GSI ENVIRONMENTAL

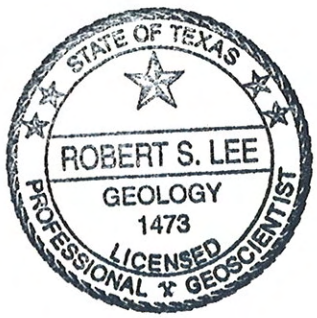
## CERTIFICATION OF GEOSCIENCE

**Preliminary Site Investigation Results, Rayford Road**

Charlie Burch Site, Spring, Texas
Rohm and Haas Texas, Inc., Deer Park, Texas
VCP Site No. 421

I, Robert S. Lee, a licensed geologist in the State of Texas, certify that I have reviewed the geosciences portions of the "Preliminary Site Investigation Results, Rayford Road," issued 14 November 2006.

Robert S. Lee, P.G.
State of Texas
Registration No. 1473



November 14, 2006
GSI Job No. G-3040

GROUNDWATER
SERVICES, INC.

Mr. Ed Tokarski
Rohm and Haas
3100 State Road
Croydon, PA 19021

Re: Preliminary Site Investigation Results, Rayford Road, Charlie Burch Site, Spring, Texas. VCP Site No. 421.

Dear Mr. Tokarski:

At the request of Rohm and Haas, Groundwater Services, Inc. (GSI), has conducted an investigation to determine whether a plume of 1,2-dichloroethane (1,2-DCA) has reached Rayford Road south of the Charlie Burch site in Spring, Texas. Results confirm that the southern extremity (i.e., the hydraulically downgradient toe) of the 1,2-DCA plume has not reached Rayford Road. This letter provides a preliminary summary of the procedures and results of groundwater investigation activities conducted during late October and early November 2006.

## WORKPLAN OBJECTIVES AND STRATEGY

Groundwater samples were collected in order to define the southern (downgradient) extent of the affected groundwater plume associated with the Charlie Burch site (see Figure 1). An on-going investigation on the upgradient Amerson tract has recently confirmed the presence of detectable concentrations of 1,2-dichloroethane (DCA) in shallow groundwater approximately 1000 ft north of Rayford Road.

The work program involved collection and analysis of groundwater samples from two depths (approximately 43 ft and 53 ft below ground surface, bgs) at each of nine locations along an approximate 0.25-mile length of Rayford Road. Sampling points were located in the area most likely to encounter affected groundwater if the plume had extended as far south as Rayford Road. To confirm stratigraphy prior to groundwater sampling, continuous soil cores were collected at seven of the nine locations. Additional information for the work program is provided below.

## WORK PROGRAM

### Confirmation of Site Stratigraphy

Continuous coring was conducted at seven locations shown on Figure 1 (i.e., locations GP-RR1, 2, 3, 4, 5, 7 and 9) to confirm site stratigraphy prior to collecting groundwater samples. In general, logging was completed to a total depth of 55 ft bgs and indicated a surface clay of approximate average thickness of 10 ft underlain by a silty sand to the

total depth investigated. At locations GP-RR4 and GP-RR5 a silty clay was encountered within the silty sand at an approximate depth of 37 ft bgs; therefore, coring was terminated at 40 ft bgs at these two locations. In addition, coring was conducted at GP-RR3 from the depth interval of 10 ft to 40 ft bgs.

Soil coring was completed using a track-mounted 6610-DT Geoprobe™ rig, operated under the supervision of a Texas licensed water well driller, and overseen by a GSI project scientist or geologist. Soil cores were collected continuously with depth, logged in accordance with the Unified Soil Classification System (USCS), and examined for chemical odor, staining, or other visual evidence of contamination. Representative portions of each soil core were retained at ambient temperature in sealed plastic bags for organic vapor screening using a photoionization detector equipped with a 11.8 mV lamp. Excess soil cores were retained in appropriate containers and transferred to Rohm and Haas property for management with soil cuttings from the recent drilling program. On completion, borings were sealed by filling to ground surface with granular bentonite.

**Groundwater Sample Collection**

During the period October 30-November 2, 2006, a total of 19 groundwater samples from 9 temporary sampling locations (see Figure 1) were collected and analyzed for 1,2-DCA. Groundwater samples were typically collected from the depth intervals of 41-45 ft bgs and 51-55 ft bgs, although some shallow samples were obtained from 40-44 ft bgs or 42-46 ft bgs. At each of the locations GP-RR4 and GP-RR5, one sample was collected above the silty clay (33-37 ft bgs) and an attempt was made to collect two samples beneath the clay. At GP-RR4, no water flowed into the sampler at the 42-46 ft bgs depth interval; therefore, no sample was collected.

Groundwater sampling was performed using a track-mounted 6610-DT Geoprobe™ rig, operated under the supervision of a Texas licensed water well driller, and overseen by a GSI project geologist. Groundwater samples were collected using a sampling device consisting of a 4-ft length of stainless steel well screen encased in a water-tight sheath, and deployed on the Geoprobe sampling rods. The sampler was driven to the required depth and the rods retracted to expose the screen to the formation. The sample screen and drill rods were removed from the ground and decontaminated using a pressurized steam cleaner after collection of each sample. Where coring had been conducted, groundwater sampling was completed in a separate borehole located within approximately 2 ft of the original boring.

Groundwater samples were then collected using 0.25-in diameter Waterra inertial pumps consisting of a hand-activated foot-valve deployed on dedicated HDPE tubing lowered within the rods to the screen depth. Downhole materials included either i) tubing and a foot valve which had been thoroughly cleaned prior to use or ii) dedicated tubing and foot valve. At sample locations where more than one depth interval was targeted, a new borehole was completed within one foot of the original sampling location. Each borehole was plugged with granular bentonite after sampling.

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SERVICES, INC.

November 14, 2006

**Sample Analysis**

Groundwater samples were retained in laboratory supplied 40-ml vials pre-preserved with hydrochloric acid (HCl). The samples were not filtered prior to preservation. After collection, the samples were stored in a wet ice cooler and submitted under chain-of-custody control for laboratory analysis by Severn Trent Laboratories, Houston, Texas. Groundwater samples were analyzed for 1,2-DCA by USEPA Method 8260B. Laboratory results for 1,2-DCA were compared to the Protective Concentration Level (PCL) of 0.005 mg/L published in the Texas Risk Reduction Program (TRRP) under 30 TAC 350 Subchapter D.

Laboratory results indicated that 1,2-DCA was not detected in any sample at any location (see Table 1).

Should you have any questions concerning this letter, please contact me at 713-522-6300. We look forward to continuing our work together on this project.

Sincerely,

Elaine A. Higgins

Elaine A. Higgins, P.E.
Environmental Engineer

EAH/hs
Attachments.

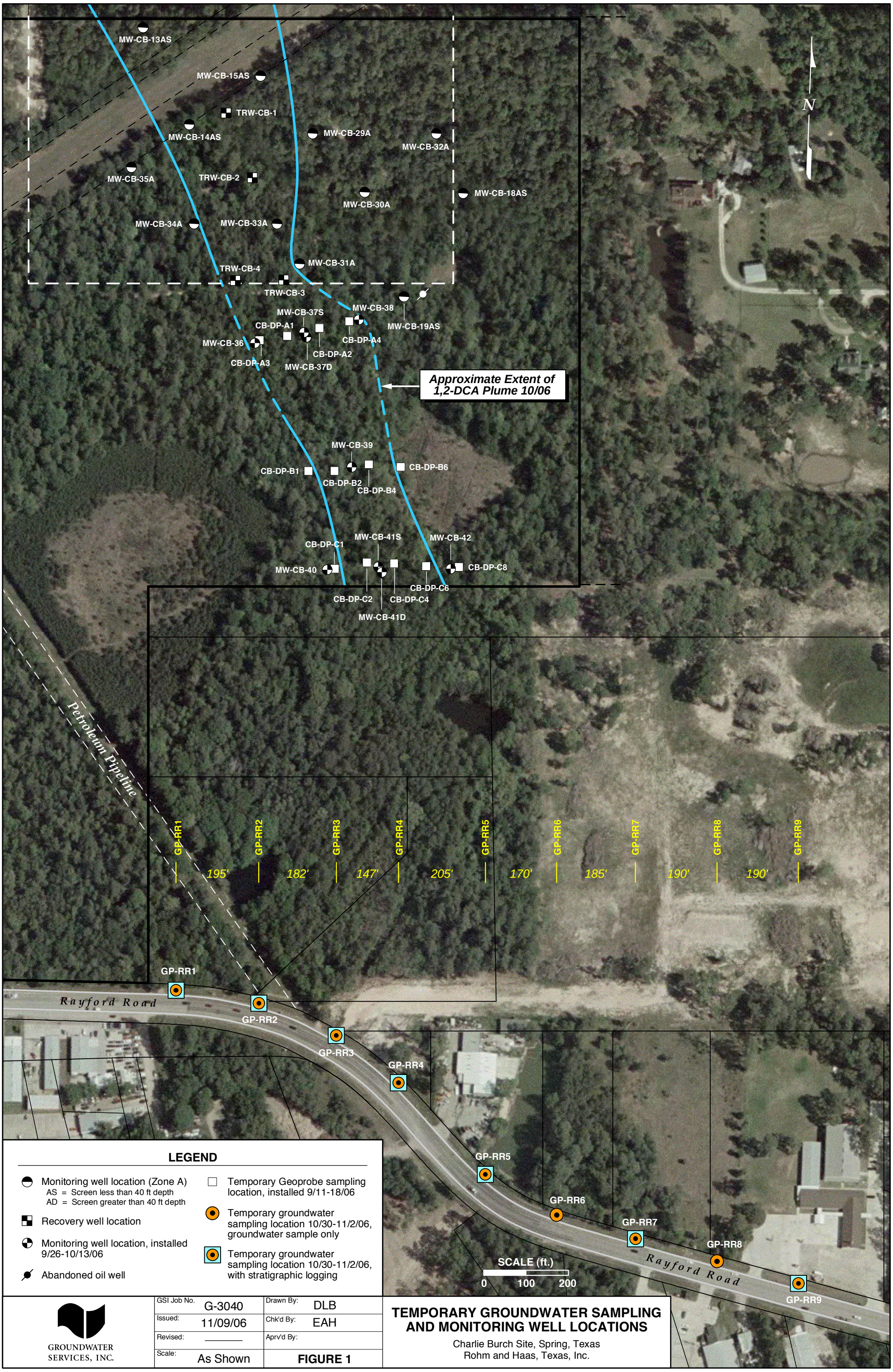
GROUNDWATER SERVICES, INC.

**TABLE 1**
**RESULTS OF GROUNDWATER SAMPLING**
**TEMPORARY GROUNDWATER SAMPLING LOCATIONS**

Amerson Tract, Charlie Burch Site, Spring, Texas
Rohm and Haas, Texas, Inc.

| | ***1,2-Dichloroethane*** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **SAMPLE LOCATION:** | GP-RR1 | GP-RR2 | GP-RR3 | GP-RR4 | GP-RR5 | GP-RR6 | GP-RR7 | GP-RR8 | GP-RR9 |
| **DATE SAMPLED:** | 11/1/06 | 11/1/06 | 11/2/06 | 10/30-11/2/06 | 10/31-11/2/06 | 11/2/06 | 10/31/06 | 10/31/06 | 10/31/06 |
| **DATE ANALYZED:** | 11/2/06 | 11/2/06 | 11/3/06 | 10/31-11/3/06 | 11/1-3/06 | 11/3/06 | 11/1/06 | 11/1/06 | 11/1/06 |
| **SCREENED INTERVAL (ft bgs)** | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| 33 - 37 | NS | NS | NS | <0.00047 | <0.00047 | NS | NS | NS | NS |
| 40 - 44 | NS | NS | <0.00047 | NS | <0.00047 | <0.00047 | NS | NS | NS |
| 41 - 45 | NS | <0.00047 | NS | NS | NS | NS | <0.00047 | <0.00047 | <0.00047 |
| 42 - 46 | <0.00047 | NS | NS | No flow | NS | NS | NS | NS | NS |
| 51 - 55 | <0.00047 | <0.00047 | <0.00047 | <0.00047 | <0.00047 | <0.00047 | <0.00047 | <0.00047 | <0.00047 |

Notes:
1. Samples collected using direct push rig (Geoprobe) at locations shown on Figure 1.
2. Samples analyzed by Severn Trent Laboratory, Houston, Texas, in accordance with U.S. EPA Method 8260B.
3. No flow = Groundwater not encountered at this location and depth.
   NS = Sample not collected from depth interval at this location.
   < = Analyte not detected at detection limit indicated.




## LEGEND

- Monitoring well location (Zone A)
  - AS = Screen less than 40 ft depth
  - AD = Screen greater than 40 ft depth
- Recovery well location
- Monitoring well location, installed 9/26-10/13/06
- Abandoned oil well
- Temporary Geoprobe sampling location, installed 9/11-18/06
- Temporary groundwater sampling location 10/30-11/2/06, groundwater sample only
- Temporary groundwater sampling location 10/30-11/2/06, with stratigraphic logging

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| | | | |
|---|---|---|---|
| GSI Job No. | G-3040 | Drawn By: | DLB |
| Issued: | 11/09/06 | Chk'd By: | EAH |
| Revised: | _____ | Aprv'd By: | |
| Scale: | As Shown | **FIGURE 1** | |

# TEMPORARY GROUNDWATER SAMPLING AND MONITORING WELL LOCATIONS

Charlie Burch Site, Spring, Texas
Rohm and Haas, Texas, Inc.

North
A

South
A'

Tie Point:
Cross-Section B-B'

13 Acre Tract

Amerson Tract

Rayford
Rd ROW

MW-CB-14AS

MW-CB-31A

MW-CB-37S&D*

MW-CB-39*

MW-CB-41S&D*

GP-RR2*

ELEVATION, ft, Mean Sea Level (MSL)

125
120
110
100
90
80
70
60
50
45

Silt (ML)

Silty CLAY (CL)

Clayey SILT (ML)

Silty CLAY (CL)

Clayey
SAND (SC)

(SC)

Silty SAND (SM) and
SAND (SP)

Silty SAND (SM) and
SAND (SP)

SAND (SP)

CL

Silty to clayey
SAND (SM/SC)

TD = 40.0 ft

TD = 40.0 ft

TD = 51.0 ft

TD = 55.0 ft

CL/SC

MW-CB-37S
40-50 ft

SC/ML

MW-CB-41S
40-50 ft

CL/ML

SC/ML

MW-CB-37D
58-58 ft

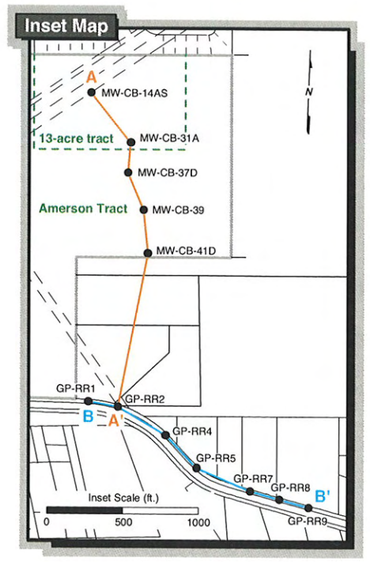
MW-CB-41D
59-69 ft

Silty CLAY (CL)

TD = 70.0 ft

TD = 72.0 ft

Inset Map




STATE OF TEXAS
ROBERT S. LEE
GEOLOGY
1473
LICENSED
PROFESSIONAL * GEOSCIENTIST

**PRELIMINARY**

HORIZONTAL SCALE, ft
0 100 200 300 400

VERTICAL SCALE: 1 INCH = 10 ft
VERTICAL EXAGGERATION: 20X

**LEGEND**

- SILT (ML)
- SAND (SP)
- Silty SAND (SM)
- Clayey SAND (SC) or sandy CLAY
- Silty CLAY (CL)
- Static water level elevation (SWL)
- Groundwater encountered during drilling
- Screened interval
- TD Total depth of boring ft below ground surface (BGS)
- * Ground surface elevation not surveyed as of 11/1/06

**FIGURE 1**

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| | | | |
|---|---|---|---|
| GSI Job No. | G-3040 | Drawn By: | DLB |
| Issued: | 11/01/06 | Chk'd By: | RSL |
| Revised: | ——— | Aprv'd By: | RSL |
| Scale: | As Shown | **FIGURE 1** | |

# GEOLOGIC CROSS-SECTION NORTH-SOUTH ORIENTATION

Charlie Burch Site, Spring, Texas
Rohm & Haas, Texas, Inc.

West

**B**

East

**B'**

Tie Point: Cross-Section A-A'

GP-RR1* GP-RR2* GP-RR3 GP-RR4* GP-RR5* GP-RR6 GP-RR7* GP-RR8* GP-RR9*

ELEVATION, ft, Mean Sea Level (MSL)

125 120 110 100 90 80 70 60

SILT (ML) and silty CLAY (CL)

Silty to clayey SAND (SM/SC)

Silty SAND (SM) and SAND (SP)

SC

Silty SAND (SM) and SAND (SP)

Silty CLAY (CL)

Clayey SAND (SC)

SM

SC

| | GP-RR1 | GP-RR2 | GP-RR3 | GP-RR4 | GP-RR5 | GP-RR6 | GP-RR7 | GP-RR8 | GP-RR9 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 10/30/06 33 | 10/31/06 33 | | | | |
| | | | | 1,2-DCA < 0.00047 mg/L | 1,2-DCA < 0.00047 mg/L | | | | |
| | | | | 37 | 37 | | | | |
| | 11/01/06 42 | 11/01/06 41 | 11/02/06 40 | 11/02/06 42 | 11/02/06 40 | 11/02/06 40 | 10/31/06 41 | 10/31/06 41 | 10/31/06 41 |
| | 1,2-DCA < 0.00047 mg/L | 1,2-DCA < 0.00047 mg/L | 1,2-DCA < 0.00047 mg/L | No flow | 1,2-DCA < 0.00047 mg/L | 1,2-DCA < 0.00047 mg/L | 1,2-DCA < 0.00047 mg/L | 1,2-DCA < 0.00047 mg/L | 1,2-DCA < 0.00047 mg/L |
| | 46 | 45 | 44 | 46 | 44 | 44 | 45 | 45 | 45 |
| | 11/01/06 51 | 11/01/06 51 | 11/01/06 51 | 11/01/06 51 | 11/02/06 51 | 11/02/06 51 | 10/31/06 51 | 10/31/06 51 | 10/31/06 51 |
| | 1,2-DCA < 0.00047 mg/L | 1,2-DCA < 0.00047 mg/L | 1,2-DCA < 0.00047 mg/L | 1,2-DCA < 0.00047 mg/L | 1,2-DCA < 0.00047 mg/L | 1,2-DCA < 0.00047 mg/L | 1,2-DCA < 0.00047 mg/L | 1,2-DCA < 0.00047 mg/L | 1,2-DCA < 0.00047 mg/L |
| | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 |
| | TD = 55.0 ft | TD = 55.0 ft | TD = 55.0 ft | TD = 55.0 ft | TD = 55.0 ft | TD = 55.0 ft | TD = 55.0 ft | TD = 55.0 ft | TD = 55.0 ft |

**LEGEND**

- SILT (ML)
- SAND (SP)
- Silty SAND (SM)
- Clayey SAND (SC) or sandy CLAY
- Silty CLAY (CL)
- 11/01/06 — Date of GW sampling
- ▽ — Groundwater encountered during drilling
- | — Screened interval
- TD — Total depth of boring ft below ground surface (BGS)
- * — Ground surface elevation not surveyed as of 11/1/06

STATE OF TEXAS ROBERT S. LEE GEOLOGY 1473 LICENSED PROFESSIONAL GEOSCIENTIST

**PRELIMINARY**

HORIZONTAL SCALE, ft

0 100 200 300 400

VERTICAL SCALE: 1 INCH = 10 ft

VERTICAL EXAGGERATION: 20X

Inset Map

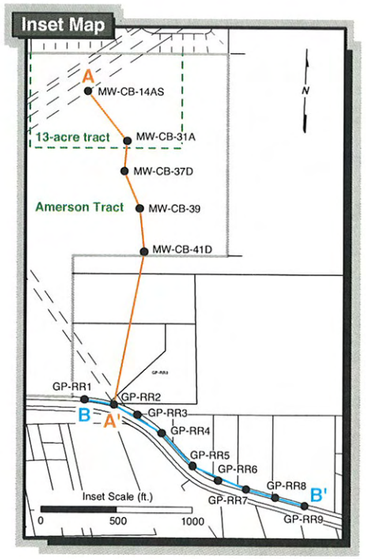


FIGURE 2

GROUNDWATER SERVICES, INC.

| | | | |
|---|---|---|---|
| GSI Job No. | G-3040 | Drawn By: | DLB |
| Issued: | 11/08/06 | Chk'd By: | RSL |
| Revised: | ——— | Aprv'd By: | RSL |
| Scale: | As Shown | FIGURE 2 | |

**GEOLOGIC CROSS-SECTION WEST-EAST ORIENTATION**

Charlie Burch Site, Spring, Texas
Rohm & Haas, Texas, Inc.