis of TPH using Method 8015M. The soil boring log for SB-3 is included in Attachment 1. Upon completion of sampling activities, the soil boring was plugged by backfilling with hydrated bentonite chips.

Monitoring Well Installation

Brown and Caldwell converted the boring installed to a total depth of 76 feet bgs into a permanent groundwater monitoring well, MW-2, to assess background levels of chloride and TDS in groundwater that had not been potentially affected by operations at the saltwater facility. Groundwater was encountered at approximately 63 feet bgs. The monitoring well was constructed with 20 feet of 2-inch diameter, 0.010 machine slot, flush-threaded, Schedule 40 polyvinyl chloride (PVC) screen, and 2-inch diameter Schedule 40 PVC casing to ground surface. The well screen intersects the saturated interface in the formation. The well was completed a few inches below ground surface and protected with a flush-to-grade manhole set in a 3-foot square, 4-inch thick, concrete pad. The well was completed in accordance with New Mexico Environment Department (NMED) Ground Water Quality Bureau and Oil Conservation Division (OCD) guidance and standards.

Brown and Caldwell developed the monitoring well using a 1.5-inch disposable PVC bailer. Monitoring well development was considered complete when produced fluids were relatively free of suspended material. Approximately 25 gallons of groundwater was bailed from monitoring well MW-2 during development. A period of at least 24 hours was allowed to pass prior to groundwater sampling of monitoring well MW-2.

Brown and Caldwell used a handheld Global Positioning System (GPS) device to determine the location of the monitoring well, as required by the New Mexico OCD. The monitoring well location is depicted on Figure 2 and coordinates for monitoring wells at the site are listed on Table 3.

Collection and Analysis of Groundwater Samples

Brown and Caldwell measured the static water level in each monitoring well, immediately prior to sampling and purging, using a decontaminated oil/water interface probe. The monitoring wells were purged using low flow/low stress purging procedures with a 2-inch submersible stainless steel Fultz pump and disposable polyethylene tubing. The oil/water interface probe and pump were decontaminated in the field before and after use by washing with a non-phosphate detergent (Liquinox) and water wash, followed by two distilled water rinses.

At monitoring well MW-1, the intake of the Fultz pump was placed at 70 feet bgs. A pumping rate of 0.40 liters per minute was sustained and field parameter measurements for pH, specific conductivity, turbidity, and temperature were collected during the purging process. A YSI 600 XL flow cell was used to measure these parameters at 3 minute increments. A total of approximately 5.0 liters of groundwater were produced before parameters indicated groundwater stabilization had occurred. Upon completion of purging operations, a groundwater sample and a duplicate groundwater sample were immediately collected from the monitoring well at the pump discharge line, after the flow cell had been disconnected.

The pump was then lowered approximately 25 feet down the screened interval to 95 feet bgs. The same procedures as described above were utilized to sample monitoring well MW-1 at 95 feet bgs. A pumping rate of 0.45 liters per minute was sustained during the purging process and a total of approximately 6.5 liters of groundwater were produced before parameters indicated groundwater stabilization had occurred. Upon completion of purging operations, a groundwater sample was immediately collected from the monitoring well at the pump discharge line, after the flow cell had been disconnected.

At monitoring well MW-2, the intake of the Fultz pump was placed at 70 feet bgs, consistent with the first interval sampled at monitoring well MW-1. The same procedures as described above were utilized to sample MW-2 at 70 feet bgs. A pumping rate of 0.30 liters per minute was sustained during the purging process and a total of approximately 8 liters of groundwater were produced before parameters indicated groundwater stabilization had occurred. Upon completion of

purging operations, a groundwater sample was immediately collected from the monitoring well at the pump discharge line, after the flow cell had been disconnected.

The field data sheets for purging and sampling of monitoring wells MW-1 at 70 feet and at 95 feet, and MW-2 at 70 feet are included as Attachment 2.

Each sample was transferred into laboratory-supplied, 500-milliliter plastic containers, labeled, and placed on ice in an insulated cooler using standard chain-of-custody procedures. The samples were shipped to Severn Trent Laboratories, Inc. in Houston, Texas. The groundwater samples were analyzed for:

- Total Dissolved Solids (TDS) by EPA Method 160.1
- Chlorides by EPA Method 300.0

Groundwater Analytical Results

The groundwater sample collected from monitoring well MW-1 at 70 feet bgs indicates a TDS content of 1,260 milligrams per liter (mg/L) and a chlorides content of 327 mg/L. The groundwater sample collected from monitoring well MW-1 at 95 feet bgs indicates a TDS content of 1,510 mg/L and a chlorides content of 476 mg/L. The groundwater sample collected from monitoring well MW-2 at 70 feet bgs indicates an even greater TDS content of 2,090 mg/L and a chlorides content of 527 mg/L. Chloride concentrations in both wells exceed the 250 mg/L domestic water supply standard for chloride established by the New Mexico Water Quality Control Commission (WQCC). TDS concentrations in both monitoring wells exceed the 1,000 mg/L limit for TDS established by the New Mexico WQCC.

Tabulated groundwater analytical results are included as Table 1. The laboratory analytical reports are included as Attachment 3.

Soil Analytical Results

Soil analytical results indicate a minor detection of gasoline range TPH in the 5-5.5 foot bgs sample interval from soil boring SB-3, but the concentration of 0.313 mg/kg, which is an estimated value between the reporting limit of 1 mg/kg and the method detection limit of 0.04297 mg/kg, is below the allowable limit of 100 mg/kg for TPH as established by the New Mexico Environment Department (NMED). Diesel range TPH was not detected. The TPH analysis for the initial sample was requested within a 5-day turnaround time. Upon receipt of initial laboratory analytical results, it was determined that the two remaining delineation

sample intervals that were archived by the laboratory pending analysis could be discarded.

Tabulated soil analytical results are included as Table 2. The laboratory analytical reports are included as Attachment 3.

Waste Management

Soil cuttings generated during soil boring and monitoring well installation activities were placed in clean, 55-gallon steel drums. Decontamination water, well development water, and purge water produced during well installation and sampling activities were also placed in a clean, 55-gallon steel drum. Non-hazardous waste labels were affixed to each drum. A total of two drums containing soil and one drum containing water were produced during the investigation activities and staged near the northwest corner of the property, near monitoring well MW-2, pending offsite disposal.

Conclusions and Recommendations

Based on the New Mexico WQCC regulations, if the first measured values at a site exceed the established limits (Section 20.6.2.3103 NMAC, Subsections A-C) and historic groundwater data for the site is unavailable, the first measured concentrations default as the allowable limits. Subsequently, measured concentrations at a site may not exceed these limits. Given that monitoring well MW-2 is upgradient, based on both local topographic information and the site-specific survey data, elevated chlorides and TDS may be either: 1) naturally occurring; or 2) present due to an offsite source. A meeting with the New Mexico OCD is recommended to determine if chlorides and TDS concentrations observed in the upgradient well may be used as background water quality, or if further investigation to address potential offsite sources will be necessary.

Minor TPH concentrations near the truck loading dock appear to be present within the fill material only (up to approximately 5 feet bgs). Concentrations indicate that TPH does not exceed the NMED allowable limit of 100 mg/kg, and TPH has not impacted native soils south of and adjacent to the truck loading dock area. No further action is recommended for soils in the area of the truck loading dock.

If you have any additional questions regarding the information contained in this correspondence, please contact Madeline Mauk at (713)-646-1119.

Sincerely,

BROWN AND CALDWELL

Madeline S. Mauk, P.E.
Supervising Engineer

BROWN AND CALDWELL

Lynn M. Wright, P.G.
Supervising Geologist

cc: Brown and Caldwell Project File

Figures

1 Site Location Map
2 Monitoring Well Location Map

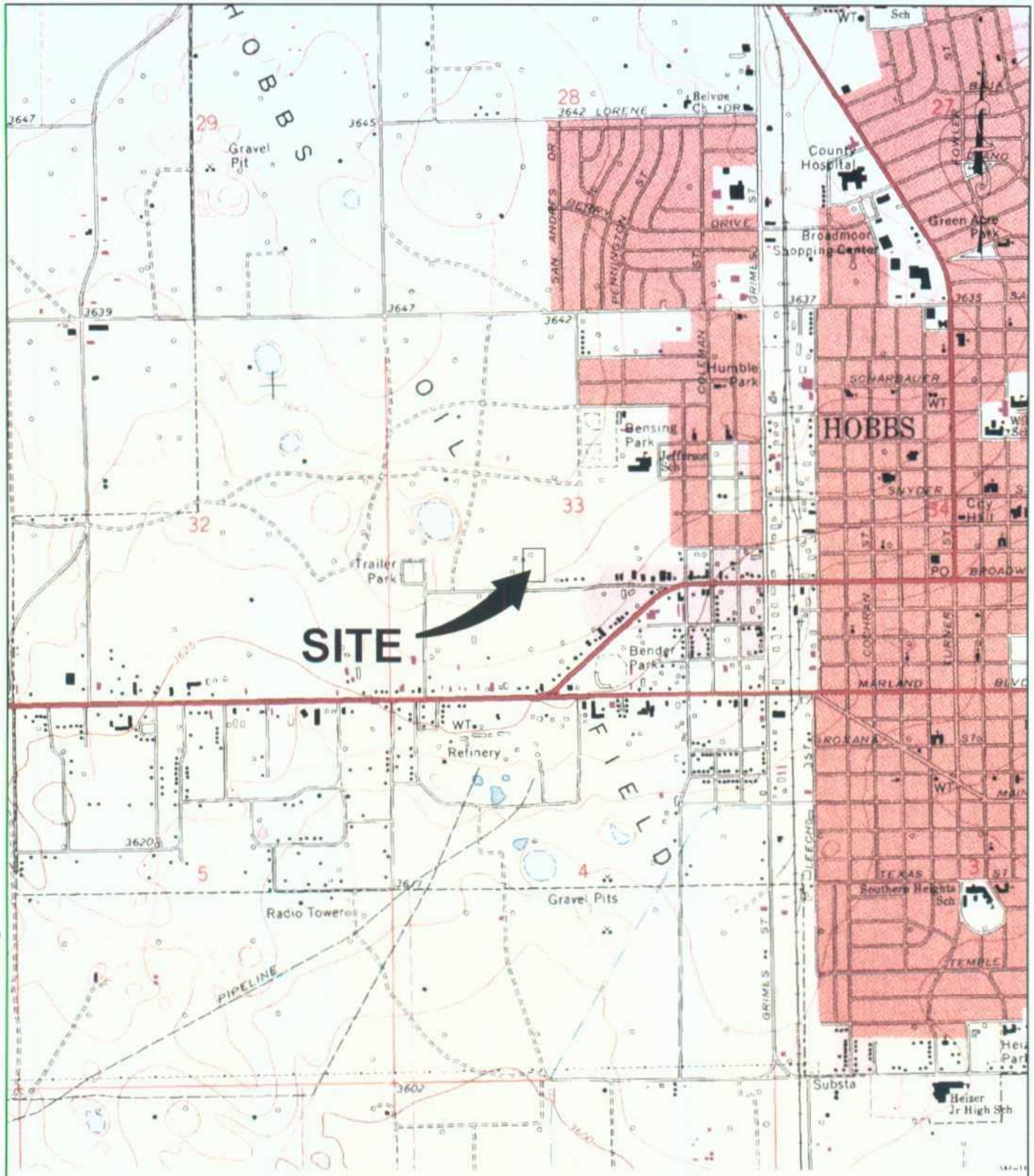
Tables

1 Groundwater Analytical Results
2 Soil Analytical Results
3 GPS Coordinates for Monitoring Wells

Attachments

1 Soil Boring/Monitoring Well Logs
2 Groundwater Sampling Field Data Sheets
3 Laboratory Analytical Report

FIGURES



SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE - HOBBS WEST, NEW MEXICO; 1969, REVISED 1979

0 1000 2000

APPROXIMATE SCALE IN FEET

BROWN AND CALDWELL

1415 Louisiana
Suite 2500
Houston, Texas 77002
Tel: (713) 759-0999
Fax: (713) 308-3886

KEY ENERGY SERVICES, INC.

SALTWATER FACILITY SITE LOCATION MAP
HOBBS, NEW MEXICO
FIGURE 1

Aug 26, 2004 - 2:45pm ckelly
P:\Cad\JOBS\KeyEnerg\25935\HobbsSiteLocMap.dwg

REFERENCE: NEW MEXICO RESOURCE GEOGRAPHIC INFORMATION SYSTEM PROGRAM, HOBBS WEST 7.5 MINUTE DIGITAL ORTHOPHOTO QUAD NE QUARTER, UTM NAD 83

LEGEND

- SOIL BORING LOCATION (ARCADIS, MARCH 2003)
- MONITORING WELL LOCATION (BROWN AND CALDWELL, JUNE 2004)
- MONITORING WELL LOCATION (ARCADIS, MARCH 2003)
- FENCELINE

0 50 100

APPROXIMATE SCALE IN FEET

BROWN AND CALDWELL
1415 Louisiana
Suite 2500
Houston, Texas 77002
Tel: (713) 759-0999
Fax: (713) 308-3886

KEY ENERGY SERVICES, INC.

SALTWATER FACILITY MONITORING WELL LOCATION MAP
HOBBS, NEW MEXICO
FIGURE 2

Aug 26, 2004 - 2:45pm ckelly
P:\Cad\JOBS\KeyEnerg\25935\HobbsSiteMap.dwg

TABLES

Table 1
Groundwater Analytical Results
Key Energy Services, Inc. - Hobbs Saltwater Facility
Hobbs, New Mexico

Laboratory Analysis			Total Dissolved Solids (mg/L) [EPA Method 160.1]	Chlorides (mg/L) [EPA Method 300.0]
NMWQCC[1] Groundwater Protection Limit			1,000[2]	250
Sample Location	Sample ID	Sample Date		
MW-1 (70 feet)	MW-1-70	6/10/2004	1,260	327
MW-1 (70 feet)	DUP-01	6/10/2004	1,310	331
MW-1 (95 feet)	MW-1-95	6/10/2004	1,510	476
MW-2 (70 feet)	MW-2	6/11/2004	2,090	527

Notes:

1) NMWQCC = New Mexico Water Quality Control Commission (Regulation 20.6.2.3103, Subsections A-C).

2) Total Dissolved Solids limit established by NMWQCC; default value is first measured value established for site in the event that previous groundwater data for site is unavailable.

Table 2
Soil Analytical Results
Key Energy Services, Inc. - Hobbs Saltwater Facility
Hobbs, New Mexico

Laboratory Analysis			TPH (mg/kg) [METHOD 8015B]	
Constituent of Concern			Gasoline-Range Organics (GRO)	Diesel-Range Organics (DRO)
NMED Soil-to-Groundwater Protection Limit			100	100
Sample Location	Sample ID	Sample Date		
SB-03	SB-03 (5-5.5)	6/9/2004	0.313 J	< 0.04297 (1)

Notes:

NMED = New Mexico Environment Department

mg/kg = milligrams per kilogram

J = Result is estimated value between the MDL and PQL.

(1) Analyte not detected above method detection limit (MDL) of 0.04297 mg/kg.

Table 3
Coordinates for Monitoring Wells
Key Energy Services, Inc. - Hobbs Saltwater Facility
Hobbs, New Mexico

Monitoring Well	Latitude	Longitude
MW-1	32° 41' 56.35"	- 103° 09' 15.44"
MW-2	32° 42' 00.77"	- 103° 09' 18.79"
SB-3	32° 41' 56.00"	- 103° 09' 16.66"

Notes:

(1) GARMIN brand handheld Global Positioning System unit. North American Datum (1983). (dd°mm'ss.ss")

ATTACHMENT 1

Soil Boring/Monitoring Well Logs

Monitoring Well: **MW-2**

Project Name: **Hobbs Saltwater Facility Monitor Well and Soil Boring** Project Number: **25935.001** Sheet **1** of **3**

Project Location: **1502 West Broadway Place, Hobbs, New Mexico**		Logged By: **C. Putney**	Approved:
Drilling Contractor: **Harrison and Cooper**		Date Started: **6/9/04**	Date Finished: **6/9/04**
Drilling Equipment: **IR TH-60**	Driller: **Leonard**	Total Boring Depth: (feet) **76.0**	Depth to Static Water: (feet)
Drilling Method: **Air Rotary**	Borehole Diameter: **8"**	TOC Elevation:	Ground Elevation:
Sampling Method: **split-spoon/shovel**		Diameter and Type of Well Casing: **2" PVC**	
Comments: **Water level measured from top of casing.**		Slot Size: **0.010 "**	Filter Material: **20/40 silica**
		Development Method: **bailer**	

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID	Monitoring Well Remarks
2		SP SM		Hand auger to clear for utlities to 3'. Fine to medium sand, loose, unconsolidated, caliche at 6 inches.	0		0		Flush mount completion
4		SP SM		SAND; fine to medium, trace caliche.	0		.4		
6					0		.5		
8					0		.3		
10					0		.5		
12					0		.5		
14									
16				SAND/SANDSTONE; Caliche/calcareous cementation increases, brown to light grayish brown, very hard (lithified) sandstone layers, some interlayered fine to medium sand seams, dry.					
18									
20					0		0		No recovery with split spoons due to very hard caliche/cemented sand layers. Logged cuttings.
22									
24									
26									
28									
30		SP SM		SAND; fine to medium, light reddish-brown, trace caliche, mostly loose, dry.	0		0		
32									

Monitoring Well: **MW-2**

Project Name: **Hobbs Saltwater Facility Monitor Well and Soil Boring** Project Number: **25935.001** Sheet 2 of 3

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID	Monitoring Well Remarks
34									
36					0		.5		
38									
40									
42				SANDSTONE; brown, very hard, dry. (chips from cuttings).					
44									
46					0		0		
48									
50		SP SM		SAND; fine to medium, lt. reddish brown, mostly loose, moisture increasing at 60', caliche/calcareous cementation at 58' and at 66'. Saturated sand at 65'. No odor. Trace clayey sand at 71.5.	0		.7		
52									
54									54.0
56									Top of screened interval at 56 ft.
58					0		1.7		
60									
62									
64	▼								
66					0		1.5		
68									
70					0		2		Pump intake at 70'. Collected groundwater sample MW-2 for chlorides and TDS.
72									
74									

Monitoring Well: **MW-2**

Project Name: **Hobbs Saltwater Facility Monitor Well and Soil Boring** Project Number: **25935.001** Sheet 3 of 3

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID	Monitoring Well Remarks
76									76.0

Soil Boring: **SB-3**

Project Name: **Hobbs Saltwater Facility Monitor Well and Soil Boring** Project Number: **25935.001** Sheet **1** of **1**

Project Location: **1502 West Broadway Place, Hobbs, New Mexico**		Logged By: **C. Putney**	Approved:
Drilling Contractor: **Harrison and Cooper**		Date Started: **6/9/04**	Date Finished: **6/9/04**
Drilling Equipment: **IR TH-60**	Driller: **Leonard**	Total Boring Depth: (feet) **15.0**	Depth to Static Water: (feet)
Drilling Method: **Air Rotary**	Borehole Diameter: **8"**	TOC Elevation:	Ground Elevation:
Sampling Method: **split-spoon**		Diameter and Type of Well Casing:	
Comments:		Slot Size:	Filter Material:
		Development Method:	

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID	Soil Boring Remarks
2				Cleared to 3' for utilities. Fill material/road base, light brown w/ gravel, dk. brown silty clay with gravel below 3', slightly moist, no odor.			.6	0	
4									
6		SM		Silty Sand, light to moderate calcareous cementation in some portions, dry, no odor.			.5	0	Sample SB-3-5-5.5 (Analyzed for TPH-GRO/DRO)
8							2	0 0	
10		SM		Silty sand, trace clay, light reddish-brown, crumbly, dry, light calcareous cementation.			.8	0	Sample SB-3-9-9.8 (Not analyzed by lab)
12							.7	0	
14							1.8	0	Sample SB-3-14-14.8 (Not analyzed by lab) Boring backfilled with bentonite chips hydrated in lifts.

ATTACHMENT 2

Groundwater Sampling Field Data Sheets

BROWN AND CALDWELL

GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-1

1. PROJECT INFORMATION

Project Number: 25935 Task Number 001 Date: 6-10-04 Time: 1305

Client: KEY ENERGY Personnel: C. PUTNEY

Project Location: HOBBS, NM Weather: CLEAR, SUNNY, 90°F

2. WELL DATA

Casing Diameter: 4 inches	Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: FLUSH
Screen Diameter: 4 inches	Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: MOUNT
Total Depth of Well: ~196' feet	From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:
Depth to Static Water: 63.69 feet	From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:
Depth to Product: — feet	From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:

Length of Water Column: ~126.31 feet Well Volume: 82 gal Screened Interval (from GS): 46'-196'

Pump intake depth 70' (from GS)

Note: 2-inch well = 0.16 gal/ft 4-inch well = 0.65 gal/ft

3. PURGE DATA

Purge Method: ☐ Bailer, Size: ___ ☐ Bladder Pump ☒ 2" Submersible Pump ☐ 4" Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other:

Materials: Pump/Bailer ☒ Stainless ☐ PVC ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☒ Field Cleaned ☐ Disposable

Materials: Rope/Tubing ☒ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Was well purged dry? ☐ Yes ☒ No Pumping Rate: 0.4 gal/min

Equipment Model(s)

1. YSI 6000 XL
2. HACH TURBIDITY
3. FULTZ 2" PUMP

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Depth to Water (TOC)	Comments
1325	0.5	6.47	25.07	1.638	451.0	3.24	4.14	63.69	CLEAR
1328	2.0	6.43	26.07	1.675	460.7	2.14	4.82	63.70	
1331	3.0	6.20	25.66	1.670	478.3	1.70	4.83	63.71	
1334	4.0	6.11	26.22	1.705	486.0	1.80	4.80	63.72	
1337	5.0	6.31	26.08	1.695	482.0	1.18	4.81	63.72	

4. SAMPLING DATA

Method(s): ☐ Bailer, Size: ___ ☐ Bladder Pump ☒ 2" Submersible Pump ☐ 4" Submersible Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other:

Materials: Pump/Bailer ☒ Stainless ☐ PVC ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☒ Field Cleaned ☐ Disposable

Materials: Tubing/Rope ☒ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Depth to Water at Time of Sampling: 63.72 Field Filtered? ☐ Yes ☐ No

Sample ID: MW-1-70 Sample Time: 1345 # of Containers: 1

Duplicate Sample Collected? ☒ Yes ☐ No ID: DUP-01

Geochemical Analyses

Ferrous Iron: ____ mg/L

DO: ____ mg/L

Nitrate: ____ mg/L

Sulfate: ____ mg/L

Alkalinity: ____ mg/L

5. COMMENTS

SAMPLED MW-1 AT ~70' BTOC, THEN DROPPED PUMP TO ~95' BTOC AND SAMPLED AGAIN. (TDS + CHLORIDES)

Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.

Signature

BROWN AND CALDWELL

GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-1

1. PROJECT INFORMATION

Project Number: 25935 Task Number: 001 Date: 6-10-04 Time: 1400

Client: KEY ENERGY Personnel: C. PUTNEY

Project Location: HOBBS, NM Weather: CLEAR, SUNNY, 90° F

2. WELL DATA

Casing Diameter: 4 inches	Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other:
Screen Diameter: 4 inches	Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: PUSH MOUNT
Total Depth of Well: ~196' feet	From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:
Depth to Static Water: 163.70 feet	From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:
Depth to Product: — feet	From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:

Length of Water Column: 126.3 feet Well Volume: 82 gal Screened Interval (from GS): 46'-196'

Pump intake depth 95 (from GS)

Note: 2-inch well = 0.16 gal/ft 4-inch well = 0.65 gal/ft

3. PURGE DATA

Purge Method: ☐ Bailer, Size: ___ ☐ Bladder Pump ☒ 2" Submersible Pump ☐ 4" Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other:

Materials: Pump/Bailer ☒ Stainless ☐ PVC ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☒ Field Cleaned ☐ Disposable

Materials: Rope/Tubing ☒ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Was well purged dry? ☐ Yes ☒ No Pumping Rate: 0.45 L gal/min

Equipment Model(s)

1. YSI 600 XL
2. HACH TURBIDITY
3. FULTZ 2" PUMP

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Depth to Water (TOC)	Comments
1400	0.5	5.78	20.88	1.737	512.1	0.03	7.58	163.70	CLEAR
1403	1.75	5.46	20.38	1.831	535.7	-2.7	7.51	163.71	
1406	3.50	5.43	20.43	1.840	538.4	-0.29	7.96	163.71	
1409	4.75	5.45	20.53	1.856	540.1	-0.35	7.29	163.72	
1412	6.50	5.46	20.47	1.862	541.1	-0.39	7.72	163.73	↓

4. SAMPLING DATA

Method(s): ☐ Bailer, Size: ___ ☐ Bladder Pump ☒ 2" Submersible Pump ☐ 4" Submersible Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other:

Materials: Pump/Bailer ☒ Stainless ☐ PVC ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☒ Field Cleaned ☐ Disposable

Materials: Tubing/Rope ☒ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Depth to Water at Time of Sampling: 163.73 Field Filtered? ☐ Yes ☐ No

Sample ID: MW-1-95 Sample Time: 1420 # of Containers: 1

Duplicate Sample Collected? ☐ Yes ☒ No ID:

Geochemical Analyses

Ferrous Iron: ___ mg/L

DO: ___ mg/L

Nitrate: ___ mg/L

Sulfate: ___ mg/L

Alkalinity: ___ mg/L

5. COMMENTS

SAMPLED MW-1 AT -70' THEN DROPPED PUMP TO 95' BTOC AND SAMPLED AGAIN. (TDS + CHLORIDES)

Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.

Signature

BROWN AND CALDWELL

GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-2

1. PROJECT INFORMATION

Project Number: 25935 Task Number: 001 Date: 6-11-04 Time: 1245

Client: KEY ENERGY Personnel: C. PUTNEY

Project Location: HOBBS, NM Weather: CLEAR, SUNNY, 90°F

2. WELL DATA

Casing Diameter: 2 inches	Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: (FLUSH
Screen Diameter: 2 inches	Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: MOUNT)
Total Depth of Well: feet	From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:
Depth to Static Water: 63.96 feet	From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:
Depth to Product: — feet	From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:

Length of Water Column: 12.04 feet Well Volume: gal Screened Interval (from GS): 56' - 76'

Pump intake depth 70' (from GS)

Note: 2-inch well = 0.16 gal/ft 4-inch well = 0.65 gal/ft

3. PURGE DATA

Purge Method: ☐ Bailer, Size: ☐ Bladder Pump ☒ 2" Submersible Pump ☐ 4" Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other:

Materials: Pump/Bailer ☒ Stainless ☐ PVC ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☒ Field Cleaned ☐ Disposable

Materials: Rope/Tubing ☒ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Was well purged dry? ☐ Yes ☒ No Pumping Rate: 0.30 L/min (LITERS)

Equipment Model(s)

1. YSI 600 XL
2. HACH TURBIDITY
3. FLUID 2" SUB. PUMP

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Depth to Water (TOC)	Comments
1305	0.5	5.65	22.55	2.170	330.3	-10.04	32.8	64.08	CLEAR
1308	2.25	5.14	21.88	2.112	426.0	-1.62	23.1	64.08	
1311	3.5	5.13	22.03	2.088	448.4	0.20	14.4	64.09	
1314	4.75	5.09	21.77	2.057	464.2	1.18	9.72	64.10	
1317	6.0	5.01	21.56	2.017	479.2	2.02	5.15	64.12	
1320	8.25	5.16	21.25	1.999	482.1	2.68	3.73	64.13	

4. SAMPLING DATA

Method(s): ☐ Bailer, Size: ☐ Bladder Pump ☒ 2" Submersible Pump ☐ 4" Submersible Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other:

Materials: Pump/Bailer ☒ Stainless ☐ PVC ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☒ Field Cleaned ☐ Disposable

Materials: Tubing/Rope ☒ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Depth to Water at Time of Sampling: 64.15 Field Filtered? ☐ Yes ☒ No

Sample ID: MW-2 Sample Time: 1322 # of Containers: 1

Duplicate Sample Collected? ☐ Yes ☒ No ID:

Geochemical Analyses

Ferrous Iron: mg/L

DO: mg/L

Nitrate: mg/L

Sulfate: mg/L

Alkalinity: mg/L

5. COMMENTS

CHLORIDES, TDS

Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.

Signature

ATTACHMENT 3

Laboratory Analytical Report

SEVERN TRENT STL

Hobbs

ANALYTICAL REPORT

JOB NUMBER: 275487

Prepared For:

Brown and Caldwell
1415 Louisiana
Suite 2500
Houston, TX 77002

Attention: Madeline Mauk

Date: 06/21/2004

Signature

6/22/04
Date

Name: Ed B. Fry

Title: Project Manager III

E-Mail: efry@stl-inc.com

Severn Trent Laboratories
6310 Rothway Drive
Houston, TX 77040

PHONE: (713) 690-4444

TOTAL NO. OF PAGES 19

SEVERN TRENT STL

06/21/2004

Madeline Mauk
Brown and Caldwell
1415 Louisiana
Suite 2500
Houston, TX 77002

Reference:
Project : Brown and Caldwell-Hobbs Eunice
Project No. : 275487
Date Received : 06/11/2004
STL Job : 275487

Dear Madeline Mauk:

Enclosed are the analytical results for your project referenced above. The following samples are included in the report.

1. SB-3 (5-5.5)
2. SB-3 (9-9.8)
3. SB-3 (14-14.5)
4. MW-1-70
5. MW-1-95
6. DUP-01

All holding times were met for the tests performed on these samples.

Enclosed, please find the Quality Control Summary. All quality control results for the QC batch that are applicable to the sample(s) are acceptable except as noted in the QC batch reports.

The test results in this report meet all NELAP requirements for STL Houston's NELAP accredited parameters. Any exceptions to NELAP requirements will be noted and included in a case narrative as a part of this report.

If the report is acceptable, please approve the enclosed invoice and forward it for payment.

Thank you for selecting Severn-Trent Laboratories to serve as your analytical laboratory on this project. If you have any questions concerning these results, please feel free to contact me at any time.

We look forward to working with you on future projects.

Sincerely,

Ed B. Fry
Project Manager

SEVERN TRENT STL

SAMPLE INFORMATION
Date: 06/21/2004

Job Number.: 275487
Customer...: Brown and Caldwell
Attn.....: Madeline Mauk

Project Number.....: 99004969
Customer Project ID....: HOBBS EUNICE
Project Description....: Brown and Caldwell-Hobbs Eunice

Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampled	Time Sampled	Date Received	Time Received
275487-1	SB-3 (5-5.5)	Soil	06/09/2004	12:00	06/11/2004	08:39
275487-2	SB-3 (9-9.8)	Soil	06/09/2004	12:08	06/11/2004	08:39
275487-3	SB-3 (14-14.5)	Soil	06/09/2004	12:15	06/11/2004	08:39
275487-4	MW-1-70	Water	06/10/2004	13:45	06/11/2004	08:39
275487-5	MW-1-95	Water	06/10/2004	14:20	06/11/2004	08:39
275487-6	DUP-01	Water	06/10/2004	00:00	06/11/2004	08:39

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SEVERN TRENT STL

LABORATORY TEST RESULTS

Job Number: 275487

Date:06/21/2004

CUSTOMER: Brown and Caldwell | PROJECT: HOBBS EUNICE | ATTN: Madeline Mauk

Customer Sample ID: SB-3 (5-5.5)
Date Sampled.....: 06/09/2004
Time Sampled.....: 12:00
Sample Matrix.....: Soil

Laboratory Sample ID: 275487-1
Date Received.....: 06/11/2004
Time Received.....: 08:39

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
SW-846 8015B	Total Volatile Petroleum Hydrocarbons TVPH as GRO, Soil	313	J		42.97	1000.00	1.0000	ug/Kg	103342		06/18/04 1336	cad
SW-846 3550B	Extraction (Ultrasonic) DRO Ultrasonic Extraction, Soil	Complete					1		103188		06/15/04 1000	mra
SW-846 8015B	Total Extractable Petroleum Hydrocarbons TEPH - as Diesel, Soil	2.094468	U		2.094468	8.3	1	mg/Kg	103263		06/17/04 1526	maz

* In Description = Dry Wgt.

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SEVERN TRENT STL

LABORATORY TEST RESULTS

Job Number: 275487

Date:06/21/2004

CUSTOMER: Brown and Caldwell | PROJECT: HOBBS EUNICE | ATTN: Madeline Mauk

Customer Sample ID: MW-1-70
Date Sampled.....: 06/10/2004
Time Sampled.....: 13:45
Sample Matrix.....: Water

Laboratory Sample ID: 275487-4
Date Received.....: 06/11/2004
Time Received.....: 08:39

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
EPA 160.1	Solids, Total Dissolved (TDS), Water	1260			2.99	10	1	mg/L	102935		06/14/04 1800	sur
EPA 300.0	Chloride, Water	327			0.70	4.0	10	mg/L	102945		06/15/04 0607	cas

* In Description = Dry Wgt.

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SEVERN TRENT STL

LABORATORY TEST RESULTS

Job Number: 275487

Date:06/21/2004

CUSTOMER: Brown and Caldwell | PROJECT: HOBBS EUNICE | ATTN: Madeline Mauk

Customer Sample ID: MW-1-95
Date Sampled.....: 06/10/2004
Time Sampled.....: 14:20
Sample Matrix.....: Water

Laboratory Sample ID: 275487-5
Date Received.....: 06/11/2004
Time Received.....: 08:39

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
EPA 160.1	Solids, Total Dissolved (TDS), Water	1510			2.99	10	1	mg/L	102935		06/14/04 1800	sur
EPA 300.0	Chloride, Water	476			0.70	4.0	10	mg/L	102945		06/15/04 0622	cas

* In Description = Dry Wgt.

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SEVERN TRENT STL

LABORATORY TEST RESULTS

Job Number: 275487

Date:06/21/2004

CUSTOMER: Brown and Caldwell | PROJECT: HOBBS EUNICE | ATTN: Madeline Mauk

Customer Sample ID: DUP-01
Date Sampled.....: 06/10/2004
Time Sampled.....: 00:00
Sample Matrix.....: Water

Laboratory Sample ID: 275487-6
Date Received.....: 06/11/2004
Time Received.....: 08:39

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
EPA 160.1	Solids, Total Dissolved (TDS), Water	1310			2.99	10	1	mg/L	102935		06/14/04 1800	sur
EPA 300.0	Chloride, Water	331			0.70	4.0	10	mg/L	102945		06/15/04 0637	cas

* In Description = Dry Wgt.

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SEVERN TRENT STL

QUALITY CONTROL RESULTS

Job Number.: 275487 Report Date.: 06/21/2004

CUSTOMER: Brown and Caldwell PROJECT: HOBBS EUNICE ATTN: Madeline Mauk

Test Method.....: EPA 300.0 Analyst...: cas
Method Description.: Ion Chromatography Analysis Units.....: mg/L Test Code.: CHL
Parameter.....: Chloride Batch(s)...: 102945

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result *	Limits	F	Date	Time
CV		WCS31126	19.753		20.00		98.8	90.0-110.		06/14/2004	1701
CB			0.2653							06/14/2004	1716
MB			0.2621							06/14/2004	1731
CS		WCS31126	19.568		20.00		97.8	90.0-110.		06/14/2004	1746
U	275458-1		54.164			54.071	0.2	20		06/14/2004	1816
S	275458-1	WCS30882	58.397		10.000000	54.071	43.3	80-120		06/14/2004	1831
CCV		WCS31126	19.686		20.00		98.4	90.0-110.		06/14/2004	2002
CCB			0.2566							06/14/2004	2017
CV		WCS31126	19.919		20.00		99.6	90.0-110.		06/14/2004	2304
CB			0							06/14/2004	2319
DU	275514-3		7.5783			5.9711	23.7	20	C	06/14/2004	2349
MS	275514-3	WCS30882	16.555		10.000000	5.9711	105.8	80-120		06/15/2004	0004
MB			0.2293							06/15/2004	0135
CS		WCS31126	20.034		20.00		100.2	90.0-110.		06/15/2004	0150
CV		WCS31126	19.617		20.00		98.1	90.0-110.		06/15/2004	0205
CCB			0							06/15/2004	0220
CCV		WCS31126	19.720		20.00		98.6	90.0-110.		06/15/2004	0507
CB			0.2680							06/15/2004	0522
U	275451-1		1.8166			1.7858	0.0308	0.4000		06/15/2004	0723
MS	275451-1	WCS30882	11.657		10.000000	1.7858	98.7	80-120		06/15/2004	0738
CCV		WCS31126	20.050		20.00		100.2	90.0-110.		06/15/2004	0808
CCB			0.2601							06/15/2004	0823
CV		WCS31126	19.637		20.00		98.2	90.0-110.		06/15/2004	0908
CB			0.2266							06/15/2004	0924

Test Method.....: EPA 160.1 Analyst...: sur
Method Description.: Solids, Total Dissolved (TDS) Units.....: mg/L Test Code.: TDS
Parameter.....: Solids, Total Dissolved (TDS) Batch(s)...: 102935

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result *	Limits	F	Date	Time
U	275517-2		1052.00			1012.00	3.9	10.0		06/14/2004	1800
LCS		WCS31351	3520.00		3600		97.8	90.0-110.		06/14/2004	1800
MB			1.00							06/14/2004	1800
U	275487-6		1311.00			1256.00	4.3	10.0		06/14/2004	1800
B			1.00							06/14/2004	1800
LCS		WCS31351	3506.00		3600		97.4	90.0-110.		06/14/2004	1800
DU	275338-10		1359.00			1388.00	2.1	10.0		06/14/2004	1800

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

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SEVERN TRENT STL

QUALITY CONTROL RESULTS

Job Number.: 275487 Report Date.: 06/21/2004

CUSTOMER: Brown and Caldwell PROJECT: HOBBS EUNICE ATTN: Madeline Mauk

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

Test Method.....: SW-846 8015B Units.....: ug/L Analyst...: cad
Method Description.: Total Volatile Petroleum Hydrocarbons Batch(s)...: 103342

CCV	Continuing Calibration Verification	SCCV970	103342-1		06/18/2004	0816

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	F
TVPH as GRO, Water	239.472		250		95.8		85.0-115.0	

CCV	Continuing Calibration Verification	SCCV970	103342-2		06/18/2004	1506

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	F
TVPH as GRO, Water	262.056		250		104.8		85.0-115.0	

LCS	Laboratory Control Sample	BXS061704A	103342-1		06/18/2004	1045

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	F
TVPH as GRO, Soil	285.683		250.000000		114.3		49-151	

MB	Method Blank		103342-1		06/18/2004	1122

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	F
TVPH as GRO, Soil	ND							

MS	Matrix Spike	BX110503A	275487-1		06/18/2004	1225

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	F
TVPH as GRO, Soil	247.273		500	15.6384	46.3		50-150	

MSD	Matrix Spike Duplicate	BX110503A	275487-1		06/18/2004	1251

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	F
TVPH as GRO, Soil	246.769	247.273	250.000000	15.6384	92.5		50-150	
					0.2		20	

Test Method.....: SW-846 8015B Units.....: mg/L Analyst...: maz
Method Description.: Total Extractable Petroleum Hydrocarbons Batch(s)...: 103263

LCS	Laboratory Control Sample	GC020404	103263-1		06/17/2004	1443

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	F
TVPH - as Diesel, Soil	1216.6435		1000.000000		121.7		70-130	

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

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SEVERN TRENT STL

QUALITY CONTROL RESULTS

Job Number.: 275487

Report Date.: 06/21/2004

CUSTOMER: Brown and Caldwell | PROJECT: HOBBS EUNICE | ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
MB	Method Blank	GC040904	103263-1		06/17/2004	1400

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	F
TEPH - as Diesel, Soil	ND							

MS	Matrix Spike	GC052704	275487-1		06/17/2004	1400

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	F
TEPH - as Diesel, Soil	1087.6501		1000.000000	ND	108.8		70-130	

MSD	Matrix Spike Duplicate	GC052704	275487-1		06/17/2004	1443

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	F
TEPH - as Diesel, Soil	1323.3977	1087.6501	1000.000000	ND	132.3		70-130	
					19.6		20	

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

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SEVERN TRENT STL

SURROGATE RECOVERIES REPORT

Job Number.: 275487

Report Date.: 06/21/2004

CUSTOMER: Brown and Caldwell PROJECT: HOBBS EUNICE ATTN: Madeline Mauk

Method.....: Total Extractable Petroleum Hydrocarbons Method Code...: 8015D Prep Batch....: 103188
Batch(s).....: 103263 Test Matrix...: Soil Equipment Code: EXTGC01

Lab ID	DT	Sample ID	Date	OTERPH
103263- 1	LCS		06/17/2004	101.5
103263- 1	MB		06/17/2004	110.6
275487- 1		SB-3 (5-5.5)	06/17/2004	95.2
275487- 1	MS	SB-3 (5-5.5)	06/17/2004	105.4
275487- 1	MSD	SB-3 (5-5.5)	06/17/2004	116.7

Test	Test Description	Limits
OTERPH	o-Terphenyl	60 - 140

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SEVERN TRENT STL

SURROGATE RECOVERIES REPORT

Job Number.: 275487 Report Date.: 06/21/2004

CUSTOMER: Brown and Caldwell PROJECT: HOBBS EUNICE ATTN: Madeline Mauk

Method.....: Total Volatile Petroleum Hydrocarbons Method Code...: 8015G Prep Batch....:
Batch(s).....: 103342 Test Matrix...: Water Equipment Code: BTEX07

Lab ID	DT	Sample ID	Date	ATFT	BFB
103342- 1	CCV		06/18/2004	93.6	88.5
103342- 2	CCV		06/18/2004	99.2	92.8

Test	Test Description	Limits
ATFT	a,a,a-Trifluorotoluene	68 - 143
BFB	BFB (Surrogate)	70 - 139

Method.....: Total Volatile Petroleum Hydrocarbons Method Code...: 8015G Prep Batch....:
Batch(s).....: 103342 Test Matrix...: Soil Equipment Code: BTEX07

Lab ID	DT	Sample ID	Date	ATFT	BFB
103342- 1	LCS		06/18/2004	91.4	89.1
103342- 1	MB		06/18/2004	84.8	83.0
275487- 1		SB-3 (5-5.5)	06/18/2004	89.0	87.0
275487- 1	MS	SB-3 (5-5.5)	06/18/2004	98.4	90.8
275487- 1	MSD	SB-3 (5-5.5)	06/18/2004	96.4	89.2

Test	Test Description	Limits
ATFT	a,a,a-Trifluorotoluene	50 - 150
BFB	BFB (Surrogate)	50 - 150

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QUALITY ASSURANCE METHODS

REFERENCES AND NOTES

Report Date: 06/21/2004

REPORT COMMENTS

1) All pages of this report are integral parts of the analytical data. Therefore, this report should be reproduced only in its entirety.
2) Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.
3) According to 40CFR Part 136.3, pH, Chlorine Residual, and Dissolved Oxygen analyses are to be performed immediately after aqueous sample collection. When these parameters are not indicated as field,(e.g. pH Field) they were not analyzed immediately, but as soon as possible on laboratory receipt.
4) For all USACE projects, the QC limits are based on "mean +/- 2 sigma", which are the warning limits.

General Information:

- Cresylic Acid is the combination of o,m and p-Cresol. The combination is reportesd as the final result.
- m-Cresol and p-Cresol co-elute. The result of the two is reported as either m&p-cresol or as p-cresol.
- m-Xylene and p-Xylene co-elute. The result of the two is reported as m,p-Xylene.
- N-Nitrosodiphenylamine decomposes in the gas chromatograph inlet forming dipheylamine and, consequently, may be detected as diphenylamine.
- Methylene Chloride and Acetone are recognized potential laboratory contaminants. Its presence in the sample up to five times the amount reported in the blank may be attributed to laboratory contamination.
- Trimethysilyl(Diazomethane) is used to esterify acid herbicides in Method SW-846 8151A.
- For Inorganic analyses, duplicate QC limits are determined as follows: If the sample result is less than or equal to 5 times the reporting limit, the RPD limit is equal to the reporting limit. If the sample result is greater than 5 times the reporting limit, the RPD limit is the method defined RPD.

Explanation of Qualifiers:

U - This qualifier indicates that the analyte was analyzed but not detected.
J - (Organics only) This qualifier indicates that the analyte is an estimated value between the RL and the MDL.
B - (Inorganics only) This Qualifier indicates that the analyte is an estimated value between the RL and the MDL.
N - (Organics only) This flag indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic charachterization of a TIC, such as "chlorinated hydrocarbon", the "N" flag is not used.

Explanation of General QC Outliers:

A - Matrix interference present in sample.
a - MS/MSD analyses yielded comparable poor recoveries, indicating a possible matrix interference. Method performance is demonstrated by acceptable LCS recoveries.
b - Target analyte was found in the method blank.
M - QC sample analysis yielded recoveries outside QC acceptance criteria. This sample was reanalyzed.
L - LCS analysis yielded high recoveries, indicating a potential high bias. No target analytes were observed above the RL in the associated samples.
G - Marginal outlier within 1% of acceptance criteria.
r - RPD value is outside method acceptance criteria.
C - Poor RPD values observed due to the non-homogenous nature of the sample.
O - Sample required dilution due to matrix interference.
D - Sample reported from a dilution.
d - Spike and/or surrogate diluted.
P - The recovery of this analyte is outside default QC limits. The data is accepted and will be used to calculate in-house statistical limits.
E - The reported concentration exceeds the instrument calibration.
F - The analyte is outside QC limits. The sample data is accepted since this analyte is not reported in associated samples.
H - Continuing Calibration Verification (CCV) standard is not associated with the samples reported.
q - See the subcontract final report for qualifier explanation.

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QUALITY ASSURANCE METHODS

REFERENCES AND NOTES

Report Date: 06/21/2004

W - The MS/MSD recoveries are outside QC acceptance criteria because the amount spiked is much less than the amount found in the sample.
K - High recovery will not affect the quality of reported results.
Z - See case narrative.

Explanation of Organic QC Outliers:

e - Method blank analysis yielded phthalate concentrations above the RL. Phthlates are recognized potential laboratory contaminants. Its presence in the sample up to five times the amount reported in the blank may be attributed to laboratory contamination.
S - Sample reanalyzed/reextracted due to poor surrogate recovery. Reanalysis confirmed original analysis indicating a possible matrix interference.
T - Sample analysis yielded poor surrogate recovery.
R - The RPD between the two GC columns is greater than 40% and no anomalies are present. The higher result is reported as per EPA Method 8000B.
I - The RPD between the two GC columns is greater than 40% and anomalies are present. The lower of the two results has been reported.
X - Gaseous compound. In-house QC limits are advisory.
Y - Ketone compounds have poor purge efficiency. In-house QC limits are advisory.
f - Surrogate not associated with reported analytes.

Explanation of Inorganic QC Outliers:

Q - Method blank analysis yielded target analytes above the RL. Associated sample results are greater than 10 times the concentrations observed in the method blank.
V - The RPD control limit for sample results less than 5 times the RL is +/- the RL value. Sample and duplicate results are within method acceptance criteria.
e - Serial dilution failed due to matrix interference.
g - Sample result quantitated by Method of Standard Additions (MSA) due to the analytical spike recovery being below 85 percent. The correlation coefficent for the MSA is greater than or equal to 0.995.
s - BOD/cBOD seed value is not within method acceptance criteria. Due to the nature of the test method, the sample cannot be reanalyzed.
l - BOD/cBOD LCS value is not within method acceptance criteria. Due to the nature of the test method, sample cannot be reanalyzed.
n - Sample result quantitated by Method of Standard Additions (MSA) due to the analytical spike recovery being below 85 percent. The correlation coefficient for the MSA is less than 0.995.

Abbreviations:

Batch - Designation given to identify a specific extraction, digestion, preparation, or analysis set.
CCV - Continuing Calibration Verification
CRA - Low level standard check - GFAA, Mercury
CRI - Low level standard check - ICP
Dil Fac - Dilution Factor - Secondary dilution analysis
DLFac - Detection Limit Factor
EB - Extraction Blank (TCLP, SPLP, etc.)
ICAL - Initial Calibration
ICB - Initial Calibration Blank
ICV - Initial Calibration Verification
ISA - Interference Check Sample A - ICP
ISB - Interference Check Sample B - ICP
LCD - Laboratory Control Duplicate
LCS - Laboratory Control Sample
MB - Method Blank
MD - Method Duplicate
MDL - Method Detection Limit
MS - Matrix Spike

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QUALITY ASSURANCE METHODS

REFERENCES AND NOTES

Report Date: 06/21/2004

MSD - Matrix Spike Duplicate
ND - Not Detected
PB - Preparation Blank
PREPF - Preparation Factor
RL - Reporting Limit
RPD - Relative Percent Difference
RRF - Relative Response Factor
RT - Retention Time
DU - Duplicate

Method References:

(1) EPA 600/4-79-020 Methods for the Analysis of Water and Wastes, March 1983.
(2) EPA 600/R-94-111 Methods for the Determination of MEtals in Environmental Samples, Supplement I, May 1994.
(3) EPA SW846 Test Methods for Evaluating Solid Waste, Third Edition, September 1986; Update I July 1992; Update II, September 1994, Update IIA August 1993; Update IIB, January 1995; Update III, December 1996, Update IVA January 1998, Update IVB November 2000.
(4) Standard Methods for the Examination of Water and Wastewater, 16th Edition (1985), 17th Edition (1989), 18th Edition (1992), 19th Edition (1995), 20th Edition (1998).
(5) HACH Water Analysis Handbook 3rd Edition (1997).
(6) Federal Register, July 1, 1990 (40 CFR Part 136 Appendix A).
(7) Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, 2nd Edition, January 1997.
(8) ASTM Annual Book of Methods (Various Years)
(9) Diagnosis and Improvement of Saline and Alkali Soils, Agriculture Handbook No. 60, United States Department of Agriculture, 1954.

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SEVERN TRENT STL

LABORATORY CHRONICLE

Job Number: 275487 Date: 06/21/2004

CUSTOMER: Brown and Caldwell PROJECT: HOBBS EUNICE ATTN: Madeline Mauk

Lab ID: 275487-1 Client ID: SB-3 (5-5.5) Date Recvd: 06/11/2004 Sample Date: 06/09/2004

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED		DILUTION
SW-846 3550B	Extraction (Ultrasonic) DRO	1	103188		06/15/2004	1000	
SW-846 8015B	Total Extractable Petroleum Hydrocarbons	1	103263	103188	06/17/2004	1526	
SW-846 8015B	Total Volatile Petroleum Hydrocarbons	1	103342		06/18/2004	1336	1.0000

Lab ID: 275487-4 Client ID: MW-1-70 Date Recvd: 06/11/2004 Sample Date: 06/10/2004

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED		DILUTION
EPA 300.0	Ion Chromatography Analysis	1	102945		06/15/2004	0607	10
EPA 160.1	Solids, Total Dissolved (TDS)	1	102935		06/14/2004	1800	

Lab ID: 275487-5 Client ID: MW-1-95 Date Recvd: 06/11/2004 Sample Date: 06/10/2004

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED		DILUTION
EPA 300.0	Ion Chromatography Analysis	1	102945		06/15/2004	0622	10
EPA 160.1	Solids, Total Dissolved (TDS)	1	102935		06/14/2004	1800	

Lab ID: 275487-6 Client ID: DUP-01 Date Recvd: 06/11/2004 Sample Date: 06/10/2004

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED		DILUTION
EPA 300.0	Ion Chromatography Analysis	1	102945		06/15/2004	0637	10
EPA 160.1	Solids, Total Dissolved (TDS)	1	102935		06/14/2004	1800	

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SEVERN TRENT **STL**

No. 609050

CHAIN OF CUSTODY RECORD

CUSTOMER INFORMATION	PROJECT INFORMATION
COMPANY: BROWN & CALDWELL	PROJECT NAME/NUMBER: HOBBS - Eunice
SEND REPORT TO: MADELINE MALIC	**BILLING INFORMATION**
ADDRESS: 1415 LOUISIANA ST STE 2000	BILL TO:
	ADDRESS:
PHONE: 713-759-0999	PHONE:
FAX: 713-308-3886	FAX: PO NO:

NUMBER OF CONTAINERS

ANALYSIS/METHOD REQUEST: TPH 8015M-DRO, TDS, Chlorides, GRO

LAB JOB NO. 115487

SAMPLE NO.	SAMPLE DESCRIPTION	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	CONTAINER	PRESERV.	REMARKS/PRECAUTIONS
1	SB-3 (5-5.5)	6-9-04	1200	S	4oz		5 DAY TAT
2	SB-3 (9-9.8)	6-9-04	1208	S	4oz		HOLD
3	SB-3 (14-14.5)	6-9-04	1215	S	4oz		HOLD
4	MW-1-70	6-10-04	1345	W	Plast.		
5 (MW-1-95 CP)	MW-1-90	6-10-04	1420	W	Plast		
6	DUP-01	6-10-04	-	W	Plas.		

SAMPLER: [signature]

SHIPMENT METHOD: FED-EX.

AIRBILL NO.:

REQUIRED TURNAROUND* ☐ SAME DAY ☐ 24 HOURS ☐ 48 HOURS ☐ 72 HOURS ☐ 5 DAYS ☐ 10 DAYS ☐ ROUTINE ☐ OTHER _____

1. RELINQUISHED BY:	DATE	2. RELINQUISHED BY:	DATE	3. RELINQUISHED BY:	DATE
SIGNATURE: [signature]	6/10/04	SIGNATURE:		SIGNATURE:	
PRINTED NAME/COMPANY: Brown & Caldwell	TIME 1900	PRINTED NAME/COMPANY:	TIME	PRINTED NAME/COMPANY:	TIME
1. RECEIVED BY:	DATE	2. RECEIVED BY:	DATE	3. RECEIVED BY:	DATE
SIGNATURE: [signature]	6/11/04	SIGNATURE:		SIGNATURE:	
PRINTED NAME/COMPANY: STL	TIME 08:39	PRINTED NAME/COMPANY:	TIME	PRINTED NAME/COMPANY:	TIME

*RUSH TURNAROUND MAY REQUIRE SURCHARGE

STL8222H-600 (0803)

STL Houston
6310 Rothway Drive
Houston, TX 77040

rpjsckl | Job Sample Receipt Checklist Report | V2

Job Number.: 275487 Location.: 57216 Check List Number.: 1 Description.:
Customer Job ID.....: Job Check List Date.: 06/11/2004 Date of the Report..: 06/11/2004
Project Number.: 99004969 Project Description.: Brown and Caldwell-Hobbs Eunice Project Manager.....: ebf
Customer.....: Brown and Caldwell Contact.: Madeline Mauk

Questions ?	(Y/N)	Comments
Chain of Custody Received?	Y	
...If "yes", completed properly?	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 of cooler acceptable? (4 deg C +/- 2).	Y	2.6
...If "no", is sample an air matrix?(no temp req.)		
Thermometer ID	Y	405
Samples received intact (good condition)?	Y	
Volatile samples acceptable? (no headspace)		
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	
Radioactivity at or below background levels?	Y	
Additional		
Comments		
Sample Custodian Signature/Date	Y	ACR

ACR 6-11-04

STL HOUSTON - SAMPLE RECEIPT CHECKLIST

CLIENT NAME: Braun & Caldwell CARRIER/DRIVER NAME: Fedex

PROJECT: UNPACKED BY: AR

DATE RECEIVED: 2004 JUN 11 AM 8:39 UNPACKED STAMP: 2004 JUN 11 AM 9:29

TOTAL # COOLERS RECEIVED: 1

COOLER CHECKLIST

COOLER ID	COC PRESENT (Y/N)	CUSTODY TAPE PRESENT (Y/N)	CUSTODY TAPE INTACT (Y/N)	COOLER TEMP °C	THERM ID	TEMP BLK PRESENT (Y/N)	List Sample Bottles in Each Cooler if out of Temperature
BLW 14	Y	C	Y	2.6	405	Y	
		B	Y				
		C					
		B					
		C					
		B					

C = COOLER B = BOTTLES

COOLER(S) SCREENED FOR RADIATION? Yes ✓ No ___ IF TEMP BLK N, HOW WAS TEMP TAKEN: ___

SHORT HOLD / RUSH SAMPLES (include department delivered to and time delivered)

SPECIFIC PROJECT INFORMATION

JOB NUMBER: 275487

VOLATILE HEADSPACE ACCEPTABLE? Yes ___ No ___ NA ✓

(If ANY headspace is present, list details in INCONSISTENCIES section)

Marked As Preserved? Yes ___ No ✓

Number of VOA Vials: 0

pH OF WATER SAMPLES

PRESERVATION	# BOTTLES	CORRECT pH (Y/N)	If N, List sample ID and Corresponding pH
H2SO4 (<2)			
HNO3 (<2)			
HCL (<2) (Not VOA Vials)			
NaOH – Cyanide (>12)			
NaOH/Zn Acetate – Sulfide (>9)			
Other			

OF NEAT BOTTLES: 3 # OF SOIL JARS: 3

INCONSISTENCIES – Place in Job Notes as well (CTRL F-12)

ACTION TAKEN

PERSON CONTACTED: ___ DATE: ___

RESOLUTION: ___

NOTES: ___

(Use back of sheet if necessary)

Project Manager: ___

SEVERN TRENT STL

HOBBS

ANALYTICAL REPORT

JOB NUMBER: 275517

Prepared For:

Brown and Caldwell
1415 Louisiana
Suite 2500
Houston, TX 77002

Attention: Madeline Mauk

Date: 07/08/2004

Signature

Date 7/8/04

Name: Ed B. Fry

Title: Project Manager III

E-Mail: efry@stl-inc.com

Severn Trent Laboratories
6310 Rothway Drive
Houston, TX 77040

PHONE: (713) 690-4444

SEVERN TRENT STL

07/08/2004

Madeline Mauk
Brown and Caldwell
1415 Louisiana
Suite 2500
Houston, TX 77002

Reference:
Project : Brown and Caldwell-Hobbs Eunice
Project No. : 275517
Date Received : 06/12/2004
STL Job : 275517

Dear Madeline Mauk:

Enclosed are the analytical results for your project referenced above. The following samples are included in the report.

3. MW-2

All holding times were met for the tests performed on these samples.

Enclosed, please find the Quality Control Summary. All quality control results for the QC batch that are applicable to the sample(s) are acceptable except as noted in the QC batch reports.

The test results in this report meet all NELAP requirements for STL Houston's NELAP accredited parameters. Any exceptions to NELAP requirements will be noted and included in a case narrative as a part of this report.

If the report is acceptable, please approve the enclosed invoice and forward it for payment.

Thank you for selecting Severn-Trent Laboratories to serve as your analytical laboratory on this project. If you have any questions concerning these results, please feel free to contact me at any time.

We look forward to working with you on future projects.

Sincerely,

Ed B. Fry
Project Manager

SEVERN TRENT STL

SAMPLE INFORMATION
Date: 07/08/2004

Job Number.: 275517
Customer...: Brown and Caldwell
Attn.....: Madeline Mauk

Project Number.....: 99004969
Customer Project ID....: KEY ENERGY
Project Description....: Brown and Caldwell-Hobbs Eunice

Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampled	Time Sampled	Date Received	Time Received
275517-3	MW-2	Water	06/11/2004	13:22	06/12/2004	11:52

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SEVERN TRENT STL

LABORATORY TEST RESULTS

Job Number: 275517

Date:07/08/2004

CUSTOMER: Brown and Caldwell | PROJECT: KEY ENERGY | ATTN: Madeline Mauk

Customer Sample ID: MW-2
Date Sampled.....: 06/11/2004
Time Sampled.....: 13:22
Sample Matrix.....: Water

Laboratory Sample ID: 275517-3
Date Received.....: 06/12/2004
Time Received.....: 11:52

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
EPA 160.1	Solids, Total Dissolved (TDS), Water	2090			2.99	10	1	mg/L	102935		06/14/04 1800	sur
EPA 300.0	Chloride, Water	527			7.0	40	100	mg/L	103052		06/15/04 2059	cas

* In Description = Dry Wgt.

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SEVERN TRENT STL

QUALITY CONTROL RESULTS

Job Number.: 275517 Report Date.: 07/08/2004

CUSTOMER: Brown and Caldwell PROJECT: KEY ENERGY ATTN: Madeline Mauk

Test Method.....: EPA 300.0 Analyst...: cas
Method Description.: Ion Chromatography Analysis Units.....: mg/L Test Code.: CHL
Parameter.....: Chloride Batch(s)...: 103052

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result *	Limits	F	Date	Time
ICV		WCS31126	19.932		20.00		99.7	90.0-110.		06/15/2004	1200
ICB			0							06/15/2004	1215
MB			0							06/15/2004	1230
LCS		WCS31126	19.729		20.00		98.6	90.0-110.		06/15/2004	1245
CCV		WCS31126	20.712		20.00		103.6	90.0-110.		06/15/2004	1501
CCB			0.2720							06/15/2004	1516
DU	275458-1		5.6227			5.4458	3.2	20		06/15/2004	1712
MS	275458-1	WCS30882	15.894		10.000000	5.4458	104.5	80-120		06/15/2004	1727
DU	275590-1		3.4219			3.4423	0.6	20		06/15/2004	1757
CCV		WCS31126	19.725		20.00		98.6	90.0-110.		06/15/2004	1813
CCB			0.2434							06/15/2004	1828
MS	275590-1	WCS30882	13.806		10.000000	3.4423	103.6	80-120		06/15/2004	1843
CCV		WCS31126	19.795		20.00		99.0	90.0-110.		06/15/2004	2114
CCB			0.2501							06/15/2004	2129
DU	275517-3		5.1628			5.2670	2.0	20		06/15/2004	2144
MS	275517-3	WCS30882	15.791		10.000000	5.2670	105.2	80-120		06/15/2004	2159
CCV		WCS31126	20.097		20.00		100.5	90.0-110.		06/16/2004	0015
CCB			0.2435							06/16/2004	0031
MB			0							06/16/2004	0046
LCS		WCS31126	19.804		20.00		99.0	90.0-110.		06/16/2004	0101
DU	275334-2		7.5941			7.2345	4.9	20		06/16/2004	0146
MS	275334-2	WCS30882	18.024		10.000000	7.2345	107.9	80-120		06/16/2004	0201
CCV		WCS31126	19.584		20.00		97.9	90.0-110.		06/16/2004	0317
CCB			0							06/16/2004	0332
DU	275407-2		4.2093			4.1746	0.8	20		06/16/2004	0533
MS	275407-2	WCS30882	14.703		10.000000	4.1746	105.3	80-120		06/16/2004	0548
CCV		WCS31126	19.758		20.00		98.8	90.0-110.		06/16/2004	0618
CCB			0.2345							06/16/2004	0633
CCV		WCS31126	19.904		20.00		99.5	90.0-110.		06/16/2004	0704
CCB			0.2642							06/16/2004	0719

Test Method.....: EPA 160.1 Analyst...: sur
Method Description.: Solids, Total Dissolved (TDS) Units.....: mg/L Test Code.: TDS
Parameter.....: Solids, Total Dissolved (TDS) Batch(s)...: 102935

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result *	Limits	F	Date	Time
DU	275338-10		1359.00			1388.00	2.1	10.0		06/14/2004	1800
DU	275487-6		1311.00			1256.00	4.3	10.0		06/14/2004	1800
MB			1.00							06/14/2004	1800
LCS		WCS31351	3506.00		3600		97.4	90.0-110.		06/14/2004	1800
DU	275517-2		1052.00			1012.00	3.9	10.0		06/14/2004	1800
LCS		WCS31351	3520.00		3600		97.8	90.0-110.		06/14/2004	1800
MB			1.00							06/14/2004	1800

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

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QUALITY ASSURANCE METHODS

REFERENCES AND NOTES

Report Date: 07/08/2004

REPORT COMMENTS

1) All pages of this report are integral parts of the analytical data. Therefore, this report should be reproduced only in its entirety.
2) Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.
3) According to 40CFR Part 136.3, pH, Chlorine Residual, and Dissolved Oxygen analyses are to be performed immediately after aqueous sample collection. When these parameters are not indicated as field,(e.g. pH Field) they were not analyzed immediately, but as soon as possible on laboratory receipt.
4) For all USACE projects, the QC limits are based on "mean +/- 2 sigma", which are the warning limits.

General Information:

- Cresylic Acid is the combination of o,m and p-Cresol. The combination is reportesd as the final result.
- m-Cresol and p-Cresol co-elute. The result of the two is reported as either m&p-cresol or as p-cresol.
- m-Xylene and p-Xylene co-elute. The result of the two is reported as m,p-Xylene.
- N-Nitrosodiphenylamine decomposes in the gas chromatograph inlet forming dipheylamine and, consequently, may be detected as diphenylamine.
- Methylene Chloride and Acetone are recognized potential laboratory contaminants. Its presence in the sample up to five times the amount reported in the blank may be attributed to laboratory contamination.
- Trimethysilyl(Diazomethane) is used to esterify acid herbicides in Method SW-846 8151A.
- For Inorganic analyses, duplicate QC limits are determined as follows: If the sample result is less than or equal to 5 times the reporting limit, the RPD limit is equal to the reporting limit. If the sample result is greater than 5 times the reporting limit, the RPD limit is the method defined RPD.

Explanation of Qualifiers:

U - This qualifier indicates that the analyte was analyzed but not detected.
J - (Organics only) This qualifier indicates that the analyte is an estimated value between the RL and the MDL.
B - (Inorganics only) This Qualifier indicates that the analyte is an estimated value between the RL and the MDL.
N - (Organics only) This flag indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic charachterization of a TIC, such as "chlorinated hydrocarbon", the "N" flag is not used.

Explanation of General QC Outliers:

A - Matrix interference present in sample.
a - MS/MSD analyses yielded comparable poor recoveries, indicating a possible matrix interference. Method performance is demonstrated by acceptable LCS recoveries.
b - Target analyte was found in the method blank.
M - QC sample analysis yielded recoveries outside QC acceptance criteria. This sample was reanalyzed.
L - LCS analysis yielded high recoveries, indicating a potential high bias. No target analytes were observed above the RL in the associated samples.
G - Marginal outlier within 1% of acceptance criteria.
r - RPD value is outside method acceptance criteria.
C - Poor RPD values observed due to the non-homogenous nature of the sample.
O - Sample required dilution due to matrix interference.
D - Sample reported from a dilution.
d - Spike and/or surrogate diluted.
P - The recovery of this analyte is outside default QC limits. The data is accepted and will be used to calculate in-house statistical limits.
E - The reported concentration exceeds the instrument calibration.
F - The analyte is outside QC limits. The sample data is accepted since this analyte is not reported in associated samples.
H - Continuing Calibration Verification (CCV) standard is not associated with the samples reported.
q - See the subcontract final report for qualifier explanation.

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QUALITY ASSURANCE METHODS

REFERENCES AND NOTES

Report Date: 07/08/2004

W - The MS/MSD recoveries are outside QC acceptance criteria because the amount spiked is much less than the amount found in the sample.
K - High recovery will not affect the quality of reported results.
Z - See case narrative.

Explanation of Organic QC Outliers:

e - Method blank analysis yielded phthalate concentrations above the RL. Phthlates are recognized potential laboratory contaminants. Its presence in the sample up to five times the amount reported in the blank may be attributed to laboratory contamination.
S - Sample reanalyzed/reextracted due to poor surrogate recovery. Reanalysis confirmed original analysis indicating a possible matrix interference.
T - Sample analysis yielded poor surrogate recovery.
R - The RPD between the two GC columns is greater than 40% and no anomalies are present. The higher result is reported as per EPA Method 8000B.
I - The RPD between the two GC columns is greater than 40% and anomalies are present. The lower of the two results has been reported.
X - Gaseous compound. In-house QC limits are advisory.
Y - Ketone compounds have poor purge efficiency. In-house QC limits are advisory.
f - Surrogate not associated with reported analytes.

Explanation of Inorganic QC Outliers:

Q - Method blank analysis yielded target analytes above the RL. Associated sample results are greater than 10 times the concentrations observed in the method blank.
V - The RPD control limit for sample results less than 5 times the RL is +/- the RL value. Sample and duplicate results are within method acceptance criteria.
e - Serial dilution failed due to matrix interference.
g - Sample result quantitated by Method of Standard Additions (MSA) due to the analytical spike recovery being below 85 percent. The correlation coefficent for the MSA is greater than or equal to 0.995.
s - BOD/cBOD seed value is not within method acceptance criteria. Due to the nature of the test method, the sample cannot be reanalyzed.
l - BOD/cBOD LCS value is not within method acceptance criteria. Due to the nature of the test method, sample cannot be reanalyzed.
n - Sample result quantitated by Method of Standard Additions (MSA) due to the analytical spike recovery being below 85 percent. The correlation coefficient for the MSA is less than 0.995.

Abbreviations:

Batch - Designation given to identify a specific extraction, digestion, preparation, or analysis set.
CCV - Continuing Calibration Verification
CRA - Low level standard check - GFAA, Mercury
CRI - Low level standard check - ICP
Dil Fac - Dilution Factor - Secondary dilution analysis
DLFac - Detection Limit Factor
EB - Extraction Blank (TCLP, SPLP, etc.)
ICAL - Initial Calibration
ICB - Initial Calibration Blank
ICV - Initial Calibration Verification
ISA - Interference Check Sample A - ICP
ISB - Interference Check Sample B - ICP
LCD - Laboratory Control Duplicate
LCS - Laboratory Control Sample
MB - Method Blank
MD - Method Duplicate
MDL - Method Detection Limit
MS - Matrix Spike

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QUALITY ASSURANCE METHODS

REFERENCES AND NOTES

Report Date: 07/08/2004

MSD - Matrix Spike Duplicate
ND - Not Detected
PB - Preparation Blank
PREPF - Preparation Factor
RL - Reporting Limit
RPD - Relative Percent Difference
RRF - Relative Response Factor
RT - Retention Time
DU - Duplicate

Method References:

(1) EPA 600/4-79-020 Methods for the Analysis of Water and Wastes, March 1983.
(2) EPA 600/R-94-111 Methods for the Determination of MEtals in Environmental Samples, Supplement I, May 1994.
(3) EPA SW846 Test Methods for Evaluating Solid Waste, Third Edition, September 1986; Update I July 1992; Update II, September 1994, Update IIA August 1993; Update IIB, January 1995; Update III, December 1996, Update IVA January 1998, Update IVB November 2000.
(4) Standard Methods for the Examination of Water and Wastewater, 16th Edition (1985), 17th Edition (1989), 18th Edition (1992), 19th Edition (1995), 20th Edition (1998).
(5) HACH Water Analysis Handbook 3rd Edition (1997).
(6) Federal Register, July 1, 1990 (40 CFR Part 136 Appendix A).
(7) Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, 2nd Edition, January 1997.
(8) ASTM Annual Book of Methods (Various Years)
(9) Diagnosis and Improvement of Saline and Alkali Soils, Agriculture Handbook No. 60, United States Department of Agriculture, 1954.

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SEVERN TRENT STL

LABORATORY CHRONICLE

Job Number: 275517

Date: 07/08/2004

CUSTOMER: Brown and Caldwell | PROJECT: KEY ENERGY | ATTN: Madeline Mauk

Lab ID: 275517-3 Client ID: MW-2 Date Recvd: 06/12/2004 Sample Date: 06/11/2004

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED		DILUTION
EPA 300.0	Ion Chromatography Analysis	1	103052		06/15/2004	2059	100
EPA 160.1	Solids, Total Dissolved (TDS)	1	102935		06/14/2004	1800	

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SEVERN TRENT SERVICES

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No. 002086

CHAIN OF CUSTODY RECORD

CUSTOMER INFORMATION		PROJECT INFORMATION	
COMPANY:	BROWN & CALDWELL	PROJECT NAME/NUMBER:	KEY ENERGY Eunice & HOBBS
SEND REPORT TO:	MADLINE MAUK	**BILLING INFORMATION**	
ADDRESS:	1415 LOUISIANA	BILL TO:	
	STE 2800	ADDRESS:	
PHONE:	713-759-0999	PHONE:	
FAX:	713-308-3886	FAX:	PO NO.:

LAB JOB NO.: 115511

ANALYSIS METHOD REQUESTED: TDS, Chlorides

SAMPLE NO.	SAMPLE IDENTIFICATION	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX			NUMBER OF CONTAINERS	TDS	Chlorides						REMARKS/PRECAUTIONS
1	MW-1	6-11-04	1625	W				X	X						EUNICE
2	DUP-01	6-11-04	—	W				X	X						EUNICE
3	MW-2	6-11-04	1222	W				X	X						HOBBS

SAMPLER: [signature]
SHIPMENT METHOD: DROP-OFF
AIRBILL NO.:

REQUIRED TURNAROUND* ☐ SAME DAY ☐ 24 HOURS ☐ 48 HOURS ☐ 72 HOURS ☐ 5 DAYS ☐ 10 DAYS ☒ ROUTINE ☐ OTHER

RELINQUISHED BY	DATE	RELINQUISHED BY	DATE	RELINQUISHED BY	DATE
SIGNATURE: [signature]	6/12/04	SIGNATURE:		SIGNATURE:	
PRINTED NAME/COMPANY:	TIME 1145	PRINTED NAME/COMPANY:	TIME	PRINTED NAME/COMPANY:	TIME
RECEIVED BY	DATE 6/14/04	**RECEIVED BY**	DATE	**RECEIVED BY**	DATE
SIGNATURE: [signature]		SIGNATURE:		SIGNATURE:	
PRINTED NAME/COMPANY: SR	TIME 1152	PRINTED NAME/COMPANY:	TIME	PRINTED NAME/COMPANY:	TIME

rpjsckl | Job Sample Receipt Checklist Report | V2

Job Number.: 275517 Location.: 57216 Check List Number.: 1 Description.:
Customer Job ID.....: Job Check List Date.: 06/12/2004 Date of the Report..: 06/12/2004
Project Number.: 99004969 Project Description.: Brown and Caldwell-Hobbs Eunice Project Manager.....: ebf
Customer.....: Brown and Caldwell Contact.: Madeline Mauk

Questions ?	(Y/N)	Comments
Chain of Custody Received?	Y	
...If "yes", completed properly?	Y	
Custody seal on shipping container?	N	
...If "yes", custody seal intact?		
Custody seals on sample containers?	N	
...If "yes", custody seal intact?		
Samples chilled?	Y	
Temperature of cooler acceptable? (4 deg C +/- 2).	Y	2.2
...If "no", is sample an air matrix?(no temp req.)		
Thermometer ID	Y	368
Samples received intact (good condition)?	Y	
Volatile samples acceptable? (no headspace)		
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	
Radioactivity at or below background levels?	Y	
Additional		
Comments		
Sample Custodian Signature/Date	Y	TES

STL HOUSTON - SAMPLE RECEIPT CHECKLIST

CLIENT NAME: Braun and Caldwell CARRIER/DRIVER NAME: Client

PROJECT: _____ UNPACKED BY: [illegible] 2004 JUN 12 PM 1:25

DATE RECEIVED: 2004 JUN 12 AM 11:52 UNPACKED STAMP: _____

TOTAL # COOLERS RECEIVED: 1

COOLER CHECKLIST

COOLER ID	COC PRESENT (Y/N)	CUSTODY TAPE		COOLER TEMP (°C)	THERM ID	TEMP BLK PRESENT (Y/N)	List Sample Bottles in Each Cooler if out of Temperature
		PRESENT (Y/N)	INTACT (Y/N)				
10/Purple 7	Y	C N	N	2.2	300	Y	
		B N	N				
		C					
		B					
		C					
		B					

C = COOLER B = BOTTLES

COOLER(S) SCREENED FOR RADIATION? Yes ✓ No ___ IF TEMP BLK N; HOW WAS TEMP TAKEN: _____

SHORT HOLD / RUSH SAMPLES (include department delivered to and time delivered)

_____

_____

SPECIFIC PROJECT INFORMATION

VOLATILE HEADSPACE ACCEPTABLE? Yes ___ No ___ NA ✓

(If ANY headspace is present, list details in INCONSISTENCIES section)

JOB NUMBER: 275511

Marked As Preserved? Yes ___ No ___

Number of VOA Vials: _____

pH OF WATER SAMPLES

PRESERVATION	# BOTTLES	CORRECT pH (Y/N)	If N, List sample ID and Corresponding pH
H2SO4 (<2)			
HNO3 (<2)			
HCL (<2) (Not VOA Vials)			
NaOH – Cyanide (>12)			
NaOH/Zn Acetate – Sulfide (>9)			
Other			

OF NEAT BOTTLES: 3 # OF SOIL JARS: _____

INCONSISTENCIES – Place in Job Notes as well (CTRL F-12)

_____

_____

_____

_____

ACTION TAKEN

PERSON CONTACTED: _____ DATE: _____

RESOLUTION _____

_____

_____

NOTES _____

_____

_____

(Use back of sheet if necessary)

Project Manager _____