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Alameda County
Environmental Health

October 6, 2011

Jerry Wickham
Alameda County Environmental Health Svcs
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Re: Transmittal Letter
Site Location: Springtown Gas
909 Blue Bell Drive, Livermore, CA 94551

Dear Mr. Wickham:

On behalf of Aminifilibadi Masood & Amini Sharbano, Geological Technics Inc. (GTI) prepared the 2nd Semi-Annual Groundwater Monitoring & Interim Remedial Action Status Report, dated October 4, 2011.

I declare under penalty of law that the information and/or recommendations contained in the above referenced document or report is true and correct to the best of my knowledge.

Respectfully submitted,

Aminifilibadi Masood/Amini Sharbano
Property Owner
909 Blue Bell Drive
Livermore, CA 94551

Geological Technics Inc.

REPORT

Groundwater Monitoring and Interim Remedial Action Status

2nd Semi-Annual Report

Springtown Gas
909 Bluebell Drive
Livermore, California

Project No. 1409.2
October 4, 2011

Prepared for:
Masood Amini Filibadi and Shahrbano Amini
909 Bluebell Drive
Livermore, California 95353

Prepared by:
Geological Technics Inc.
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October 4, 2011

Project No.: 1409.2
Project Name: Springtown Gas (Bluebell)

Masood Amini Filibadi and Shahrbano Amini
Springtown Gas
909 Bluebell Drive
Livermore, California 94551

RE: Report – 2nd Semi-Annual 2011 Groundwater Monitoring (3rd Quarter 2011)
Springtown Gas, 909 Bluebell Drive, Livermore, California

Dear Masood Amini Filibadi and Shahrbano Amini:

Geological Technics Inc. (GTI) has prepared the following 2nd Semi-Annual Report for the 3rd Quarter 2011 groundwater monitoring event performed on August 19th, 2011 at Springtown Gas, 909 Bluebell Drive, Livermore, California.

If you have any questions, please do not hesitate to call me at (209) 522-4119.

Respectfully submitted,

Raynold I. Kablanow II, Ph.D.
Vice President

cc: Jerry Wickham – ACEHS

TABLE OF CONTENTS

FIGURES

APPENDICES

Geological Technics Inc.
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REPORT

Groundwater Monitoring and Interim Remedial Action Status

2nd Semi-Annual Report

Springtown Gas
909 Bluebell Drive
Livermore, California

Project No. 1409.2
October 4, 2011

1. EXECUTIVE SUMMARY

This report summarizes the results of the 3rd Quarter 2011 groundwater monitoring and sampling event that took place on August 19th, 2011 at Springtown Gas, 909 Bluebell Drive, Livermore, Alameda County, California (Site) and includes an evaluation of the interim remedial effectiveness as directed by Alameda County Environmental Health (ACEH) in correspondence dated November 15, 2010. In an ACEH correspondence dated May 5th, 2011 GTI's request for a reduction in groundwater monitoring frequency and sampling was approved and implemented during the 3rd Quarter groundwater monitoring event. In addition, GTI was directed to conduct verification monitoring during the 3rd Quarter event in order to confirm that contaminant concentrations did not rebound during the five months following the end of the additional hydrogen peroxide injection pilot study.

The average groundwater elevation at the site was 511.48 feet above mean sea level (AMSL) and the groundwater flow was N60°W at a gradient of 0.006 ft/ft for this event. This was the ninth monitoring event in which well P-1 was incorporated into the contours, and the fifth event that wells MW-4, MW-101, MW-102, and MW-103 were incorporated into the contours.

The results of analyses conducted on groundwater samples collected from the four monitoring wells reported that two of the four wells (STMW-2 and STMW-3) were below laboratory reporting limits for all constituents analyzed. Monitoring wells MW-101, MW-102, MW-103 and MW-4 were not monitored during this event, per the ACEH correspondence dated May 5th, 2011.

STMW-2 and STMW-3 reported below laboratory reporting limits for the second and third consecutive quarter, respectively. Monitoring wells STMW-1 reported to contain 1.3 µg/L of MTBE, which is below Environmental Screening Levels (ESLs) and California Drinking Water Maximum Contaminant Levels (MCLs) for all constituents analyzed. Monitoring well P-1 reported to contain 14.0 µg/L of MTBE during the 3rd Quarter event.

The following recommendations are made:

1. Since the site meets low risk closure criteria, Geological Technics Inc. recommends that the site be considered for low-risk closure immediately.
2. Pending ACEH approval, GTI proposes preparing a work plan for well abandonment activities, in preparation for site closure.
3. Continue groundwater monitoring until directed otherwise by ACEH.

2. PHYSICAL SETTING

The Site is situated in a mixed commercial-residential land-use area of Livermore, California, located at the southeast corner of the intersection of Springtown Boulevard and Blue Bell Drive, approximately 300 feet north of westbound Interstate 580 (Figure 1). The Site occupies approximately 0.74 acres, and is currently an operating service station with mini-mart retailing Chevron-branded gasoline and diesel fuel products. The site contains one UST cluster in the east portion of the Site consisting of one 12,000 gallon capacity unleaded gasoline UST, and a 12,000 gallon capacity segmented UST storing 6,000 gallons of diesel and 6,000 gallons of premium unleaded. A single story mini-mart is located on the southern portion of the Site, and six canopied fuel dispensers are located in the north portion of the Site. No automotive repair facilities exist on the Site. The Site is adjoined by Springtown Boulevard on the west, motel properties on the south and east, and Bluebell Drive on the north. Retail land-use is located on the north side of Bluebell Drive, with residential land-use beyond to the north and northeast.

The Site is located at an elevation of approximately 520 feet above mean sea level in the northeast portion of the Livermore Valley (USGS 1981). The Livermore Valley is a structural basin bounded by faults on the east and west that create the Altamont Hills uplift on the east and the Pleasanton Ridge uplift on the west (CDM&G, 1991). The shallow Pleistocene to recent sediments underlying the basin consist of alluvial deposits that have been informally divided into upper and lower units. The sediment, ranging from coarse-grained gravel to fine-grained mud, was transported northward from the Northern Diablo Range on the southern margin of the basin and deposited in an alluvial fan, braided stream, and lacustrine environments. Because the sediment prograded northward, the coarse-grained sediment makes up nearly 80% of the sediment in the southern part of the basin, but northward and westward interfingers with clay deposits that may be as much as 30 feet thick (DWR, 2004).

Drainages from the south, north, and east converge in the western part of the basin and flow out of the basin toward the Sunol Valley and Alameda Creek west of Pleasanton Ridge. The nearest surface drainages are Las Positas Creek located approximately 1 mile west of the Site, and Cavetano Creek 2 miles west of the Site (USGS 1981).

The alluvial fan, braided stream and lacustrine deposits are the principal aquifers for most domestic and irrigation purposes in the Livermore Valley, although the underlying Livermore Formation, which may be as much as 4,000 feet thick, yields significant quantities of groundwater on the eastern side of the basin (DWR 2004).

3. GROUNDWATER MONITORING

3.1. Groundwater Elevation and Flow Direction

The average groundwater elevation for the 3rdQuarter 2011 monitoring event was 511.48 feet AMSL on August 19th, 2011, which corresponds to approximately 7.75 feet below ground surface (bgs). This elevation represents an decrease of 0.31 feet since the 1st Quarter 2011 monitoring event (February 17th, 2011) and a increase of 0.23 feet since the 3rd Quarter 2010 monitoring event (August 24th, 2010). The groundwater gradient for the 3rd Quarter 2011 groundwater monitoring event was N60°W at a gradient of 0.006 ft/ft, which is consistent with the previous groundwater monitoring events.

The gradient direction for the 3rd Quarter 2011 groundwater monitoring event is shown on Figure 2 (Groundwater Gradient Map 3rd Quarter). The calculated groundwater gradient and flow direction is shown on Figure 3 (Groundwater Gradient Rose Diagram). The groundwater elevation data are summarized in Table 1 included in Appendix A. Table 4 provides a summary of monitoring well completion data.

3.2. Groundwater Sampling Procedure

The 3rd Quarter 2011 groundwater monitoring event was conducted on August 19th, 2011. GTI monitored groundwater elevations and collected groundwater samples for analyses from four groundwater monitoring wells on the Site. Depth to water in each monitoring well was measured and recorded before groundwater samples were collected from the wells. The wells were purged of at least three well volumes of stagnant water using dedicated Waterra® foot valves and tubing. Purging continued until the temperature, conductivity, and pH of the groundwater stabilized (<10% variation in three consecutive readings), indicating that formation water representative of aquifer conditions was entering the wells. These water quality parameters were measured at intervals of each well volume purged. All purge water was placed in a 55-gallon DOT drums and secured on-site.

Before a sample was collected from each well, the water level was allowed to recharge to at least 80% of its initial level. Dedicated tubing attached to Waterra® foot valves were used to collect groundwater samples from the monitoring wells.

The samples were placed into 40-ml VOA vials preserved with hydrochloric acid. Care was taken to minimize sample aeration during sample collection and avoid generating headspace. All samples were checked for the presence of headspace, labeled, recorded on a chain-of-custody, and placed in an ice chest cooled to 4°C for transport to the analytical laboratory. All non-disposable sampling equipment was decontaminated in an Alconox solution and double-rinsed with de-ionized water before initial use and between uses at each monitoring well.

Groundwater monitoring field logs are included in Appendix C. A summary of Water Quality Parameter Data is included in Table 3 of Appendix A.

3.3. Laboratory Analyses

The groundwater samples collected on August 19th, 2011, were delivered to BC Laboratories of Bakersfield, California (ELAP #1186) for the following analyses:

The laboratory utilized USEPA Method 8260B to analyze the groundwater samples for the following constituents:

- Total petroleum hydrocarbons as gasoline (TPH-G),
  - Benzene, toluene, ethylbenzene, and total xylenes (BTEX),
  - Methyl tertiary butyl ether (MTBE), and,
  - Di-isopropyl alcohol (DIPE), ethyl-tertiary butyl ether (EtBE), tert-amyl-methyl ether (TAME), 1,2-dichloroethane (1,2-DCA), 1,2-dibromoethane (EDB), tert butyl alcohol (TBA), methanol and ethanol

The results and detection limits for the above analyses are listed in Table 2 included in Appendix A. Certified analytical reports are included in Appendix B.

As required under AB2886, the groundwater elevation and laboratory analytical data were submitted electronically to GeoTracker on October 5, 2011 for the groundwater elevation data, (confirmation number 3755842089), and the laboratory analytical data (confirmation number 4395536065).

4. GROUNDWATER MONITORING FINDINGS

The results of the 3rd Quarter 2011 groundwater monitoring event indicate the following:

- The average groundwater elevation at the site was 511.48 feet AMSL and the groundwater flow was N60°W at a gradient of 0.005 for this event.
- The results of analyses conducted on groundwater samples collected from the four monitoring wells (STMW-1, STMW-2, STMW-3 and P-1) are as follows:
  - Concentrations of Total Petroleum Hydrocarbons as gasoline (TPH-G) were not detected above laboratory reporting limits (50 µg/l). P-1 reported a TPH-G concentration of 10 µg/l.

- Concentrations of Methyl tertiary Butyl Ether (MTBE) were detected in groundwater samples collected from two of the four monitoring wells tested: STMW-1 (1.3 µg/l), and P-1 (14.0 µg/l). This suggests the MTBE groundwater plume is localized in the vicinity of monitoring well P-1.
- Concentrations of Tert-Butyl Alcohol (TBA) were detected in groundwater samples collected from one of the four monitoring wells tested: STMW-1 (290 µg/l).
- Concentrations of di-isopropyl alcohol (DIPE), ethyl-tertiary butyl ether (EtBE), tert-amyl-methyl ether (TAME), 1,2-dichloroethane (1,2-DCA), 1,2-dibromoethane (EDB), methanol, ethanol, benzene, toluene, ethylbenzene and total xylenes (BTEX) were not detected in groundwater samples collected from the sites four monitoring wells tested during the 3rd Quarter 2011.
- Concentrations of all constituents were reported in the groundwater samples collected from the four monitoring wells are at or near historic lows for the 3rd Quarter of 2011.

* Dissolved Oxygen (DO) concentrations remained elevated in all wells sampled that were incorporated into the hydrogen peroxide pilot test. The last hydrogen peroxide injection event prior to the 3rd Quarter 2011 groundwater monitoring event was conducted on March 10th, 2011. (See DO data in Table 3: Summary of Water Quality Parameter Data)

5. REMEDIAL EFFECTIVENESS

5.1. Hydrogen Peroxide Pilot Study

In correspondence dated March 13th, 2009, Alameda County Environmental Health Department (ACEH) directed GTI to conduct interim hydrogen peroxide injections on a weekly basis for no longer than 4 weeks. On April 14th, 2010, GTI request included the newly installed monitoring wells into the injection group. Per two email requests dated April 21st, 2010 and May 17th, 2010, ACEH extended the interim hydrogen peroxide injection events to a total of 16 events. The interim hydrogen peroxide injection pilot test consisted of a total of 16 injection events conducted from March 30th, 2010 through July 21st, 2010. A total of approximately 2,385 gallons of dilute hydrogen peroxide solution was injected during the interim hydrogen peroxide injection series.

A historical summary of the hydrogen peroxide injections pilot test activities can be referred to in both the *Additional Site Characterization and Interim Remedial Action Report* prepared by GTI, dated July 30th, 2010 and in the 2nd and 3rd Quarter 2010 *Groundwater Monitoring and Interim Remedial Effectiveness* report dated October 18th, 2010.

The additional hydrogen peroxide injection pilot study, approved by ACHCSA on November 15, 2010, consisted of a total of 12 injection events conducted from December 14th, 2010 through March 10th, 2011. A total of approximately 2,393 gallons of hydrogen peroxide solution was injected during the interim hydrogen peroxide injection series. Table 5 of Appendix A contains a summary of the volumes, concentrations, wells, and dates of application for each of the injection events for both the pilot study and additional pilot study.

5.2. Impact on Dissolved Oxygen Concentrations

First Pilot Study

Refer to Section 5.2 of the 1st Quarter 2011 *Groundwater Monitoring and Interim Remedial Effectiveness* report dated March 28th, 2011.

Additional Pilot Study

The following table includes a summary of the Dissolved Oxygen (DO) concentrations that were monitored in the field throughout the first pilot study as well as throughout the additional pilot study injection events.

Location	**Pre Remedial DO Level** (2/10/2010)	**Mid Remedial DO Level** (4/07/10)	**Post Remedial DO Level** (8/24/10)	**Pre Remedial DO Level** (11/30/10)	**Mid Remedial DO Level** (02/17/11)	**Post Remedial DO Level** (8/19/11)
STMW-1	6.77	46.5	43.37	-	44.57	34.54
STMW-2*	0.87	3.65	0.53	-	36.31	32.75
STMW-3	0.89	44.26	45.92	-	39.47	40.40
P-1	0.85	41.56	25.20	-	42.07	31.87
MW-101	-	-	-	3.85	38.97	-
MW-102	-	-	-	4.55	21.70	-
MW-103	-	-	-	2.83	54.71	-
MW-4**	-	-	-	0.15	0.13	-

* Please note that STMW-2 did not receive hydrogen peroxide during the first pilot study, but received hydrogen peroxide during the additional pilot study. The DO concentrations for STMW-2 taken during the first pilot study can be used as a background comparison.

** Please note that up-gradient monitoring well MW-4 did not receive peroxide injections during either of the pilot studies. DO concentrations were included for comparison as a representative background.

Despite being screened in a coarse grained unit, which has increased potential for transport, during the 3rd Quarter 2010 groundwater monitoring event, MW-101, MW-102 and MW-103 exhibited a sustained elevated DO following one month (July 21st, 2010 through August 24th, 2010) without peroxide injections during the first pilot study.

The seven monitoring wells that received hydrogen peroxide injections during the additional pilot study exhibited a sustained elevated DO following two weeks (February 3rd, 2011 through February 17th, 2011) without peroxide injections. Monitoring wells STMW-1, STMW-2, STMW-3 and P-1 exhibited a sustained elevated DO following over five months (March 10th, 2011 through August 19th, 2011) without peroxide injections during the additional pilot study.

The additional hydrogen peroxide pilot study appears to have been successful at sustaining the elevated DO concentrations achieved during the first pilot study and increasing DO concentrations in STMW-2 and MW-102.

5.3. Impact on Contamination Concentrations

First Pilot Study
Refer to Section 5.3 of the 1st Quarter 2011 *Groundwater Monitoring and Interim Remedial Effectiveness* report dated March 28th, 2011.

Additional Pilot Study
The 3rd Quarter 2011 groundwater monitoring event represented groundwater conditions more than five months after the conclusion of the additional hydrogen peroxide injection pilot study. The analytical data has indicated historic or near historic low contaminant concentrations for the site. The following table is a summary of the MTBE and TBA concentrations reported to be present before the first pilot test and near the end of the additional pilot test:

Location	MTBE (µg/l)			TBA (µg/l)		
	Pre Pilot Test (2/10/10)	1st QTR GW Monitoring Event* (2/17/11)	3rd QTR GW Monitoring Event** (8/19/11)	Pre Pilot Test (2/10/10)	1st QTR GW Monitoring Event* (2/17/11)	3rd QTR GW Monitoring Event** (8/19/11)
STMW-1	32	4.2	1.3	28	<5	290
STMW-2	<0.5	<0.5	<0.5	110	<5	<5
STMW-3	44	<0.5	<0.5	610	<5	<5
P-1	110	1.9	14	5,200	<5	<5

* Please note that the 1st Quarter 2011 groundwater monitoring event was conducted one month following the last injection event of the first hydrogen peroxide injection pilot, study to allow for potential rebound of concentrations.

** Please note that the 3rd Quarter 2011 groundwater monitoring event was conducted more than five months following the last injection event (March 10th, 2011) of the additional pilot study, to allow for potential rebound of concentrations.

5.4. Environmental Screening Levels

Maximum concentrations reported in the 3rd Quarter 2011 groundwater monitoring event were compared to Table F-1a. Groundwater Screening Levels (groundwater is a current or potential drinking water resource) of *Screening for Environmental Concerns with Contaminated Soil and Groundwater Interim Final – November 2007 (Revised May 2008)* prepared by the California Regional Water Quality Control Board San Francisco Bay Region.

Contaminant of Concern	3rd Qtr 2011 Max Concentrations (µg/l)	Table F-1a ESL (µg/l)
TPH-Gasoline	10	100
MTBE	14	5
TBA	290	12

MTBE was reported to be slightly above ESLs (based on taste and odor) in one well (P-1: 14 ug/L), however all other wells sampled during the 3rd Quarter 2011 reported to be below both the Environmental Screening Levels (ESLs) of 5 µg/L and the California Drinking Water Maximum Contaminant Level of 13 µg/l in all wells for MTBE. TBA was found to be non-detect below the reporting limits in all wells, except STMW-1 which reported a TBA concentration of 290 µg/L.

5.5. Opinion of Effectiveness

It is GTI's opinion that the interim remedial activities consisting of a hydrogen peroxide injection pilot test and additional pilot test were successful and that ISCO was an effective technology to address the contamination in the subsurface.

It is hypothesized that a small amount of residual contamination located in the northwest area of the former USTs (in the vicinity of SB-8: see Figure 2) may be sourcing the groundwater plume that is being reported in samples collected from P1 and STMW-1. Contamination within the vicinity of the sites monitoring wells has been effectively treated, indicated by the residual elevated DO levels following five months without hydrogen peroxide injection.

6. LOW RISK CLOSURE CONSIDERATION

1. The leak has been stopped and ongoing sources, including free product, removed or remediated.

One underground waste oil tank was located on this site and was removed on February 7, 1992 by Alpha Geo Services Inc. Three 10,000 gallon underground storage tanks (UST's) were removed on December, 13, 1993, followed by the installation of three new gasoline USTs in a separate pit on the east side of the Site, which are still present. Impacted soil was removed from the waste oil and gasoline UST removal excavations and was transported and disposed offsite. GTI concludes that the leak has been stopped and ongoing sources have been removed.

2. The site has been adequately characterized.

A summary of previous investigations including various soil borings, groundwater monitoring well data, CPT and GeoProbe borings have been incorporated into a Site Conceptual Model and Additional Site Characterization Reports. The vertical and lateral

extents of the soil and groundwater contamination in the subsurface have been identified, and updated as new information has become available.

As discussed in the *Additional Site Characterization & Interim Remedial Action Report* prepared by GTI, dated July 30, 2010, groundwater and soil contaminants at the site are primarily MTBE and TBA. A minimal amount of TPH-G and methanol has been reported to be present in groundwater and soil but are deemed insignificant. The MTBE and TBA groundwater plume appears to be centered on well P1, and appears to attenuate laterally with distance. The soil plume is laterally and vertically defined with very little contamination reported to be present. It was suspected that a pocket of contaminated soil located in the northwest area of the former USTs (vicinity of SB-8) may have been sourcing the groundwater plume. A pocket of contaminated soil was identified from the GeoProbe investigation in the median of Bluebell Drive. The analytical data from soil sampling indicated that the extent of the contamination appeared to be limited vertically and laterally.

3. The dissolved hydrocarbon plume is not migrating.

The site monitoring wells (with the exception of P-1 and STMW-1) have been reported to contain non-detect levels of contaminants of concern. Both P-1 and STMW-1 reported concentrations of MTBE which have been steadily declining and in the first quarter of 2011 are reported to be below CRWCB SFBA Environmental Screening Levels (ESL's).

Based on historical groundwater monitoring data, the historical groundwater gradient is estimated to be 0.005 ft/ft N60°W. The down gradient wells would be considered to include STMW-3 and MW-103, and may include STMW-1 and MW-101. Recent groundwater monitoring from the 1st and 3rd Quarters of 2011 have indicated that concentrations reported in down gradient wells (STMW-3, MW-101 and MW-103) are non-detect, and below California drinking water MCLs for all analyzed constituents. It appears that the groundwater plume is limited in extent, as contaminants of concern are not present in the down gradient wells.

Previous site investigations performed by Enviro Soil Tech Consultants in 2007 and 2008 indicated that groundwater contamination had migrated north along a coarse-grained sand bed. It is GTI's opinion that the interim remedial action of hydrogen peroxide injection that included MW-101 and MW-102 will address any residual offsite contamination.

4. No water wells, deeper drinking water aquifers, surface water, or other sensitive receptors are likely to be impacted.

In March 2007, a 2000-foot receptor well survey was conducted. A total of 51 wells were located within 2,000 feet of the Site, of which 49 are monitoring wells for other contaminated sites. One domestic well and one supply well were located within 2,000 feet of the Site. The domestic well was reported to be located approximately 1950 feet southeast of the Site and the supply well was reported to be located approximately 1,400 feet southeast of the Site. Both of the reported wells appear to be located up gradient of the site, and therefore would not be expected to be impacted.

5. The site presents no significant risk to human health.

The potential risk to human health for this site can be estimated by examining the various exposure pathways and beneficial uses of the soil and groundwater at the site. The San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) Basin Plan designates the beneficial uses of groundwater in the Livermore Valley as domestic, municipal, and industrial/agricultural supply.

- As discussed previously, the 1st Quarter 2011 (February 17, 2011) groundwater monitoring event results indicate that all monitoring wells were reported to contain levels of contaminants of concern that were below analytical reporting limits, or below drinking water MCLs (13 µg/l) and ESLs based on taste & odors (5.0 µg/l). Therefore, potential use of groundwater as a source of drinking water would not pose a significant threat to human health. Samples collected during the 3rd Quarter 2011 groundwater monitoring event, concentrations of MTBE slightly decreased in STMW-1 and slightly increased in P-1, following five months to allow for rebound following the additional hydrogen peroxide injection pilot study. However these concentrations are below or close to drinking water MCLs (13 µg/l) and ESLs based on taste & odors (5.0 µg/l).
- The recent 3rd Quarter 2011 groundwater monitoring analytical data results show that the concentrations of MTBE reported to be present in STMW-1 and P1 (1.3 and 14 µg/l respectively) are well below the ESL for vapor intrusion into buildings (24,000 µg/l). Therefore, potential for vapor intrusion into buildings would not pose a significant threat to human health.
- Historical analytical data indicates the plume is not and has not been reported to be located in the subsurface beneath the on-site buildings; therefore the potential for vapor intrusion is not significant.
- The surface of the site is encapsulated with concrete, asphalt and structures, so the risk of dermal contact with soil or groundwater is low.

Based on the low concentrations of contaminants reported to be present in recent groundwater sampling, stability of the plume and adequate characterization of the on-site contamination GTI concludes that the site does not present a significant risk to human health.

6. The site presents no significant risk to the environment.

The potential risk to the environment for this site can be estimated by examining the various beneficial uses of the soil and groundwater at the site:

- The nearest surface water is located approximately one mile west of the site, but is not likely to be impacted due to distance from the release, and recent MTBE concentrations being significantly below the ESL for aquatic habitat goal of 8,000 µg/l. Therefore, potential for impact to aquatic habitat would not pose a significant threat to the environment.

Due to the low concentrations of contaminants reported to be present in recent groundwater sampling, stability of the plume and adequate characterization of the on-site contamination GTI concludes that the site does not present a significant risk to the environment.

7. CONCLUSIONS

The results of the 3rd Quarter 2011 groundwater monitoring event indicate the following:

- The average groundwater elevation at the site was 511.48 feet AMSL and the groundwater flow was N60°W at a gradient of 0.005 for this event.
- The results of analyses conducted on groundwater samples collected from the four monitoring wells (STMW-1, STMW-2, STMW-3 and P-1) are as follows:
  - Two of the four monitoring wells (STMW-2 and STMW-3) sampled during the 3rd Quarter event were found to be non-detect above reporting limits for all analyzed constituents.
  - Concentrations of Total Petroleum Hydrocarbons as gasoline (TPH-G) were not detected above laboratory reporting limits (50 µg/L). P-1 reported a TPH-G concentration of 10 µg/L, which is below [1]Environmental Screening Levels (ESL) and California drinking water MCLs.
  - Concentrations of Methyl tertiary Butyl Ether (MTBE) were detected in groundwater samples collected from two of the four monitoring wells tested: STMW-1 (1.3 µg/l), and P-1 (14.0 µg/l). This suggests the MTBE groundwater plume is localized in the vicinity of monitoring well P-1.
  - Concentrations of Tert-Butyl Alcohol (TBA) were detected in groundwater samples collected from one of the four monitoring wells tested: STMW-1 (290 µg/l).
  - Concentrations of di-isopropyl alcohol (DIPE), ethyl-tertiary butyl ether (EtBE), tert-amyl-methyl ether (TAME), 1,2-dichloroethane (1,2-DCA), 1,2-dibromoethane (EDB), methanol, ethanol, benzene, toluene, ethylbenzene and total xylenes (BTEX) were not detected in groundwater samples collected from the sites four monitoring wells tested during the 3rd Quarter 2011.
  - Concentrations of all constituents were reported in the groundwater samples collected from the four monitoring wells are at or near historic lows for the 3rd Quarter of 2011.
- Following over five months of rebound period subsequent the last additional hydrogen peroxide injection pilot study event (March 10th, 2011), only two wells showed a slight rebound in contaminant concentrations:
  - Concentrations of MTBE reported to increase in P-1 from 1.9 µg/L during the 1st Quarter 2011 to 14 µg/L during the 3rd Quarter 2011.
  - Concentrations of TBA reported to increase in STMW-1 from non-detect during the 1st Quarter 2011 to 290 µg/L during the 3rd Quarter 2011.
- Dissolved Oxygen (DO) concentrations remained elevated in all wells sampled that were incorporated into the hydrogen peroxide pilot test. The last hydrogen peroxide injection event prior to the 3rd Quarter 2011 groundwater monitoring event was conducted on March 10th, 2011(See DO data in Table 3: Summary of Water Quality Parameter Data)

- The site appears to meet the criteria for low-risk closure, with no significant threat posed to human health or the environment.

8. RECOMMENDATIONS

1. Since the site meets low risk closure criteria, Geological Technics Inc. recommends that the site be considered for low-risk closure immediately.
2. Pending ACEH approval, GTI proposes preparing a work plan for well abandonment activities, in preparation for site closure.
3. Continue groundwater monitoring until directed otherwise by ACEH.

9. REFERENCES

California Environmental Protection Agency "*Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties*", January 2005

California Regional Water Quality Control Board, San Francisco Bay Region "*Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final*", November, 2007 (Revised May 2008).

Enviro Soil Tech Consultants *"Off-site Drilling and Vapor Extraction Pilot Test at the Property Located at 909 Bluebell Drive, Livermore, California*", July 1, 2008.

Geological Technics Inc. *"Additional Site Characterization & Interim Remedial Action Report, Springtown Gas, 909 Bluebell Drive, Livermore, California"*, dated July 30, 2010.

Geological Technics Inc. *"Site Conceptual Model Report December 2008 – Springtown Gas, 909 Bluebell Drive, Livermore, California*", December 8, 2008.

10. LIMITATIONS

This report was prepared in accordance with the generally accepted standard of care and practice in effect at the time Services were rendered. It should be recognized that definition and evaluation of environmental conditions is an inexact science and that the state or practice of environmental geology/hydrology is changing and evolving and that standards existing at the present time may change as knowledge increases and the state of the practice continues to improve. Further, that differing subsurface soil characteristics can be experienced within a small distance and therefore cannot be known in an absolute sense. All conclusions and recommendations are based on the available data and information.

The tasks proposed and completed during this project were reviewed and approved by the local regulatory agency for compliance with the law. No warranty, expressed or implied, is made.

11. CERTIFICATION

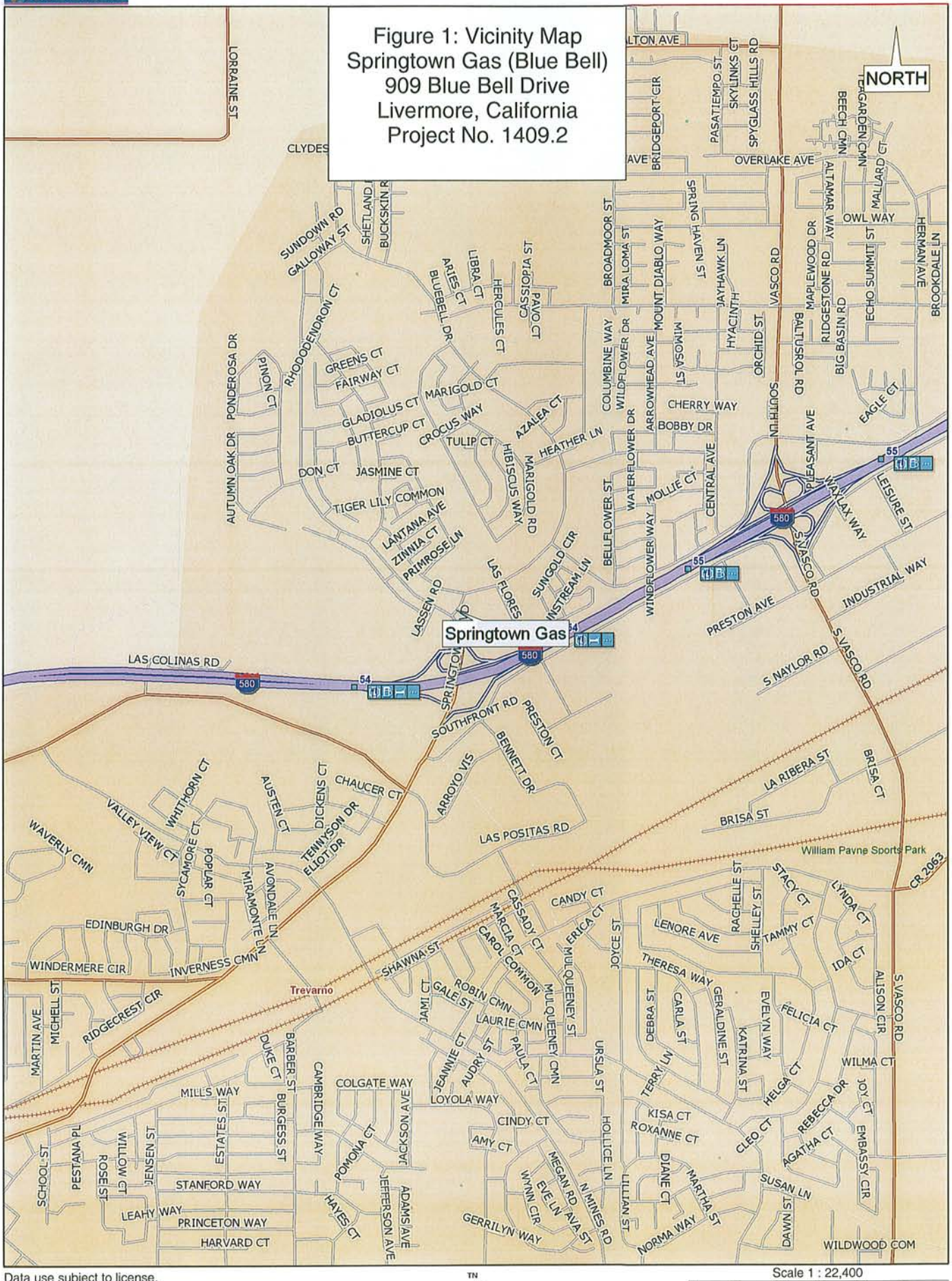
This report was prepared by:

Andrew Dorn, B.Sc. Geology

This report was prepared under the direction of:

Raynold I. Kablanow II, PhD
PG, CHG, REAII

Figure 1: Vicinity Map
Springtown Gas (Blue Bell)
909 Blue Bell Drive
Livermore, California
Project No. 1409.2



Data use subject to license.

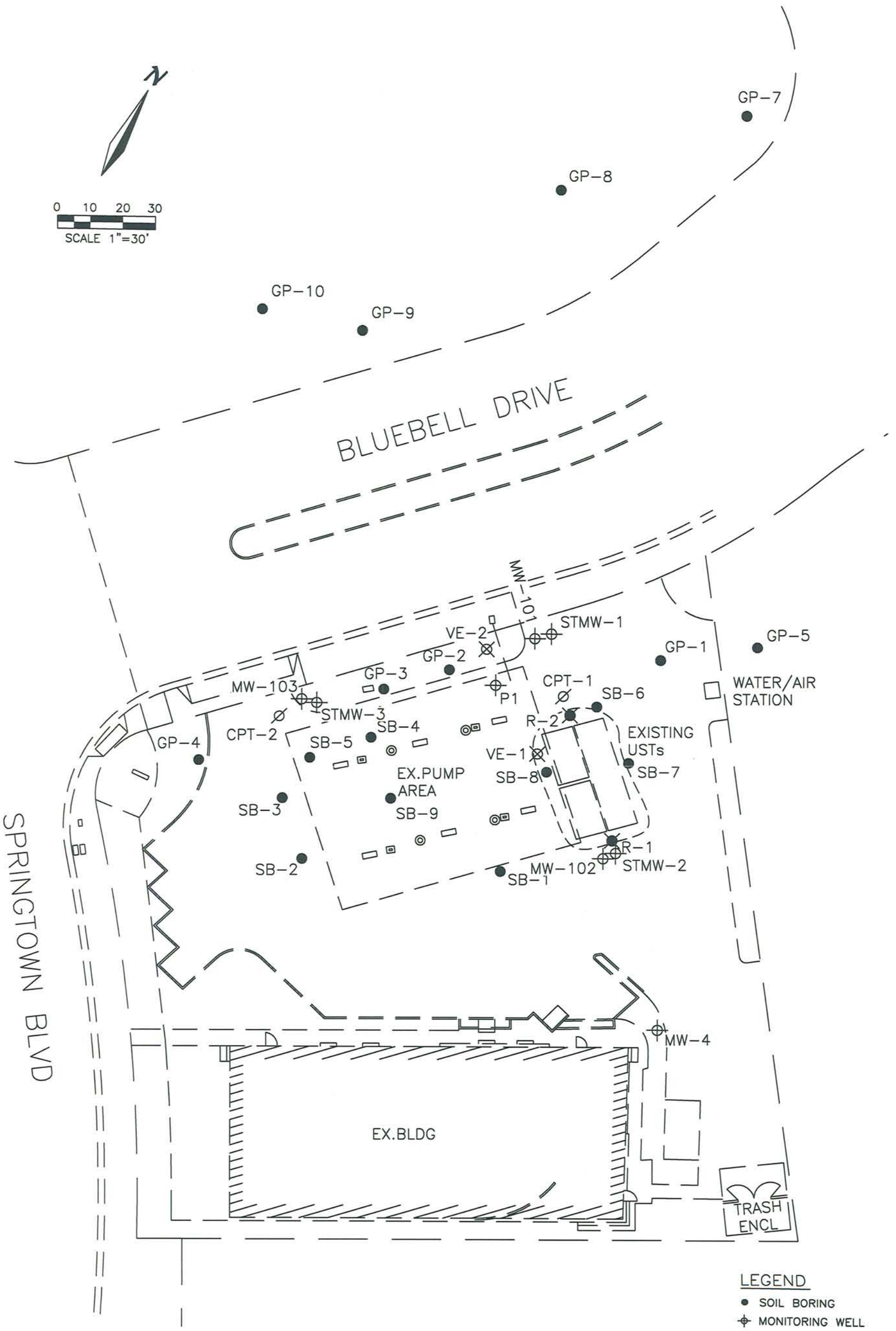
www.delorme.com

TN
MN (14.0°E)

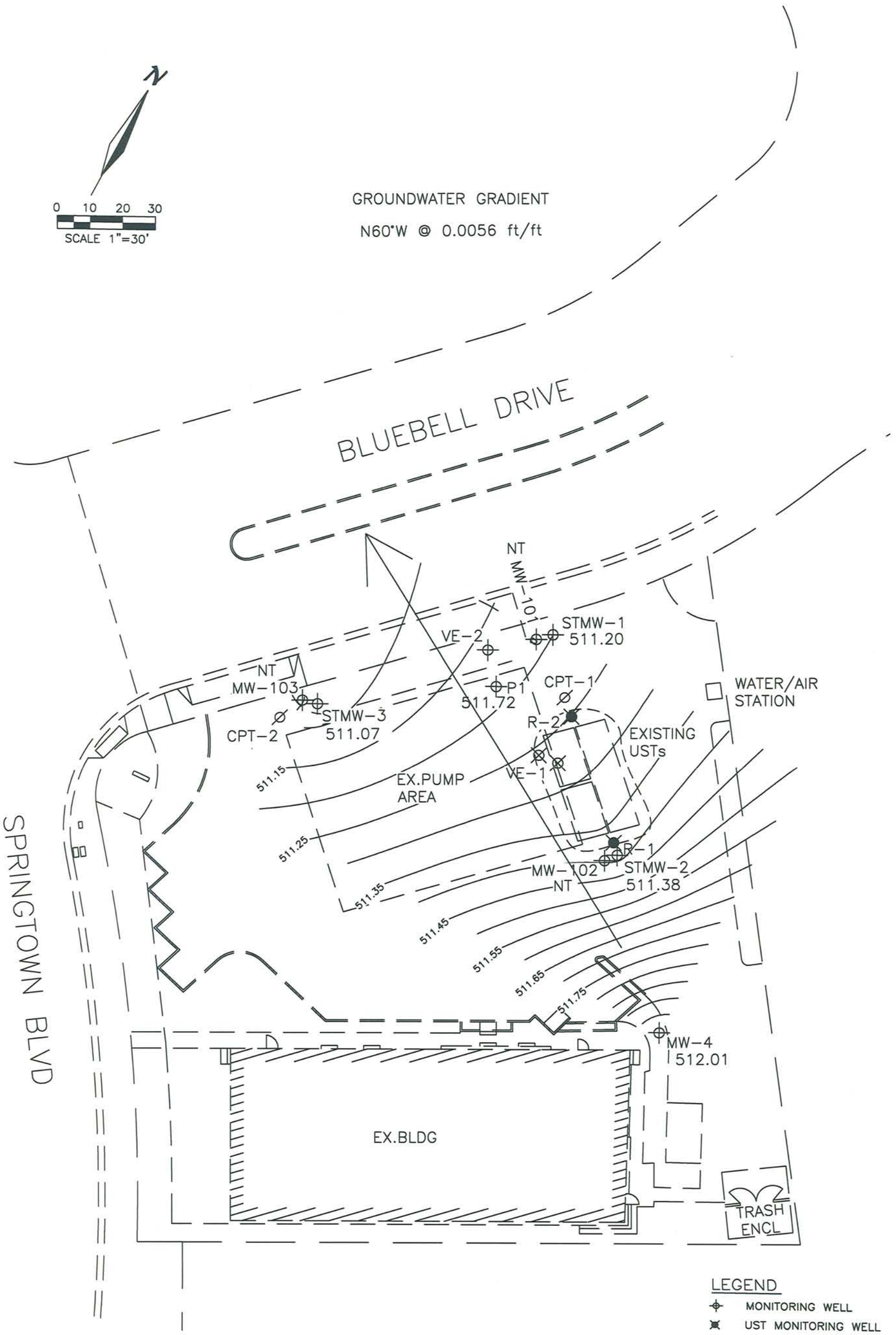
Scale 1 : 22,400

1" = 1,866.7 ft

Data Zoom 13-2



By: AD	*Geological Technics, Inc.*	FIGURE 2: Site Map
Job No: 1409.2 Date: 8/19/11	1172 Kansas Avenue Modesto, CA 95351 209.522.4119 (tel) 209.522.4227 (fax)	SPRINGTOWN GAS (BLUEBELL) 909 BLUEBELL DRIVE LIVERMORE, CA
Scale: 1"=30'		
File: 14092 Site Map		Page 1 of 1



Gradient determined using 3-point problem w/ MW-4, STMW-3 & STMW-1 along w/ computer generated contours

By:	AD
Job No:	1409.2 Date: 8/19/11
Scale:	1"=30'
File:	14092 GWG Contour

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1172 Kansas Avenue
Modesto, CA
95351
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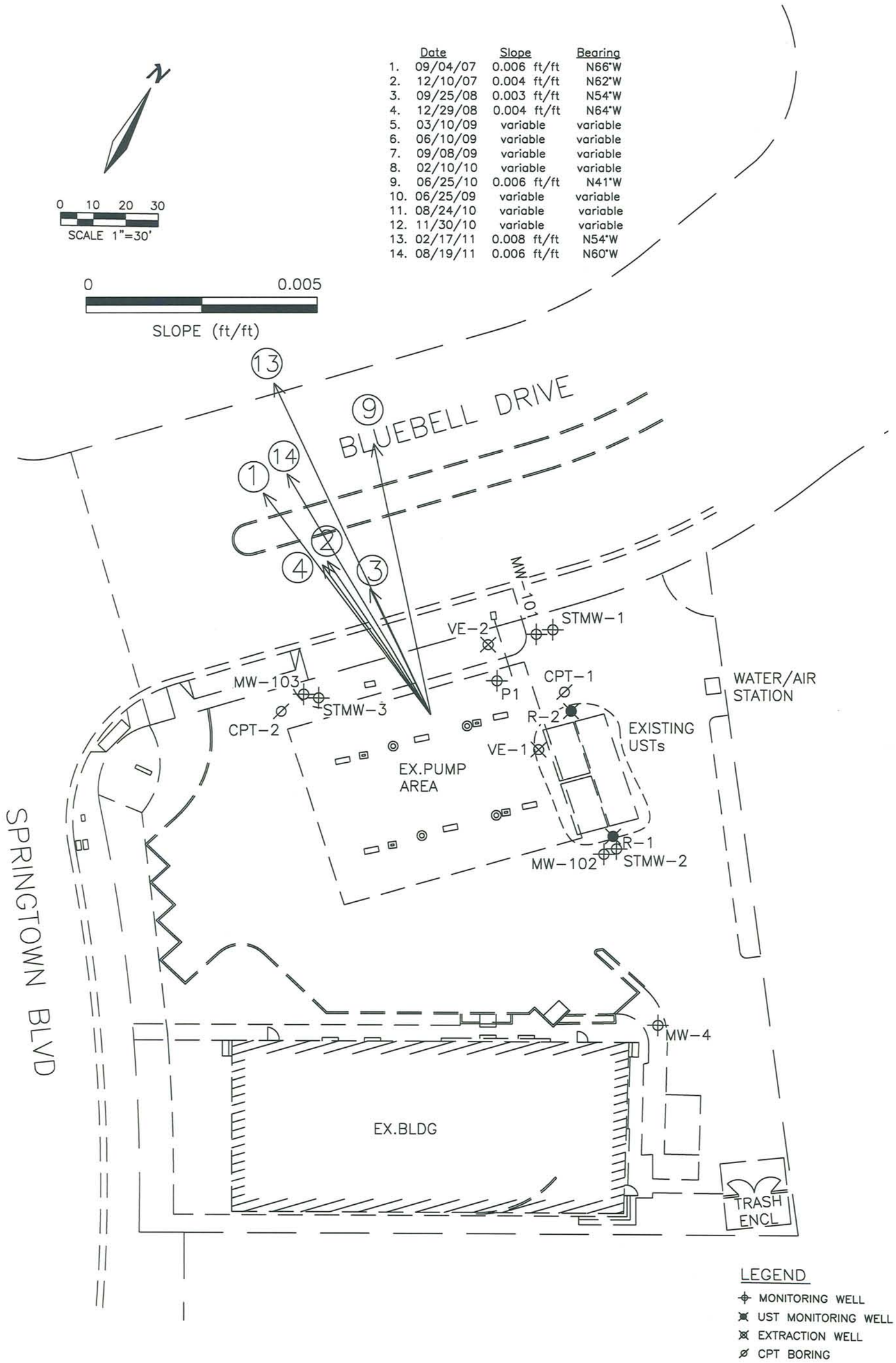
FIGURE 3: Groundwater Gradient Map
(3rd Quarter 2011)

SPRINGTOWN GAS (BLUEBELL)
909 BLUEBELL DRIVE
LIVERMORE, CA



	Date	Slope	Bearing
1.	09/04/07	0.006 ft/ft	N66°W
2.	12/10/07	0.004 ft/ft	N62°W
3.	09/25/08	0.003 ft/ft	N54°W
4.	12/29/08	0.004 ft/ft	N64°W
5.	03/10/09	variable	variable
6.	06/10/09	variable	variable
7.	09/08/09	variable	variable
8.	02/10/10	variable	variable
9.	06/25/10	0.006 ft/ft	N41°W
10.	06/25/09	variable	variable
11.	08/24/10	variable	variable
12.	11/30/10	variable	variable
13.	02/17/11	0.008 ft/ft	N54°W
14.	08/19/11	0.006 ft/ft	N60°W

By:	AD
Job No:	1409.2 Date: 8/19/11
Scale:	1"=30'
File:	14092 Rose Diagram

Geological Technics, Inc.
1172 Kansas Avenue
Modesto, CA
95351
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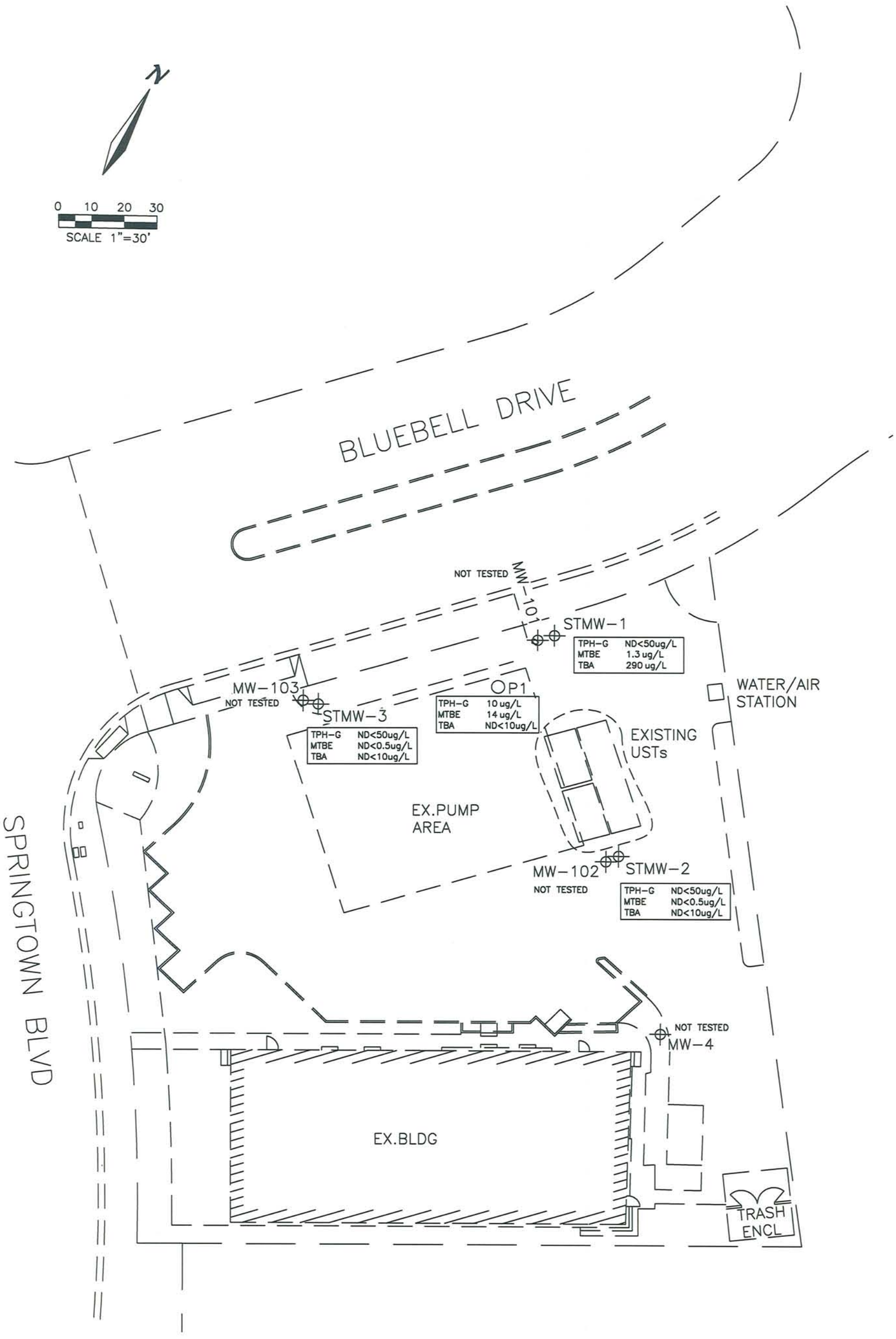
FIGURE 4: Groundwater Gradient Rose Diagram

SPRINGTOWN GAS (BLUEBELL)
909 BLUEBELL DRIVE
LIVERMORE, CA



By:	AD
Job No:	1409.2 Date: 8/19/11
Scale:	1"=30'
File:	14092 GW Concentrations

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1172 Kansas Avenue
Modesto, CA
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FIGURE 5: Groundwater Concentrations (3rd Quarter 2011)

SPRINGTOWN GAS (BLUEBELL)
909 BLUEBELL DRIVE
LIVERMORE, CA

Appendix A

Summary Tables

Table 1
Summary of Groundwater Elevation

Springtown Gas
909 Bluebell Drive
Livermore, California

Date		STMW-1	STMW1	STMW-2	STMW2	STMW-3	STMW3	P-1	P-1	MW-4	MW-4	MW-101	MW-101	MW-102	MW-102	MW-103	MW-103	Avg GW	AVG GW	GW Gradient	
		GW Elev	DTW	GW Elev	DTW	GW Elev	DTW	GW Elev	DTW	GW Elev	DTW	GW Elev	DTW	GW Elev	DTW	GW Elev	DTW	Elev	DTW	Slope	Direction
	*top of casing**	517.55		519.59		520.37		518.93		521.98		518.42		520.13		520.07				ft/ft	
**																					
9/4/2007		510.97	6.58	511.59	8.00	510.85	9.52	-	-	-	-	-	-	-	-	-	-	511.14	-	0.006	N66°W
12/10/2007		511.29	6.26	511.59	8.00	511.25	9.12	-	-	-	-	-	-	-	-	-	-	511.38	-	0.004	N62°W
9/25/2008		510.69	6.86	510.9	8.69	510.65	9.72	-	-	-	-	-	-	-	-	-	-	510.75	-	0.003	N54°W
11/20/2008		510.81	6.74	511.17	8.42	510.82	9.55	-	-	-	-	-	-	-	-	-	-	510.93	-	0.004	N60°W
12/29/2008		511.60	5.95	511.9	7.69	511.50	8.87	-	-	-	-	-	-	-	-	-	-	511.67	-	0.004	N64°W
3/10/2009		512.60	4.95	512.99	6.60	512.44	7.93	513.20	5.73	-	-	-	-	-	-	-	-	512.81	6.30	variable	variable
6/10/2009		510.90	6.65	511.21	8.38	510.84	9.53	511.50	7.43	-	-	-	-	-	-	-	-	511.11	8.00	variable	variable
9/8/2009		510.62	6.93	510.78	8.81	510.59	9.78	511.17	7.76	-	-	-	-	-	-	-	-	510.79	8.32	variable	variable
2/10/2010		512.39	5.16	512.68	6.91	512.00	8.37	512.95	5.98	-	-	-	-	-	-	-	-	512.51	6.61	variable	variable
6/25/2010		511.19	6.36	511.43	8.16	511.06	9.31	511.73	7.20	512.09	9.89	511.36	7.06	511.47	8.66	511.38	8.69	511.46	8.17	variable	variable
8/24/2010		511.15	6.40	511.38	8.21	511.01	9.36	510.72	8.21	511.98	10.00	511.21	7.21	511.31	8.82	511.23	8.84	511.25	8.38	variable	variable
11/30/2010		511.48	6.07	511.72	7.87	511.21	9.16	511.93	7.00	512.37	9.61	511.47	6.95	511.58	8.55	511.50	8.57	511.66	7.97	variable	variable
2/17/2011		511.59	5.96	511.85	7.74	511.50	8.87	511.63	7.30	512.51	9.47	511.71	6.71	511.83	8.30	511.73	8.34	511.79	7.84	0.008	N54°W
8/19/2011		511.20	6.35	511.38	8.21	511.07	9.30	511.72	7.21	512.01	9.97	-	-	-	-	-	-	511.48	8.21	0.006	N60°W
																	Historical	**511.48**	**7.75**	**0.005**	**N60°W**

*TOC elevations surveyed on 9/06/07 by Muir Consutling Inc. for wells STMW-1, 2, 3, & P-1 NAD 83 and NGVD 29
*TOC elevations surveyed on 7/08/10 by Benchmark Engineering for wells MW-101, 102, 103, & MW-4
**Gradient and slope determined from computer generated contours
***Gradient calculated using 3-point problem w/ MW-4, STMW-1 and STMW-3 as of 2/17/11
"-" Well P-1 not surveyed until 2/03/09

Table 2
Summary of Groundwater Analytical Data

Springtown Gas
909 Bluebell Drive
Livermore, California

MONITORING WELL	Date	TPHg	B	T	E	X	MtBE	TBA	DIPE	EtBE	TAME	1,2-DCA	EDB	Methanol	Ethanol
		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
STMW-1	9/4/2007	**220**	<10	<10	<10	<10	**850**	**6,500**	-	-	-	-	-	-	-
	12/10/2007	**210**	<5	<5	<5	<5	**540**	**4,200**	-	-	-	-	-	-	-
	9/25/2008	**230**	<0.5	<0.5	<0.5	<1.0	**204**	**704**	<0.5	<0.5	**0.6**	<0.5	<0.5	<5	<20
	11/20/2008	<50	<0.5	<0.5	<0.5	<1.0	**14**	**930**	<0.5	<0.5	<0.5	-	-	-	-
	12/29/2008	<50	<0.5	<0.5	<0.5	<1.0	**15**	**1,000**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	3/10/2009	<50	<0.5	<0.5	<0.5	<1.0	**29**	**3,000**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	6/10/2009	<50	<0.5	<0.5	<0.5	<1.0	**60**	**3,800**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	9/8/2009	<50	<0.5	<0.5	<0.5	<1.0	**52**	**190**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	2/10/2010	<50	<0.5	<0.5	<0.5	<1.0	**32**	**28**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	6/25/2010	Not sampled													
	8/24/2010	<50	<0.5	<0.5	<0.5	<1.0	**5.9**	**87**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	11/30/2010	Not sampled													
	2/17/2011	<50	<0.5	<0.5	<0.5	<1.0	**4.2**	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	8/19/2011	<50	<0.5	<0.5	<0.5	<1.0	**1.3**	**290**	<0.5	<0.5	<0.5	<0.5	<0.5	-	-
STMW-2	9/4/2007	<50	<0.5	<0.5	<0.5	<0.5	<1	**42**	-	-	-	-	-	-	-
	12/10/2007	<50	<0.5	<0.5	<0.5	<0.5	<1	**83**	-	-	-	-	-	-	-
	9/25/2008	<50	<0.5	<0.5	<0.5	<1	<0.5	**71**	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<20
	11/20/2008	**90**	**1.7**	**6.9**	**1.7**	**7.6**	**2.2**	**190**	<0.5	<0.5	<0.5	-	-	-	-
	12/29/2008	<50	<0.5	<0.5	<0.5	<1.0	<0.5	**56**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	3/10/2009	<50	<0.5	<0.5	<0.5	<1.0	**1.5**	**96**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	6/10/2009	<50	<0.5	<0.5	<0.5	<1.0	**1.1**	**43**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	9/8/2009	<50	<0.5	<0.5	<0.5	<1.0	<0.5	**45**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	2/10/2010	<50	<0.5	<0.5	<0.5	<1.0	<0.5	**110**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	6/25/2010	Not sampled													
	8/24/2010	<50	<0.5	<0.5	<0.5	<1.0	<0.5	**33**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	11/30/2010	Not sampled													
	2/17/2011	<50	<0.5	<0.5	<0.5	<1.0	<50	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	8/19/2011	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<10	<0.5	<0.5	<0.5	<0.5	<0.5	-	-
STMW-3	9/4/2007	**59**	<1	<1	<1	<1	**160**	**120**	-	-	-	-	-	-	-
	12/10/2007	<50	<0.5	<0.5	<0.5	<0.5	**17**	**86**	-	-	-	-	-	-	-
	9/25/2008	<50	<0.5	<0.5	<0.5	<0.5	**67**	**31.7**	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<20
	11/20/2008	<50	<0.5	<0.5	<0.5	<1.0	**12**	<5	<0.5	<0.5	<0.5	-	-	-	-
	12/29/2008	<50	<0.5	<0.5	<0.5	<1.0	**2.2**	<5.	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	3/10/2009	<50	<0.5	<0.5	<0.5	<1.0	**3**	**95**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	6/10/2009	<50	<0.5	<0.5	<0.5	<1.0	**8.3**	**45**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	9/8/2009	<50	<0.5	<0.5	<0.5	<1.0	**11**	**29**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	2/10/2010	<50	<0.5	<0.5	<0.5	<1.0	**44**	**610**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	6/25/2010	Not sampled													
	8/24/2010	<50	<0.5	<0.5	<0.5	<1.0	ND<0.5	ND<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	11/30/2010	Not sampled													
	2/17/2011	<50	<0.5	<0.5	<0.5	<1.0	<50	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	8/19/2011	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<10	<0.5	<0.5	<0.5	<0.5	<0.5	-	-
P1	11/20/2008	<50	<5	<5	<5	<10	**180**	**2,300**	<5	<5	<5	-	-	-	-
	12/29/2008	<50	<0.5	<0.5	<0.5	<1.0	**120**	**3,900**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	3/10/2009	<50	<0.5	<0.5	<0.5	<1.0	**240**	**9,300**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	6/10/2009	<50	<0.5	<0.5	<0.5	<1.0	**250**	**6,300**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	9/8/2009	<250	<2.5	<2.5	<2.5	<5	**180**	**2,900**	<2.5	<2.5	<2.5	<2.5	<2.5	<250	<25
	2/10/2010	<250	<2.5	<2.5	<2.5	<5	**110**	**5,200**	<2.5	<2.5	<2.5	<2.5	<2.5	<250	<25
	6/25/2010	Not sampled													
	8/24/2010	<50	<0.5	<0.5	<0.5	<1.0	**5.4**	**120**	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	11/30/2010	Not sampled													
	2/17/2011	<50	<0.5	<0.5	<0.5	<1.0	**1.9**	ND<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	8/19/2011	**10**	<0.5	<0.5	<0.5	<1.0	**14**	ND<10	<0.5	<0.5	<0.5	<0.5	<0.5	-	-
MW-4	6/25/2010	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	8/24/2010	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	11/30/2010	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	2/17/2011	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	8/19/2011	Not sampled													
MW-101	6/25/2010	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	8/24/2010	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	11/30/2010	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	2/17/2011	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	8/19/2011	Not sampled													
MW-102	6/25/2010	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	8/24/2010	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	11/30/2010	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	2/17/2011	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	8/19/2011	Not sampled													
MW-103	6/25/2010	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	8/24/2010	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	11/30/2010	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	2/17/2011	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<50	<5
	8/19/2011	Not Sampled													

Notes:

TPHg	Total petroleum hydrocarbons as gasoline
TPHd	Total petroleum hydrocarbon
B	Benzene
T	Toluene
E	Ethylbenzene
X	Total xylenes
MtBE	Methyl tertiary butyl ether
TBA	Tert-butyl alcohol
DIPE	Di-isopropyl ether
EtBE	Ethyl-tertiary butyl ether
TAME	Tert-amyl-methyl ether
1,2-DCA	1,2-Dichloroethane
EDB	1,2-Dibromoethane
bgs	below ground surface
ug/l	micrograms per liter
-	Not analyzed or not reported

Table 3
Summary of Water Quality Parameter Data

Springtown Gas
909 Bluebell Drive
Livermore, California

Monitoring Well	STMW-1						STMW-2						STMW-3					
Date	pH	E.C.	°C	°F	ORP	DO	pH	E.C.	°C	°F	ORP	DO	pH	E.C.	°C	°F	ORP	DO
9/4/2007	6.37	1462	21.40	70.5	NM	NM	6.43	1405	21.1	70.0	NM	NM	6.14	2115	20	68.0	NM	NM
12/10/2007	6.92	1090	18.50	65.3	NM	NM	7.02	1074	19.8	67.6	NM	NM	6.77	1267	NM	NM	NM	NM
9/25/2008	7.22	1706	21.63	70.9	48.3	0.38	7.15	1652	21.26	70.3	34	0.7	6.84	1838	20.32	68.6	60.2	0.84
10/2/2008	7.16	1701	21.57	70.8	45.6	0.68	7.07	1650	21.14	70.1	51.8	0.58	6.82	1892	20.47	68.8	156	1.81
10/9/2008	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
10/16/2008	7.53	970	21.48	70.7	71.6	36.39	7.07	1611	21.35	70.4	56.7	0.21	7.38	656	20.64	69.2	66.6	37.4
10/23/2008	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
10/30/2008	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
11/6/2008	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
11/20/2008	7.36	1554	20.74	69.3	208.3	11.17	7.20	1782	21.21	70.2	211.4	1.13	7.88	771	20.63	69.1	194.6	15.53
12/29/2008	7.78	1685	18.61	65.5	168.8	41.24	7.64	1577	20.21	68.4	66.9	2.04	7.55	1196	19.69	67.4	141.5	32.54
3/10/2009	7.23	1861	16.14	61.1	401.3	20.56	7.31	1600	17.94	64.3	372.9	0.67	7.10	1555	17.29	63.1	509.3	7.17
6/10/2009	7.24	1624	18.76	65.8	469.2	12.69	7.30	1548	18.58	65.4	348.7	0.38	7.08	1476	17.97	64.3	557.5	2.17
9/8/2009	7.07	NM	21.66	71.0	544.3	NM	7.22	NM	20.88	69.6	250.1	NM	6.83	NM	20.15	68.3	564.2	NM
2/10/2010	7.35	1660	17.09	62.8	531.3	6.77	7.30	1618	18.71	65.7	394.4	0.87	7.20	1642	17.99	64.4	469.0	0.89
6/25/2010	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
8/24/2010	6.44	707	20.79	69.4	195.7	43.37	6.32	1730	20.45	68.8	135.9	0.53	6.61	384	20.10	68.2	255.2	45.92
11/30/2010	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2/17/2011	8.10	365	17.55	63.6	241.3	44.57	NM	NM	NM	NM	NM	NM	8.14	241	18.21	64.8	249	39.47
8/19/2011	7.43	1402	19.05	66.3	260.1	34.54	7.64	1098	18.80	65.8	98.9	32.75	6.74	1532	17.30	63.1	409.4	40.40

Monitoring Well	P-1						VE-1						VE-2					
Date	pH	E.C.	°C	°F	ORP	DO	pH	E.C.	°C	°F	ORP	DO	pH	E.C.	°C	°F	ORP	DO
9/4/2007	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
12/10/2007	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
9/25/2008	7.2	1941	20.6	69.1	50.3	1.19	6.9	2072	22.8	73.0	-44.9	3.07	7.1	1933	21.67	71.0	-13.6	6.48
10/2/2008	7.1	1893	20.44	68.8	59.6	1.18	7.18	1780	22.02	71.6	2.1	8.29	NM	NM	NM	NM	NM	NM
10/9/2008	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
10/16/2008	7.75	1285	20.61	69.1	85.9	18.23	6.84	1668	22.29	72.1	3.3	1.53	7.16	1912	21.38	70.5	-1.1	7.25
10/23/2008	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	7.42	1924	19.91	67.8	49.6	8.48
10/30/2008	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	7.81	1052	20.05	68.1	164.0	172.1
11/6/2008	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	7.13	1329	19.94	67.9	183.5	9.77
11/20/2008	7.99	1392	19.96	67.9	180	8.19	6.99	1960	18.91	66.0	38.6	4.82	6.89	1593	19.47	67.0	224.5	9.09
12/29/2008	7.99	1766	18.99	66.2	285.5	43.92	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/10/2009	7.30	1797	16.81	62.3	473.9	3.03	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
6/10/2009	7.34	1795	17.85	64.1	455.7	1.09	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
9/8/2009	7.14	NM	19.98	68.0	312.2	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2/10/2010	7.42	1658	17.22	63.0	139.0	0.85	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
6/25/2010	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
8/24/2010	7.99	632	20.95	69.7	206.4	25.20	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
11/30/2010	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2/17/2011	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
8/19/2011	7.58	753	17.65	63.8	206.5	31.87	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Monitoring Well	MW-4						MW-101						MW-102					
Date	pH	E.C.	°C	°F	ORP	DO	pH	E.C.	°C	°F	ORP	DO	pH	E.C.	°C	°F	ORP	DO
6/25/2010	7.20	1228	18.20	64.76	165.5	0.05	7.20	1077	19.40	66.92	248.3	30.27	7.10	1042	19.60	67.28	190.3	6.35
8/24/2010	6.11	1343	19.27	66.69	125.7	0.94	6.58	1170	19.80	67.64	178.5	7.36	6.44	1141	19.81	67.66	129.3	5.22
11/30/2010	6.83	1258	18.73	65.71	214.6	0.15	6.73	1083	18.72	65.70	189.3	3.85	6.76	1060	18.91	66.04	151.0	4.55
2/17/2011	7.28	1459	18.14	64.65	229.4	0.13	7.32	1126	19.27	66.69	266.3	38.97	7.30	1094	19.18	66.52	261.8	21.70
8/19/2011	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Monitoring Well	MW-103					
Date	pH	E.C.	°C	°F	ORP	DO
6/25/2010	7.12	1316	19.10	66.38	277.3	29.46
8/24/2010	6.56	1464	19.32	66.78	192.1	23.64
11/30/2010	6.89	1307	18.82	65.88	140.6	2.83
2/17/2011	7.21	1389	18.74	65.73	282.1	54.71
8/19/2011	NM	NM	NM	NM	NM	NM

Notes:

E.C.	Electricval conductivity
°C	Degrees centigrade
°F	Degrees fahrenheit
ORP	Oxygen reduction potential
DO	Dissolved oxygen
NM	Not measured

Table 4
Summary of Monitoring Well Completion Data

Springtown Gas
909 Bluebell Drive
Livermore, California

Well Number	Status	Date Drilled	Total Depth (ft)	Boring Diameter (in)	Well Casing Diameter (in)	Casing Type	Slot Size (in)	Sand Type	Well Screen		Filter Pack		Annular Seal		Grout Seal	
									From	To	From	To	From	To	From	To
STMW-1	Active	8/23/2007	20	10	2	PVC	0.02	#2/12	10	20	20	8	8	7	7	0
STMW-2	Active	8/23/2007	20	10	2	PVC	0.02	#2/12	10	20	20	8	8	7	7	0
STMW-3	Active	8/23/2007	20	10	2	PVC	0.02	#2/12	10	20	20	8	8	7	7	0
P1	Active	9/19/2008	20	10	4	PVC	0.02	#3/12	10	20	20	8	8	7	7	0
MW-4	Active	2/25/2010	20	8	2	PVC	0.02	#3/12	10	20	20	8	8	5	5	0
MW-101	Active	2/25/2010	37	8	2	PVC	0.02	#3/12	32	37	37	30	30	28	28	0
MW-102	Active	2/25/2010	40	8	2	PVC	0.02	#3/12	32	40	40	30	30	27	27	0
MW-103	Active	2/26/2010	35	8	2	PVC	0.02	#3/12	30	35	35	28	28	25	25	0

Table 5
Summary of Hydrogen Peroxide Injections

Springtown Gas
909 Bluebell Drive
Livermore, California

Pilot Test

DATE	STMW-1		STMW-2		STMW-3		P1		MW-101		MW-102		MW-103	
	7%	10%	-	-	7%	10%	7%	10%	7%	10%	-	-	7%	10%
3/30/2010	65	-	-	-	60	-	25	-	-	-	-	-	-	-
4/7/2010	75	-	-	-	50	-	25	-	-	-	-	-	-	-
4/15/2010	10	-	-	-	30	-	10	-	50	-	-	-	50	-
4/22/2010	15	-	-	-	30	-	10	-	55	-	-	-	50	-
4/30/2010	-	15	-	-	-	30	-	8	-	50	-	-	-	47
5/5/2010	-	10	-	-	-	35	-	5	-	50	-	-	-	50
5/11/2010	-	10	-	-	-	35	-	5	-	50	-	-	-	50
5/18/2010	-	10	-	-	-	25	-	5	-	45	-	-	-	45
5/26/2010	-	10	-	-	-	25	-	5	-	55	-	-	-	55
6/2/2010	-	10	-	-	-	50	-	7	-	50	-	-	-	35
6/9/2010	10	-	-	-	50	-	8	-	35	-	-	-	40	-
6/16/2010	15	-	-	-	45	-	-	7	45	-	-	-	40	-
7/1/2010	15	-	-	-	40	-	-	7	45	-	-	-	45	-
7/8/2010	10	-	-	-	30	-	-	10	50	-	-	-	50	-
7/14/2010	10	-	-	-	30	-	-	10	50	-	-	-	50	-
7/21/2010	10	-	-	-	25	-	-	10	50	-	-	-	50	-
Totals	**235**	**65**	**0**	**0**	**390**	**200**	**78**	**79**	**380**	**300**	**0**	**0**	**375**	**282**

Total Volume Injected During Pilot Study: **2385 gallons hydrogen peroxide solution**

Additional Pilot Test

DATE	STMW-1		STMW-2		STMW-3		P1		MW-101		MW-102		MW-103	
	7%	10%	7%	10%	7%	10%	7%	10%	7%	10%	7%	10%	7%	10%
12/14/2010	-	10	10	-	30	-	-	10	50	-	35	-	50	-
12/15/2010	10	-	5	-	20	-	10	-	-	-	15	-		-
12/21/2010	-	15	15	-	45	-	-	20	50	-	50	-	50	-
12/28/2010	5	-	5	-	10	-	25	-	25	-	20	-	20	-
12/30/2010	5	-	5	-	10	-	10	-	25	-	25	-	30	-
1/4/2011	5	-	5	-	-	-	20	-	25	-	25	-	30	-
1/11/2011	5	-	5	-	30	-	20	-	25	-	25	-	-	-
1/18/2011	10	-	10	-	-	-	10	-	25	-	30	-	25	-
1/20/2011	10	-	5	-	27	-	8	-	30	-	30	-	-	-
1/25/2011	10	-	5	-	-	-	5	-	30	-	30	-	30	-
1/27/2011	10	-	5	-	25	-	10	-	30	-	30	-	-	-
2/1/2011	5	-	5	-	-	-	20	-	25	-	25	-	30	-
2/3/2011	8	-	8	-	26	-	16	-	24	-	28	-	-	-
2/18/2011	5	-	5	-	-	-	20	-	25	-	25	-	30	-
2/22/2011	5.5	-	5	-	30	-	22	-	25	-	27.5	-	-	-
2/24/2011	5	-	5.25	-	-	-	19.5	-	29.5	-	35	-	30	-
3/1/2011	5	-	5	-	30	-	20	-	25	-	25	-	-	-
3/3/2011	5	-	5	-	-	-	20	-	25	-	25	-	30	-
3/9/2011	5	-	5	-	30	-	8	-	32	-	33	-	-	-
3/10/2011	5	-	5	-	-	-	20	-	25	-	25	-	30	-
Totals	**119**	**25**	**123**	**0**	**313**	**0**	**284**	**30**	**551**	**0**	**564**	**0**	**385**	**0**

Total Volume Injected During Additional Pilot Study: **2393 gallons hydrogen peroxide solution**

Appendix B

Laboratory Analytical Data Sheets

BC Laboratories, Inc.
Environmental Testing Laboratory Since 1949

Date of Report: 08/29/2011

Andrew Dorn

Geological Technics
1172 Kansas Avenue
Modesto, CA 95354

Project:	Water Samples
BC Work Order:	1113544
Invoice ID:	B106559

Enclosed are the results of analyses for samples received by the laboratory on 8/22/2011. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Contact Person: Christina Herndon
Client Service Rep

Authorized Signature

Table of Contents

Geological Technics Inc.

1172 Kansas Avenue
Modesto, CA
(209) 522-4119 Fax 522-4227
E-mail: gti@gtienv.com

Chain of Custody

11-13544

Project #:	Client/Project Name:
1409.2	Springtown Gas

Site Address:
909 Bluebell Drive, Livermore, CA

Global ID No.:
T06019716197

Sampled By: (print and sign name)
Andrew Dorn

Date	Time	Field I.D.	Sample I.D.	No. of Containers	Matrix (Soil, Water, Gas, Other)	Preservation Type	* Method 8260B	Analysis Requested
8-19-11	1310	-1	P-1	4	W	HCL	X	
"	1359	-2	STMW-1	"	"	"	X	
"	1245	-3	STMW-2	"	"	"	X	
"	1315	-4	STMW-3	"	"	"	X	

SHIP BY: DISTRIBUTION
FED EX
SUB-OUT

Laboratory: BC LABS
Temp. @ Shipping: C°
Temp. @ Lab Receipt: C°
Purchase Order # 1409 - 70331S
EDF Report: ☒ Yes ☐ No
Turnaround Time: S = Standard
1 day 2 day 5 day

Remarks

*METHOD 8260 B INCLUDES THE FOLLOW CONSTITUENTS & REPORTING LIMITS:

TPH-G	50 ug/L
BTEX	0.5 ug/L
MTBE	0.5 ug/L
ETBE	0.5 ug/L
DIPE	0.5 ug/L
TAME	0.5 ug/L
TBA	0.5 ug/L
1,2-DCA	0.5 ug/L
EDB	0.5 ug/L

Relinquished by: (signature)	Date:	Time:	Received by: (signature)	Date:	Time:
Elizabeth Simmons	8/22/11	1405		8-22-11	1405
Relinquished by: (signature)	Date:	Time:	Received by: (signature)	Date:	Time:
	8-22-11	2107	Maryann M	8-22-11	2107
Relinquished by: (signature)	Date:	Time:	Received by: (signature)	Date:	Time:

Please return cooler/ice chest to Geological Technics Inc.

Rev. 2/2009

Chain of Custody and Cooler Receipt Form for 1113544 Page 2 of 2

BC LABORATORIES INC. SAMPLE RECEIPT FORM Rev. No. 12 06/24/08 Page 1 Of 1

Submission #: 11-13544

SHIPPING INFORMATION
Federal Express ☐ UPS ☐ Hand Delivery ☐
BC Lab Field Service ☑ Other ☐ (Specify)_____

SHIPPING CONTAINER
Ice Chest ☑ None ☐
Box ☐ Other ☐ (Specify)_____

Refrigerant: Ice ☑ Blue Ice ☐ None ☐ Other ☐ Comments:

Custody Seals: Ice Chest ☐ Intact? Yes ☐ No ☐ | Containers ☐ Intact? Yes ☐ No ☐ | None ☑ Comments:

All samples received? Yes ☑ No ☐ All samples containers intact? Yes ☑ No ☐ Description(s) match COC? Yes ☑ No ☐

COC Received ☑YES ☐NO

Emissivity: 0.97 Container: VOA Thermometer ID: 163 Date/Time 8-22-11

Temperature: A 4.3 °C / C 4.3 °C Analyst Init ATM 2107

SAMPLE CONTAINERS	SAMPLE NUMBERS 1	2	3	4	5	6	7	8	9	10
QT GENERAL MINERAL/ GENERAL PHYSICAL										
PT PE UNPRESERVED										
QT INORGANIC CHEMICAL METALS										
PT INORGANIC CHEMICAL METALS										
PT CYANIDE										
PT NITROGEN FORMS										
PT TOTAL SULFIDE										
2oz. NITRATE / NITRITE										
PT TOTAL ORGANIC CARBON										
PT TOX										
PT CHEMICAL OXYGEN DEMAND										
P4A PHENOLICS										
40ml VOA VIAL TRAVEL BLANK										
40ml VOA VIAL	A 4	A 14	A 4	14	( )	( )	( )	( )	( )	( )
QT EPA 413.1, 413.2, 418.1										
PT ODOR										
RADIOLOGICAL										
BACTERIOLOGICAL										
40 ml VOA VIAL- 504										
QT EPA 508/608/8080										
QT EPA 515.1/8150										
QT EPA 525										
QT EPA 525 TRAVEL BLANK										
100ml EPA 547										
100ml EPA 531.1										
QT EPA 548										
QT EPA 549										
QT EPA 632										
QT EPA 8015M										
QT AMBER										
8 OZ. JAR										
32 OZ. JAR										
SOIL SLEEVE										
PCB VIAL										
PLASTIC BAG										
FERROUS IRON										
ENCORE										

Comments:
Sample Numbering Completed By: TMM Date/Time: 8/22/11 2145
A = Actual / C = Corrected

[H:\DOCS\WP\BCLAB_DOCS\FORMS\SAMREC2.WPD]

Geological Technics
1172 Kansas Avenue
Modesto, CA 95354

Reported: 08/29/2011 17:23
Project: Water Samples
Project Number: 1409.2 Springtown Gas
Project Manager: Andrew Dorn

Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information		
1113544-01	**COC Number:**	---	**Receive Date:** 08/22/2011 21:07
	Project Number:	1409.2 Springtown Gas	**Sampling Date:** 08/19/2011 15:10
	Sampling Location:	---	**Sample Depth:** ---
	Sampling Point:	P-1	**Lab Matrix:** Water
	Sampled By:	Andrew Dorn of GTIM	**Sample Type:** Water
			Delivery Work Order:
			Global ID: T06019716197
			Location ID (FieldPoint): P-1
			Matrix: W
			Sample QC Type (SACode): CS
			Cooler ID:
1113544-02	**COC Number:**	---	**Receive Date:** 08/22/2011 21:07
	Project Number:	1409.2 Springtown Gas	**Sampling Date:** 08/19/2011 13:55
	Sampling Location:	---	**Sample Depth:** ---
	Sampling Point:	STMW-1	**Lab Matrix:** Water
	Sampled By:	Andrew Dorn of GTIM	**Sample Type:** Water
			Delivery Work Order:
			Global ID: T06019716197
			Location ID (FieldPoint): STMW-1
			Matrix: W
			Sample QC Type (SACode): CS
			Cooler ID:
1113544-03	**COC Number:**	---	**Receive Date:** 08/22/2011 21:07
	Project Number:	1409.2 Springtown Gas	**Sampling Date:** 08/19/2011 12:45
	Sampling Location:	---	**Sample Depth:** ---
	Sampling Point:	STMW-2	**Lab Matrix:** Water
	Sampled By:	Andrew Dorn of GTIM	**Sample Type:** Water
			Delivery Work Order:
			Global ID: T06019716197
			Location ID (FieldPoint): STMW-2
			Matrix: W
			Sample QC Type (SACode): CS
			Cooler ID:

Geological Technics
1172 Kansas Avenue
Modesto, CA 95354

Reported: 08/29/2011 17:23
Project: Water Samples
Project Number: 1409.2 Springtown Gas
Project Manager: Andrew Dorn

Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information			
1113544-04	**COC Number:**	---	**Receive Date:**	08/22/2011 21:07
	Project Number:	1409.2 Springtown Gas	**Sampling Date:**	08/19/2011 13:15
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	STMW-3	**Lab Matrix:**	Water
	Sampled By:	Andrew Dorn of GTIM	**Sample Type:**	Water
			Delivery Work Order:	
			Global ID: T06019716197	
			Location ID (FieldPoint): STMW-3	
			Matrix: W	
			Sample QC Type (SACode): CS	
			Cooler ID:	

Geological Technics
1172 Kansas Avenue
Modesto, CA 95354

Reported: 08/29/2011 17:23
Project: Water Samples
Project Number: 1409.2 Springtown Gas
Project Manager: Andrew Dorn

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1113544-01 | **Client Sample Name:** 1409.2 Springtown Gas, P-1, 8/19/2011 3:10:00PM, Andrew Dorn

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	ND	ug/L	0.50	0.083	EPA-8260	ND		1
1,2-Dibromoethane	ND	ug/L	0.50	0.16	EPA-8260	ND		1
1,2-Dichloroethane	ND	ug/L	0.50	0.17	EPA-8260	ND		1
Ethylbenzene	ND	ug/L	0.50	0.098	EPA-8260	ND		1
Methyl t-butyl ether	**14**	**ug/L**	**0.50**	**0.11**	**EPA-8260**	ND		1
Toluene	ND	ug/L	0.50	0.093	EPA-8260	ND		1
Total Xylenes	ND	ug/L	1.0	0.36	EPA-8260	ND		1
t-Amyl Methyl ether	ND	ug/L	0.50	0.25	EPA-8260	ND		1
t-Butyl alcohol	ND	ug/L	10	9.4	EPA-8260	ND		1
Diisopropyl ether	ND	ug/L	0.50	0.23	EPA-8260	ND		1
Ethyl t-butyl ether	ND	ug/L	0.50	0.18	EPA-8260	ND		1
Total Purgeable Petroleum Hydrocarbons	**10**	**ug/L**	**50**	**7.2**	**Luft-GC/MS**	ND	J	1
1,2-Dichloroethane-d4 (Surrogate)	109	%	76 - 114 (LCL - UCL)		EPA-8260			1
Toluene-d8 (Surrogate)	98.8	%	88 - 110 (LCL - UCL)		EPA-8260			1
4-Bromofluorobenzene (Surrogate)	92.5	%	86 - 115 (LCL - UCL)		EPA-8260			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8260	08/25/11	08/26/11 20:12	KEA	HPCHEM	1	BUH2044

Geological Technics
1172 Kansas Avenue
Modesto, CA 95354

Reported: 08/29/2011 17:23
Project: Water Samples
Project Number: 1409.2 Springtown Gas
Project Manager: Andrew Dorn

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1113544-02 | **Client Sample Name:** 1409.2 Springtown Gas, STMW-1, 8/19/2011 1:55:00PM, Andrew Dorn

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	ND	ug/L	0.50	0.083	EPA-8260	ND		1
1,2-Dibromoethane	ND	ug/L	0.50	0.16	EPA-8260	ND		1
1,2-Dichloroethane	ND	ug/L	0.50	0.17	EPA-8260	ND		1
Ethylbenzene	ND	ug/L	0.50	0.098	EPA-8260	ND		1
Methyl t-butyl ether	**1.3**	**ug/L**	**0.50**	**0.11**	**EPA-8260**	ND		1
Toluene	ND	ug/L	0.50	0.093	EPA-8260	ND		1
Total Xylenes	ND	ug/L	1.0	0.36	EPA-8260	ND		1
t-Amyl Methyl ether	ND	ug/L	0.50	0.25	EPA-8260	ND		1
t-Butyl alcohol	**290**	**ug/L**	**10**	**9.4**	**EPA-8260**	ND		1
Diisopropyl ether	ND	ug/L	0.50	0.23	EPA-8260	ND		1
Ethyl t-butyl ether	ND	ug/L	0.50	0.18	EPA-8260	ND		1
Total Purgeable Petroleum Hydrocarbons	ND	ug/L	50	7.2	Luft-GC/MS	ND		1
1,2-Dichloroethane-d4 (Surrogate)	105	%	76 - 114 (LCL - UCL)		EPA-8260			1
Toluene-d8 (Surrogate)	100	%	88 - 110 (LCL - UCL)		EPA-8260			1
4-Bromofluorobenzene (Surrogate)	94.1	%	86 - 115 (LCL - UCL)		EPA-8260			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8260	08/25/11	08/26/11 19:49	KEA	HPCHEM	1	BUH2044

Geological Technics
1172 Kansas Avenue
Modesto, CA 95354

Reported: 08/29/2011 17:23
Project: Water Samples
Project Number: 1409.2 Springtown Gas
Project Manager: Andrew Dorn

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1113544-03 | **Client Sample Name:** 1409.2 Springtown Gas, STMW-2, 8/19/2011 12:45:00PM, Andrew Dorn

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	ND	ug/L	0.50	0.083	EPA-8260	ND		1
1,2-Dibromoethane	ND	ug/L	0.50	0.16	EPA-8260	ND		1
1,2-Dichloroethane	ND	ug/L	0.50	0.17	EPA-8260	ND		1
Ethylbenzene	ND	ug/L	0.50	0.098	EPA-8260	ND		1
Methyl t-butyl ether	ND	ug/L	0.50	0.11	EPA-8260	ND		1
Toluene	ND	ug/L	0.50	0.093	EPA-8260	ND		1
Total Xylenes	ND	ug/L	1.0	0.36	EPA-8260	ND		1
t-Amyl Methyl ether	ND	ug/L	0.50	0.25	EPA-8260	ND		1
t-Butyl alcohol	ND	ug/L	10	9.4	EPA-8260	ND		1
Diisopropyl ether	ND	ug/L	0.50	0.23	EPA-8260	ND		1
Ethyl t-butyl ether	ND	ug/L	0.50	0.18	EPA-8260	ND		1
Total Purgeable Petroleum Hydrocarbons	ND	ug/L	50	7.2	Luft-GC/MS	ND		1
1,2-Dichloroethane-d4 (Surrogate)	112	%	76 - 114 (LCL - UCL)		EPA-8260			1
Toluene-d8 (Surrogate)	98.7	%	88 - 110 (LCL - UCL)		EPA-8260			1
4-Bromofluorobenzene (Surrogate)	94.6	%	86 - 115 (LCL - UCL)		EPA-8260			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8260	08/25/11	08/26/11 08:15	KEA	HPCHEM	1	BUH2044

Geological Technics
1172 Kansas Avenue
Modesto, CA 95354

Reported: 08/29/2011 17:23
Project: Water Samples
Project Number: 1409.2 Springtown Gas
Project Manager: Andrew Dorn

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1113544-04 | **Client Sample Name:** 1409.2 Springtown Gas, STMW-3, 8/19/2011 1:15:00PM, Andrew Dorn

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	ND	ug/L	0.50	0.083	EPA-8260	ND		1
1,2-Dibromoethane	ND	ug/L	0.50	0.16	EPA-8260	ND		1
1,2-Dichloroethane	ND	ug/L	0.50	0.17	EPA-8260	ND		1
Ethylbenzene	ND	ug/L	0.50	0.098	EPA-8260	ND		1
Methyl t-butyl ether	ND	ug/L	0.50	0.11	EPA-8260	ND		1
Toluene	ND	ug/L	0.50	0.093	EPA-8260	ND		1
Total Xylenes	ND	ug/L	1.0	0.36	EPA-8260	ND		1
t-Amyl Methyl ether	ND	ug/L	0.50	0.25	EPA-8260	ND		1
t-Butyl alcohol	ND	ug/L	10	9.4	EPA-8260	ND		1
Diisopropyl ether	ND	ug/L	0.50	0.23	EPA-8260	ND		1
Ethyl t-butyl ether	ND	ug/L	0.50	0.18	EPA-8260	ND		1
Total Purgeable Petroleum Hydrocarbons	ND	ug/L	50	7.2	Luft-GC/MS	ND		1
1,2-Dichloroethane-d4 (Surrogate)	108	%	76 - 114 (LCL - UCL)		EPA-8260			1
Toluene-d8 (Surrogate)	98.6	%	88 - 110 (LCL - UCL)		EPA-8260			1
4-Bromofluorobenzene (Surrogate)	95.7	%	86 - 115 (LCL - UCL)		EPA-8260			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8260	08/25/11	08/26/11 07:52	KEA	HPCHEM	1	BUH2044

Geological Technics
1172 Kansas Avenue
Modesto, CA 95354

Reported: 08/29/2011 17:23
Project: Water Samples
Project Number: 1409.2 Springtown Gas
Project Manager: Andrew Dorn

Volatile Organic Analysis (EPA Method 8260)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: BUH2044						
Benzene	BUH2044-BLK1	ND	ug/L	0.50	0.083	
1,2-Dibromoethane	BUH2044-BLK1	ND	ug/L	0.50	0.16	
1,2-Dichloroethane	BUH2044-BLK1	ND	ug/L	0.50	0.17	
Ethylbenzene	BUH2044-BLK1	ND	ug/L	0.50	0.098	
Methyl t-butyl ether	BUH2044-BLK1	ND	ug/L	0.50	0.11	
Toluene	BUH2044-BLK1	ND	ug/L	0.50	0.093	
Total Xylenes	BUH2044-BLK1	ND	ug/L	1.0	0.36	
t-Amyl Methyl ether	BUH2044-BLK1	ND	ug/L	0.50	0.25	
t-Butyl alcohol	BUH2044-BLK1	ND	ug/L	10	9.4	
Diisopropyl ether	BUH2044-BLK1	ND	ug/L	0.50	0.23	
Ethyl t-butyl ether	BUH2044-BLK1	ND	ug/L	0.50	0.18	
Total Purgeable Petroleum Hydrocarbons	BUH2044-BLK1	ND	ug/L	50	7.2	
1,2-Dichloroethane-d4 (Surrogate)	BUH2044-BLK1	108	%	76 - 114 (LCL - UCL)		
Toluene-d8 (Surrogate)	BUH2044-BLK1	97.8	%	88 - 110 (LCL - UCL)		
4-Bromofluorobenzene (Surrogate)	BUH2044-BLK1	95.1	%	86 - 115 (LCL - UCL)		

Geological Technics
1172 Kansas Avenue
Modesto, CA 95354

Reported: 08/29/2011 17:23
Project: Water Samples
Project Number: 1409.2 Springtown Gas
Project Manager: Andrew Dorn

Volatile Organic Analysis (EPA Method 8260)

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: BUH2044										
Benzene	BUH2044-BS1	LCS	26.710	25.000	ug/L	107		70 - 130		
Toluene	BUH2044-BS1	LCS	25.510	25.000	ug/L	102		70 - 130		
1,2-Dichloroethane-d4 (Surrogate)	BUH2044-BS1	LCS	9.8400	10.000	ug/L	98.4		76 - 114		
Toluene-d8 (Surrogate)	BUH2044-BS1	LCS	10.160	10.000	ug/L	102		88 - 110		
4-Bromofluorobenzene (Surrogate)	BUH2044-BS1	LCS	10.630	10.000	ug/L	106		86 - 115		

Geological Technics
1172 Kansas Avenue
Modesto, CA 95354

Reported: 08/29/2011 17:23
Project: Water Samples
Project Number: 1409.2 Springtown Gas
Project Manager: Andrew Dorn

Volatile Organic Analysis (EPA Method 8260)

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: BUH2044	Used client sample: N										
Benzene	MS	1113168-32	ND	25.200	25.000	ug/L		101		70 - 130	
	MSD	1113168-32	ND	24.460	25.000	ug/L	3.0	97.8	20	70 - 130	
Toluene	MS	1113168-32	ND	23.840	25.000	ug/L		95.4		70 - 130	
	MSD	1113168-32	ND	23.850	25.000	ug/L	0.0	95.4	20	70 - 130	
1,2-Dichloroethane-d4 (Surrogate)	MS	1113168-32	ND	10.710	10.000	ug/L		107		76 - 114	
	MSD	1113168-32	ND	11.330	10.000	ug/L	5.6	113		76 - 114	
Toluene-d8 (Surrogate)	MS	1113168-32	ND	10.160	10.000	ug/L		102		88 - 110	
	MSD	1113168-32	ND	9.9800	10.000	ug/L	1.8	99.8		88 - 110	
4-Bromofluorobenzene (Surrogate)	MS	1113168-32	ND	10.140	10.000	ug/L		101		86 - 115	
	MSD	1113168-32	ND	9.8200	10.000	ug/L	3.2	98.2		86 - 115	

Geological Technics
1172 Kansas Avenue
Modesto, CA 95354

Reported: 08/29/2011 17:23
Project: Water Samples
Project Number: 1409.2 Springtown Gas
Project Manager: Andrew Dorn

Notes And Definitions

J	Estimated Value (CLP Flag)
MDL	Method Detection Limit
ND	Analyte Not Detected at or above the reporting limit
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference

Appendix C

Groundwater Monitoring Field Notes

Geological Technics, Inc.

Groundwater Monitoring Field Log

Project Name: Springtown Gas (Blue Bell)

Project No.: 1409.2

Project Location: 909 Bluebell Drive

Livermore, CA

Well I.D.: STMW-1

Date: 8/19/2011

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
13:25	0	20.44	948	7.57	264.6	39.15	Brown, no odor, lots of sediments
13:33	2.25	19.17	1096	7.31	257.1	37.60	Clear, no odor, very few sediments
13:40	4.50	18.99	1318	7.49	254.5	36.19	Clear, no odor, very few sediments
13:50	6.75	19.05	1402	7.43	260.1	34.54	Clear, no odor, very few sediments
13:55							Collected Samples

Purge Method: ☒ Dedicated Waterra ☐ Centrifugal pump with dedicated tubing ☐ Other

Pumping Rate: 0.23 gal/min

Well Constructed TD (ft):	20.00
* Well TD (ft):	19.38
Silt Thickness (ft):	0.62
Initial DTW (ft):	6.35
Water column height (ft):	13.03
One casing volume (gal):	2.22
** Final DTW (ft):	6.61
Casing diameter (in):	2"

Sample Containers used: 4 # VOAs X preserved ____ non-preserved

____ # amber liters ____ preserved ____ non-preserved

____ # polys ____ ____ preserved ____ non-preserved

____ # polys ____ ____ preserved ____ non-preserved

Notes:

Sampled By: A. Dorn

Sample Method: Waterra ☒ Bailer ☐ Other ☐

* = measured ** = @ sampling

Purged Water Drummed: ☒ Yes ☐ No

No. of Drums:

Gallons per foot of casing. 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48

Geological Technics, Inc.

Groundwater Monitoring Field Log

Project Name: Springtown Gas (Blue Bell)

Well I.D.: STMW-2

Project No.: 1409.2

Date: 8/19/2011

Project Location: 909 Bluebell Drive

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
12:00	0	22.55	901	7.81	240.1	24.56	Light brown, no odor, very few sediments
12:20	2.0	19.72	1214	7.34	162.9	37.42	Light brown, no odor, very few sediments
12:30	4.0	18.83	1106	7.66	121.0	32.89	Light brown, no odor, very few sediments
12:40	6.0	18.80	1098	7.64	98.9	32.75	Light brown, no odor, very few sediments
12:45							Collected Samples

Purge Method: ☒ Dedicated Waterra ☐ Centrifugal pump with dedicated tubing ☐ Other

Pumping Rate: 0.13 gal/min

Well Constructed TD (ft):	20.00
* Well TD (ft):	19.76
Silt Thickness (ft):	0.24
Initial DTW (ft):	8.21
Water column height (ft):	11.55
One casing volume (gal):	1.96
** Final DTW (ft):	8.34
Casing diameter (in):	2"

Sample Containers used: 4 # VOAs X preserved ____ non-preserved

____ # amber liters ____ preserved ____ non-preserved

____ # polys ____ ____ preserved ____ non-preserved

____ # polys ____ ____ preserved ____ non-preserved

Notes: No bubbles in flow cell or tubing despite high DO levels

Sampled By: A. Dorn

Sample Method: Waterra ☒ Bailer ☐ Other ☐

* = measured ** = @ sampling

Purged Water Drummed: ☒ Yes ☐ No

No. of Drums: 1

Gallons per foot of casing. 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48

Geological Technics, Inc.

Groundwater Monitoring Field Log

Project Name: Springtown Gas (Blue Bell)

Project No.: 1409.2

Project Location: 909 Bluebell Drive

Livermore, CA

Well I.D.: STMW-3

Date: 8/19/2011

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
12:50	0	18.10	1362	7.02	295.5	53.45	Light brown, no odor, few sediments
12:56	2.0	17.62	1489	6.85	413.7	39.01	Light brown, no odor, few sediments
13:02	4.0	17.47	1457	6.79	410.6	37.97	Light brown, no odor, few sediments
13:10	6.0	17.30	1532	6.74	409.4	40.40	Light brown, no odor, few sediments
13:15							Collected Samples

Purge Method: ☒ Dedicated Waterra ☐ Centrifugal pump with dedicated tubing ☐ Other

Pumping Rate: 0.2 gal/min

Well Constructed TD (ft):	20.00
* Well TD (ft):	19.69
Silt Thickness (ft):	0.31
Initial DTW (ft):	9.30
Water column height (ft):	10.39
One casing volume (gal):	1.77
** Final DTW (ft):	9.71
Casing diameter (in):	2"

Sample Containers used: 4 # VOAs X preserved ____ non-preserved

____ # amber liters ____ preserved ____ non-preserved

____ # polys ____ ____ preserved ____ non-preserved

____ # polys ____ ____ preserved ____ non-preserved

Notes:

Sampled By: A. Dorn Andrew Dorn

Sample Method: Waterra ☒ Bailer ☐ Other ☐

* = measured ** = @ sampling

Purged Water Drummed: ☐ Yes ☐ No

No. of Drums:

Gallons per foot of casing. 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48

Geological Technics, Inc.

Groundwater Monitoring Field Log

Project Name: Springtown Gas (Blue Bell)

Well I.D.: P-1

Project No.: 1409.2

Date: 8/19/2011

Project Location: 909 Bluebell Drive

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
14:00	0	17.27	743	8.00	246.3	38.83	Light brown, very mild odor, very few sediments
14:20	8.0	17.77	749	7.63	201.0	35.74	Light brown, very mild odor, very few sediments
14:45	16.0	17.65	753	7.58	206.5	31.87	Light brown, very mild odor, very few sediments
-	24.0						
15:10							Collected Samples

Purge Method: ☒ Dedicated Waterra ☐ Centrifugal pump with dedicated tubing ☐ Other

Pumping Rate: 0.34 gal/min

Well Constructed TD (ft):	20.00
* Well TD (ft):	19.49
Silt Thickness (ft):	0.51
Initial DTW (ft):	7.21
Water column height (ft):	12.28
One casing volume (gal):	7.98
** Final DTW (ft):	8.01
Casing diameter (in):	4"

Sample Containers used: 4 # VOAs X preserved ____ non-preserved

____ # amber liters ____ preserved ____ non-preserved

____ # polys ____ ____ preserved ____ non-preserved

____ # polys ____ ____ preserved ____ non-preserved

Notes: Well dewatered numerous times-quit purging after 21.5 gallons

Sampled By: A. Dorn

Sample Method: Waterra ☒ Bailer ☐ Other ☐

* = measured ** = @ sampling

Purged Water Drummed: ☐ Yes ☐ No

No. of Drums:

Gallons per foot of casing. 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48