



SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

000001

DEPT. OF ENVIRONMENTAL
CONSERVATION
FAIRBANKS
ANCHORAGE
SITKA
EASTON

RECEIVED

JUL 03 2000

Dept. of Environmental Conservation
Underground Storage Tanks — FAP

June 28, 2000

Williams Express, Inc.
1101 Kermit Drive, Suite 800
Nashville, Tennessee 37217-5111

Attn: Mr. Gregory Stephenson, P.G.

**RE: GROUNDWATER PLUME CHARACTERIZATION AND LIMITED
CORRECTIVE ACTION PLAN, WILLIAMS EXPRESS STORE NO. 5030, 3727
SPENARD ROAD, ANCHORAGE, ALASKA**

ADEC File No. L30.30; FacID No. 2884

This letter report presents the results of our groundwater plume characterization activities conducted at Williams Express Store No. 5030 (WES No. 5030), 3727 Spenard Road, Anchorage, Alaska. Results of the monitoring well installation and sampling efforts were considered in conjunction with a limited document review and source area evaluation to identify site-specific remedial objectives and develop a corrective action plan. A vicinity map of the area is included as Figure 1, and a site map depicting pertinent site features is provided as Figure 2. Verbal authorization to proceed on this project was received from Mr. Gregory Stephenson of Williams Express, Inc. (Williams) on March 29, 2000.

BACKGROUND

The WES No. 5030 facility was constructed in 1992. The filling station stores gasoline product in four underground storage tanks (USTs) located near the site's northeast corner. Previous assessment work at this site includes a 1991 preacquisition site assessment, a 1991 UST closure assessment, and a June 1999 UST release investigation. Brief summaries of these efforts are included in the following paragraphs. Locations of the current WES No. 5030 UST array and dispenser islands, former Bunker C fuel UST, and other pertinent site features are shown on Figure 2.

Shannon & Wilson conducted a Preacquisition Site Assessment (PSA) for Williams in June 1991. Soil and groundwater samples were collected from six soil borings, shown on Figure 2 as TH1 through TH6. Laboratory analyses indicated elevated concentrations of diesel range organic compounds (DRO), gasoline range organic compounds (GRO), benzene, and 1,2-dichloroethane in the site's soil and groundwater. The PSA literature and records review identified several potential off-site sources of the petroleum hydrocarbons. The nearest potential sources were located approximately 100 feet north of the WES No. 5030 site at the properties occupied by Thrifty Rent-A-Car and a Chevron Service Station. Both sites were listed on the Alaska Department of Environmental Conservation (ADEC) Contaminated Sites database system

in 1991, presumably due to impacted soils and groundwater associated with gasoline and diesel USTs in use at that time. A third filling station was identified to the northeast of WES No. 5030, on the property currently occupied by a Skipper's restaurant. The few details provided for this site were based largely on a review of aerial photographs, which indicated the filling station operated for an unknown duration between 1959 and 1980. Locations of the three potential source areas relative to WES No. 5030 are shown on Figures 1 and 2.

A 2,500-gallon UST was removed from the site's southwest corner in September 1991. The tank was apparently used to store Bunker C heating fuel, but was likely abandoned after the site was supplied with natural gas in 1963. Confirmation soil samples collected during the 1991 closure assessment contained maximum hydrocarbon concentrations of 141 ppm DRO and 113 ppm total petroleum hydrocarbons (TPH), and did not contain detectable GRO, benzene, toluene, ethylbenzene, and xylene (BTEX) constituents.

Site characterization work conducted since 1991 has confirmed the presence of impacted soil and groundwater at WES No. 5030. In June and July 1999, a release investigation was conducted to assess potentially impacted soil encountered during tank upgrade activities. As part of this effort, about 120 cubic yards of impacted soil were excavated from the north end of the UST array and transported off-site for treatment and disposal. Analytical soil samples collected from the excavation base at 7 to 9.5 feet below the ground surface (bgs) contained elevated GRO and BTEX constituent concentrations, with the highest concentrations measured in the soil samples collected between the USTs. The extent of impacted soil was not determined, although samples collected 5 to 10 feet north of the UST array exhibited a concentration reduction of two or three orders of magnitude. These results indicate that product migration through the coarse-grained soil was likely characterized primarily by vertical infiltration with a relatively limited lateral component. The impacted soil may therefore be confined to the immediate vicinity of the UST array, despite GRO concentrations up to 9,670 ppm remaining in the soil between the tanks. Moreover, the residual hydrocarbons in the soil may have limited mobility due to the overlying pavement that inhibits precipitation infiltration. As a precautionary measure, two horizontal vapor extraction lines were placed in the excavation, approximately 8 feet bgs. A detailed site map showing the excavation limits and vapor extraction lines is provided as Figure 3.

To evaluate the potential impact to groundwater, three monitoring wells were installed in July 1999. As shown on Figure 2, Monitoring Well B1MW was placed within the zone of impacted soil excavated in June 1999, and Wells B2MW and B3MW were positioned to assess downgradient areas. Soil and groundwater samples collected from two of the three monitoring well borings contained elevated GRO and BTEX constituents. Although Monitoring Well B1MW was placed within the area of impacted soil excavation, the highest hydrocarbon concentrations were measured in the groundwater sample collected from Monitoring Well B2MW, located about 50 feet west of the Williams UST array. Well B2MW is not directly downgradient from the on-site UST array, based on the southwesterly groundwater flow direction

measured in August 1999. In contrast, the August 1999 groundwater sample from Well B3MW, which *is* located downgradient of the Williams UST array, did not contain detectable GRO or BTEX constituents. Previous studies conducted for the WES No. 5030 site and adjacent properties have indicated different groundwater flow directions. In 1991, the on-site flow direction was reportedly measured to the southeast. Work conducted at the Chevron site to the north of WES No. 5030 reportedly indicated a flow direction to the south-southwest. Due to uncertainties regarding groundwater flow direction, it was not previously established whether the elevated hydrocarbon levels observed in B2MW are attributable to the on-site UST array and/or other potential sources.

PURPOSE AND OBJECTIVES

The purpose of the May 2000 project was to develop a remedial strategy to address impacted soil and groundwater at WES No. 5030. Specific data collection objectives consisted of the following:

1. characterize the impacted groundwater plume by determining flow direction, concentration gradient, and leading edge location;
2. evaluate potential source area(s); and
3. collect natural attenuation parameters and other data necessary to evaluate remedial action alternatives.

The site characterization results and document review effort were used to develop conclusions regarding plume properties and likely source areas. These conclusions in turn formed the basis of our site-specific remedial objectives and subsequent corrective action recommendations.

FIELD ACTIVITIES

Field activities performed or directed by Shannon & Wilson included drilling groundwater monitoring wells, field screening, monitoring well development and surveying, collecting analytical soil and groundwater samples, and coordination with the project laboratory for analytical testing. Summaries of these field activities are provided in the following sections. Under subcontract to Shannon & Wilson, Discovery Drilling (Discovery) provided personnel and equipment to advance the borings, install the monitoring wells, and transport soil cuttings to Alaska Soil Recycling (ASR) for thermal desorption. Under subcontract to Williams, CT&E Environmental Services, Inc. (CT&E) and Southern Petroleum Laboratories (SPL) provided laboratory analyses of the soil and groundwater samples. A work plan for this project was submitted to the ADEC, and approved on April 14, 2000 by Ms. Lynne Bush.

000004

Soil Borings

Three soil borings, designated Borings B4, B5, and B6, were advanced on May 8, 2000. Approximate locations of the three borings are shown on Figure 2 as Monitoring Wells B4MW, B5MW, and B6MW. The monitoring well locations were selected to measure background groundwater conditions, evaluate contributions of potential off-site sources to the impacted groundwater plume, and to estimate plume dimensions. The three borings were advanced to depths ranging from approximately 17 to 18 feet bgs. Groundwater was encountered at about 14 feet bgs in each boring. Drill cuttings were containerized in three 55-gallon open-top drums, which were subsequently transported to ASR for thermal desorption.

Soil samples were obtained from Borings B4, B5, and B6 at approximately 5-foot intervals in the top 10 feet bgs, and at 2.5-foot intervals between ten feet bgs and the groundwater contact. Samples were collected using a 3-inch outside-diameter (OD) split-spoon sampler placed in the hollow drill stem and driven approximately 18 inches into undisturbed soil beneath the drill auger. Each of the twelve soil samples was visually classified and screened using an OVM 580B photoionization detector (PID) calibrated with 100 ppm of isobutylene standard gas.

Eight soil samples from the three borings were submitted for laboratory analyses. Samples were selected to evaluate the hydrocarbon distribution throughout the soil profile and to measure the soil's total organic carbon (TOC) content. The two soil samples from each borehole exhibiting the highest headspace reading were submitted for hydrocarbon analyses. It is significant to note that the highest headspace readings for each boring were measured in samples collected from the saturated soil directly above the silt interface at about 16.5 feet bgs, or from the adjacent sampling interval of 12.5 to 14 feet bgs. Two TOC samples were selected based on low headspace readings and representation of the site's range of soil types. Analytical soil samples were placed in the laboratory-supplied containers using a clean stainless-steel spoon. Soil samples for volatile hydrocarbon analyses were extracted in the field using 25-ml aliquots of methanol, in accordance with Alaska Method 101 (AK 101). The number, depth, field screening readings, and classification of the project's field screening and analytical soil samples are summarized in Table 1 and on Figures 5, 6, and 7.

Monitoring Well Installation, Development and Sampling

The three soil borings were completed as Monitoring Wells B4MW, B5MW, and B6MW. The wells were constructed of 2-inch nominal inside diameter (ID) schedule 40 PVC pipe with threaded connections. The bottom 10 feet of each well is constructed of a PVC well screen with 0.010-inch slots. The screened casing sections were placed at a depth interval of 8 to 18 feet bgs in B5MW and B6MW, and about 7 to 17 feet bgs in B4MW. The well screen intervals were selected both to encompass the interval of anticipated groundwater fluctuation, and to avoid

penetrating the silty soil stratum by more than 1.5 feet. Monitoring well construction details for B4MW, B5MW, and B6MW, including depths of placement and packing materials, are shown on Figures 8, 9, and 10, respectively.

Monitoring Wells B4MW, B5MW, and B6MW were developed and sampled on May 15, 2000, in accordance with ADEC guidelines. Using a Whale submersible pump, approximately 30 gallons of groundwater were removed from each of the three new monitoring wells. The water produced during development was transported and discharged to the water treatment system located at the former WES No. 5021, 6010 Old Seward Highway. Water quality parameters, including pH, temperature, dissolved oxygen (DO), turbidity, conductivity, and ferrous (dissolved) iron, were measured at 5-gallon intervals during the development process. The development details are listed in Table 2.

Immediately following development, groundwater samples were collected from Monitoring Wells B4MW, B5MW, and B6MW using a Whale submersible pump. In addition, groundwater samples from Monitoring Wells B1MW, B2MW, and B3MW were collected using a polyethylene disposable bailer. Prior to sample collection, Monitoring Wells B1MW, B2MW, and B3MW were purged of at least three well volumes. Water quality parameters, including pH, temperature, DO, turbidity, and conductivity, were measured prior to groundwater sample collection from Monitoring Wells B1MW through B6MW. Water quality results are shown in Table 2. Purgewater from B1MW, B2MW, and B3MW was transported to the former WES No. 5021 for discharge in that site's water treatment system.

LABORATORY ANALYSES

Using chain-of-custody procedures, soil and groundwater samples were transferred to the project laboratories in coolers with ice packs. The analytical results are listed in Table 3 and on Figure 2. Detailed laboratory reports from CT&E and SPL included in Attachments 1 and 2, respectively.

Soil samples were submitted to CT&E for hydrocarbon, lead, and TOC analyses. Samples B4S3, B4S4, B5S3, B5S4, B6S3 and B6S4 were analyzed for GRO by AK 101 and BTEX by Environmental Protection Agency (EPA) Method 8021B as modified by AK 101. Samples B4S4, B5S4, and B6S4 were also analyzed for total lead by EPA Method 6010B, and Samples B5S2 and B6S2 were analyzed for TOC using CT&E's TOC standard operating procedure (SOP).

Soil Samples B5S4 and B6S2 were submitted to Shannon & Wilson's geotechnical laboratory for sieve analysis by American Society of Testing and Materials (ASTM) Method D 422-63. The sieve analysis results are shown on Figure 11.

The groundwater samples from Monitoring Wells B1MW through B6MW were submitted to SPL for hydrocarbon analyses and to CT&E for natural attenuation parameters. Each sample was analyzed for GRO by AK 101, BTEX by EPA Method 602, nitrates and sulfates by EPA Method 300.0, and methane by ASTM Method D-1945M.

SUBSURFACE CONDITIONS

Soil conditions documented during drilling are recorded on the boring logs, included as Figures 5, 6, and 7. The soil encountered in Borings B4 through B6 generally consisted of non-frost susceptible (nfs), coarse-grained material to about 16.5 feet bgs, underlain by silt to the bottom of the borings. Samples B5S4 and B6S2, taken from approximately 15 to 16.5 and 10 to 11.5 feet bgs, respectively, were submitted to Shannon & Wilson's geotechnical laboratory for soil classification. Testing results, shown on Figure 11, indicate that Sample B5S4 is a gravelly sand (SP) and Sample B6S2 is a slightly silty, gravelly sand (SP-SM). Both classifications are consistent with field observations. The materials documented in the top 8 feet bgs of B4 did differ from those encountered in B5 and B6 at the same depth, possibly due to the boring locations. As shown on Figure 2, Boring B4 is located in a landscaped area whereas Borings B5 and B6 are located in the paved driveway.

The coarse-grained soils observed in Borings B4, B5, and B6 are not expected to retard vertical product infiltration or lateral transport of impacted groundwater. Results of TOC analyses support this conclusion. Samples B5S2 and B6S2, collected at a depth of approximately 10 to 11.5 feet bgs, contained TOC of 0.3271 and 0.1147 percent, respectively. These levels are consistent with typical TOC values of 0.1 to 0.2 percent reported for Alaskan soil of this type. The TOC results may be used in future fate and transport modeling to estimate hydrocarbon migration rates and/or to calculate alternative cleanup levels.

Groundwater was encountered in Borings B4, B5, and B6 at approximately 14 feet bgs during drilling on May 8, 2000. To obtain more precise determination of relative groundwater levels, a level loop vertical survey of the three new monitoring wells and three previously existing wells was conducted on May 12, 2000. The top of casing elevations (measuring points) for each well are recorded in Table 2. The survey results were used in conjunction with water level measurements to determine the groundwater flow direction. The May 2000 groundwater data indicated a flow direction to the southwest at an approximate gradient of 0.5 percent. This flow direction is consistent with the August, September, and December 1999 data for this site.

DISCUSSION OF RESULTS

Applicable soil cleanup levels for this site were determined using the ADEC's Method Two guidelines contained in the January 1999, 18 AAC 75.341 regulations. The most stringent

050007

exposure pathway criteria listed in Tables B1 and B2 for the "under 40-inch (precipitation) zone" are assumed. Table C of 18 AAC 75.345 establishes groundwater cleanup levels. The applicable soil and groundwater cleanup levels are listed in Table 3. The following paragraphs discuss the results of the soil and groundwater sample analyses in context of these site cleanup levels and the site's data collection objectives.

Soil Samples

Two soil samples from each boring were tested for hydrocarbon constituents. In addition, one soil sample from each boring was tested for total lead. Detectable BTEX concentrations were reported for at least one of the two analytical soil samples from each soil boring, with the highest levels measured in Sample B5S4. The benzene concentrations of 0.0367, 1.48, and 1.32 ppm in Samples B4S4, B5S4, and B6S4, respectively, exceed the applicable soil cleanup levels. Detectable GRO concentrations were reported for two of the six samples, but do not exceed the applicable soil cleanup level. Total lead was not detected in the three soil samples analyzed for this parameter.

Each sample that contained elevated BTEX concentrations was collected from a depth interval within the saturated zone. This observation is consistent with the measurement of elevated concentrations in each groundwater sample, as discussed below. The only other sample to contain detectable benzene, Sample B5S3, was collected from a depth interval that is likely within the range of seasonal groundwater fluctuation. These data are consistent with the earlier assertion that impacted soil within the site boundaries is confined to the immediate vicinity of the UST array and "smear zone" soil overlying the impacted groundwater plume in the site's western area.

Groundwater Samples

The results of the hydrocarbon and natural attenuation parameter analyses are discussed separately in the following paragraphs.

Hydrocarbon Analyses

Detectable GRO and/or BTEX constituent concentrations were measured in each of the six groundwater samples collected in May 2000. The highest levels were measured in the B2MW groundwater sample, which contained 87 ppm GRO, 2 ppm benzene, 9.6 ppm toluene, 2.6 ppm ethylbenzene, and 20 ppm xylenes. Each of these constituent concentrations exceeds the corresponding groundwater cleanup level. With one exception, the GRO and benzene concentrations in the other groundwater samples also exceed the groundwater cleanup levels. The groundwater sample from Well B3MW, located downgradient of the WES No. 5030 UST

000008

array with respect to groundwater flow, contained only trace concentrations of toluene and xylenes, and did not contain detectable GRO, benzene, or ethylbenzene.

In a conversation with Ms. Carla Morgan of SPL on May 30, 2000, she indicated that methyl tertiary butyl ether (MTBE) was detected in the groundwater samples from B1MW, B2MW, B5MW, and B6MW.

It is evident from an evaluation of groundwater results shown on Figure 2 that the impacted plume's on-site component is centered in the vicinity of B2MW, and extends to the southwest in the direction of groundwater flow. The general trend of decreasing concentrations over the distance spanned by B2MW, B5MW, and B6MW suggests that the source of the impacted groundwater is located further north or northeast of B2MW. The decreasing trend does not appear sufficient to contain the impacted plume within the WES No. 5030 site boundary, however, although the plume's leading edge location was not established by our field efforts. The literature references a 1995 direct-push groundwater sample collected in Greenland Drive, directly west of the WES No. 5030 site. This sample reportedly contained 5.8 ppm GRO and 1.8 ppm benzene, concentrations similar to the magnitudes measured in the May 2000 sample from Well B6MW. If the plume does extend off-site to the southwest, it may constitute a threat to human receptors. Based on information obtained in a previous Shannon & Wilson site assessment, at least one municipal or private well is located within 1/2 mile of the site.

Natural Attenuation

Results of the natural attenuation parameter analyses were evaluated to determine the presence of aerobic and/or anaerobic processes. The first parameter considered is dissolved oxygen (DO), as aerobic activity is the most energetically favorable degradation process, and available DO will likely be consumed first. The DO levels measured in May 2000 ranged from 2.24 ppm to 4.14 ppm, but are not believed to be representative of the groundwater formation due to potential agitation during the well development and purging process. In contrast, laboratory sample results indicate that anaerobic degradation may be occurring within the groundwater plume. Assuming that samples from Monitoring Wells B3MW and B4MW represent background conditions, sulfate reduction, nitrate reduction, and methane generation may be occurring within the impacted plume. Likewise, field measurements indicate that ferrous iron concentrations are higher within the impacted groundwater plume, providing evidence of iron (III) reduction. The distribution pattern for each of these four parameters is consistent with increased anaerobic activity within the impacted plume.

000000

Quality Control

A laboratory-prepared methanol soil trip blank, designated TB, accompanied the soil sample bottles throughout the sample collection and transport processes. The trip blank did not contain detectable GRO or BTEX concentrations, indicating that the soil samples were not impacted during sample handling and storage.

A water trip blank, designated TB, accompanied the water sample bottles from the laboratory to the site during sampling activities and was analyzed by SPL. The trip blank did not contain detectable levels of GRO or BTEX, indicating that the groundwater samples were not impacted during the sample handling and storage process.

Summary of Analytical Data Interpretations

Groundwater samples collected from B1MW, B2MW, B5MW, and B6MW in May 2000 confirm the presence of impacted groundwater within the WES No. 5030 site boundaries. Results of the May 2000 soil sample analyses do not reveal areas of impacted soil above the groundwater smear zone, other than the previously-identified area at the UST array's north end. Considered in context of previous assessment results, the data also indicate that the impacted soil associated with the Williams UST array is not the primary source of the impacted groundwater plume that may extend off site to the southwest. This interpretation is supported data pertaining to the groundwater flow direction, the location of the groundwater plume relative to the Williams UST array, the estimated volume of impacted soil near the Williams UST array, the presence of only trace hydrocarbon concentrations in the groundwater downgradient from the UST array, the hydrocarbon concentration gradient within the plume, and previous measurements of free product in monitoring wells north of WES No. 5030.

POTENTIAL OFF-SITE SOURCE AREAS

A brief search and records review was conducted to establish the potential contribution of off-site sources to the impacted groundwater observed at WES No. 5030. This search and records review was conducted to develop an overview of environmental conditions at nearby properties. The ADEC database was searched to identify registered USTs, leaking USTs (LUSTs), and contaminated sites at properties adjacent to WES No. 5030. Two active LUST sites were located directly upgradient of WES No. 5030: Thrifty Rent-A-Car (Thrifty), at 3730 Spenard Road; and Chevron Service Station #9-9014 (Chevron), at 3808 Minnesota Drive. The ADEC's Anchorage office records for Thrifty and Chevron were briefly reviewed on May 9, 2000. In addition, Shannon & Wilson's June 1991 Interim PSA Report for the former Foodland Market site was reviewed.

000010

Based on aerial photographs, automobile filling and service stations have been operating north of the site since the 1950's. Moreover, petroleum releases have been documented at both sites. A summary of our records review for the Thrifty and Chevron sites is detailed below. Two other potential off-site sources identified during the review are also discussed.

Thrifty Rent-A-Car, 3730 Spenard Road

Aerial photographs from 1959 and 1966 show a filling station and automobile storage yard on the site now occupied by Thrifty. According to ADEC records, a 1,000-gallon used oil UST was installed in January 1980 and a 4,000-gallon gasoline UST was installed in January 1984. Locations of these USTs are shown on Figure 2. The results of a tank tightness test performed on the 4,000-gallon UST in September 1989 indicated a leaking swing joint on the suction line. Following repair activities in September 1989, four monitoring wells were installed. Analytical groundwater samples collected from Monitoring Wells T-1 through T-4 following installation contained maximum hydrocarbon concentrations of 28.8 ppm benzene, 81.4 ppm total BTEX, and 30.8 ppm TPH.

The ADEC database indicated that the 1,000-gallon used oil UST was last used in September 1988, but remains in place. The 4,000-gallon gasoline UST and associated piping was excavated and removed in August 1992. A soil sample collected at approximately 10 feet bgs below the northwest corner of the former gasoline UST contained 1.3 ppm benzene, 236.30 ppm total BTEX, and 940 ppm volatile petroleum hydrocarbons (VPH).

Free product ranging from 6 to 12 inches in thickness was encountered in Chevron Monitoring Wells MW-9 and MW-11 and on-site Thrifty Monitoring Well T-2 during groundwater sampling conducted for Thrifty in February 1995. Fingerprint analyses of the product and groundwater samples from the five monitoring wells sampled in February 1995 concluded that the hydrocarbon constituents were from an unleaded gasoline containing MTBE, probably from a single source, and with an estimated age of less than 4 years old. The report summarizing the groundwater and product sampling and analyses concluded that the groundwater flow direction was towards the southwest and that the impacted groundwater originated from the Chevron site.

Chevron Service Station #9-9014, 3808 Minnesota Drive

Aerial photographs show a filling station at the present Chevron site since at least 1959. According to ADEC records, five USTs used to store gasoline, diesel, and used oil were removed and replaced in July 1995. The UST closure assessment report was not available in the ADEC's Anchorage office files. The current ADEC project manager, Mr. Clint Adler, indicated that the records for the Chevron site are located in the ADEC's Fairbanks office. The Second Semi-

000011

Annual 1999 Groundwater and Sampling report prepared by Gettler-Ryan, Inc. (G-R) and Fourth Quarter 1999 Remedial System Evaluation report prepared by SECOR International, Inc. (SECOR) for Chevron were obtained by internet access and reviewed. These reports are included in Attachment 3.

According to the G-R groundwater and sampling report, routine groundwater monitoring has been conducted at the Chevron site since July 1992. Thrifty Monitoring Wells T-1, T-2, and T-4 were sampled as part of the Chevron groundwater monitoring event in September 1994, and added to the Chevron monitoring program in August 1996. The SECOR remedial system evaluation report indicates that soil vapor extraction (SVE) and air sparging were initiated at the Chevron site on May 31, 1996.

Results of the October 18, 1999 groundwater sampling event conducted at the Chevron and Thrifty sites indicate that GRO and/or BTEX constituent concentrations continue to exceed the ADEC groundwater cleanup levels. The highest concentrations were measured in the groundwater samples from MW-9 and MW-11, although product was not reported at that time. To provide a comprehensive overview of groundwater concentrations at the Thrifty, Chevron, and Williams sites, the analytical results and groundwater flow directions measured in Fall 1999 are shown on Figure 4. A comparison of the groundwater analyses at both sites verifies that the highest BTEX constituent concentrations were measured in Chevron monitoring wells located upgradient of WES No. 5030. The groundwater flow directions measured during both sampling events were in the southwesterly direction. Based on this comparison, the impacted groundwater observed on the Williams site appears to be largely attributable to an upgradient source area(s).

Other Potential Sources

Two additional sources were noted in our brief research and records review. Due to the distance from the WES No. 5030 site or lack of ADEC records, these sites are not presently considered primary contributors to the impacted groundwater plume. The first potential source is the Alpina Auto Repair and Service Station at 3607 Spenard Road, approximately 1,000 feet northwest of WES No. 5030. According to ADEC records, nine USTs used to store gasoline, diesel, and used oil were removed from this site in September 1995.

The second potential source is a former Unocal filling station that operated on the property now occupied by Skipper's restaurant at 3611 Minnesota Drive. An aerial photograph from 1966 shows a filling and service station. A subsequent photograph from 1980 shows the building structure removed and the site unpaved. The ADEC database did not contain any records regarding a registered UST, LUST, or contaminated site located at this property.

CORRECTIVE ACTION

060012

An objective of this investigation was to evaluate corrective action at the site, given that elevated hydrocarbon levels exist in the site's soil and groundwater. To develop a corrective action recommendation, alternative strategies are evaluated in the context of known site conditions, apparent hydrocarbon sources, and site-specific remedial objectives.

Source Area Summary

As presented in this document, multiple source area(s) are potential contributors to the impacted groundwater plume. Because source-area identification is an important consideration in establishing remedial objectives and associated corrective action, our conclusions and supporting data regarding potential source areas are reiterated in this section. Our efforts focused on potential source areas located on the WES No. 5030, Thrifty, and Chevron properties. Our field activities and limited document review were used to develop the conclusions listed below.

1. Impacted soil and groundwater are present at the WES No. 5030, Thrifty, and Chevron sites. The greatest apparent risk to human health and the environment is posed by impacted groundwater that extends southwest of WES No. 5030.
2. Based on soil samples collected from soil drilling and excavation activities, impacted soil within the WES No. 5030 site boundary appears to be limited to the vicinity of the UST array and the smear zone above the impacted groundwater plume. No on-site sources other than the WES No. 5030 UST array have been identified. Furthermore, the impacted soil near the UST array does not appear to be a primary contributor to the impacted groundwater plume.
3. Patterns of hydrocarbon distribution indicate that the center of the impacted groundwater plume's on-site component is located west of the Williams UST array, and appears to extend to the southwest in the direction of apparent groundwater flow.
4. Based on comparable groundwater flow directions measured at the WES No. 5030 and Chevron sites, the elevated hydrocarbon concentrations in the WES No. 5030 wells are indicative of a source area to the north or northeast of Well B2MW. This interpretation is consistent with previous observations of free product in Chevron Wells MW-9 and MW-11.
5. The source of detectable hydrocarbons in the B4MW groundwater sample has not been determined. It is possible that these levels reflect contributions from off-site sources at either the Chevron property and/or potential source areas further to the northeast.

010013

6. The conclusions stated in items 1 through 5 above provide a strong line of evidence that the impacted plume observed at WES No. 5030 is attributable primarily to an off-site source located to the north to northeast.

Remedial Objectives

The fundamental remedial objective at most impacted sites is protecting human health and the environment. Site-specific remedial objectives are developed by applying this guiding principle to the particular site conditions, considering the chemical constituents of concern, soil properties, site use, evaluation of complete exposure pathways, and risk to potential receptors. The subsurface at the WES No. 5030 site is characterized by elevated concentrations of volatile petroleum hydrocarbon constituents in both the soil and groundwater, with assumed off-site migration of the impacted groundwater plume. For these conditions, corrective action typically consists of a combination of source-area treatment and downgradient plume control. Application of these dual objectives to WES No. 5030, however, is complicated both by the presence of multiple source areas and continued operation of the on-site filling station. Two primary regions of impacted media have been identified at WES No. 5030: the impacted soil and groundwater in the vicinity of the UST array, and the impacted groundwater plume that extends southwest from the site's northern boundary. Williams' specific remedial objectives associated with each of these areas are discussed separately in the following paragraphs.

UST Array

Eventually, source-area treatment will likely be required to address the impacted soil in the vicinity of the Williams UST array. Remedial action in this area is facilitated by the horizontal vapor extraction pipes placed during the 1999 soil removal action. In the immediate future, however, corrective action in this area may not be cost-effective for several reasons. First, the potential for a known or unknown subsurface release remains due to the site's continued operation as a fuel storage and distribution facility, and remedial action initiated at this time may therefore be duplicated at a later date. Second, the impacted soil constitutes a low risk to potential receptors, relative to the impacted groundwater plume to the west. Third, soil sample analyses indicate that the lateral extent of impacted soil is limited, despite the high GRO concentrations measured in 1999 directly below the assumed release location.

Similarly, active groundwater treatment is not recommended for this source area, based on sample results that indicate groundwater downgradient of the Williams UST array is not presently impacted with hydrocarbon concentrations greater than ADEC cleanup levels. Based on the concentration gradient across the Williams site and adjacent properties, the levels observed in Well B1MW may reflect the combined contributions of releases from the Williams UST array and off-site sources. Soil samples from the July 1999 and May 2000 soil boring efforts did not indicate other on-site areas of impacted vadose-zone soil that could serve as secondary sources for impacted groundwater.

000014

In the context of these factors, the current remedial objective for the UST array is to conduct limited, cost-effective source-area treatment that utilizes in-place piping. Groundwater conditions will continue to be monitored using semi-annual sample collection from Monitoring Wells B1MW and B3MW.

Impacted Groundwater Plume

The impacted groundwater plume in the site's western area appears to migrate off site to the southwest, and corrective action is appropriate to protect downgradient receptors. To efficiently address the impacted plume, corrective action may include both source-area treatment and plume containment measures. Because the primary plume source appears to be located north of WES No. 5030 site boundary, source area treatment is not presently a remedial objective of Williams.

Evaluation of Remedial Action Alternatives

Williams' overall remedial objective is to protect human health and the environment from potential releases associated with Williams' on-site fuel handling and storage operations. Specific objectives for the WES No. 5030 presently consist of limited source-area treatment in the vicinity of the on-site UST array and continued groundwater monitoring. Groundwater treatment is not planned at this time.

Corrective action alternatives considered for source area soil treatment consisted of excavation with ex-situ treatment, passive vapor extraction, and active vapor extraction. Evaluation criteria included remedial effectiveness, access limitations, cost efficiency, cleanup time, impact to facility operations, and site-specific source area and subsurface soil conditions. Based on these considerations, we recommend a passive vapor extraction system (VES) to treat the impacted soil in the vicinity of the Williams UST.

The proposed passive vapor extraction system (VES) consists of riser pipes installed on the existing extraction pipes. Wind-driven fans placed on the riser pipes will induce subsurface flow and physical removal of volatile hydrocarbon constituents. Implementation of this comparatively simple technology is intended to provide cost-effective treatment, given the apparently limited extent of impacted soil and extended timeframe for conducting cleanup. If site conditions or remedial objectives change, this system can be upgraded to active VES.

It is emphasized that these activities are not intended to achieve site closure. Due to continued site use as a commercial filling station, additional site assessment and corrective action may be required prior to site closure.

In the context of these factors, the current remedial objective for the UST array is to conduct limited, cost-effective source-area treatment that utilizes in-place piping. Groundwater conditions will continue to be monitored using semi-annual sample collection from Monitoring Wells B1MW and B3MW.

Impacted Groundwater Plume

The impacted groundwater plume in the site's western area appears to migrate off site to the southwest, and corrective action is appropriate to protect downgradient receptors. To efficiently address the impacted plume, corrective action may include both source-area treatment and plume containment measures. Because the primary plume source appears to be located north of WES No. 5030 site boundary, source area treatment is not presently a remedial objective of Williams. Measures to contain plume migration may be implemented to mitigate the potential impact to drinking water wells located downgradient of WES No. 5030.

Evaluation of Remedial Action Alternatives

Williams' overall remedial objective is to protect human health and the environment from potential releases associated with Williams' on-site fuel handling and storage operations. Specific objectives for the WES No. 5030 presently consist of limited source-area treatment in the vicinity of the on-site UST array and continued groundwater monitoring. Groundwater treatment is not planned at this time.

Corrective action alternatives considered for source area soil treatment consisted of excavation with ex-situ treatment, passive vapor extraction, and active vapor extraction. Evaluation criteria included remedial effectiveness, access limitations, cost efficiency, cleanup time, impact to facility operations, and site-specific source area and subsurface soil conditions. Based on these considerations, we recommend a passive vapor extraction system (VES) to treat the impacted soil in the vicinity of the Williams UST.

The proposed passive vapor extraction system (VES) consists of riser pipes installed on the existing extraction pipes. Wind-driven fans placed on the riser pipes will induce subsurface flow and physical removal of volatile hydrocarbon constituents. Implementation of this comparatively simple technology is intended to provide cost-effective treatment, given the apparently limited extent of impacted soil and extended timeframe for conducting cleanup. If site conditions or remedial objectives change, this system can be upgraded to active VES.

It is emphasized that these activities are not intended to achieve site closure. Due to continued site use as a commercial filling station, additional site assessment and corrective action may be required prior to site closure.

000018

CONCLUSIONS AND RECOMMENDATIONS

As a result of our 1999 and 2000 field activities, impacted soil and groundwater were identified in the vicinity of Monitoring Wells B1MW through B6MW. Hydrocarbon concentrations measured in the groundwater samples from each well except B3MW exceed the applicable ADEC cleanup levels for one or more constituents. The analytical soil results do not provide evidence of on-site source areas other than the Williams UST array. Soil samples collected during a 1999 UST assessment indicate that impacted soil is confined to the immediate vicinity of the USTs, although the precise extent has not been determined.

Corrective action is recommended to treat impacted soils within the vicinity of the UST array. An evaluation of remedial alternatives was conducted in context of site assessment data, a source area evaluation, and site-specific remedial objectives. It is our opinion that passive vapor extraction using previously-installed piping is presently the best method to achieve source area soil treatment in an effective and cost-efficient manner.

Groundwater located directly downgradient of the Williams UST array does not appear to be impacted at this time. Groundwater samples from Monitoring Well B3MW, located directly downgradient from the UST with respect to groundwater flow, have contained only trace hydrocarbon constituents. The highest on-site dissolved hydrocarbon concentrations were observed in groundwater samples from Well B2MW. Based on our field observations, analytical results, and document review, the impacted groundwater plume associated with Well B2MW appears to be migrating from an upgradient source(s), with the leading edge likely extending off site to the southwest. In accordance with Williams' remedial objectives, we recommend continued groundwater monitoring at this site.

CLOSURE/LIMITATIONS

This report was prepared for the exclusive use of our client and their representatives in the study of this site. The findings we have presented within this report are based on the limited research, sampling, and analyses that we conducted at this site. They should not be construed as definite conclusions regarding the soil and groundwater conditions at this site. It is possible that our subsurface tests missed higher levels of petroleum hydrocarbon constituents, although our intention was to sample areas likely to be impacted. As a result, the sampling and analyses performed can only provide you with our professional judgment as to the environmental characteristics of this site, and in no way guarantees that an agency or its staff will reach the same conclusions as Shannon & Wilson, Inc. The data presented in this report should be considered representative of the time of our site assessment. Changes in site conditions can occur with time, due to natural forces and/or human activity. In addition, changes in Government codes, regulations, or laws may occur. Because of such changes beyond our control, our observations and interpretations may need to be revised.

Shannon & Wilson has prepared the information in Attachment 4, "Important Information About Your Geotechnical/Environmental Report," to assist you and others in understanding the use and limitations of our reports.

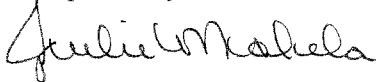
You are advised that various state and federal agencies (ADEC, EPA, etc.) may require the reporting of this information. Shannon & Wilson does not assume the responsibility for reporting these findings and therefore, has not, and will not, disclose the results of this study without your prior approval.

We appreciate this opportunity to be of service. Please call the undersigned with any questions or comments concerning the contents of this report.

Sincerely,

SHANNON & WILSON, INC.

Prepared By



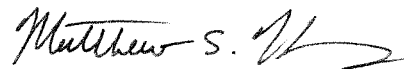
Julie A. Makela
Environmental Engineer II

srb: RNB

encl: Tables 1, 2, and 3; Figures 1 through 11; Attachments 1 through 4

cc: Mr. Paul Farnsworth, Alaska Projects
Ms. Lynne Bush, ADEC

Approved By



Matthew S. Hemry, P.E.
Principal Engineer

TABLE 1 - SAMPLE LOCATIONS AND DESCRIPTIONS

Sample No.	Date	Sample Location	Depth (ft.)	Headspace (ppm) ^	Sample Classification
Soil Samples					
B4S1	5/8/2000	Boring 4, Sample 1	5-6.5	0.1	Gray-brown, slightly silty, sandy GRAVEL, damp
B4S2	5/8/2000	Boring 4, Sample 2	10-11.5	0	Gray-brown, slightly silty, fine SAND; moist
B4S3	5/8/2000	Boring 4, Sample 3	12.5-14	9	Brown, slightly silty, gravelly, coarse SAND; moist
B4S4	5/8/2000	Boring 4, Sample 4	15-16.5	1.6	Brown, slightly silty, gravelly, coarse SAND; wet
B5S1	5/8/2000	Boring 5, Sample 1	5-6.5	0	Brown, slightly silty, gravelly SAND; damp
B5S2	5/8/2000	Boring 5, Sample 2	10-11.5	0.5	Gray-brown, slightly silty, gravelly SAND; damp
B5S3	5/8/2000	Boring 5, Sample 3	12.5-14	460	Gray-brown, gravelly, coarse SAND; moist
B5S4	5/8/2000	Boring 5, Sample 4	15-16.5	217	Gray-brown, gravelly, coarse SAND; wet (SP)
B6S1	5/8/2000	Boring 6, Sample 1	5-6.5	0.2	Brown, slightly silty, gravelly SAND; damp
B6S2	5/8/2000	Boring 6, Sample 2	10-11.5	0.2	Brown, slightly silty, gravelly SAND; damp (SP-SM)
B6S3	5/8/2000	Boring 6, Sample 3	12.5-14	0.8	Gray-brown, slightly silty, gravelly, medium SAND; moist
B6S4	5/8/2000	Boring 6, Sample 4	15-16.5	152	Gray-brown, slightly silty, gravelly, coarse SAND; wet
TB	5/8/2000	Trip Blank	-	-	Ottawa sand with methanol, prepared by the laboratory
Groundwater Samples					
B1MW	5/15/2000	Boring/Monitoring Well B1MW	11.86*	-	Groundwater
B2MW	5/15/2000	Boring/Monitoring Well B2MW	12.77*	-	Groundwater
B3MW	5/15/2000	Boring/Monitoring Well B3MW	13.24*	-	Groundwater
B4MW	5/15/2000	Boring/Monitoring Well B4MW	12.08*	-	Groundwater
B5MW	5/15/2000	Boring/Monitoring Well B5MW	12.90*	-	Groundwater
B6MW	5/15/2000	Boring/Monitoring Well B6MW	12.90*	-	Groundwater
TB	5/5/2000	Trip Blank	-	-	Organic-free water, prepared by the laboratory

KEY DESCRIPTION

Sample analyzed by the laboratory

Not applicable

^

* Field screening instrument was an OVM 580B photoionization detector (PID)

Depth below measuring point (top of well casing)

ppm Parts per million

010010

TABLE 2 - WATER SAMPLING LOG

SHANNON & WILSON, INC.

000010

WATER LEVEL MEASUREMENT DATA

WELL NUMBER	B1MW	B2MW	B3MW	B4MW	B5MW	B6MW
DATE WATER LEVEL MEASURED	5/15/2000	5/15/2000	5/15/2000	5/15/2000	5/15/2000	5/15/2000
TIME WATER LEVEL MEASURED	15:50	15:25	16:35	10:15	14:20	12:15
MP ELEVATION, FT	97.90	98.48	98.82	98.23	98.43	98.13
DEPTH TO WATER BELOW MP, FT	11.86	12.77	13.24	12.08	12.90	12.90
WATER LEVEL ELEVATION, FT	86.04	85.71	85.58	86.15	85.53	85.23

DEVELOPMENT, PURGING, AND SAMPLING DATA

WELL NUMBER	B1MW	B2MW	B3MW	B4MW	B5MW	B6MW
DATE SAMPLED	5/15/2000	5/15/2000	5/15/2000	5/15/2000	5/15/2000	5/15/2000
TIME SAMPLED	16:10	15:40	16:50	11:40	15:10	13:00
DEPTH TO WATER BELOW MP, FT	11.86	12.77	13.24	12.08	12.90	12.90
TOTAL DEPTH OF WELL BELOW MP, FT	17.77	17.69	17.46	16.76	17.80	17.81
WATER COLUMN IN WELL, FT	5.91	4.92	4.22	4.68	4.90	4.91
GALLONS PER FOOT	0.16	0.16	0.16	0.16	0.16	0.16
GALLONS IN WELL	0.95	0.79	0.68	0.75	0.78	0.79
TOTAL GALLONS PUMPED/BAILED	3.0	2.5	2.5	28.0	32.0	35.0
TEMPERATURE, °C	4.9	4.8	5.0	5.4	5.2	5.2
SPECIFIC CONDUCTANCE, µMHO/CM	921	577	561	606	616	653
pH - STANDARD UNITS	6.20	6.31	6.23	6.30	6.40	6.46
DISSOLVED OXYGEN, PPM	3.29	4.14	4.12	3.46	2.24	2.61
TURBIDITY, NTU	10	10	10	432	220	50
FERROUS IRON, PPM	5.0	8.0	1.6	2.0	6.0	5.0
DEVELOPMENT METHOD	-	-	-	Whale Pump	Whale Pump	Whale Pump
PURGING METHOD	Bailer	Bailer	Bailer	-	-	-
SAMPLING METHOD	Bailer	Bailer	Bailer	Whale Pump	Whale Pump	Whale Pump
DIAMETER OF WELL CASING	2-inch	2-inch	2-inch	2-inch	2-inch	2-inch
REMARKS		Slight Hydro-carbon Odor			Slight Hydro-carbon Odor	

Sampling Personnel: Julie Makela & Mike Soltis

Note: MP Elevations Surveyed by Shannon & Wilson on May 12, 2000

KEY	DESCRIPTION
°C	Degrees Celsius
FT	Feet
µMHO/CM	Micromhos per Centimeter
MP	Measuring Point
NM	Not Measured
NTU	Nephelometric Turbidity Units
PPM	Part per Million

TABLE 3 - SUMMARY OF ANALYTICAL RESULTS

Soil Samples

Parameter Tested	Method*	Cleanup Level (ppm)**	Sample Number and Depth in Feet (See Table 1, Figures 2, 5, 6, and 7, and Attachment 1)*				
			B4S3 12.5-14	B4S4 15-16.5	B5S2 10-11.5	B5S3 12.5-14	B5S4 15-16.5
PID Headspace Reading - ppm	OVM 580B	NA	9	1.6	0.5	460	217
Gasoline Range Organics (GRO) - ppm	AK 101	300	ND [1.42]	ND [1.51]	-	ND [1.77]	12.2
Aromatic Volatile Organics (BTEX)							
Benzene - ppm	EPA 8021B/AK 101	0.02	ND [0.00708]	0.0367	-	0.0141	1.48
Toluene - ppm	EPA 8021B/AK 101	5.4	ND [0.0283]	ND [0.0303]	-	0.0490	0.0450
Ethylbenzene - ppm	EPA 8021B/AK 101	5.5	ND [0.0283]	ND [0.0303]	-	ND [0.0353]	0.0813
Xylenes - ppm	EPA 8021B/AK 101	78	ND [0.0283]	ND [0.0303]	-	0.0927	3.41
Total Lead - ppm	EPA 6010B	1,000	-	ND [5.06]	-	-	ND [5.27]
Total Organic Carbon (TOC) - percent	TOC CTE SOP	NA	-	-	0.3271	-	-

KEY DESCRIPTION

* See Attachment 12 for compounds tested, method, and laboratory reporting limits

** Soil cleanup level is the most stringent standard listed in Table B1 or B2, 18 AAC 75, for the "under 40 inches (precipitation) zone"

- Sample not analyzed for this parameter

NA Not applicable

ND [1.29]

Analyte not detected above the laboratory reporting limit of 1.29 ppm

ppm Parts per million

Reported concentration exceeds regulated cleanup level

000020

TABLE 3 - SUMMARY OF ANALYTICAL RESULTS

Soil Samples

Parameter Tested	Method*	Sample Number and Depth in Feet (See Table 1, Figures 2, 5, 6, and 7, and Attachment 1)*				
		Cleanup Level (ppm)**	B6S2 10-11.5	B6S3 12.5-14	B6S4 15-16.5	TB -
PID Headspace Reading - ppm	OVM 580B	NA	0.2	0.8	152	-
Gasoline Range Organics (GRO) - ppm	AK 101	300	-	ND [1.78]	3.46	ND [2.50]
Aromatic Volatile Organics (BTEX)	EPA 8021B/AK 101	0.02	-	ND [0.00888]	1.32	ND [0.0125]
Benzene - ppm	EPA 8021B/AK 101	5.4	-	ND [0.0355]	ND [0.0256]	ND [0.0500]
Toluene - ppm	EPA 8021B/AK 101	5.5	-	ND [0.0355]	ND [0.0256]	ND [0.0500]
Ethylbenzene - ppm	EPA 8021B/AK 101	78	-	ND [0.0355]	0.238	ND [0.0500]
Xylenes - ppm	EPA 8021B/AK 101	1,000	-	-	ND [5.23]	-
Total Lead - ppm	EPA 6010B	NA	0.1147	-	-	-
Total Organic Carbon (TOC) - percent	TOC CTE SOP	NA	-	-	-	-

KEY DESCRIPTION

- * See Attachment 1 for compounds tested, method, and laboratory reporting limits
- ** Soil cleanup level is the most stringent standard listed in Table B1 or B2, 18 AAC 75, for the "under 40 inches (precipitation) zone"
- Sample not analyzed for this parameter
- NA Not applicable
- ND [1.29] Analyte not detected above the laboratory reporting limit of 1.29 ppm
- ppm Parts per million
- Reported concentration exceeds regulated cleanup level

000021

TABLE 3 - SUMMARY OF ANALYTICAL RESULTS

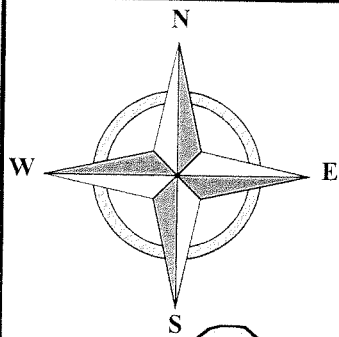
Groundwater Samples

Parameter Tested	Method*	Cleanup Level (ppm) ***	Sample Number and Depth in Feet (See Table 1, Figure 2, and Attachments 1 and 2)*							
			B1MW 11.86 †	B2MW 12.77 †	B3MW 13.24 †	B4MW 12.08 †	B5MW 12.90 †	B6MW 12.90 †	TB	
Gasoline Range Organics (GRO) - ppm	AK 101	1.3	15	87	ND [0.2]	1.6	56	6.3	ND [0.2]	
Aromatic Volatile Organics	EPA 602	0.005	0.54	2	ND [0.001]	0.4	9.3	4.5	ND [0.001]	
Benzene - ppm	EPA 602	1.0	0.15	9.6	0.0026	2.9	0.45	ND [0.001]	ND [0.001]	
Toluene - ppm	EPA 602	0.7	0.34	2.6	ND [0.001]	0.017	8.5	0.14	ND [0.001]	
Ethylbenzene - ppm	EPA 602	10.0	4	20	0.018	1.68	0.580	0.581	ND [0.001]	
Xylenes - ppm	EPA 602	NA	ND [0.500]		1.54	25.6	ND [0.5000]	1.94	0.581	
Nitrate - ppm	EPA 300.0	NA	6.11	2.32	5.83	0.796	1.51	0.580	0.580	
Sulfate - ppm	EPA 300.0	NA	1.69							
Methane - ppm	ASTM D-1945M	NA								

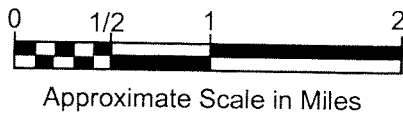
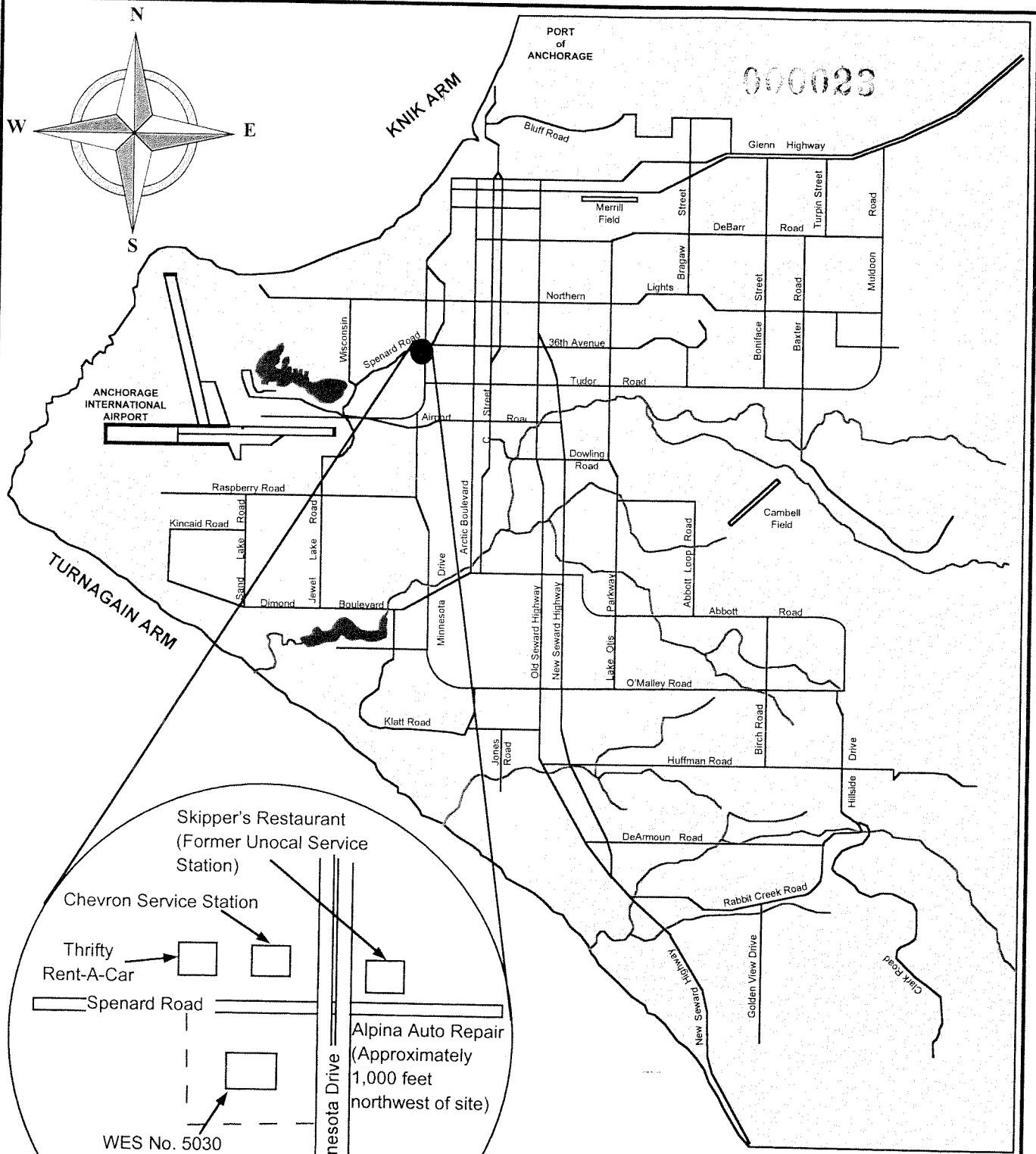
KEY DESCRIPTION

- * See Attachments 1 and 2 for compounds tested, method, and laboratory reporting limits
- *** Groundwater cleanup level is regulated standard listed in Table C, 18 AAC 75
- † Depth from measuring point (top of well casing) to static water level
- Sample not analyzed for this parameter
- NA Not applicable
- ND [1.29] Analyte not detected above the laboratory reporting limit of 1.29 ppm
- ppm Parts per million
- Reported concentration exceeds regulated cleanup level


000022



000023



Project Location

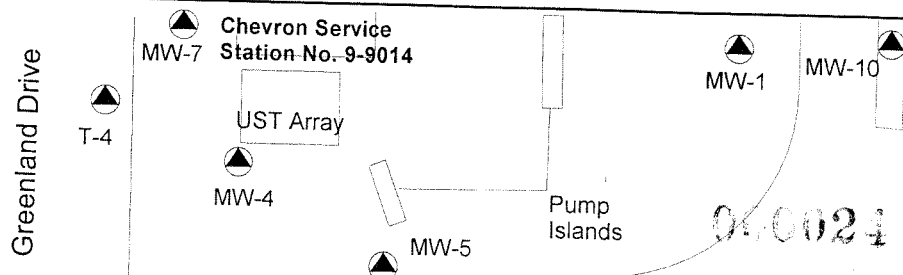
3727 Spenard Road Anchorage, Alaska	
VICINITY MAP	
June 2000	Y-6300-302
 SHANNON & WILSON, INC. Geotechnical & Environmental Consultants	
Fig. 1	

1,000 gallon used oil UST
(abandoned in September 1988)



3730 Spenard Road

Former 4,000 gallon
gasoline UST
(removed August 1992)

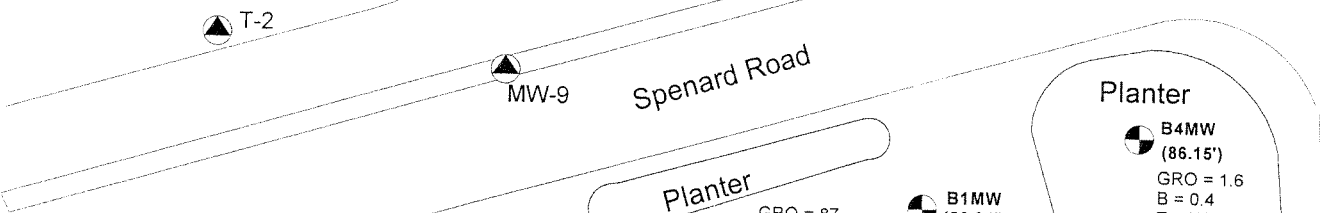


Chevron Service
Station No. 9-9014

UST Array

Pump Islands

3608 Minnesota Drive



Greenland Drive

Spenard Road

Planter

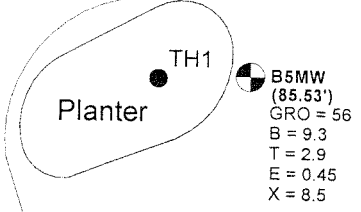
B4MW
(86.15')
GRO = 1.6
B = 0.4
T = ND
E = ND
X = 0.017

Planter

GRO = 87
B = 2
T = 9.6
E = 2.6
X = 20

B1MW
(86.04')

GRO = 15
B = 0.54
T = 0.15
E = 0.34
X = 4



TH1

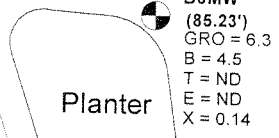
B5MW
(85.53')
GRO = 56
B = 9.3
T = 2.9
E = 0.45
X = 8.5

Canopy

WES 5030
UST Array

B3MW
(85.58')

GRO = ND
B = ND
T = 0.0026
E = ND
X = 0.018



Planter

B6MW
(85.23')
GRO = 6.3
B = 4.5
T = ND
E = ND
X = 0.14

TH3

Williams
Express
Store
No. 5030

Canopy

Planter

Pump Islands

Greenland Drive

Minnesota Drive

Former 2,500 gallon Bunker C UST
(removed September 1991)

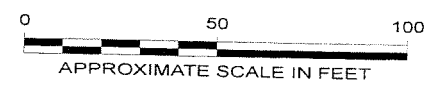
TH4

TH6
(90-100 feet to the south)

Approximate Direction of
Groundwater Flow Measured
on May 15, 2000

Legend

- MW-1 Approximate location and number of Chevron Monitoring Well MW-1.
- T-1 Approximate location and number of Thrifty Monitoring Well T-1.
- B1MW (86.04') GRO = 15 B = 0.54 T = 0.15 E = 0.34 X = 4 Approximate location and number of Monitoring Well B1MW; installed by Shannon & Wilson. Groundwater level elevation in feet; measured on May 15, 2000. GRO and BTEX concentrations in ppm; May 2000 groundwater sampling event.
- B1 Approximate location and number of soil boring drilled in June 1991.
- ND Analyte not detected above the laboratory reporting limit.



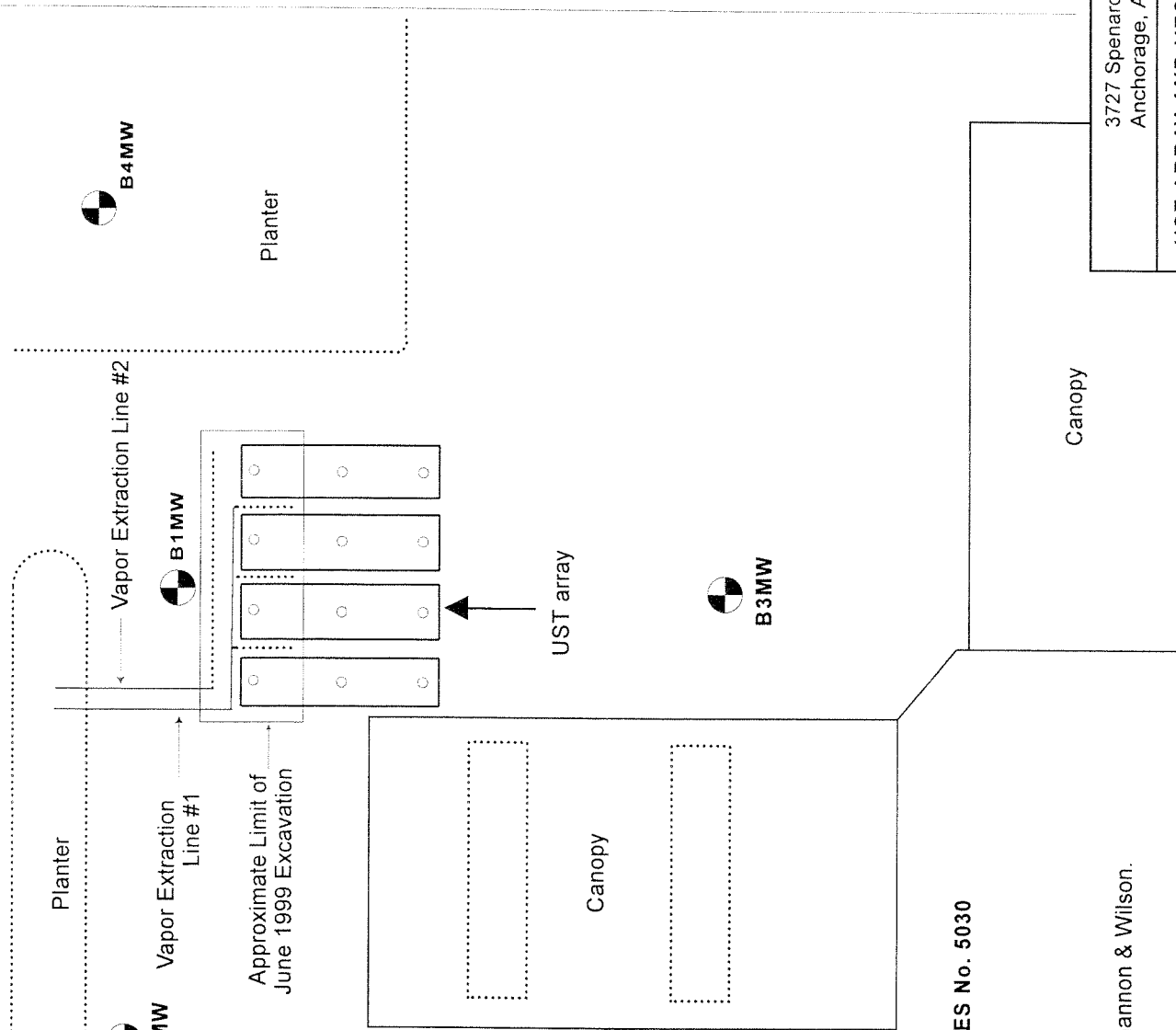
3727 Spenard Road Anchorage, Alaska	
SITE PLAN	
June 2000	Y-6300-302
SHANNON & WILSON, INC. Geotechnical & Environmental Consultants	
Fig. 2	

000025

Minnesota Drive



Spenard Road



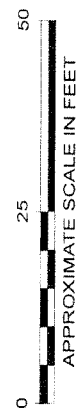
Canopy

3727 Spenard Road Anchorage, Alaska	
UST ARRAY AND VES PIPING LAYOUT	
June 2000	Y-6300-302
SHANNON & WILSON, INC. Geotechnical & Environmental Consultants	
Fig. 3	

Legend



Monitoring Well B1MW installed by Shannon & Wilson.



1,000 gallon used oil UST (abandoned in September 1988)

Approximate Direction of Groundwater Flow Measured by Gettler-Ryan on October 18, 1999

Chevron Service Station No. 9-9014

MW-10 NS

MW-1
GRO = 7.98
B = 0.187
T = 0.0717
E = 0.528
X = 1.32
MTBE = ND

UST Array

Pump Islands

T-1
GRO = 0.75
B = ND
T = 0.237
E = 0.0171
X = 0.0574
MTBE = ND

Greenland Drive

T-4
GRO = 7.98
B = 0.187
T = 0.0717
E = 0.528
X = 1.32
MTBE = 0.0606

MW-4
GRO = 10.4
B = 0.278
T = 1.97
E = 0.382
X = 2.54
MTBE = ND

MW-5
GRO = ND
B = 0.00731
T = ND
E = ND
X = ND
MTBE = ND

Thrifty Rent-A-Car

3730 Spenard Road

Former 4,000 gallon gasoline UST (removed August 1992)

MW-11
GRO = 369
B = 4.17
T = 42.4
E = 11.6
X = 92.6
MTBE = ND

MW-8
GRO = 0.865
B = 0.0654
T = 0.00103
E = 0.0824
X = 0.272
MTBE = 0.0246

T-2 NS

MW-9
GRO = 205
B = 6.99
T = 45.8
E = 3.28
X = 53.3
MTBE = ND

Spenard Road

Planter

B1MW
B = 2.2
T = 18
E = 2.8
X = 20

Planter

Planter

B2MW
B = 5.0
T = 6.5
E = 0.36
X = 3.8

B3MW
B = ND
T = ND
E = ND
X = ND

Current WES 5030 UST Array



Canopy

Planter

Williams Express Store No. 5030

Canopy

Minnesota Drive

Planter

Pump Islands

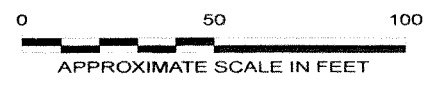
Approximate Direction of Groundwater Flow Measured by Shannon & Wilson on September 9, 1999

Former 2,500 gallon Bunker C UST (removed September 1991)

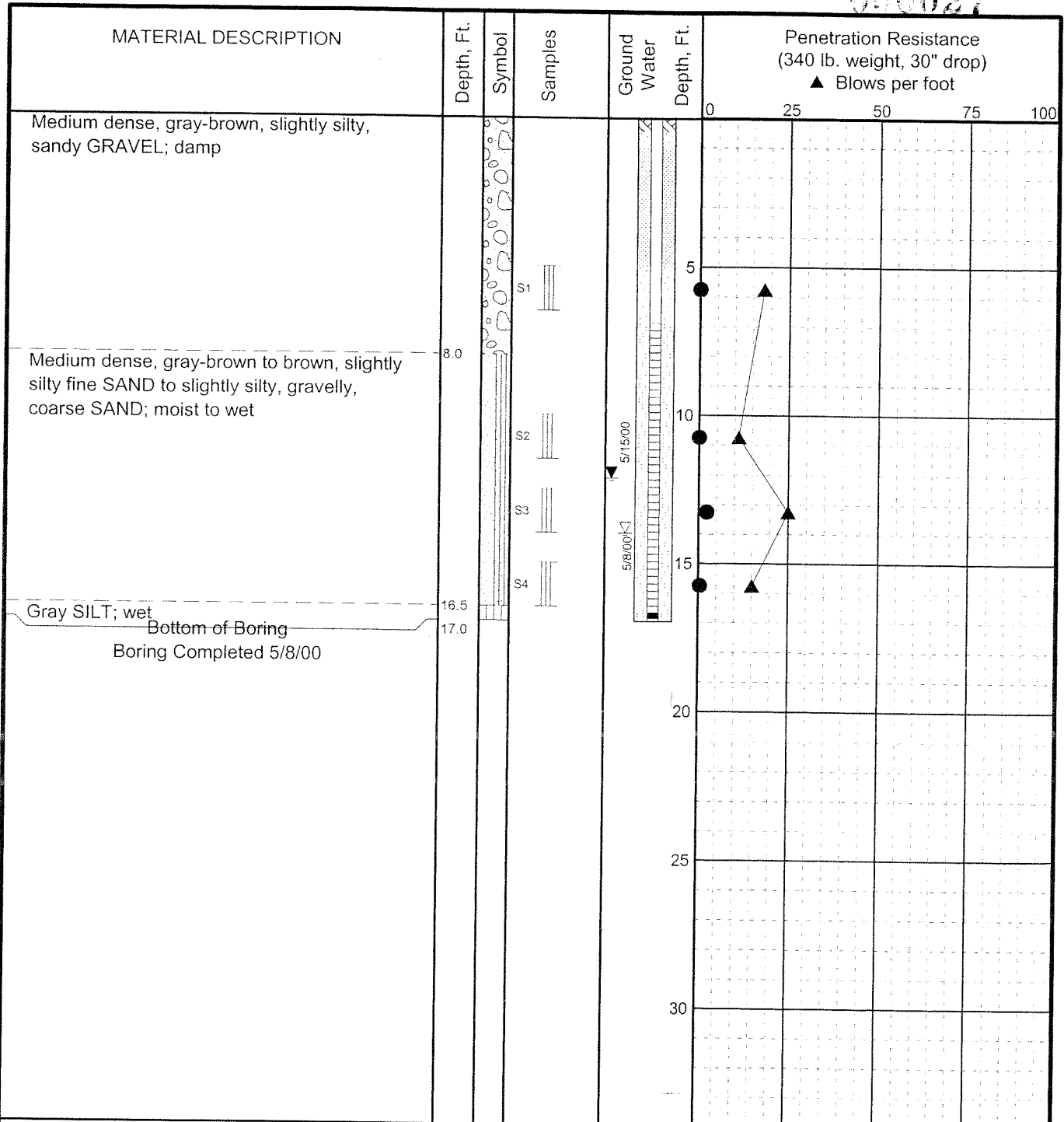
Legend

B1MW
B = 2.2
T = 18
E = 2.8
X = 20
Approximate location and number of Williams Monitoring Well B1MW; installed by Shannon & Wilson.
BTEX concentrations in ppm; September 9, 1999 groundwater sampling event performed by Shannon & Wilson for Williams Express.

MW-1
GRO = 7.98
B = 0.187
T = 0.0717
E = 0.528
X = 1.32
MTBE = ND
Approximate location and number of Thrifty or Chevron Monitoring Well MW-1.
GRO, BTEX, and MTBE concentrations in ppm; October 18, 1999 groundwater sampling event performed by Gettler-Ryan for Chevron.
NS = Not Sampled ND = Not Detected



3727 Spenard Road Anchorage, Alaska	
FALL 1999 SITE PLAN	
June 2000	Y-6300-302
SHANNON & WILSON, INC. Geotechnical & Environmental Consultants	
Fig. 4	



LEGEND

- * Sample Not Recovered
- ▬ 2" O.D. Split Spoon Sample
- ▬ 3" O.D. Split Spoon Sample
- ▨ Surface Seal
- ▨ Solid Casing and Annular Sealant
- ▨ Well Screen and Filter Sand
- ▨ Cuttings Backfill
- ▽ Ground Water Level At Time of Drilling
- ▼ Static Ground Water Level
- PID Reading (ppm)

NOTES

- The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
- The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
- Water level, if indicated above, is for the date specified and may vary.
- USC letter symbol based on visual classification.

3727 Spenard Road
Anchorage, Alaska

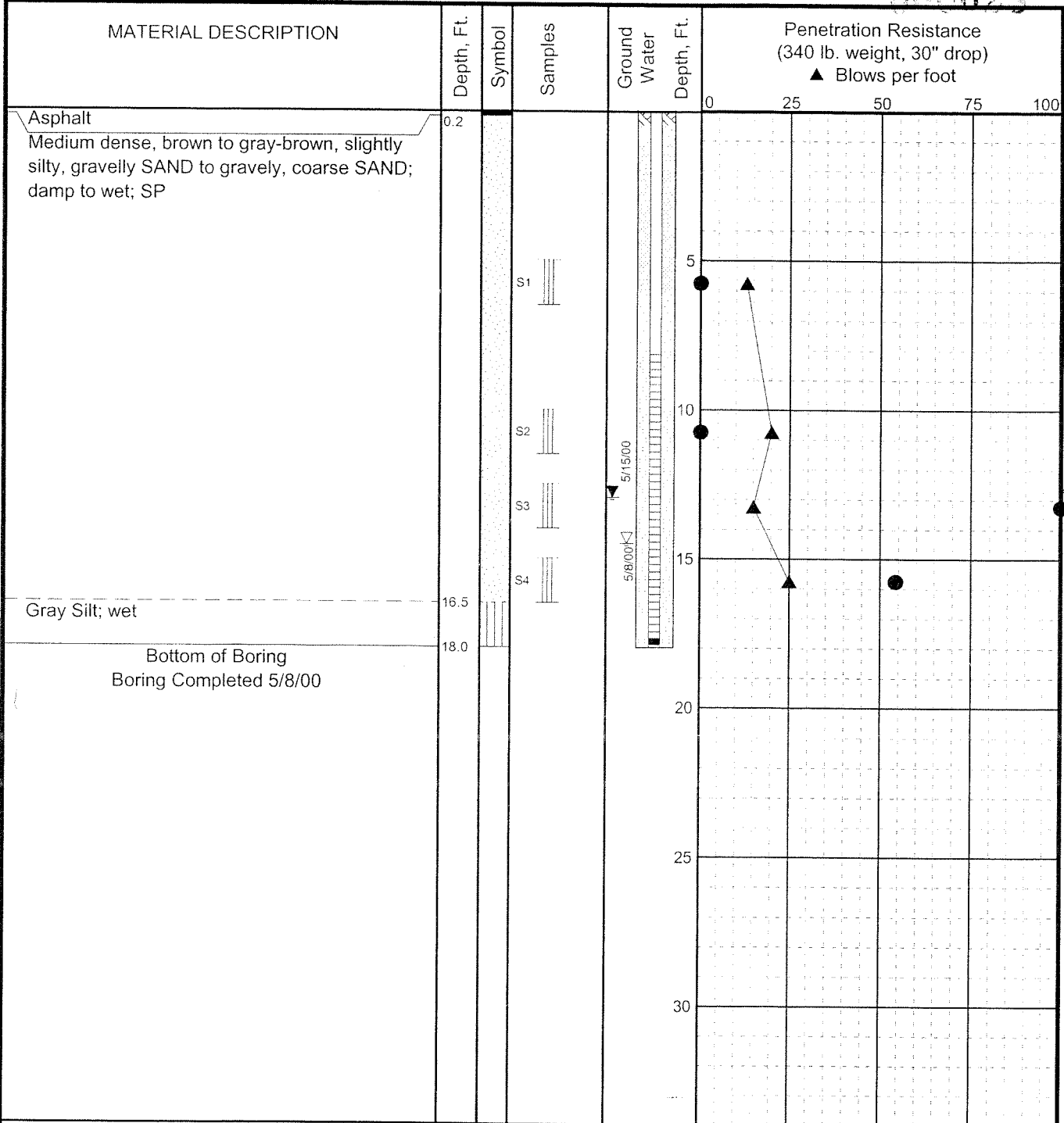
LOG OF BORING NO. B4

June 2000

Y-6300-302

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. 5



LEGEND

- * Sample Not Recovered
- ┆ 2" O.D. Split Spoon Sample
- ┆ 3" O.D. Split Spoon Sample
- ☒ Surface Seal
- ▨ Solid Casing and Annular Sealant
- ☒ Well Screen and Filter Sand
- ☒ Cuttings Backfill
- ▽ Ground Water Level At Time of Drilling
- ▼ Static Ground Water Level

● PID Reading (ppm)

NOTES

- The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
- The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
- Water level, if indicated above, is for the date specified and may vary.
- USC letter symbol based on visual classification.

3727 Spenard Road
Anchorage, Alaska

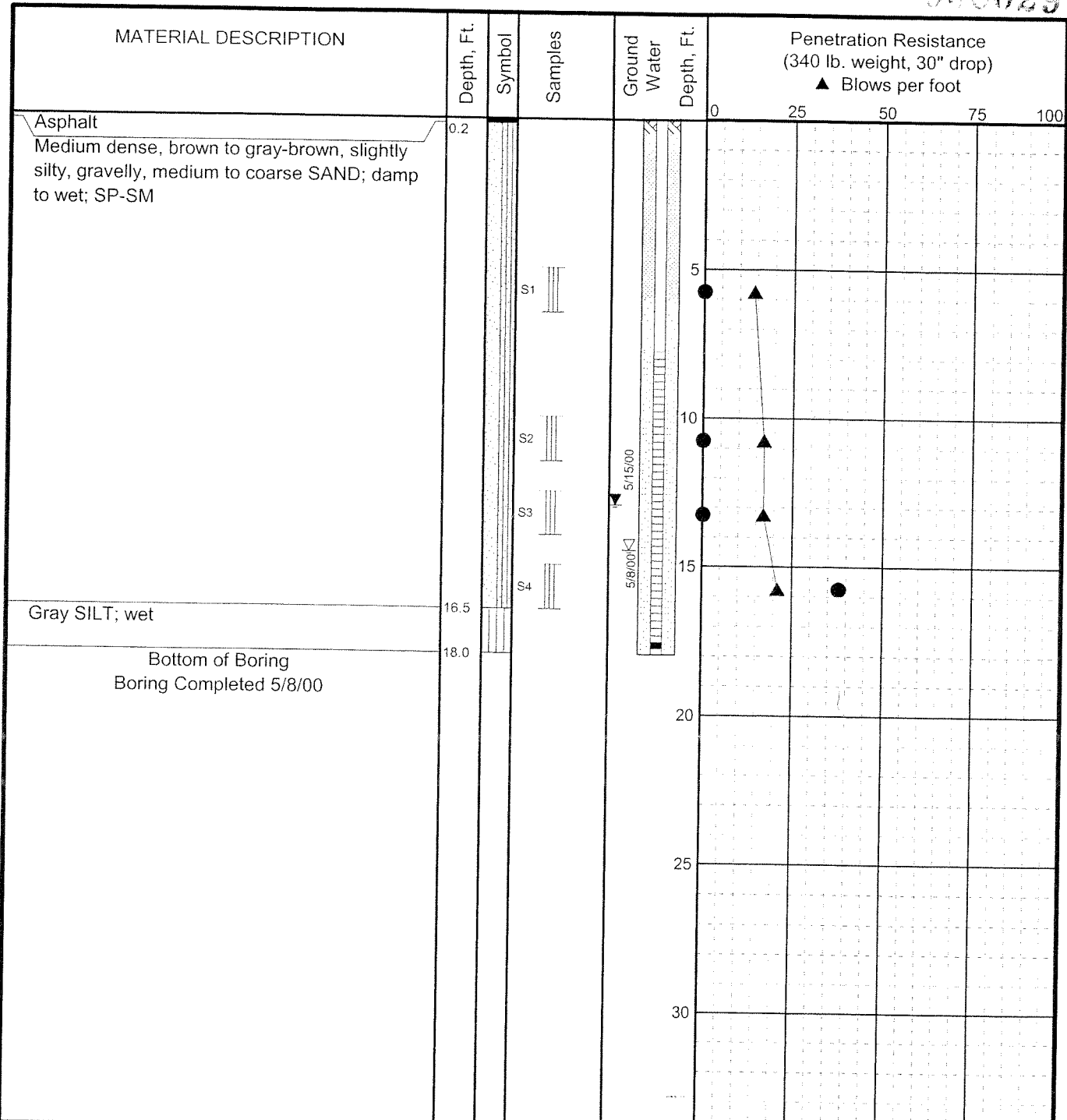
LOG OF BORING NO. B5

June 2000 Y-6300-302

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. 6

MASTER LOG 5030MW.GPJ SHAN_WIL.GDT 6/12/00



LEGEND

- * Sample Not Recovered
- ▬ 2" O.D. Split Spoon Sample
- ▬ 3" O.D. Split Spoon Sample
- ▨ Surface Seal
- ▨ Solid Casing and Annular Sealant
- ▨ Well Screen and Filter Sand
- ▨ Cuttings Backfill
- ▽ Ground Water Level At Time of Drilling
- ▼ Static Ground Water Level
- PID Reading (ppm)

NOTES

- The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
- The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
- Water level, if indicated above, is for the date specified and may vary.
- USC letter symbol based on visual classification.

3727 Spenard Road
Anchorage, Alaska

LOG OF BORING NO. B6

June 2000 Y-6300-302

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

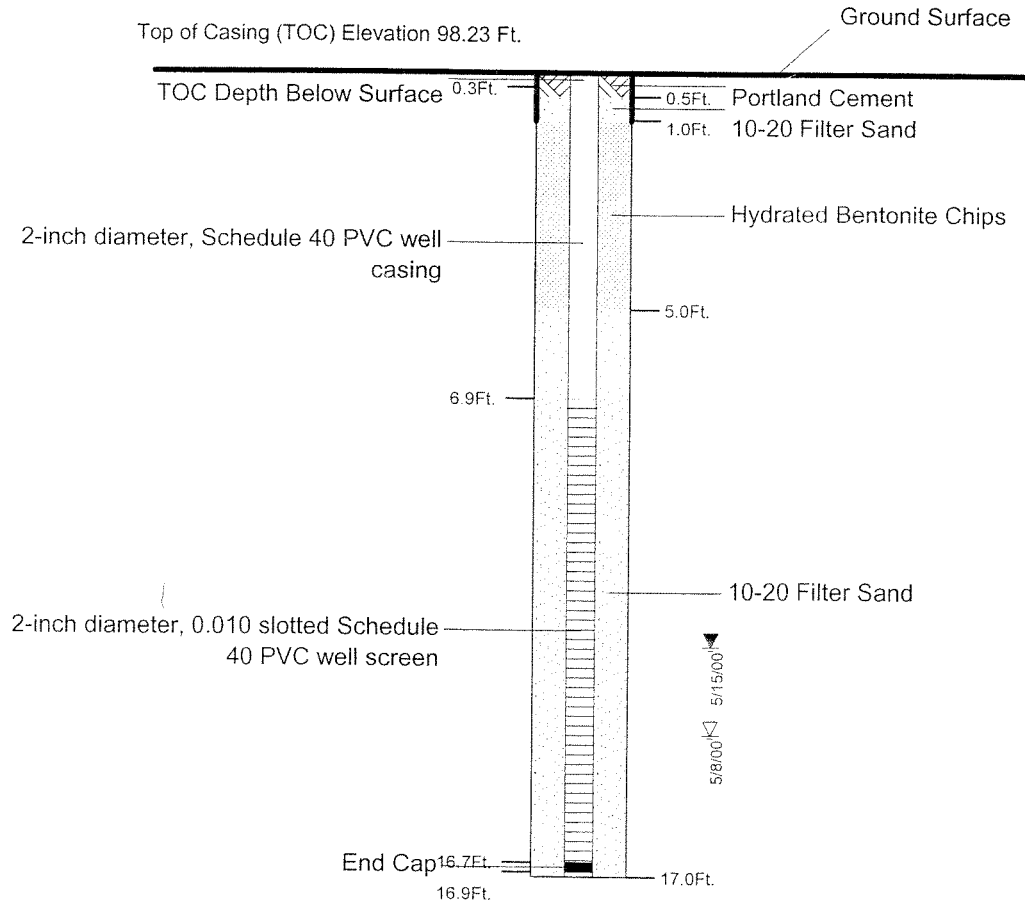
Fig. 7

MASTER LOG 5030MW.GPJ SHAN WIL.GDT 6/12/00

Casing Description

Backfill Description

090030



LEGEND

- ▽ Ground Water Level At Time of Drilling
- ▼ Static Ground Water Level

NOTE: All joints use threaded connections.

3727 Spenard Road
Anchorage, Alaska

**MONITORING WELL B4MW
CONSTRUCTION DETAIL**

June 2000

Y-6300-302

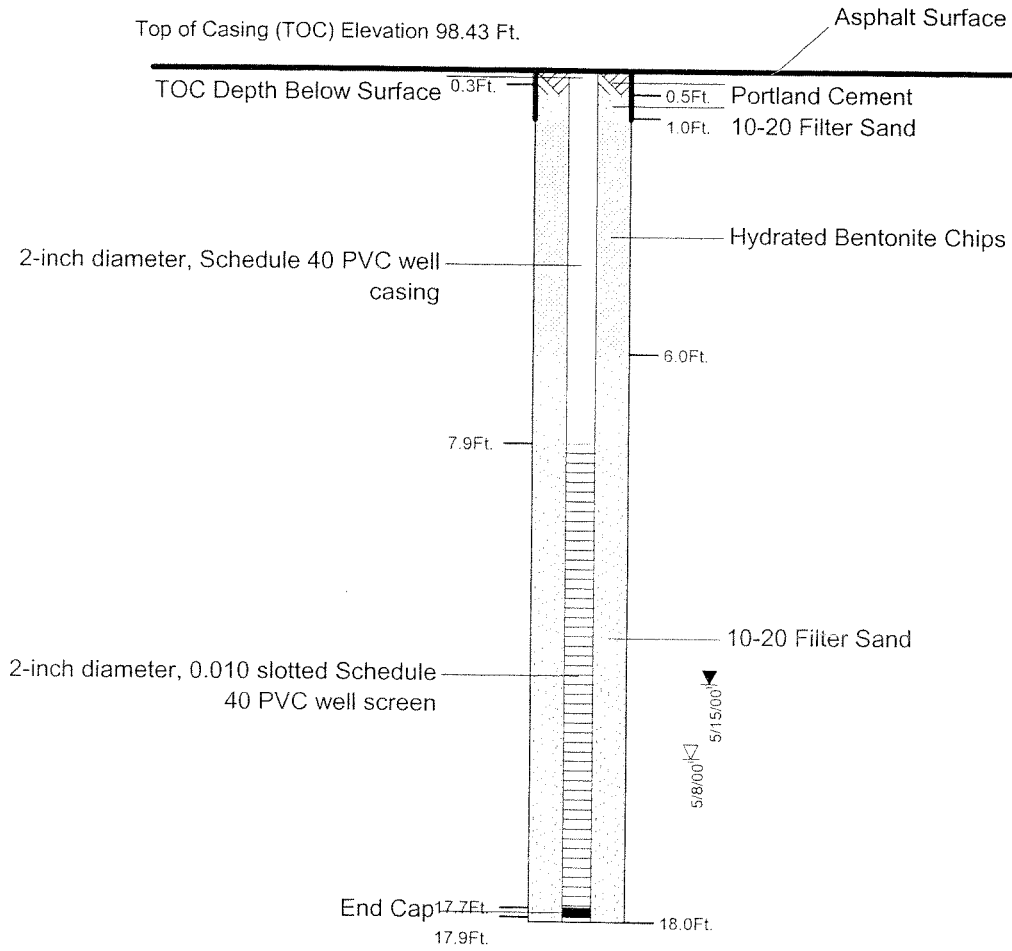
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. 8

000031

Casing Description

Backfill Description



LEGEND

- ▽ Ground Water Level At Time of Drilling
- ▼ Static Ground Water Level

NOTE: All joints use threaded connections.

3727 Spenard Road
Anchorage, Alaska

**MONITORING WELL B5MW
CONSTRUCTION DETAIL**

June 2000

Y-6300-302

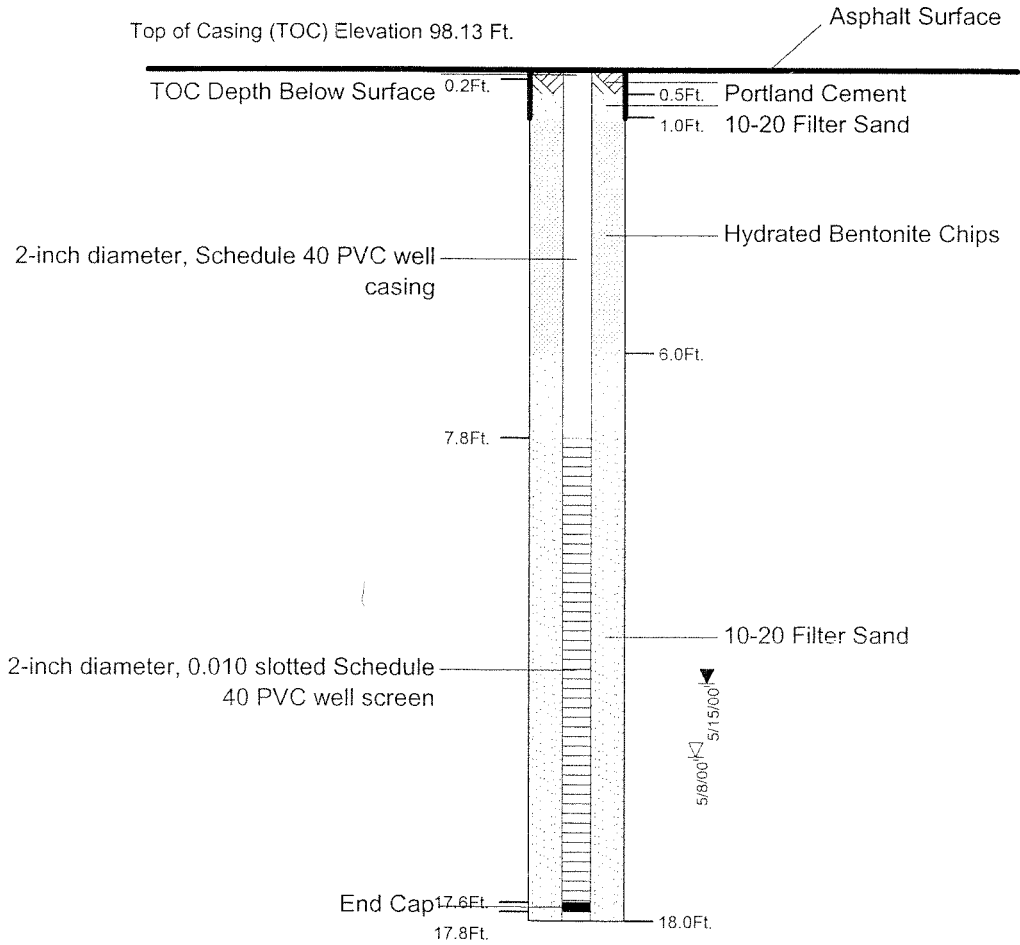
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. 9

000032

Casing Description


Backfill Description



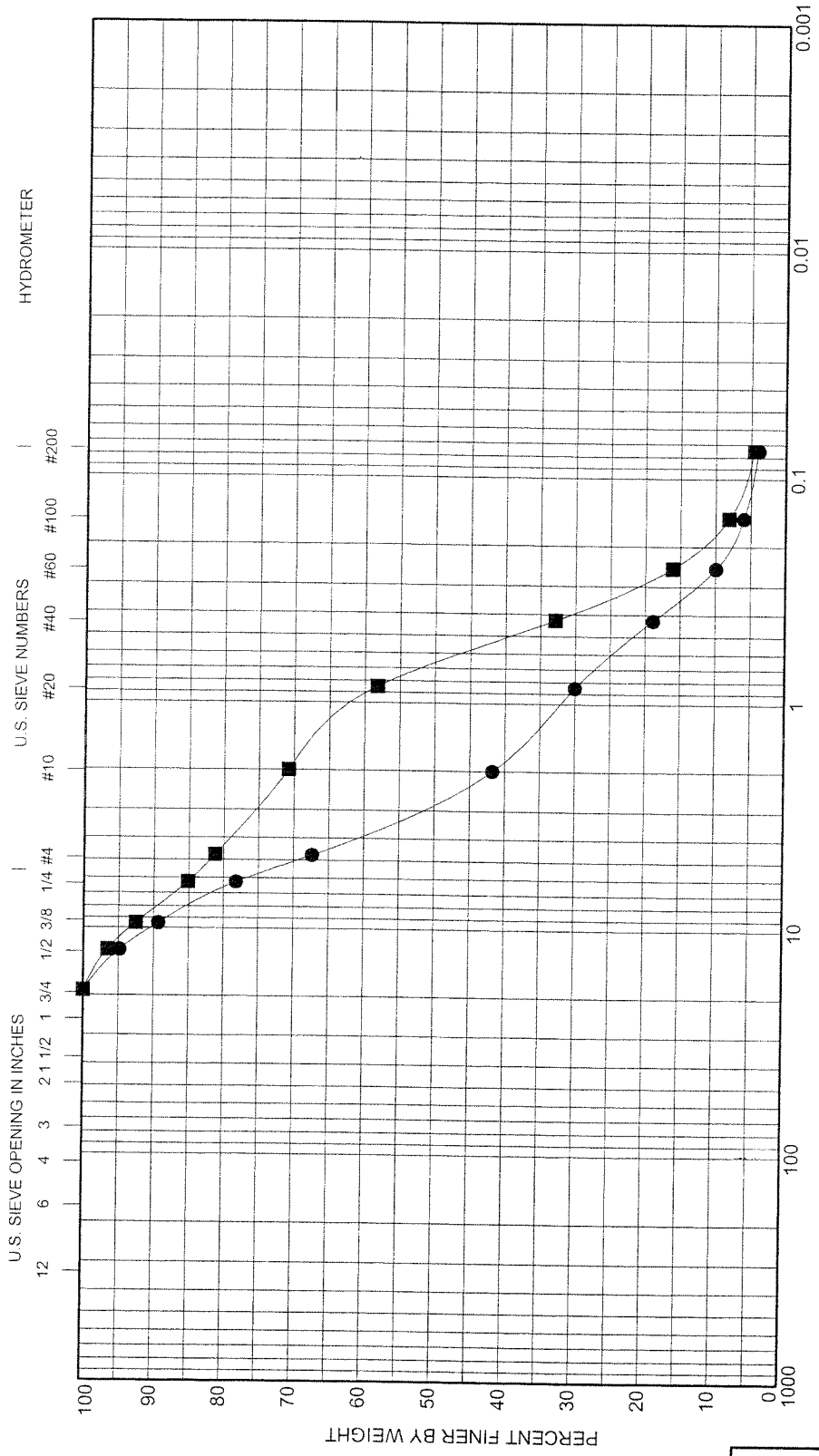
LEGEND

- ▽ Ground Water Level At Time of Drilling
- ▼ Static Ground Water Level

NOTE: All joints use threaded connections.

3727 Spenard Road Anchorage, Alaska	
MONITORING WELL B6MW CONSTRUCTION DETAIL	
June 2000	Y-6300-302
 SHANNON & WILSON, INC. Geotechnical and Environmental Consultants	Fig. 10

000033



Sample	Depth, Ft	GRAVEL			SAND			SILT OR CLAY				
		coarse	fine		coarse	medium	fine	LL	PL	PI	Cc	Cu
Classification												
Gravelly SAND (SP)												
Slightly silty, gravelly SAND (SP-SM)												
Sample	Depth, Ft	D100	D60	D30	D10	%Cobble	%Gravel	%Sand	%Silt	%Clay		
● B-5, S-4	15.0 - 16.5	19	3.71	0.85	0.25	0	33	63				
■ B-6, S-2	10.0 - 11.5	19	0.96	0.39	0.17	0	18	77				

3727 Spenard Road
Anchorage, Alaska

GRAIN SIZE CLASSIFICATION

June 2000 Y6300-302

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants Fig. 11

090031

ATTACHMENT 1
RESULTS OF ANALYTICAL TESTING BY
CT&E ENVIRONMENTAL SERVICES INC.
OF ANCHORAGE, ALASKA



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

Lena Hanson Julie Makela
Shannon & Wilson Inc.
5430 Fairbanks St Ste 3
Anchorage, AK 99518

Work Order: 1002017
Y6300-302 WES 5030
Client: Williams Express
Report Date: May 16, 2000

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 CT&E. A copy of our Quality Control Manual that outlines this program is available at your request.

Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth in our Quality Assurance Program Plan.

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

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

- U Indicates the analyte was analyzed for but not detected.
- J Indicates an estimated value that falls below PQL, but is greater than the MDL.
- B Indicates the analyte is found in the blank associated with the sample.
- * The analyte has exceeded allowable limits.
- GT Greater Than
- D Secondary Dilution
- LT Less Than
- ! Surrogate out of range



CT&E Ref.# 1002017001
 Client Name Williams Express
 Project Name/# Y6300-302 WES 5030
 Client Sample ID WES 5030-B4S3
 Matrix Soil/Solid
 Ordered By

Client PO#
 Printed Date/Time 05/16/2000 10:44
 Collected Date/Time 05/08/2000 9:45
 Received Date/Time 05/08/2000 14:30
 Technical Director Stephen C. Ede

Released By *Sharon Patten*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
SOLIDS								
Total Solids	87.1		%	SM20 2540G			05/09/00	WDW
VOLATILE FUELS DEPT								
Gasoline Range Organics	1.42 U	1.42	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Benzene	0.00708 U	0.00708	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Toluene	0.0283 U	0.0283	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Ethylbenzene	0.0283 U	0.0283	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
P & M -Xylene	0.0283 U	0.0283	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Xylene	0.0283 U	0.0283	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Surrogates								
1,4-Difluorobenzene <Surr>	86.7		%	AK101/8021B	60-120	05/08/00	05/12/00	MAH
1,4-Bromofluorobenzene <Surr>	53.1		%	AK101/8021B	50-150	05/08/00	05/12/00	MAH



090037

CT&E Ref.# 1002017002
 Client Name Williams Express
 Project Name/# Y6300-302 WES 5030
 Client Sample ID WES 5030-B4S4
 Matrix Soil/Solid
 Ordered By

Client PO#
 Printed Date/Time 05/16/2000 10:44
 Collected Date/Time 05/08/2000 9:55
 Received Date/Time 05/08/2000 14:30
 Technical Director Stephen C. Ede

Released By *Sharon Paster*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
SOLIDS								
Total Solids	88.6		%	SM20 2540G			05/09/00	WDW
METALS DEPT								
Lead	5.06 U	5.06	mg/Kg	SW846 6010B		05/11/00	05/12/00	CMO
VOLATILE FUELS DEPT								
Gasoline Range Organics	1.51 U	1.51	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Benzene	0.0367	0.00757	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Toluene	0.0303 U	0.0303	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Ethylbenzene	0.0303 U	0.0303	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
p,p'-M-Xylene	0.0303 U	0.0303	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
o-Xylene	0.0303 U	0.0303	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Subrogates								
1,4-Difluorobenzene <Surr>	87.9		%	AK101/8021B	60-120	05/08/00	05/12/00	MAH
4-Bromofluorobenzene <Surr>	58.2		%	AK101/8021B	50-150	05/08/00	05/12/00	MAH



CT&E Environmental Services Inc.

000033

CT&E Ref.# 1002017003
 Client Name Williams Express
 Project Name/# Y6300-302 WES 5030
 Client Sample ID WES 5030-B5S2
 Matrix Soil/Solid
 Ordered By

Client PO#
 Printed Date/Time 05/16/2000 10:44
 Collected Date/Time 05/08/2000 11:05
 Received Date/Time 05/08/2000 14:30
 Technical Director Stephen C. Ede

Released By

Sharon Peterson

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
SOLIDS								
Total Solids	96.3		%	SM20 2540G			05/11/00	WDW
TETERS DEPT								
Total Organic Carbon	3271	578	mg/Kg	TOC CTE SOP		05/09/00	05/09/00	SCL



CT&E Ref.# 1002017004
 Client Name Williams Express
 Project Name/# Y6300-302 WES 5030
 Client Sample ID WES 5030-B5S3
 Matrix Soil/Solid
 Ordered By

Client PO#
 Printed Date/Time 05/16/2000 10:44
 Collected Date/Time 05/08/2000 11:15
 Received Date/Time 05/08/2000 14:30
 Technical Director Stephen C. Ede

Released By *Sharon Patten*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
SOLIDS								
Total Solids	87.0		%	SM20 2540G			05/09/00	WDW
VOLATILE FUELS DEPT								
Gasoline Range Organics	1.77 U	1.77	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Benzene	0.0141	0.00883	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Toluene	0.0490	0.0353	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Ethylbenzene	0.0353 U	0.0353	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
P & M -Xylene	0.0529	0.0353	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
o-Xylene	0.0398	0.0353	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Surrogates								
1,4-Difluorobenzene <Surr>	87.8		%	AK101/8021B	60-120	05/08/00	05/12/00	MAH
1-Bromofluorobenzene <Surr>	55.6		%	AK101/8021B	50-150	05/08/00	05/12/00	MAH



CT&E Ref.# 1002017005
 Client Name Williams Express
 Project Name/# Y6300-302 WES 5030
 Client Sample ID WES 5030-B5S4
 Matrix Soil/Solid
 Ordered By

Client PO#
 Printed Date/Time 05/16/2000 10:44
 Collected Date/Time 05/08/2000 11:20
 Received Date/Time 05/08/2000 14:30
 Technical Director Stephen C. Ede

Released By *Shawn P. Foster*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
SOLIDS								
Total Solids	90.5		%	SM20 2540G			05/09/00	WDW
METALS DEPT								
Lead	5.27 U	5.27	mg/Kg	SW846 6010B		05/11/00	05/12/00	CMO
VOLATILE FUELS DEPT								
Gasoline Range Organics	12.2	1.34	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Benzene	1.48	0.00669	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Toluene	0.0450	0.0268	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Ethylbenzene	0.0813	0.0268	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
o & m -Xylene	2.51	0.0268	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
p-Xylene	0.895	0.0268	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
PROGATES								
1,4-Difluorobenzene <Surr>	94.7		%	AK101/8021B	60-120	05/08/00	05/12/00	MAH
4-Bromofluorobenzene <Surr>	87.7		%	AK101/8021B	50-150	05/08/00	05/12/00	MAH



T&E Ref.# 1002017006
 Client Name Williams Express
 Project Name/# Y6300-302 WES 5030
 Client Sample ID WES 5030-B6S2
 Matrix Soil/Solid
 Ordered By

Client PO#
 Printed Date/Time 05/16/2000 10:44
 Collected Date/Time 05/08/2000 12:50
 Received Date/Time 05/08/2000 14:30
 Technical Director Stephen C. Ede

Released By *Shawn Patten*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
LIDS								
Total Solids	90.6		%	SM20 2540G			05/11/00	WDW
WATERS DEPT								
Total Organic Carbon	1147	447	mg/Kg	TOC CTE SOP		05/09/00	05/09/00	SCL



000042

CT&E Ref.# 1002017007
 Client Name Williams Express
 Project Name/# Y6300-302 WES 5030
 Client Sample ID WES 5030-B6S3
 Matrix Soil/Solid
 Ordered By

Client PO#
 Printed Date/Time 05/16/2000 10:44
 Collected Date/Time 05/08/2000 13:00
 Received Date/Time 05/08/2000 14:30
 Technical Director Stephen C. Ede

Released By *Sharon Patton*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
SOLIDS								
Total Solids	84.9		%	SM20 2540G			05/09/00	WDW
VOLATILE FUELS DEPT								
Solvent Range Organics								
Benzene	1.78 U	1.78	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Toluene	0.00888 U	0.00888	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
o-Xylene	0.0355 U	0.0355	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
m-Xylene	0.0355 U	0.0355	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
p-Xylene	0.0355 U	0.0355	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
o,p-Xylene	0.0355 U	0.0355	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Surrogates								
1,4-Difluorobenzene <Surr>	88.5		%	AK101/8021B	60-120	05/08/00	05/12/00	MAH
1,3-Dibromofluorobenzene <Surr>	63.3		%	AK101/8021B	50-150	05/08/00	05/12/00	MAH



T&E Ref.# 1002017008
Client Name Williams Express
Project Name/# Y6300-302 WES 5030
Client Sample ID WES 5030-B6-S4
Matrix Soil/Solid
Ordered By

Client PO#
Printed Date/Time 05/16/2000 10:44
Collected Date/Time 05/08/2000 13:05
Received Date/Time 05/08/2000 14:30
Technical Director Stephen C. Ede

Released By *Sharon Poston*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
SOLIDS								
Total Solids	91.5		%	SM20 2540G			05/09/00	WDW
METALS DEPT								
Lead	5.23 U	5.23	mg/Kg	SW846 6010B		05/11/00	05/12/00	CMO
VOLATILE FUELS DEPT								
Gasoline Range Organics	3.46	1.28	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Benzene	1.32	0.00639	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Toluene	0.0256 U	0.0256	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Ethylbenzene	0.0256 U	0.0256	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
o & m -Xylene	0.238	0.0256	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
p-Xylene	0.0256 U	0.0256	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
PROPAGATES								
1,4-Difluorobenzene <Surr>	96.7		%	AK101/8021B	60-120	05/08/00	05/12/00	MAH
4-Bromofluorobenzene <Surr>	69.9		%	AK101/8021B	50-150	05/08/00	05/12/00	MAH



CT&E Ref.# 1002017009
 Client Name Williams Express
 Project Name/# Y6300-302 WES 5030
 Client Sample ID WES 5030-TB
 Matrix Soil/Solid
 Ordered By

Client PO#
 Printed Date/Time 05/16/2000 10:44
 Collected Date/Time 05/08/2000 14:00
 Received Date/Time 05/08/2000 14:30
 Technical Director Stephen C. Ede

Released By *Shawn Patton*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	init
SOLIDS								
Total Solids	100		%	SM20 2540G			05/09/00	WDW
VOLATILE FUELS DEPT								
Gasoline Range Organics	2.50 U	2.50	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Benzene	0.0125 U	0.0125	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Toluene	0.0500 U	0.0500	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Ethylbenzene	0.0500 U	0.0500	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
P & M -Xylene	0.0500 U	0.0500	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
o-Xylene	0.0500 U	0.0500	mg/Kg	AK101/8021B		05/08/00	05/12/00	MAH
Surrogates								
1,4-Difluorobenzene <Surr>	86.9		%	AK101/8021B	60-120	05/08/00	05/12/00	MAH
Bromofluorobenzene <Surr>	86.8		%	AK101/8021B	50-150	05/08/00	05/12/00	MAH

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

CHAIN OF CUSTODY RECORD

ge 1 of 1
Laboratory CRE
Attn: Shane

400 N. 34th Street, Suite 100 Seattle, WA 98103
(206) 632-8020

11500 Olive Blvd., Suite 276 St. Louis, MO 63141
(314) 872-8170

1354 N. Grandridge Blvd. Kennewick, WA 99336
(509) 735-1280

2055 Hill Road Fairbanks, AK 99709
(907) 479-0600

5430 Fairbanks Street, Suite 3 Anchorage, AK 99518
(907) 561-2120

2412 N. 30th St., Suite 201 Tacoma, WA 98407
(206) 759-0156

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp. Grab			Total Number of Containers	Remarks/Matrix
				GRD	IBTEX	Other		
UES 5030 - B4S3	1	945	5.8.06	X	X		2	Soil
- B4S4	2	955		X	X		2	
- B5S2	3	1105		X			1	
- B5S3	4	1115		X			2	
- B5S4	5	1120		X	X		2	
- B6S2	6	1255		X		X	1	
- B6S3	7	1300		X	X		2	
- B6S4	8	1305		X	X		2	
- TB	9	1400		X	X		1	

Project Information

Project Number: UES 5030 - 302

Project Name: UES 5030

Contact: Sally McVay

Ongoing Project? Yes No

Sampler: SPM

Requested Turn Around Time: add

Special Instructions: Bill Williams

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

Sample Receipt

Total Number of Containers: _____

COC Seals/Intact? Y/N/NA: _____

Received Good Cond./Cold: _____

Delivery Method: _____

(attach shipping bill, if any)

Instructions

Relinquished By: Shannon & Wilson Time: 1430

Received By: 1. [Signature] Time: 1430

Relinquished By: 2. [Signature] Time: _____

Received By: 2. [Signature] Time: _____

Relinquished By: 3. [Signature] Time: _____

Received By: 3. [Signature] Time: _____



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

ATTN: JULIE MAKELA

John Zinza
Shannon & Wilson Inc.
5430 Fairbanks St Ste 3
Anchorage, AK 99518

Work Order: 1002296
Y6300-302 WES 5030
Client: Williams Express
Report Date: May 31, 2000

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 CT&E. A copy of our Quality Control Manual that outlines this program is available at your request.

Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth in our Quality Assurance Program Plan.

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

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

- U Indicates the analyte was analyzed for but not detected.
- J Indicates an estimated value that falls below PQL, but is greater than the MDL.
- B Indicates the analyte is found in the blank associated with the sample.
- * The analyte has exceeded allowable limits.
- GT Greater Than
- D Secondary Dilution
- LT Less Than
- ! Surrogate out of range



CT&E Ref.# 1002296001
 Client Name Williams Express
 Project Name/# Y6300-302 WES 5030
 Client Sample ID WES 5030-B1MW
 Matrix Water (Surface, Eff., Ground)
 Ordered By

Client PO#
 Printed Date/Time 05/31/2000 9:50
 Collected Date/Time 05/16/2000 14:15
 Received Date/Time 05/16/2000 15:00
 Technical Director Stephen C. Ede

Released By *Shawn Patten*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
WATERS DEPT								
Bromide	0.551	0.500	mg/L	EPA 300.0			05/18/00	SCL
Chloride	385	5.00	mg/L	EPA 300.0			05/22/00	SCL
Fluoride	0.517	0.500	mg/L	EPA 300.0			05/18/00	SCL
Nitrate-N	0.500 U	0.500	mg/L	EPA 300.0			05/18/00	SCL
Nitrite-N	0.500 U	0.500	mg/L	EPA 300.0	1 max		05/18/00	SCL
Ortho Phosphate-P	0.500 U	0.500	mg/L	EPA 300.0			05/18/00	SCL
Sulfate	6.11	0.500	mg/L	EPA 300.0			05/18/00	SCL
Gas Chromatography								
Ethane	1.69	0.0310	mg/L	ASTM D-1945M			05/24/00	TPF
Ethane	0.0580 U	0.0580	mg/L	ASTM D-1945M			05/24/00	TPF
Benzene	0.163 U	0.163	mg/L	ASTM D-1945M			05/24/00	TPF



000043

CT&E Ref.# 1002296002
 Client Name Williams Express
 Project Name/# Y6300-302 WES 5030
 Client Sample ID WES 5030-B2MW
 Matrix Water (Surface, Eff., Ground)
 Ordered By

Client PO#
 Printed Date/Time 05/31/2000 9:50
 Collected Date/Time 05/16/2000 14:05
 Received Date/Time 05/16/2000 15:00
 Technical Director Stephen C. Ede

Released By *Sharon Patten*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
WATERS DEPT								
Amide	0.520	0.500	mg/L	EPA 300.0			05/18/00	SCL
Chloride	93.7	5.00	mg/L	EPA 300.0			05/22/00	SCL
Fluoride	0.500 U	0.500	mg/L	EPA 300.0			05/18/00	SCL
Nitrate-N	0.581	0.500	mg/L	EPA 300.0			05/18/00	SCL
Nitrite-N	0.500 U	0.500	mg/L	EPA 300.0	1 max		05/18/00	SCL
Ortho Phosphate-P	0.500 U	0.500	mg/L	EPA 300.0			05/18/00	SCL
Sulfate	2.32	0.500	mg/L	EPA 300.0			05/18/00	SCL
Gas Chromatography								
Methane	5.83	0.0350	mg/L	ASTM D-1945M			05/24/00	TPF
Ethane	0.0650 U	0.0650	mg/L	ASTM D-1945M			05/24/00	TPF
Benzene	0.183 U	0.183	mg/L	ASTM D-1945M			05/24/00	TPF



000049

CT&E Ref.# 1002296003
 Client Name Williams Express
 Project Name/# Y6300-302 WES 5030
 Client Sample ID WES 5030-B3MW
 Matrix Water (Surface, Eff., Ground)
 Ordered By

Client PO#
 Printed Date/Time 05/31/2000 9:50
 Collected Date/Time 05/16/2000 14:10
 Received Date/Time 05/16/2000 15:00
 Technical Director Stephen C. Ede

Released By *Sharon Peterson*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
WATERS DEPT								
Amide	0.502	0.500	mg/L	EPA 300.0			05/18/00	SCL
Chloride	91.0	5.00	mg/L	EPA 300.0			05/22/00	SCL
Fluoride	0.500 U	0.500	mg/L	EPA 300.0			05/18/00	SCL
Nitrate-N	1.54	0.500	mg/L	EPA 300.0			05/18/00	SCL
Nitrite-N	0.500 U	0.500	mg/L	EPA 300.0	1 max		05/18/00	SCL
Ortho Phosphate-P	0.500 U	0.500	mg/L	EPA 300.0			05/18/00	SCL
Sulfate	25.6	0.500	mg/L	EPA 300.0			05/18/00	SCL
Gas Chromatography								
Methane	0.0500 U	0.0500	mg/L	ASTM D-1945M			05/24/00	TPF
Ethane	0.0930 U	0.0930	mg/L	ASTM D-1945M			05/24/00	TPF
Ethene	0.260 U	0.260	mg/L	ASTM D-1945M			05/24/00	TPF



CT&E Ref.# 1002296004
 Client Name Williams Express
 Project Name/# Y6300-302 WES 5030
 Client Sample ID WES 5030-B4MW
 Matrix Water (Surface, Eff., Ground)
 Ordered By

Client PO#
 Printed Date/Time 05/31/2000 9:50
 Collected Date/Time 05/16/2000 14:20
 Received Date/Time 05/16/2000 15:00
 Technical Director Stephen C. Ede

Released By *Shawn P. [Signature]*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
WATERS DEPT								
Amide	0.540	0.500	mg/L	EPA 300.0			05/18/00	SCL
Chloride	107	5.00	mg/L	EPA 300.0			05/22/00	SCL
Fluoride	0.500 U	0.500	mg/L	EPA 300.0			05/18/00	SCL
Nitrate-N	1.68	0.500	mg/L	EPA 300.0			05/18/00	SCL
Nitrite-N	0.500 U	0.500	mg/L	EPA 300.0	1 max		05/18/00	SCL
Ortho Phosphate-P	0.500 U	0.500	mg/L	EPA 300.0			05/18/00	SCL
Sulfate	12.4	0.500	mg/L	EPA 300.0			05/18/00	SCL
Gas Chromatography								
Methane	0.796	0.0410	mg/L	ASTM D-1945M			05/24/00	TPF
Ethane	0.0770 U	0.0770	mg/L	ASTM D-1945M			05/24/00	TPF
Propane	0.214 U	0.214	mg/L	ASTM D-1945M			05/24/00	TPF



CT&E Ref.# 1002296005
 Client Name Williams Express
 Project Name/# Y6300-302 WES 5030
 Client Sample ID WES 5030-B5MW
 Matrix Water (Surface, Eff., Ground)
 Ordered By

Client PO#
 Printed Date/Time 05/31/2000 9:50
 Collected Date/Time 05/16/2000 14:00
 Received Date/Time 05/16/2000 15:00
 Technical Director Stephen C. Ede

Released By

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
WATERS DEPT								
Amide	0.500 U	0.500	mg/L	EPA 300.0			05/18/00	SCL
Chloride	75.6	5.00	mg/L	EPA 300.0			05/22/00	SCL
Fluoride	0.576	0.500	mg/L	EPA 300.0			05/18/00	SCL
Nitrate-N	0.580	0.500	mg/L	EPA 300.0			05/18/00	SCL
Nitrite-N	0.500 U	0.500	mg/L	EPA 300.0	1 max		05/18/00	SCL
Ortho Phosphate-P	0.500 U	0.500	mg/L	EPA 300.0			05/18/00	SCL
Sulfate	0.500 U	0.500	mg/L	EPA 300.0			05/18/00	SCL
Gas Chromatography								
Methane	1.51	0.0330	mg/L	ASTM D-1945M			05/24/00	TPF
Ethane	0.0620 U	0.0620	mg/L	ASTM D-1945M			05/24/00	TPF
Benzene	0.173 U	0.173	mg/L	ASTM D-1945M			05/24/00	TPF



CT&E Ref.# 1002296006
 Client Name Williams Express
 Project Name/# Y6300-302 WES 5030
 Client Sample ID WES 5030-B6MW
 Matrix Water (Surface, Eff., Ground)
 Ordered By

Client PO#
 Printed Date/Time 05/31/2000 9:50
 Collected Date/Time 05/16/2000 13:55
 Received Date/Time 05/16/2000 15:00
 Technical Director Stephen C. Ede

Released By *Shawn P. Foster*

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
WATERS DEPT								
Bromide	0.501	0.500	mg/L	EPA 300.0			05/18/00	SCL
Chloride	84.7	5.00	mg/L	EPA 300.0			05/22/00	SCL
Fluoride	0.500 U	0.500	mg/L	EPA 300.0			05/18/00	SCL
Nitrate-N	0.581	0.500	mg/L	EPA 300.0			05/18/00	SCL
Nitrite-N	0.500 U	0.500	mg/L	EPA 300.0	1 max		05/18/00	SCL
Ortho Phosphate-P	0.500 U	0.500	mg/L	EPA 300.0			05/18/00	SCL
Sulfate	0.580	0.500	mg/L	EPA 300.0			05/18/00	SCL
Gas Chromatography								
Methane	1.94	0.0450	mg/L	ASTM D-1945M			05/24/00	TPF
Ethane	0.0850 U	0.0850	mg/L	ASTM D-1945M			05/24/00	TPF
Benzene	0.237 U	0.237	mg/L	ASTM D-1945M			05/24/00	TPF

1002296



Geotechnical and Environmental Consultants

CHAIN OF CUSTODY RECORD

Page 1 of 1
Laboratory STK
Attn: Brock

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

11500 Olive Blvd., Suite 276
St. Louis, MO 63141
(314) 872-8170

154 N. Grandridge Blvd.
Kennewick, WA 99336
(509) 735-1280

2055 Hill Road
Fairbanks, AK 99709
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

2412 N. 30th St., Suite 201
Tacoma, WA 98407
(206) 759-0156

Analysis Parameters/Sample Container Description
(Include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp. Grab		Total Number of Containers	Remarks/Matrix
				Method	ASTM-D 1940 Substrate GPA 300.D		
UES 5030-3am2	1	5:16:00	14:15	X	X	3	HAD
-B3am2	2		14:05	X	X	3	
-B3am2	3		14:10	X	X	3	
-B41m2	4		14:20	X	X	3	
-B5m2	5		14:00	X	X	3	
-B6m2	6		13:55	X	X	3	

Project Information

Project Number: 10300-302

Project Name: UES 5030

Contact: Mike Morale

Ongoing Project? Yes No

Sampler: SAM

Sample Receipt

Total Number of Containers

COC Seals/Inact? Y/N/NA

Received Good Cond./Cold

Delivery Method:

(attach shipping bill, if any)

Instructions

Requested Turn Around Time: 30d

Special Instructions: Bill Williams

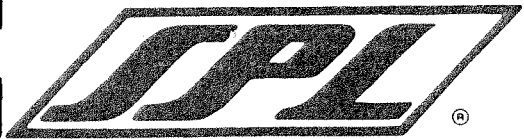
Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: <i>Andrew Morale</i> Printed Name: Andrew Morale Date: 5/10/00 Company: Shannon & Wilson	Signature: _____ Printed Name: _____ Date: _____ Company: _____	Signature: _____ Printed Name: _____ Date: _____ Company: _____
Signature: <i>Shannon & Wilson</i> Printed Name: Shannon & Wilson Date: 5/16/00 Company: Shannon & Wilson	Signature: _____ Printed Name: _____ Date: _____ Company: _____	Signature: _____ Printed Name: _____ Date: _____ Company: _____
Signature: <i>Paula Shively</i> Printed Name: Paula Shively Date: 5/16/00 Company: Shannon & Wilson	Signature: _____ Printed Name: _____ Date: _____ Company: _____	Signature: _____ Printed Name: _____ Date: _____ Company: _____
Signature: <i>Tara Lambert</i> Printed Name: Tara Lambert Date: _____ Company: STK	Signature: _____ Printed Name: _____ Date: _____ Company: _____	Signature: _____ Printed Name: _____ Date: _____ Company: _____

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

19 50 10

000051

ATTACHMENT 2
RESULTS OF ANALYTICAL TESTING BY
SOUTHERN PETROLEUM LABORATORY
OF SCOTT, LOUISIANA



LAFAYETTE AREA LAB
500 AMBASSADOR CAFFERY PKWY.
SCOTT, LOUISIANA
ZIP 70583-8544
PHONE: (337) 237-4775

000055

L A B O R A T O R Y R E P O R T

SPL WORKORDER NUMBER: 0005817

Submitted to:

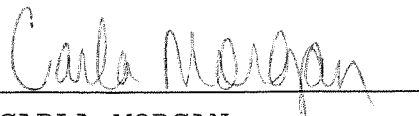
JULIE MAKELA
SHANNON & WILSON, INC.
5430 FAIRBANKS STREET
SUITE 3
ANCHORAGE AK 99518

Reported: 05/23/00

Prepared For: MAPCO PETROLEUM INC.

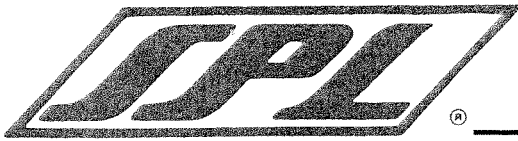
Measurement Basis: This analysis was performed in accordance with EPA guidelines for analysis and quality control. Results on Dry Weight Basis for applicable soil tests.

Approved By:



CARLA MORGAN
Project Manager

Note: This report may not be reproduced, except in full, without written permission from SPL.



Date: Tuesday, May 23, 2000

*****SUMMARY REPORT*****

000058

Company: MAPCO PETROLEUM INC.

Project No: Y6300-302

Site: ANCHORAGE, AK

Project: #5030, 3727 SPENARD ROAD

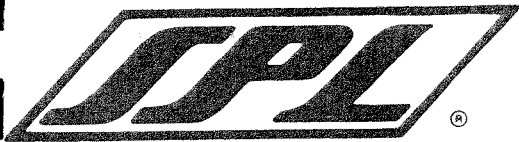
Workorder	Matrix	Client ID	Collected	Compound	Result	Det Limit	Method
0005817-01	WATER	WES5030-B1MW	5/15/00	Gasoline Range Organics	15	1.0mg/L	Alaska Method AK101.0
				Benzene	540	10µg/L	Method 602 40 CFR PART 136
				Toluene	150	1µg/L	Method 602 40 CFR PART 136
				EthylBenzene	340	1µg/L	Method 602 40 CFR PART 136
				Total Xylene	4000	10µg/L	Method 602 40 CFR PART 136
0005817-02	WATER	WES5030-B2MW	5/15/00	Gasoline Range Organics	87	2.0mg/L	Alaska Method AK101.0
				Benzene	2000	20µg/L	Method 602 40 CFR PART 136
				Toluene	9600	20µg/L	Method 602 40 CFR PART 136
				EthylBenzene	2600	20µg/L	Method 602 40 CFR PART 136
				Total Xylene	20000	20µg/L	Method 602 40 CFR PART 136
0005817-03	WATER	WES5030-B3MW	5/15/00	Gasoline Range Organics	ND	0.2mg/L	Alaska Method AK101.0
				Benzene	ND	1µg/L	Method 602 40 CFR PART 136
				Toluene	2.6	1µg/L	Method 602 40 CFR PART 136
				EthylBenzene	ND	1µg/L	Method 602 40 CFR PART 136
				Total Xylene	18	1µg/L	Method 602 40 CFR PART 136
0005817-04	WATER	WES5030-B4MW	5/15/00	Gasoline Range Organics	1.6	0.2mg/L	Alaska Method AK101.0
				Benzene	400	1µg/L	Method 602 40 CFR PART 136
				Toluene	ND	1µg/L	Method 602 40 CFR PART 136
				EthylBenzene	ND	1µg/L	Method 602 40 CFR PART 136
				Total Xylene	17	1µg/L	Method 602 40 CFR PART 136
0005817-05	WATER	WES5030-B5MW	5/15/00	Gasoline Range Organics	56	5.0mg/L	Alaska Method AK101.0
				Benzene	9300	50µg/L	Method 602 40 CFR PART 136
				Toluene	2900	50µg/L	Method 602 40 CFR PART 136
				EthylBenzene	450	50µg/L	Method 602 40 CFR PART 136
				Total Xylene	8500	50µg/L	Method 602 40 CFR PART 136
0005817-06	WATER	WES5030-B6MW	5/15/00	Gasoline Range Organics	6.3	0.2mg/L	Alaska Method AK101.0
				Benzene	4500	20µg/L	Method 602 40 CFR PART 136
				Toluene	ND	1µg/L	Method 602 40 CFR PART 136
				EthylBenzene	ND	1µg/L	Method 602 40 CFR PART 136
				Total Xylene	140	1µg/L	Method 602 40 CFR PART 136
0005817-07	WATER	WES5030-TB	5/15/00	Gasoline Range Organics	ND	0.2mg/L	Alaska Method AK101.0
				Benzene	ND	1µg/L	Method 602 40 CFR PART 136
				Toluene	ND	1µg/L	Method 602 40 CFR PART 136
				EthylBenzene	ND	1µg/L	Method 602 40 CFR PART 136
				Total Xylene	ND	1µg/L	Method 602 40 CFR PART 136

ND - Not Detected.

Notes: *Ref: Methods for chemical Analysis of Water and Wastes, 1983, EPA.

**Ref: Standard Methods for Examination of Water and Wastewater, 18th ed.

***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd ed.



LAFAYETTE AREA LAB
 500 AMBASSADOR CAFFERY PKWY.
 SCOTT, LOUISIANA
 ZIP 70583-8544
 PHONE: (337) 237-4775

Certificate of Analysis No. L1-0005817-01

000057

MAPCO PETROLEUM INC.
 1101 KERMIT DRIVE; 8TH FLOOR
 NASHVILLE, TN 37217
 ATTN: GREG STEPHENSON

DATE: 05/23/00

PROJECT: #5030, 3727 SPENARD ROAD
 SITE: ANCHORAGE, AK
 SAMPLED BY: SHANNON & WILSON
 SAMPLE ID: WES5030-B1MW

PROJECT NO: Y6300-302
 MATRIX: WATER
 DATE SAMPLED: 05/15/00 16:10:00
 DATE RECEIVED: 05/17/00

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	540	10 P	µg/L
TOLUENE	150	1 P	µg/L
ETHYLBENZENE	340	1 P	µg/L
TOTAL XYLENE	4000	10 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	5030		µg/L
Surrogate		% Recovery	
1,4-Difluorobenzene	102		
4-Bromofluorobenzene	107		
Method 602 40 CFR PART 136			
Analyzed by: JKY			
Date: 05/19/00			
Gasoline Range Organics	15	1.0 P	mg/L
Surrogate		% Recovery	
4-Bromofluorobenzene	108		
TFT	112		
Alaska Method AK101.0			
Analyzed by: JKY			
Date: 05/19/00 12:19:00			

(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
 **Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
 ***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: This analysis was performed in accordance with EPA guidelines for analysis and quality control. Results on Dry Weight Basis for applicable soil tests.



LAFAYETTE AREA LAB
 500 AMBASSADOR CAFFERY PKWY.
 SCOTT, LOUISIANA
 ZIP 70583-8544
 PHONE: (337) 237-4775

Certificate of Analysis No. L1-0005817-02

000058

MAPCO PETROLEUM INC.
 1101 KERMIT DRIVE; 8TH FLOOR
 NASHVILLE, TN 37217
 ATTN: GREG STEPHENSON

DATE: 05/23/00

PROJECT: #5030, 3727 SPENARD ROAD
 SITE: ANCHORAGE, AK
 SAMPLED BY: SHANNON & WILSON
 SAMPLE ID: WES5030-B2MW

PROJECT NO: Y6300-302
 MATRIX: WATER
 DATE SAMPLED: 05/15/00 15:40:00
 DATE RECEIVED: 05/17/00

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	2000	20 P	µg/L
TOLUENE	9600	20 P	µg/L
ETHYLBENZENE	2600	20 P	µg/L
TOTAL XYLENE	20000	20 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	34200		µg/L

Surrogate

% Recovery

1,4-Difluorobenzene

100

4-Bromofluorobenzene

109

Method 602 40 CFR PART 136

Analyzed by: JKY

Date: 05/19/00

Gasoline Range Organics

87

2.0 P

mg/L

Surrogate

% Recovery

4-Bromofluorobenzene

113

TFT

107

Alaska Method AK101.0

Analyzed by: JKY

Date: 05/19/00 12:42:00

(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
 **Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
 ***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: This analysis was performed in accordance with EPA guidelines for analysis and quality control. Results on Dry Weight Basis for applicable soil tests.



LAFAYETTE AREA LAB
 500 AMBASSADOR CAFFERY PKWY.
 SCOTT, LOUISIANA
 ZIP 70583-8544
 PHONE: (337) 237-4775

Certificate of Analysis No. L1-0005817-03

000059

MAPCO PETROLEUM INC.
 1101 KERMIT DRIVE; 8TH FLOOR
 NASHVILLE, TN 37217
 ATTN: GREG STEPHENSON

DATE: 05/23/00

PROJECT: #5030, 3727 SPENARD ROAD
 SITE: ANCHORAGE, AK
 SAMPLED BY: SHANNON & WILSON
 SAMPLE ID: WES5030-B3MW

PROJECT NO: Y6300-302
 MATRIX: WATER
 DATE SAMPLED: 05/15/00 16:56:00
 DATE RECEIVED: 05/17/00

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1 P	µg/L
TOLUENE	2.6	1 P	µg/L
ETHYLBENZENE	ND	1 P	µg/L
TOTAL XYLENE	18	1 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	20.6		µg/L

Surrogate

% Recovery

1,4-Difluorobenzene
 4-Bromofluorobenzene

96
 96

Method 602 40 CFR PART 136
 Analyzed by: JKY
 Date: 05/18/00

Gasoline Range Organics

ND

0.2 P

mg/L

Surrogate

% Recovery

4-Bromofluorobenzene
 TFT

110
 103

Alaska Method AK101.0
 Analyzed by: JKY
 Date: 05/18/00 15:50:00

ND - Not detected.

(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
 **Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
 ***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: This analysis was performed in accordance with EPA guidelines for analysis and quality control. Results on Dry Weight Basis for applicable soil tests.



LAFAYETTE AREA LAB
 500 AMBASSADOR CAFFERY PKWY.
 SCOTT, LOUISIANA
 ZIP 70583-8544
 PHONE: (337) 237-4775

Certificate of Analysis No. L1-0005817-04

000060

MAPCO PETROLEUM INC.
 1101 KERMIT DRIVE; 8TH FLOOR
 NASHVILLE, TN 37217
 ATTN: GREG STEPHENSON

DATE: 05/23/00

PROJECT: #5030, 3727 SPENARD ROAD
 SITE: ANCHORAGE, AK
 SAMPLED BY: SHANNON & WILSON
 SAMPLE ID: WES5030-B4MW

PROJECT NO: Y6300-302
 MATRIX: WATER
 DATE SAMPLED: 05/15/00 11:40:00
 DATE RECEIVED: 05/17/00

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	400	1 P	µg/L
TOLUENE	ND	1 P	µg/L
ETHYLBENZENE	ND	1 P	µg/L
TOTAL XYLENE	17	1 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	417		µg/L

Surrogate

% Recovery

1,4-Difluorobenzene 128
 4-Bromofluorobenzene 101

Method 602 40 CFR PART 136

Analyzed by: JKY
 Date: 05/18/00

Gasoline Range Organics 1.6 0.2 P mg/L

Surrogate

% Recovery

4-Bromofluorobenzene 104
 TFT 134 <

Alaska Method AK101.0
 Analyzed by: JKY
 Date: 05/18/00 16:13:00

(P) - Practical Quantitation Limit ND - Not detected.
 < - Recovery beyond control limits.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
 **Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
 ***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

COMMENTS: Surrogate failure due to matrix interference.

QUALITY ASSURANCE: This analysis was performed in accordance with EPA guidelines for analysis and quality control. Results on Dry Weight Basis for applicable soil tests.



LAFAYETTE AREA LAB
 500 AMBASSADOR CAFFERY PKWY.
 SCOTT, LOUISIANA
 ZIP 70583-8544
 PHONE: (337) 237-4775

Certificate of Analysis No. L1-0005817-05

000061

MAPCO PETROLEUM INC.
 1101 KERMIT DRIVE; 8TH FLOOR
 NASHVILLE, TN 37217
 ATTN: GREG STEPHENSON

DATE: 05/23/00

PROJECT: #5030, 3727 SPENARD ROAD
 SITE: ANCHORAGE, AK
 SAMPLED BY: SHANNON & WILSON
 SAMPLE ID: WES5030-B5MW

PROJECT NO: Y6300-302
 MATRIX: WATER
 DATE SAMPLED: 05/15/00 15:10:00
 DATE RECEIVED: 05/17/00

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	9300	50 P	µg/L
TOLUENE	2900	50 P	µg/L
ETHYLBENZENE	450	50 P	µg/L
TOTAL XYLENE	8500	50 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	21150		µg/L

Surrogate

% Recovery

1,4-Difluorobenzene
 4-Bromofluorobenzene

102
 100

Method 602 40 CFR PART 136

Analyzed by: JKY

Date: 05/19/00

Gasoline Range Organics

56

5.0 P

mg/L

Surrogate

% Recovery

4-Bromofluorobenzene
 TFT

108
 104

Alaska Method AK101.0

Analyzed by: JKY

Date: 05/19/00 13:05:00

(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
 **Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
 ***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: This analysis was performed in accordance with EPA guidelines for analysis and quality control. Results on Dry Weight Basis for applicable soil tests.



LAFAYETTE AREA LAB
 500 AMBASSADOR CAFFERY PKWY.
 SCOTT, LOUISIANA
 ZIP 70583-8544
 PHONE: (337) 237-4775

Certificate of Analysis No. L1-0005817-06

MAPCO PETROLEUM INC.
 1101 KERMIT DRIVE; 8TH FLOOR
 NASHVILLE, TN 37217
 ATTN: GREG STEPHENSON

000062

DATE: 05/23/00

PROJECT: #5030, 3727 SPENARD ROAD
 SITE: ANCHORAGE, AK
 SAMPLED BY: SHANNON & WILSON
 SAMPLE ID: WES5030-B6MW

PROJECT NO: Y6300-302
 MATRIX: WATER
 DATE SAMPLED: 05/15/00 13:00:00
 DATE RECEIVED: 05/17/00

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	4500	20 P	µg/L
TOLUENE	ND	1 P	µg/L
ETHYLBENZENE	ND	1 P	µg/L
TOTAL XYLENE	140	1 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	4640		µg/L

Surrogate

% Recovery

1,4-Difluorobenzene
 4-Bromofluorobenzene

107
 91

Method 602 40 CFR PART 136
 Analyzed by: JKY
 Date: 05/19/00

Gasoline Range Organics

6.3 0.2 P

mg/L

Surrogate

% Recovery

4-Bromofluorobenzene
 TFT

110
 103

Alaska Method AK101.0
 Analyzed by: JKY
 Date: 05/18/00 17:15:00

(P) - Practical Quantitation Limit ND - Not detected.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
 **Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
 ***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

COMMENTS: Surrogate failure due to matrix interference.

QUALITY ASSURANCE: This analysis was performed in accordance with EPA guidelines for analysis and quality control. Results on Dry Weight Basis for applicable soil tests.



LAFAYETTE AREA LAB
 500 AMBASSADOR CAFFERY PKWY.
 SCOTT, LOUISIANA
 ZIP 70583-8544
 PHONE: (337) 237-4775

Certificate of Analysis No. L1-0005817-07

MAPCO PETROLEUM INC.
 1101 KERMIT DRIVE; 8TH FLOOR
 NASHVILLE, TN 37217
 ATTN: GREG STEPHENSON

000063

DATE: 05/23/00

PROJECT: #5030, 3727 SPENARD ROAD
 SITE: ANCHORAGE, AK
 SAMPLED BY: SPL
 SAMPLE ID: WES5030-TB

PROJECT NO: Y6300-302
 MATRIX: WATER
 DATE SAMPLED: 05/15/00 14:21:00
 DATE RECEIVED: 05/17/00

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1 P	µg/L
TOLUENE	ND	1 P	µg/L
ETHYLBENZENE	ND	1 P	µg/L
TOTAL XYLENE	ND	1 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/L

Surrogate

% Recovery

1,4-Difluorobenzene
 4-Bromofluorobenzene

97
 95

Method 602 40 CFR PART 136

Analyzed by: JKY

Date: 05/19/00

Gasoline Range Organics

ND

0.2 P

mg/L

Surrogate

% Recovery

4-Bromofluorobenzene
 TFT

108
 101

Alaska Method AK101.0

Analyzed by: JKY

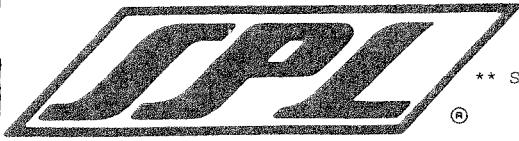
Date: 05/18/00 17:39:00

ND - Not detected.

(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
 **Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
 ***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: This analysis was performed in accordance with EPA guidelines for analysis and quality control. Results on Dry Weight Basis for applicable soil tests.



** SPL BATCH QUALITY CONTROL REPORT **
Method 602 [40 CFR]

LAFAYETTE AREA LAB
500 AMBASSADOR CAFFERY PKWY.
SCOTT, LOUISIANA
ZIP 70583-8544
PHONE: (337) 237-4775

000064

Matrix: Water
Units: µg/L

Batch Id: HPBB000518103101

LABORATORY CONTROL SAMPLE

S P I K E C O M P O U N D S	Method Blank Result <2>	Spike Added <3>	Blank Spike		QC Limits(**) (Mandatory) % Recovery Range
			Result <1>	Recovery %	
Benzene	ND	50	56	112	70 - 130
Toluene	ND	50	53	106	70 - 130
EthylBenzene	ND	50	53	106	70 - 130
O Xylene	ND	50	54	108	70 - 130
M & P Xylene	ND	100	100	100	70 - 130

MATRIX SPIKES

S P I K E C O M P O U N D S	Sample Results <2>	Spike Added <3>	Matrix Spike		Matrix Spike Duplicate		MS/MSD Relative % Difference	QC Limits(***) (Advisory)	
			Result <1>	Recovery <4>	Result <1>	Recovery <5>		RPD Max.	Recovery Range
BENZENE	ND	20	22	110	21	105	4.65	20	70 - 130
TOLUENE	2.6	20	21	92.0	20	87.0	5.59	20	70 - 130
ETHYLBENZENE	ND	20	21	105	20	100	4.88	20	70 - 130
O XYLENE	2.7	20	23	102	21	91.5	10.9	20	70 - 130
M & P XYLENE	15	40	45	75.0	43	70.0	6.90	20	70 - 130

Analyst: JKY

Sequence Date: 05/18/00

SPL ID of sample spiked: 0005817-03A

Sample File ID: BE18414.TX0

Method Blank File ID:

Blank Spike File ID: BE18404.TX0

Matrix Spike File ID: BE18419A.TX0

Matrix Spike Duplicate File ID: BE18420A.TX0

* = Values Outside QC Range. « = Data outside Method Specification limits.

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = [(<1> - <2>) / <3>] x 100

LCS % Recovery = (<1> / <3>) x 100

Relative Percent Difference = |(<4> - <5>) / [(<4> + <5>) x 0.5] x 100

(**) = Source: 602 Table 2

(***) = Source: 602 Table 2

SAMPLES IN BATCH(SPL ID): 0005817-01A 0005817-03A 0005817-04A 0005817-06A



** SPL BATCH QUALITY CONTROL REPORT **
Alaska Method AK101.0

LAFAYETTE AREA LAB
500 AMBASSADOR CAFFERY PKWY.
SCOTT, LOUISIANA
ZIP 70583-8544
PHONE: (337) 237-4775

Matrix: Water
Units: mg/L

Batch Id: HPBB000518103104

000065

LABORATORY CONTROL SAMPLE

S P I K E C O M P O U N D S	Method Blank Result <2>	Spike Added <3>	Blank Spike		QC Limits(**) (Mandatory) % Recovery Range
			Result <1>	Recovery %	
Gasoline Range Organics	ND	5.0	5.3	106	70 - 130

M A T R I X S P I K E S

S P I K E C O M P O U N D S	Sample Results <2>	Spike Added <3>	Matrix Spike		Matrix Spike Duplicate		MS/MSD Relative % Difference	QC Limits(***) (Advisory)	
			Result <1>	Recovery <4>	Result <1>	Recovery <5>		RPD Max.	Recovery Range
			GASOLINE RANGE ORGANICS	6.3	5.0	11		94.0	11

Analyst: JKY

Sequence Date: 05/18/00

SPL ID of sample spiked: 0005817-06A

Sample File ID: FE18417.TX0

Method Blank File ID:

Blank Spike File ID: FE18406.TX0

Matrix Spike File ID: FE18421.TX0

Matrix Spike Duplicate File ID: FE18422.TX0

* = Values Outside QC Range. * = Data outside Method Specification limits.

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = [(<1> - <2>) / <3>] x 100

LCS % Recovery = (<1> / <3>) x 100

Relative Percent Difference = |(<4> - <5>)| / [(<4> + <5>) x 0.5] x 100

(**) = Source:

(***) = Source:

SAMPLES IN BATCH(SPL ID): 0005817-03A 0005817-04A 0005817-06A 0005817-07A



** SPL BATCH QUALITY CONTROL REPORT **

Method 602 [40 CFR]

LAFAYETTE AREA LAB
500 AMBASSADOR CAFFERY PKWY.
SCOTT, LOUISIANA
ZIP 70583-8544
PHONE: (337) 237-4775

000068

Matrix: Water
Units: µg/L

Batch Id: HPBB000519090000

LABORATORY CONTROL SAMPLE

S P I K E C O M P O U N D S	Method Blank Result <2>	Spike Added <3>	Blank Spike		QC Limits(**) (Mandatory) % Recovery Range
			Result <1>	Recovery %	
Benzene	ND	50	46	92.0	70 - 130
Toluene	ND	50	44	88.0	70 - 130
EthylBenzene	ND	50	45	90.0	70 - 130
O Xylene	ND	50	46	92.0	70 - 130
M & P Xylene	ND	100	90	90.0	70 - 130

MATRIX SPIKES

S P I K E C O M P O U N D S	Sample Results <2>	Spike Added <3>	Matrix Spike		Matrix Spike Duplicate		MS/MSD Relative % Difference	QC Limits(***) (Advisory)	
			Result <1>	Recovery <4>	Result <1>	Recovery <5>		RPD Max.	Recovery Range
			BENZENE	ND	20	22			
TOLUENE	ND	20	22	110	22	110	0	20	70 - 130
ETHYLBENZENE	ND	20	22	110	22	110	0	20	70 - 130
O XYLENE	ND	20	23	115	23	115	0	20	70 - 130
M & P XYLENE	ND	40	47	118	46	115	2.58	20	70 - 130

Analyst: JKY

Sequence Date: 05/19/00

SPL ID of sample spiked: 0005917-03A

Sample File ID: BE19531.TX0

Method Blank File ID:

Blank Spike File ID: BE19504.TX0

Matrix Spike File ID: BE19532.TX0

Matrix Spike Duplicate File ID: BE19533.TX0

* = Values Outside QC Range. < = Data outside Method Specification limits.

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = [(<1> - <2>) / <3>] x 100

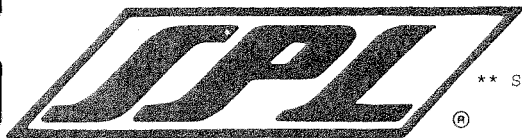
LCS % Recovery = (<1> / <3>) x 100

Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100

(**) = Source: 602 Table 2

(***) = Source: 602 Table 2

SAMPLES IN BATCH(SPL ID): 0005817-01A 0005817-02A 0005817-05A 0005817-06A
0005817-07A



** SPL BATCH QUALITY CONTROL REPORT **
Alaska Method AK101.0

LAFAYETTE AREA LAB
500 AMBASSADOR CAFFERY PKWY.
SCOTT, LOUISIANA
ZIP 70583-8544
PHONE: (337) 237-4775

Matrix: Water
Units: mg/L

Batch Id: HPBB000519090001

000067

LABORATORY CONTROL SAMPLE

S P I K E C O M P O U N D S	Method Blank Result <2>	Spike Added <3>	Blank Spike		QC Limits(**) (Mandatory) % Recovery Range
			Result <1>	Recovery %	
Gasoline Range Organics	ND	5.0	5.33	107	70 - 130

M A T R I X S P I K E S

S P I K E C O M P O U N D S	Sample Results <2>	Spike Added <3>	Matrix Spike		Matrix Spike Duplicate		MS/MSD Relative % Difference	QC Limits(***) (Advisory)	
			Result <1>	Recovery <4>	Result <1>	Recovery <5>		RPD Max.	Recovery Range
GASOLINE RANGE ORGANICS	ND	5.0	5.66	113	5.70	114	0.881	20	50 - 130

Analyst: JKY

Sequence Date: 05/19/00

SPL ID of sample spiked: 0005916-04A

Sample File ID: FE19521.TX0

Method Blank File ID:

Blank Spike File ID: FE19506.TX0

Matrix Spike File ID: FE19522.TX0

Matrix Spike Duplicate File ID: FE19523.TX0

* = Values Outside QC Range. < = Data outside Method Specification limits.

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = [(<1> - <2>) / <3>] x 100

LCS % Recovery = (<1> / <3>) x 100

Relative Percent Difference = [(<4> - <5>) / [(<4> + <5>) x 0.5]] x 100

(**) = Source:

(***) = Source:

SAMPLES IN BATCH(SPL ID): 0005817-01A 0005817-02A 0005817-05A

Sample Receipt Checklist

000068

0005817

Client: <u>Shannon + Wilson</u>		COC Serial #:		
Project #:	Project Loc: <u>Anchorage AK</u>	Yes	No	NA
Are Custody seals on the shipping container present and intact?		<input checked="" type="checkbox"/>		
Chain-of-Custody (COC) present and signed by the sampler?		<input checked="" type="checkbox"/>		
Traffic reports, airbills, or bills of lading present?		<input checked="" type="checkbox"/>		
Are sample containers intact?		<input checked="" type="checkbox"/>		
Are sample tags/field labels present on each sample?		<input checked="" type="checkbox"/>		
Are all samples present in the sample kit listed on the COC?		<input checked="" type="checkbox"/>		
Do date/time of sample collection agree with COC?		<input checked="" type="checkbox"/>		
Do sample tags/field tags agree with COC?		<input checked="" type="checkbox"/>		
Does sample type agree with COC?		<input checked="" type="checkbox"/>		
Does the number of bottles received for each parameter agree with COC?		<input checked="" type="checkbox"/>		
Does the bottle type and volume agree with COC?		<input checked="" type="checkbox"/>		
Are the analyses requested listed on the COC?		<input checked="" type="checkbox"/>		
Is the sample kit temperature 2 - 6 degrees C?		<input checked="" type="checkbox"/>		
Record the temperature in degrees C in the NA column.				<u>4C</u>
Is the pH of all preserved samples checked and documented properly?		<input checked="" type="checkbox"/>		
Are all samples preserved according to EPA guidelines?		<input checked="" type="checkbox"/>		
Are all samples within the EPA maximum holding times?		<input checked="" type="checkbox"/>		
Do sample containers conform to EPA guidelines?		<input checked="" type="checkbox"/>		
Did the receiving technician record the date/time of receipt and sign the COC?		<input checked="" type="checkbox"/>		
Was a nonconformance filled out for any items with a NO response?			<input checked="" type="checkbox"/>	
Method of sample delivery to SPL and airbill number where applicable (circle one)?				
<input checked="" type="checkbox"/> Fed-X	<input type="checkbox"/> UPS	Other: <u>512621107300</u>		
Method of sample disposal:(circle one)				
<input checked="" type="checkbox"/> SPL Disposal	<input type="checkbox"/> HOLD	<input type="checkbox"/> Return to Client		
Receiving Technician signature: <u>[Signature]</u>		Date/Time: <u>5-17-00 1008</u>		

000071

ATTACHMENT 3

SECOND SEMI-ANNUAL 1999 GROUNDWATER AND SAMPLING REPORT

PREPARED BY GETTLER-RYAN, INC. (G-R)

AND

FOURTH QUARTER 1999 REMEDIAL SYSTEM EVALUATION REPORT

PREPARED BY SECOR INTERNATIONAL, INC. (SECOR)

FOR CHEVRON

000072

November 12, 1999
Job #386716

Mr. Robert Cochran
Chevron Products Company
P.O. Box 6004
San Ramon, CA 94583

RE: Second Semi-Annual 1999 Groundwater Monitoring & Sampling Report
Chevron Service Station No. 9-9014/State Facility ID: 47
3608 Minnesota Drive
Anchorage, Alaska

Dear Mr. Cochran:

This report documents the semi-annual groundwater monitoring and sampling event performed by Gettler-Ryan Inc. (G-R). On October 18, 1999, field personnel were on-site to monitor ten wells (MW-1, MW-4, MW-5, MW-7, MW-8, MW-9, MW-11, T-1, T-2, and T-4) and sample nine wells (MW-1, MW-4, MW-5, MW-7, MW-8, MW-9, MW-11, T-1, and T-4) the above referenced site. One well (T-2) was connected to system.

Static groundwater levels were measured and the wells were checked for the presence of separate-phase hydrocarbons. Separate-phase hydrocarbons were not present in any of the wells. Static water level data and groundwater elevations are presented in Table 1. A Potentiometric Map is included as Figure 1. Purge water was subsequently discharged.

Groundwater samples were collected from the monitoring wells as specified by G-R Standard Operating Procedure - Groundwater Sampling (attached). The field data sheets for this event are attached. The samples were analyzed by Severn Trent Laboratories, Inc., an approved Alaska facility. Analytical results are presented in Tables 1 and 2. Isoconcentration Maps are included as Figures 2 and 3, and a Concentration Map is included as Figure 4. The chain of custody document and laboratory analytical reports are attached.

Please call if you have any questions or comments regarding this report. Thank you.

Sincerely,

Deanna L. Harding
Project Coordinator

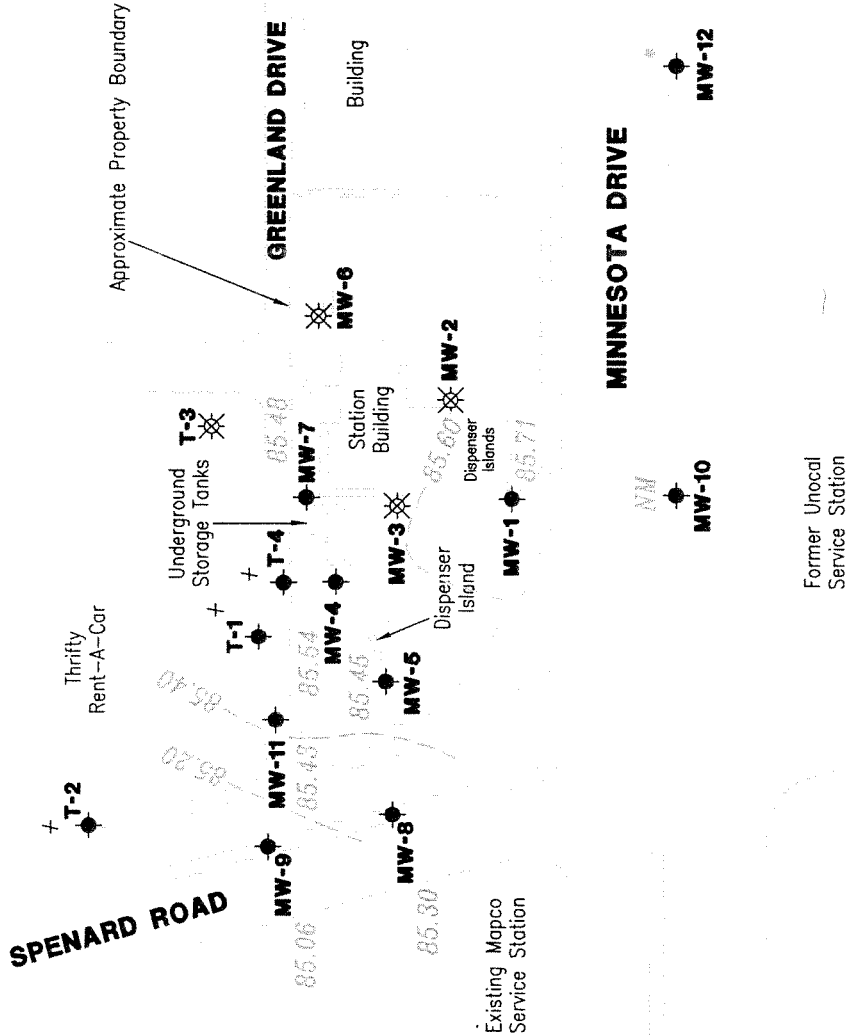
Stephen J. Carter
Senior Geologist

Figure 1: Potentiometric Map
Figure 2: Isoconcentration Map – Gasoline Range Organics
Figure 3: Isoconcentration Map – Benzene
Figure 4: MTBE Concentration Map
Table 1: Groundwater Monitoring Data and Analytical Results
Table 2: Groundwater Analytical Results
Attachments: Standard Operating Procedure - Groundwater Sampling
Field Data Sheets
Chain of Custody Document and Laboratory Analytical Reports

cc: Mr. Clint Adler, Alaska Department of Environmental Conservation, (via e-mail)
Mr. Rusty Benkosky, Secor International, 9912 Business Park Drive, Sacramento, CA 95827
Floyd & Sons, Inc., 3730 Spenard Road, Anchorage, AK 99517

EXPLANATION

- ◆ Groundwater monitoring well
- ⊗ Abandoned monitoring well
- 99.99 Groundwater elevation in feet referenced to Mean Sea Level (MSL)
- - - - Groundwater elevation contour, dashed where inferred.
- + TOC not available
- * Not located
- NM Not Monitored



000073

Approximate groundwater flow direction at a gradient of 0.003 to 0.007 FL/FL.

Source: Figure Modified From Drawing Provided By RRM Engineering.

Gettler - Ryan Inc.

6747 Sierra Ct., Suite J (925) 551-7555
Dublin, CA 94568

POTENTIOMETRIC MAP
Chevron Service Station No. 9-9014
3608 Minnesota Drive
Anchorage, Alaska

DATE: October 18, 1999
REVISED DATE:

FIGURE

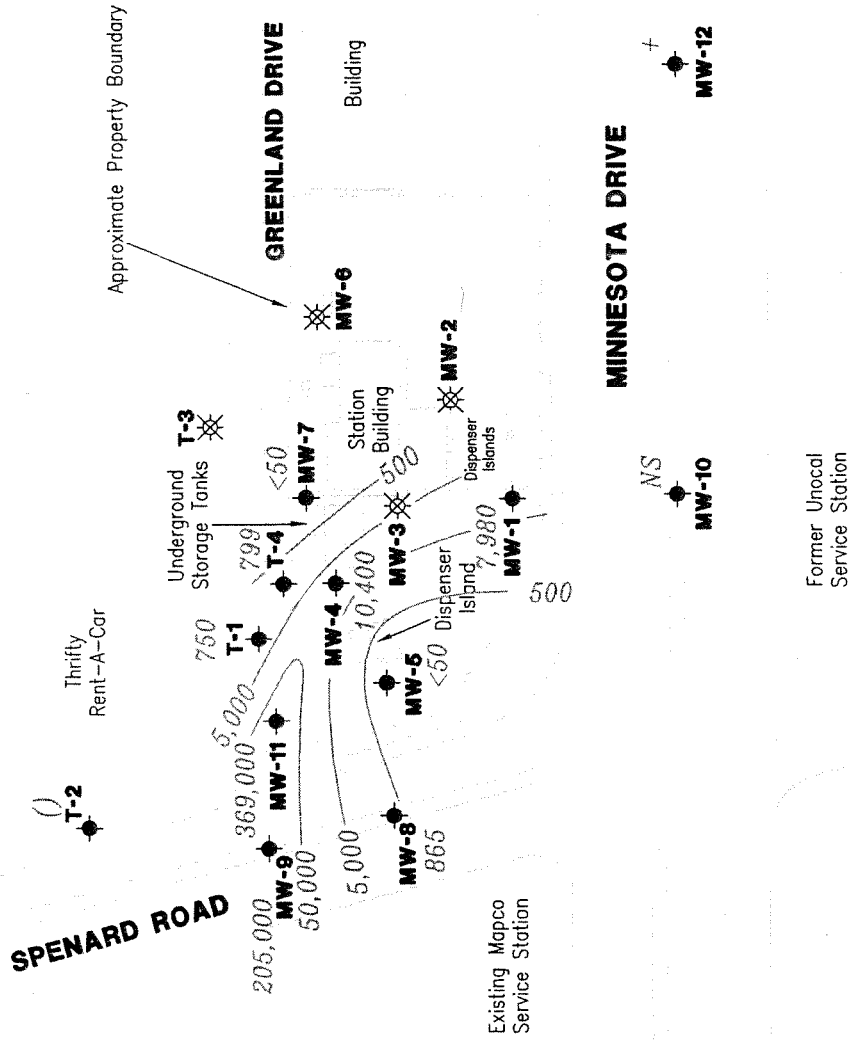
1

JOB NUMBER
386716



EXPLANATION

- ◆ Groundwater monitoring well
- ⊗ Abandoned monitoring well
- 500 GRO (Gasoline Range Organics) concentration in ppb
- 500 GRO isoconcentration contour
- + Not located
- () Connected to system
- NS Not Sampled



000074

Source: Figure Modified From Drawing Provided By RRM Engineering.



Gertler - Ryan Inc.

6747 Sierra Ct., Suite J
Dublin, CA 94568
(925) 551-7555

GRO ISOCONCENTRATION MAP
Chevron Service Station No. 9-9014
3608 Minnesota Drive
Anchorage, Alaska

JOB NUMBER
386716

REVIEWED BY

DATE
October 18, 1999

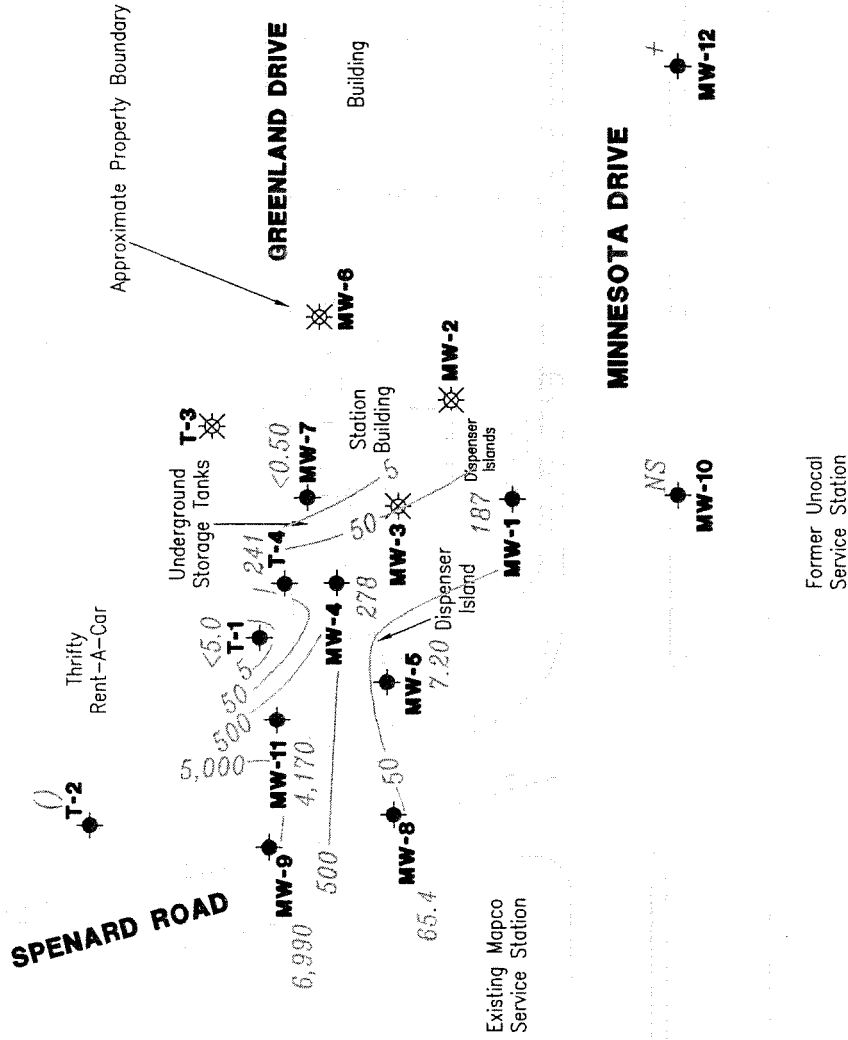
REVISED DATE

FIGURE

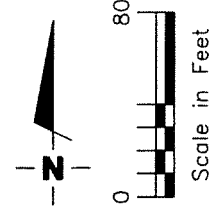
2

EXPLANATION

- ◆ Groundwater monitoring well
- ⊗ Abandoned monitoring well
- 5.00 Benzene concentration in ppb
- 5.00 Benzene isoconcentration contour
- + Not located
- Connected to system
- NS Not Sampled



000075



Source: Figure Modified From Drawing Provided By RRM Engineering.

FIGURE

3

BENZENE ISOCONCENTRATION MAP
 Chevron Service Station No. 9-9014
 3608 Minnesota Drive
 Anchorage, Alaska

Gettler - Ryan Inc.

6747 Sierra Ct., Suite J (925) 551-7555
 Dublin, CA 94568



JOB NUMBER 386716
 REVIEWED BY
 DATE October 18, 1999
 REVISED DATE

Chevron Service Station No. 9-9014
 3608 Minnesota Drive
 Anchorage, Alaska

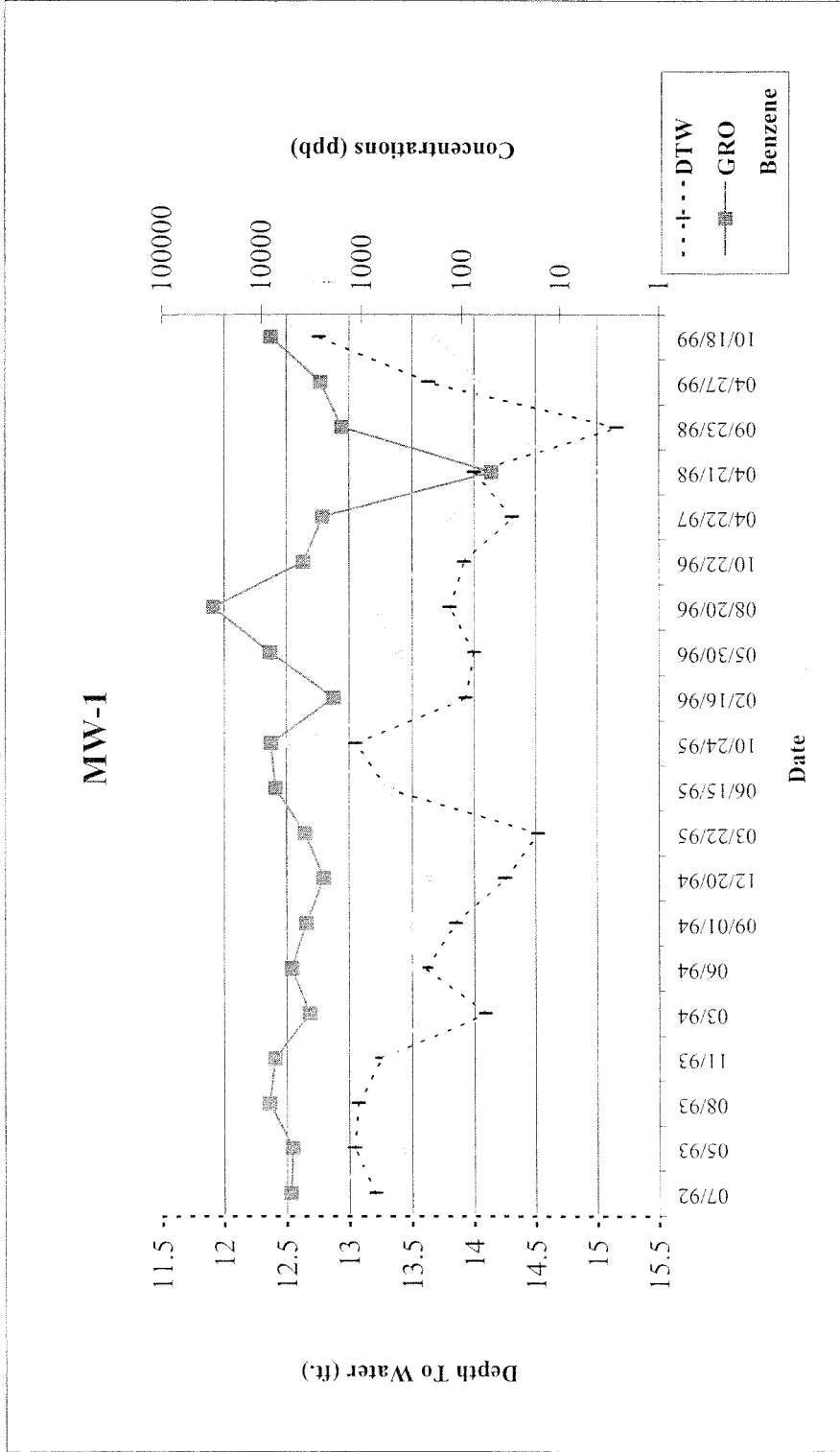
000077

Table 1
 Groundwater Monitoring Data and Analytical Results

WELL ID/ TOC* (ft.)	DATE	DTW (ft.)	GWE (msl)	SPIHT (ft.)	SPHT Removed	TPH (ppb)	DRO (ppb)	GRO (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
MW-1 98.61	07/92	13.21	85.40	--	--	1,000	1,950	5,100	2,500	6,030	1,230	5,610	--
	11/92	13.20	85.41	--	--	--	--	--	--	--	--	--	--
	05/93	13.04	85.57	--	--	ND	360	4,900	440	990	260	1,200	--
	08/93	13.07	85.54	--	--	ND	430	8,300	770	980	260	1,100	--
	11/93	13.26	85.35	--	--	ND	610	7,300	530	1,000	280	1,100	--
	03/94	14.09	84.52	--	--	ND	740	3,300	230	240	140	360	--
	06/94	13.61	85.00	--	--	ND	400	5,000	300	480	180	600	--
	09/01/94	13.85	84.76	--	--	ND	410	3,600	330	310	120	400	--
	12/20/94	14.25	84.36	--	--	--	--	2,400	240	220	83	250	--
	12/20/94	--	--	--	--	--	--	2,700	290	250	97	250	--
98.47	03/22/95	14.52	84.09	--	--	--	--	3,700	110	220	43	570	--
	06/15/95	13.30	85.31	--	--	--	--	7,200	580	840	200	740	--
	10/24/95	13.05	85.42	--	--	--	--	8,000	5,600	280	230	790	--
	02/16/96	13.93	84.54	--	--	--	--	1,900	150	80	62	180	--
	05/30/96	14.00	84.47	--	--	--	410	8,150	455	825	220	876	--
	08/20/96	13.80	84.67	--	--	--	--	30,400	774	4,290	235	3,320	--
	10/22/96	13.92	84.55	--	--	--	--	3,820	222	385	130	566	--
	04/22/97	14.31	84.16	--	--	--	--	2,460	143	89	105	301	--
	04/21/98	14.00	84.47	--	--	--	--	<50	3.11	<0.5	1.96	1.99	--
	09/23/98	15.16	83.31	--	--	--	--	1,570	64.2	7.64	87.3	144	--
(D)	04/27/99	13.63	84.84	0.00	0.00	--	--	2,570	66.4	10.1	91.8	201	17.6
	04/27/99	--	--	--	--	--	--	2,490	66.0	13.4	90.8	206	16.7
	10/18/99	12.76	85.71	0.00	0.00	--	--	7,980	187	71.7	528	1,320	<50.0

Chevron Service Station No. 9-9014
 3608 Minnesota Drive
 Anchorage, Alaska

000073



Chevron Service Station No. 9-9014
 3608 Minnesota Drive
 Anchorage, Alaska

000079

Table 1
 Groundwater Monitoring Data and Analytical Results

WELL ID/ TOC*(ft.)	DATE	DTW (ft.)	GWE (msl)	SPHT (ft.)	SPHT Removed	TPH (ppb)	DRO (ppb)	GRO (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)	
MW-2 98.73	07/92	13.33	85.40	--	--	800	70	4,310	442	767	75	382	--	
	11/92	13.27	85.46	--	--	--	--	--	--	--	--	--	--	
	05/93	13.48	85.25	--	--	ND	33	440	110	130	20	94	--	
	08/93	13.54	85.19	--	--	ND	42	1,600	230	310	52	190	--	
	11/93	13.40	85.33	--	--	ND	80	1,300	130	190	43	190	--	
	03/94	14.27	84.46	--	--	ND	320	730	130	89	15	110	--	
	06/94	13.80	84.93	--	--	ND	170	130	180	180	31	170	--	
	09/01/94	14.03	84.70	--	--	ND	120	930	120	170	28	120	--	
	12/20/94	14.45	84.28	--	--	--	--	1,200	59	130	25	180	--	
	03/22/95	14.68	84.05	--	--	--	--	3,800	460	97	130	200	--	
	06/15/95	13.45	85.28	--	--	--	--	2,000	190	390	40	310	--	
	NOT MONITORED/SAMPLED													
	MW-3 99.15	07/92	13.85	85.30	--	--	ND	ND	771	154	89	5.0	45	--
11/92		13.70	85.45	--	--	--	--	--	--	--	--	--	--	
05/93		14.00	85.15	--	--	ND	20	ND	23	1.0	ND	3.0	--	
08/93		14.01	85.14	--	--	--	ND	280	83	28	4.0	20	--	
11/93		13.90	85.25	--	--	ND	ND	110	31	5.0	ND	7.0	--	
03/94		14.75	84.40	--	--	ND	ND	ND	24	0.7	1.2	5.4	--	
06/94		14.24	84.91	--	--	ND	ND	ND	16	ND	ND	2.7	--	
09/01/94		14.53	84.62	--	--	ND	ND	110	29	3.4	ND	6.6	--	
12/20/94		14.98	84.17	--	--	--	--	ND	30	ND	ND	4.3	--	
03/22/95		15.22	83.93	--	--	--	--	ND	460	97	130	200	--	
06/15/95		13.99	85.16	--	--	--	--	80	24	0.58	0.61	6.4	--	
NOT MONITORED/SAMPLED														

Chevron Service Station No. 9-9014
 3608 Minnesota Drive
 Anchorage, Alaska

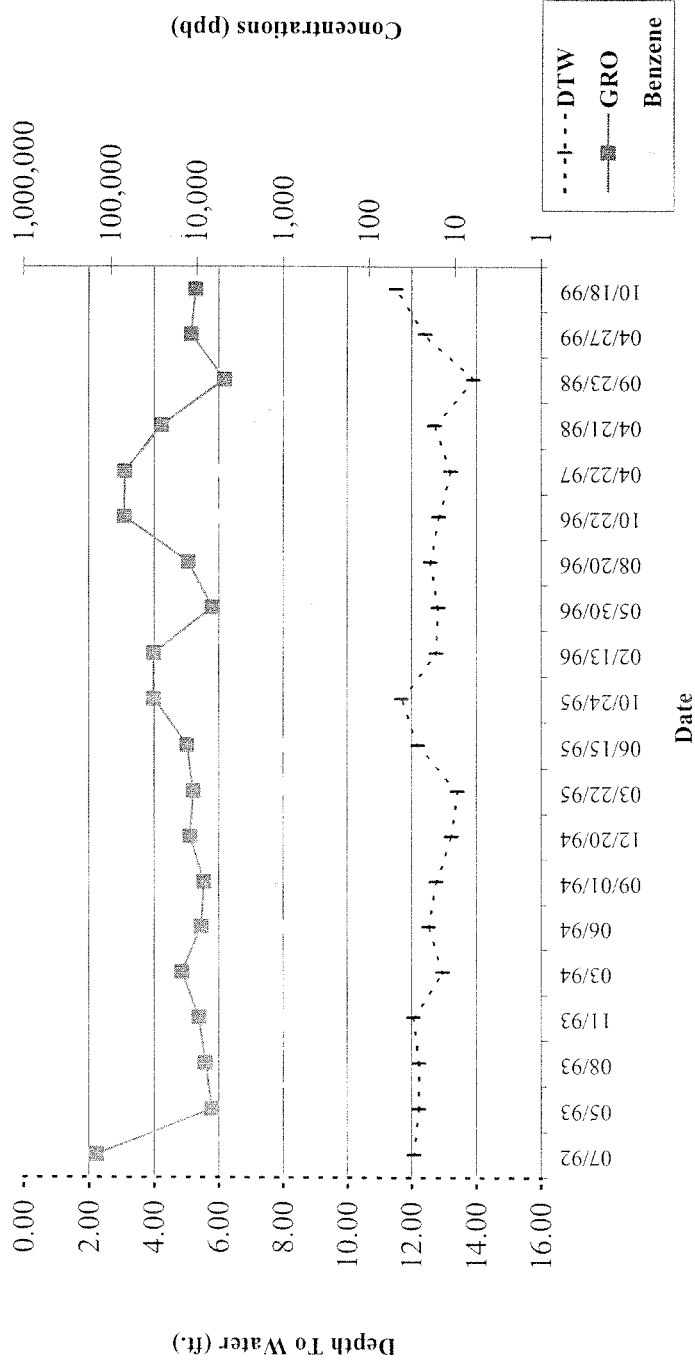
000080

Table 1
Groundwater Monitoring Data and Analytical Results

WELL ID/ TOC*(ft.)	DATE	DIW (ft.)	GWE (msl)	SPHT (ft.)	SPHT Removed	TPH (ppb)	DRO (ppb)	GRO (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)	
MW-4 97.31	07/92	12.07	85.24	--	--	14,700	380	146,000	10,900	32,700	3,110	15,700	--	
	11/92	11.86	85.45	--	--	--	--	--	--	--	--	--	--	
	05/93	12.22	85.09	--	--	ND	240	6,700	1,500	2,200	170	1,400	--	
	08/93	12.23	85.08	--	--	ND	190	8,000	690	1,200	200	1,600	--	
	11/93	12.06	85.25	--	--	ND	340	9,500	1,100	2,000	160	1,200	--	
	03/94	12.96	84.35	--	--	1100	370	15,000	2,000	3,000	220	1,300	--	
	06/94	12.52	84.79	--	--	ND	340	8,900	1,100	1,700	140	820	--	
	09/01/94	12.75	84.56	--	--	ND	220	8,300	1,400	2,100	150	900	--	
	12/20/94	13.23	84.08	--	--	--	--	12,000	2,000	3,100	180	1,200	--	
	03/22/95	13.42	83.63	--	--	--	--	11,000	1,000	7,700	1,800	26,000	--	
	06/15/95	12.20	84.85	--	--	--	--	13,000	1,100	2,800	250	2,000	--	
	10/24/95	11.69	85.36	--	--	--	--	32,000	1,900	6,500	360	2,300	--	
97.05	02/13/96	12.75	84.30	--	--	--	--	32,000	3,300	1,000	500	2,600	--	
	05/30/96	12.82	84.23	--	--	--	--	6,590	443	1,010	85	830	250	
	05/30/96	CONFIRMATION RUN											260	
	08/20/96	12.57	84.48	--	--	--	--	12,600	686	1,550	235	1,730	--	
	10/22/96	12.84	84.21	--	--	--	--	69,400	6,410	21,200	1,020	7,210	--	
	04/22/97	13.21	83.84	--	--	--	--	69,200	5,970	20,700	1,360	9,290	--	
	04/21/98	12.70	84.35	--	--	--	--	25,900	2,370	7,220	757	4,500	--	
	09/23/98	13.91	83.14	--	--	--	--	4,810	540	733	349	1,250	--	
	04/27/99	12.41	84.64	0.00	0.00	--	--	11,600	342	3,080	345	345	2,060	<250
	10/18/99	11.51	85.54	0.00	0.00	--	--	10,400	278	1,970	382	2,540	<250	

Chevron Service Station No. 9-9014
 3608 Minnesota Drive
 Anchorage, Alaska

MW-4



180000

Chevron Service Station No. 9-9014
 3608 Minnesota Drive
 Anchorage, Alaska

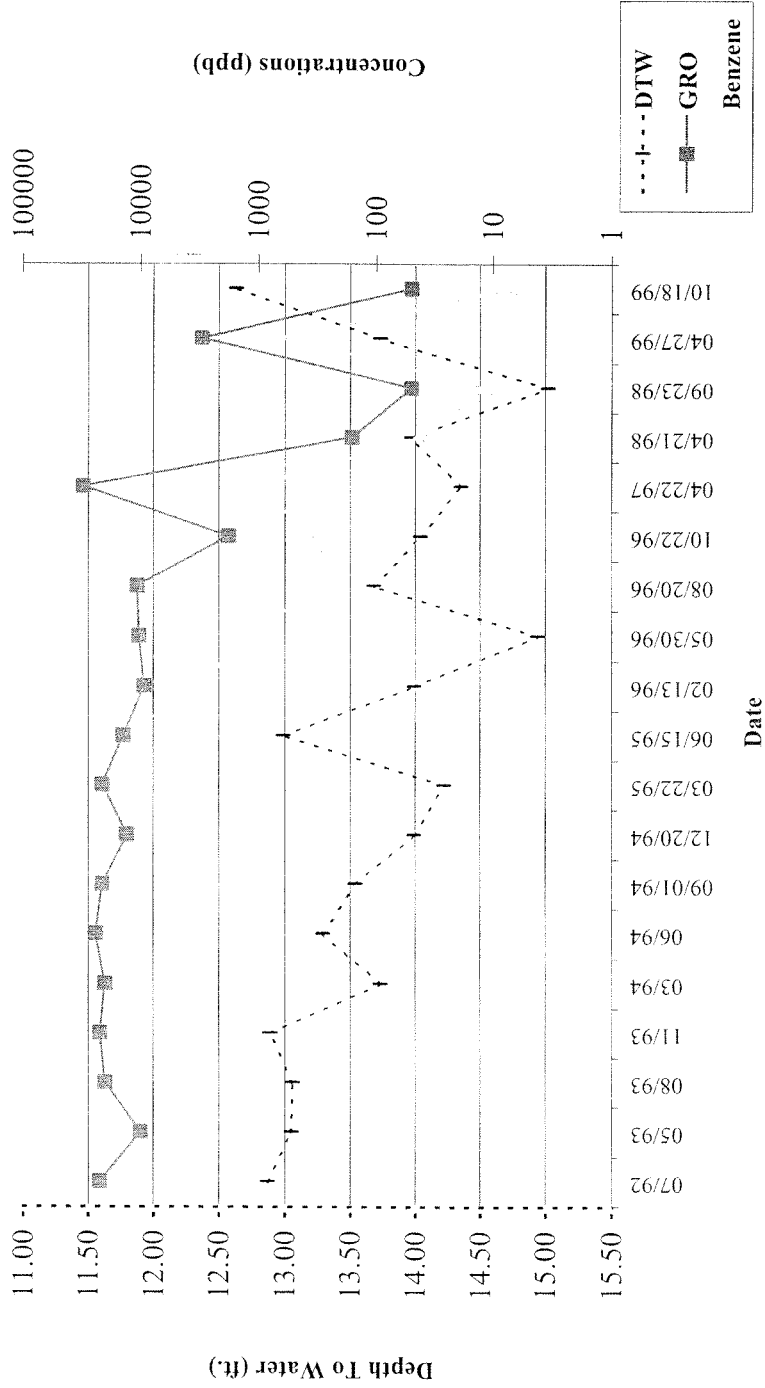
000082

Table 1
 Groundwater Monitoring Data and Analytical Results

WELL ID/ TOC*(ft.)	DATE	DTW (ft.)	GWE (msl)	SPHT (ft.)	SPHT Removed	TPH (ppb)	DRO (ppb)	GRO (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
MW-5 98.02	07/92	12.87	85.15	--	--	2,200	ND	22,100	5,240	2,300	328	1,680	--
	11/92	12.80	85.22	--	--	--	--	--	--	--	--	--	--
	05/93	13.05	84.97	--	--	200	880	10,000	5,000	2,300	360	2,100	--
	08/93	13.06	84.96	--	--	ND	350	20,000	5,700	3,200	300	2,000	--
	11/93	12.89	85.13	--	--	ND	760	22,000	5,800	3,200	370	2,200	--
	03/94	13.73	84.29	--	--	1,300	770	20,000	4,900	2,800	410	2,200	--
	06/94	13.29	84.73	--	--	ND	850	24,000	5,600	3,800	320	2,300	--
	09/01/94	13.54	84.48	--	--	ND	400	21,000	4,500	3,000	330	2,000	--
	12/20/94	13.99	84.03	--	--	--	--	13,000	3,200	1,000	240	1,300	--
	03/22/95	14.22	83.80	--	--	--	--	21,000	3,400	2,000	260	1,500	--
	06/15/95	12.99	85.03	--	--	--	--	14,000	3,800	2,100	300	1,900	--
	10/24/95	INACCESSIBLE	--	--	--	--	--	--	--	--	--	--	--
	02/13/96	13.99	84.09	--	--	--	--	9,300	2,600	510	190	930	--
	05/30/96	14.94	83.14	--	--	--	--	10,300	1,640	726	167	856	--
(D) 05/30/96	14.94	83.14	--	--	--	--	12,300	1,430	791	200	986	--	
08/20/96	13.68	84.40	--	--	--	--	10,600	219	599	160	2,270	--	
10/22/96	14.04	84.04	--	--	--	--	1,780	342	99	27	363	--	
(D) 10/22/96	14.04	84.04	--	--	--	--	3,000	594	142	54	465	--	
04/22/97	14.35	83.73	--	--	--	--	30,500	1,070	4,710	509	8,530	--	
04/21/98	13.97	84.11	--	--	--	--	161	41.6	4.43	4.56	23.8	--	
(D) 04/21/98	13.97	84.11	--	--	--	--	146	35	3.68	3.85	20.5	--	
09/23/98	15.02	83.06	--	--	--	--	<50	11.7	<0.5	<0.5	<1.0	--	
(D) 09/23/98	15.02	83.06	--	--	--	--	<50	10.3	<0.5	<0.5	<1.0	--	
04/27/99	13.73	84.35	0.00	0.00	0.00	--	2,980	544	211	132	366	<250	
10/18/99	12.63	85.45	0.00	0.00	0.00	--	<50	7.20	<0.50	<0.50	<0.50	<5.00	
(D) 10/18/99	--	--	--	--	--	--	<50	7.31	<0.50	<0.50	<0.50	<5.00	

Chevron Service Station No. 9-9014
 3608 Minnesota Drive
 Anchorage, Alaska

MW-5



000083

Chevron Service Station No. 9-9014
 3608 Minnesota Drive
 Anchorage, Alaska

000084

Table 1
 Groundwater Monitoring Data and Analytical Results

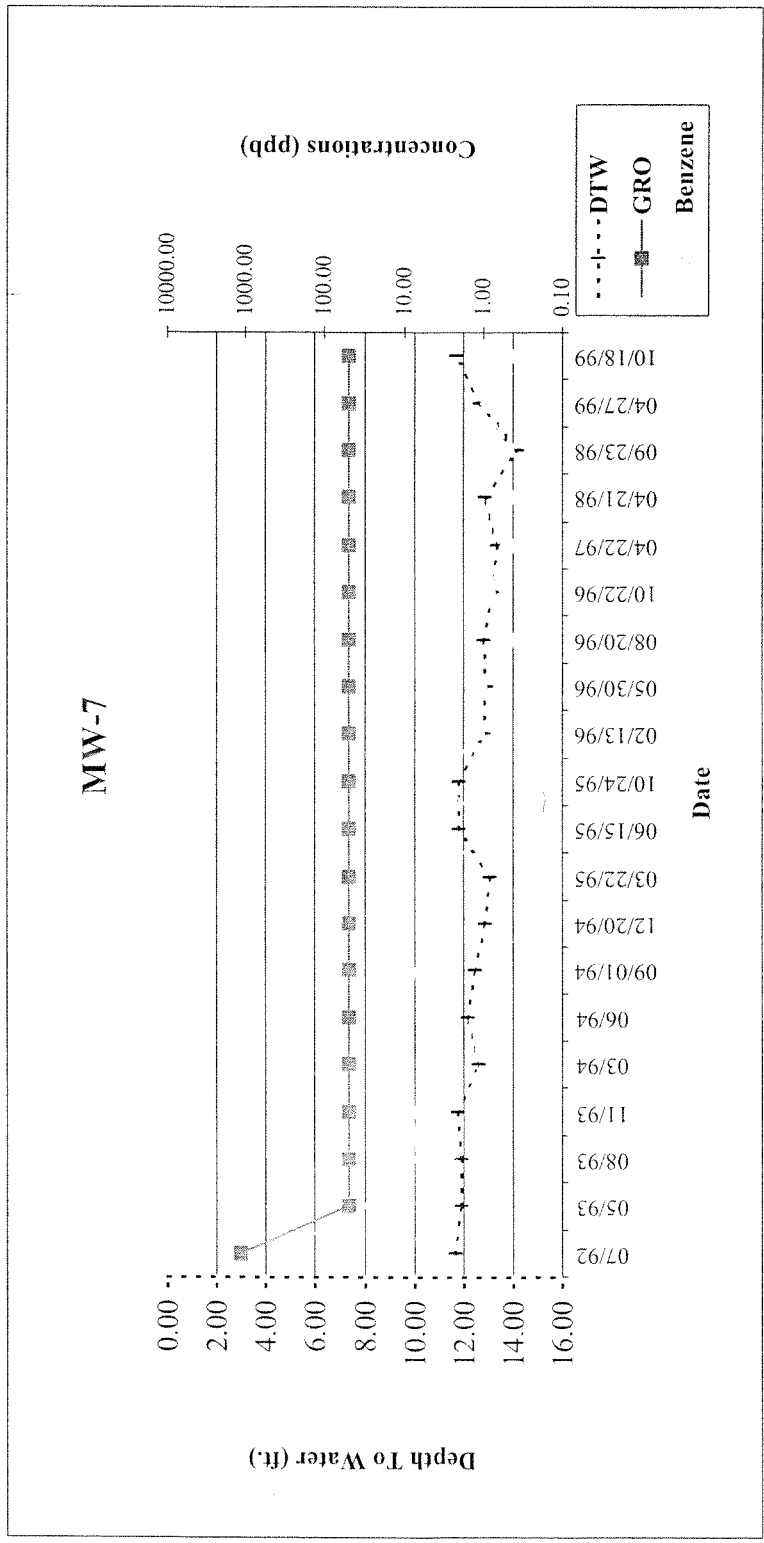
WELL ID/ TOC*(ft.)	DATE	DTW (ft.)	GWE (msl)	SPHT (ft.)	SPHT Removed	TPH (ppb)	DRO (ppb)	GRO (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)	
MW-6 97.40	07/92	12.03	85.37	--	--	ND	ND	ND	ND	ND	ND	ND	--	
	11/92	11.93	85.47	--	--	--	--	--	--	--	--	--	--	
	05/93	12.22	85.18	--	--	ND	9.0	ND	ND	ND	ND	ND	--	
	08/93	12.26	85.14	--	--	ND	ND	ND	ND	ND	ND	ND	--	
	11/93	12.10	85.30	--	--	ND	--	ND	ND	ND	ND	ND	--	
	03/94	13.04	84.36	--	--	ND	ND	ND	ND	ND	ND	ND	--	
	06/94	12.57	84.83	--	--	ND	ND	ND	ND	ND	ND	ND	--	
	09/01/94	12.82	84.58	--	--	ND	ND	ND	ND	ND	ND	ND	--	
	NOT MONITORED/SAMPLED													
	MW-7 97.01	07/92	11.64	85.37	--	--	ND	ND	1,180	417	127	6.0	39	--
11/92		11.52	85.49	--	--	--	--	--	--	--	--	--	--	
05/93		11.91	85.10	--	--	ND	14	ND	29	7.0	2.0	7.0	--	
08/93		11.90	85.11	--	--	ND	13	ND	7.0	0.9	ND	1.0	--	
11/93		11.75	85.26	--	--	ND	ND	ND	8.0	0.5	ND	1.0	--	
03/94		12.62	84.39	--	--	ND	ND	ND	11	ND	1.0	1.5	--	
06/94		12.18	84.83	--	--	ND	ND	ND	12	ND	ND	ND	--	
09/01/94		12.44	84.57	--	--	ND	ND	ND	6.9	ND	ND	ND	--	
12/20/94		12.88	84.13	--	--	--	--	--	3.8	ND	ND	ND	--	
03/22/95		13.06	84.13	--	--	--	--	--	4.3	ND	ND	ND	--	
06/15/95		11.83	84.13	--	--	--	--	--	0.78	ND	ND	ND	--	
10/24/95		11.81	85.37	--	--	--	--	--	3.5	ND	ND	ND	--	
02/13/96		12.81	84.37	--	--	--	--	--	1.2	ND	ND	ND	--	
05/30/96		12.92	84.26	--	--	--	--	--	1.1	<0.5	<0.5	<1.0	--	
08/20/96	12.81	84.37	--	--	--	--	--	<0.5	<0.5	<0.5	<1.0	--		
10/22/96	13.14	84.04	--	--	--	--	--	0.87	2.4	<0.5	1.7	--		
04/22/97	13.35	83.83	--	--	--	--	--	<0.5	<0.5	<0.5	<1.0	--		

Chevron Service Station No. 9-9014
 3608 Minnesota Drive
 Anchorage, Alaska

000085

Table 1
Groundwater Monitoring Data and Analytical Results

WELL ID/ TOC* (ft.)	DATE	DTW (ft.)	GWE (msl)	SPHT (ft.)	SPHT Removed	TPH (ppb)	DRO (ppb)	GRO (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
MW-7	04/21/98	12.86	84.32	--	--	--	--	<50	<0.5	<0.5	<0.5	<1.0	--
(cont)	09/23/98	14.18	83.00	--	--	--	--	<50	<0.5	<0.5	<0.5	<1.0	--
	04/27/99	12.68	84.50	0.00	0.00	--	--	<50	0.89	0.57	<0.50	<0.50	<5.00
	10/18/99	11.70	85.48	0.00	0.00	--	--	<50	<0.50	<0.50	<0.50	<0.50	<5.00



Chevron Service Station No. 9-9014
 3608 Minnesota Drive
 Anchorage, Alaska

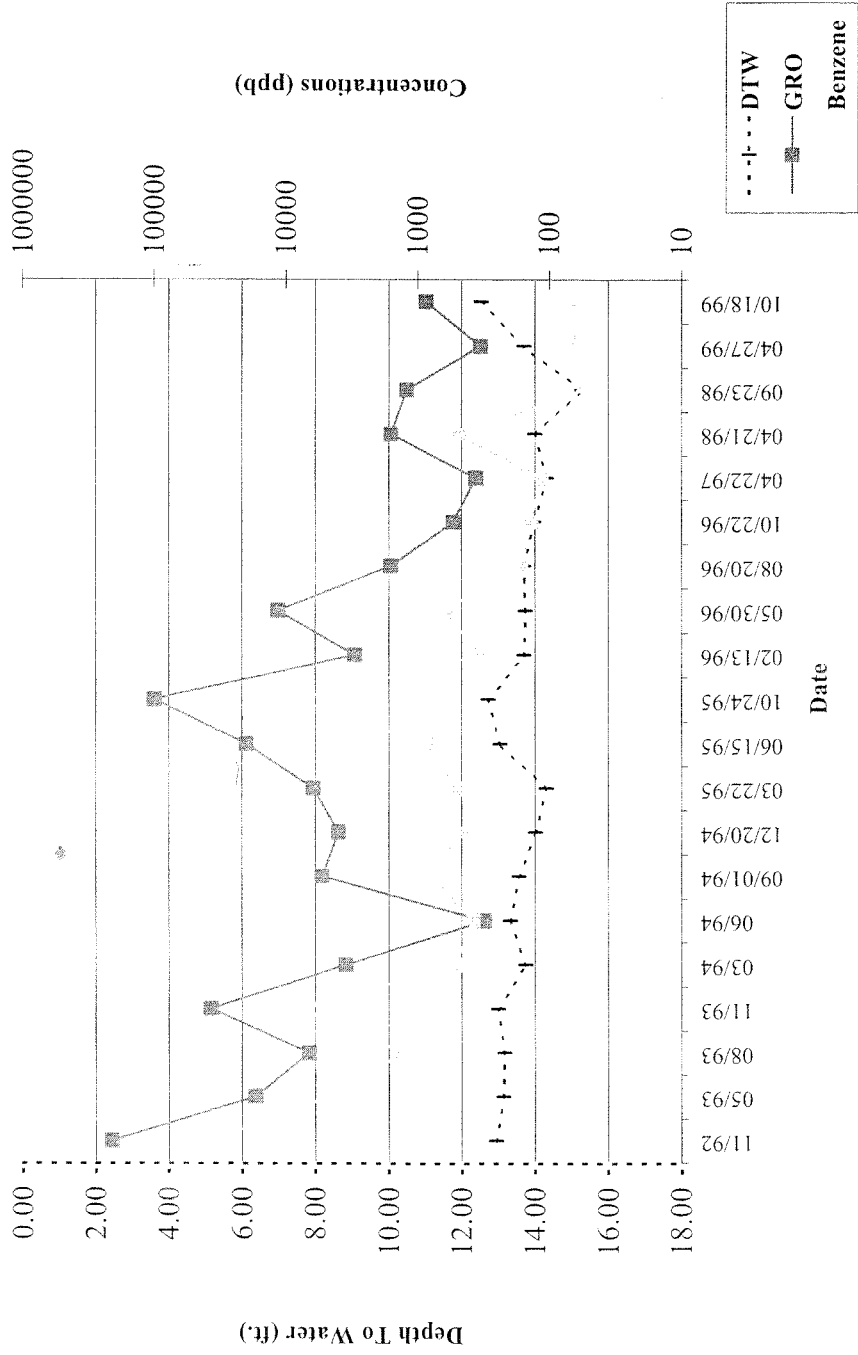
000085

Table 1
 Groundwater Monitoring Data and Analytical Results

WELL ID/ TOC* (ft.)	DATE	DTW (ft.)	GWE (msl)	SPHT (ft.)	SPHT Removed	TPH (ppb)	DRO (ppb)	GRO (ppb)	B (ppb)	I (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
MIW-8 97.95	11/92	12.95	85.00	--	--	29,000	1,700	210,000	37,000	54,000	4,000	22,000	--
	05/93	13.15	84.80	--	--	4,000	530	17,000	4,800	6,100	1,000	4,400	--
	08/93	13.18	84.77	--	--	4,000	160	6,700	1,300	1,300	280	110	--
	11/93	13.01	84.94	--	--	ND	ND	37,000	7,400	9,200	780	3,500	--
	03/94	13.75	84.20	--	--	ND	ND	3,500	520	750	110	420	--
	06/94	13.34	84.61	--	--	ND	130	310	380	610	90	390	--
	09/01/94	13.57	84.38	--	--	ND	ND	5,300	780	1,100	160	760	--
	12/20/94	14.02	83.93	--	--	--	--	4,000	480	860	98	500	--
	03/22/95	14.31	83.64	--	--	--	--	6,200	520	1,200	110	650	--
	06/15/95	13.06	84.89	--	--	--	--	20,000	860	3,800	710	3,700	--
	10/24/95	12.73	85.12	--	--	--	--	100,000	8,500	17,000	1,600	8,700	--
	02/13/96	13.71	84.14	--	--	--	--	3,000	330	380	96	600	--
	05/30/96	13.74	84.11	--	--	--	--	11,500	627	2,210	137	1,220	--
08/20/96	13.70	84.15	--	--	--	--	1,600	165	255	37	189	--	
10/22/96	13.98	83.87	--	--	--	--	537	138	<0.5	2.9	17	--	
04/22/97	14.33	83.52	--	--	--	--	360	116	<2.5	<2.5	5.80	--	
04/21/98	14.00	83.85	--	--	--	--	1,590	489	32.7	102	959	--	
09/23/98	15.28	82.57	--	--	--	--	1,210	55.4	6.45	72.7	116	--	
04/27/99	13.71	84.14	0.00	0.00	0.00	--	332	63.0	1.08	6.64	66.5	63.4	
10/18/99	12.55	85.30	0.00	0.00	0.00	--	865	65.4	1.03	82.4	82.4	272	24.6

Chevron Service Station No. 9-9014
 3608 Minnesota Drive
 Anchorage, Alaska

MW-8



000087

Chevron Service Station No. 9-9014
 3608 Minnesota Drive
 Anchorage, Alaska

Table 1
 Groundwater Monitoring Data and Analytical Results

WELL ID/ TOC* (ft.)	DATE	DTW (ft.)	GWE (msl)	SPHT (ft.)	SPHT Removed	TPH (ppb)	DRO (ppb)	GRO (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
MIW-9													
98.28	09/01/94	14.89	83.39	--	--	--	--	--	--	--	--	--	--
97.95	03/22/95	15.34	83.39	--	--	--	--	--	--	--	--	--	--
	06/15/95	13.58	84.82**	0.56	--	--	--	--	--	--	--	--	--
98.20	10/24/95	13.33	84.65**	0.04	--	--	--	--	--	--	--	--	--
	02/13/96	14.53	83.67	--	--	--	--	--	--	--	--	--	--
	05/30/96	14.63	83.36**	0.05	0.08	--	--	--	--	--	--	--	--
	08/20/96	14.63	83.33**	0.01	10.00	--	--	--	--	--	--	--	--
	10/22/96	14.56	83.64	--	--	--	--	197,000	4,380	16,500	8,230	50,200	--
	04/22/97	14.99	82.97**	0.01	0.03	--	--	74,000	7,280	12,800	1,950	11,100	--
	04/21/98	14.50	83.70	--	--	--	--	10,400	1,900	1,120	144	972	--
	09/23/98	15.96	82.24	--	--	--	--	833	41.4	4.59	47.7	76.7	--
	04/27/99	14.35	83.85	0.00	0.00	--	--	8,150	2,030	214	48.3	473	113/97.8 ¹
	10/18/99	13.14	85.06	0.00	0.00	--	--	205,000	6,990	45,800	3,280	53,300	<2,500

Chevron Service Station No. 9-9014
 3608 Minnesota Drive
 Anchorage, Alaska

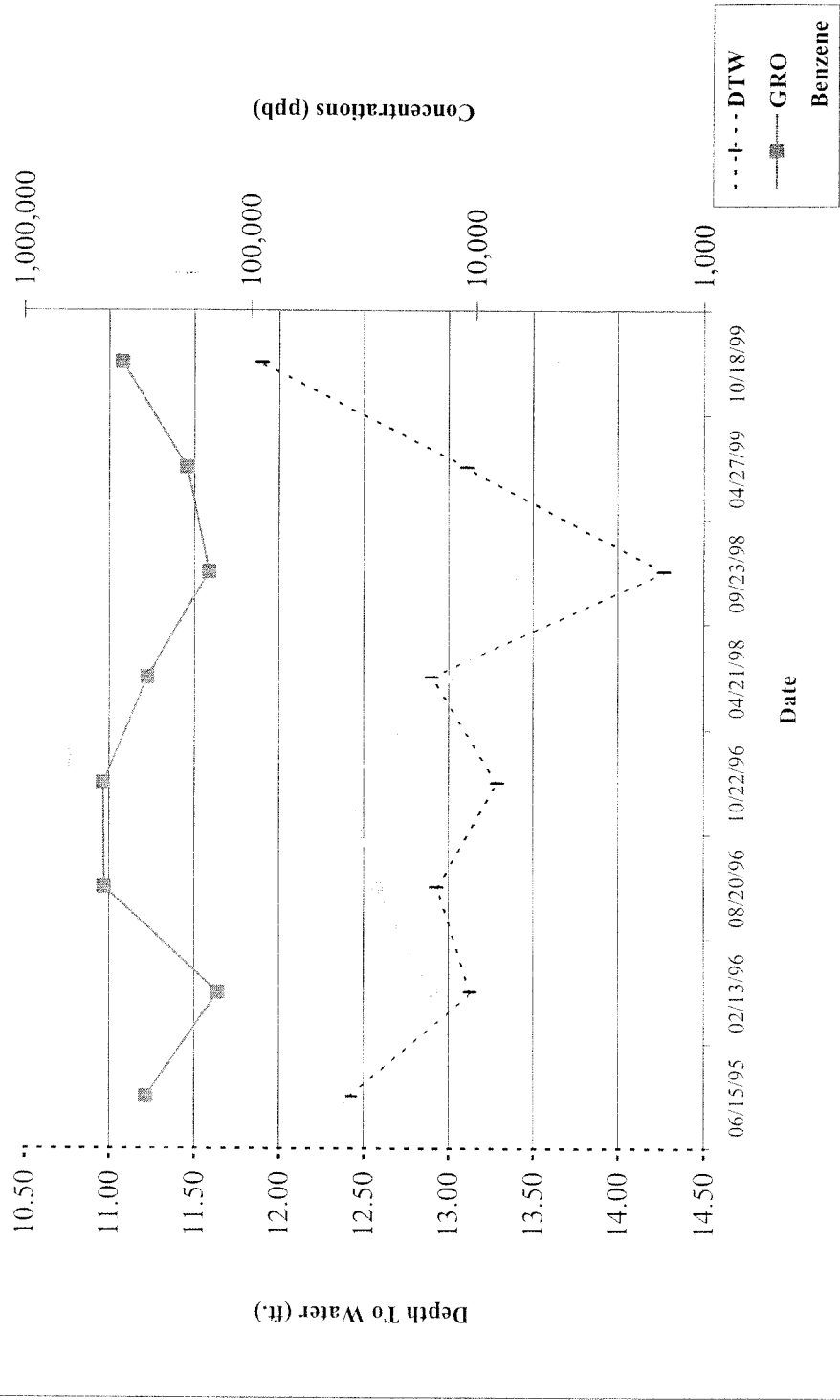
000090

Table 1
Groundwater Monitoring Data and Analytical Results

WELL ID/ TOC* (ft.)	DATE	DTW (ft.)	GWE (msl)	SPHT (ft.)	SPHT Removed	TPH (ppb)	DRO (ppb)	GRO (ppb)	B (ppb)	I (ppb)	E (ppb)	X (ppb)	MTBE (ppb)	
MW-10 97.60	11/92	13.19	84.41	--	--	ND	100	ND	ND	ND	ND	ND	--	
	05/93	14.11	83.49	--	--	ND	ND	ND	ND	ND	ND	ND	--	
	08/93	13.37	84.23	--	--	ND	ND	ND	ND	ND	ND	ND	--	
	11/93	13.24	84.36	--	--	ND	ND	ND	ND	ND	ND	ND	--	
	06/94	13.61	83.99	--	--	ND	ND	ND	ND	ND	ND	ND	--	
	09/01/94	13.78	83.82	--	--	ND	ND	ND	ND	ND	ND	ND	--	
	NOT MONITORED/SAMPLED													
	MW-11 97.41	06/94	12.72	84.69	--	--	--	--	--	40,000	68,000	5,700	29,000	--
		09/01/94	12.97	84.44	--	--	--	--	--	25,000	46,000	4,400	23,000	--
12/20/94		14.07	84.00**	0.82	--	--	--	--	--	--	--	--	--	
03/22/95		14.60	83.73**	1.15	--	--	--	--	--	--	--	--	--	
06/15/95		12.42	84.99	--	--	--	--	290,000	41,000	110,000	8,800	44,000	--	
10/24/95		12.13	85.20	--	--	--	--	--	--	--	--	--	--	
02/13/96		13.13	84.20	--	--	--	--	140,000	16,000	61,000	4,700	24,000	--	
(D) 02/13/96		--	--	--	--	--	--	220,000	18,000	69,000	6,000	31,000	--	
05/30/96		13.28	84.07**	0.02	0.03	--	--	--	--	--	--	--	--	
08/20/96		12.93	84.40	--	--	--	--	444,000	27,900	69,400	8,760	47,900	--	
(D)	08/20/96	--	--	--	--	--	--	467,000	27,800	72,100	7,430	43,800	--	
	10/22/96	13.29	84.04	--	--	--	--	448,000	37,400	126,000	10,200	54,900	--	
	04/22/97	13.82	83.61**	0.12	0.07	--	--	--	--	--	--	--	--	
	04/21/98	12.90	84.43	--	--	--	--	286,000	12,900	84,500	8,050	63,400	--	
	09/23/98	14.27	83.06	--	--	--	--	153,000	3,780	36,500	5,490	46,800	--	
04/27/99	13.11	84.22	0.00	0.00	--	--	191,000	4,080	37,900	5,780	37,300	<2,500		
10/18/99	11.90	85.43	0.00/Sheen	0.00	--	--	369,000	4,170	42,400	11,600	92,600	<1,000		

Chevron Service Station No. 9-9014
 3608 Minnesota Drive
 Anchorage, Alaska

MW-11



000091

Chevron Service Station No. 9-9014
 3608 Minnesota Drive
 Anchorage, Alaska

Table 1
 Groundwater Monitoring Data and Analytical Results

WELL ID/ TOC* (ft.)	DATE	DTW (ft.)	GWE (msl)	SPHT (ft.)	SPHT Removed	TPH (ppb)	DRO (ppb)	GRO (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
T-1	09/01/94	12.97	--	--	--	--	--	--	2,000	6,800	600	3,900	--
	08/20/96	12.24	--	--	--	--	--	--	--	--	--	--	--
	10/22/96	12.65	--	--	--	--	--	--	--	--	--	--	--
	04/22/97	12.87	--	--	--	--	5,820	976	199	280	199	1,360	--
	04/22/97	--	--	--	--	--	6,180	970	189	253	189	1,290	--
	04/21/98	12.51	--	--	--	--	--	--	--	--	--	--	--
	09/23/98	14.00	--	--	--	--	--	--	--	--	--	--	--
	04/27/99	12.13	--	0.00	0.00	--	--	11,200	111	3,290	372	1,720	<250
	10/18/99	11.06	--	0.00	0.00	--	--	750	<5.0	237	17.1	57.4	<50.0
	T-2	09/01/94	13.64	--	--	--	--	--	--	3,200	2,000	250	1,300
08/20/96		13.94	--	0.28	--	--	--	--	--	--	--	--	--
10/22/96		14.23	--	0.29	--	--	--	--	--	--	--	--	--
04/22/97		14.94	--	0.72	--	--	--	--	--	--	--	--	--
04/21/98		14.00	--	--	--	--	--	--	--	--	--	--	--
09/23/98		16.89	--	0.22	--	--	--	--	--	--	--	--	--
T-3	04/27/98	13.07	--	0.00	0.00	--	--	6,990	1,060	1,080	128	619	<50.0
	10/18/99	12.05	--	0.00	0.00	--	--	UNABLE TO SAMPLE - CONNECTED TO SYSTEM					--
	09/01/94	12.21	--	--	--	--	--	--	--	--	--	--	--
	NOT MONITORED/SAMPLED												
T-4	09/01/94	--	--	--	--	--	--	--	3,100	750	100	890	--
	08/20/96	12.32	--	--	--	--	--	--	--	--	--	--	--
	10/22/96	12.70	--	--	--	--	--	--	--	--	--	--	--
	04/22/97	12.93	--	--	--	--	--	5,680	882	333	213	1,070	--

000092

Chevron Service Station No. 9-9014
 3608 Minnesota Drive
 Anchorage, Alaska

000093

Table 1
 Groundwater Monitoring Data and Analytical Results

WELL ID/ TOC* (ft.)	DATE	DTW (ft.)	GWE (msl)	SPIH (ft.)	SPHT Removed	TPH (ppb)	DRO (ppb)	GRO (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)	
T-4	04/21/98	12.43	--	--	--	--	--	--	--	--	--	--	--	
(cont)	09/23/98	13.29	--	--	--	--	--	--	--	--	--	--	--	
	04/27/99	12.21	--	0.00	0.00	UNABLE TO SAMPLE DUE TO ICE BLOCKAGE							--	--
	10/18/99	11.24	--	0.00	0.00	--	--	799	241	<2.5	<2.5	43.1	28.5/60.6 ¹	
Trip Blank TB-LB	02/13/96	--	--	--	--	--	--	ND	ND	ND	ND	ND	--	
	05/30/96	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<1.0	--	
	08/20/96	--	--	--	--	--	--	<50	<0.5	0.52	<0.5	<1.0	--	
	10/22/96	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<1.0	--	
	04/22/97	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<1.0	--	
	04/21/98	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<1.0	--	
	09/23/98	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<1.0	--	
	04/27/99	--	--	--	--	--	--	<50	<0.50	0.60	<0.50	<0.50	<5.00	
	10/18/99	--	--	--	--	--	--	<50	<0.50	4.42	<0.50	0.62	<5.00	

Chevron Service Station No. 9-9014
 3608 Minnesota Drive
 Anchorage, Alaska

Table 1
Groundwater Monitoring Data and Analytical Results

EXPLANATIONS:

Groundwater monitoring data and laboratory analytical results prior to April 27, 1999, were compiled from reports prepared by Blaine Tech Services, Inc.

TOC = Top of Casing elevation (ft.) = Feet	B = Benzene	ND = Not Detected
DTW = Depth to Water	T = Toluene	-- = Not Measured/Not Analyzed
GWE = Groundwater Elevation	E = Ethylbenzene	D = Duplicate
msl = Mean sea level	X = Xylenes	
SPHT = Separate Phase Hydrocarbon Thickness	MTBE = Methyl tertiary butyl ether	
DRO = Diesel Range Organics	ppb = Parts per billion	
GRO = Gasoline Range Organics		

* TOC elevations are relative to mean sea level (msl).

** GWE has been corrected due to the presence of SPH; Correction factor: [(TOC-DTW)+(SPHT x 0.8)].

† MTBE by EPA Method 8260B.

NOTE:

In order to plot data in the charts, all NDs have been assigned an arbitrary number consistent with the detection limit for each constituent analyzed. Please refer to table for specific results/detection limits.

000094

Chevron Service Station No. 9-9014
 3608 Minnesota Drive
 Anchorage, Alaska

Table 2

Groundwater Analytical Results

WELL ID	DATE	TOTAL ALKALINITY (ppm)	NITRITE-NITROGEN (ppb)	NITRATE/ NITRITE-NITROGEN (ppb)	FERROUS IRON (ppm)	SULFATE (ppm)
MW-1	04/21/98	48	<10	<10	<0.5	56.2
	09/23/98	54	724		90.1	47.8
MW-4	04/21/98	21.5	<10	<10	82.7	26.1
	09/23/98	66.8	14,300		10.6	41.9
MW-5	04/21/98	67.5	504		11.6	21.5
	09/23/98	37.5	8,860		29.4	35.6
MW-7	04/21/98	32	6,400		<0.5	21.5
	09/23/98	<5.0	6,450		1.56	33.2
MW-8	04/21/98	53.5	<10	<10	19	3.14
	09/23/98	52	572		68	48.9
MW-9	04/21/98	61.5	<10	<10	99.3	30
	09/23/98	53.8	397		53.2	48
MW-11	04/21/98	98	<10	<10	14.5	2.73
	09/23/98	39.7	21,000		10.8	7.17

EXPLANATIONS:

Groundwater laboratory analytical results were compiled from reports prepared by Blaine Tech Services, Inc.

ppm = Parts per million

ppb = Parts per billion

000095

March 9, 2000
Project 077.41793.004

Mr. Bob Cochran
Chevron Products Company
P.O. Box 5004
San Ramon, California 95843

Re: **Fourth Quarter 1999 Remedial System Evaluation Report**
Chevron Service Station #9-9014
3608 Minnesota Drive
Anchorage, Alaska
ADEC #47

Dear Mr. Cochran:

This report, prepared by SECOR International Incorporated (SECOR) for Chevron Products Company (Chevron), presents operational data for the soil vapor extraction (SVE) system operating at the subject site (Figure 1). SVE and air sparging were initiated at the site on May 31, 1996. A brief description and performance of the remedial system between September 13, 1999 and December 8, 1999 are presented below.

Soil Vapor Extraction System

The SVE system is comprised of six vertical SVE wells (MW-1, MW-4, MW-5, MW-7, T-2, and MW-11), two horizontal wells (Horizontal-1 and Horizontal-2), a 5-horsepower (hp) positive-displacement blower, and a Lower Explosive Limit (LEL) meter set to shut the system down if the influent LEL exceeds 20%.

SVE system runtime was 46% from September 13, 1999 through December 8, 1999. Downtime was attributed to high influent LEL. The SVE system removed 11.7 pounds of Gasoline Range Organics (GRO) and 0.1 pounds of benzene from the soil and groundwater this quarter. SVE system operational and analytical data, including applied vacuum, flow rate, influent reading, influent GRO and benzene concentrations, and mass removal data are presented in Table 1. Graphical presentation of GRO and benzene mass removal and influent concentration data are shown in Figures 2 and 3.

Air Sparging System

The AS system is comprised of four AS wells (AS-1 through AS-3 and T-2) and a 3-hp sparge blower. The AS system was 46% operational during this quarter and had an average injection pressure of 3.8 psi. AS system operational data, including flow rate and applied pressure data are presented in Table 3.

Air Quality

SECOR evaluated potential system emissions with the EPA air quality model SCREEN 3 (Attachment B). Evaluation of the air model determined that in order to exceed OSHA 8-hour prescribed exposure limits, stack emissions of benzene would have to exceed 5,035 ppmv. The highest concentration of benzene in the effluent stack this quarter was 0.0556 ppmv, therefore the system operated in compliance with air regulations.

Conclusions

Based on groundwater analytical data from SVE wells MW-4, MW-5, and MW-11 as well as in down gradient well MW-9, the general trend of dissolved hydrocarbons in groundwater has declined, suggesting that the SVE and air sparge systems have been effective in removing hydrocarbons from the subsurface. SECOR recommends that the SVE and AS systems continue to operate through the first quarter 2000.

Due to the insignificant quantities of SPH found in the monitoring wells, the SPH removal was discontinued. If measurable SPH is detected in the wells, the SPH removal program will again be initiated.

If you have any questions or require additional information, please do not hesitate to call me at (916) 364-1880, ext. 229.

Sincerely,

SECOR International Incorporated

Rusty E. Benkosky
Project Engineer

Greg Barclay
Senior Geologist

Attachments: Table 1 - Soil Vapor Extraction System Performance Data
Table 2 - Soil Vapor Extraction Well Data
Table 3 - Air Sparge System Operational Data
Table 4 - Separate Phase Hydrocarbon Removal Data
Figure 1 - Site Plan
Figure 2 - Soil Vapor Extraction System Mass Removal Trend
Figure 3 - Soil Vapor Extraction System Influent Concentrations
Attachment A - Remedial System Field Data Sheets and Certified Analytical Reports
Attachment B - Screen 3 Emission Modeling

cc: Mr. Clint Adler, Alaska Department of Environmental Conservation
Floyd & Sons, Inc.
Mr. Tim Lamb, Delaney, Whiles, Hayes, Gerety, Ellison and Young

000099

Table 1
Soil Vapor Extraction System Performance Data

Chevron Service Station 9-9014
3608 Minnesota Drive, Anchorage, AK

Sample ID	Date Sampled	Hour Meter Reading (hours)	Blower Vacuum ("H ₂ O)	Average Flow Rate (scfm)	FID Influent (ppmv)	Gasoline Range Organics			Benzene			
						Influent Conc. (ppmv)	Removal Rate (lbs/day)	Net Removed (pounds)	Influent Conc. (ppmv)	Removal Rate (lbs/day)	Net Removed (pounds)	
EFFL 05/31/96		--	--	193	>2,500	244	--	0	17	--	3	
EFFL 06/06/96		--	--	195	636	284	--	147	26	--	39	
EFFL 06/12/96		--	--	176	733	745	--	445	17	--	57	
EFFL 06/19/96		--	--	185	494	432	--	658	18	--	81	
EFFL 07/11/96		--	--	193	560	428	--	1,348	12	--	134	
EFFL 08/07/96		--	--	162	1212	357	--	1,941	15	--	203	
EFFL 10/21/96		--	--	128	305	249	--	2,482	8	--	252	
EFFL 11/26/96		--	--	125	408	641	--	3,579	23	--	357	
EFFL 12/19/96		--	--	173	112	97	--	3,726	23	--	367	
EFFL 01/22/97		--	--	120	49	143	--	3,948	1.73	--	373	
EFFL 02/13/97		--	--	145	286	176	--	4,162	4.03	--	286	
EFFL 03/25/97		--	--	122	1176	236	--	4,599	4.89	--	412	
EFFL 04/03/97		--	--	174	212	--	--	5,343	--	--	412	
EFFL 05/06/97		--	--	160	475	371	--	5,343	9.2	--	459	
EFFL 05/14/97		--	--	191	410	--	--	5,485	--	--	459	
EFFL 05/22/97		--	--	175	412	305	--	5,485	10.6	--	472	
EFFL 06/04/97		--	--	178	388	--	--	5,485	--	--	472	
EFFL 06/17/97		--	--	182	79	258	--	5,717	8.91	--	493	
EFFL 07/30/97		--	--	182	195	158	--	6,188	7.76	--	554	
EFFL 08/26/97		--	--	160	175	177	--	6,479	6.9	--	584	
EFFL 11/25/97		--	--	151	56	27	--	6,485	--	--	585	
EFFL 12/30/97		--	--	190	98	110	--	6,554	0.86	--	592	
EFFL 01/16/98		--	--	150	47	5	--	6,554	3.74	--	592	
EFFL 03/11/98		--	--	130	116	88	--	6,615	0.09	--	595	
EFFL 04/07/98		--	--	138	150	75	--	6,722	--	--	605	
EFFL 05/28/98		--	--	144	137	97	--	6,992	2.01	--	629	
EFFL 06/24/98		--	--	40.7	75	74	--	7,023	2.88	--	632	
EFFL 10/01/98		--	a	50	0	20.9	1.1	48.9	0.42	0.8	633	
EFFL 11/27/98		1,368	b	58	0	67.0	3.5	130.4	1.91	0.08	635	
EFFL 12/17/98		1,848	b	50	0	ND	0.0	34.9	0.75	0.03	637	
REPORTING PERIOD: 10/1/98 to 12/17/98												
TOTAL POUNDS REMOVED:												637
PERIOD POUNDS REMOVED:												4.6
PERIOD AVG FLOW RATE:					130							
PERIOD PERCENT OPERATIONAL:					100%							
scfm = Standard cubic feet per minute												
ppmv = Parts per million by volume												
-- = Not available or not applicable												
ND = Non-detectable above detection limit												
NS = Not sampled												
a. Data collected prior to October 1, 1998 was collected and reported by Flour Dani												
b. Hour run time estimated assuming continuous run between site visits												
Benzene MW = 78.06 g/mol												
Molecular Weight used for GRO is 100 g/mole.												

Table 2
Soil Vapor Extraction Well Data
Chevron Service Station 9-9014
3608 Minnesota Drive, Anchorage, AK

Date Sampled	MW-1				MW-4				MW-5				MW-7			
	Vacuum (in H2O)	Flow Rate (scfm)	FID/PID (ppmv)	Status	Vacuum (in H2O)	Flow Rate (scfm)	FID/PID (ppmv)	Status	Vacuum (in H2O)	Flow Rate (scfm)	FID/PID (ppmv)	Status	Vacuum (in H2O)	Flow Rate (scfm)	FID/PID (ppmv)	Status
03/11/98	--	--	4	O	21	87	205	C	--	--	--	C	--	--	--	C
04/07/98	--	--	0	O	21	96	215	C	--	--	--	C	--	--	--	C
05/28/98	--	--	0	O	15	73	14	C	--	--	--	C	--	--	--	C
06/24/98	--	--	--	O	17	73	5	C	--	--	--	C	--	--	--	C
10/01/98	--	32	--	O	--	37	--	O	--	30	--	O	--	20	--	O
11/27/98	--	130	0	O	0	130	0	O	--	130	0	O	--	130	0	O
12/17/98	--	130	0	O	0	130	0	O	--	130	0	O	--	130	0	O

Date Sampled	MW-11				Horizontal-1				Horizontal-2							
	Vacuum (in H2O)	Flow Rate (scfm)	FID/PID (ppmv)	Status	Vacuum (in H2O)	Flow Rate (scfm)	FID/PID (ppmv)	Status	Vacuum (in H2O)	Flow Rate (scfm)	FID/PID (ppmv)	Status	Vacuum (in H2O)	Flow Rate (scfm)	FID/PID (ppmv)	Status
03/11/98	21	6	1100	C	--	--	--	C	--	--	--	C	18	110	27	C
04/07/98	21	7	1021	C	--	--	--	C	--	--	--	C	19	115	32	C
05/28/98	16	55	448	C	--	--	--	C	--	--	--	C	15	94	11	C
06/24/98	16	52	284	C	--	--	--	C	--	--	--	C	15	95	6	C
10/01/98	--	26	--	O	--	43	--	O	--	43	--	O	--	43	--	O
11/27/98	--	130	0	O	--	130	0	O	--	130	0	O	--	130	0	O
12/17/98	--	130	0	O	--	130	0	O	--	130	0	O	--	130	0	O

ppmv = parts per million per volume
in H2O = vacuum in inches of water
-- = Not Available
O = Open
C = Closed

060101

3/17/00

Table 3
Air Sparge System Operational Data

Chevron Service Station 9-9014
3608 Minnesota Drive, Anchorage, AK

Total System Data			AS-1			AS-2			AS-3		
Date Checked	Hour Meter Reading (hours)	Avg. Flow Rate (scfm)	Injection Pressure (psi)	Status (O/C)	Flow Rate (scfm)	Injection Pressure (psi)	Status (O/C)	Flow Rate (scfm)	Injection Pressure (psi)	Status (O/C)	Flow Rate (scfm)
05/14/97	--	--	3.5	O	8.5	--	O	--	3.5	O	7.7
05/21/97	--	--	3.2	O	7.8	3.2	O	7.7	3.3	O	7.7
06/04/97	--	--	3.0	O	6.2	3.0	O	6.5	3.3	O	6.4
06/17/97	--	--	3.4	O	7.4	3.6	O	7.6	3.5	O	6.4
07/30/97	--	--	3.3	O	6.5	3.3	O	7.6	3.4	O	6.6
08/26/97	--	--	3.5	O	5.5	3.5	O	6.4	3.5	O	6.1
09/06/97	--	--	--	O	--	--	O	--	--	O	--
11/25/97	--	--	3.5	O	5.9	3.5	O	5.7	3.5	O	5.7
12/30/97	--	--	3.5	O	4.9	3.5	O	4.8	3.5	O	5.3
01/16/97	--	--	3.3	O	10.5	3.3	O	2.7	1.0	O	0.4
02/15/98	--	--	--	O	--	--	O	--	--	O	--
03/11/98	--	--	3.0	O	5.4	3.0	O	3.1	3.0	O	4.5
04/07/98	--	--	3.2	O	5.4	3.2	O	4.3	3.2	O	5.1
05/28/98	--	--	4.0	O	6.8	4.0	O	3.5	4.0	O	4.7
06/24/98	--	--	3.6	O	4.6	3.6	O	1.4	3.6	O	2.8
10/01/98	--	--	4.5	O	7.0	4.3	O	1.6	4.3	O	1.6
11/27/98	--	--	3.0	O	32.7	3.5	O	32.7	3.5	O	32.7
12/17/98	--	--	3.0	O	32.7	3.5	O	32.7	3.5	O	32.7

REPORTING PERIOD: 10/1/98

PERIOD AVG INJECTION PRESSURE: 3.0

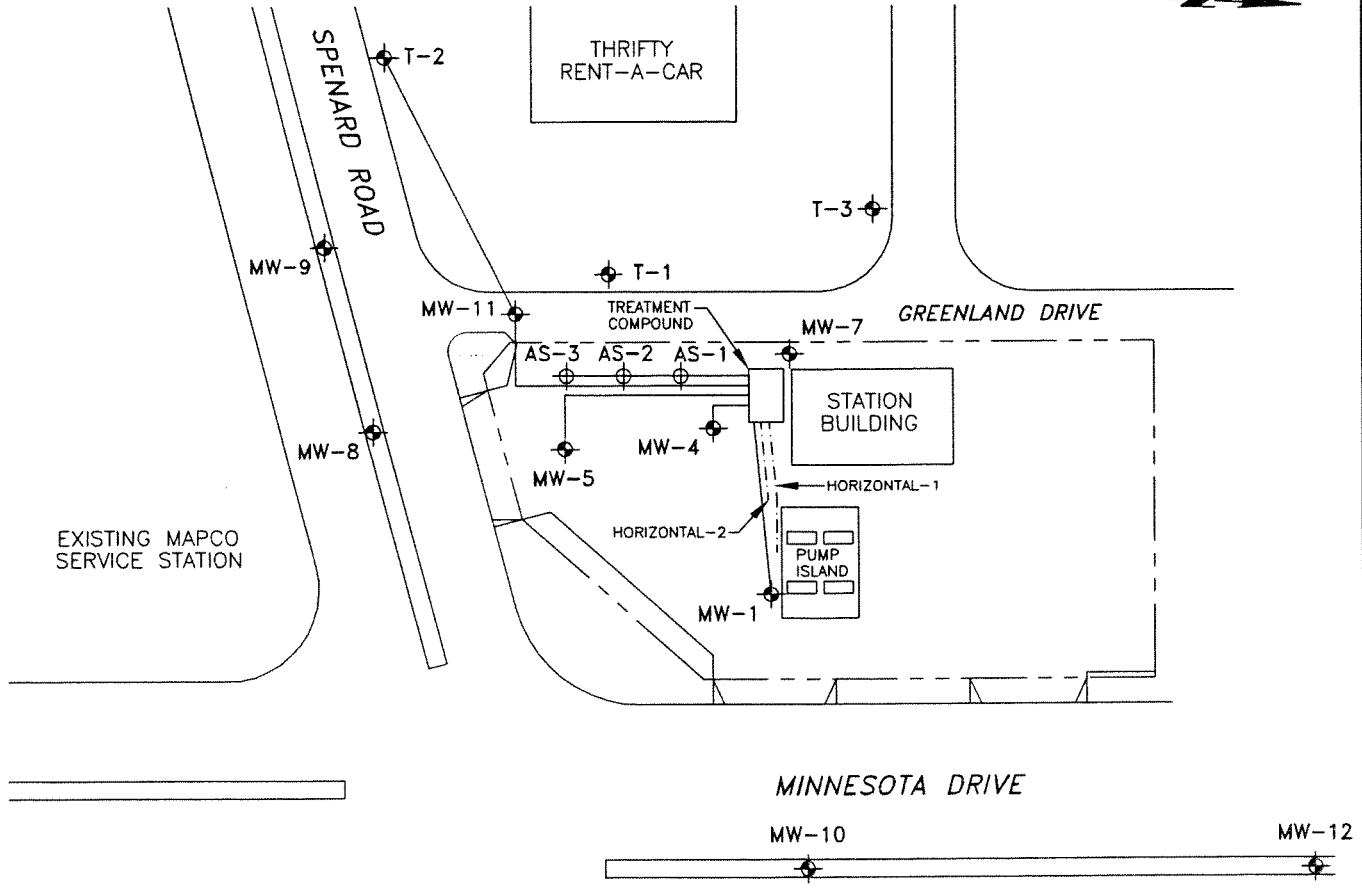
PERIOD AVG FLOW RATE: 0.0

PERIOD PERCENT OPERATIONAL: --

scfm = Standard cubic feet per minute

psi = pounds per square inch

000102

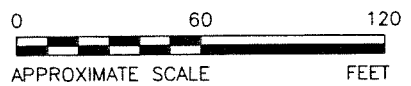


LEGEND:

- ⊕ MW-1 GROUNDWATER MONITORING WELL
- ⊕ AS-1 AIR SPARGING WELL
- - - - - APPROXIMATE PROPERTY BOUNDARY
- - - - - HORIZONTAL SVE PIPING
- REMEDIATION PIPING LOCATION

WELLS USED FOR SVE	SCREEN INTERVAL	WELLS USED FOR AS	SCREEN INTERVAL
MW-1	5-24'	AS-1	19-24'
MW-4	5-24'	AS-2	19-24'
MW-5	5-24'	AS-3	19-24'
MW-7	5-24'	T-2	NA
MW-11	8-18'		
HORIZONTAL-1	-		
HORIZONTAL-2	-		
T-2	NA		

REFERENCE: THIS FIGURE IS BASED ON A "SITE PLAN" PROVIDED BY FLUOR DANIEL AND RRM ENGINEERING CONTRACTING FIRM AND IS INTENDED FOR ILLUSTRATION ONLY.



199811.122120 X:\SACTO\CHEVRON\99014\SITEPLAN

SECOR
International
Incorporated

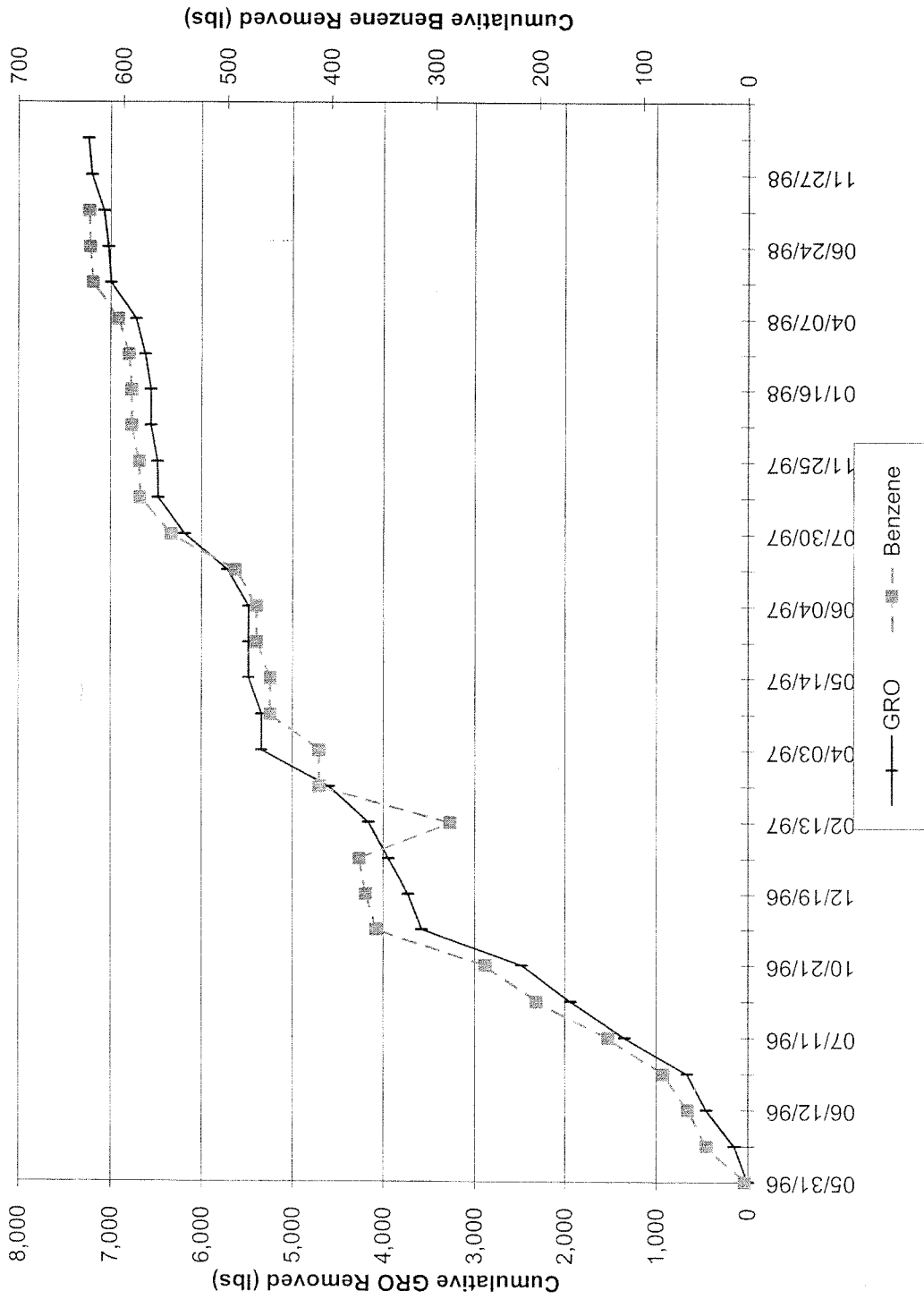
DRAWN	TJZ
APPR	RB
DATE	16JLY99
JOB NO.	7G007-040-01

FIGURE 1
CHEVRON SERVICE STATION #9-9014
3608 MINNESOTA DRIVE
ANCHORAGE, ALASKA

SITE PLAN

Figure 2
Soil Vapor Extraction System Mass Removal Trend

Chevron Service Station #9-9014
3608 Minnesota Drive
Anchorage, Alaska



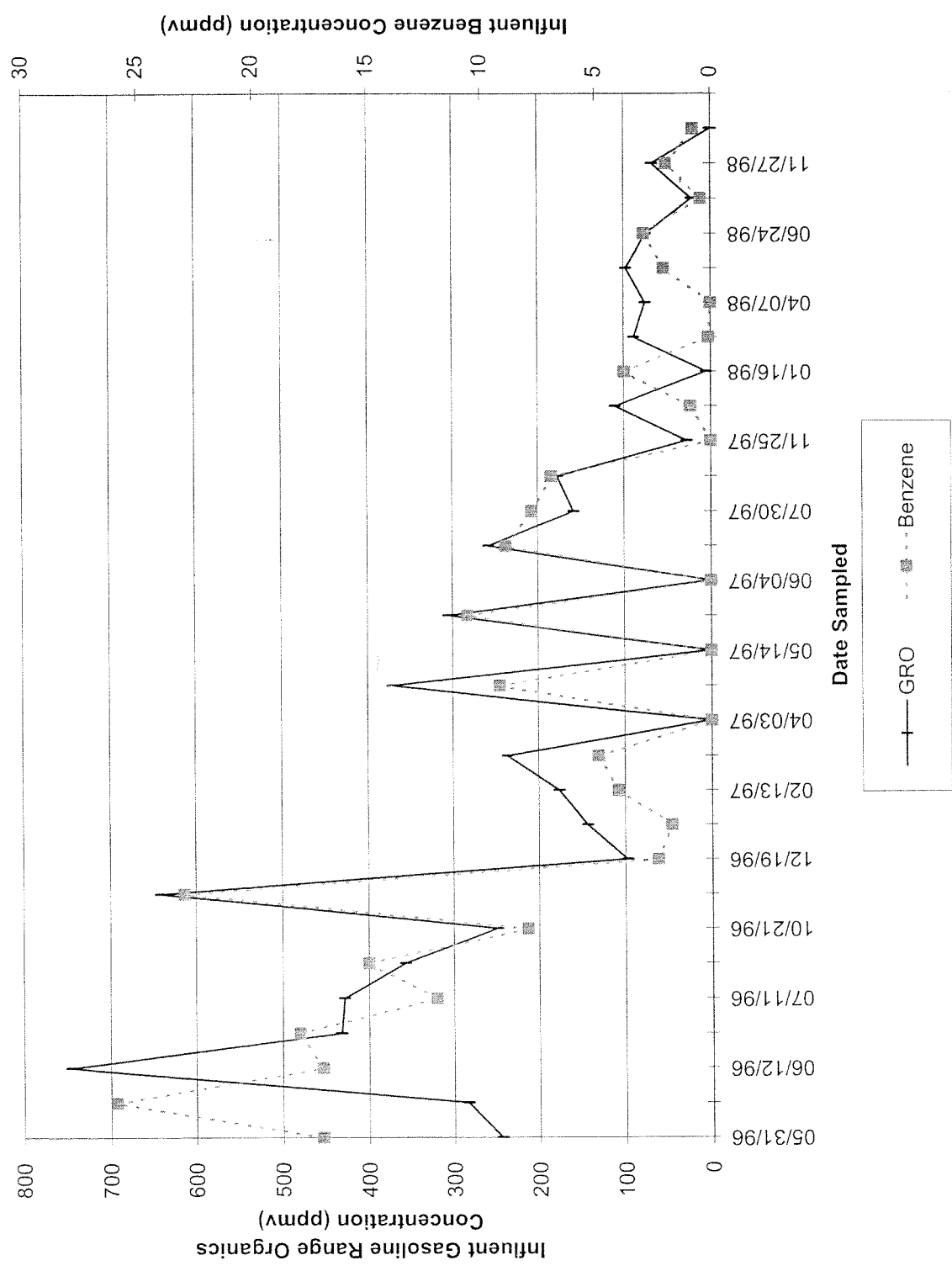
801000

101090

3/17/00

Figure 3
Soil Vapor Extraction System Influent Concentrations

Chevron Service Station #9-9014
3608 Minnesota Drive
Anchorage, Alaska



060105

ATTACHMENT A

**REMEDIAL SYSTEM FIELD DATA SHEETS AND
CERTIFIED ANALYTICAL REPORTS**

000106

ATTACHMENT B
SCREEN 3 EMISSION MODELING

SCREEN 3 EMISSION MODELING

SECOR conducted an evaluation of benzene emissions from the soil vapor extraction system installed at the subject site. This evaluation was conducted using SCREEN3, an EPA air quality modeling program. SCREEN3 was used to calculate the maximum allowable benzene emission rate from the soil vapor extraction system. The following conditions were used as inputs for the SCREEN3 model:

stack height = 4 m
stack exit flow rate = 150 scfm
stack inside diameter = 0.05 m
stack gas temperature = 366.5 K (200 °F)
ambient air temperature = 276.5 K (38 °F)
receptor height = 2.0 m
urban setting
simple terrain

The OSHA permissible exposure limit (PEL) for benzene is $3190 \mu\text{g}/\text{m}^3$ (1 ppm). The SCREEN3 model calculates that benzene concentrations resulting from the soil vapor extraction system will not exceed this level provided benzene emission rates from the system are less than 220 lbs/day (1.15 g/s). For this emission rate to be reached, the benzene concentration in the effluent would have to be approximately 5,035 ppm-v ($16,300 \text{ mg}/\text{m}^3$)

000103

ATTACHMENT C
NON-HAZARDOUS WASTE MANIFEST

000109

ATTACHMENT 4

**“IMPORTANT INFORMATION ABOUT YOUR
GEOTECHNICAL/ENVIRONMENTAL REPORT”**

Important Information About Your Environmental Site Assessment/Evaluation Report

ENVIRONMENTAL SITE ASSESSMENTS/EVALUATIONS ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

This report was prepared to meet the needs you specified with respect to your specific site and your risk management preferences. Unless indicated otherwise, we prepared your report expressly for you and for the purposes you indicated. No one other than you should use this report for any purpose without first conferring with us. No one is authorized to use this report for any purpose other than that originally contemplated without our prior written consent.

The findings and conclusions documented in this site assessment/evaluation have been prepared for specific application to this project and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in this area. The conclusions presented are based on interpretation of information currently available to us and are made within the operational scope, budget, and schedule constraints of this project. No warranty, express or implied, is made.

OUR REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

Our environmental site assessment is based on several factors and may include (but not be limited to): reviewing public documents to chronicle site ownership for the past 30, 40, or more years; investigating the site's regulatory history to learn about permits granted or citations issued; determining prior uses of the site and those adjacent to it; reviewing available topographic and real estate maps, historical aerial photos, geologic information, and hydrologic data; reviewing readily available published information about surface and subsurface conditions; reviewing federal and state lists of known and potentially contaminated sites; evaluating the potential for naturally occurring hazards; and interviewing public officials, owners/operators, and/or adjacent owners with respect to local concerns and environmental conditions.

Except as noted within the text of the report, no sampling or quantitative laboratory testing was performed by us as part of this site assessment. Where such analyses were conducted by an outside laboratory, Shannon & Wilson relied upon the data provided and did not conduct an independent evaluation regarding the reliability of the data.

CONDITIONS CAN CHANGE.

Site conditions, both surface and subsurface, may be affected as a result of natural processes or human influence. An environmental site assessment/evaluation is based on conditions that existed at the time of the evaluation. Because so many aspects of a historical review rely on third party information, most consultants will refuse to certify (warrant) that a site is free of contaminants, as it is impossible to know with absolute certainty if such a condition exists. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas that showed no signs of contamination at the time they were studied.

Unless your consultant indicates otherwise, your report should not be construed to represent geotechnical subsurface conditions at or adjacent to the site and does not provide sufficient information for construction-related activities. Your report also should not be used following floods, earthquakes, or other acts of nature; if the size or configuration of the site is altered; if the location of the site is modified; or if there is a change of ownership and/or use of the property.

INCIDENTAL DAMAGE MAY OCCUR DURING SAMPLING ACTIVITIES.

Incidental damage to a facility may occur during sampling activities. Asbestos and lead-based paint sampling often require destructive sampling of pipe insulation, floor tile, walls, doors, ceiling tile, roofing, and other building materials. Shannon & Wilson does not provide for paint repair. Limited repair of asbestos sample locations are provided. However, Shannon & Wilson neither warranties repairs made by our field personnel, nor are we held liable for injuries or damages as a result of those repairs. If you desire a specific form of repair, such as those provided by a licensed roofing contractor, you need to request the specific repair at the time of the proposal. The owner is responsible for repair methods that are not specified in the proposal.

READ RESPONSIBILITY CLAUSES CAREFULLY.

Environmental site assessments/evaluations are less exact than other design disciplines because they are based extensively on judgment and opinion, and there may not have been any (or very limited) investigation of actual subsurface conditions. Wholly unwarranted claims have been lodged against consultants. To limit this exposure, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses may appear in this report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

Consultants cannot accept responsibility for problems that may develop if they are not consulted after factors considered in their reports have changed, or conditions at the site have changed. Therefore, it is incumbent upon you to notify your consultant of any factors that may have changed prior to submission of the final assessment/evaluation.

An assessment/evaluation of a site helps reduce your risk, but does not eliminate it. Even the most rigorous professional assessment may fail to identify all existing conditions.

ONE OF THE OBLIGATIONS OF YOUR CONSULTANT IS TO PROTECT THE SAFETY, HEALTH, PROPERTY, AND WELFARE OF THE PUBLIC.

If our environmental site assessment/evaluation discloses the existence of conditions that may endanger the safety, health, property, or welfare of the public, we may be obligated under rules of professional conduct, statutory law, or common law to notify you and others of these conditions.

The preceding paragraphs are based on information provided by the ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland