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2004 ANNUAL REPORT

Gold Hill Store Site
3040 Parks Highway
Fairbanks, Alaska
ADEC Facility ID No. 0440
Grant No. 15044032

Submitted to:

Mr. Phil Carboy
P.O. Box 80701
Fairbanks, Alaska 99708

Submitted by:

AMEC Earth & Environmental, Inc.
7376 SW Durham Road
Portland, Oregon 97224

3-024-01110-9

June 2004



June 10, 2004

3-024-01110-9

Mr. Phil Carboy
P.O. Box 80701
Fairbanks, Alaska 99708

Dear Mr. Carboy:

**Re: 2004 Annual Report
Gold Hill Store Site
3040 Parks Highway, Fairbanks, Alaska
ADEC Facility ID No. 0440
Grant No. 15044032**

AMEC Earth & Environmental, Inc. is pleased to submit this 2004 Annual Report for the above site. This report has been prepared to document activities completed between January and June 2004. Activities accomplished include remediation system start up and operation, final groundwater monitoring, domestic water well sampling, decommissioning of inactive remediation wells and water wells, disposal of investigation-derived waste, and a carbon change-out for the drinking water supply treatment system for the Gold Hill Store.

If you have any questions regarding this report, or if you require additional information, please feel free to give us a call at (907) 479-7586.

Sincerely,

AMEC Earth & Environmental, Inc.

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1.0 INTRODUCTION

On behalf of Mr. Phil Carboy, AMEC Earth & Environmental, Inc. (AMEC) has prepared this 2004 Annual Report for the Gold Hill Store site (Site) located at 3040 Parks Highway, Fairbanks, Alaska (Figure 1). The purpose of this report is to present the results of work performed between January and June 2004, as outlined in AMEC's Revised Work Plan (AMEC, 2003a), and including modifications to this work plan as approved by the Alaska Department of Environmental Conservation (ADEC). Work on this Site continues to be performed as part of ADEC's Financial Assistance Program, under Grant No. 15044032. The following activities are discussed in this report:

- Groundwater monitoring and sampling conducted in May 2004.
- Domestic water well sampling conducted in March and May 2004.
- Remediation system start-up and operation.
- Well decommissioning conducted in May and June 2004.
- Change-out of the carbon tanks on the treatment system for well GHW-2.
- Disposal of investigation-derived waste (IDW).

2.0 SITE DESCRIPTION

The Gold Hill Store is located on a 2.3-acre property in the Cripple Creek Drainage Basin, approximately 7.5 miles west of Fairbanks, Alaska (Figure 1). Cripple Creek, a tributary to the Chena River, is located approximately 0.5 miles south of the Site and flows northwesterly between Chena Ridge (south of Cripple Creek) and Ester Dome (North of Cripple Creek and the Site). The George Parks Highway borders the southern boundary of the Site, and parallels Cripple Creek.

A single-story, wood frame liquor/grocery store is located at the western portion of the Site (Figure 2). This building also is used as a residence. A septic system and domestic water supply well service the property. The water supply well (GHW-2) is located beneath the westernmost corner of the building. The septic tank and leach field are buried near the northern property boundary at the base of a 150-foot tall bluff. The building is heated using oil stored in an unregulated heating oil underground storage tank (UST) located along the northwestern side of the store building (AGRA, 1994b).

Surrounding properties are described as:

- The Cornell Corrections Facility, a juvenile residential facility located east of and adjacent to the Site (Tax Lot 931),
- The Blue Loon Saloon located southeast of the Site, across the George Parks Highway,
- The Parks Highway Truck Stop located south of the Site, across the George Parks Highway,
- A 150-foot high bluff to the north, and
- Undeveloped land to the west.

Available public utilities are telephone and electrical service. No public water or sewage utility systems service this area. Water service at the Site is provided by the on-site domestic water supply well GHW-2. Water service at the Cornell Corrections Facility is provided by the Water Wagon, from an off-site source. Septic systems with shallow leach fields collect sanitary sewage at the Site and vicinity.

The Site is developed on top of dredge spoils and mining tailings. Topographic relief across the Site is generally less than 2 feet, although the ground surface becomes progressively more uneven northward toward the base of the bluff at the Site's northern boundary. These uneven areas are vegetated tailings piles. The Site slopes generally to the south. Runoff is directed to a culvert that parallels the north side of the George Parks Highway (Figure 2). The nearest surface waters are Cripple Creek, located 0.5 miles to the south, and several small ponds located within approximately 0.25 miles to the south and west.

The site is identified as Tax Lot 926, Section 9, Township 1 South, Range 2 West, relative to the Fairbanks Meridian, Alaska.

3.0 BACKGROUND

Petroleum hydrocarbons were detected in groundwater during a subsurface assessment in May 1994. The Site's former gasoline USTs were suspected as the source (Figure 2). Mr. Carboy entered into an agreement with ADEC to receive State of Alaska funding to facilitate UST replacement, conduct site cleanup, and assess the potential impact to on-site and adjacent off-site drinking water supplies. Funding was provided to Mr. Carboy under Grant No. 15044021, as approved by ADEC in a letter dated June 28, 1994. Subsequently, the USTs were removed and replaced in summer 1994.

In October 1994, AMEC (formerly AGRA Earth & Environmental, Inc.) submitted a work plan to ADEC to address soil and groundwater contamination. The work plan also recommended application of two remedial technologies: air sparging (AS) and soil vapor extraction (SVE), selected for their potential effectiveness in treating groundwater and soil, respectively. ADEC pursued listing the Site on ADEC's list of contaminated sites and initiated groundwater monitoring and source mitigation as ADEC Facility ID No. 0440.

The 1994 work plan presented target soil and groundwater cleanup levels (ADEC Level A) under Alaska Administrative Code (AAC) Title 18 Chapter 78 and groundwater cleanup levels established by AAC Title 18 Chapter 80. ADEC Level A cleanup standards were assigned to the Site. Periodic (quarterly to annual) groundwater monitoring has been conducted since 1994. A remediation system was installed in 1996 to perform AS of groundwater and SVE of vadose soils. The remediation system operated through November 2002, when system operation was terminated for re-evaluation. The remediation system significantly reduced groundwater contaminant concentrations. Additional details regarding Site environmental history are included in multiple reports submitted to ADEC and are summarized in the 2002 and 2003 Annual Reports (AMEC, 2003b and AMEC, 2004). Existing monitoring wells and remediation points are illustrated on Figure 3 and summarized in Table 1.

4.0 GEOLOGY AND HYDROGEOLOGY

AMEC's understanding of geologic and hydrogeologic conditions at the Site is based on the previous investigations conducted to assess soil and groundwater conditions. This section describes both regional and Site-specific geology and hydrogeology, and integrates them into a Conceptual Hydrological Site Model.

4.1 Regional Geology and Hydrogeology

The major physiographic features of the Fairbanks area include the Tanana River floodplain to the south and the low rolling hills of the Yukon-Tanana Uplands to the north. The floodplain geology consists of inter-bedded and channeled sand, silt, and gravel deposits to approximately 600 feet of depth. The floodplain is generally flat and slopes gently west-northwest at about 5 feet per mile (Glass, 1988). The elevation of the floodplain within the Fairbanks area is approximately 440 feet above mean sea level. The surrounding hills reach elevations of 1,500 feet. The Site is situated near the southern extent of the uplands region at an elevation of approximately 560 feet.

The hills comprising the Yukon-Tanana Uplands consist of bedrock overlain by silt deposits of variable thickness. The bedrock is a folded and fractured metamorphic complex of schist and quartzite. Granitic intrusions into the metamorphic rock form the core of many of the higher hills and domes within the uplands region. The upper slopes of the hills are generally covered by windblown silt deposits. The lower slopes are covered by reworked silt deposits transported downhill by fluvial processes, slumping, and landslides. In general, the thickness of the silt deposits decreases with increasing elevation and may be nearly or entirely absent at the ridges. Permafrost underlies most of the north-facing slopes and valley floors within the uplands region and may also be found on the lower portions of south-facing slopes.

Groundwater in the uplands region is observed within fractures in the tailings material, within interstitial pores of alluvial deposits located in the lower slopes and valley bottoms, and within fractured schist bedrock. Although these aquifers are generally unconfined, permafrost on the lower slopes may locally confine shallow groundwater resulting in artesian conditions (Nelson, 1978). Such conditions may be manifested as springs and perennial streams and, in the winter, the development of overflow ice along the valley floor. The presence of the water table aquifer is evident in the numerous ponds and small lakes located along the valley floor.

4.2 Site Geology and Hydrogeology

A bedrock assemblage of fresh schist that grades into weathered schist underlies the study area. Competent schist bedrock is encountered at approximately 58 feet below ground surface (bgs), based on the well log from WW-2. The top of weathered schist bedrock is evident in shallower monitoring wells (MW-1, MW-4, MW5, MW-6, MW-8, MW-10, MW-11, MW-12, and MW-14) at depths ranging from 13.5 feet bgs (MW-4) to 25 feet bgs (MW-14). Approximately 20 feet of sand and gravel material lie between the weathered schist and the ground surface (AGRA, 1994a). Particle size within the overburden material grades from a silty sand with gravel in the lowest 5 feet to a coarse gravel with sand in the uppermost 5 feet.

As stated above, the Site is developed on top of dredge spoils. These shallow dredge spoils consist of sands and silts with variable gravel content. At present, the dredge spoils have not been split (in a stratigraphic sense) from the gravel-rich native soils. A bluff located at the northern edge of the Site rises approximately 150 feet above the valley floor and exposes loess (windblown glacial sediment).

Groundwater has been identified at the Site in three lithological units: (1) the tailings material, (2) alluvial material, and (3) the underlying schist bedrock. Based on boring logs and observations during drilling, groundwater sampling, and aquifer testing, it is believed that the groundwater in these units is connected. A natural southeasterly

groundwater flow is inferred for the water table aquifer based on the local topography and the assumption that groundwater flows away from the bluff and toward Cripple Creek to the south. The depth to the water table has been measured in monitoring wells screened in both the alluvial and schist water-bearing zones. The similarity of depths to water in the alluvium and bedrock suggests that confining conditions are not present at the Site. A November 2001 groundwater elevation survey indicated that groundwater levels ranged between 6.84 and 17.53 feet bgs, and a March 2000 groundwater elevation survey indicated that groundwater levels ranged between 9.69 and 21.02 feet bgs.

Information about groundwater in the bedrock was obtained from logs of water supply wells installed at the Site and nearby properties. Although the soil immediately above the bedrock is saturated, the samples of bedrock retrieved below this soil are dry to moist. The bedrock typically becomes wetter in the deeper regions of the schist zone.

It is uncertain whether this pattern of wet-dry-wet aquifer zones is due to either perched conditions in the alluvial material, or to fracture distribution and location in the schist. The former case implies that the schist and alluvial water-bearing zones are not hydraulically connected, and the latter case allows for either complete or no hydraulic connection. A pumping test performed in 1995 (AGRA, 1995) with pumping at WW-1 (screened at 170 to 200 feet bgs in the schist zone) produced slight drawdown in monitoring wells screened in the alluvial zone of the aquifer. These test results imply hydraulic connection between the schist and alluvial zones of the aquifer. The local aquifer system is therefore considered to be unconfined and contains three distinct facies: (1) tailings material, (2) alluvial material, and (2) bedrock material.

4.3 Conceptual Hydrogeologic Site Model

Based on the above discussion, groundwater at the Site occurs in one unconfined aquifer consisting of bedrock, alluvium, and tailings zones. All zones appear to be hydraulically connected.

Under normal (i.e., non-pumping) conditions, groundwater flow would be expected to follow topography, resulting in flow to the south and southwest. In addition, groundwater mounding associated with at least one septic system and leach field may impact local groundwater transport, although the presence/absence of this impact has not been investigated.

The tailings and shallow alluvium zones of the aquifer are contaminated by gasoline and its constituents. Groundwater samples from a well screened in the schist zone (WW-1) indicates that petroleum hydrocarbons are present, but at concentrations less than the ADEC groundwater cleanup levels.

Porosity for the material in the alluvial zone of the aquifer, gravels with a sandy to silty matrix, is expected to range between 0.20 and 0.50 (Fetter, pg. 86, 1988). Because the pore spaces between the gravels may be filled with sands and silts, the hydraulic conductivity may be more representative of silts. A pumping test performed in 1995 (AGRA, 1995) estimates a hydraulic conductivity of 0.2 feet/day. A specific yield of 0.01 to 0.25 is reported in the literature (Anderson and Woessner, pg. 43, 1992) for silty to gravelly material.

5.0 GROUNDWATER MONITORING

A final round of groundwater monitoring and sampling was conducted on May 13 and 14, 2004. Review of the October 2003 results and continued discussions with ADEC were the basis for the recommendations for well selection and analytical testing for the May 2004 monitoring event. Based on these discussions and e-mail correspondence with ADEC, an outline of the proposed monitoring plan for the May 2004 monitoring event was approved by ADEC via e-mail dated April 1, 2004.

Based on the review of the October 2003 sampling results, the suite of natural attenuation parameters was expanded for the May 2004 groundwater sampling event to include ferrous iron, nitrogen, orthophosphate, oxidation reduction potential, specific conductivity and dissolved oxygen. In addition, ethylene dibromide (EDB) concentrations were found above the ADEC clean up levels in several wells sampled in October 2003 and prompted expanded testing for EDB in May 2004.

5.1 Relative Well Elevation Survey

Seasonal freeze and thaw can result in frost jacking that causes changes in the elevations of well casings at the Site. Groundwater elevations are measured relative to the tops of well casings; therefore, groundwater elevations are most accurate when calculated using recent well top-of-casing (TOC) survey data. Well survey data for all active wells was collected by AMEC on June 4 and July 11, 2003. Details of the July 2003 TOC survey events are provided in the 2003 Annual Report (AMEC, 2004). An evaluation of the depth to water measurements collected in May 2004, and their corresponding calculated relative water elevations, suggested that significant change in TOC elevations had not occurred over the 2003-2004 winter season. Therefore, a new well elevation survey was not conducted in 2004.

5.2 Groundwater Elevations

Groundwater elevations were measured prior to sampling of each well by measuring the depths to water relative to the TOCs. A water level probe is used to measure the depth to water to the nearest 0.01 foot. Wells were sounded for both depth to water

and depth to bottom. Groundwater elevations were calculated by subtracting the depth to water from the most recent TOC elevations.

Groundwater elevations and depth to water data are presented in Table 2 (2004 Groundwater Elevations and BTEX/GRO Concentrations) and Table 3 (Historical Groundwater Elevations and BTEX/GRO Concentrations). Figure 4 illustrates groundwater elevations for May 13 and 14, 2004.

In May 2004, depths to water ranged from 13.7 feet (MW-18) to 18.3 feet (MW-12), with an apparent groundwater flow direction to the southeast. During the three 2003 events, depths to water ranged from 12.34 feet (MW-18) to 18.58 feet (MW-12). Measurements collected in May 2004 are consistent with previously collected data.

5.3 Groundwater Sampling

Groundwater samples were collected from a total of eleven monitoring points; monitoring wells (MW- 2, MW-12, MW14, MW-16, MW-17, MW-18, MW-19, MW-20), two SVE wells (VE-1, VE-2), and from the on-site domestic drinking water well (GHW-2). Sampling was performed in accordance with the Revised Work Plan (AMEC, 2003a) and final ADEC approved revisions outlined in their email dated April 1, 2004. All samples were submitted to SGS/CT&E Environmental for analytical testing of:

- Gasoline range organics (GRO) using Alaska (AK) Method 101 for all wells
- Benzene, toluene, ethylbenzene, and xylenes (BTEX) using U.S. Environmental Protection Agency (EPA) Method 8021 for all wells except GHW-2
- BTEX using EPA Method 524 for GHW-2 only (pre and post treated)
- Methyl-t-butyl-ether (MTBE) and 1,2-Dichloroethane (EDC) using modified EPA Method 8260 (MW-2, MW-12, MW-16, MW-20, VE-2, GHW-2)
- 1,2-Dibromoethane (EDB) using EPA Method 504 (MW-2, MW-12, MW-16, MW-20, VE-2, GHW-2)
- Total Lead using EPA Method 6010B (MW-2 and MW-20)
- Total iron, and manganese - EPA Method SW 6010B (MW-2, MW-12, MW-14, MW-16, MW-20)
- Nitrate-N and sulfate - EPA Method 300.0 (MW-2, MW-12, MW-14, MW-16, MW-20)
- Methane - Method RSK-175 (MW-2, MW-12, MW-14, MW-16, MW-20)
- Sulfide - EPA Method 376.2 (MW-2, MW-12, MW-14, MW-16, MW-20)
- Total organic carbon - Method 4500(MW-2, MW-12, MW-14, MW-16, MW-20)

- Nitrogen (Ammonia) - EPA method 4500 (MW-2, MW-12, MW-14, MW-16, MW-20)
- Orthophosphate - EPA 365.2 (MW-2, MW-12, MW-14, MW-16, MW-20)
- Gasoline Degrading Bacteria Analysis (MW-14 and MW-16)

In addition to the above analytical test methods, the following field measurements were obtained to provide a greater understanding of natural attenuation processes at the site:

- Ferrous Iron - Hach Colorimetric Field Test Kit (MW-2 and MW-12)
- Oxidation-Reduction Potential - Yellow Springs Instrument (YSI) 556 Field Probe (MW-2, MW-12, MW-14, MW-16, MW-20)
- Specific Conductance - YSI 556 Field Probe (MW-2, MW-12, MW-14, MW-16, MW-20)
- Dissolved Oxygen - YSI 556 Field Probe (MW-2, MW-12, MW-14, MW-16, MW-20)

Laboratory-supplied containers were filled with sample and placed in an iced cooler for transport back to the laboratory under customary chain-of-custody procedures.

Sample collection methods are described in the following sections. Field notes for all sampling events are presented in Appendix A.

5.3.1 Monitoring Well Sampling Method

Groundwater sampling was performed on May 13 and 14, 2004. Groundwater samples were collected from monitoring wells and SVE wells using a peristaltic pump and dedicated tubing. During the May 2004 sampling event, AMEC used a YSI water analyzer during sample collection at selected wells (MW-2, MW-12, MW-14, MW-16, and MW-20) to obtain data in support of a more complete evaluation of natural attenuation processes. Low flow sampling procedures were used to reduce turbidity and to minimize aeration of the groundwater samples. Groundwater samples were collected at each location once field parameters stabilized, as measured with the YSI. Approximately 1 to 2 gallons of water was purged from each well sampled using the YSI.

At MW-17, MW-18, MW-19, VE-1, and VE-2, AMEC used it's standard sampling procedure for this site, employing a peristaltic pump to purge the tubing for at least 30 seconds before samples were collected. Low flow sampling procedures also were used at these wells.

All purge water that was generated was drummed and stored on site. Drummed waste was picked up for transport and disposal by OIT, Inc. on May 28, 2004. A copy of the

treatment certificate was not available at the time this report was prepared. A copy of the treatment certificate will be provided under separate cover once received from OIT, Inc.

5.3.2 Drinking Water Well Sampling Method

GHW-2 supplies potable water to the Gold Hill Store. The same pre-filtration and post-filtration sampling points were used for both the March 18, 2003 and May 14, 2004 sample collections. The pre-treatment samples were collected directly from the tap upstream of the treatment system at the wellhead in the Carboy residence. The tap was opened for approximately 10 seconds prior to sample collection. The post-treatment samples were collected directly from the liquor store bathroom sink tap. Treated water was allowed to run for 5 to 10 minutes prior to sample collection.

5.4 Groundwater Analytical Results - May 2004

On May 13 and 14, 2004, AMEC collected groundwater samples from eight monitoring wells, two SVE wells, and one drinking water well (MW- 2, MW-12, MW14, MW-16, MW-17, MW-18, MW-19, MW-20, VE-1, VE-2, and GHW-2). Analytical results for the May 2004 sampling events are discussed in the following sections, and presented on Figure 5 and in Tables 2 through 6. Laboratory analytical reports and chain-of-custody documentation for the May 2004 sampling event are presented in Appendix B.

5.4.1 Groundwater Contaminants

Groundwater contaminants at the site consist of petroleum hydrocarbons, volatile and semi-volatile organic compounds, and total lead. At MW-2, benzene, MTBE, EDB, EDC were detected in groundwater at concentrations of 160 micrograms per liter ($\mu\text{g/L}$), 0.00538 milligrams per liter (mg/L), 0.00095 mg/L , 0.0858 mg/L , respectively. Total lead was not detected above the elevated Practical Quantitation Limit (PQL) of 50 $\mu\text{g/L}$, but the reporting limit exceeds ADEC groundwater cleanup levels. Benzene, MTBE, EDB, and EDC exceeded the ADEC groundwater cleanup levels. Other analytes were not detected in groundwater above reported PQLs.

At MW-12, MTBE, EDB, EDC were detected in groundwater at concentrations of 0.0109 mg/L , 0.00235 mg/L , 0.026 mg/L , respectively. MTBE, EDB, and EDC exceed the ADEC groundwater cleanup levels. Other analytes were not detected in groundwater above reported PQLs.

At MW-16, GRO, and BTEX were detected in groundwater at concentrations of 8.49 mg/L , 930 $\mu\text{g/L}$, 1,070 $\mu\text{g/L}$, 283 $\mu\text{g/L}$, 1,556 $\mu\text{g/L}$, respectively. MTBE, EDB, and EDC were detected in groundwater at concentrations of 0.128 mg/L , 0.0177 mg/L , and

0.195 mg/L, respectively. GRO, benzene, toluene, MTBE, EDB, and EDC concentrations exceed ADEC groundwater cleanup levels. Other analytes were not detected in groundwater above reported PQLs.

At MW-17, GRO and benzene were detected in groundwater at concentrations of 1.48 mg/L and 637 µg/L, respectively. GRO and benzene concentrations exceed ADEC groundwater cleanup levels. Other analytes were not detected in groundwater above reported PQLs.

At MW-20, GRO, BTEX, EDB, EDC, and total lead were detected in groundwater at concentrations of 15.7 mg/L, 4,360 µg/L, 2,180 µg/L, 410 µg/L, 1,002 µg/L, 0.0114 mg/L, 0.092 mg/L, and 0.0969 mg/L, respectively. GRO, benzene, toluene, EDB, EDC, and total lead concentrations exceed ADEC groundwater cleanup levels. MTBE was not detected above the elevated PQL of 50 µg/L, but the reporting limit exceeds ADEC groundwater cleanup levels. Other analytes were not detected in groundwater above reported PQLs.

At GHW-2, benzene was detected in groundwater (from the pre-treatment sample location) at a concentration of 0.5 µg/L. Benzene did not exceed the ADEC groundwater cleanup level. Other analytes were not detected in groundwater above reported PQLs.

At VE-2, MTBE, EDB, and EDC were detected in groundwater at concentrations of 0.0481 mg/L, 0.00208 mg/L, and 0.00394 mg/L, respectively. MTBE and EDB exceeded ADEC groundwater cleanup levels. Other analytes were not detected in groundwater above reported PQLs.

At MW-14, MW-18, MW-19, and VE-1, groundwater analytes were not detected above reported PQLs.

Analytical results are presented in Table 2 (2004 Groundwater Elevations and BTEX/GRO Concentrations), Table 3 (Historical Groundwater Elevations and BTEX/GRO Concentrations), and Table 4 (Groundwater VOC, SVOC, and Total Lead Concentrations). Analytical results are illustrated on Figure 5.

5.4.2 Natural Attenuation Parameters

At MW-2, sulfate, nitrate-N, methane, total iron, total manganese, and total organic carbon were detected in groundwater at concentrations of 26.6 mg/L, 0.347 mg/L, 0.005 mg/L, 0.832 mg/L, 0.029 mg/L, and 2.45 mg/L. Other natural attenuation parameters were not detected above reported PQL.



At MW-12, sulfate, nitrate-N, total iron, total manganese, and total organic carbon were detected in groundwater at concentrations of 28.3 mg/L, 3.71 mg/L, 11.7 mg/L, 0.07 mg/L, and 2.52 mg/L. Other natural attenuation parameters were not detected above reported PQL.

At MW-14, sulfate, nitrate-N, and total organic carbon were detected in groundwater at concentrations of 37.8 mg/L, 15.8 mg/L, and 3.49 mg/L. Other natural attenuation parameters were not detected above reported PQL.

At MW-16, sulfate, total iron, total manganese, and total organic carbon were detected in groundwater at concentrations of 33.3 mg/L, 12.0 mg/L, 0.8 mg/L, and 7.31 mg/L. Other natural attenuation parameters were not detected above reported PQL.

At MW-20, sulfate, total iron, total manganese, and total organic carbon were detected in groundwater at concentrations of 41.2 mg/L, 3.06 mg/L, 2.46 mg/L, and 10.8 mg/L. Other natural attenuation parameters were not detected above reported PQL.

Analytical results are presented in Table 5 (Groundwater Natural Attenuation Parameters - Laboratory Measurements). Other natural attenuation parameters as measured in the field are presented in Table 6 (Groundwater Natural Attenuation Parameters - Field Measurements).

5.5 Contaminant Trends

Based on the data collected in 2004, the extent of impacted groundwater is still reasonably well defined by monitoring wells MW-2, MW-12, MW-14, and MW-19, remediation wells VE-1 and VE-2, and drinking water well GHW-2. Of these locations, MW-2 is the only one at which petroleum hydrocarbons exceeded ADEC groundwater cleanup levels in May 2004. Benzene was detected at a concentration of 160 µg/L at MW-2, but no other constituents exceeded ADEC groundwater cleanup levels. Historic data from this sampling point suggests seasonal detections of benzene during spring or early summer sampling events. No benzene was detected at MW-2 in October 2003; and historic detections of benzene during the late summer, fall or winter only exceeded ADEC groundwater cleanup levels once, in December 1995.

Monitoring points located within the area of impacted groundwater include MW-16, MW-17, and MW-20. BTEX and GRO concentrations increased significantly at MW-20, relative to 2003 analytical results. BTEX and GRO concentrations were significantly reduced at MW-16, likely due to operation of the upgraded remediation system (a pair of AS/SVE points (AS-2X/VE-2X) is located near MW-16). Benzene and GRO concentrations also decreased at MW-17.

Analysis for other petroleum constituents was also completed in May 2004, and included an expanded set of monitoring points (MW-2, MW-12, MW-16, MW-20, VE-2, and GHW-2) to document the extent of MTBE, EDB, EDC, and total lead present within the area of impacted groundwater. MTBE was detected at concentrations exceeding its EPA PRG at all monitoring points except GHW-2, where no MTBE was detected (no ADEC groundwater cleanup level has been established for MTBE). EDB was detected at concentrations exceeding its ADEC groundwater cleanup level at all monitoring points except GHW-2, where no EDB was detected. EDC was detected at concentrations exceeding its ADEC groundwater cleanup level at all monitoring points except VE-2 (0.00394 mg/L) and GHW-2 (not detected). Total lead was detected only at MW-2 and MW-20, and exceeded its ADEC groundwater cleanup level at both locations.

As discussed in the 2003 Annual Report (AMEC, 2004), the presence of EDB, EDC, and total lead indicate a release of leaded gasoline, which was phased out of use during the 1980s. Likewise, the presence of MTBE can be indicative of an older release as it was commonly used as an octane booster beginning in the 1970s. These lines of evidence are consistent with information provided by Mr. Carboy, who has stated the release occurred in 1978 (based on an interview with a former employee), prior to his ownership of the site. Reportedly, a 4,000-gallon gasoline UST was overfilled.

5.6 Natural Attenuation Evaluation

A broad suite of natural attenuation parameters were measured as part of the May 2004 sampling event. Previous natural attenuation data were collected from two monitoring wells, MW-2 and MW-20, in October 2003.

Several factors may have an influence on the natural attenuation occurring at the site. Groundwater flow direction is most likely to the south/southeast. The septic leach field for the Gold Hill Store is located upgradient (north) of the area of impacted groundwater, between it and the bluff. The septic leachfield has the potential to influence groundwater chemistry. The AS/SVE system was turned on May 6, 2004, and shut off on May 12, and certainly influenced groundwater chemistry. AMEC's assessment of the natural attenuation parameters collected in May 2004 is summarized below:

- Field parameters - Dissolved oxygen (DO) measurements indicated the highest relative percent DO at MW-16 and MW-20, in the vicinity of the air sparging treatment system. Lower DO measurements were recorded at locations cross- and downgradient. Oxygen reduction potential (ORP) measurements across the site all were positive (ranging from 37 to 67 millivolts [mV]). Temperature and pH

readings did not vary significantly across the site, and conductivity was relatively uniform with one exception, a relatively high reading of 3.2 (millisiemens [mS]) at MW-12.

- **Electron Acceptors and Reduced Products** - As noted, DO was elevated in the area of the treatment system. Nitrate was elevated in concentration at locations along the eastern edge of the site (MW-14 and MW-12), and depleted within the plume area. Total iron was elevated at three locations (MW-12, MW-16, and MW-20). Ferrous iron was not detected at the two locations tested (MW-2 and MW-12). Sulfate concentrations were elevated across the plume area, and sulfide was not detected. Manganese ranged from 0.03 to 2.46 mg/L, with the highest readings recorded near the plume center at MW-16 and MW-20 (0.8 and 2.46 mg/L, respectively). Methane was detected at only one downgradient monitoring well, MW-2 (0.005 mg/L).
- **Nutrients and Bacteria** - Relatively uniform total organic carbon concentrations were measured across the site (ranging from 2.45 to 10.8 mg/L), with the highest readings at wells with the highest constituents of concern (COC) concentrations (MW-16 and MW-20). The trace nutrients ammonia and orthophosphate were not detected in any of the five wells sampled. Gasoline-degrading bacteria were detected at substantial numbers at the two wells sampled (MW-14 and MW-16). The number of viable bacteria was two orders of magnitude higher at MW-16 (near the heart of the plume) than at MW-14 (located crossgradient to the plume), suggesting that gasoline-degrading bacteria are more active within the plume.

The depletion of nitrate within the plume area suggests that petroleum biodegradation may have occurred there, as petroleum biodegradation often relies on nitrate as an electron acceptor in the absence of oxygen. The presence of elevated total iron without the presence of ferrous iron suggests that anaerobic processes may have leached iron from soil in the past and that the start of air sparging may have oxidized the dissolved iron to ferric or other non-ferrous forms. The presence of substantial numbers of gasoline-degrading bacteria within the plume suggests that bioremediation is a strong possibility. The lack of nutrient nitrogen (ammonia) and phosphorus (orthophosphate) indicates that nutrient addition might favorably stimulate biodegradation either with or without the operation of the air sparging system.

6.0 DRINKING WATER TREATMENT SYSTEM

In December 2003, a drinking water treatment system was designed and installed at GHW-2, the primary drinking water well for the Gold Hill Store. The treatment system was installed to address the detection of benzene at a concentration of 3.35 µg/L at this well in June 2003. The treatment system was approved by a qualified engineer,

Mr. Robert Tilly, and was installed by a local water supply company, Culligan (doing business as Alaska Water Systems [AWS]). The design and installation are in accordance with ADEC regulations (18 AAC 80) for a Class C public water system. The report from Mr. Tilly documenting the water treatment system installation is presented in Appendix C. Additional details regarding the water treatment system and its requirements are presented in the 2003 Annual Report (AMEC, 2004).

6.1 Water Supply Testing and Monitoring

Mr. Tilly recommended testing the water for the first time after installation at approximately 3 months, with a second sampling event at 6 months after installation. The analytical results from these tests, used in conjunction with the flow recorded by the Blue White water meter, will allow for estimation of the appropriate timing for carbon changeout. Based on the water flow and the June 2003 benzene concentration, Mr. Tilly estimated that carbon changeout would likely need to occur every 12 to 18 months.

AMEC collected water samples on March 18 and May 14, 2004, to evaluate petroleum hydrocarbon concentrations in the untreated pre-filtration water and to evaluate the effectiveness of the carbon filtration in the treated post-filtration tap water.

In March, water samples (both pre-treatment and post-treatment) were tested for volatile organic compounds (VOCs) using EPA Method 524.2, EDB using EPA Method 504, and GRO using AK Method 101. This analytical suite was based on discussions and concurrence by ADEC via e-mail dated March 10, 2004. Benzene was detected at 0.99 µg/L in the pre-treatment water sample. No other constituents were detected above PQLs in the pre-treatment water sample. No constituents were detected in the post-treatment water sample. The laboratory analytical report and chain-of-custody documentation for the March 2004 sampling event is presented in Appendix D.

In May, water samples (both pre-treatment and post-treatment) were tested for BTEX, MTBE, and EDC using EPA Method 524.2, EDB using EPA Method 504, and GRO using AK Method 101. This analytical suite was based on discussions and concurrence by ADEC via e-mail dated April 1, 2004. Benzene was detected at 0.5 µg/L in the pre-treatment water sample. No other constituents were detected above PQLs in the pre-treatment water sample. No constituents were detected in the post-treatment water sample. The analytical data from the May 2004 sampling event is included with the groundwater sampling data presented in Appendix B.

The water meter recorded water usage of 6,049 gallons as of May 27, 2004. This volume results in an approximate daily use of 50 gallons between February 4, 2004 (time of water meter installation) and May 27, 2004.

6.2 Carbon Changeout

One carbon changeout was performed during the grant program, to minimize the future costs to the property owner. Carbon changeout occurred on May 27, 2004, and consisted of disconnecting each carbon canister, removing the used carbon into containers (for transport to the local landfill), placing new carbon in each canister, and re-installing each canister. The system was flushed for 10 minutes after carbon replacement.

6.3 Post-Grant Water Treatment System Operation and Maintenance

AMEC discussed the operation and monitoring of the water treatment system with Mr. Carboy prior to installation of the water treatment system in late 2003. The discussion covered the timing of carbon changeouts (anticipated at 1-3 years, depending upon water usage and benzene concentrations, as recommended by Mr. Tilly), periodic water testing for petroleum hydrocarbons (see Section 9.3 below for analytical methods and frequency), and the need for Mr. Carboy to assume responsibility for system operation and water testing once the ADEC grant program ended in June 2004. System operation will require the following:

- Monitor the water meter for usage to anticipate timing for carbon changeout.
- Collection and analysis of water samples.
- Reporting to ADEC the results of water testing.
- Requests for carbon changeout based on analytical tests or water meter usage.

Mr. Carboy understood he would need to maintain the water treatment system after the end of the grant program.

7.0 CONCEPTUAL SITE MODEL

A conceptual site model (CSM) predicts potential exposure routes and potential receptors based upon knowledge of site contaminants, site history, site geology and hydrogeology, and site land use. AMEC has developed a CSM for the site in accordance with ADEC's Risk Assessment Procedures Manual (ADEC 2000), and it is presented in the sections below.

7.1 Nature and Extent of Contamination

Site-related constituents of interest (COIs) are GROs, and BTEX in subsurface soils and groundwater. Overfilling of a former 4,000 gallon UST is the potential source of the petroleum-related chemicals in subsurface soils and groundwater. Subsurface

contamination in soils does not appear to extend significantly off-site (see Section 9.1 below for more details). Impacted groundwater may extend slightly off-site from the Gold Hill Store property onto commercial property to the east that is currently owned by Mr. Gary Shirle, and supports the Cornell Corrections facility. Surface soils are not impacted at the source area.

7.2 Land Uses and Groundwater Consideration

The land use at the Site and near vicinity is primarily commercial and anticipated to continue to be commercial in the future. Exceptions to this include the Gold Hill Store, which has an attached apartment, and the adjacent Cornell Correction facility to the east that houses juveniles (Tax Lot 931). No vegetable gardens are grown on the site and adjacent properties, and there is no subsistence fishing or hunting at the site.

Groundwater is at approximately 10 to 20 feet bgs. Groundwater flows in a southerly to southeasterly direction. Groundwater underlying the site is used as the potable water source for the Gold Hill Store. Under Alaska Administrative Code 70.050(2), groundwater is to be protected for use as a water supply. Two water wells are located on the site. One well (GHW-1) was taken out of use due to poor water quality and low water volume. The active drinking water well (GHW-2) has recently been documented to contain low concentrations of benzene, less than the ADEC groundwater cleanup levels. As a precaution, ADEC requested that a water treatment system be installed (AMEC, 2003b) to remove benzene from this Class C drinking water well. In addition, three water wells (WW-1, WW-2, and a "Former Water Well") are located at the adjacent Cornell Corrections facility, and all three have been impacted by petroleum hydrocarbons. Potable water for this facility is provided by the Water Wagon, which obtains water through College Utilities, who in turn obtains water from Golden Heart Utilities. The closest surface water body to the Site is Cripple Creek, located approximately 0.5 miles to the south. Groundwater contamination from the Site has not migrated to this surface water body nor is it anticipated to in the future.

7.3 Exposure Routes

Two types of exposure routes are generally considered in human health risk assessments (HHRAs): (1) direct, and (2) indirect. A direct exposure route is complete when a receptor comes into direct contact with the impacted medium (e.g., dermal exposure or ingestion). An indirect exposure occurs when the constituents of potential concern (COPC) are transferred from the originally impacted medium (e.g., soil) to another medium (e.g., air) and subsequently to a human receptor. Identification of complete exposure routes in each medium for each receptor is discussed separately below and presented in Figure 6.

Ingestion of and dermal contact with groundwater from supply wells is a potentially direct complete exposure route for a current/future resident, current/future indoor worker, and site visitor. Dermal contact with groundwater is potentially a complete exposure route for an excavation worker. Inhalation of vapors migrating from subsurface soil and groundwater through the vadose zone into indoor air is a potentially complete route for a current/future resident, current/future indoor worker, and current/future site visitor. Inhalation of vapors migrating from subsurface soil and groundwater through the vadose zone to outdoor air is a potentially complete route for a current/future outdoor worker, current/future site visitor, and excavation worker.

Since groundwater may be encountered at less than 15 feet bgs, direct contact with groundwater is a potential exposure pathway to excavation workers. This exposure pathway includes inhalation of vapors from, and dermal contact with, groundwater in an excavation. Excavation workers would also potentially be exposed to dermal absorption and ingestion of soil contaminants.

7.4 Evaluation of Exposure Routes

In accordance with ADEC risk assessment guidelines (ADEC, 2000), AMEC evaluated the nature and extent of contamination, land uses and groundwater considerations, and exposure routes and receptors to develop a CSM for the Gold Hill Store Site. Land use is considered commercial and groundwater is potable. The active on-site drinking water well has been fitted with a water treatment system to mitigate benzene in groundwater, and downgradient drinking water wells at the Cornell Correction facility have been decommissioned (see Section 9.4.2 below for more information). Future hypothetical residents, current/future indoor and outdoor workers, current/future site visitors, and future hypothetical excavation workers may potentially be exposed to volatile petroleum-related COIs in subsurface soil and groundwater. However, ongoing assessment and remediation activities suggest that exposure through many routes is not likely, as discussed for the following pathways:

- Ingestion of and dermal contact with groundwater - Though the active on-site water well (GHW-2) has recently contained benzene, it has not been detected at concentrations exceeding ADEC groundwater cleanup levels. Furthermore, the water treatment system installed at GHW-2 is designed to remove benzene from the water supply. The out-of-use, on-site water well (GHW-1) is not plumbed for use, nor is it readily accessible. The three water wells at the adjacent Cornell Corrections facility (WW-1, WW-2, "Former Water Well") have all been decommissioned. Therefore, exposure through this pathway is not anticipated.
- Inhalation of vapors migrating to indoor air - Both soil and groundwater impact originated east (downgradient) of the Gold Hill Store building. Most of the

impacted soil has been excavated, and the groundwater impact has migrated even further to the east and southeast away from the building. Therefore, exposure through this pathway is not anticipated.

- Inhalation of vapors migrating to outdoor air - Groundwater impact has migrated below a graveled area of the site, but worker and visitor activity would most likely occur in the parts of the site that are capped with asphalt and concrete. In addition, petroleum hydrocarbon impacts remaining in soil occur primarily at the soil-water interface, which occurs at some distance from the surface at 10 to 20 feet bgs. Therefore, unacceptable exposure from inhalation of vapors migrating to outdoor air is not anticipated.
- Direct contact with groundwater for excavation workers - This exposure pathway would only be complete if construction or utility work were to be performed within the area of impacted groundwater, which is primarily limited to property owned by Mr. Carboy. A small area of impacted groundwater may be present east of the Gold Hill Store site on the adjacent Cornell Corrections facility property.

8.0 REMEDIATION SYSTEM OPERATION AND MAINTENANCE

The remediation system was designed and installed to address gasoline-impacted groundwater and soil. The system consists of two interrelated components: a groundwater AS system, and an SVE system. An equipment shed that houses the mechanical portion of the system is located east of the Gold Hill Store (Figure 3).

Modifications were made to the existing remediation system during the 2003 field season. A new AS/SVE system and updated remote sensing equipment was added to refocus the remediation effort. AMEC's 2003 Annual Report (AMEC, 2004) documents the details of this remediation system upgrade effort, and was submitted to ADEC in March 2004.

The upgraded remediation system was operated for a short period in the fall of 2003 before being shut down for the winter season. The following system start-up activities were performed by AMEC in spring 2004, resulting in system start-up on May 6, 2004.

8.1 Remediation System Start-Up Activities

The following tasks were performed to replace inoperable equipment, calibrate data collection equipment, and test for favorable (thawed) sub-surface operating conditions:

- Two blowers were replaced. Blower #1 (SVE New system, Gast model R6130Q-50) failed at the end of the remediation period in 2003. Blower #2 (SVE Old system, Gast model R6130Q-50) was inoperable during remediation and testing in

2003. A new comparable replacement for Blower #1 (Gast model R5121-2), and a used comparable replacement for Blower #2 (Reliance, 2.5 HP) were installed on April 20-23, 2004. Electrical installation was performed by Fulford Electric and mechanical installation was performed by AMEC.

- An electrical fuse in the blower control panel was replaced. Blower #1 apparently generated high electrical loads during failure that resulted in a blown fuse at the electrical panel. The fuse was replaced after installation of the replacement blower was completed.
- Sensaphone system components were calibrated. The remote monitoring equipment requires calibration to ensure collection of accurate data. The remote readings were compared with direct on-site readings and electronically adjusted to correlate.
- Water was removed from knockout tank #1 (new system). Water (approximately 15 gallons) was generated and collected in knockout tank #1 during the remediation and testing in 2003. The water was transferred from the knockout tank to a 55-gallon drum and stored on-site. Evergreen Spill Solutions transported the drum to OIT, Inc. for thermal treatment on May 28, 2004. A copy of the treatment certificate was not available at the time this report was prepared. A copy of the treatment certificate will be provided under separate cover upon receipt from OIT, Inc.
- Well water condition (frozen or thawed) was checked. MW-16 was probed to check for ice on April 23, 2004. The groundwater in the well was not frozen.
- All system components were tested. The system was turned on and allowed to run for short periods on April 23, 2004 to ensure that all components were operational and to allow time to calibrate the remote sensing equipment. The system was not allowed to continue running after the test because the pressure and vacuum readings indicated that ice blockage was potentially restricting air flow through the system lines. Blocked lines can overwork the blower motors and cause pre-mature failures.

8.2 Remediation System Operation and Maintenance

The AS/SVE system at Gold Hill began operating on May 6, 2004, and has been operated continuously except for a brief period during the May 2004 groundwater sampling event. AMEC maintains and monitors the system during operation by completing the following tasks.

- Monitor system remotely several times a week.
- Change hydrophobic filter on photo-ionization detector (PID) when needed.

- Visit system weekly.
- Empty the knockout when needed.

Figure 7 presents a summary of the PID readings and removal calculations from May 6 through June 4, 2004. PID readings have ranged from a low of 8.8 parts per million (ppm) on May 16 to a high of 101.2 ppm on May 8. On two occasions, the PID recorded negative values that are associated with electrical power outage to the remediation system. The first outage occurred on the first day of operation during system start-up. The second outage occurred during remediation well decommissioning activities when the power was shut-off for safety reasons. Lower PID readings were recorded on May 13 and 14, during which time the remediation system was turned off to allow for the May 2004 groundwater sampling event to occur. The remediation system was turned back on the afternoon of May 17.

The daily rate of hydrocarbon removal ranged from approximately 0.5 to 3.5 pounds during period from May 6 through June 4, 2004. The total hydrocarbon removal for this period of operation is calculated to be 55 pounds.

9.0 CLOSURE ACTIVITIES AND EXIT STRATEGY

The exit strategy envisioned for this site consists of a variety of activities, all designed to move the site closer to a "No Further Remedial Action Planned" (NFRAP) finding. A summary of these activities and how they will support a future NFRAP finding by ADEC is presented in the following sections.

9.1 Extent of Soil Impact

Assessment of petroleum hydrocarbon impact to soil was completed in 1994 and 1995 during two release investigations and removal of the former USTs (AMEC 1994a, 1994c, and 1995). The results of analytical testing of soil samples from these explorations is summarized below:

- Piping and Pump Island Trenches - Soil analytical results collected from piping and pump island trenches during UST removal indicate no concentrations of BTEX or GRO above ADEC Method 2 Soil Cleanup Levels.
- UST Cavity Sidewalls - Surficial soil along the sidewalls at the UST cavity did not contain BTEX or GRO above ADEC Method 2 Soil Cleanup Levels. However, soils near the soil-water interface on all sidewalls contained benzene and GRO exceeding ADEC Method 2 Soil Cleanup Levels. The maximum concentrations of benzene (36 milligrams per kilogram [mg/kg]) and GRO (6,400 mg/kg) were

reported for the sample collected at the lower southeast corner of the UST cavity (GHSW-18).

- UST Cavity Floor - Soil samples were collected in pairs under each of the three USTs that were removed. Analytical results indicate soil impact remains in the western side of the cavity associated with the former western-most 4,000-gallon UST, where benzene was detected at 10 mg/kg (GHE-1) and GRO was detected at 520 mg/kg to 4,200 mg/kg (GHE-2 and GHE-1, respectively).
- Other Soil Impacts - No soil impacts were identified to the south, west, or north of the Gold Hill Store building. Soil impacts east and southeast of the store building appear to be associated with the soil-water interface. Concentrations of benzene and GRO have been documented to exceed ADEC Method 2 Soil Cleanup Levels out toward the eastern property boundary (at MW-1 and MW-2), and up to approximately 40 feet south of the former USTs (at B-14).

Based on this information, the extent of soil impact, both vertically and laterally has generally been defined, and does not extend significantly off-site to the east.

9.2 Continued SVE System Operation

Per prior agreement with ADEC, AMEC shall continue to operate and monitor the AS/SVE system beginning on June 12, 2004, for approximately 8 weeks (ending on August 6, 2004) at no additional cost to ADEC or the property owner. The system may be shut down for short periods for any required maintenance or justified need (e.g., groundwater sampling).

9.3 Long Term Monitoring

Because groundwater impact above ADEC Groundwater Cleanup Levels remains on-site, ADEC will require some level of ongoing groundwater monitoring to confirm there are no changes to their understanding of the extent of groundwater impact. Therefore, AMEC has developed a list of monitoring points for consideration as part of a long-term monitoring plan, to support ADEC's ability to issue a finding of NFRAP for this site.

The following monitoring points are proposed: MW-2, MW-16, MW-20, GHW-2, MW-12, and VE-2. These monitoring points provide the best locations at which to document trends and evaluate the extent of groundwater impact. Analytical testing should include:

- GRO/BTEX using AK Method 101/8021 at all wells, except GHW-2
- BTEX using EPA Method 524.2 at GHW-2

- EDB using EPA Method 504 at GHW-2
- MTBE and EDC using EPA Method 8260 at GHW-2

Monitoring should occur annually in the early summer months for a period of two years. Monitoring should occur annually thereafter only for GHW-2 to confirm that exposure through ingestion of groundwater does not occur. Monitoring at other wells should be reduced to bi-annual or less frequent, assuming plume stability is documented. Analytical reports should be submitted to ADEC annually, documenting regular monitoring activities.

9.4 Well Decommissioning

AMEC decommissioned a total of six wells in 2004. All well decommissioning activities were performed by Homestead Drilling with oversight provided by AMEC. All wells were decommissioned in accordance with ADEC guidelines for well decommissioning, and as approved by ADEC via e-mail on March 25, 2004 and May 26, 2004. Details of the well decommissioning activities are provided in the following subsections.

9.4.1 Air Sparging and Vapor Extraction Well Decommissioning

A total of three air sparging wells (AS-3, AS-6, AS-7) and one vapor extraction well (VE-3), were abandoned on May 14, 2004. The 2-inch PVC wells were decommissioned by overdrilling, removing the well casings and surface features (i.e., well monuments), and backfilling the borings with bentonite. The ground surface was covered with native materials (gravel) at AS-6, AS-7, and VE-3. The surface at AS-3 was finished in concrete to match the surrounding concrete slab near the pump islands. Well casings and associated debris were disposed of as municipal waste by Homestead Drilling. Well decommissioning activities occurred concurrent with the May 2004 sampling event, and the notes documenting decommissioning activities can be found in Appendix E.

9.4.2 Water Well Decommissioning

A total of three unused drinking water wells remain at the site (GHW-1) and the adjacent Cornell Corrections Facility to the east (WW-2 and "Former Water Well"). Decommissioning of all three wells was approved by ADEC (via e-mail on March 25, 2004) as part of the last budget amendment, to eliminate potential future exposure points to impacted groundwater. ADEC (Division of Environmental Health) approved the decommissioning methods for WW-2 and the "Former Water Well" via e-mail on May 26, 2004. However, access to GHW-1 proved to be extremely difficult (located in a crawl space for which the only access exists under a large kitchen appliance).

Resolution on the method required by ADEC (Division of Environmental Health) for GHW-1 decommissioning was not reached until June 3, 2004; too near to the end of the grant period to complete the work, given the difficult access to the well.

The methods for decommissioning each of these wells are based on the requirements of 18 AAC 80.010(b) and Section 4.10 of the American Water Works Association (AWWA) standard for Water Wells (A100-97). AMEC obtained permission from the adjacent property owner, Mr. Gary Shirle, to perform the decommissioning activities approved by ADEC. Water well decommissioning at the Cornell site was performed on June 4, 2004. A summary of the decommissioning activities is presented in the sections the follow. Field notes documenting water well decommissioning activities are presented in Appendix E.

WW-2 (NW of the Cornell Corrections Facility Building)

This well was a 4-inch diameter, PVC well installed to a total depth of 80 feet bgs. This well was decommissioned by filling the well with a bentonite grout slurry from the bottom of the well to approximately 5 feet bgs, using a tremmie pipe. Casing removal was not performed due to the total depth (80 feet). Bentonite chips were placed on top of the bentonite grout from 5 to 2 feet bgs, to absorb water brought up with the grout. The surface well completion (steel casing) was cut at the ground surface, and the open hole was filled with soil and gravel from 2 feet bgs to the surface.

"Former Water Well" (SW Corner of the Cornell Corrections Facility Building)

In 1995, the 172-foot deep well was noted to have collapsed at depths below approximately 80 feet bgs. The Former Water Well was partially decommissioned and then converted to a monitoring well by AMEC in 1995, to allow its use during an aquifer pump test. A field well sounding of 67 feet, performed on May 11, 2004, confirmed this conversion.

The construction details for this well below approximately 80 feet bgs are not well known. The aboveground completion was metal, with a diameter of 8 inches. This well was decommissioned similarly to WW-2, with bentonite grout placed through a tremmie pipe to 4 feet bgs, then bentonite chips placed from 4 to 2 feet bgs to absorb water, the steel casing cut flush with the ground surface, and the hole filled with soil and gravel to grade. The proximity to the building and the unknowns of actual well construction made casing removal problematic and therefore casing was not removed.

GHW-1 (In Crawl Space Under the Kitchen of the Gold Hill Store Apartment)

The third well proposed for decommissioning, GHW-1, was not readily accessible within the remaining grant period, and therefore was left in place. This is a driven well, installed to a total depth of 23 feet bgs, and case the entire length. The following rationale for leaving the well in place was submitted for ADEC consideration via e-mail on May 7, 2004:

- Access to that crawl space can only be gained by moving large kitchen appliances, and clearance within the crawl space is reported by Phil Carboy (the owner) to be very limited.
- The well is not currently connected to a pump, so water cannot be obtained from the well.
- According to Mr. Carboy, this well was too shallow to produce an adequate water supply, and that was the main reason for installation of the water well currently in use (GHW-2).
- Because access to the well is blocked by kitchen appliances, because water volume was low, and because another water supply is readily available and currently in use, it is not likely that reconnection of GHW-1 would take place.

9.5 Investigation-Derived Waste Disposal Activities

A total of five drums of IDW required disposal prior to the end of the grant period. IDW consisted of:

- Three drums of soil generated during installation of three AS points using hollow-stem auger drilling methods in September 2003.
- One drum of soil generated during overdrilling of the four remediation wells decommissioned in May 2004 (AS-3, AS-6, AS-7, and VE-3).
- One drum of water generated during remediation system operation in 2003 and 2004, and purge water from the October 2003 and May 2004 groundwater sampling events.

Approval for disposal of IDW was received from ADEC on July 7, 2003. All five drums were picked up by Evergreen Spill Solutions on May 28, 2004, and transported to OIT, Inc. for thermal treatment. A treatment certificate was not available at the time this report was prepared. A copy of the treatment certificate will be provided under separate cover upon receipt from OIT, Inc.

10.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the work conducted at the Site throughout the grant program, AMEC makes the following conclusions:

- The extent of groundwater impacted by petroleum hydrocarbons is adequately delineated. Groundwater impact is located primarily on the Gold Hill Store site, but may extend slightly off-site to the southeast onto the Cornell Corrections facility property. Based on the natural attenuation data collected in 2003/2004, geochemical trends suggest that an environmental conducive to natural attenuation of petroleum hydrocarbons is present at the site.
- The extent of soil impacted by petroleum hydrocarbons also is adequately defined. Remaining soil impact is primarily associated with the soil-water interface east and southeast of the Gold Hill Store building, and may extend slightly onto the Cornell Corrections facility property to the east.
- The active on-site drinking water source is protected by a water treatment system. Exposure through the ingestion and dermal contact pathways is not likely.
- The inactive on-site drinking water well is not currently connected to a pump or plumbing, and historically it did not provide an adequate water supply. Access to this well is extremely difficult, so exposure through ingestion and dermal contact of water from this well is not likely. Given time, continued groundwater treatment coupled with natural attenuation of petroleum hydrocarbons should remove any continuing potential threat at this well.
- Three inactive, but impacted water wells (WW-1, WW-2, and "Former Water Well") at the adjacent Cornell Correction facility have been decommissioned. WW-1 was decommissioned in 1998. WW-2 and "Former Water Well" were decommissioned on June 4, 2004.
- Exposure to petroleum hydrocarbon vapors migrating to outdoor air is not likely due to the depth of impact (at the soil-water interface at approximately 10 to 20 feet bgs), and the concentration of site activity on asphalt/concrete-capped areas of the site. Exposure for construction or utility workers could occur only if work were to be performed directly within impacted soil/groundwater.
- Unused remediation wells have been decommissioned. Remaining remediation wells are in use as remediation points or groundwater monitoring points. No monitoring wells have been decommissioned since additional groundwater monitoring is anticipated following the end of the grant program.



- All remaining IDW was transported off-site to OIT, Inc. for thermal treatment on May 28, 2004. A treatment certificate will be provided under separate cover upon receipt from OIT, Inc.
- The remediation system is operating effectively, and has removed approximately 55 pounds of petroleum hydrocarbons between May 6 and June 4, 2004. AMEC will continue to operate the system for approximately two months through August 6, 2004, at no cost to ADEC or the property owner.

Given these conclusions, AMEC makes the following recommendations:

- The site has been adequately characterized. No additional exploration is necessary. Complete exposure pathways have been evaluated, and eliminated where possible. ADEC should strongly consider issuing a NFRAP finding for this site.
- Long-term groundwater monitoring will be required by ADEC as part of a NFRAP finding. AMEC has proposed a scope of work for long term monitoring (presented in Section 9.3).
- The carbon filtration system for the Gold Hill Store water supply well should remain in operation until petroleum hydrocarbon concentrations have decreased below ADEC groundwater cleanup levels.

We appreciate the opportunity to be of continued service to you on this project. If you have any questions or need further assistance, please do not hesitate to contact Michelle Peterson at (907) 479-7586, or Jack Spadaro at (503) 639-4300.

AMEC Earth & Environmental, Inc.

A handwritten signature in cursive script that reads "Michelle L. Peterson".

Michelle L. Peterson, R.G.
Senior Project Manager

A handwritten signature in cursive script that reads "Jack T. Spadaro".

Jack T. Spadaro, Ph.D., CHMM
Associate

RGS/jlm

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LIMITATIONS

This report was prepared exclusively for Mr. Phil Carboy by AMEC Earth & Environmental, Inc. The quality of information, conclusions and estimates contained herein is consistent with the level of effort involved in AMEC services and based on: i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions and qualifications set forth in this report. This 2004 Annual Report is intended to be used by Mr. Carboy for the Gold Hill Store Site (3040 Parks Highway, Fairbanks, Alaska) only, subject to the terms and conditions of its contract with AMEC. Any other use of, or reliance on, this report by any third party is at that party's sole risk.

The findings contained herein are relevant to the dates of the AMEC Site visit and should not be relied upon to represent conditions at later dates. In the event that changes in the nature, usage, or layout of the property or nearby properties are made, the conclusions and recommendations contained in this report may not be valid. If additional information becomes available, it should be provided to AMEC so the original conclusions and recommendations can be modified as necessary.

TABLES

TABLE 2
2004 Groundwater Elevations and BTEX/GRO Concentrations

Well ID	Sample Date	Top-of-Casing Elevation	Depth to Water	Water Elevation	Benzene	Toluene	Ethylbenzene	Xylenes	GRO
					(feet)				(µg/L)
<i>18 AAC 75.345 Groundwater Cleanup Levels ^A</i>					5	1,000	700	10,000	1.3
MW-2	5/14/04	93.40	14.91	78.49	160	2 U	2 U	4 U	0.344
MW-2 DUP	5/14/04	93.40	14.91	78.49	176	2 U	2 U	4 U	0.37
MW-12	5/14/04	96.78	18.30	78.48	0.5 U	2 U	2 U	4 U	0.09 U
MW-14	5/13/04	95.54	16.62	78.92	0.5 U	2 U	2 U	4 U	0.09 U
MW-16	5/13/04	94.32	16.70	77.62	930	1,070	283	1,556	8.49
MW-16 DUP	5/13/04	94.32	16.70	77.62	1,000	1,290	347	1,757	9.66
MW-17	5/14/04	92.81	14.50	78.31	637	2 U	2 U	5.03	1.48
MW-18	5/14/04	93.02	13.70	79.32	0.5 U	2 U	2 U	4 U	0.09 U
MW-19	5/14/04	93.17	14.38	78.79	0.5 U	2 U	2 U	4 U	0.09 U
MW-20	5/13/04	96.15	17.10	79.05	4,360	2,180	410	1,002	15.70
VE-1	5/14/04	95.00	14.71	80.29	0.5 U	2 U	2 U	4 U	0.09 U
VE-2	5/14/04	94.40	15.24	79.16	0.5 U	2 U	2 U	4 U	0.09 U
GHW-2	5/14/04	NM	NM	NM	0.5	0.5 U	0.5 U	1 U	0.09 U

Notes:

^A 18 AAC 75.345, Table C (Groundwater Cleanup Levels), dated January 30, 2003

GRO = Gasoline Range Organics

µg/L = micrograms per liter

mg/L = milligrams per liter

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

NT = Not Tested

NM = Not Measured (collected from tap)

Values shown in bold indicate a detection of that constituent.

Shaded values indicate concentrations that exceed the ADEC Cleanup Levels.

Updated TOC elevation surveys were conducted on 4 June and 11 July 2003, and use MW-12 as a common benchmark.

GHW-2 sample was collected from the liquor store bathroom sink tap.

TABLE 3
Historical Groundwater Elevations and BTEX/GRO Concentrations

Well ID	Sample Date	Top-of-Casing Elevation	Depth to Water	Water Elevation	Benzene	Toluene	Ethylbenzene	Xylenes	GRO
<i>18 AAC 75.345 Groundwater Cleanup Levels^A</i>					5	1,000	700	10,000	1.3
MW-1/VE-8	5/20/94	96.71	NM	NM	20,500	42,300	9,660	37,100	192
MW-1/VE-8	12/20/94	96.71	13.58	83.13	25,000	25,000	14,000	57,000	340
MW-1/VE-8	3/8/95	96.71	15.10	81.61	18,000	16,000	4,600	21,000	140
MW-1/VE-8	6/28/95	96.71	NM	NM	NS	NS	NS	NS	NS
MW-1/VE-8	10/2/95	96.71	12.97	83.74	16,700	28,800	7,710	32,400	144
MW-1/VE-8	12/19/95	96.71	15.20	81.51	16,000	14,000	3,600	14,000	150
MW-1/VE-8	3/6/96	96.71	dry	dry	NS	NS	NS	NS	NS
MW-1/VE-8	6/7/96	96.71	dry	dry	NS	NS	NS	NS	NS
MW-1/VE-8	9/12/96	96.71	16.11	80.60	NS	NS	NS	NS	NS
MW-1/VE-8	12/11/96	96.71	FZ	FZ	NS	NS	NS	NS	NS
MW-1/VE-8	3/13/97	96.71	dry	dry	NS	NS	NS	NS	NS
MW-1/VE-8	6/12/97	96.71	FZ	FZ	NS	NS	NS	NS	NS
MW-1/VE-8	9/27/97	96.71	dry	dry	NS	NS	NS	NS	NS
MW-1/VE-8	12/22/97	96.71	dry	dry	NS	NS	NS	NS	NS
MW-1/VE-8	3/10/98	96.71	dry	dry	NS	NS	NS	NS	NS
MW-1/VE-8	5/27/98	96.71	FZ	FZ	NS	NS	NS	NS	NS
MW-1/VE-8	8/27/98	96.71	NM	NM	NS	NS	NS	NS	NS
MW-1/VE-8	12/10/98	96.71	FZ	FZ	NS	NS	NS	NS	NS
MW-1/VE-8	3/26/99	96.71	FZ	FZ	NS	NS	NS	NS	NS
MW-1/VE-8	6/3/99	96.71	FZ	FZ	NS	NS	NS	NS	NS
MW-1/VE-8	9/1/99	96.71	15.65	81.06	170	2,600	1,200	9,000	47
MW-1/VE-8	12/20/99	96.71	FZ	FZ	NS	NS	NS	NS	NS
MW-1/VE-8	3/22/00	96.71	FZ	FZ	NS	NS	NS	NS	NS
MW-1/VE-8	11/8/00	96.71	FZ	FZ	NS	NS	NS	NS	NS
MW-1/VE-8	9/11/01	96.71	NM	NM	290	98.9	63	456	2.25
MW-1/VE-8	9/5/02	96.71	12.58	84.13	193	37.7	33.6	289	1.47
MW-2	12/20/94	96.33	15.18	81.15	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-2	3/8/95	96.33	NM	NM	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-2	6/28/95	96.33	13.52	82.81	1 U	1 U	1 U	2 U	0.02 U
MW-2	10/2/95	96.33	13.52	82.81	1 U	1 U	1 U	2 U	0.02 U
MW-2	12/19/95	96.33	15.12	81.21	6.9	108	54	220	1.40
MW-2	3/6/96	96.33	dry	dry	NS	NS	NS	NS	NS
MW-2	6/7/96	96.33	17.00	79.33	2.1	0.5 U	0.5 U	0.5 U	0.05 U
MW-2	9/12/96	96.30	14.04	82.26	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-2	12/11/96	96.30	16.25	80.05	3.04	0.5 U	0.5 U	0.5 U	0.05 U
MW-2	3/13/97	96.30	dry	dry	NS	NS	NS	NS	NS
MW-2	6/12/97	96.30	FZ	FZ	NS	NS	NS	NS	NS
MW-2	9/27/97	95.83	15.23	80.60	2.78	0.5 U	0.5 U	1.16	0.0724
MW-2	12/22/97	95.83	16.80	79.03	0.65	0.5 U	0.5 U	1.5 U	0.05 U
MW-2	3/10/98	95.83	dry	dry	NS	NS	NS	NS	NS
MW-2	5/27/98	95.84	17.95	77.89	23.6	0.5 U	0.5 U	1.5 U	0.119
MW-2	8/27/98	95.84	14.36	81.48	0.5 U	0.5 U	0.5 U	1.5 U	0.0708
MW-2	12/10/98	95.84	15.90	79.94	0.5 U	0.5 U	0.5 U	1.5 U	0.0752
MW-2	3/26/99	95.84	19.11	76.73	NS	NS	NS	NS	NS
MW-2	6/3/99	98.19	17.65	80.54	1.40	0.5 U	0.5 U	1.50 U	0.0504
MW-2	9/1/99	98.19	14.27	83.92	0.5 U	0.5 U	0.5 U	1.50 U	0.0615
MW-2	12/21/99	98.19	15.73	82.46	0.5 U	0.5 U	0.5 U	1.50 U	0.0713
MW-2	3/16/00	98.19	18.23	79.96	0.5 U	0.5 U	0.5 U	1.50 U	0.053
MW-2	11/10/00	98.19	13.73	84.46	0.5 U	0.5 U	0.5 U	1.50 U	0.05 U
MW-2	1/18/01	98.19	16.63	81.56	NS	NS	NS	NS	NS

TABLE 3
Historical Groundwater Elevations and BTEX/GRO Concentrations

Well ID	Sample Date	Top-of-Casing Elevation	Depth to Water	Water Elevation	Benzene	Toluene	Ethylbenzene	Xylenes	GRO
		(feet)			(µg/L)				(mg/L)
<i>18 AAC 75.345 Groundwater Cleanup Levels^A</i>					5	1,000	700	10,000	1.3
MW-2	9/5/02	98.19	12.36	85.83	0.5 U	2 U	2 U	4 U	0.09 U
MW-2	6/4/03	93.40	15.18	78.22	444	2 U	2 U	4 U	0.64
MW-2	10/30/03	93.40	13.32	80.08	0.5 U	2 U	2 U	4 U	0.09 U
MW-2 DUP	10/30/03	93.40	13.32	80.08	0.5 U	2 U	2 U	4 U	0.09 U
MW-2	5/14/04	93.40	14.91	78.49	160	2 U	2 U	4 U	0.344
MW-2 DUP	5/14/04	93.40	14.91	78.49	176	2 U	2 U	4 U	0.37
MW-3	12/20/94	98.15	15.27	82.88	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-3	3/8/95	98.15	NM	NM	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-3	6/28/95	98.15	14.58	83.57	1 U	1 U	1 U	2 U	0.02 U
MW-3	9/29/95	98.15	17.46	80.69	1 U	1 U	1 U	2 U	0.02 U
MW-3	12/19/95	98.15	19.68	78.47	NS	NS	NS	NS	NS
MW-3	3/6/96	98.15	dry	dry	NS	NS	NS	NS	NS
MW-3	6/7/96	98.15	dry	dry	NS	NS	NS	NS	NS
MW-3	9/12/96	100.79	20.62	80.17	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-3	12/11/96	100.79	dry	dry	NS	NS	NS	NS	NS
MW-3	3/13/97	100.79	dry	dry	NS	NS	NS	NS	NS
MW-3	6/12/97	100.79	dry	dry	NS	NS	NS	NS	NS
MW-3	9/27/97	100.79	dry	dry	NS	NS	NS	NS	NS
MW-3	12/22/97	100.79	dry	dry	NS	NS	NS	NS	NS
MW-3	3/10/98	100.79	dry	dry	NS	NS	NS	NS	NS
MW-3	5/27/98	100.32	dry	dry	NS	NS	NS	NS	NS
MW-3	8/27/98	100.32	dry	dry	NS	NS	NS	NS	NS
MW-3	12/10/98	100.32	dry	dry	NS	NS	NS	NS	NS
MW-3	3/26/99	102.65	dry	dry	NS	NS	NS	NS	NS
MW-3	6/3/99	102.65	dry	dry	NS	NS	NS	NS	NS
MW-3	9/1/99	102.66	19.91	82.75	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-3	12/21/99	102.64	22.15	80.49	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-3	11/10/00	102.63	17.53	85.10	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-3	9/5/02	102.63	16.74	85.89	0.5 U	2 U	2 U	4 U	0.09 U
MW-4	12/20/94	100.35	15.94	84.41	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-4	6/28/95	100.35	13.29	87.06	1 U	1 U	1 U	2 U	0.02 U
MW-4	9/29/95	100.35	14.72	85.63	NS	NS	NS	NS	NS
MW-4	12/19/95	100.35	dry	dry	NS	NS	NS	NS	NS
MW-4	3/6/96	100.35	dry	dry	NS	NS	NS	NS	NS
MW-4	6/7/96	100.35	dry	dry	NS	NS	NS	NS	NS
MW-4	9/12/96	100.28	dry	dry	NS	NS	NS	NS	NS
MW-4	12/11/96	100.28	dry	dry	NS	NS	NS	NS	NS
MW-4	3/13/97	100.28	dry	dry	NS	NS	NS	NS	NS
MW-4	6/12/97	100.28	dry	dry	NS	NS	NS	NS	NS
MW-4	9/27/97	100.28	dry	dry	NS	NS	NS	NS	NS
MW-4	12/22/97	100.28	dry	dry	NS	NS	NS	NS	NS
MW-4	3/10/98	100.28	dry	dry	NS	NS	NS	NS	NS
MW-4	4/28/98	<i>decommissioned</i>							
MW-5	12/20/94	97.44	12.57	84.87	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-5	3/8/95	97.44	13.83	83.61	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-5	6/28/95	97.44	NM	NM	1 U	1 U	1 U	2 U	0.02 U
MW-5	9/29/95	97.44	15.40	82.04	NS	NS	NS	NS	NS
MW-5	12/19/95	97.44	17.45	79.99	NS	NS	NS	NS	NS
MW-5	3/6/96	97.44	dry	dry	NS	NS	NS	NS	NS
MW-5	6/7/96	97.44	17.54	79.90	NS	NS	NS	NS	NS

TABLE 3
Historical Groundwater Elevations and BTEX/GRO Concentrations

Well ID	Sample Date	Top-of-Casing Elevation	Depth to Water	Water Elevation	Benzene	Toluene	Ethylbenzene	Xylenes	GRO
					(feet)				(µg/L)
<i>18 AAC 75.345 Groundwater Cleanup Levels^A</i>					5	1,000	700	10,000	1.3
MW-5	9/12/96	100.12	dry	dry	NS	NS	NS	NS	NS
MW-5	12/11/96	100.12	dry	dry	NS	NS	NS	NS	NS
MW-5	3/13/97	100.12	dry	dry	NS	NS	NS	NS	NS
MW-5	6/12/97	100.12	dry	dry	NS	NS	NS	NS	NS
MW-5	9/27/97	100.12	dry	dry	NS	NS	NS	NS	NS
MW-5	12/22/97	100.12	dry	dry	NS	NS	NS	NS	NS
MW-5	3/10/98	100.12	dry	dry	NS	NS	NS	NS	NS
MW-5	4/28/98	<i>decommissioned</i>							
MW-6/AS-10	12/20/94	<i>has never been sampled</i>							
MW-7	12/20/94	97.69	NM	NM	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-7	6/28/95	97.69	NM	NM	NS	NS	NS	NS	NS
MW-7	9/29/95	97.69	NM	NM	NS	NS	NS	NS	NS
MW-7	12/19/95	97.69	15.87	81.82	37,000	15,000	4,700	16,000	230
MW-7	3/6/96	97.63	dry	dry	NS	NS	NS	NS	NS
MW-7	6/7/96	97.63	dry	dry	NS	NS	NS	NS	NS
MW-7	9/12/96	97.68	16.71	80.97	31,000	25,000	1,700	18,000	240
MW-7	12/11/96	97.68	19.30	78.38	NS	NS	NS	NS	NS
MW-7	3/13/97	97.68	dry	dry	NS	NS	NS	NS	NS
MW-7	6/12/97	97.68	dry	dry	NS	NS	NS	NS	NS
MW-7	9/27/97	dry	dry	dry	NS	NS	NS	NS	NS
MW-7	12/22/97	dry	dry	dry	NS	NS	NS	NS	NS
MW-7	3/10/98	dry	dry	dry	NS	NS	NS	NS	NS
MW-7	4/28/98	<i>decommissioned</i>							
MW-8	12/20/94	97.60	13.90	83.70	61,000	80,000	7,100	33,000	560
MW-8	3/8/95	97.60	NM	NM	NS	NS	NS	NS	NS
MW-8	6/29/95	97.60	13.16	84.44	41,900	39,440	5,780	11,040	432
MW-8	10/2/95	97.60	13.46	84.14	31,600	7,510	3,070	6,790	87
MW-8	12/19/95	97.60	NM	NM	NS	NS	NS	NS	NS
MW-8	3/6/96	97.60	NM	NM	NS	NS	NS	NS	NS
MW-8	6/7/96	97.60	NM	NM	NS	NS	NS	NS	NS
MW-8	9/12/96	97.58	16.52	81.06	38,000	49,000	3,200	20,000	350
MW-8	12/11/96	97.58	dry	dry	NS	NS	NS	NS	NS
MW-8	3/13/97	97.58	dry	dry	NS	NS	NS	NS	NS
MW-8	6/12/97	97.58	dry	dry	NS	NS	NS	NS	NS
MW-8	9/27/97	97.58	dry	dry	NS	NS	NS	NS	NS
MW-8	12/22/97	97.58	dry	dry	NS	NS	NS	NS	NS
MW-8	3/10/98	97.58	NM	NM	NS	NS	NS	NS	NS
MW-8	4/28/98	<i>decommissioned</i>							
MW-9/VE-7	12/20/94	NM	NM	NM	NS	NS	NS	NS	NS
MW-9/VE-7	3/8/95	NM	NM	NM	73,000	81,000	5,500	32,000	350
MW-9/VE-7	6/28/95	NM	NM	NM	NS	NS	NS	NS	NS
MW-9/VE-7	9/29/95	NM	NM	NM	NS	NS	NS	NS	NS
MW-9/VE-7	12/19/95	NM	NM	NM	NS	NS	NS	NS	NS
MW-9/VE-7	3/6/96	NM	NM	NM	NS	NS	NS	NS	NS
MW-9/VE-7	6/7/96	NM	NM	NM	NS	NS	NS	NS	NS
MW-9/VE-7	6/17/96	NM	NM	NM	NS	NS	NS	NS	NS
MW-9/VE-7	11/10/00	NM	13.75	NM	0.51	0.5 U	0.5 U	1.5 U	0.0896
MW-9/VE-7	9/11/01	NM	NM	NM	0.89	3.57	2.08	65.3	0.236
MW-9/VE-7	1/18/01	NM	15.18	NM	217	3.9	37.4	391	3.18
MW-9/VE-7	9/5/02	NM	12.33	NM	0.5 U	2 U	2 U	5.92	0.09 U

TABLE 3
Historical Groundwater Elevations and BTEX/GRO Concentrations

Well ID	Sample Date	Top-of-Casing Elevation	Depth to Water	Water Elevation	Benzene	Toluene	Ethylbenzene	Xylenes	GRO
					(feet)				($\mu\text{g/L}$)
<i>18 AAC 75.345 Groundwater Cleanup Levels^A</i>					5	1,000	700	10,000	1.3
MW-9/VE-7	6/4/03	94.38	15.26	79.12	355	20 U	22	574	1.86
MW-10	12/20/94	96.86	13.77	83.09	NS	NS	NS	NS	NS
MW-10	3/22/95	96.86	NM	NM	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-10	6/28/95	96.86	9.90	86.96	1 U	1 U	1 U	2 U	0.036
MW-10	10/2/95	96.86	11.84	85.02	1 U	1 U	1 U	2 U	0.02 U
MW-10	12/19/95	96.86	15.24	81.62	NS	NS	NS	NS	NS
MW-10	3/6/96	96.86	dry	dry	NS	NS	NS	NS	NS
MW-10	6/7/96	96.86	dry	dry	NS	NS	NS	NS	NS
MW-10	9/12/96	96.78	14.16	82.62	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-10	12/11/96	96.78	dry	dry	NS	NS	NS	NS	NS
MW-10	3/13/97	96.78	dry	dry	NS	NS	NS	NS	NS
MW-10	6/12/97	96.78	dry	dry	NS	NS	NS	NS	NS
MW-10	9/27/97	96.32	16.87	79.45	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-10	12/22/97	96.32	dry	dry	NS	NS	NS	NS	NS
MW-10	3/10/98	96.32	dry	dry	NS	NS	NS	NS	NS
MW-10	5/27/98	96.32	dry	dry	NS	NS	NS	NS	NS
MW-10	8/28/98	96.32	17.17	79.15	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-10	12/10/98	96.32	17.17	79.15	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-10	3/26/99	96.32	dry	dry	NS	NS	NS	NS	NS
MW-10	6/3/99	98.67	17.95	80.72	NS	NS	NS	NS	NS
MW-10	9/1/99	98.67	13.82	84.85	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-10	12/21/99	98.68	16.12	82.56	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-10	3/22/00	98.68	FZ	FZ	NS	NS	NS	NS	NS
MW-10	9/5/02	98.68	10.86	87.82	0.5 U	2 U	2 U	4 U	0.09 U
MW-11	12/20/94	99.72	NM	NM	NS	NS	NS	NS	NS
MW-11	3/8/95	99.72	NM	NM	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-11	3/22/95	99.72	NM	NM	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-11	6/28/95	99.72	16.73	82.99	NS	NS	NS	NS	NS
MW-11	9/29/95	99.72	17.63	82.09	7.6	1 U	1 U	2 U	0.041
MW-11	12/19/95	99.72	19.57	80.15	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-11	3/6/96	99.72	dry	dry	NS	NS	NS	NS	NS
MW-11	6/7/96	99.72	dry	dry	NS	NS	NS	NS	NS
MW-11	9/12/96	99.73	20.43	79.30	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-11	12/11/96	99.73	dry	dry	NS	NS	NS	NS	NS
MW-11	3/13/97	99.73	dry	dry	NS	NS	NS	NS	NS
MW-11	6/12/97	99.73	dry	dry	NS	NS	NS	NS	NS
MW-11	9/27/97	99.73	dry	dry	NS	NS	NS	NS	NS
MW-11	12/22/97	99.73	dry	dry	NS	NS	NS	NS	NS
MW-11	3/10/98	99.73	dry	dry	NS	NS	NS	NS	NS
MW-11	4/28/98	<i>decommissioned</i>							
MW-12	12/20/94	99.30	NM	NM	NS	NS	NS	NS	NS
MW-12	3/8/95	99.30	NM	NM	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-12	6/28/95	99.30	NM	NM	1 U	1 U	1 U	2 U	0.02 U
MW-12	9/29/95	99.30	16.87	82.43	1 U	1 U	1 U	2 U	0.02 U
MW-12	12/19/95	99.30	18.49	80.81	15	0.5 U	0.5 U	0.5 U	0.091
MW-12	3/6/96	99.30	21.71	77.59	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-12	6/7/96	99.30	NM	NM	NS	NS	NS	NS	NS
MW-12	9/12/96	99.13	17.58	81.55	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-12	12/11/96	99.13	19.20	79.93	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-12	3/13/97	99.13	22.07	77.06	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U

TABLE 3
Historical Groundwater Elevations and BTEX/GRO Concentrations

Well ID	Sample Date	Top-of-Casing Elevation	Depth to Water	Water Elevation	Benzene	Toluene	Ethylbenzene	Xylenes	GRO
					(feet)				($\mu\text{g/L}$)
<i>18 AAC 75.345 Groundwater Cleanup Levels^A</i>					5	1,000	700	10,000	1.3
MW-12	6/12/97	99.13	18.72	80.41	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-12	9/27/97	98.49	18.05	80.44	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-12	12/22/97	98.49	19.24	79.25	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-12	3/10/98	98.49	21.30	77.19	0.5 U	0.5 U	0.5 U	1.5 U	0.0772
MW-12	5/27/98	98.64	19.80	78.84	0.5 U	0.5 U	0.5 U	1.5 U	0.0652
MW-12	8/27/98	98.64	17.39	81.25	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-12	12/10/98	101.15	18.85	82.30	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-12	3/26/99	101.15	21.81	79.34	0.5 U	0.5 U	0.5 U	1.5 U	0.0841
MW-12	6/3/99	101.13	20.13	81.00	NS	NS	NS	NS	NS
MW-12	9/1/99	101.10	17.75	83.35	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-12	12/21/99	101.23	19.03	82.20	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-12	3/16/00	101.23	21.02	80.21	0.5 U	0.5 U	0.5 U	1.5 U	0.0624
MW-12	11/10/00	101.23	17.38	83.85	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-12	1/18/01	101.23	19.40	81.83	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-12	9/11/01	101.23	NM	NM	12.1	2 U	2 U	4 U	0.09 U
MW-12	9/5/02	101.23	16.51	84.72	0.5 U	2 U	2 U	4 U	0.09 U
MW-12	6/4/03	96.78	18.58	78.20	NS	NS	NS	NS	NS
MW-12	5/14/04	96.78	18.30	78.48	0.5 U	2 U	2 U	4 U	0.09 U
MW-13	9/12/96	97.19	NM	NM	580	25 U	25 U	25 U	1.98
MW-13	12/11/96	97.19	18.88	78.31	150	94	13.1	91.2	0.988
MW-13	3/13/97	97.19	23.37	73.82	160	23	19.0	156	0.965
MW-13	6/12/97	97.19	22.35	74.84	11.8	0.5 U	0.5 U	2.47	0.094
MW-13	9/27/97	96.71	18.47	78.24	15	0.5 U	0.5 U	1.5 U	0.0993
MW-13	12/22/97	96.71	20.45	76.26	5.27	0.5 U	0.5 U	1.5 U	0.0889
MW-13	3/10/98	96.71	23.27	73.44	4.6	0.5 U	0.5 U	1.5 U	0.107
MW-13	5/27/98	96.72	22.45	74.27	0.86	0.5 U	0.5 U	1.5 U	0.0776
MW-13	8/27/98	96.72	17.62	79.10	0.5 U	0.5 U	0.5 U	1.5 U	0.0562
MW-13	12/10/98	96.72	NM	NM	NS	NS	NS	NS	NS
MW-13	3/26/99	96.72	20.63	76.09	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-13	6/3/99	99.05	19.93	79.12	0.5 U	0.5 U	0.5 U	1.5 U	0.0582
MW-13	9/1/99	99.05	15.33	83.72	0.5 U	0.5 U	0.5 U	1.5 U	0.0500 U
MW-13	12/21/99	99.05	16.62	82.43	0.5 U	0.5 U	0.5 U	1.5 U	0.0500 U
MW-13	3/16/00	99.05	19.20	79.85	0.5 U	0.5 U	0.5 U	1.5 U	0.051
MW-13	11/10/00	99.05	13.90	85.15	0.5 U	0.5 U	0.5 U	1.5 U	0.0500 U
MW-13	9/5/02	99.05	12.58	86.47	0.5 U	2 U	2 U	4 U	0.09 U
MW-14	2/5/96	98.04	NM	NM	4,600	159	61.6	362	1.2
MW-14	3/10/98	98.04	21.55	76.49	NS	NS	NS	NS	NS
MW-14	5/27/98	98.04	dry	dry	NS	NS	NS	NS	NS
MW-14	8/28/98	98.04	dry	dry	NS	NS	NS	NS	NS
MW-14	12/10/98	98.04	18.21	79.83	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-14	3/26/99	98.04	21.01	77.03	4.27	0.5 U	0.5 U	1.5 U	0.05 U
MW-14	6/3/99	100.36	20.18	80.18	2.62	0.5 U	0.5 U	1.5 U	0.05 U
MW-14	9/1/99	100.37	16.97	83.40	0.570	0.5 U	0.5 U	1.5 U	0.05 U
MW-14	12/21/99	100.39	17.58	82.81	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-14	3/16/00	100.39	19.75	80.64	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-14	11/10/00	100.39	15.75	84.64	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-14	1/18/01	100.39	17.96	82.43	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-14	9/11/01	100.39	NM	NM	NS	NS	NS	NS	NS
MW-14	9/5/02	100.39	14.84	85.55	0.5 U	2 U	2 U	4 U	0.09 U
MW-14	10/29/03	95.54	15.44	80.10	0.5 U	2 U	2 U	4 U	0.09 U

TABLE 3
Historical Groundwater Elevations and BTEX/GRO Concentrations

Well ID	Sample Date	Top-of-Casing Elevation	Depth to Water	Water Elevation	Benzene	Toluene	Ethylbenzene	Xylenes	GRO
					(feet)				(µg/L)
<i>18 AAC 75.345 Groundwater Cleanup Levels^A</i>					5	1,000	700	10,000	1.3
MW-14	5/13/04	95.54	16.62	78.92	0.5 U	2 U	2 U	4 U	0.09 U
MW-15	3/11/98	87.20	11.05	76.15	0.64	0.5 U	0.5 U	1.5 U	0.05 U
MW-15	5/27/98	87.20	8.23	78.97	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-15	8/28/98	87.20	6.75	80.45	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-15	12/10/98	87.20	8.07	79.13	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-15	3/26/99	87.20	10.46	76.74	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-15	6/3/99	89.60	8.37	81.23	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-15	9/1/99	89.59	7.25	82.34	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-15	12/21/99	89.64	8.12	81.52	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-15	3/16/00	89.64	9.69	79.95	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-15	11/10/00	89.64	6.84	82.80	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-15	1/18/01	89.64	NM	NM	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
MW-15	9/11/01	89.64	NM	NM	0.5 U	0.2 U	0.2 U	0.4 U	0.09 U
MW-15	9/5/02	89.64	5.23	84.41	0.5 U	2 U	2 U	4 U	0.09 U
MW-16	7/11/03	94.32	14.51	79.81	11,400	18,400	3,110	12,110	64.8
MW-16 DUP	7/11/03	94.32	14.51	79.81	12,800	20,200	3,500	13,840	72
MW-16	5/13/04	94.32	16.70	77.62	930	1,070	283	1,556	8.49
MW-16 DUP	5/13/04	94.32	16.70	77.62	1,000	1,290	347	1,757	9.66
MW-17	7/11/03	92.81	13.50	79.31	3,140	2 U	7.67	8.2	4.68
MW-17	5/14/04	92.81	14.50	78.31	637	2 U	2 U	5.03	1.48
MW-18	7/11/03	93.02	13.33	79.69	0.5 U	2 U	2 U	4 U	0.09 U
MW-18	10/30/03	93.02	12.34	80.68	4.8	2 U	2 U	4 U	0.09 U
MW-18	5/14/04	93.02	13.70	79.32	0.5 U	2 U	2 U	4 U	0.09 U
MW-19	7/11/03	93.17	13.88	79.29	0.5 U	2 U	2 U	4 U	0.09 U
MW-19	10/30/03	93.17	13.18	79.99	0.5 U	2 U	2 U	4 U	0.09 U
MW-19	5/14/04	93.17	14.38	78.79	0.5 U	2 U	2 U	4 U	0.09 U
MW-20	7/11/03	96.15	16.43	79.72	2,050	2 U	124	59	2.94
MW-20	10/29/03	96.15	14.98	81.17	233	2 U	6.67	83.1	0.543
MW-20	5/13/04	96.15	17.10	79.05	4,360	2,180	410	1,002	15.70
WW-1	5/15/95	NM	NM	NM	1 U	111.8	1 U	2 U	NT
WW-1	5/17/95	NM	NM	NM	1 U	180	1 U	2 U	NT
WW-1	6/14/95	NM	NM	NM	0.2 U	306	0.51	1.33	NT
WW-1	1998				<i>decommissioned</i>				
WW-2	12/20/94	NM	NM	NM	NS	NS	NS	NS	NS
WW-2	5/11/95	NM	NM	NM	22	0.5 U	0.5 U	0.5 U	NT
WW-2	6/28/95	98.34	14.98	83.36	1 U	1 U	1 U	2 U	0.02 U
WW-2	9/29/95	98.34	15.89	82.45	1 U	1 U	1 U	2 U	0.02 U
WW-2	12/19/95	98.34	17.53	80.81	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
WW-2	3/6/96	98.34	22.09	76.25	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
WW-2	6/7/96	98.34	22.92	75.42	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U
WW-2	9/12/96	98.34	18.54	79.80	120	0.5 U	0.5 U	0.5 U	0.411
WW-2	11/1/96	98.34	19.53	78.81	1,700	0.5 U	0.5 U	1 U	NT
WW-2	12/11/96	98.34	21.74	76.60	1,500	0.5 U	0.5 U	0.5 U	4.2
WW-2	6/12/97	100.98	25.09	75.89	2,100	0.5 U	0.5 U	0.52	5.5
WW-2	9/27/97	97.87	21.82	76.05	1,200	25 U	25.0 U	25 U	3.6
WW-2	12/22/97	98.52	23.26	75.26	1,800	0.5 U	0.5 U	1.5 U	4.8
WW-2	3/11/98	97.87	25.11	72.76	1,700	0.5 U	0.5 U	1.5 U	3.6
WW-2	5/27/98	97.88	24.34	73.54	1,100	0.5 U	0.5 U	1.5 U	2.97
WW-2	8/3/98	97.88	18.15	79.73	2,500	5 U	5 U	15 U	5.7
WW-2	12/10/98	97.88	19.10	78.78	1,900	0.5 U	0.5 U	1.5 U	4.7

TABLE 3
Historical Groundwater Elevations and BTEX/GRO Concentrations

Well ID	Sample Date	Top-of-Casing Elevation	Depth to Water	Water Elevation	Benzene	Toluene	Ethylbenzene	Xylenes	GRO
					(feet)				(µg/L)
<i>18 AAC 75.345 Groundwater Cleanup Levels^A</i>					5	1,000	700	10,000	1.3
WW-2	3/26/99	97.88	21.46	76.42	880	0.5 U	0.5 U	1.5 U	2.93
WW-2	6/3/99	100.21	21.11	79.10	1,300	0.5 U	0.5 U	1.5 U	4.2
WW-2	9/1/99	100.22	17.39	82.83	5.11	0.5 U	0.5 U	1.5 U	0.0625
WW-2 dup	9/1/99	100.22	17.39	82.83	220	1 U	1 U	3 U	0.61
WW-2	12/21/99	100.24	17.81	82.43	1,400	0.5 U	0.5 U	1.5 U	4.3
WW-2	3/16/00	100.24	19.88	80.36	360	0.5 U	0.5 U	1.5 U	0.684
WW-2	11/10/00	100.24	15.33	84.91	1,100	2.5 U	2.5 U	7.5 U	2.7
WW-2	1/18/01	100.24	NM	NM	983	2.5 U	2.5 U	7.5 U	2.64
WW-2	9/5/02	100.24	14.39	85.85	287	20	20 U	40 U	0.9 U
WW-2	6/4/04				<i>decommissioned</i>				
VE-1	11/10/00	NM	13.94	NM	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
VE-1	9/5/02	NM	NM	NM	15	2 U	2 U	4 U	0.247
VE-1	6/4/03	95.00	15.42	79.58	1.15	2 U	2 U	4 U	0.09 U
VE-1	10/29/03	95.00	12.86	82.14	0.5 U	2 U	2 U	4 U	0.09 U
VE-1	5/14/04	95.00	14.71	80.29	0.5 U	2 U	2 U	4 U	0.09 U
VE-2	11/8/00	NM	13.74	NM	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
VE-2	9/5/02	NM	12.27	NM	0.5 U	2 U	2 U	4 U	0.09 U
VE-2	6/4/03	94.40	15.42	78.98	0.5 U	2 U	2 U	4 U	0.09 U
VE-2	5/14/04	94.40	15.24	79.16	0.5 U	2 U	2 U	4 U	0.09 U
VE-4	1/18/01	NM	13.95	NM	0.5 U	0.5 U	0.5 U	1.5 U	0.05 U
VE-4	11/10/00	NM	13.83	NM	0.5 U	0.51	0.5 U	1.5 U	0.05 U
VE-5	9/12/96	NM	NM	NM	4,300	50 U	470	500	17
VE-5	1/18/01	NM	FZ	FZ	NS	NS	NS	NS	NS
AS-5	11/10/00	NM	14.43	NM	310	540	54	500	4
AS-5	1/18/01	NM	15.82	NM	12.7	51.5	3.65	122	7.62
AS-5	9/11/01	NM	NM	NM	5,010	2,110	196	1,151	16.5
GHW-2	6/4/03	NM	NM	NM	3.35	2 U	2 U	4 U	0.09 U
GHW-2	10/29/03	NM	NM	NM	0.69	0.5 U	0.5 U	2 U	0.09 U
GHW-2	5/14/04	NM	NM	NM	0.50	0.5 U	0.5 U	1 U	0.09 U

Notes:

^A 18 AAC 75.345, Table C (Groundwater Cleanup Levels), dated January 30, 2003

GRO = Gasoline Range Organics

µg/L = micrograms per liter

mg/L = milligrams per liter

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

NM = Not Measured

dry = No groundwater in well.

FZ = The well was frozen, no groundwater monitoring was conducted.

NS = Not Sampled

NT = Not Tested

Values shown in bold indicate a detection of that constituent.

Shaded values indicate concentrations that exceed the ADEC Cleanup Levels.

Updated TOC elevation surveys were conducted on 4 June and 11 July 2003, and use MW-12 as a common benchmark.

GHW-2 sample was collected from the liquor store bathroom sink tap.

TABLE 4
Groundwater VOC, SVOC, and Total Lead Concentrations
 All Concentrations in mg/L

Well ID	Sample Date	Methyl-t-butyl ether (MTBE)	1,2-Dibromoethane (EDB)	1,2-Dichloroethane (EDC)	Total Lead
ADEC Cleanup Level ^A	-	-	0.00005	0.005	0.015
EPA Region 9 PRG ^B	0.0013	-	-	-	-
MW-2	10/30/03	0.197	0.0113	0.0692	0.0558
MW-2	5/14/04	0.00538	0.00095	0.0858	0.05 U
MW-2DUP	5/14/04	0.00511	0.000965	0.0863	0.05 U
MW-12	5/14/04	0.0109	0.00235	0.026	NA
MW-16	5/13/04	0.128	0.0177	0.195	NA
MW-20	10/29/03	0.0248	0.00471	0.001 U	0.146
MW-20	5/13/04	0.005 U	0.0114	0.092	0.0969
VE-2	5/14/04	0.0481	0.00208	0.00394	NA
GHW-2	5/14/04	0.001 U	0.0000183 U	0.0005 U	NA

Notes: All values in mg/L = milligrams per liter

NA = Not Analyzed

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

Values shown in bold indicate a detection of that constituent.

Shaded values indicate concentrations that exceed the ADEC Cleanup Levels.

^A 18 AAC 75.345 Table C (Groundwater Cleanup Levels), January 30, 2003,

and Technical Memorandum - 01-007, December 18, 2001

^B United States Environmental Protection Agency, Region 9 Preliminary Remediation Goals, October 2002.

TABLE 5
Groundwater Natural Attenuation Parameters - Laboratory Measurements
 All Concentrations in mg/L

Well ID	Sample Date	Sulfate	Ammonia-N	Nitrate-N	Ortho Phosphate-P	Sulfide	Methane	Total Iron	Total Manganese	Total Organic Carbon
MW-2	10/30/03	15.6	NA	0.613	NA	0.1 U	0.005 U	0.251	0.02 U	NA
MW-2	5/14/04	26.6	0.1 U	0.347	0.4 U	0.1 U	0.00537	0.832	0.0287	2.45
MW-12	5/14/04	28.3	0.1 U	3.71	0.4 U	0.1 U	0.005 U	11.7	0.0748	2.52
MW-14	5/13/04	37.8	0.1 U	15.8	0.4 U	0.1 U	0.005 U	0.2 U	0.02 U	3.49
MW-16	5/13/04	33.3	0.1 U	0.1 U	0.4 U	0.1 U	0.005 U	12	0.8	7.31
MW-20	10/29/03	49.5	NA	1.23	NA	0.1 U	0.005 U	5.07	1.43	NA
MW-20	5/13/04	41.2	0.1 U	0.1 U	0.4 U	0.1 U	0.005 U	3.06	2.46	10.8

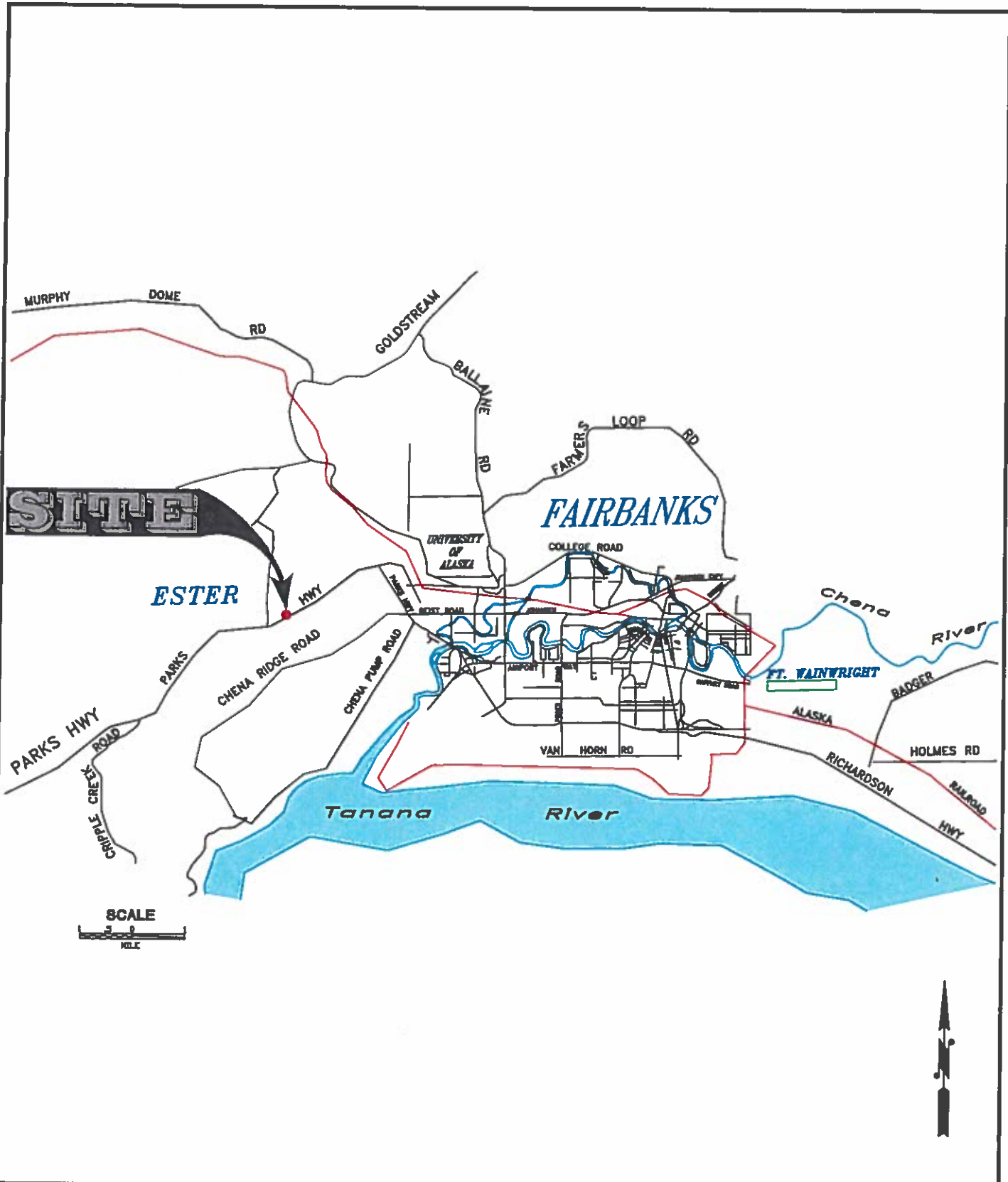
Notes: U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 NA = Not Analyzed
 Values shown in bold indicate a detection of that constituent.
 Measurements for Ferrous Iron were performed using Haak field test kit.

**TABLE 6
Groundwater Natural Attenuation Parameters - Field Measurements**

Well ID	Sample Date	Water Temperature (Celsius)	Conductivity (mS/ccm)	Dissolved Oxygen (% D.O.)	pH	Oxidation Reduction Potential	Ferrous Iron (mg/L)
MW-2	5/14/04	3.77	0.748	13.2	7.16	68.6	0
MW-12	5/14/04	4.18	3.209	7.6	7.06	38.1	0
MW-14	5/13/04	4.77	0.967	33.6	7.22	50.7	NT
MW-16	5/13/04	3.01	0.643	87	7.72	38	NT
MW-20	5/13/04	4.38	1.086	69.6	7.13	37	NT

Notes: NT = Not Tested
 Ferrrous Iron tested with Hach field test kit Model IR-18C.

FIGURES

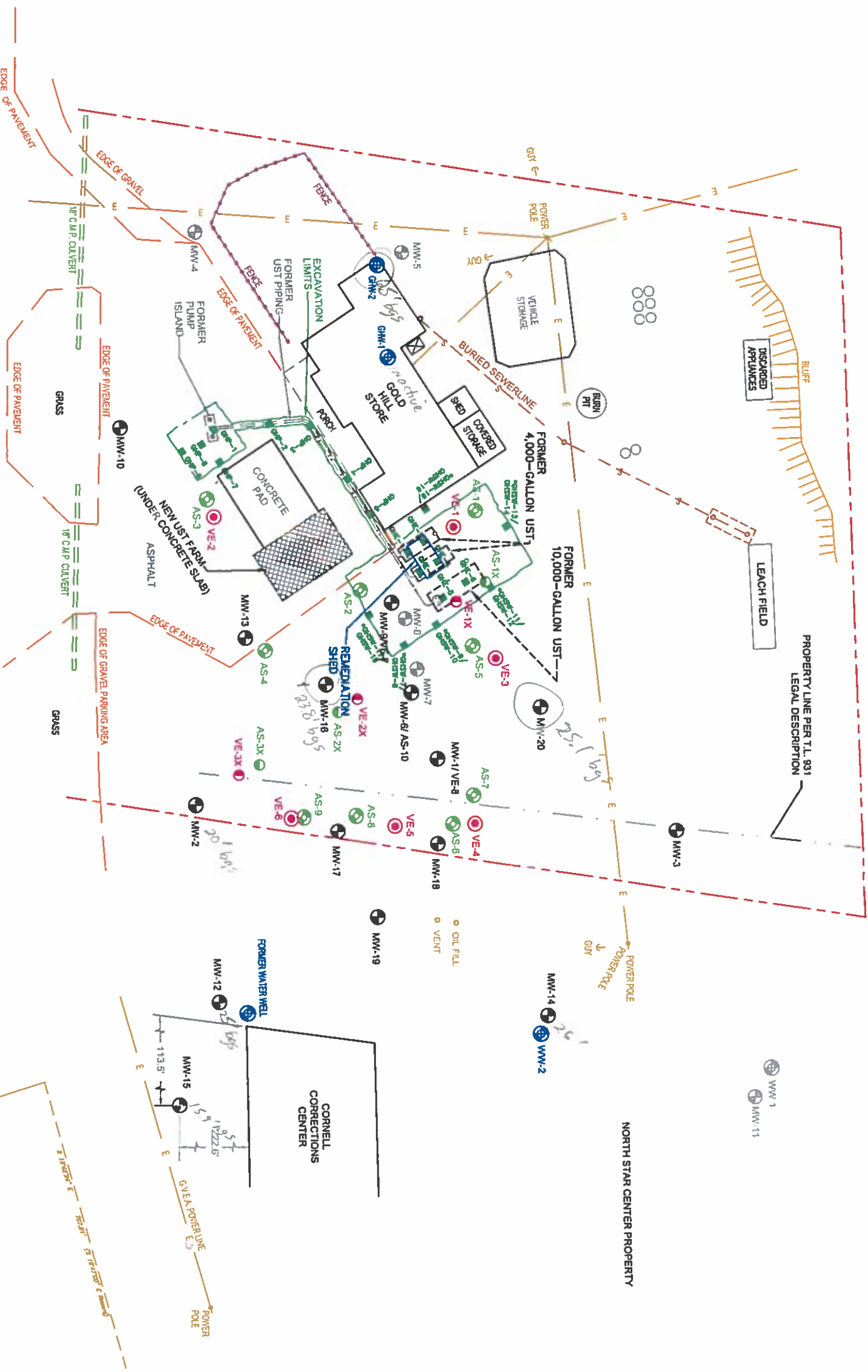


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DESIGN	EW
DRAWN	DLD
DATE	JANUARY 2004
SCALE	AS NOTED

FIGURE 1
GOLD HILL STORE
FAIRBANKS, ALASKA

SITE LOCATION MAP



- LEGEND**
- ☒ BURIED HEATING OIL TANK
 - MONITORING WELL
 - DECOMMISSIONED MW
 - VAPOR EXTRACTION WELL
 - VAPOR EXTRACTION WELL (INSTALLED 2003)
 - AIR SPARGING WELL
 - AIR SPARGING WELL (INSTALLED 2003)
 - DOMESTIC WELL
 - ABANDONED SUPPLY WELL
 - FORMER SAMPLE LOCATION



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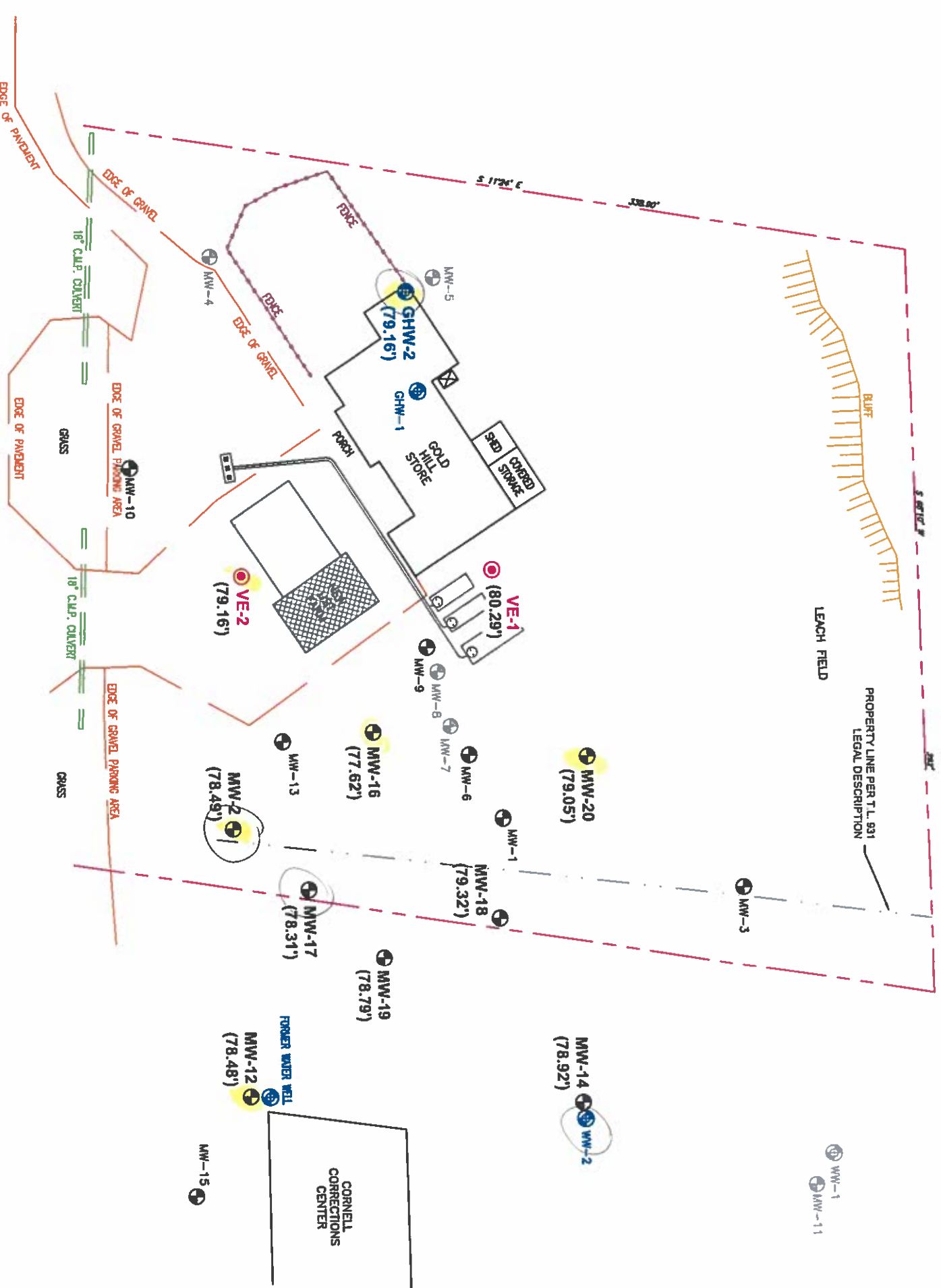
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DRAWN	DD
DATE	JUNE 2004
SCALE	1" = 50'

FIGURE 3
GOLD HILL STORE
FAIRBANKS, ALASKA

EXPLORATION & REMEDIATION PLAN

- LEGEND**
- ☒ BURIED HEATING OIL TANK
 - MONITORING WELL
 - DECOMMISSIONED MW
 - VAPOR EXTRACTION WELL
 - SUPPLY WELL
 - ABANDONED SUPPLY WELL
 - ☐ FORMER UST



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DRAWN	DD
DATE	JUNE 2004
SCALE	1" = 50'

FIGURE 4
GOLD HILL STORE
FAIRBANKS, ALASKA

MW-9 / VE-7

CONSTITUENT	DATE	DATE	DATE
B	9/5/02	6/4/03	355.0
T	2U	2U	20U
E	2U	2U	22.2
X	5.92	574	
GRO	0.09U	1.88	

VE-1

CONSTITUENT	DATE	DATE	DATE	DATE
B	9/5/02	6/4/03	10/29/03	5/14/04
T	15	1.15	0.5U	0.5U
E	2U	2U	2U	2U
X	2U	2U	2U	2U
GRO	0.247	0.09U	0.09U	0.09U

MW-13

CONSTITUENT	DATE	DATE	DATE
B	9/5/02	0.5U	
T	2U	2U	
E	2U	2U	
X	4U	4U	
GRO	0.09U		

GHW-2

CONSTITUENT	DATE	DATE	DATE
B	6/4/03	10/29/03	5/14/04
T	3.35	0.69	0.5
E	2U	0.5U	2U
X	2U	0.5U	2U
GRO	0.09U	0.09U	0.09U
MTBE	NT	NT	0.0011U
EDB	NT	NT	0.0000183U
EDC	NT	NT	0.0005U

VE-2

CONSTITUENT	DATE	DATE	DATE
B	9/5/02	6/4/03	5/14/04
T	0.5U	0.5U	0.5
E	2U	2U	2U
X	2U	2U	2U
GRO	0.09U	0.09U	0.09U
MTBE	NT	NT	0.0481
EDB	NT	NT	0.00208
EDC	NT	NT	0.00394

MW-10

CONSTITUENT	DATE	DATE	DATE
B	9/5/02	0.5U	
T	2U	2U	
E	2U	2U	
X	4U	4U	
GRO	0.09U		

MW-20

CONSTITUENT	DATE	DATE	DATE	DATE
B	7/11/03	10/29/03	5/13/04	17,500
T	2U	2U	2U	7,670
E	124	6.67	410	1,240
X	59	83.1	1,000	5,220
GRO	2.84	0.543	15.78	86.5
MTBE	NT	0.0248	0.006U	
EDB	NT	0.00474	0.0014	
EDC	NT	0.001U	0.082	
LEAD	NT	0.148	0.0989	

MW-1

CONSTITUENT	DATE	DATE	DATE
B	9/5/02	193	
T	2U	37.7	
E	2U	33.6	
X	4U	289	
GRO	1.47		

MW-3

CONSTITUENT	DATE	DATE	DATE
B	9/5/02	0.5U	
T	2U	2U	
E	2U	2U	
X	4U	4U	
GRO	0.09U		

MW-18

CONSTITUENT	DATE	DATE	DATE
B	7/11/03	10/30/03	5/14/04
T	0.5U	4.8	0.5U
E	2U	2U	2U
X	2U	2U	2U
GRO	0.09U	0.09U	0.09U

MW-14

CONSTITUENT	DATE	DATE	DATE
B	9/5/02	0.5U	
T	2U	2U	
E	2U	2U	
X	4U	4U	
GRO	0.09U		

MW-19

CONSTITUENT	DATE	DATE	DATE
B	7/11/03	10/30/03	5/14/04
T	0.5U	0.5U	0.5U
E	2U	2U	2U
X	2U	2U	2U
GRO	0.09U	0.09U	0.09U

MW-12

CONSTITUENT	DATE	DATE	DATE
B	9/5/02	0.5U	
T	2U	2U	
E	2U	2U	
X	4U	4U	
GRO	0.09U		

MW-15

CONSTITUENT	DATE	DATE	DATE
B	9/5/02	0.5U	
T	2U	2U	
E	2U	2U	
X	4U	4U	
GRO	0.09U		
MTBE	NT	0.018	
EDB	NT	0.00236	
EDC	NT	0.026	

MW-17

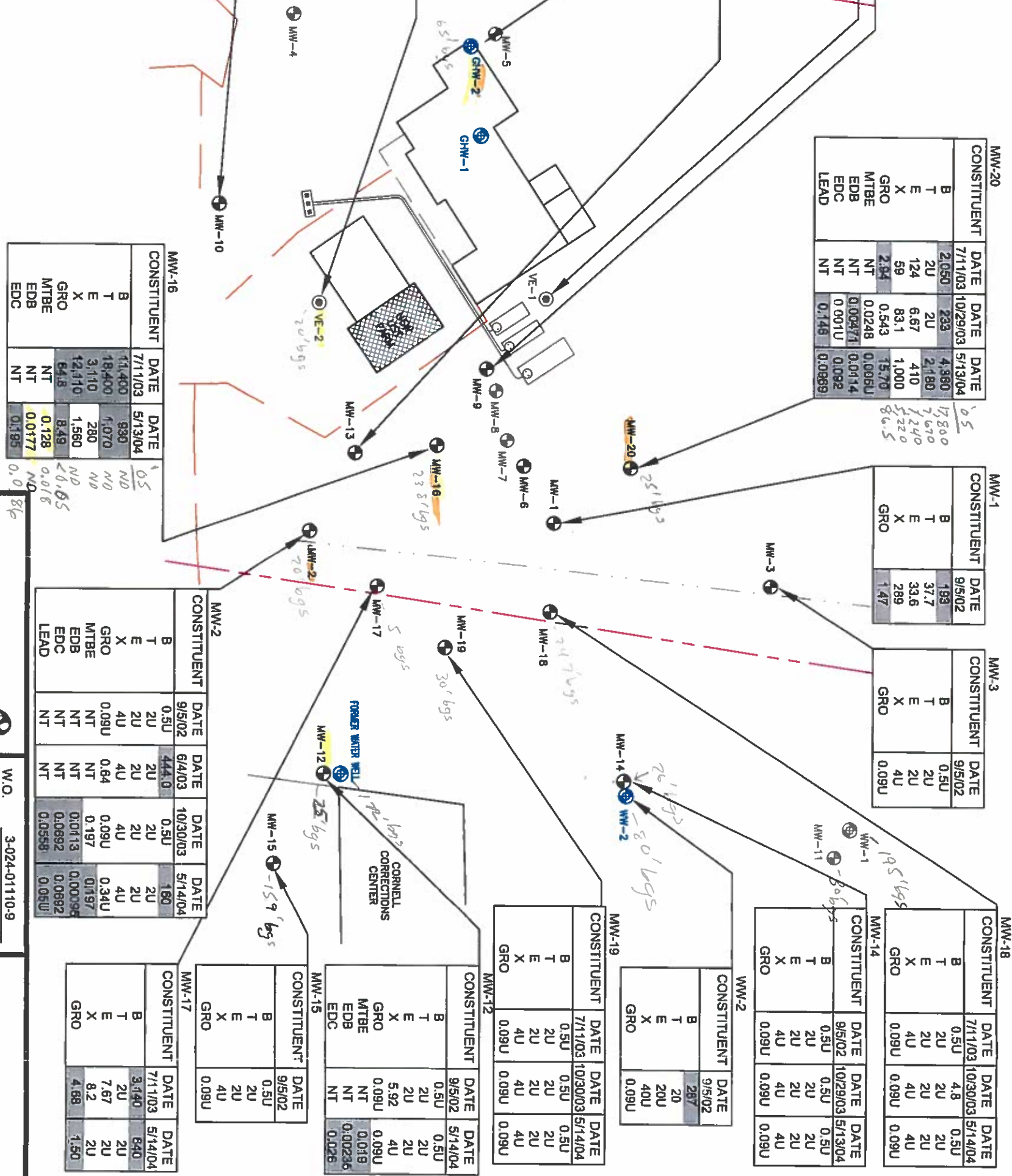
CONSTITUENT	DATE	DATE	DATE
B	9/5/02	0.5U	
T	2U	2U	
E	2U	2U	
X	4U	4U	
GRO	0.09U		

MW-2

CONSTITUENT	DATE	DATE	DATE	DATE
B	9/5/02	6/4/03	10/30/03	5/14/04
T	0.5U	444.0	0.5U	180
E	2U	2U	2U	2U
X	2U	2U	2U	2U
GRO	0.09U	0.64	0.09U	0.34U
MTBE	NT	0.197	0.0113	0.00197
EDB	NT	0.0892	0.0892	0.0892
EDC	NT	0.0558	0.0558	0.0558
LEAD	NT			

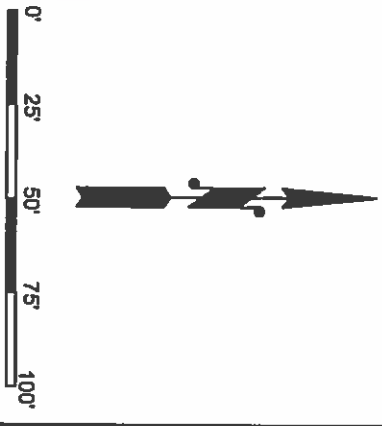
MW-16

CONSTITUENT	DATE	DATE	DATE	DATE
B	7/11/03	5/13/04	930	0.5
T	11,400	18,400	1,070	ND
E	3,110	12,110	280	ND
X	64.8	1,560	8.49	ND
GRO	0.128	0.0177		ND
MTBE	0.0177			ND
EDB				ND
EDC	0.195			ND



- LEGEND**
- MONITORING WELL
 - ⊕ DECOMMISSIONED MW
 - ⊙ SUPPLY WELL
 - ⊖ ABANDONED SUPPLY WELL
 - ⊙ VAPOR EXTRACTION WELL
 - ⊙ FORMER USE
 - SHADED VALUES INDICATE CONCENTRATIONS THAT EXCEED THE ADEC CLEANUP LEVELS

- B BENZENE
- T TOLUENE
- E ETHYLBENZENE
- X XYLENES
- MTBE METHYL TERT-BUTYLETHER
- EDB 1,2-DIBROMOETHANE
- EDC 1,2-DICHLOROETHANE
- GRO GASOLINE-RANGE ORGANICS
- GRO, MTBE, EDB, EDC in mg/L, LEAD BTEX in µg/L
- NT NOT TESTED



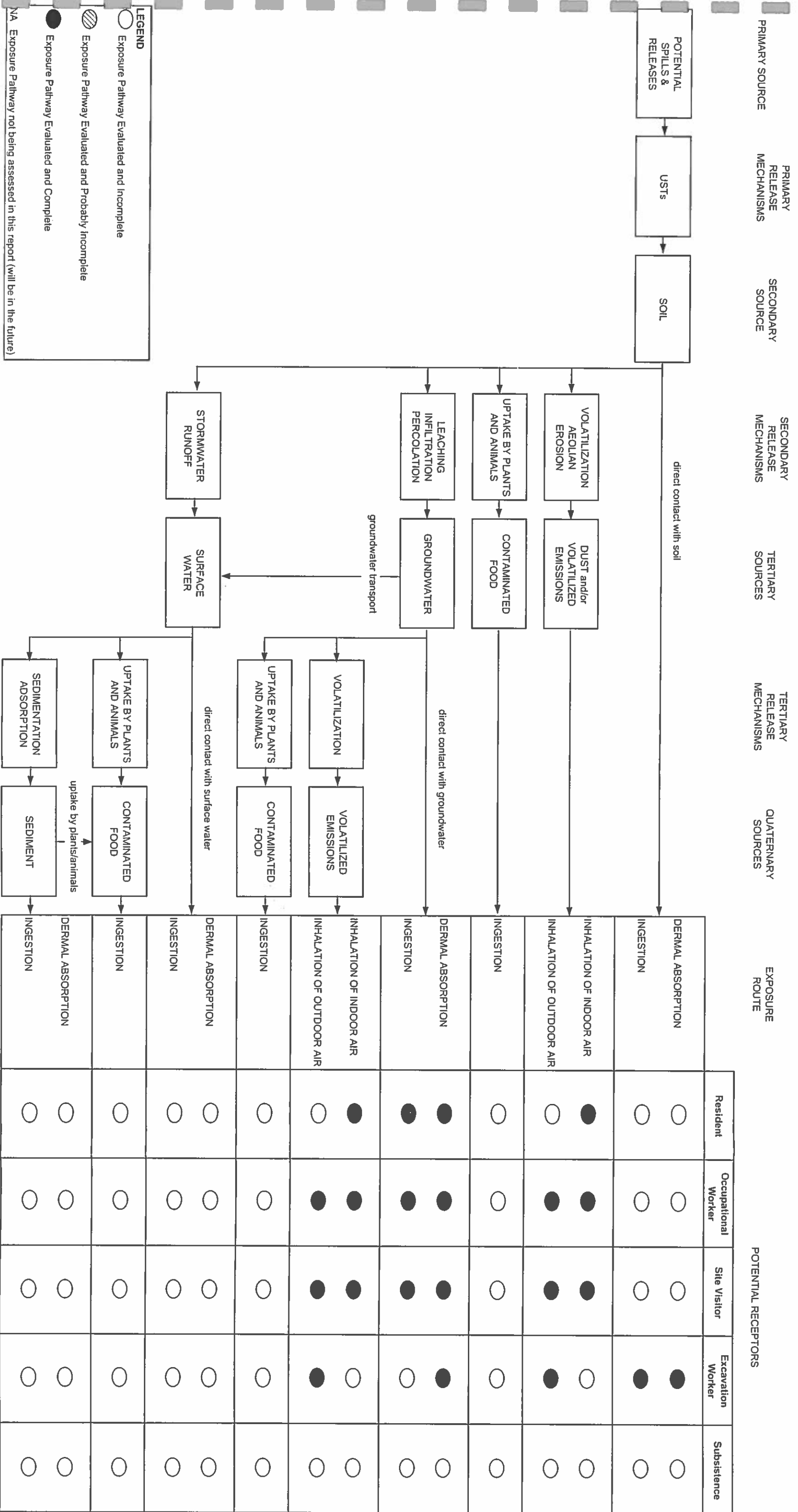
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FIGURE 5
GOLD HILL STORE
FAIRBANKS, ALASKA
GROUNDWATER CONTAMINANT CONCENTRATIONS MAP

Figure 6
Conceptual Site Model of Potentially Complete Exposure Pathways



APPENDIX A

Field Notes for Water Well and Groundwater Sampling Events

PROJECT NAME Gold Hill		PROJECT No. 3-024-01110-9	DATE 3/18/04
LOCATION Gold Hill Alaska		DAY OF WEEK Thursday	ARRIVAL TIME 1000
CLIENT OR OWNER Phil Carboy		CLIENT OR OWNER'S REPRESENTATIVE / PHONE No.	
SUBCONTRACTOR		SUBCONTRACTOR'S REPRESENTATIVE / PHONE No.	
AMEC FIELD REPRESENTATIVE Brian Peterson		AMEC PROJECT MANAGER Michelle Peterson	
WEATHER Snowing, 5F		EQUIPMENT USED Van	

Purpose: Collect groundwater samples from GHW-2 pre and post treatment (filter). Duplicate pre-treatment GRO and EDB.

Procedure: Post-treatment samples were collected from the liquor store bathroom sink tap. Water was allowed to run for 5-10 minutes prior to collecting samples directly from the tap.

Pre-treatment samples and duplicates were collected from the tap ahead of the treatment system in the Carboy residence. The tap was opened for 10 seconds prior to collecting samples directly from the tap.

Analyticals: VOCs and MTBE by EPA 524.2
EDB by EPA 504
GRO by AK 101

1115 offsite.

AMEC Field Representative



AMEC Project Manager

Contractor's Representative

Date

PROJECT NAME Gold Hill		PROJECT No. 3-024-01110-9	DATE 05/13/04
LOCATION Gold Hill Alaska		DAY OF WEEK Thursday	ARRIVAL TIME 0730
CLIENT OR OWNER Phil Carboy		CLIENT OR OWNER'S REPRESENTATIVE / PHONE No.	
SUBCONTRACTOR		SUBCONTRACTOR'S REPRESENTATIVE / PHONE No.	
AMEC FIELD REPRESENTATIVE Brian Peterson		AMEC PROJECT MANAGER Rolf Schottle	
WEATHER Clear, ~45F		EQUIPMENT USED Van, tools, Peristaltic pump, YSI, sample kit, tubing	

Purpose of visit was to collect groundwater samples from VE-1, VE-2, MW-2, MW-12, MW-14, MW-16 through 20 and GHW-2.

Collected groundwater samples from MW-14 and MW-16 for gasoline degrading bacteria analysis. Due to short (30 hr.) hold times, these samples were shipped immediately after collection. Returned to site with Steve Glynn at 1000. Collected remaining samples from MW-16 and MW-14, then collected groundwater samples from MW-20. Samples were collected using low flow methods and a YSI meter with flow-through cell. When parameters stabilized, samples were collected.

- MW-16 sample time was 11:25. 18 containers were submitted.
- MW-16 DUP sample time was 11:00. 3 containers were submitted.
- MW-14 sample time was 12:30. 12 containers were submitted.
- MW-20 sample time was 14:00. 18 containers were submitted.

See chain of custody for analytical suite.

Off site at 14:30. Will continue sampling tomorrow.

AMEC Field Representative  AMEC Project Manager _____
 Contractor's Representative _____ Date _____

05/13/04 Gold Hill

0730 Arrive on site

CLIENT: BP

EQUIP: Truax Peristaltic pump, YSI,
tubing, sample kit

WEATHER: 45°F, Clear

PURPOSE: Collect groundwater samples from
VE-1, VE-2, MW-2, MW-12, MW-14,
MW-16, MW-17, MW-18, MW-19, MW-20
and GHW-2.

PROCEDURE: First collect samples from MW-14
and MW-16 for gasoline degrading
bacteria analysis and get samples
to the UPS store (due to
short 30 hr. hold time).

MW-16

DTN = 16.70 DTB = 23.86

Sample depth = 20' ~~ft~~
(Below top of casing)

Bacterial sample time: 0815

MW-14

DTW = 16.62 DTB = 22.60

Sample Depth = 20'

Bacterial sample time 0845

Samples relinquished to The UPS store @ 0930

CREW: BP
Steve. Glynn.

05/13/01 GOLD HILL

Temp
Cond. \searrow stabilize
pH

Dissolved Ox. \searrow also record
Ox Red. Potential

For natural attenuation parameter samples.

1047

Calibrate YSI with 1413 μ S @ 25°C

Temp Cond. 1.438 mS/cm
Temp 17.75 °C
pH 7.63
D.O. 95.7
ORP 39

MN-16 begin @ 1055

Temp - 3.71°C
Specific Conductivity - 646 μ S/cm
384 μ S/cm
DO - 67.6%
DO% - 8.77
PH - 7.58
ORP - 44.5

11:02 T = 3.65 ORP = 42.7
C = 0.646 DO = 63.8
pH = 7.59

Sp C. 3.79 μ S/cm

11:20 T = 4.01 pH = 7.72
Sp C. = 0.643 ORP = 38.
C. = 387

DO% = 87
DC% = 11.29

11:30 T = 2.67 pH = 7.93
Sp C = 0.644 ORP = 9
C = 370
DO% = 84.2
DC mg/L = 11.37

Fe = 0

Sample Time 1125

MW 14 = FE = 0

05/13/04 GOLD HILL FE = 0

12:30 Time

Temp. 5.24°C
1.006 mS/cm

0.23

26.8

3.41

7.15

39.7

12.45

Temp

US / CM

US / CM

DO %

DO \rightarrow 2

PH

- ORP

12:55

4.34

0.917

555

47.3

6.13

7.34

48.01

1330 MW-20

DTW = 17.10 DTB = 24.90

13:50 = Time

5.43

1.107

690

96

11.85

7.2 - PH.

19.5 - ORP

13:55 = Time

4.7

1.077

659

71

9.35

7.14

32.8

14:00 = Time

4.38

1.086

658

69.6

9.02

7.13

37.0

Time 14:10

6.50

1.094

665

58.2

7.45

7.12 - PH

40.1 - ORP

05/13/04 GOLD HILL

SAMPLE NAME	TIME	# of CONTAINERS
MW-16	1125	18
MW-16 DUP	1125	3
MW-14	1230	12
MW-20	1400	18

Relinquished to SGS/CTHE


PROJECT NAME Gold Hill		PROJECT No. 3-024-01110-9	DATE 05/14/04
LOCATION Gold Hill Alaska		DAY OF WEEK Friday	ARRIVAL TIME 0645
CLIENT OR OWNER Phil Carboy		CLIENT OR OWNER'S REPRESENTATIVE / PHONE No.	
SUBCONTRACTOR		SUBCONTRACTOR'S REPRESENTATIVE / PHONE No.	
AMEC FIELD REPRESENTATIVE Brian Peterson		AMEC PROJECT MANAGER Rolf Schottle	
WEATHER Clear, ~45F		EQUIPMENT USED Van, tools, Peristaltic pump, YSI, sample kit, tubing	

Purpose: Continued groundwater sampling from 5/13/04. Wells sampled are MW-2, MW-12, MW-17, MW-18, MW-19, VE-1, VE-2, and GHW-2 (pre filter and post filter).

Procedure:

- Continued sampling procedure from 5/13/04 for MW-2 and MW-12 using YSI with flow-through cell.
- Collected sample GHW-2 post-treat directly from the bathroom sink tap in the liquor store side of the Gold Hill store. Water allowed to run for 5-10 minutes before collecting sample.
- Collected sample GHW-2 pre-treat from tap in water feed line (before the water treatment system) in the north-west corner of Mr. Carboy's living quarters at the Gold Hill Store. Purged about 1 gallon before sampling.
- Collect sample MW-17, MW-18, MW-19, VE-1, and VE-2 using peristaltic pump and dedicated disposable tubing. Tubing was purged before sample collection. Low flow sampling techniques were used.
- See Chain of Custody for information about analytical submittal.
- All collection completed and samples relinquished to lab at 1435.

Homestead drilling was onsite decommissioning 4 remediation wells. VE-4, AS-3, AS-6, and AS-7 were decommissioned by overdrilling and pulling out casings, then backfilling boring with bentonite and covering with native material. AS-3 was finished in concrete at parking lot surface.

AMEC Field Representative  AMEC Project Manager _____
 Contractor's Representative _____ Date _____

05/14/04
GND WLL

0645 Arrive on site

CREW: BP, Steve Glynn

EQUIP: Vac, Tools, Peristaltic Pump, YSI, Iron test kit, water interface probe.

WEATHER: ~45°F, Clear

PURPOSE: Continue sampling groundwater-

PROCEDURE: Continue from 05/13/04

Wells that are to be sampled today are VE-1, VE-2, MW-2, MW-12, MW-17, MW-18, MW-19, GHW-2

0710 Start MW-18

DTW = 13.70 DTB = 24.67

~~13.16~~ Cal. grade Y.S.I

13.16 °C

1.392

1077

83.9 00%

8.78

7.65 pH

35.0 ORP

MW-18 (Sampling Time 07:30)

YSI not used on MW-18. It was not required for that well. Calibration is to prepare for MW-12 and MW-2.

05/14/01 GOLD HILL

Time 07:30 sampling

3x40 mls GKO/137EX AK101

Sample time 0730

End MW-13 @ 0740.

0745 Begin working at MW-12

DTW = 18.30 DTB = 26.27

08:00 Time

3.61 °C

2.999 ms/cm

1756 µs/cm

17.4 DO%

2.21 DO mg/L

7.25 pH

2.9.8

08:05 Time

3.72 °C

2.962

1758

12.8

1.69

7.14 pH

34.2

05/14/01 Gold Hill

Start Sampling time 08:06

YSI @ 08:15

4.18

3.209 ms/cm

1935 µs/cm

7.6

0.90 DO mg/L

7.06

38.1

08:45 begin working at MW-2

DTW = 14.91

DTB = 19.70

09:00 Time

2.66 °C

0.761 ms/cm

440 µs/cm

10.2 DO%

1.30 DO mg/L

7.18 pH

78.4 O ORP

09:05 Time

2.76

0.744 ms/cm

428 µs/cm

7.3

1.06

7.14

81.0

VE-4 ML-1 to R-1
observe decommissioning.

8:30 AM Homestead Drilling on-site.
Meet w/ Nate to discuss scope
(4 wells to decom. by overdrilling)
Hold tailgate meeting & discuss
HASP briefly (Nate signed it
last fall for a separate drilling
job). COCs are petroleum
hydrocarbons

8:45 AM Gary Homestead on-site w/ 55-gal
drum for cuttings

9:10 AM Start overdrilling @ VE-4 (casing
could not be pulled. Gary off-site
to get supply truck.

09340 : Finished decommissioning ~~at~~ VE-4

Gold Hill
05/14/04

0920 Time
2:52
0:75
4:28
9:5
1:31

6:57 PH
95-6 CRP

9:55 Time
3:32
0:748
4:44
1:72

YSI
7:14
6804

MW-2 Sample time = 0925

0958 End MW-2
Ad upon As-3 to decom.

sampling

Gold Hill

05/14/04

start Time = 10:20 MW-17

DTW = 14.50 DTB = 24.88

3 x 40 ml's GRO/BTEX AK101

start Time 10:35

MW-19 start MW-19

DTW = 14.38 DTB = 30.10

3 x 40 ml's GRO/BTEX AK101

VE-1 start Time 11:00

DTW = 14.71 DTB = 17.88

3 x 40 ml's GRO/BTEX 101 AK101

Sample Time = 11:15

AS-3 = Decommissioning

10:15 commenced overdrilling at

AS-3 Drilled through casing & broke

up the top of the casing and

so drilled out the well ^{in the tailing}

This TOTE up casing, some casing was removed

2 Bags of Bentonite

5-6 feet to 1 foot below grade

filled with 3 to 4 inches of dirt

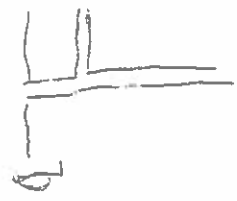
levelled to surface with cement

11:10 finished overdrilling.

Note: Horizontal line also affected

drilling & made necessary the PVC casing

impossible



Piping



Decommissioning AS-7

Set up @ 11:10
 11:15 LIFTED concrete lid/cover off surface!
 DT
 11:20: Started to lift PVC casing from well
 11:40 wells with horizontal PVC piping were breaking / fragments & so cannot be drilled out.
 Drill through frost, chipping up PVC as he goes down.
 - Once auger was pulled out the bentonite was put in
 11:50 1 bag of Bentonite

Decommissioning AS-6

Set up @ 11:20
 11:25: LIFTED concrete casing/cover of the well
 12:00: Again when the auger hit the horizontal line, the PVC fitting shattered & the Auger drilled through
 12:10 2 bags of bentonite
 12:15 1 of the drillers site with cement casing
 12:30 Finished decommissioning.

GHWZ POST TIME: 11:45

Sampling time = 12:00

• 3x4 omb's BTEX #PA524.2

• 3x40 nbs GRO AK101

GHWZ - PRE.

Returned at 1400 to collect
samples. 12 VOA's ~~later~~ submitted.

Do

All samples are submitted to lab.

Delivered samples at 1435.



Laboratory Analysis Report

200 W. Potter Drive
Anchorage, AK 99518-1605
Tel: (907) 562-2343
Fax: (907) 561-5301
Web: <http://www.sgsevenvironmental.com>

Brian Peterson
AMEC Earth and Environmental
431 Old Steese Hwy Suite 200
Fairbanks, AK 99701

Work Order:	1041993 302401109-04 Gold Hill Store
Client:	AMEC Earth and Environmental
Report Date:	June 01, 2004

Enclosed are the analytical results associated with the above workorder.

As required by the state of Alaska and the USEPA, a formal Quality Assurance/Quality Control Program is maintained by SGS. A copy of our Quality Control Manual that outlines this program is available at your request. The laboratory ADEC certification numbers are AK08-03 (DW), UST-005 (CS) and AK00971 (Micro).

Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS Quality Assurance Program Plan and the National Environmental Laboratory Accreditation Conference.

If you have any questions regarding this report or if we can be of any other assistance, please call your SGS Project Manager at (907) 562-2343.

The following descriptors may be found on your report which will serve to further qualify the data.

- PQL Practical Quantitation Limit (reporting limit).
- U Indicates the analyte was analyzed for but not detected.
- F Indicates an estimated value that falls below PQL, but is greater than the MDL.
- J The quantitation is an estimation.
- B Indicates the analyte is found in a blank associated with the sample.
- * The analyte has exceeded allowable regulatory or control limits.
- GT Greater Than
- D The analyte concentration is the result of a dilution.
- LT Less Than
- ! Surrogate out of control limits.
- Q QC parameter out of acceptance range.
- M A matrix effect was present.
- JL The analyte was positively identified, but the quantitation is a low estimation.
- E The analyte result is high outside of calibrated range.

Note: Soil samples are reported on a dry weight basis unless otherwise specified



SGS Ref.# 1041993001
Client Name AMEC Earth and Environmental
Project Name/# 302401109-04 Gold Hill Store
Client Sample ID MW-20
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time

Printed Date/Time 06/01/2004 14:03
Collected Date/Time 05/13/2004 14:00
Received Date/Time 05/13/2004 15:00
Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Ethane	0.00500 U	0.00500	mg/L	RSK-175	J			05/26/04	KWM
Methane	0.00500 U	0.00500	mg/L	RSK-175	J			05/26/04	KWM
Ethane	0.00500 U	0.00500	mg/L	RSK-175	J			05/26/04	KWM

Metals Department

Iron	3.06	0.200	mg/L	SW6010B	M		05/17/04	05/20/04	BAG
Lead	0.0969	0.0500	mg/L	SW6010B	M		05/17/04	05/20/04	BAG
Manganese	2.46	0.0200	mg/L	SW6010B	M		05/17/04	05/20/04	BAG

Waters Department

Sulfate	41.2	0.100	mg/L	EPA 300.0	Q			05/14/04	JJB
Ammonia-N	0.100 U	0.100	mg/L	4500-NH3 F	P		05/14/04	05/19/04	PLW
Nitrate-N	0.100 U	0.100	mg/L	EPA 300.0	Q			05/14/04	JJB
Ortho Phosphate-P	0.400 U	0.400	mg/L	EPA 300.0	Q			05/14/04	JJB
Sulfide	0.100 U	0.100	mg/L	EPA 376.2	O			05/14/04	AM
Total Organic Carbon	10.8	0.500	mg/L	EPA 415.1	R			05/15/04	JJB

Volatile Fuels Department

Gasoline Range Organics	15.7	0.900	mg/L	AK101 8021B	E		05/23/04	05/23/04	MCM
Benzene	4.36	0.0250	mg/L	AK101 8021B	F		05/23/04	05/24/04	MML
Toluene	2.18	0.0200	mg/L	AK101 8021B	E		05/23/04	05/23/04	MCM
Ethylbenzene	0.410	0.0200	mg/L	AK101 8021B	E		05/23/04	05/23/04	MCM
P & M -Xylene	0.574	0.0200	mg/L	AK101 8021B	E		05/23/04	05/23/04	MCM
o-Xylene	0.428	0.0200	mg/L	AK101 8021B	E		05/23/04	05/23/04	MCM

Surrogates

1,4-Difluorobenzene <surrogate>	104		%	AK101 8021B	E	75-111	05/23/04	05/23/04	MCM
4-Bromofluorobenzene <surrogate>	98.3		%	AK101 8021B	E	50-150	05/23/04	05/23/04	MCM



SGS Ref.# 1041993001
Client Name AMEC Earth and Environmental
Project Name/# 302401109-04 Gold Hill Store
Client Sample ID MW-20
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
Printed Date/Time 06/01/2004 14:03
Collected Date/Time 05/13/2004 14:00
Received Date/Time 05/13/2004 15:00
Technical Director Stephen C. Ede

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Gas Chromatography/Mass Spectroscopy									
1,2-Dichloroethane	0.0920	0.00100	mg/L	SW8260B	B		05/19/04	05/19/04	TJE
Methyl-t-butyl ether	0.00500 U	0.00500	mg/L	SW8260B	B		05/19/04	05/19/04	TJE
Surrogates									
Dibromofluoromethane <surr>	87		%	SW8260B	B	85-115	05/19/04	05/19/04	TJE
1,2-Dichloroethane-D4 <surr>	81.8		%	SW8260B	B	72-119	05/19/04	05/19/04	TJE
4-Bromofluorobenzene <surr>	95.6		%	SW8260B	B	78-124	05/19/04	05/19/04	TJE
Toluene-d8 <surr>	95.9		%	SW8260B	B	84-113	05/19/04	05/19/04	TJE
EDB+DBCP by Microextraction									
1,2-Dibromo-3-chloropropane	0.0192 U	0.0192	ug/L	EPA 504	G	(<=0.2)	05/21/04	05/21/04	WAA
1,2-Dibromoethane	11.4	* 1.92	ug/L	EPA 504	G	(<=0.05)	05/21/04	05/22/04	WAA
Surrogates									
1,3-Dichlorobenzene <surr>	105		%	EPA 504	G	30-120	05/21/04	05/21/04	WAA



SGS Ref.# 1041993002
Client Name AMEC Earth and Environmental
Project Name/# 302401109-04 Gold Hill Store
Client Sample ID MW-14
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
Printed Date/Time 06/01/2004 14:03
Collected Date/Time 05/13/2004 12:30
Received Date/Time 05/13/2004 15:00
Technical Director Stephen C. Ede

Released By

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Methane	0.00500 U	0.00500	mg/L	RSK-175	E			05/26/04	KWM
Ethane	0.00500 U	0.00500	mg/L	RSK-175	E			05/26/04	KWM
Ethene	0.00500 U	0.00500	mg/L	RSK-175	E			05/26/04	KWM

Metals Department

Iron	0.200 U	0.200	mg/L	SW6010B	G		05/17/04	05/20/04	BAG
Manganese	0.0200 U	0.0200	mg/L	SW6010B	G		05/17/04	05/20/04	BAG

Waters Department

Sulfate	37.8	0.100	mg/L	EPA 300.0	H			05/14/04	JJB
Ammonia-N	0.100 U	0.100	mg/L	4500-NH3 F	J		05/14/04	05/19/04	PLW
Nitrate-N	15.8	0.100	mg/L	EPA 300.0	H			05/14/04	JJB
Ortho Phosphate-P	0.400 U	0.400	mg/L	EPA 300.0	H			05/14/04	JJB
Sulfide	0.100 U	0.100	mg/L	EPA 376.2	I			05/14/04	AM
Total Organic Carbon	3.49	0.500	mg/L	EPA 415.1	L			05/15/04	JJB

Volatile Fuels Department

Gasoline Range Organics	0.0900 U	0.0900	mg/L	AK101 8021B	A		05/23/04	05/23/04	MCM
Benzene	0.000500 U	0.000500	mg/L	AK101 8021B	A		05/23/04	05/23/04	MCM
Toluene	0.00200 U	0.00200	mg/L	AK101 8021B	A		05/23/04	05/23/04	MCM
Ethylbenzene	0.00200 U	0.00200	mg/L	AK101 8021B	A		05/23/04	05/23/04	MCM
P & M -Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	A		05/23/04	05/23/04	MCM
o-Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	A		05/23/04	05/23/04	MCM

Surrogates

1,4-Difluorobenzene <sur>	92.5		%	AK101 8021B	A	75-111	05/23/04	05/23/04	MCM
4-Bromofluorobenzene <sur>	91.9		%	AK101 8021B	A	50-150	05/23/04	05/23/04	MCM



SGS Ref.# 1041993003
Client Name AMEC Earth and Environmental
Project Name/# 302401109-04 Gold Hill Store
Client Sample ID MW-16
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
Printed Date/Time 06/03/2004 11:37
Collected Date/Time 05/13/2004 11:25
Received Date/Time 05/13/2004 15:00
Technical Director Stephen C. Ede
Released By *Stephen C. Ede*

Sample Remarks:

Corrected Report: 1,2 Dichloroethane reporting out.
8260 - 1,2-Dichloroethane is reported above the calibration range.

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Methane	0.00500 U	0.00500	mg/L	RSK-175	J			05/26/04	KWM
Ethene	0.00500 U	0.00500	mg/L	RSK-175	J			05/26/04	KWM
Ethane	0.00500 U	0.00500	mg/L	RSK-175	J			05/26/04	KWM

Metals Department

Iron	12.0	0.200	mg/L	SW6010B	M		05/17/04	05/20/04	BAG
Manganese	0.800	0.0200	mg/L	SW6010B	M		05/17/04	05/20/04	BAG

Waters Department

Sulfate	33.3	0.100	mg/L	EPA 300.0	N			05/14/04	JJB
Ammonia-N	0.100 U	0.100	mg/L	4500-NH3 F	P		05/14/04	05/19/04	PLW
Nitrate-N	0.100 U	0.100	mg/L	EPA 300.0	N			05/14/04	JJB
Ortho Phosphate-P	0.400 U	0.400	mg/L	EPA 300.0	N			05/14/04	JJB
Sulfide	0.100 U	0.100	mg/L	EPA 376.2	O			05/14/04	AM
Total Organic Carbon	7.31	0.500	mg/L	EPA 415.1	R			05/15/04	JJB

Volatile Fuels Department

Gasoline Range Organics	8.49	0.900	mg/L	AK101 8021B	B		05/23/04	05/23/04	MCM
Benzene	0.930	0.00500	mg/L	AK101 8021B	B		05/23/04	05/23/04	MCM
Toluene	1.07	0.0200	mg/L	AK101 8021B	B		05/23/04	05/23/04	MCM
Ethylbenzene	0.283	0.0200	mg/L	AK101 8021B	B		05/23/04	05/23/04	MCM
P & M -Xylene	1.01	0.0200	mg/L	AK101 8021B	B		05/23/04	05/23/04	MCM
o-Xylene	0.546	0.0200	mg/L	AK101 8021B	B		05/23/04	05/23/04	MCM

Surrogates

1,4-Difluorobenzene <surrogate>	97.6		%	AK101 8021B	B	75-111	05/23/04	05/23/04	MCM
4-Bromofluorobenzene <surrogate>	103		%	AK101 8021B	B	50-150	05/23/04	05/23/04	MCM



SGS Ref.# 1041993003
Client Name AMEC Earth and Environmental
Project Name/# 302401109-04 Gold Hill Store
Client Sample ID MW-16
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
Printed Date/Time 06/03/2004 11:37
Collected Date/Time 05/13/2004 11:25
Received Date/Time 05/13/2004 15:00
Technical Director Stephen C. Ede

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Gas Chromatography/Mass Spectroscopy									
1,2-Dichloroethane	0.195	0.00100	mg/L	SW8260B	A		05/19/04	05/19/04	TJE
Methyl-t-butyl ether	0.128	0.00500	mg/L	SW8260B	A		05/19/04	05/19/04	TJE
Surrogates									
Dibromofluoromethane <surr>	91.4		%	SW8260B	A	85-115	05/19/04	05/19/04	TJE
1,2-Dichloroethane-D4 <surr>	89.9		%	SW8260B	A	72-119	05/19/04	05/19/04	TJE
Toluene-d8 <surr>	94.1		%	SW8260B	A	84-113	05/19/04	05/19/04	TJE
4-Bromofluorobenzene <surr>	92.5		%	SW8260B	A	78-124	05/19/04	05/19/04	TJE
EDB+DBCP by Microextraction									
1,2-Dibromo-3-chloropropane	0.0189 U	0.0189	ug/L	EPA 504	G	(<=0.2)	05/21/04	05/21/04	WAA
1,2-Dibromoethane	17.7	* 1.89	ug/L	EPA 504	G	(<=0.05)	05/21/04	05/22/04	WAA
Surrogates									
1,3-Dichlorobenzene <surr>	116		%	EPA 504	G	30-120	05/21/04	05/21/04	WAA



SGS Ref.# 1041993004
Client Name AMEC Earth and Environmental
Project Name/# 302401109-04 Gold Hill Store
Client Sample ID MW-16 DUP
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
Printed Date/Time 06/01/2004 14:03
Collected Date/Time 05/13/2004 11:25
Received Date/Time 05/13/2004 15:00
Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Gasoline Range Organics	9.66	0.900	mg/L	AK101 8021B	B		05/23/04	05/24/04	MCM
Benzene	1.00	0.00500	mg/L	AK101 8021B	B		05/23/04	05/24/04	MCM
Toluene	1.29	0.0200	mg/L	AK101 8021B	B		05/23/04	05/24/04	MCM
Ethylbenzene	0.347	0.0200	mg/L	AK101 8021B	B		05/23/04	05/24/04	MCM
P & M -Xylene	1.12	0.0200	mg/L	AK101 8021B	B		05/23/04	05/24/04	MCM
o-Xylene	0.637	0.0200	mg/L	AK101 8021B	B		05/23/04	05/24/04	MCM
Surrogates									
1,4-Difluorobenzene <surrogate>	98.1		%	AK101 8021B	B	75-111	05/23/04	05/24/04	MCM
4-Bromofluorobenzene <surrogate>	101		%	AK101 8021B	B	50-150	05/23/04	05/24/04	MCM



SGS Ref.# 1041993005
Client Name AMEC Earth and Environmental
Project Name/# 302401109-04 Gold Hill Store
Client Sample ID Trip Blank
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time

Printed Date/Time 06/01/2004 14:03
Collected Date/Time 05/13/2004 11:25
Received Date/Time 05/13/2004 15:00
Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Gasoline Range Organics	0.0900 U	0.0900	mg/L	AK101 8021B	F		05/25/04	05/26/04	MML
Benzene	0.000500 U	0.000500	mg/L	AK101 8021B	F		05/25/04	05/26/04	MML
Toluene	0.00200 U	0.00200	mg/L	AK101 8021B	F		05/25/04	05/26/04	MML
Ethylbenzene	0.00200 U	0.00200	mg/L	AK101 8021B	F		05/25/04	05/26/04	MML
P & M -Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	F		05/25/04	05/26/04	MML
o-Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	F		05/25/04	05/26/04	MML
Surrogates									
1,4-Difluorobenzene <surr>	86.9		%	AK101 8021B	F	75-111	05/25/04	05/26/04	MML
4-Bromofluorobenzene <surr>	91.6		%	AK101 8021B	F	50-150	05/25/04	05/26/04	MML
Volatile Gas Chromatography/Mass Spectroscopy									
1,2-Dichloroethane	0.00100 U	0.00100	mg/L	SW8260B	A		05/19/04	05/19/04	TJE
Methyl-t-butyl ether	0.00500 U	0.00500	mg/L	SW8260B	A		05/19/04	05/19/04	TJE
Surrogates									
Dibromofluoromethane <surr>	107		%	SW8260B	A	85-115	05/19/04	05/19/04	TJE
1,2-Dichloroethane-D4 <surr>	108		%	SW8260B	A	72-119	05/19/04	05/19/04	TJE
4-Bromofluorobenzene <surr>	114		%	SW8260B	A	78-124	05/19/04	05/19/04	TJE
Toluene-d8 <surr>	102		%	SW8260B	A	84-113	05/19/04	05/19/04	TJE
EDB+DBCP by Microextraction									
1,2-Dibromo-3-chloropropane	0.0185 U	0.0185	ug/L	EPA 504	G	(<=0.2)	05/21/04	05/21/04	WAA
1,2-Dibromoethane	0.0185 U	0.0185	ug/L	EPA 504	G	(<=0.05)	05/21/04	05/21/04	WAA
Surrogates									
1,3-Dichlorobenzene <surr>	86.7		%	EPA 504	G	30-120	05/21/04	05/21/04	WAA

SGS

SAMPLE RECEIPT FORM

CT&E WO#:

1041993



Yes No NA

- called Are samples RUSH, priority, or w/n 72 hrs. of hold time?
- If yes have you done e-mail notification?
- Are samples within 24 hrs. of hold time or due date?
- If yes, have you spoken with Supervisor?
- Archiving bottles - if req., are they properly marked?
- Are there any problems? PM Notified? _____
- Were samples preserved correctly and pH verified? _____
- _____
- _____
- If this is for PWS, provide PWSID. _____
- Will courier charges apply? _____
- _____ Method of payment? _____
- Data package required? (Level: 1 / 2 / 3 / 4) _____
- _____ Notes: _____
- Is this a DoD project? (USACE, Navy, AFCEE) _____

Due Date: 5-19-04
 Received Date: 5/12/04
 Received Time: 1500
 Is date/time conversion necessary? NO
 # of hours to AK Local Time: _____
 Thermometer ID: Long Stem A

Cooler ID	Temp Blank	Cooler Temp
<u>1</u>	°C	<u>9.9</u> °C
_____	°C	_____ °C
_____	°C	_____ °C
_____	°C	_____ °C
_____	°C	_____ °C

*Temperature readings include thermometer correction factors

Delivery method (circle all that apply): Client /
 Alert Courier / UPS / FedEx / USPS /
 AA Goldstreak / NAC / ERA / PenAir / Carliie
 Lynden / SGS-CT&E / Other: _____

Airbill # _____

Additional Sample Remarks: (if applicable)

- _____ Extra Sample Volume?
- _____ Limited Sample Volume?
- _____ Field preserved for volatiles?
- _____ Field-filtered for dissolved? _____
- _____ Lab-filtered for dissolved? _____
- _____ Ref Lab required? _____
- _____ Foreign Soil? _____

This section must be filled out for DoD projects (USACE, Navy, AFCEE)

- | Yes | No | | Samples/Analyses Affected: |
|-------|-------|---|----------------------------|
| _____ | _____ | Is received temperature $4 \pm 2^\circ\text{C}$? | _____ |
| _____ | _____ | Exceptions: _____ | _____ |
| _____ | _____ | Rad Screen performed? | _____ |
| _____ | _____ | Result: _____ | _____ |
| _____ | _____ | Was there an airbill? (Note: if above in the right hand column) | _____ |
| _____ | _____ | Was cooler sealed with custody seals? Faxed to COE? _____ | _____ |
| _____ | _____ | # / where: _____ | _____ |
| _____ | _____ | Were seal(s) intact upon arrival? | _____ |
| _____ | _____ | Was there a COC with cooler? | _____ |
| _____ | _____ | Was the COC filled out properly? | _____ |
| _____ | _____ | Did the COC indicate ACOE / AFCEE project? (if applicable) | _____ |
| _____ | _____ | Did the COC and samples correspond? | _____ |
| _____ | _____ | Were all sample packed to prevent breakage? | _____ |
| _____ | _____ | Packing material: _____ | _____ |
| _____ | _____ | Were all samples unbroken and clearly labeled? | _____ |
| _____ | _____ | Were all samples sealed in separate plastic bags? | _____ |
| _____ | _____ | Were all VOCs free of headspace and/or MeOH preserved? | _____ |
| _____ | _____ | Were correct container / sample sizes submitted? | _____ |
| _____ | _____ | Is sample condition good? | _____ |
| _____ | _____ | Was copy of CoC and Sample Receipt Forms given to PM? | _____ |

This section must be filled if problems are found.

Yes No
 _____ Was client notified of problems?

Individual contacted: _____
 Via: Phone / Fax / Email (circle one)
 Date/Time: _____
 Reason for contact: _____

SGS/CT&E Contact: _____

Notes:

Sample dates & times
 1: 5-13 1400
 2: 5-13 1230
 3: 5-13 1125
 4: 5-13 1126

Completed by (sign):

(print):

James Johnson

Login proof (check one) waived required _____

performed by: _____

SGS

1041993



CT&E WO#:

SAMPLE RECEIPT FORM FOR TRANSFERS
From
FAIRBANKS, ALASKA OR HONOLULU, HAWAII
To
ANCHORAGE, AK

TO BE COMPLETED IN ANCHORAGE UPON ARRIVAL FROM FAIRBANKS OR HAWAII.
NOTES RECORDED BELOW ARE ACTIONS NEEDED UPON ARRIVAL IN ANCHORAGE.

Notes: please check PH

Receipt Date / Time: 5-24-04 0900
Is Sample Date/Time Conversion Necessary? Yes _____ No
Number of Hours From Alaska Standard Time: _____
Foreign Soil? Yes _____ No

COOLER AND TEMP BLANK READINGS*

Cooler ID	Temp Blank	Cooler	Cooler ID	Temp Blank	Cooler
<u>1</u>	<u>✓</u>	<u>4.1</u>	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

CUSTODY SEALS INTACT: YES NO # / WHERE: Conformity, Tonback

COMPLETED BY (INITIAL): SUS

*Temperature readings include thermometer correction factors.

1041993



CT&E WO#:

SAMPLE RECEIPT FORM (page 2)

SGS

#	(Container ID)	Matrix	Test	QC	TB	Container Volume							Container Type							Preservative						Other														
						1 L	500 mL	250 mL	125 mL	60 mL	40 mL	80Z (250 mL)	40Z (125 mL)	Other	AG	CG	HDPB	Nalgene	Cubic	Coll	Sepia	Other	None	HCl	HNO ₃		H ₂ SO ₄	MeOH	Na ₂ S ₂ O ₈	NaOH										
1	A-C D-F	1	GAO/STEX MTSE, EDC E.O.B				300 mL	250 mL	125 mL	60 mL	40 mL	80Z (250 mL)	40Z (125 mL)	Other	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
	G-I S-L		ASK175				2	2	2	2					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	M N O P Q R		Pb, Fe, Mn NO ₃ , SO ₄ Sulphide Ammonia O-Phos TOC				2	2	2	2					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
2	A-C D-F G-I	1	GAO/STEX ASK 175 Fe, Mn NO ₃ , SO ₄ Sulphide Ammonia O-Phos TOC				500 mL	250 mL	125 mL	60 mL	40 mL	80Z (250 mL)	40Z (125 mL)	Other	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	H I J K L							1	1	1	1				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	A-C	1	GAO/STEX				500 mL	250 mL	125 mL	60 mL	40 mL	80Z (250 mL)	40Z (125 mL)	Other	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	A-C D-F G-I		GAO/STEX MTSE, EDC E.O.B				500 mL	250 mL	125 mL	60 mL	40 mL	80Z (250 mL)	40Z (125 mL)	Other	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Bottle Totals	
12	642

Completed by:

Date: 5-14-04



SGS Ref.# 1042000001
 Client Name AMEC Earth and Environmental
 Project Name/# Gold Hill Store Grant 15044032
 Client Sample ID MW-2
 Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
 Printed Date/Time 05/28/2004 17:11
 Collected Date/Time 05/14/2004 9:25
 Received Date/Time 05/15/2004 8:30
 Technical Director Stephen C. Ede

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Gas Chromatography/Mass Spectroscopy									
1,2-Dichloroethane	0.0858	0.00100	mg/L	SW8260B	K		05/26/04	05/26/04	TJE
Methyl-t-butyl ether	0.00538	0.00500	mg/L	SW8260B	K		05/26/04	05/26/04	TJE
Surrogates									
Dibromofluoromethane <surr>	91.8		%	SW8260B	K	85-115	05/26/04	05/26/04	TJE
1,2-Dichloroethane-D4 <surr>	90.7		%	SW8260B	K	72-119	05/26/04	05/26/04	TJE
4-Bromofluorobenzene <surr>	114		%	SW8260B	K	78-124	05/26/04	05/26/04	TJE
Toluene-d8 <surr>	108		%	SW8260B	K	84-113	05/26/04	05/26/04	TJE
EDB+DBCP by Microextraction									
1,2-Dibromo-3-chloropropane	0.0183 U	0.0183	ug/L	EPA 504	I	(<=0.2)	05/21/04	05/21/04	WAA
1,2-Dibromoethane	0.950	* 0.0916	ug/L	EPA 504	I	(<=0.05)	05/21/04	05/22/04	WAA
Surrogates									
1,3-Dichlorobenzene <surr>	62.5		%	EPA 504	I	30-120	05/21/04	05/21/04	WAA



SGS Ref.# 1042000001
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill Store Grant 15044032
Client Sample ID MW-2
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time

Printed Date/Time 05/28/2004 17:11
Collected Date/Time 05/14/2004 9:25
Received Date/Time 05/15/2004 8:30
Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Ethene	0.00500 U	0.00500	mg/L	RSK-175	J			05/26/04	KWM
Ethane	0.00500 U	0.00500	mg/L	RSK-175	J			05/26/04	KWM
Methane	0.00537	0.00500	mg/L	RSK-175	J			05/26/04	KWM
Metals Department									
Iron	0.832	0.200	mg/L	SW6010B	M		05/18/04	05/26/04	BAG
Lead	0.0500 U	0.0500	mg/L	SW6010B	M		05/18/04	05/26/04	BAG
Manganese	0.0287	0.0200	mg/L	SW6010B	M		05/18/04	05/26/04	BAG
Waters Department									
Sulfate	26.6	0.100	mg/L	EPA 300.0				05/18/04	JJB
Ammonia-N	0.100 U	0.100	mg/L	4500-NH3 F	P		05/20/04	05/21/04	PLW
Nitrate-N	0.347	0.100	mg/L	EPA 300.0	N			05/15/04	JJB
Ortho Phosphate-P	0.400 U	0.400	mg/L	EPA 300.0	N			05/15/04	JJB
Sulfide	0.100 U	0.100	mg/L	EPA 376.2	O			05/20/04	KC
Total Organic Carbon	2.45	0.500	mg/L	EPA 415.1	R			05/24/04	JJB
Volatile Fuels Department									
Gasoline Range Organics	0.344	0.0900	mg/L	AK101 8021B	E		05/25/04	05/25/04	MML
Benzene	0.160	0.000500	mg/L	AK101 8021B	E		05/25/04	05/25/04	MML
Toluene	0.00200 U	0.00200	mg/L	AK101 8021B	E		05/25/04	05/25/04	MML
Ethylbenzene	0.00200 U	0.00200	mg/L	AK101 8021B	E		05/25/04	05/25/04	MML
P & M -Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	E		05/25/04	05/25/04	MML
o-Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	E		05/25/04	05/25/04	MML
Surrogates									
1,4-Difluorobenzene <sur>	101		%	AK101 8021B	E	75-111	05/25/04	05/25/04	MML
4-Bromofluorobenzene <sur>	95.1		%	AK101 8021B	E	50-150	05/25/04	05/25/04	MML

1042000



SGS

SAMPLE RECEIPT FORM CT&E WO#:

- Yes No ^{NA} Are samples RUSH, priority, or win 72 hrs. of hold time?
- If yes have you done e-mail notification?
- Are samples within 24 hrs. of hold time or due date?
- If yes, have you spoken with Supervisor?
- Archiving bottles - if req., are they properly marked?
- Are there any problems? PM Notified?
- Were samples preserved correctly and pH verified?
- dates/times of collection from labels - Add 5/15/04
- If this is for PWS, provide PWSID.
- Will courier charges apply?
- Method of payment?
- Data package required? (Level: 1 / 2 / 3 / 4)
- Notes: _____
- Is this a DoD project? (USACE, Navy, AFCEE)

Due Date: 5/25/04
 Received Date: 5/14/04
 Received Time: 2:30pm
 Is date/time conversion necessary? NO
 # of hours to AK Local Time: _____
 Thermometer ID: Longstem A

Cooler ID	Temp Blank	Cooler Temp
#1	3.7 °C	3.7 °C
	°C	°C
	°C	°C
	°C	°C
	°C	°C

*Temperature readings include thermometer correction factors

Delivery method (circle all that apply) Client
 Alert Courier / UPS / FedEx / USPS /
 AA Goldstreak / NAC / ERA / PenAir / Cartile
 Lynden / SGS-CT&E / Other: _____
 Airbill # Fxxg Ane

This section must be filled out for DoD projects (USACE, Navy, AFCEE)

Yes	No	Is received temperature $\pm 2^{\circ}\text{C}$?	Samples/Analyses Affected:
_____	_____	Exceptions: _____	_____
_____	_____	Rad Screen performed?	_____
_____	_____	Result: _____	_____
_____	_____	Was there an airbill? (Note # above in the right hand column)	_____
_____	_____	Was cooler sealed with custody seals? Faxed to COE? _____	_____
_____	_____	# / where: _____	_____
_____	_____	Were seal(s) intact upon arrival?	_____
_____	_____	Was there a COC with cooler?	_____
_____	_____	Was the COC filled out properly?	_____
_____	_____	Did the COC indicate AC/OE / AFCEE project? (if applicable)	_____
_____	_____	Did the COC and samples correspond?	_____
_____	_____	Were all sample packed to prevent breakage?	_____
_____	_____	Packing material: _____	_____
_____	_____	Were all samples unbroken and clearly labeled?	_____
_____	_____	Were all samples sealed in separate plastic bags?	_____
_____	_____	Were all VOCs free of headspace and/or MeOH preserved?	_____
_____	_____	Were correct container / sample sizes submitted?	_____
_____	_____	Is sample condition good?	_____
_____	_____	Was copy of CoC and Sample Receipt forms given to PM?	_____

- Additional Sample Remarks: (✓ if applicable)
- Extra Sample Volume? _____
 - Limited Sample Volume? _____
 - Field preserved for volatiles? _____
 - Field-filtered for dissolved? _____
 - Lab-filtered for dissolved? _____
 - Ref Lab required? _____
 - Foreign Soil? _____

This section must be filled if problems are found.

Yes No
 Was client notified of problems? _____

Individual contacted: _____
 Via: Phone / Fax / Email (circle one)
 Date/Time: _____
 Reason for contact: _____

SGS/CT&E Contact: _____

Notes: _____

Completed by (sign): ASH/MD (print): H Hall / M Debenham
 Login proof (check one): waived _____ required _____ performed by: _____

SGS

1682

1042000



SAMPLE RECEIPT FORM (page 2)

CT&E WO#:

#	Container ID	Matrix	Test	QC	TB	Container Volume							Container Type							Preservative																				
						1L	500 mL	250 mL	125 mL	60 mL	40 mL	8oz (125 mL)	4oz (125 mL)	Other	AG	CG	HDPH	Nalgene	Cubic	Coll.	Septa	Other	None	HCl	HNO ₃	H ₂ SO ₄	MeOH	Na ₂ S ₂ O ₅	NaOH	Other										
1	A-C D-F G-I J-L M N O P Q R		GROBTEX								3/6						X					X																		
			MTBE/EDC									3/6						X					X																	
			EDB									3/6						X					X																	
			Methane									3/6						X					X																	
			Fe, Pb, Mn															X					X																	
			Nitrate/Sulfide															X					X																	
			Sulfide																X				X																	
2	A-C D-F G-I J-L M N O P Q R		GROBTEX														X				X																			
			MTBE/EDC															X				X																		
			EDB															X				X																		
			Methane															X				X																		
			Fe, Mn															X				X																		
			Nitrate/Sulfide															X				X																		
			Sulfide																X			X																		
			Manganese																X			X																		
3	A-C D-F G-I		TOC														X			X																				
			GROBTEX															X			X																			
			MTBE/EDC															X			X																			
			EDB															X			X																			
Bottle Totals	8	433																																						

Bottle Totals	8	433
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Completed by: *Melody Deth* Date: *5/14/04*



Laboratory Analysis Report

200 W. Potter Drive
Anchorage, AK 99518-1605
Tel: (907) 562-2343
Fax: (907) 561-5301
Web: <http://www.sgsevenvironmental.com>

Brian Peterson
AMEC Earth and Environmental
431 Old Steese Hwy Suite 200
Fairbanks, AK 99701

Work Order: 1042000
Gold Hill Store Grant 15044032
Client: AMEC Earth and Environmental
Report Date: May 28, 2004

Enclosed are the analytical results associated with the above workorder.

As required by the state of Alaska and the USEPA, a formal Quality Assurance/Quality Control Program is maintained by SGS. A copy of our Quality Control Manual that outlines this program is available at your request. The laboratory ADEC certification numbers are AK08-03 (DW), UST-005 (CS) and AK00971 (Micro).

Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS Quality Assurance Program Plan and the National Environmental Laboratory Accreditation Conference.

If you have any questions regarding this report or if we can be of any other assistance, please call your SGS Project Manager at (907) 562-2343.

The following descriptors may be found on your report which will serve to further qualify the data.

- PQL Practical Quantitation Limit (reporting limit).
- U Indicates the analyte was analyzed for but not detected.
- F Indicates an estimated value that falls below PQL, but is greater than the MDL.
- J The quantitation is an estimation.
- B Indicates the analyte is found in a blank associated with the sample.
- * The analyte has exceeded allowable regulatory or control limits.
- GT Greater Than
- D The analyte concentration is the result of a dilution.
- LT Less Than
- ! Surrogate out of control limits.
- Q QC parameter out of acceptance range.
- M A matrix effect was present.
- JL The analyte was positively identified, but the quantitation is a low estimation.
- E The analyte result is high outside of calibrated range.

Note: Soil samples are reported on a dry weight basis unless otherwise specified

SGS Environmental
Signature: Melody Decker

Date/Time: 5/13/04 @ 4:30 PM

CUSTODY SEAL

Ce4.1

CUSTODY SEAL

SGS Environmental

Signature: Melody Decker

Date/Time: 5/13/04 @ 4:30 PM

1041893



SGS Ref.# 1042000002
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill Store Grant 15044032
Client Sample ID MW-12
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
Printed Date/Time 05/28/2004 17:11
Collected Date/Time 05/14/2004 8:15
Received Date/Time 05/15/2004 8:30
Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Ethene	0.00500 U	0.00500	mg/L	RSK-175	J			05/26/04	KWM
Ethane	0.00500 U	0.00500	mg/L	RSK-175	J			05/26/04	KWM
Methane	0.00500 U	0.00500	mg/L	RSK-175	J			05/26/04	KWM
Metals Department									
Iron	11.7	0.200	mg/L	SW6010B	M		05/18/04	05/26/04	BAG
Manganese	0.0748	0.0200	mg/L	SW6010B	M		05/18/04	05/26/04	BAG
Waters Department									
Sulfate	28.3	0.100	mg/L	EPA 300.0				05/18/04	JJB
Ammonia-N	0.100 U	0.100	mg/L	4500-NH3 F	P		05/20/04	05/21/04	PLW
Nitrate-N	3.71	0.100	mg/L	EPA 300.0	N			05/15/04	JJB
Ortho Phosphate-P	0.400 U	0.400	mg/L	EPA 300.0	N			05/15/04	JJB
Sulfide	0.100 U	0.100	mg/L	EPA 376.2	O			05/20/04	KC
Total Organic Carbon	2.52	0.500	mg/L	EPA 415.1	R			05/24/04	JJB
Volatile Fuels Department									
Gasoline Range Organics	0.0900 U	0.0900	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
Benzene	0.000500 U	0.000500	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
Toluene	0.00200 U	0.00200	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
Ethylbenzene	0.00200 U	0.00200	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
P & M -Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
o-Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
Surrogates									
1,4-Difluorobenzene <surr>	92.9		%	AK101 8021B	A	75-111	05/26/04	05/26/04	MML
4-Bromofluorobenzene <surr>	95.7		%	AK101 8021B	A	50-150	05/26/04	05/26/04	MML

Volatile Gas Chromatography/Mass Spectroscopy



SGS Ref.# 1042000002
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill Store Grant 15044032
Client Sample ID MW-12
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
Printed Date/Time 05/28/2004 17:11
Collected Date/Time 05/14/2004 8:15
Received Date/Time 05/15/2004 8:30
Technical Director Stephen C. Ede

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Gas Chromatography/Mass Spectroscopy									
1,2-Dichloroethane	0.0260	0.00100	mg/L	SW8260B	K		05/26/04	05/26/04	TJE
Methyl-t-butyl ether	0.0109	0.00500	mg/L	SW8260B	K		05/26/04	05/26/04	TJE
Surrogates									
Dibromofluoromethane <surr>	93.6		%	SW8260B	K	85-115	05/26/04	05/26/04	TJE
1,2-Dichloroethane-D4 <surr>	90		%	SW8260B	K	72-119	05/26/04	05/26/04	TJE
4-Bromofluorobenzene <surr>	110		%	SW8260B	K	78-124	05/26/04	05/26/04	TJE
Toluene-d8 <surr>	109		%	SW8260B	K	84-113	05/26/04	05/26/04	TJE
EDB+DBCP by Microextraction									
1,2-Dibromo-3-chloropropane	0.0183 U	0.0183	ug/L	EPA 504	I	(<=0.2)	05/21/04	05/21/04	WAA
1,2-Dibromoethane	2.35	* 0.916	ug/L	EPA 504	I	(<=0.05)	05/21/04	05/22/04	WAA
Surrogates									
1,3-Dichlorobenzene <surr>	65		%	EPA 504	I	30-120	05/21/04	05/21/04	WAA



SGS Ref.# 1042000003
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill Store Grant 15044032
Client Sample ID VE-2
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
Printed Date/Time 05/28/2004 17:11
Collected Date/Time 05/14/2004 11:30
Received Date/Time 05/15/2004 8:30
Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Gasoline Range Organics	0.0900 U	0.0900	mg/L	AK101 8021B	C		05/26/04	05/26/04	MML
Benzene	0.000500 U	0.000500	mg/L	AK101 8021B	C		05/26/04	05/26/04	MML
Toluene	0.00200 U	0.00200	mg/L	AK101 8021B	C		05/26/04	05/26/04	MML
Ethylbenzene	0.00200 U	0.00200	mg/L	AK101 8021B	C		05/26/04	05/26/04	MML
P & M -Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	C		05/26/04	05/26/04	MML
o-Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	C		05/26/04	05/26/04	MML
Surrogates									
1,4-Difluorobenzene <surr>	93.4		%	AK101 8021B	C	75-111	05/26/04	05/26/04	MML
4-Bromofluorobenzene <surr>	91.7		%	AK101 8021B	C	50-150	05/26/04	05/26/04	MML
Volatile Gas Chromatography/Mass Spectroscopy									
1,2-Dichloroethane	0.00394	0.00100	mg/L	SW8260B	D		05/26/04	05/26/04	TJE
Methyl-t-butyl ether	0.0481	0.00500	mg/L	SW8260B	D		05/26/04	05/26/04	TJE
Surrogates									
Dibromofluoromethane <surr>	91		%	SW8260B	D	85-115	05/26/04	05/26/04	TJE
1,2-Dichloroethane-D4 <surr>	90.2		%	SW8260B	D	72-119	05/26/04	05/26/04	TJE
4-Bromofluorobenzene <surr>	109		%	SW8260B	D	78-124	05/26/04	05/26/04	TJE
Toluene-d8 <surr>	105		%	SW8260B	D	84-113	05/26/04	05/26/04	TJE
EDB+DBCP by Microextraction									
1,2-Dibromo-3-chloropropane	0.0192 U	0.0192	ug/L	EPA 504	I	(<=0.2)	05/21/04	05/21/04	WAA
1,2-Dibromoethane	2.08	* 0.192	ug/L	EPA 504	I	(<=0.05)	05/21/04	05/22/04	WAA
Surrogates									
1,3-Dichlorobenzene <surr>	52.8		%	EPA 504	I	30-120	05/21/04	05/21/04	WAA



SGS Ref.# 1042000004
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill Store Grant 15044032
Client Sample ID MW-2 Dup
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
Printed Date/Time 05/28/2004 17:11
Collected Date/Time 05/14/2004 9:25
Received Date/Time 05/15/2004 8:30
Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Metals Department									
Lead	0.0500 U	0.0500	mg/L	SW6010B	J		05/18/04	05/26/04	BAG
Volatile Fuels Department									
Gasoline Range Organics	0.370	0.0900	mg/L	AK101 8021B	D		05/26/04	05/26/04	MML
Benzene	0.176	0.000500	mg/L	AK101 8021B	D		05/26/04	05/26/04	MML
Toluene	0.00200 U	0.00200	mg/L	AK101 8021B	D		05/26/04	05/26/04	MML
Ethylbenzene	0.00200 U	0.00200	mg/L	AK101 8021B	D		05/26/04	05/26/04	MML
P & M -Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	D		05/26/04	05/26/04	MML
o-Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	D		05/26/04	05/26/04	MML
Surrogates									
1,4-Difluorobenzene <sur>	106		%	AK101 8021B	D	75-111	05/26/04	05/26/04	MML
4-Bromofluorobenzene <sur>	90		%	AK101 8021B	D	50-150	05/26/04	05/26/04	MML
Volatile Gas Chromatography/Mass Spectroscopy									
1,2-Dichloroethane	0.0863	0.00100	mg/L	SW8260B	F		05/26/04	05/27/04	TJE
Methyl-t-butyl ether	0.00511	0.00500	mg/L	SW8260B	F		05/26/04	05/27/04	TJE
Surrogates									
Dibromofluoromethane <sur>	91.6		%	SW8260B	F	85-115	05/26/04	05/27/04	TJE
1,2-Dichloroethane-D4 <sur>	89.9		%	SW8260B	F	72-119	05/26/04	05/27/04	TJE
4-Bromofluorobenzene <sur>	114		%	SW8260B	F	78-124	05/26/04	05/27/04	TJE
Toluene-d8 <sur>	108		%	SW8260B	F	84-113	05/26/04	05/27/04	TJE
EDB+DBCP by Microextraction									
1,2-Dibromo-3-chloropropane	0.0184 U	0.0184	ug/L	EPA 504	I	(<=0.2)	05/21/04	05/21/04	WAA
1,2-Dibromoethane	0.965	* 0.0921	ug/L	EPA 504	I	(<=0.05)	05/21/04	05/22/04	WAA



SGS Ref.# 1042000004
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill Store Grant 15044032
Client Sample ID MW-2 Dup
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
Printed Date/Time 05/28/2004 17:11
Collected Date/Time 05/14/2004 9:25
Received Date/Time 05/15/2004 8:30
Technical Director Stephen C. Ede

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
EDB+DBCP by Microextraction									
Surrogates									
1,3-Dichlorobenzene <sur>	72.5		%	EPA 504	I	30-120	05/21/04	05/21/04	WAA



SGS Ref.# 1042000005
 Client Name AMEC Earth and Environmental
 Project Name/# Gold Hill Store Grant 15044032
 Client Sample ID GHW-2 pre-treat
 Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
 Printed Date/Time 05/28/2004 17:11
 Collected Date/Time 05/14/2004 14:00
 Received Date/Time 05/15/2004 8:30
 Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Gasoline Range Organics	0.0900 U	0.0900	mg/L	AK101	B		05/20/04	05/20/04	MML
Surrogates									
4-Bromofluorobenzene <surr>	94.7		%	AK101	B	50-150	05/20/04	05/20/04	MML
Volatile Gas Chromatography/Mass Spectroscopy									
1,2-Dichloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	A	(<=0.005)	05/22/04	05/23/04	VS
Benzene	0.00050	0.00050	mg/L	EPA 524.2	A	(<=0.005)	05/22/04	05/23/04	VS
Ethylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	A	(<=0.7)	05/22/04	05/23/04	VS
Methyl-t-butyl ether	0.0010 U	0.0010	mg/L	EPA 524.2	A		05/22/04	05/23/04	VS
o-Xylene	0.00050 U	0.00050	mg/L	EPA 524.2	A		05/22/04	05/23/04	VS
P & M -Xylene	0.00050 U	0.00050	mg/L	EPA 524.2	A		05/22/04	05/23/04	VS
Toluene	0.00050 U	0.00050	mg/L	EPA 524.2	A	(<=1)	05/22/04	05/23/04	VS
Xylenes (total)	0.0010 U	0.0010	mg/L	EPA 524.2	A	(<=10)	05/22/04	05/23/04	VS
Surrogates									
1,2-Dichloroethane-D4 <surr>	101		%	EPA 524.2	A	70-130	05/22/04	05/23/04	VS
4-Bromofluorobenzene <surr>	98.1		%	EPA 524.2	A	70-130	05/22/04	05/23/04	V
Toluene-d8 <surr>	101		%	EPA 524.2	A	70-130	05/22/04	05/23/04	VS
EDB+DBCP by Microextraction									
1,2-Dibromo-3-chloropropane	0.0183 U	0.0183	ug/L	EPA 504	I	(<=0.2)	05/21/04	05/21/04	WAA
1,2-Dibromoethane	0.0183 U	0.0183	ug/L	EPA 504	I	(<=0.05)	05/21/04	05/21/04	WAA
Surrogates									
1,3-Dichlorobenzene <surr>	69.7		%	EPA 504	I	30-120	05/21/04	05/21/04	WAA



SGS Ref.# 1042000006
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill Store Grant 15044032
Client Sample ID GHW-2 post-treat
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time

Printed Date/Time 05/28/2004 17:11
Collected Date/Time 05/14/2004 12:00
Received Date/Time 05/15/2004 8:30
Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
P & M -Xylene	0.00050 U	0.00050	mg/L	EPA 524.2	A		05/22/04	05/23/04	VS
o-Xylene	0.00050 U	0.00050	mg/L	EPA 524.2	A		05/22/04	05/23/04	VS
Xylenes (total)	0.0010 U	0.0010	mg/L	EPA 524.2	A		05/22/04	05/23/04	VS
Toluene	0.00050 U	0.00050	mg/L	EPA 524.2	A		05/22/04	05/23/04	VS
Benzene	0.00050 U	0.00050	mg/L	EPA 524.2	A		05/22/04	05/23/04	VS
Ethylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	A		05/22/04	05/23/04	VS
Surrogates									
Toluene-d8 <surr>	103		%	EPA 524.2	A	70-130	05/22/04	05/23/04	VS
1,2-Dichloroethane-D4 <surr>	102		%	EPA 524.2	A	70-130	05/22/04	05/23/04	VS
4-Bromofluorobenzene <surr>	98.8		%	EPA 524.2	A	70-130	05/22/04	05/23/04	VS
Volatile Fuels Department									
Gasoline Range Organics	0.0900 U	0.0900	mg/L	AK101	B		05/20/04	05/20/04	MML
Surrogates									
4-Bromofluorobenzene <surr>	95.8		%	AK101	B	50-150	05/20/04	05/20/04	MML



SGS Ref.# 1042000007
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill Store Grant 15044032
Client Sample ID VE-1
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
Printed Date/Time 05/28/2004 17:11
Collected Date/Time 05/14/2004 11:15
Received Date/Time 05/15/2004 8:30
Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Gasoline Range Organics	0.0900 U	0.0900	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
Benzene	0.000500 U	0.000500	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
Toluene	0.00200 U	0.00200	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
Ethylbenzene	0.00200 U	0.00200	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
P & M -Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
o-Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
Surrogates									
1,4-Difluorobenzene <surrogate>	93.2		%	AK101 8021B	A	75-111	05/26/04	05/26/04	MML
4-Bromofluorobenzene <surrogate>	90		%	AK101 8021B	A	50-150	05/26/04	05/26/04	MML



SGS Ref.# 1042000008
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill Store Grant 15044032
Client Sample ID MW-17
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
Printed Date/Time 05/28/2004 17:11
Collected Date/Time 05/14/2004 10:25
Received Date/Time 05/15/2004 8:30
Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:
BTEX - Surrogate 1,4-difluorobenzene recovery is biased high due to matrix interference.

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Gasoline Range Organics	1.48	0.0900	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
Benzene	0.637	0.00500	mg/L	AK101 8021B	C		05/26/04	05/27/04	MML
Toluene	0.00200 U	0.00200	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
Ethylbenzene	0.00200 U	0.00200	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
P & M -Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
o-Xylene	0.00503	0.00200	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
Surrogates									
1,4-Difluorobenzene <surr>	135	!	%	AK101 8021B	A	75-111	05/26/04	05/26/04	MML
4-Bromofluorobenzene <surr>	97.8		%	AK101 8021B	A	50-150	05/26/04	05/26/04	MML



SGS Ref.# 1042000009
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill Store Grant 15044032
Client Sample ID MW-18
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
Printed Date/Time 05/28/2004 17:11
Collected Date/Time 05/14/2004 7:30
Received Date/Time 05/15/2004 8:30
Technical Director Stephen C. Ede

Released By *S. Stephen C. Ede*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Gasoline Range Organics	0.0900 U	0.0900	mg/L	AK101 8021B	C		05/26/04	05/27/04	MML
Benzene	0.000500 U	0.000500	mg/L	AK101 8021B	C		05/26/04	05/27/04	MML
Toluene	0.00200 U	0.00200	mg/L	AK101 8021B	C		05/26/04	05/27/04	MML
Ethylbenzene	0.00200 U	0.00200	mg/L	AK101 8021B	C		05/26/04	05/27/04	MML
P & M -Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	C		05/26/04	05/27/04	MML
o-Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	C		05/26/04	05/27/04	MML
Surrogates									
1,4-Difluorobenzene <surr>	90.3		%	AK101 8021B	C	75-111	05/26/04	05/27/04	MML
4-Bromofluorobenzene <surr>	90.8		%	AK101 8021B	C	50-150	05/26/04	05/27/04	MML



SGS Ref.# 1042000010
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill Store Grant 15044032
Client Sample ID MW-19
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
Printed Date/Time 05/28/2004 17:11
Collected Date/Time 05/14/2004 10:50
Received Date/Time 05/15/2004 8:30
Technical Director Stephen C. Ede
Released By *Stephen C. Ede*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Gasoline Range Organics	0.0900 U	0.0900	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
Benzene	0.000500 U	0.000500	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
Toluene	0.00200 U	0.00200	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
Ethylbenzene	0.00200 U	0.00200	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
P & M -Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
o-Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	A		05/26/04	05/26/04	MML
Surrogates									
1,4-Difluorobenzene <surrogate>	93.2		%	AK101 8021B	A	75-111	05/26/04	05/26/04	MML
4-Bromofluorobenzene <surrogate>	90.9		%	AK101 8021B	A	50-150	05/26/04	05/26/04	MML



SGS Ref.# 1042000011
 Client Name AMEC Earth and Environmental
 Project Name/# Gold Hill Store Grant 15044032
 Client Sample ID Trip Blank
 Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
 Printed Date/Time 05/28/2004 17:11
 Collected Date/Time 05/14/2004 10:50
 Received Date/Time 05/15/2004 8:30
 Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:

8260 - LCS recovery for dibromomethane is low and does not meet laboratory QC goals. The PQL is considered estimated for this analyte in the associated samples.

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Gasoline Range Organics	0.0900 U	0.0900	mg/L	AK101 8021B	C		05/26/04	05/26/04	MML
Benzene	0.000500 U	0.000500	mg/L	AK101 8021B	C		05/26/04	05/26/04	MML
Toluene	0.00200 U	0.00200	mg/L	AK101 8021B	C		05/26/04	05/26/04	MML
Ethylbenzene	0.00200 U	0.00200	mg/L	AK101 8021B	C		05/26/04	05/26/04	MML
P & M -Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	C		05/26/04	05/26/04	MML
o-Xylene	0.00200 U	0.00200	mg/L	AK101 8021B	C		05/26/04	05/26/04	MML
Surrogates									
1,4-Difluorobenzene <surr>	93.7		%	AK101 8021B	C	75-111	05/26/04	05/26/04	MML
4-Bromofluorobenzene <surr>	92.9		%	AK101 8021B	C	50-150	05/26/04	05/26/04	MML
Volatile Gas Chromatography/Mass Spectroscopy									
1,2-Dichloroethane	0.00100 U	0.00100	mg/L	SW8260B	B		05/24/04	05/25/04	TJE
Methyl-t-butyl ether	0.00500 U	0.00500	mg/L	SW8260B	B		05/24/04	05/25/04	TJE
Surrogates									
Dibromofluoromethane <surr>	89.6		%	SW8260B	B	85-115	05/24/04	05/25/04	TJE
1,2-Dichloroethane-D4 <surr>	84.8		%	SW8260B	B	72-119	05/24/04	05/25/04	TJE
4-Bromofluorobenzene <surr>	110		%	SW8260B	B	78-124	05/24/04	05/25/04	TJE
Toluene-d8 <surr>	109		%	SW8260B	B	84-113	05/24/04	05/25/04	TJE
Volatile Gas Chromatography/Mass Spectroscopy									
1,2-Dichloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	J	(<=0.005)	05/22/04	05/23/04	VS
Benzene	0.00050 U	0.00050	mg/L	EPA 524.2	J	(<=0.005)	05/22/04	05/23/04	VS
Ethylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	J	(<=0.7)	05/22/04	05/23/04	VS
Methyl-t-butyl ether	0.0010 U	0.0010	mg/L	EPA 524.2	J		05/22/04	05/23/04	VS
o-Xylene	0.00050 U	0.00050	mg/L	EPA 524.2	J		05/22/04	05/23/04	VS
P & M -Xylene	0.00050 U	0.00050	mg/L	EPA 524.2	J		05/22/04	05/23/04	VS



SGS Ref.# 1042000011
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill Store Grant 15044032
Client Sample ID Trip Blank
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
Printed Date/Time 05/28/2004 17:11
Collected Date/Time 05/14/2004 10:50
Received Date/Time 05/15/2004 8:30
Technical Director Stephen C. Ede

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Gas Chromatography/Mass Spectroscopy									
Toluene	0.00050 U	0.00050	mg/L	EPA 524.2	J	(<=1)	05/22/04	05/23/04	VS
Xylenes (total)	0.0010 U	0.0010	mg/L	EPA 524.2	J	(<=10)	05/22/04	05/23/04	VS
Surrogates									
1,2-Dichloroethane-D4 <surr>	103		%	EPA 524.2	J	70-130	05/22/04	05/23/04	VS
4-Bromofluorobenzene <surr>	98.2		%	EPA 524.2	J	70-130	05/22/04	05/23/04	VS
Toluene-d8 <surr>	102		%	EPA 524.2	J	70-130	05/22/04	05/23/04	VS
EDB+DBCP by Microextraction									
1,2-Dibromo-3-chloropropane	0.0186 U	0.0186	ug/L	EPA 504	I	(<=0.2)	05/21/04	05/21/04	WAA
1,2-Dibromoethane	0.0186 U	0.0186	ug/L	EPA 504	I	(<=0.05)	05/21/04	05/21/04	WAA
Surrogates									
1,3-Dichlorobenzene <surr>	61.6		%	EPA 504	I	30-120	05/21/04	05/21/04	WAA

Tinna Thomas

From: Melody Debenham [melody_debenham@sgs.com]
Sent: Tuesday, May 18, 2004 11:03 AM
To: Tinna M. Thomas
Subject: AMEC 1042000

Hi-

I checked with the client, and they would like MTBE and EDC for sample #5 run by 524.

Thanks,
Melody

Melody Debenham
Project Manager - Fairbanks Office
SGS Environmental Services
phone (907) 474-8656
fax (907) 474-9685

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1042000



Figure 2-1. Example of Project-Specific Chain of Custody Form

Control Number: 001

Date Page 1 of 1

Chain of Custody

CT&E 3180 Peger Road Fairbanks, AK 99701 Phone: (907) 474-8656		Michelle Peterson ph: (907) 478-7686 Gold Hill Store, Grant #15044032 3024011109-04 <i>Deliver results to the address above or as stated in contract</i>		Michelle Peterson AMEC Earth & Environmental 431 Old Steese Hwy, Suite 200 Fairbanks, AK 99701		Michelle Peterson Company: Same Address: Same																					
QC Level: ADEC 18 AAC 75 TAT: 1 week (std)		Sample Data		Lab Use		Preservatives																					
EPA ID	Sample ID	Date Collected	Time Collected	Lab ID	Soil	Ground Water	Drinking Water	HCl	HCl	none	HCl	HCl	Hold	VOA	AUG	250 ml	P/O										
5A-L	GHW-2 pre-treat	5/14/04	14:50	1435	X	X	X	X	X	X	X	X		12													
6A-E	GHW-2 post treat	5/14/04	12:00	1435	X	X	X	X	X	X	X	X		6													
7A-C	VE-1	5/14/04	07:30	1115	X	X	X	X	X	X	X	X															
8A-C	MW-17	5/14/04	10:25		X	X	X	X	X	X	X	X															
9A-C	MW-18	5/14/04	07:30		X	X	X	X	X	X	X	X															
10A-C	MW-19	5/14/04	10:50		X	X	X	X	X	X	X	X															
11A-L	trip blank- EDB													3													
	trip blank- HCl													9													
	temp blank													1													
Samplers Signature: <i>Michelle Peterson</i>		Date: 5/14/04		Time: 1435		For Lab Use		Comments		Lab No.:		Doas COC match samples: Y or N		Broken container: Y or N		Received within holding time: Y or N		COC seal intact: Y or N		Any other problems: Y or N		If problems, Amec contacted: Y or N		Date collected:		Temperature (°C):	
Relinquished By: <i>Michelle Peterson</i>		Date: 5/14/04		Time: 1435		Soil		Ground Water		Drinking Water		Matrix		MTBE & EDC- EPA 8260		GRO/BTEX- AK 101&EPA8021		Extra Volume for MS/MSD		Note: Include Project name and number on all invoices.							
Received By: <i>Michelle Peterson</i>		Date: 5/14/04		Time: 4:50 pm		Soil		Ground Water		Drinking Water		Matrix		MTBE & EDC- EPA 8260		GRO/BTEX- AK 101&EPA8021		Extra Volume for MS/MSD		Note: Include Project name and number on all invoices.							
Relinquished By:		Date:		Time:		Soil		Ground Water		Drinking Water		Matrix		MTBE & EDC- EPA 8260		GRO/BTEX- AK 101&EPA8021		Extra Volume for MS/MSD		Note: Include Project name and number on all invoices.							
Received By (LAB): <i>Michelle Peterson</i>		Date: 5/15/04		Time: 0830		Soil		Ground Water		Drinking Water		Matrix		MTBE & EDC- EPA 8260		GRO/BTEX- AK 101&EPA8021		Extra Volume for MS/MSD		Note: Include Project name and number on all invoices.							

SGS

1042000



CT&E WO#:

SAMPLE RECEIPT FORM FOR TRANSFERS
From
FAIRBANKS, ALASKA OR HONOLULU, HAWAII
To
ANCHORAGE, AK

TO BE COMPLETED IN ANCHORAGE UPON ARRIVAL FROM FAIRBANKS OR HAWAII.
NOTES RECORDED BELOW ARE ACTIONS NEEDED UPON ARRIVAL IN ANCHORAGE.

Notes: _____

Receipt Date / Time: 5/15/4 @ 0830
Is Sample Date/Time Conversion Necessary? Yes No
Number of Hours From Alaska Standard Time: 1
Foreign Soil? Yes No

COOLER AND TEMP BLANK READINGS*

Cooler ID	Temp Blank	Cooler	Cooler ID	Temp Blank	Cooler
<u>1</u>	<u>2.6</u>	<u>5.2</u>	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

CUSTODY SEALS INTACT: YES / NO # / WHERE: 2 - F
COMPLETED BY (INITIAL): ASS

*Temperature readings include thermometer correction factors.

1041999

✓

1042000

SGS Environmental

CUSTODY SEAL

Signature: Mulodi Dehl

Date/Time: 5/14/04 @ 4:30 PM

SGS Environmental

CUSTODY SEAL

Signature: Mulodi Dehl

Date/Time: 5/14/04 @ 4:30 PM

BioLogic Resources, LLC
10260 SW Nimbus Ave., Suite M7A
Portland, OR 97223
Phone 503.670.1312
Fax 503.670.7262

For: AMEC Earth & Environmental
7376 SW Durham Rd.
Portland, OR 97224
Attn: Virginia Anderson

Received: 05.14.04
Tested: 05.14.04
Completed: 05.24.04

Lab #	Sample	Gasoline Degrading Bacteria CFU/ml
AE042	MW-14 05-13-04 0845	1.3×10^3
AE043	MW-16 05-13-04 0815	1.2×10^5

Sampling Site: Gold Hill Store

Kim W. Hutchinson
Microbiologist/Principal

APPENDIX B

Laboratory Analytical Reports and Chain-of-Custody Documentation

May 2004 Sampling Event

APPENDIX C

Engineer's Report of Water Treatment System Installation

ROBERT H. TILLY, P.E.
CONSULTING ENGINEER

March 29, 2004

Michelle L. Peterson, PHONE: (907) 456-7403
Senior Project Manager
AMEC
431 Old Steese Highway
Fairbanks, AK 99701

1901 HILLING AVENUE
FAIRBANKS, ALASKA 99709
FAX: (907) 456-7413
E-MAIL: bobtilly@ptialaska.net

Project (2003-48)

Subject: Gold Hill Liquor Store & Gas Station, Class C Public Water Well

Dear Ms. Peterson,

This report is to document and confirm the installation of the required equipment to treat and reduce the benzene contaminants from the site well water. A leaking underground storage tank (LUST) on-site seemed to be contaminating the drinking well water and test results of June 6, 2003 indicated 0.00335 mg/L. The EPA has set an enforceable standard called the Maximum Contaminant Level (MCL) for benzene at 5 parts per billion for drinking water systems.

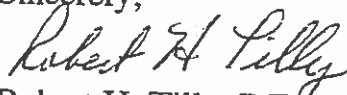
Two, 10" x 54" tanks with activated carbon were installed on December 10, 2003 and the water meter was installed prior to February 4, 2004. One tank is providing treatment and the other is bypassed until required. One tank will always be in service to provide continuous water treatment with activated carbon when the spent tank is removed and replaced with a new tank.

The test results must be monitored, as well as the water meter, to document the gallons treated. When the test results plotted show a continued significant increase in mg/L and approaching the test results of June 6, 2003, then another test should be conducted to verify the test results prior to making the decision to switch to the unused activated carbon tank. When the tank is switched, the number of gallons treated should be documented and used as a reference for future notification to those monitoring this system. Testing of the raw well water and carbon treatment water to determine the efficiency of the treatment should be accomplished together.

Alaskan Water Systems have estimated that a new activated carbon tank will cost \$290 for labor and materials. With low water usage, I expect each tank may have a life span of 2-3 years before replacement is necessary.

Attached are two pages of color photos (4) total to document the original installation for your information and files. Please contact me if you have any questions or require further engineering assistance for this project.

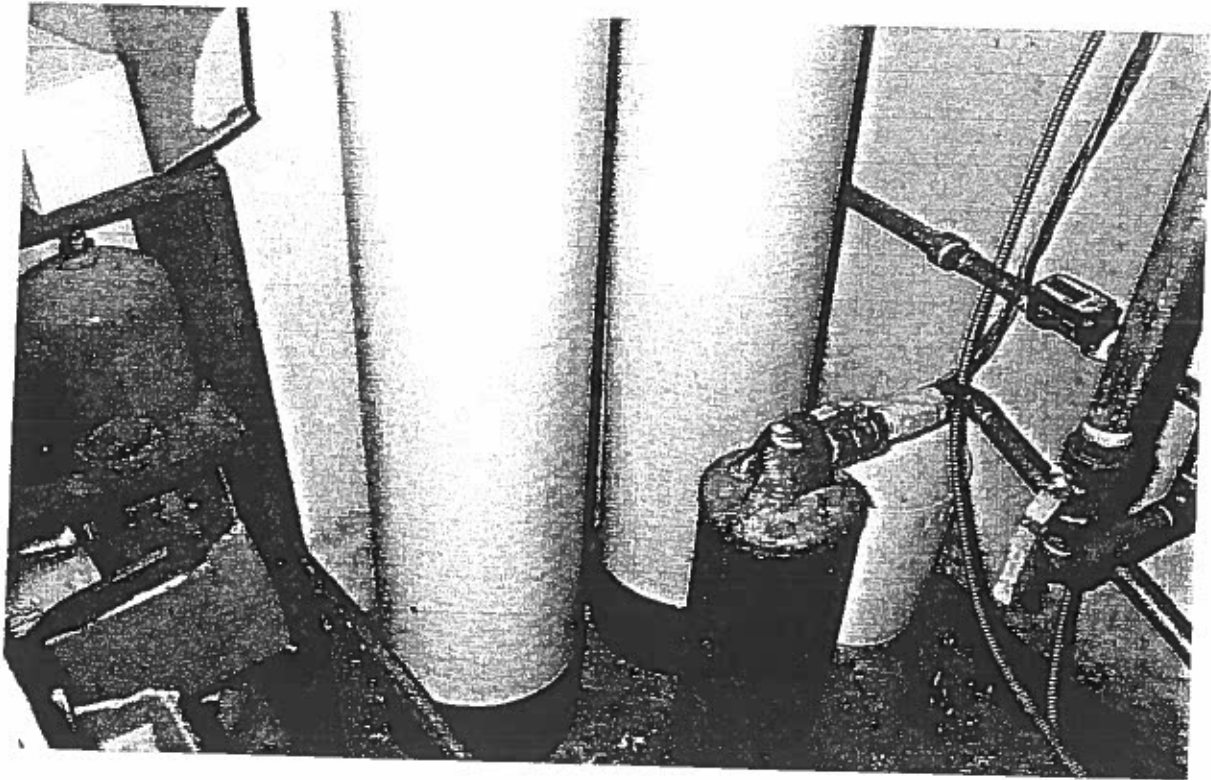
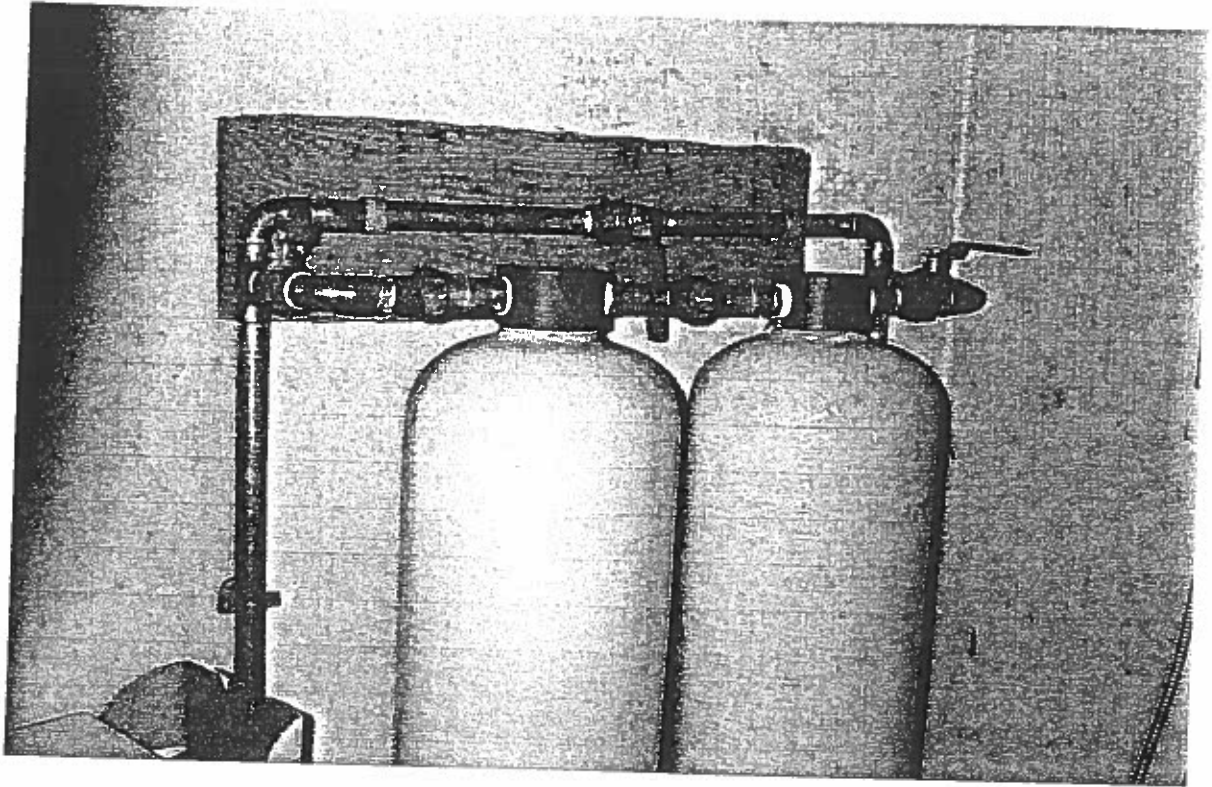
Sincerely,

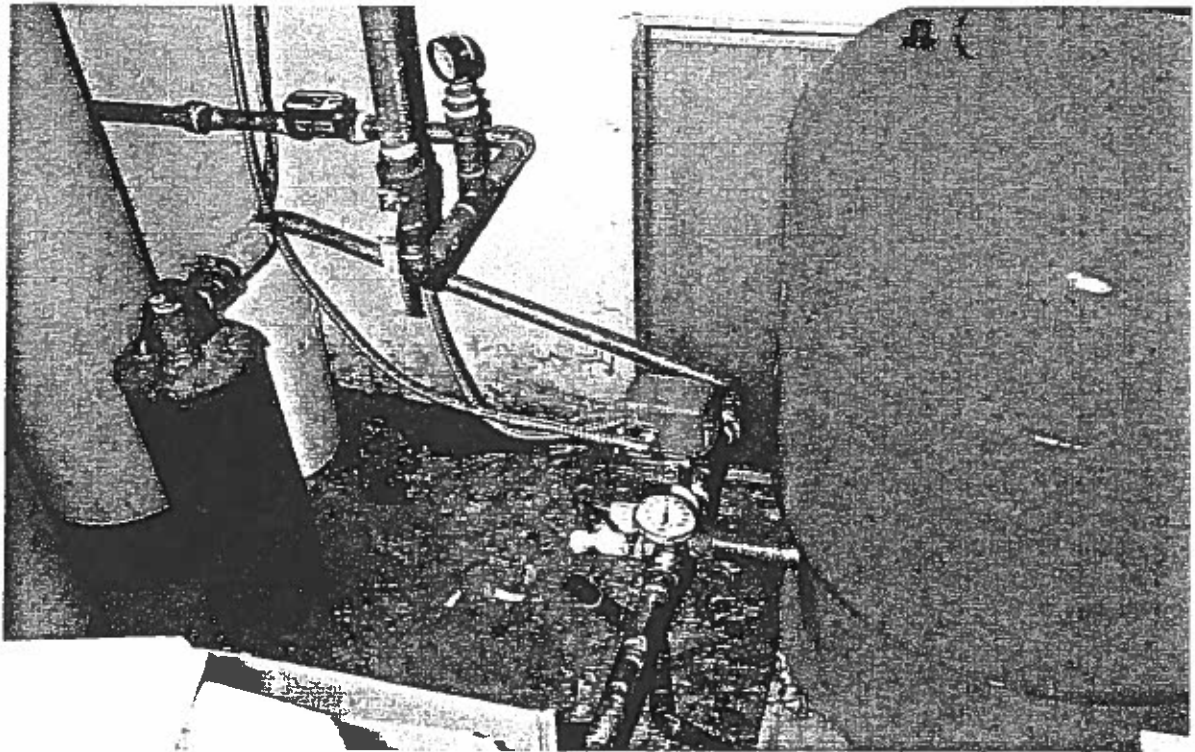
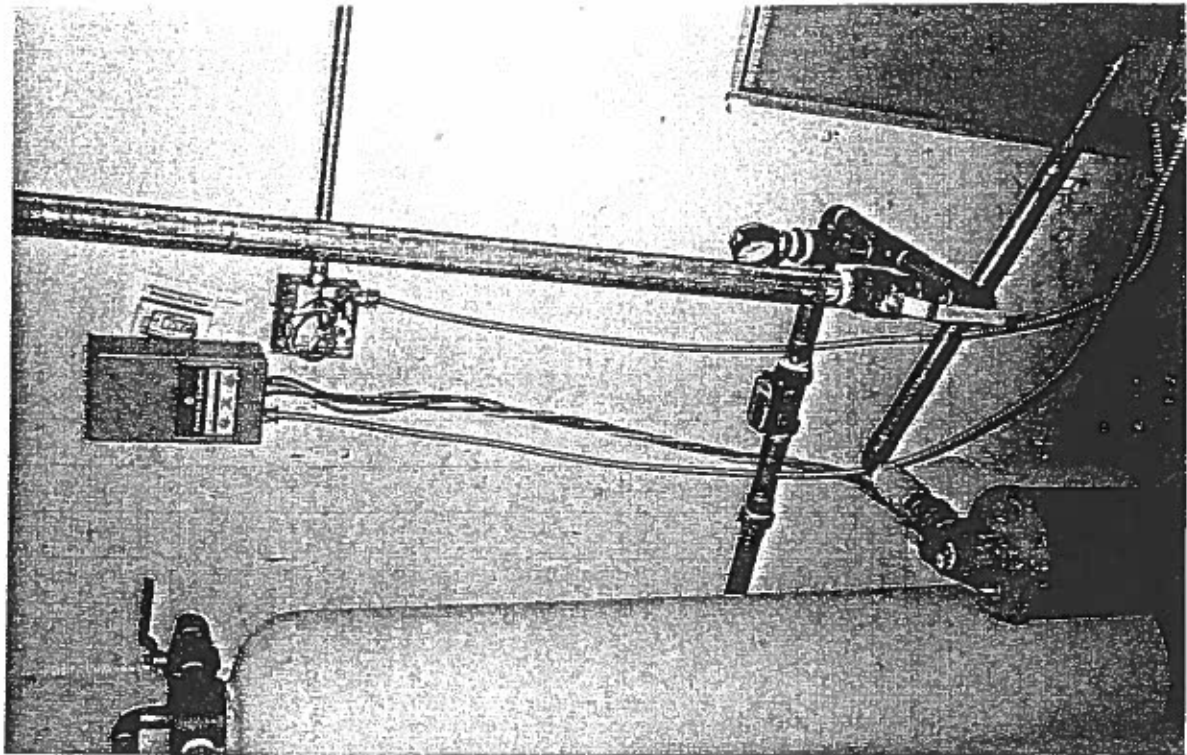


Robert H. Tilly, P.E.
Consulting Engineer

Attachments







APPENDIX D

Laboratory Analytical Reports and Chain-of-Custody Documentation

March 2004 Drinking Water Well Sampling Event



AEE FAIRBANKS

MAY 6 2004

RECEIVED
CTF

SGS/CT&E Environmental Services
Alaska Division
Level II Laboratory Data Report

Project: Gold Hill
Client: AMEC Earth and Environmental
SGS/CT&E Work Order: 1040130

Released by: (Signature) Stephen C. Ede
(Printed Name) Stephen C. Ede
(Title) Technical Director
(Date) 3/29/04

Contents:

- Case Narrative
- Chain of Custody/Sample Rec Form
- Final Report Pages
- QC Summary Pages

Note:

Unless otherwise noted, all quality assurance/quality control criteria are in compliance with the standards set forth by the proper regulatory authority, the SGS Quality Assurance Program Plan, and the National Environmental Laboratory Accreditation Conference.

This report contains a total number of 31 pages.



Case Narrative

Client RZAFRBK AMEC Earth and Environmental
Workorder 1040130 Gold Hill

Printed Date/Time 3/29/2004 16:17

Sample ID Client Sample ID

- 543733 MB
524 - MB recovery for 1,2,3-trichlorobenzene is greater than one half the PQL. This analyte is not detected above the PQL in any of the associated samples.
- 543742 IB
524 - IB recoveries for naphthalene and 1,2,3-trichlorobenzene are greater than the PQL. IB meets tune criteria. Please see IB (HSN#) 543744 for cleanliness criteria.
- 544074 MS
GRO/BTEX - MS recovery for o-xylene was biased low due to sample foaming.
- 544075 MSD
GRO/BTEX - MSD recovery for o-xylene was biased low due to sample foaming.

CHAIN OF CUSTODY RECORD

1040130



CT&E Environmental Services Inc.
Laboratory Division

1 CLIENT: **AMEC** CONTACT: **MICHELLE PETERSON** PHONE NO: (907) 479-7586 PROJECT: **GOLD HILL** PWSID#: _____

REPORTS TO: **431 Old Steeple Hwy, Suite 200 Fairbanks, AK 99701** FAX NO: (907) 479-0193

INVOICE TO: **SAME** QUOTE# _____ P.O. NUMBER: _____

2

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	No. CONTAINERS	SAMPLE TYPE C = COMP G = GRAB	Preservatives Used			REMARKS
							HCl	NaOH	HCl	
①	GHW-2 POST TREAT	3/14/04	1030	H ₂ O	9	G	X	X	X	
②	GHW-2 PRE TREAT		1050		9	L	X	X	X	
③	B DUP		1050		6	L	X	X	X	
④	TRIP BLANK EDB				3					
⑤	TRIP BLANK HCl				6					
⑥	TEMP. BLANK				1					

3

4

5

Collected/Relinquished By: (1) *Michelle Peterson* Date: 3/18/04 Time: 1327 Received By: *Melody Debrah* Date: 3/18/04 Time: 430pm

Relinquished By: (2) *Melody Debrah* Date: 3/19/04 Time: 0900

Relinquished By: (3) _____ Date: _____ Time: _____

Relinquished By: (4) _____ Date: _____ Time: _____

Shipping Carrier: **Hand** Shipping Ticket No: _____

Data Deliverables: Level I Level II Level III EDD Type: _____

Requested Turnaround Time and Special Instructions: _____

Temperature C: **2.6°C**

Chain of Custody Seal: (Circle) **NA**
INTACT BROKEN ABSENT

PAGE 1 OF 1

1040130



SGS

SAMPLE RECEIPT FORM

CT&E WO#:

- Yes No NA
 Are samples RUSH, priority, or within 72 hrs. of hold time?
- If yes have you done e-mail notification?
- Are samples within 24 hrs. of hold time or due date?
- If yes, have you spoken with Supervisor?
- Archiving bottles - if required, are they properly marked?
- Are there any problems? PM Notified? _____
- Were samples preserved correctly and pH verified? MD

- If this is for PWS, provide PWSID. _____
- Will courier charges apply?
- Method of payment? _____
- Data package required? (Level: 1 / 2 / 3) _____
- Notes: _____
- Is this a DoD project? (USACE, Navy, AFCEE) _____

Due Date: 3/29/04
 Received Date: 3/18/04
 Received Time: 1:27 PM
 Is date/time conversion necessary? NO
 # of hours from AK Standard Time:
 Received Temperature*: _____ °C
 Thermometer ID: long stem A

Cooler ID	Temp Blank	Cooler Temp
<u>1</u>	<u>2.6</u> °C	<u>2.3</u> °C
_____	_____ °C	_____ °C
_____	_____ °C	_____ °C
_____	_____ °C	_____ °C

*Temperature readings include thermometer correction factors
 Delivery method (circle all that apply): Client
 Alert Courier / UPS / FedEx / USPS /
 AA Goldstreak / NAC / ERA / PenAir / Carlile
 Lynden / SGS-CT&E / Other: _____

This section must be filled out for DoD projects (USACE, Navy, AFCEE)

Yes	No		Samples/Analyses Affected:
_____	_____	Is received temperature 4 ± 2°C?	_____
_____	_____	Exceptions:	_____
_____	_____	Rad Screen performed?	_____
_____	_____	Result: _____	_____
_____	_____	Was there an airbill? (Note # above in the right hand column)	_____
_____	_____	Was cooler sealed with custody seals? Faxed to COE? _____	_____
_____	_____	# / where: _____	_____
_____	_____	Were seal(s) intact upon arrival?	_____
_____	_____	Was there a COC with cooler?	_____
_____	_____	Was the COC filled out properly?	_____
_____	_____	Did the COC indicate ACOE / AFCEE project? (if applicable)	_____
_____	_____	Did the COC and samples correspond?	_____
_____	_____	Were all sample packed to prevent breakage?	_____
_____	_____	Packing material: _____	_____
_____	_____	Were all samples unbroken and clearly labeled?	_____
_____	_____	Were all samples sealed in separate plastic bags?	_____
_____	_____	Were all bottles for volatiles free of headspace?	_____
_____	_____	Were correct container / sample sizes submitted?	_____
_____	_____	Is sample condition good?	_____

Airbill # _____
 Additional Sample Remarks: (✓ if applicable)
 Extra Sample Volume?
 Limited Sample Volume?
 Field preserved for volatiles?
 Field-filtered for dissolved?
 Lab-filtered for dissolved?
 Ref Lab required?
 Foreign Soil?

This section must be filled if problems are found.

Yes No
 Was client notified of problems?

Individual contacted: _____
 Date/Time: _____
 Phone/Fax: _____
 Reason for contact: _____

SGS/CT&E Contact: _____

Notes:

Completed by (sign): Melody Deberham
 Login proof (check one): waived _____ required performed by: Melody Deberham
 (Print): _____

SGS

CT&E WO#:

1040130



SAMPLE RECEIPT FORM FOR TRANSFERS
From
FAIRBANKS, ALASKA OR HONOLULU, HAWAII
To
ANCHORAGE, AK

TO BE COMPLETED IN ANCHORAGE UPON ARRIVAL FROM FAIRBANKS OR HAWAII.
NOTES RECORDED BELOW ARE ACTIONS NEEDED UPON ARRIVAL IN ANCHORAGE.

Notes: _____

Receipt Date / Time: 3-19-04 0900
Is Sample Date/Time Conversion Necessary? Yes _____ No
Number of Hours From Alaska Standard Time: _____
Foreign Soil? Yes _____ No

COOLER AND TEMP BLANK READINGS*

Cooler ID	Temp Blank	Cooler	Cooler ID	Temp Blank	Cooler
<u>1</u>	<u>5.5</u>	<u>5.4</u>	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

CUSTODY SEALS INTACT: YES NO # / WHERE: 1 on front, 1 on back

COMPLETED BY (INITIAL): JLS

*Temperature readings include thermometer correction factors.

0510401

SGS Environmental

CUSTODY SEAL

Signature:

Melosh Debnik

Date/Time:

3/18/04 @ 4:30 pm

SGS Environmental CUSTODY SEAL

Date/Time: *3/18/04 @ 4:30 pm*

Signature: *Melosh Debnik*

5520
TA-54



Laboratory Analysis Report

200 W. Potter Drive
Anchorage, AK 99518-1605
Tel: (907) 562-2343
Fax: (907) 561-5301
Web: <http://www.sgsevenvironmental.com>

Michelle Peterson
AMEC Earth and Environmental
431 Old Steese Hwy Suite 200
Fairbanks, AK 99701

Work Order:	1040130 Gold Hill
Client:	AMEC Earth and Environmental
Report Date:	March 29, 2004

Enclosed are the analytical results associated with the above workorder.

As required by the state of Alaska and the USEPA, a formal Quality Assurance/Quality Control Program is maintained by SGS. A copy of our Quality Control Manual that outlines this program is available at your request. The laboratory ADEC certification numbers are AK08-03 (DW), UST-005 (CS) and AK00971 (Micro).

Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS Quality Assurance Program Plan and the National Environmental Laboratory Accreditation Conference.

If you have any questions regarding this report or if we can be of any other assistance, please call your SGS Project Manager at (907) 562-2343.

The following descriptors may be found on your report which will serve to further qualify the data.

- PQL Practical Quantitation Limit (reporting limit).
- U Indicates the analyte was analyzed for but not detected.
- F Indicates an estimated value that falls below PQL, but is greater than the MDL.
- J The quantitation is an estimation.
- B Indicates the analyte is found in a blank associated with the sample.
- * The analyte has exceeded allowable regulatory or control limits.
- GT Greater Than
- D The analyte concentration is the result of a dilution.
- LT Less Than
- ! Surrogate out of control limits.
- Q QC parameter out of acceptance range.
- M A matrix effect was present.
- JL The analyte was positively identified, but the quantitation is a low estimation.
- E The analyte result is high outside of calibrated range.

Note: Soil samples are reported on a dry weight basis unless otherwise specified



SGS Ref.# 1040130001
 Client Name AMEC Earth and Environmental
 Project Name/# Gold Hill
 Client Sample ID GHW-2 Post Treat
 Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
 Printed Date/Time 03/29/2004 16:17
 Collected Date/Time 03/18/2004 10:30
 Received Date/Time 03/18/2004 13:27
 Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Gasoline Range Organics	0.0900 U	0.0900	mg/L	AK101	D		03/24/04	03/24/04	BRB
Surrogates									
4-Bromofluorobenzene <surrogate>	97.2		%	AK101	D	50-150	03/24/04	03/24/04	BRB
Volatile Gas Chromatography/Mass Spectroscopy									
1,1,1,2-Tetrachloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
1,1,1-Trichloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.2)	03/22/04	03/22/04	VS
1,1,2,2-Tetrachloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
1,1,2-Trichloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/22/04	VS
1,1-Dichloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
1,1-Dichloroethene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.007)	03/22/04	03/22/04	VS
1,1-Dichloropropene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
1,2,3-Trichlorobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
1,2,3-Trichloropropane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
1,2,4-Trichlorobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.07)	03/22/04	03/22/04	VS
1,2,4-Trimethylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
1,2-Dibromo-3-chloropropane	0.0020 U	0.0020	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
1,2-Dibromoethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
1,2-Dichlorobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.6)	03/22/04	03/22/04	VS
1,2-Dichloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/22/04	VS
1,2-Dichloropropane	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/22/04	VS
1,3,5-Trimethylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
1,3-Dichlorobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
1,3-Dichloropropane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
1,4-Dichlorobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.075)	03/22/04	03/22/04	VS
2,2-Dichloropropane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
2-Chlorotoluene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
4-Chlorotoluene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
4-Isopropyltoluene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS



SGS Ref.# 1040130001
 Client Name AMEC Earth and Environmental
 Project Name/# Gold Hill
 Client Sample ID GHW-2 Post Treat
 Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
 Printed Date/Time 03/29/2004 16:17
 Collected Date/Time 03/18/2004 10:30
 Received Date/Time 03/18/2004 13:27
 Technical Director Stephen C. Ede

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Initials
Volatile Gas Chromatography/Mass Spectroscopy									
Benzene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/22/04	VS
Bromobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Bromochloromethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Bromodichloromethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Bromoform	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Bromomethane	0.0010 U	0.0010	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Carbon tetrachloride	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/22/04	VS
Chlorobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.1)	03/22/04	03/22/04	VS
Chloroethane	0.0010 U	0.0010	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Chloroform	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Chloromethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
cis-1,2-Dichloroethene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.07)	03/22/04	03/22/04	VS
cis-1,3-Dichloropropene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Dibromochloromethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Dibromomethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Dichlorodifluoromethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Ethylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.7)	03/22/04	03/22/04	VS
Hexachlorobutadiene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Isopropylbenzene (Cumene)	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Methyl-t-butyl ether	0.0010 U	0.0010	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Methylene chloride	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/22/04	VS
n-Butylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
n-Propylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Naphthalene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
o-Xylene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
P & M -Xylene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
sec-Butylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Styrene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.1)	03/22/04	03/22/04	VS
tert-Butylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Tetrachloroethene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/22/04	VS
Toluene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=1)	03/22/04	03/22/04	VS
Total Trihalomethanes	0.0020 U	0.0020	mg/L	EPA 524.2	G	(<=0.08)	03/22/04	03/22/04	VS
trans-1,2-Dichloroethene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.1)	03/22/04	03/22/04	VS
trans-1,3-Dichloropropene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS



SGS Ref.# 1040130001
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill
Client Sample ID GHW-2 Post Treat
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
Printed Date/Time 03/29/2004 16:17
Collected Date/Time 03/18/2004 10:30
Received Date/Time 03/18/2004 13:27
Technical Director Stephen C. Ede

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Gas Chromatography/Mass Spectroscopy									
Trichloroethene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/22/04	VS
Trichlorofluoromethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Vinyl chloride	0.00040 U	0.00040	mg/L	EPA 524.2	G	(<=0.002)	03/22/04	03/22/04	VS
Xylenes (total)	0.0010 U	0.0010	mg/L	EPA 524.2	G	(<=10)	03/22/04	03/22/04	VS
Surrogates									
1,2-Dichloroethane-D4 <surr>	99.7		%	EPA 524.2	G	70-130	03/22/04	03/22/04	VS
4-Bromofluorobenzene <surr>	99.6		%	EPA 524.2	G	70-130	03/22/04	03/22/04	VS
Toluene-d8 <surr>	98.7		%	EPA 524.2	G	70-130	03/22/04	03/22/04	VS
PDB+DBCP by Microextraction									
1,2-Dibromo-3-chloropropane	0.0197 U	0.0197	ug/L	EPA 504	A	(<=0.0002)	03/26/04	03/26/04	WAA
1,2-Dibromoethane	0.0197 U	0.0197	ug/L	EPA 504	A	(<=0.00005)	03/26/04	03/26/04	WAA
Surrogates									
1,3-Dichlorobenzene <surr>	68.3		%	EPA 504	A	30-150	03/26/04	03/26/04	WAA



SGS Ref.# 1040130002
 Client Name AMEC Earth and Environmental
 Project Name/# Gold Hill
 Client Sample ID GHW-2 Pre Treat
 Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
 Printed Date/Time 03/29/2004 16:17
 Collected Date/Time 03/18/2004 10:50
 Received Date/Time 03/18/2004 13:27
 Technical Director Stephen C. Ede
 Released By *Stephen C. Ede*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Initials
Volatile Fuels Department									
Gasoline Range Organics	0.0900 U	0.0900	mg/L	AK101	D		03/24/04	03/24/04	BR
Surrogates									
4-Bromofluorobenzene <surr>	95.6		%	AK101	D	50-150	03/24/04	03/24/04	BR
Volatile Gas Chromatography/Mass Spectroscopy									
1,1,1,2-Tetrachloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
1,1,1-Trichloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.2)	03/22/04	03/22/04	V
1,1,2,2-Tetrachloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	V
1,1,2-Trichloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/22/04	VS
1,1-Dichloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	V
1,1-Dichloroethene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.007)	03/22/04	03/22/04	V
1,1-Dichloropropene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
1,2,3-Trichlorobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	V
1,2,3-Trichloropropane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	V
1,2,4-Trichlorobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.07)	03/22/04	03/22/04	VS
1,2,4-Trimethylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	V
1,2-Dibromo-3-chloropropane	0.0020 U	0.0020	mg/L	EPA 524.2	G		03/22/04	03/22/04	V
1,2-Dibromoethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
1,2-Dichlorobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.6)	03/22/04	03/22/04	V
1,2-Dichloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/22/04	V
1,2-Dichloropropane	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/22/04	VS
1,3,5-Trimethylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	V
1,3-Dichlorobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	V
1,3-Dichloropropane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
1,4-Dichlorobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.075)	03/22/04	03/22/04	V
2,2-Dichloropropane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	V
2-Chlorotoluene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
4-Chlorotoluene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	V
4-Isopropyltoluene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	V



SGS Ref.# 1040130002
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill
Client Sample ID GHW-2 Pre Treat
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
Printed Date/Time 03/29/2004 16:17
Collected Date/Time 03/18/2004 10:50
Received Date/Time 03/18/2004 13:27
Technical Director Stephen C. Ede

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Gas Chromatography/Mass Spectroscopy									
Benzene	0.00099	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/22/04	VS
Bromobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Bromochloromethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Bromodichloromethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Bromoform	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Bromomethane	0.0010 U	0.0010	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Carbon tetrachloride	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/22/04	VS
Chlorobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.1)	03/22/04	03/22/04	VS
Chloroethane	0.0010 U	0.0010	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Chloroform	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Chloromethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
cis-1,2-Dichloroethene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.07)	03/22/04	03/22/04	VS
cis-1,3-Dichloropropene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Dibromochloromethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Dibromomethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Dichlorodifluoromethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Ethylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.7)	03/22/04	03/22/04	VS
Hexachlorobutadiene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Isopropylbenzene (Cumene)	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Methyl-t-butyl ether	0.0010 U	0.0010	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Methylene chloride	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/22/04	VS
n-Butylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
n-Propylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Naphthalene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
o-Xylene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
P & M -Xylene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
sec-Butylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Styrene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.1)	03/22/04	03/22/04	VS
tert-Butylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Tetrachloroethene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/22/04	VS
Toluene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=1)	03/22/04	03/22/04	VS
Total Trihalomethanes	0.0020 U	0.0020	mg/L	EPA 524.2	G	(<=0.08)	03/22/04	03/22/04	VS
trans-1,2-Dichloroethene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.1)	03/22/04	03/22/04	VS
trans-1,3-Dichloropropene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS



SGS Ref.# 1040130002
 Client Name AMEC Earth and Environmental
 Project Name/# Gold Hill
 Client Sample ID GHW-2 Pre Treat
 Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
 Printed Date/Time 03/29/2004 16:17
 Collected Date/Time 03/18/2004 10:50
 Received Date/Time 03/18/2004 13:27
 Technical Director Stephen C. Ede

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Gas Chromatography/Mass Spectroscopy									
Trichloroethene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/22/04	V
Trichlorofluoromethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/22/04	VS
Vinyl chloride	0.00040 U	0.00040	mg/L	EPA 524.2	G	(<=0.002)	03/22/04	03/22/04	V
Xylenes (total)	0.0010 U	0.0010	mg/L	EPA 524.2	G	(<=10)	03/22/04	03/22/04	V
Surrogates									
1,2-Dichloroethane-D4 <surr>	98.2		%	EPA 524.2	G	70-130	03/22/04	03/22/04	V
4-Bromofluorobenzene <surr>	101		%	EPA 524.2	G	70-130	03/22/04	03/22/04	VS
Toluene-d8 <surr>	102		%	EPA 524.2	G	70-130	03/22/04	03/22/04	V
EDB+DBCP by Microextraction									
1,2-Dibromo-3-chloropropane	0.0213 U	0.0213	ug/L	EPA 504	A	(<=0.0002)	03/26/04	03/26/04	WAA
1,2-Dibromoethane	0.0213 U	0.0213	ug/L	EPA 504	A	(<=0.00005)	03/26/04	03/26/04	WAA
Surrogates									
1,3-Dichlorobenzene <surr>	49.1		%	EPA 504	A	30-150	03/26/04	03/26/04	WAA



SGS Ref.# 1040130003
 Client Name AMEC Earth and Environmental
 Project Name/# Gold Hill
 Client Sample ID Dup
 Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
 Printed Date/Time 03/29/2004 16:17
 Collected Date/Time 03/18/2004 10:50
 Received Date/Time 03/18/2004 13:27
 Technical Director Stephen C. Ede

Released By *Stephen C. Ede*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Gasoline Range Organics	0.0900 U	0.0900	mg/L	AK101	D		03/24/04	03/24/04	BRB
Surrogates									
4-Bromofluorobenzene <surr>	94.3		%	AK101	D	50-150	03/24/04	03/24/04	BRB
PDB+DBCP by Microextraction									
1,2-Dibromo-3-chloropropane	0.0195 U	0.0195	ug/L	EPA 504	A	(<=0.0002)	03/26/04	03/26/04	WAA
1,2-Dibromoethane	0.0195 U	0.0195	ug/L	EPA 504	A	(<=0.00005)	03/26/04	03/26/04	WAA
Surrogates									
1,3-Dichlorobenzene <surr>	52.5		%	EPA 504	A	30-150	03/26/04	03/26/04	WAA



SGS Ref.# 1040130004
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill
Client Sample ID Trip Blank
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
Printed Date/Time 03/29/2004 16:17
Collected Date/Time 03/18/2004 10:30
Received Date/Time 03/18/2004 13:27
Technical Director Stephen C. Ede
Released By *Stephen C. Ede*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Gasoline Range Organics	0.0900 U	0.0900	mg/L	AK101	D		03/24/04	03/24/04	BR
Surrogates									
4-Bromofluorobenzene <surr>	94.4		%	AK101	D	50-150	03/24/04	03/24/04	BR
Volatile Gas Chromatography/Mass Spectroscopy									
1,1,1,2-Tetrachloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
1,1,1-Trichloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.2)	03/22/04	03/23/04	VS
1,1,2,2-Tetrachloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
1,1,2-Trichloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/23/04	VS
1,1-Dichloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
1,1-Dichloroethene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.007)	03/22/04	03/23/04	VS
1,1-Dichloropropene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
1,2,3-Trichlorobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
1,2,3-Trichloropropane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
1,2,4-Trichlorobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.07)	03/22/04	03/23/04	VS
1,2,4-Trimethylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
1,2-Dibromo-3-chloropropane	0.0020 U	0.0020	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
1,2-Dibromoethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
1,2-Dichlorobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.6)	03/22/04	03/23/04	VS
1,2-Dichloroethane	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/23/04	VS
1,2-Dichloropropane	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/23/04	VS
1,3,5-Trimethylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
1,3-Dichlorobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
1,3-Dichloropropane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
1,4-Dichlorobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.075)	03/22/04	03/23/04	VS
2,2-Dichloropropane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
2-Chlorotoluene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
4-Chlorotoluene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
4-Isopropyltoluene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS



SGS Ref.# 1040130004
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill
Client Sample ID Trip Blank
Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
Printed Date/Time 03/29/2004 16:17
Collected Date/Time 03/18/2004 10:30
Received Date/Time 03/18/2004 13:27
Technical Director Stephen C. Ede

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Gas Chromatography/Mass Spectroscopy									
Benzene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/23/04	VS
Bromobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
Bromochloromethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
Bromodichloromethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
Bromoform	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
Bromomethane	0.0010 U	0.0010	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
Carbon tetrachloride	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/23/04	VS
Chlorobenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.1)	03/22/04	03/23/04	VS
Chloroethane	0.0010 U	0.0010	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
Chloroform	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
Chloromethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
cis-1,2-Dichloroethene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.07)	03/22/04	03/23/04	VS
cis-1,3-Dichloropropene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
Dibromochloromethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
Dibromomethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
Dichlorodifluoromethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
Ethylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.7)	03/22/04	03/23/04	VS
Hexachlorobutadiene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
Isopropylbenzene (Cumene)	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
Methyl-t-butyl ether	0.0010 U	0.0010	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
Methylene chloride	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/23/04	VS
n-Butylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
n-Propylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
Naphthalene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
o-Xylene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
P & M -Xylene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
sec-Butylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
Styrene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.1)	03/22/04	03/23/04	VS
tert-Butylbenzene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
Tetrachloroethene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/23/04	VS
Toluene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=1)	03/22/04	03/23/04	VS
Total Trihalomethanes	0.0020 U	0.0020	mg/L	EPA 524.2	G	(<=0.08)	03/22/04	03/23/04	VS
trans-1,2-Dichloroethene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.1)	03/22/04	03/23/04	VS
trans-1,3-Dichloropropene	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS



SGS Ref.# 1040130004
 Client Name AMEC Earth and Environmental
 Project Name/# Gold Hill
 Client Sample ID Trip Blank
 Matrix Water (Surface, Eff., Ground)

All Dates/Times are Alaska Standard Time
 Printed Date/Time 03/29/2004 16:17
 Collected Date/Time 03/18/2004 10:30
 Received Date/Time 03/18/2004 13:27
 Technical Director Stephen C. Ede

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Int
Volatile Gas Chromatography/Mass Spectroscopy									
Trichloroethene	0.00050 U	0.00050	mg/L	EPA 524.2	G	(<=0.005)	03/22/04	03/23/04	
Trichlorofluoromethane	0.00050 U	0.00050	mg/L	EPA 524.2	G		03/22/04	03/23/04	VS
Vinyl chloride	0.00040 U	0.00040	mg/L	EPA 524.2	G	(<=0.002)	03/22/04	03/23/04	
Xylenes (total)	0.0010 U	0.0010	mg/L	EPA 524.2	G	(<=10)	03/22/04	03/23/04	
Surrogates									
1,2-Dichloroethane-D4 <surr>	99.1		%	EPA 524.2	G	70-130	03/22/04	03/23/04	
4-Bromofluorobenzene <surr>	99.1		%	EPA 524.2	G	70-130	03/22/04	03/23/04	VS
Toluene-d8 <surr>	100		%	EPA 524.2	G	70-130	03/22/04	03/23/04	
EDB+DBCP by Microextraction									
1,2-Dibromo-3-chloropropane	0.0210 U	0.0210	ug/L	EPA 504	A	(<=0.0002)	03/26/04	03/26/04	WAA
1,2-Dibromoethane	0.0210 U	0.0210	ug/L	EPA 504	A	(<=0.00005)	03/26/04	03/26/04	WAA
Surrogates									
1,3-Dichlorobenzene <surr>	53.1		%	EPA 504	A	30-150	03/26/04	03/26/04	WAA



CT&E Ref.# 543733 Method Blank
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill
Matrix Drinking Water

Printed Date/Time 03/29/2004 16:17
Prep Batch VXX 11534
Method SW5030
Date 03/22/2004

QC results affect the following production samples:

1040130001, 1040130002, 1040130004

Sample Remarks:

524 - MB recovery for 1,2,3-trichlorobenzene is greater than one half the PQL. This analyte is not detected above the PQL in any of the associated samples.

Parameter	Results	Reporting Limit	Units	Analysis Date	Init
Volatile Gas Chromatography/Mass Spectroscopy					



CT&E Ref.# 543733 Method Blank
 Client Name AMEC Earth and Environmental
 Project Name/# Gold Hill
 Matrix Drinking Water

Printed Date/Time 03/29/2004 16:17
 Prep Batch VXX 11534
 Method SW5030
 Date 03/22/2004

Parameter	Results	Reporting Limit	Units	Analysis Date	Init
Volatile Gas Chromatography/Mass Spectroscopy					
1,1,1,2-Tetrachloroethane	0.00050 U	0.00050	mg/L	03/22/04	VS
1,1,1-Trichloroethane	0.00050 U	0.00050	mg/L	03/22/04	VS
1,1,2,2-Tetrachloroethane	0.00050 U	0.00050	mg/L	03/22/04	VS
1,1,2-Trichloroethane	0.00050 U	0.00050	mg/L	03/22/04	VS
1,1-Dichloroethane	0.00050 U	0.00050	mg/L	03/22/04	VS
1,1-Dichloroethene	0.00050 U	0.00050	mg/L	03/22/04	VS
1,1-Dichloropropene	0.00050 U	0.00050	mg/L	03/22/04	VS
1,2,3-Trichlorobenzene	0.00031F	0.00050	mg/L	03/22/04	VS
1,2,3-Trichloropropane	0.00050 U	0.00050	mg/L	03/22/04	VS
1,2,4-Trichlorobenzene	0.00050 U	0.00050	mg/L	03/22/04	VS
1,2,4-Trimethylbenzene	0.00050 U	0.00050	mg/L	03/22/04	VS
1,2-Dibromo-3-chloropropane	0.0020 U	0.0020	mg/L	03/22/04	VS
1,2-Dibromoethane	0.00050 U	0.00050	mg/L	03/22/04	VS
1,2-Dichlorobenzene	0.00050 U	0.00050	mg/L	03/22/04	VS
1,2-Dichloroethane	0.00050 U	0.00050	mg/L	03/22/04	VS
1,2-Dichloropropane	0.00050 U	0.00050	mg/L	03/22/04	VS
1,3,5-Trimethylbenzene	0.00050 U	0.00050	mg/L	03/22/04	VS
1,3-Dichlorobenzene	0.00050 U	0.00050	mg/L	03/22/04	VS
1,3-Dichloropropane	0.00050 U	0.00050	mg/L	03/22/04	VS
1,4-Dichlorobenzene	0.00050 U	0.00050	mg/L	03/22/04	VS
2,2-Dichloropropane	0.00050 U	0.00050	mg/L	03/22/04	VS
2-Chlorotoluene	0.00050 U	0.00050	mg/L	03/22/04	VS
4-Chlorotoluene	0.00050 U	0.00050	mg/L	03/22/04	VS
4-Isopropyltoluene	0.00050 U	0.00050	mg/L	03/22/04	VS
Benzene	0.00050 U	0.00050	mg/L	03/22/04	VS
Bromobenzene	0.00050 U	0.00050	mg/L	03/22/04	VS
Bromochloromethane	0.00050 U	0.00050	mg/L	03/22/04	VS
Bromodichloromethane	0.00050 U	0.00050	mg/L	03/22/04	VS
Bromoform	0.00050 U	0.00050	mg/L	03/22/04	VS
Bromomethane	0.0010 U	0.0010	mg/L	03/22/04	VS
Carbon tetrachloride	0.00050 U	0.00050	mg/L	03/22/04	VS
Chlorobenzene	0.00050 U	0.00050	mg/L	03/22/04	VS
Chloroethane	0.0010 U	0.0010	mg/L	03/22/04	VS
Chloroform	0.00050 U	0.00050	mg/L	03/22/04	VS
Chloromethane	0.00050 U	0.00050	mg/L	03/22/04	VS
cis-1,2-Dichloroethene	0.00050 U	0.00050	mg/L	03/22/04	VS
cis-1,3-Dichloropropene	0.00050 U	0.00050	mg/L	03/22/04	VS
Dibromochloromethane	0.00050 U	0.00050	mg/L	03/22/04	VS
Dibromomethane	0.00050 U	0.00050	mg/L	03/22/04	VS



CT&E Ref.# 543733 Method Blank
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill
Matrix Drinking Water

Printed Date/Time 03/29/2004 16:17
Prep Batch VXX 11534
Method SW5030
Date 03/22/2004

Parameter	Results	Reporting Limit	Units	Analysis Date	Init
Volatile Gas Chromatography/Mass Spectroscopy					
Dichlorodifluoromethane	0.00050 U	0.00050	mg/L	03/22/04	VS
Ethylbenzene	0.00050 U	0.00050	mg/L	03/22/04	VS
Hexachlorobutadiene	0.00020F	0.00050	mg/L	03/22/04	VS
Isopropylbenzene (Cumene)	0.00050 U	0.00050	mg/L	03/22/04	VS
Methyl-t-butyl ether	0.0010 U	0.0010	mg/L	03/22/04	VS
Methylene chloride	0.00050 U	0.00050	mg/L	03/22/04	VS
n-Butylbenzene	0.00050 U	0.00050	mg/L	03/22/04	VS
n-Propylbenzene	0.00050 U	0.00050	mg/L	03/22/04	VS
Naphthalene	0.00025F	0.00050	mg/L	03/22/04	VS
o-Xylene	0.00050 U	0.00050	mg/L	03/22/04	VS
p & m -Xylene	0.00050 U	0.00050	mg/L	03/22/04	VS
sec-Butylbenzene	0.00050 U	0.00050	mg/L	03/22/04	VS
Styrene	0.00050 U	0.00050	mg/L	03/22/04	VS
tert-Butylbenzene	0.00050 U	0.00050	mg/L	03/22/04	VS
Tetrachloroethene	0.00050 U	0.00050	mg/L	03/22/04	VS
Toluene	0.00050 U	0.00050	mg/L	03/22/04	VS
Total Trihalomethanes	0.0020 U	0.0020	mg/L	03/22/04	VS
trans-1,2-Dichloroethene	0.00050 U	0.00050	mg/L	03/22/04	VS
trans-1,3-Dichloropropene	0.00050 U	0.00050	mg/L	03/22/04	VS
Trichloroethene	0.00050 U	0.00050	mg/L	03/22/04	VS
Trichlorofluoromethane	0.00050 U	0.00050	mg/L	03/22/04	VS
Vinyl chloride	0.00040 U	0.00040	mg/L	03/22/04	VS
Xylenes (total)	0.0010 U	0.0010	mg/L	03/22/04	VS
Surrogates					
1,2-Dichloroethane-D4 <surr>	99.7		%	03/22/04	VS
4-Bromofluorobenzene <surr>	101		%	03/22/04	VS
Toluene-d8 <surr>	98.9		%	03/22/04	VS

Batch VMS 6509
Method EPA 524.2
Instrument HP 5890 Series II MS1 VJA



SGS Ref.# 543734 Lab Control Sample

Printed Date/Time 03/29/2004 16:17
Prep Batch VXX 11534
Method SW5030
Date 03/22/2004

Client Name AMEC Earth and Environmental
Project Name/# Gold Hill
Matrix Drinking Water

QC results affect the following production samples:
1040130001, 1040130002, 1040130004

Sample Remarks:
LCS

Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
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Volatile Gas Chromatography/Mass Spectroscopy



SGS Ref.# 543734 Lab Control Sample

Printed Date/Time 03/29/2004 16:17
Prep Batch VXX 11534
Method SW5030
Date 03/22/2004

Client Name AMEC Earth and Environmental
Project Name/# Gold Hill
Matrix Drinking Water

Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Volatile Gas Chromatography/Mass Spectroscopy								
1,1,1,2-Tetrachloroethane	LCS 0.021	105	(70-130)			0.02 mg/L	03/22/04	VS
1,1,1-Trichloroethane	LCS 0.020	98	(70-130)			0.02 mg/L	03/22/04	VS
1,1,2,2-Tetrachloroethane	LCS 0.019	94	(70-130)			0.02 mg/L	03/22/04	VS
1,1,2-Trichloroethane	LCS 0.018	92	(70-130)			0.02 mg/L	03/22/04	VS
1,1-Dichloroethane	LCS 0.020	99	(70-130)			0.02 mg/L	03/22/04	VS
1,1-Dichloroethene	LCS 0.022	110	(70-130)			0.02 mg/L	03/22/04	VS
1,1-Dichloropropene	LCS 0.021	103	(70-130)			0.02 mg/L	03/22/04	VS
1,2,3-Trichlorobenzene	LCS 0.019	95	(70-130)			0.02 mg/L	03/22/04	VS
1,2,3-Trichloropropane	LCS 0.019	94	(70-130)			0.02 mg/L	03/22/04	VS
1,2,4-Trichlorobenzene	LCS 0.020	99	(70-130)			0.02 mg/L	03/22/04	VS
1,2,4-Trimethylbenzene	LCS 0.020	98	(70-130)			0.02 mg/L	03/22/04	VS
1,2-Dibromo-3-chloropropane	LCS 0.020	102	(70-130)			0.02 mg/L	03/22/04	VS
1,2-Dibromoethane	LCS 0.019	96	(70-130)			0.02 mg/L	03/22/04	VS
1,2-Dichlorobenzene	LCS 0.018	92	(70-130)			0.02 mg/L	03/22/04	VS
1,2-Dichloroethane	LCS 0.019	97	(70-130)			0.02 mg/L	03/22/04	VS
1,2-Dichloropropane	LCS 0.020	100	(70-130)			0.02 mg/L	03/22/04	VS
1,3,5-Trimethylbenzene	LCS 0.020	100	(70-130)			0.02 mg/L	03/22/04	VS
1,3-Dichlorobenzene	LCS 0.019	96	(70-130)			0.02 mg/L	03/22/04	VS
1,3-Dichloropropane	LCS 0.019	94	(70-130)			0.02 mg/L	03/22/04	VS
1,4-Dichlorobenzene	LCS 0.019	95	(70-130)			0.02 mg/L	03/22/04	VS
2,2-Dichloropropane	LCS 0.021	105	(70-130)			0.02 mg/L	03/22/04	VS



SGS Ref.# 543734 Lab Control Sample
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill
Matrix Drinking Water

Printed Date/Time 03/29/2004 16:17
Prep Batch VXX 11534
Method SW5030
Date 03/22/2004

Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Volatile Gas Chromatography/Mass Spectroscopy								
2-Chlorotoluene	LCS 0.020	101	(70-130)			0.02 mg/L	03/22/04	VS
4-Chlorotoluene	LCS 0.019	96	(70-130)			0.02 mg/L	03/22/04	VS
4-Isopropyltoluene	LCS 0.020	100	(70-130)			0.02 mg/L	03/22/04	VS
Benzene	LCS 0.020	102	(70-130)			0.02 mg/L	03/22/04	VS
Bromobenzene	LCS 0.019	94	(70-130)			0.02 mg/L	03/22/04	VS
Bromochloromethane	LCS 0.020	100	(70-130)			0.02 mg/L	03/22/04	VS
Bromodichloromethane	LCS 0.019	93	(70-130)			0.02 mg/L	03/22/04	VS
Bromoform	LCS 0.021	104	(70-130)			0.02 mg/L	03/22/04	VS
Bromomethane	LCS 0.022	110	(70-130)			0.02 mg/L	03/22/04	VS
Carbon tetrachloride	LCS 0.021	103	(70-130)			0.02 mg/L	03/22/04	VS
Chlorobenzene	LCS 0.020	102	(70-130)			0.02 mg/L	03/22/04	VS
Chloroethane	LCS 0.021	103	(70-130)			0.02 mg/L	03/22/04	VS
Chloroform	LCS 0.020	98	(70-130)			0.02 mg/L	03/22/04	VS
Chloromethane	LCS 0.023	114	(70-130)			0.02 mg/L	03/22/04	VS
cis-1,2-Dichloroethene	LCS 0.019	96	(70-130)			0.02 mg/L	03/22/04	VS
cis-1,3-Dichloropropene	LCS 0.019	96	(70-130)			0.02 mg/L	03/22/04	VS
Dibromochloromethane	LCS 0.021	103	(70-130)			0.02 mg/L	03/22/04	VS
Dibromomethane	LCS 0.019	97	(70-130)			0.02 mg/L	03/22/04	VS
Dichlorodifluoromethane	LCS 0.024	118	(70-130)			0.02 mg/L	03/22/04	VS
Ethylbenzene	LCS 0.021	104	(70-130)			0.02 mg/L	03/22/04	VS



SGS Ref.# 543734 Lab Control Sample

Printed Date/Time 03/29/2004 16:17
Prep Batch VXX 11534
Method SW5030
Date 03/22/2004

Client Name AMEC Earth and Environmental
Project Name/# Gold Hill
Matrix Drinking Water

Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Volatile Gas Chromatography/Mass Spectroscopy								
Hexachlorobutadiene	LCS 0.019	96	(70-130)			0.02 mg/L	03/22/04	VS
Isopropylbenzene (Cumene)	LCS 0.021	103	(70-130)			0.02 mg/L	03/22/04	VS
Methyl-t-butyl ether	LCS 0.029	95	(70-130)			0.03 mg/L	03/22/04	VS
Methylene chloride	LCS 0.020	99	(70-130)			0.02 mg/L	03/22/04	VS
n-Butylbenzene	LCS 0.020	100	(70-130)			0.02 mg/L	03/22/04	VS
i-Propylbenzene	LCS 0.020	98	(70-130)			0.02 mg/L	03/22/04	VS
Naphthalene	LCS 0.019	96	(70-130)			0.02 mg/L	03/22/04	VS
o-Xylene	LCS 0.020	100	(70-130)			0.02 mg/L	03/22/04	VS
p & m-Xylene	LCS 0.043	107	(70-130)			0.04 mg/L	03/22/04	VS
sec-Butylbenzene	LCS 0.020	102	(70-130)			0.02 mg/L	03/22/04	VS
Styrene	LCS 0.020	100	(70-130)			0.02 mg/L	03/22/04	VS
tert-Butylbenzene	LCS 0.020	99	(70-130)			0.02 mg/L	03/22/04	VS
Tetrachloroethene	LCS 0.020	100	(70-130)			0.02 mg/L	03/22/04	VS
Toluene	LCS 0.021	104	(70-130)			0.02 mg/L	03/22/04	VS
trans-1,2-Dichloroethene	LCS 0.021	105	(70-130)			0.02 mg/L	03/22/04	VS
trans-1,3-Dichloropropene	LCS 0.020	99	(70-130)			0.02 mg/L	03/22/04	VS
Trichloroethene	LCS 0.020	101	(70-130)			0.02 mg/L	03/22/04	VS
Trichlorofluoromethane	LCS 0.020	98	(70-130)			0.02 mg/L	03/22/04	VS
Vinyl chloride	LCS 0.021	106	(70-130)			0.02 mg/L	03/22/04	VS

Surrogates



SGS Ref.# 543734 Lab Control Sample

Printed Date/Time 03/29/2004 16:17
Prep Batch VXX 11534
Method SW5030
Date 03/22/2004

Client Name AMEC Earth and Environmental
Project Name/# Gold Hill
Matrix Drinking Water

Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Volatile Gas Chromatography/Mass Spectroscopy								
1,2-Dichloroethane-D4 <sur>	LCS	99	(70-130)			0.03 mg/L	03/22/04	VS
4-Bromofluorobenzene <sur>	LCS	98	(70-130)			0.03 mg/L	03/22/04	VS
Toluene-d8 <sur>	LCS	102	(70-130)			0.03 mg/L	03/22/04	VS

Batch VMS 6509
Method EPA 524.2
Instrument HP 5890 Series II MS1 VJA



CT&E Ref.# 544072 Method Blank
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 03/29/2004 16:17
Prep Batch VXX 11541
Method SW5030
Date 03/24/2004

QC results affect the following production samples:

1040130001, 1040130002, 1040130003, 1040130004

Sample Remarks:

Parameter	Results	Reporting Limit	Units	Analysis Date	Init
Volatile Fuels Department					
Gasoline Range Organics	0.0252F	0.0900	mg/L	03/24/04	BRB
Benzene	0.000500 U	0.00050	mg/L	03/24/04	BRB
Toluene	0.00200 U	0.00200	mg/L	03/24/04	BRB
Ethylbenzene	0.00200 U	0.00200	mg/L	03/24/04	BRB
P & M -Xylene	0.000775F	0.00200	mg/L	03/24/04	BRB
o-Xylene	0.000886F	0.00200	mg/L	03/24/04	BRB
Surrogates					
1,4-Difluorobenzene <surr>	94.5		%	03/24/04	BRB
1-Bromofluorobenzene <surr>	95.3		%	03/24/04	BRB

Batch VFC 6261
Method AK101 8021B
Instrument HP 5890 Series II PID+HECD VBA



SGS Ref.# 544073 Lab Control Sample

Printed Date/Time 03/29/2004 16:17
Prep Batch VXX 11541
Method SW5030
Date 03/24/2004

Client Name AMEC Earth and Environmental
Project Name/# Gold Hill
Matrix Water (Surface, Eff., Ground)

QC results affect the following production samples:
1040130001, 1040130002, 1040130003, 1040130004

Sample Remarks:
LCS

Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Volatile Fuels Department								
Gasoline Range Organics	LCS 0.453	101	(60-120)			0.45 mg/L	03/24/04	BRB
Benzene	LCS 0.0255	109	(86-124)			0.0234 mg/L	03/24/04	BRB
Toluene	LCS 0.0846	111	(81-120)			0.0764 mg/L	03/24/04	BRB
Ethylbenzene	LCS 0.0167	118	(85-127)			0.0141 mg/L	03/24/04	BRB
P & M -Xylene	LCS 0.0553	118	(90-119)			0.047 mg/L	03/24/04	BRB
o-Xylene	LCS 0.0218	113	(90-116)			0.0192 mg/L	03/24/04	BRB
Surrogates								
1,4-Difluorobenzene <surrogate>	LCS	104	(73-124)			0.05 mg/L	03/24/04	BRB
4-Bromofluorobenzene <surrogate>	LCS	106	(60-120)			0.05 mg/L	03/24/04	BRB

Batch VFC 6261
Method AK101 8021B
Instrument HP 5890 Series II PID+HECD VBA



SGS Ref.# 544074 Matrix Spike
 544075 Matrix Spike Duplicate

Printed Date/Time 03/29/2004 16:17
 Prep Batch VXX 11541
 Method Volatile Fuels Extraction (W)
 Date 03/24/2004

Original 1041370014
 Matrix Water (Surface, Eff., Ground)

QC results affect the following production samples:
 1040130001, 1040130002, 1040130003, 1040130004

Sample Remarks:
 MS GRO/BTEX - MS recovery for o-xylene was biased low due to sample foaming.
 MSD GRO/BTEX - MSD recovery for o-xylene was biased low due to sample foaming.

Parameter	Qualifiers	Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Volatile Fuels Department										
Gasoline Range Organics	MS	0.0900 U	0.512	94	(60-120)			0.45	mg/L 03/24/04	BRB
	MSD		0.494	90		4	(< 20)	0.45	mg/L 03/24/04	BRB
Benzene	MS	0.00246	0.0237	91	(86-124)			0.0234	mg/L 03/24/04	BRB
	MSD		0.0234	90		1	(< 20)	0.0234	mg/L 03/24/04	BRB
Toluene	MS	0.00200 U	0.0689	90	(81-120)			0.0764	mg/L 03/24/04	BRB
	MSD		0.0694	90		1	(< 20)	0.0764	mg/L 03/24/04	BRB
Ethylbenzene	MS	0.00200 U	0.0144	95	(85-127)			0.0141	mg/L 03/24/04	BRB
	MSD		0.0144	95		0	(< 20)	0.0141	mg/L 03/24/04	BRB
P & M -Xylene	MS	0.00200 U	0.0459	93	(90-119)			0.047	mg/L 03/24/04	BRB
	MSD		0.0460	94		0	(< 20)	0.047	mg/L 03/24/04	BRB
o-Xylene	MS	0.00331	0.0204	89 *	(90-116)			0.0192	mg/L 03/24/04	BRB
	MSD		0.0203	88 *		1	(< 20)	0.0192	mg/L 03/24/04	BRB
Surrogates										
1,4-Difluorobenzene <surr>	MS			86	(73-124)			0.05	mg/L 03/24/04	BRB
	MSD			88		2		0.05	mg/L 03/24/04	BRB
1,2-Dibromofluorobenzene <surr>	MS			118	(50-150)			0.05	mg/L 03/24/04	BRB
	MSD			116		2		0.05	mg/L 03/24/04	BRB

Batch VFC 6261
 Method AK101 8021B
 Instrument HP 5890 Series II PID+HECD VBA



CT&E Ref.# 544597 Method Blank
Client Name AMEC Earth and Environmental
Project Name/# Gold Hill
Matrix Drinking Water

Printed Date/Time 03/29/2004 16:17
Prep Batch XXX 13246
Method EPA 504
Date 03/26/2004

QC results affect the following production samples:
1040130001, 1040130002, 1040130003, 1040130004

Sample Remarks:

Parameter	Results	Reporting Limit	Units	Analysis Date	Init
EDB+DBCP by Microextraction					
1,2-Dibromo-3-chloropropane	0.0200 U	0.0200	ug/L	03/26/04	WAA
1,2-Dibromoethane	0.0200 U	0.0200	ug/L	03/26/04	WAA
Surrogates					
1,3-Dichlorobenzene <surr>	93.9		%	03/26/04	WAA
Batch	XGC 4763				
Method	EPA 504				
Instrument	HP 5890 Series II ECD SV I F				



SGS Ref.# 544598 Lab Control Sample
 544599 Lab Control Sample Duplicate
 Client Name AMEC Earth and Environmental
 Project Name/# Gold Hill
 Matrix Drinking Water

Printed Date/Time 03/29/2004 16:17
 Prep Batch XXX 13246
 Method EPA 504
 Date 03/26/2004

QC results affect the following production samples:
 1040130001, 1040130002, 1040130003, 1040130004

Sample Remarks:
 LCS
 LCSD

Parameter	QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
EDB+DBCP by Microextraction								
1,2-Dibromo-3-chloropropane	LCS	0.352	(70-130)	11	(< 20)	0.4 ug/L	03/26/04	WAA
	LCSD	0.393						
1,2-Dibromoethane	LCS	0.344	(70-130)	11	(< 20)	0.4 ug/L	03/26/04	WAA
	LCSD	0.385						
Surrogates								
1,3-Dichlorobenzene <surr>	LCS		(30-150)	8		28.6 mg/L	03/26/04	WAA
	LCSD							

Batch XGC 4763
 Method EPA 504
 Instrument HP 5890 Series II ECD SV I F

APPENDIX E

Field Notes for Water Well Decommissioning

6/14/2004

Golden Hill Well

DATE

Pg. 7

Decommissioning (2 wells, former water well & none)
Job # 3-024-01110-9

1300

Arrive on-site, Holmstead drilling waiting. Gary explains that there was a mix up in communication. He was aware that I received his 1145 AM message that he would arrive on site at 1300.

1315

HASP Tailgate Meeting

1320

Gauge Former Water Well
Total Depth: ≈ 67.20
Depth to H₂O: ≈ 16.50

1340

Begin Decommissioning Former Water Well

1420

Complete bentonite filling for former water well. Bentonite^{grout} filled to approximately 4' bgs with bentonite chips to approximately 2' bgs. The chips were applied to absorb excess water that was drawn to the surface by the grout. Prepare to move to ww-2 while bentonite grout dries.

6/4/2004 Golden Hill well
Decommissioning

DATE

Pg. 2

1435

Gauge WW-2:

Total Depth : \approx 87.40

Depth to H₂O : \approx 15.20

1445

ww-2 is filled with bentonite
grout to approximately 5' bgs. Max
headspace is left for bentonite chip-
die to excess water drawn to the
surface by grout. Return to former water well
to complete decommissioning.

1630

Steel casing above ground surface
is cut, remainder of boring hole
is cased with soil and brought to
grade. Former water well decommissioning complete.

1715

Steel casing above ground surface
is cut for ww-2. Remainder of
borehole is cased with soil and brought
to grade. ww-2 ~~is~~ decommissioning complete.
Begin clean-up procedures.

1735

Depart Site