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SOIL AND GROUNDWATER CORRECTIVE ACTION PLAN
1201 EAST THIRD AVENUE
ANCHORAGE, ALASKA

1.0 INTRODUCTION

This corrective action plan (CAP) presents our plan for remediation of the Municipal Light & Power (ML&P) site located at 1201 East Third Avenue, Anchorage, Alaska. Shannon & Wilson, Inc. (S&W) has primarily relied upon the physical and chemical data presented in the Harding Lawson Associates (HLA) report titled "Phase II Remedial Investigation, Municipal Light and Power Facilities, Anchorage, Alaska (Revision No. 2)," HLA Project No. 10585 dated August 2, 1993 to prepare this CAP. This CAP is currently restricted in scope to the area surrounding the former waste oil underground storage tank and gasoline underground storage tanks to the south of the ML&P Technical Service Station.

This report includes a summary of the previous work at the site to the extent necessary to prepare the recommendations for remediation. Additional limited groundwater sampling was completed to further assess the site for preparation of this CAP.

HLA recommended three options in their report, including in situ vapor extraction, excavation and on-site lime treatment, and excavation and off-site thermal treatment. S&W proposed to prepare this corrective action plan for the implementation of the in situ (in the ground) vapor extraction system. In addition, an air injection system (AIS) for remediation of the dissolved phase contaminants in the groundwater and an in situ bioremediation system are being proposed for this site.

2.0 SITE AND PROJECT DESCRIPTION

The ML&P Technical Service Station site is at 1201 East Third Avenue in Anchorage, Alaska. Five underground storage tanks (USTs) formerly existed at this location including one diesel fuel tank, one heating oil tank, one waste oil tank and two gasoline tanks. The tanks were removed in 1989 and 1990, and decommissioning assessments were prepared by HLA. The location of the former USTs, existing monitoring wells, buildings, and other general features at the project site are shown in Figure 1.

On the basis of further site assessment work (HLA,1993), S&W has petitioned the Alaska Department of Environmental Conservation (ADEC) for a finding of no further action for the diesel

and heating oil tank source areas. Therefore, these source areas are not included in the scope of this CAP. Because of the impact to the CAP, one particular detail of the decommissioning operation must be restated. The gasoline and waste oil UST excavations were lined with polyethylene before backfilling with imported granular soil. S&W assumes that the imported fill is not contaminated, but that the corrective action should treat contamination which still exists beneath the liners.

HLA collected soil and groundwater samples following the removal of the Underground Storage Tanks (USTs). Their investigation included ten shallow soil borings and the installation of four groundwater monitoring wells. Soil samples were collected from the borings, as well as four groundwater screening samples. Groundwater samples were also collected from one upgradient monitoring well, and three downgradient monitoring wells.

HLA's sampling and analysis efforts indicated that petroleum hydrocarbon-impacted soils and groundwater were present in the vicinity of the former gasoline and waste oil USTs. The results of analyses by HLA for soil samples from the gasoline and waste oil UST areas are summarized in Table 1. An HLA drawing showing the interpreted extent of soil and groundwater contamination at the site is included in Appendix A. The concentrations detected exceed Level B cleanup criteria (based on the ADEC UST Matrix established in 18 AAC 78.315) which were selected by HLA as appropriate for the site. The Level B criteria are 200 ppm for diesel range organics, 100 ppm for gasoline range organics, 0.5 ppm for benzene, and 15 ppm for total BTEX.

Table 1. Summary Results of Testing by HLA for Site 3 Gasoline and Waste Oil UST Areas

Parameter	Test Method	Number of Samples Tested	Concentration Range (ppm)
Total Petroleum Hydrocarbon	EPA 418.1	4	4,400 to 15,000
Diesel Range Organics	EPA 8100	4	230 to 12,000
Gasoline Range Organics	EPA 8015	11	<0.26 to 5,500
Benzene	EPA 8020	11	<0.0024 to 11
Total BTEX	EPA 8020	11	ND to 114.31

Groundwater is reported to have been "encountered sporadically" in the vicinity of the UST excavations, but was "obviously impacted" when it was encountered. A groundwater field-screening sample (3GW04), which was collected west of the gasoline UST excavation, contained

0.170 ppm benzene and 0.313 ppm total BTEX. Contamination was not, however, encountered in either of two downgradient monitoring wells (3MW03, 3MW04) or the upgradient well (3MW05). Low concentrations of VOCs (0.005 ppm benzene and 0.012 ppm Total BTEX) were detected in one downgradient well (3MW02).

HLA concluded that soil contamination was limited to an area approximately 130 feet by 50 feet along the south side of the service station. HLA additionally concluded that the groundwater contamination extended from the source area surrounding the previous USTs underneath the service station to the north in an area approximately 170 feet by 120 feet.

Including our review of previously existing information, S&W was responsible for identifying data gaps, collecting samples and requesting analyses as appropriate to fill the data gaps, and for preparing this CAP for ML&P.

3.0 LABORATORY TESTING

The three existing monitoring wells (3MW02, 3MW03, and 3MW04) on the north side of the service station were sampled on July 26, 1993. Three groundwater samples were sent to Northern Testing Laboratories (NTL) and analyzed for the presence/absence of iron bacteria and to evaluate the presence/number of petroleum degrading microbes (heterotrophic plate count).

At the completion of the water sampling activities, S&W's representative sent the water samples to the laboratory under chain-of-custody procedures. The results of the analyses are summarized in Table 2. The laboratory reports are presented in Appendix B.

Table 2. Iron Bacteria and Heterotrophic Plate Count Results

Sample No.	Location	Iron Bacteria	Heterotrophic Plate Count
W-4	3MW02	Negative	8.5×10^8 colonies/ml
W-5	3MW03	Negative	4.5×10^9 colonies/ml
W-6	3MW04	Negative	1.4×10^9 colonies/ml

4.0 SUBSURFACE CONDITIONS

4.1 Soils

The boring information available from the previous site investigation in the vicinity of the former waste oil and gasoline USTs indicates a mixture of soil types. Typically, soil at the site consists of gravelly sand or sandy gravel fill, and native sand or gravelly sand in the upper 5 feet of the site. The sand grades to a silt and/or clay layer in the 7 to 8 foot interval, with clay interbeds. Locally, the contact with this finer-grained soil was encountered as shallow as 2 to 3 feet below the ground surface. The depth and continuity of the underlying confining layer (the Bootlegger Cove Clay Formation identified by HLA) was not established during the previous field investigations.

HLA's Boring 3B11, drilled through the fill placed in the excavation for the former gasoline USTs, places the water level at about 7 feet below the ground surface, the bottom of the fill at about 8 feet depth, and the clay contact at about 10.5 feet deep. S&W assumes that conditions are similar beneath the fill placed in the excavation of the former waste oil UST. HLA's Boring 3MW02 (See Figure 1) shows approximately 2 to 3 feet of sandy gravel fill at the surface, then sand to approximately 14 feet below the ground surface, then interbeded sandy silt, silty, sandy gravel, and silt to the depth explored which was 20 feet below the ground surface. The groundwater depth in Boring 3MW02 was approximately 15.5 feet below the ground surface. The subsurface conditions in HLA's Boring 3MW03 consisted of typically granular soils and groundwater at 11.7 feet below the ground surface. The clay contact was not logged in the 20 foot depth explored. The subsurface conditions in HLA's Boring 3MW04 were similar to Boring 3MW02 and groundwater was encountered at about 16 feet deep. S&W assumes that the representations on HLA's boring logs are typical of the subsurface conditions along the north side of the service station. The HLA boring logs referenced herein are reproduced in Appendix A.

4.2 Groundwater

Based on HLA's boring logs and observations, the water level across the south side of the service station site appears to vary from approximately 5 to 7 feet below the ground surface. Where the upper contact with the silty or clayey Bootlegger formation was encountered in this depth, HLA's logs generally indicated that no free groundwater was encountered during drilling. For the purposes of this CAP, S&W assumes that groundwater on the south side of the service

station building is sporadic or absent except for possibly a 2 to 3 foot thick saturated zone beneath the former tank locations. Based on subsurface conditions referenced above, we assume that approximately 5 feet of saturated soil above the clayey confining layer is typical of the north side of the building.

5.0 DISCUSSION OF REMEDIAL ALTERNATIVES

From the information gathered during the previous explorations, the subsurface conditions of the site have been assessed for soil vapor extraction, air injection, and bioremediation. These assessments are as follows:

- Based on soil descriptions by HLA and standard correlations of permeability with soil grain size and density, the permeability of the sandy gravel, gravelly sand, and sand at the site are on the order of 1×10^{-3} to 1×10^{-4} cm/sec. These values are in a suitable range for vapor extraction of volatile contaminants and in situ infiltration of nutrients required for bioremediation. Vapor extraction has been accomplished on soils with a permeability of less than 10^{-6} cm/sec.

- The surface of the site is partially covered with asphalt pavement that minimizes surface air from short circuiting the vapor extraction system. If the holes, cracks and joints in the surface pavement are patched, an increase in the radius of influence and efficiency of the vapor extraction system will occur. It is S&W's understanding from discussions with ML&P personnel that at a minimum, the south side of the site will be paved. We also recommend paving the north side once the underground system has been installed.

- The vapor extraction and air injection systems will supply oxygen to the subsurface that could potentially increase the biodegradation rate of the petroleum hydrocarbons.

- High heterotrophic plate count of microbial colonies (10^8 to 10^9 colonies per milliliter) measured in the groundwater samples from the monitoring wells suggests that intensive natural biodegradation of petroleum hydrocarbons in the subsurface is occurring.

- Iron bacteria, the cause of biofouling in air injection systems, were negative (non-existent) in the groundwater samples.

6.0 RECOMMENDATIONS FOR SITE REMEDIATION

The contaminants at this site are found in three distinct contaminant phase/media combinations including:

- Adsorbed volatile contaminants and vapors in the soil interstices,
- Adsorbed semi-volatile and non-volatile contaminants, and
- Dissolved volatile, semi-volatile and non-volatile contaminants.

Each phase/media combination requires a separate remedial approach due to the phase state (vapor, adsorbed, or dissolved) and the physical constraints of the contaminated media. Three remedial measures are proposed in concert for the comprehensive remedial action. Respective to the above phase/media combinations, these remedial measures are:

1. Soil vapor extraction system (VES),
2. In situ bioremediation (seasonal), and
3. Air injection system (AIS)/In situ bioremediation (seasonal).

VES is based upon the principles of mass transfer, moving contaminants from the adsorbed phase into a vapor phase, and then removing them from the system via an applied vacuum to the subsurface. AIS also works according to the principles of mass transfer, except the contaminants are moved from the dissolved (aqueous) phase to the vapor phase, and then are removed from the subsurface by the VES portion of the system. The AIS works in a similar fashion to the air stripping tower currently in use at ML&P's Site 2 (1121 E. 1st Ave.), except that the mass transfer of contaminants from the groundwater to the air occurs in situ, avoiding the need for water disposal or reinjection of the waste water. In situ bioremediation is not a mass transfer process, but rather a biological process whereby contaminants are broken down from hydrocarbons to the inert compounds, water and carbon dioxide. Biomass (more microorganisms) is also produced during the process.

VES and seasonal in situ bioremediation should be sufficient to achieve remediation of the site, given sufficient time. However, there is evidence from the monitoring wells on site that the dissolved phase contaminants have moved beneath the building and should be actively eliminated at the head of the plume. This may be accomplished rapidly with air injection, whereas bioremediation, although very effective on both volatile and non-volatile contaminants, will progress less quickly. The VES and AIS will increase the effectiveness of the bioremediation

procedure by providing oxygen to the subsurface. The bioremediation portion of the cleanup is only expected to be actively pursued during the summer months. Air injection is generally not practicable to treat much of the south side of the service station due to the clay layering within 5 feet of the ground surface. However, a few AIS wells which inject air beneath the liners separating the imported fill and contaminated undisturbed soil could significantly shorten treatment of the source areas. The proposed system is graphically described in Figure 2.

6.1 Vapor Extraction Pilot Tests

In conjunction with the installation of the full scale remedial system, pilot tests will be performed to evaluate the radius of influence of a typical vent well and a lateral vent pipe. The radius of influence from the pilot test will be compared to assumptions used in layout of the downgradient fence of wells and the horizontal extraction lines planned for the full scale system. The vertical vent test should be performed on one of the vapor extraction wells which are to be installed on the north side of the ML&P Technical Service Station. The lateral vent test should be performed on a lateral run of pipe placed along side of the liner separating the imported fill from the surrounding ground near the former gasoline tank excavation.

Air monitoring will be performed on site with a flameionization detector (FID), and two confirmatory laboratory vapor samples (one for each test) will be analyzed for volatile aromatic organics (EPA Method 8020) and gasoline range organics (EPA Method 8015) on a 24-hour turn-around basis. The pilot tests should be performed as soon as possible in the construction of the remedial system to confirm the preliminary design. Following the pilot test, the necessary design modifications (i.e., adjusting the well spacing or installing supplemental wells) will be made to optimize the vapor extraction system. S&W will prepare a work plan to further define the goals of the pilot tests and to provide procedures for performing the tests including interpretation of results. A summary report will be prepared to describe the findings of the pilot tests and to present design modifications to the remediation system as necessary.

6.2 Vapor Extraction System

A vapor extraction system (VES) will remove volatile contaminants, primarily BTEX, from the pore space of the vadose zone soil. Vapor extraction works well in more permeable soils, in which air flow occurs easily. Unfortunately, no wells were installed in the tank excavation area, and the borehole logs from the three downgradient monitoring wells indicate widely varying soil conditions from the south side of the building to the north. To more fully understand the

subsurface conditions and evaluate the site, a pilot test should be performed as described above. Based upon S&W's evaluation of the known site conditions, we made preliminary engineering estimates regarding the viability of a VES at the site.

S&W used the United States Environmental Protection Agency software program "Hyperventilate" to assess the potential use of vapor extraction as a remedial technology at the site. Single well flow rates were estimated based on modest vacuum levels and typical formation permeability. Next, a residual mass of contaminant was assumed and the number of extraction wells required to remove the contaminant over a 2 year remediation period was estimated. This approach formed the basis for the conceptual VES design presented in this CAP. The pilot vapor extraction tests are expected to provide the site specific information necessary to confirm our assumptions and to support selection of environmental shed equipment (i.e., blower size/capacity).

Due to the shallow confining layer and limited extent of perched water, a trenched system is better suited for remediation of the south side of the ML&P Technical Service Station as opposed to a network of vertical wells. S&W's preliminary design for the south side of the service station consists of three zones of slotted horizontal pipes which together extend the length of the contaminated zone identified by HLA. For maximum effect in the source areas, lateral vent lines extend north from the main trench along each side of the backfilled excavations for the former gasoline and waste oil USTs. Both vertical extraction and air injection wells should be installed on the north side of the building to intercept dissolved-phase contaminants that are migrating underneath the building. Our preliminary VES design for the north side of the ML&P building consist of four vertical vents with five foot screen intervals spaced approximately 30 feet apart and distributed along the downgradient edge of the groundwater contaminant plume identified by HLA. The bottom of the vertical vents should be at least one foot above the water table to avoid drawing water into the vapor recovery system. The combined effect of extraction from both sides of the building should be adequate to remediate soil beneath the structure over time.

We anticipate that by removing the BTEX from the pore space of the vadose zone soil, some BTEX will also be removed from the groundwater by chemical diffusion through the induced concentration gradient. The VES will also provide the additional advantage of drawing oxygen into the subsurface materials to promote in situ bioremediation of the hydrocarbon constituents. The VES may be operated at lower flow rates once air emissions have decreased, in order to avoid desiccation (drying) of the subsurface. Maintaining soil moisture is an important factor in optimizing the bioremediation process. We anticipate that the operation of the VES will be on a continuous basis initially, with a gradual decrease in the operation schedule as the remediation

occurs. The VES will be most effective during the summer when air and soil temperatures are elevated. However, operation during the winter, when the water table will likely drop, may effectively promote increased air flow deeper in the soil profile. During the operation of the VES, effluent concentration data will be collected throughout the seasons, and an evaluation of removal efficiencies and operation/maintenance costs will be prepared. This data will then be used to adjust the operation of the VES.

The time required to remediate the site to below ADEC's cleanup guidelines is difficult to predict. Based on industry experience, we would anticipate about two years of operation, working the VES progressively less and less as the remediation continues to allow longer time periods for volatilization of the hydrocarbons without sacrificing efficiency. After the system is in operation and performance data is obtained, a more accurate prediction of the VES operation can be made.

6.3 In Situ Bioremediation

Bioremediation is a method of treating petroleum hydrocarbons due to the ability of microorganisms to utilize the contaminants as a carbon (food) source and reduce them to carbon dioxide and water. A network of nutrient and moisture delivery pipes will be installed in the vadose zone at a shallow depth (approximately 2.5 to 3 feet below the ground surface), which will provide subsurface access for the infiltration of the components necessary to promote bacterial growth. The desired effect of the system is that the nutrients, and hence enhanced microbial activity, will follow the same pathways the hydrocarbons followed, including the zone along the water table (smear zone), thereby naturally "seeking out" and treating contaminated areas.

The in situ bioremediation system is intended to be seasonal only due to the depth of freezing which occurs in the Anchorage area. Frost depths in granular soils can exceed 6 to 8 feet if the surface is kept clear of snow. The microorganisms are most active under warm conditions, and will be less productive during the winter. In addition, the delivery of nutrients in solution would be very difficult when the ground is frozen, unless a method of heating the subsurface was applied, which would be cost prohibitive.

The bioremediation will occur with indigenous (naturally occurring) bacteria. Experience has shown that most sites where older releases of petroleum products exist have a natural population of hydrocarbon-degrading microorganisms that are acclimated to the site-specific conditions. Tests performed to supplement existing data for preparation of this CAP confirm that heterotrophs are present beneath the site. The task of the bioremediation process is to encourage

this population to grow by introducing oxygen and nutrients into the subsurface. The result is a faster rate of respiration, or growth, of the microorganisms, which leads to a faster reduction of contaminants. The bioremediation system will be implemented immediately following construction of and in conjunction with the VES.

6.4 Air Injection System

An air injection system will be installed for the volatilization of dissolved-phase contaminants in the groundwater. Air injection wells will be installed below the water table on the north side and locally on the south side of the service station to inject air into the saturated zone. The dissolved hydrocarbons are volatilized by the injected air and carried into the vadose zone to be removed by the vapor extraction system. Air injection also raises the dissolved oxygen levels in the saturated zone and provides for greater biological remediation.

The AIS simulates an air stripping system that is normally operated by pumping impacted groundwater aboveground to be treated in a stripping tower. However, the in situ AIS method is more cost-effective because it alleviates the need to dispose of treated waste water. AISs are also much easier (than air stripping towers) to operate during the winter months when temperatures fall below freezing.

We anticipate that the operation of the AIS will promote a rise in the water table within the area of influence of the injection wells. The radius of influence is anticipated to be at least equal to the depth below the water table of the screened portion of the well. The depth of the AIS wells on the south side of the service station will be about 10 feet, with the top of the screen set (and sealed off) below the polyethylene liner separating the fill and undisturbed soils. The radius of influence of these wells could vary from nil (if dry) to nearly 10 feet (assuming the liner is below the water table). Because these shallow AIS wells may seasonally or sporadically go dry, they will be equipped with water level monitoring instruments so that they can be cycled or deactivated when dry.

The depth of the AIS wells on the north side of the service station will be approximately 20 to 22 feet, with the base keyed into the clay confining layer. The bottom of the one foot long well screen should be no more than about 0.5 feet above the clay layer. At this depth, the well screen will be positioned at least 4 feet below the water table (north of the service station), leading to a radius of influence of at least 4 feet and probably on the order of about 8 feet. The effective radius of the AIS wells is increased by the presence of nearby VES wells. S&W's preliminary design for

the AIS wells on the north side of the service station consists of nine wells spaced at approximately 16 foot intervals and distributed over the downgradient edge of the contaminant plume identified by HLA. Four of the AIS wells are co-located with VES wells. During the operation of the AIS, air pressure data will be collected from the on-site monitoring wells. This data will then be used to adjust the operating pressure of the AIS.

6.5 Monitoring Wells

During 1993 buried utility work on the north side of the service station, Monitoring Wells 3MW02 and 3MW04 were decommissioned and destroyed, respectively. These wells must be replaced for downgradient monitoring of the remediation system. The replacement wells should be placed north of the driveway, along the edge of the slope to the north of the shop. The replacement wells are designated Monitoring Wells 3MW06 and 3MW07 on Figure 1.

An additional monitoring well should be installed on the south side of the service station for monitoring of the vapor extraction and bioremediation systems at that location. This well is designated Monitoring Well 3MW08 on Figure 1.

6.6 General Installation Requirements

We recommend that the horizontal vapor recovery lines of the VES and in situ bioremediation delivery lines be installed with a backhoe. Vertical vapor recovery and air injection wells should be installed with a drill rig using hollow-stem auger. The installation and equipment requirements for a project of this type and layout are as follows:

VES

- Three (3) zones of horizontal extraction pipes (with four (4) laterals) placed south of the service station at a depth of about 3 feet,
- Four (4) 4-inch vertical extraction wells, north of the service station at about 15 feet depth,
- Extraction pipe, four-inch-diameter HDPE blank manifold pipe and four-inch-diameter Schedule 40 PVC 20-slot screen,

AIS

- Twelve (12) vertical air injection wells; nine (9) wells on the north side and three (3) wells on the south side of the service station,
- Injection wells, two-inch-diameter Schedule 40 PVC 20-slot screen and blank riser pipe,

- Injection well screen length; the bottom 1 foot,
- Air injection header pipes, one-inch-diameter HDPE individually plumbed to each well,

Bioremediation

- Three horizontal bioremediation infiltration lines (with a total of 19 laterals) installed at approximately 2.5 to 3 feet depth,
- Seventeen (17) 30 foot long and two (2) 20 foot long horizontal infiltration laterals, 2-inch Schedule 40 PVC 20-slot screen and blank manifold pipe,
- Bioremediation header pipes, one-inch-diameter HDPE individually plumbed to each of three zones of bioinfiltration lines,

Monitoring Wells

- Two (2) monitoring wells on the north side of the driveway north of the service station,
- One (1) monitoring well on the south side of the service station,
- Monitoring wells, 2-inch Schedule 40 PVC 20-slot screen and Schedule 40 PVC blank pipe,
- Monitoring wells, screened approximately 3 to 4 feet above, and 6 to 7 feet below the static groundwater depth,
- Wells will be either flush mounted or above-ground completion as required by site conditions and activities,

General

- All feeder and blank vent piping and appurtenances; Schedule 40 HDPE,
- Two explosion-proof blowers required, each capable of 100 CFM, at suction or pressure equivalent to approximately 50 inches of water,
- One condensate collection trap in line,
- All piping slopes are minimum 0.5% away from the environmental shed,
- All paving will be provided by ML&P,
- One environmental shed constructed to meet applicable codes and regulations, and
- Utilities -- power meter is to be provided, hook-up will be ordered and accomplished by ML&P, water will be provided by ML&P via a hose bib on the environmental shed.

The trench and piping details are shown in Figures 3 and 3A. Figures 4, 4A, and 4B show the well details for the air injection, vapor extraction, and monitoring wells, respectively. The environmental shed detail is shown in Figure 5.

6.7 System Monitoring

Upon VES start-up, S&W will monitor emissions from the VES stack by obtaining vapor samples from a sampling port installed on the discharge stack. On the first day of operation, the emissions will be monitored continuously with a flameionization detector (FID), and vapor analytical samples will be obtained at time 0, 2, 4, and 8 hours. The vapor samples will be tested for BTEX by EPA 8020 and total volatile hydrocarbons by EPA 5030/8015. The laboratory results will be reviewed and correlated with the FID measurements. Subsequent operation of the VES will be based on periodic monitoring with the FID and confirmation testing of analytical vapor samples.

One analytical vapor sample from the system will be taken each day for the first week, followed by weekly samples for the first month and monthly thereafter. As with the startup samples, the periodic vapor samples will be tested for BTEX and total volatile hydrocarbons. Testing will be performed twice yearly once the analytical results indicate a steady state removal. A 24-hour turn-around will be requested from the laboratory for samples collected during the first month.

Flow rates in the stack will be determined with a Pitot tube. The flow rates will be used in conjunction with stack emission concentrations to derive a daily estimated emission rate for total hydrocarbons and individual gas stream components.

6.8 Air Quality Monitoring

Monitoring of ambient air quality in the immediate area of the project site will be required to evaluate and control emissions from the VES so that the emissions remain within specified OSHA guidelines. If stack emissions exceed allowable concentrations for benzene (i.e., 1 ppm), S&W will model the site using the EPA air pollution model SCREEN. If the results of this modeling are unacceptable, an air monitoring program will be implemented. If an air monitoring program is required, it is anticipated that 1 upwind location and 3 downwind locations will be sampled on a monthly basis for the duration of the project. The proposed sampling locations near the project site are based on the predominant wind direction, which is from the southwest during the warmer seasons in the Anchorage area and from a northerly direction during winter months.

Time-averaged samples will be collected using 3M personnel badges and analyzed for BTEX by an independent laboratory. Locations for monitoring will be determined as the need arises. The concentration of benzene in the downwind monitors are expected to be below the OSHA 8-hour time-weighted average (TWA) for benzene of 1 ppm. A clean air intake will be provided for dilution of the vapor emission so it does not exceed the 1 ppm downwind exposure limit. No vapor treatment, e.g., a thermal oxidizer, is expected to be required based upon the concentrations observed during field investigations.

6.9 Miscellaneous

A public notice will be issued by ML&P in a local newspaper describing the proposed soil and groundwater treatment to occur at the site, as required by 40 CFR 280.67 (Appendix C).

Interim reports for the soil and groundwater remediation work will be submitted to the client and ADEC during regularly scheduled times and project milestones. The first report will be submitted after one week of operation, the second after one month of operation, then quarterly. The reports will include at a minimum, the following data:

- Hours of VES operation,
- Air flow measurements from the extraction tube,
- Exhaust gas LEL, percent oxygen, FID levels, and temperature,
- Analytical results of vapor and air monitoring samples,
- Monitoring well pressure levels and water level measurements,
- Area of VES influence measurements, and
- General comments and problems encountered with the remediation equipment.

The estimated amount of hydrocarbons removed from the vadose and the saturated zone will also be included in these reports. Active remediation of soil and water vapor should be considered complete when the incremental amount of recovered contaminant approaches nil recovery. At this point, the active systems should be shut down, and the project should continue with periodic groundwater monitoring to demonstrate that the groundwater resource is restored.

7.0 COST ESTIMATE

S&W has prepared a summary cost estimate (See Appendix D) which includes the estimated cost for the VES pilot test, system installation, startup, and then operation/maintenance expenses for five years. Operation and maintenance expenses assume that the remediation system will operate for two years, after which groundwater monitoring will continue for 3 years. All

other details which support the pricing are generally shown in the text above. The costs have been separated into two categories for line items defined by our MOA term contract, and line items which do not appear in the term contract. In the latter category, standard laboratory rates and subcontract estimates are used with an S&W markup for outside services.

8.0 CLOSURE

The conclusions and recommendations presented in this report are based on site conditions as they presently exist, and assume that the explorations (conducted by others in this case) are representative of the subsurface conditions throughout the site, i.e., the subsurface conditions are not significantly different from those encountered in the explorations. If, during construction, subsurface conditions different from those encountered in the explorations are observed or appear to be present, we should be advised at once so that we can review those conditions and reconsider our recommendations where necessary. If there is a substantial lapse of time between submittal of our report and the start of work at the site, or if conditions have changed due to natural causes or construction operations at or near the site, we recommend that this report be reviewed to determine the applicability of the conclusions and recommendations considering the changed conditions and time lapse.

Unanticipated conditions are commonly encountered and cannot be fully determined by merely taking soil samples or making explorations. Such unexpected conditions require that additional expenditures be made to achieve a properly constructed project. A contingency fund is recommended to accommodate such potential extra costs. Shannon and Wilson has prepared the attachments in Appendix E "Important Information About Your Geotechnical Engineering/Subsurface Waste Management Report" to assist you and others in understanding the use and limitations of our reports.

SHANNON & WILSON, INC.

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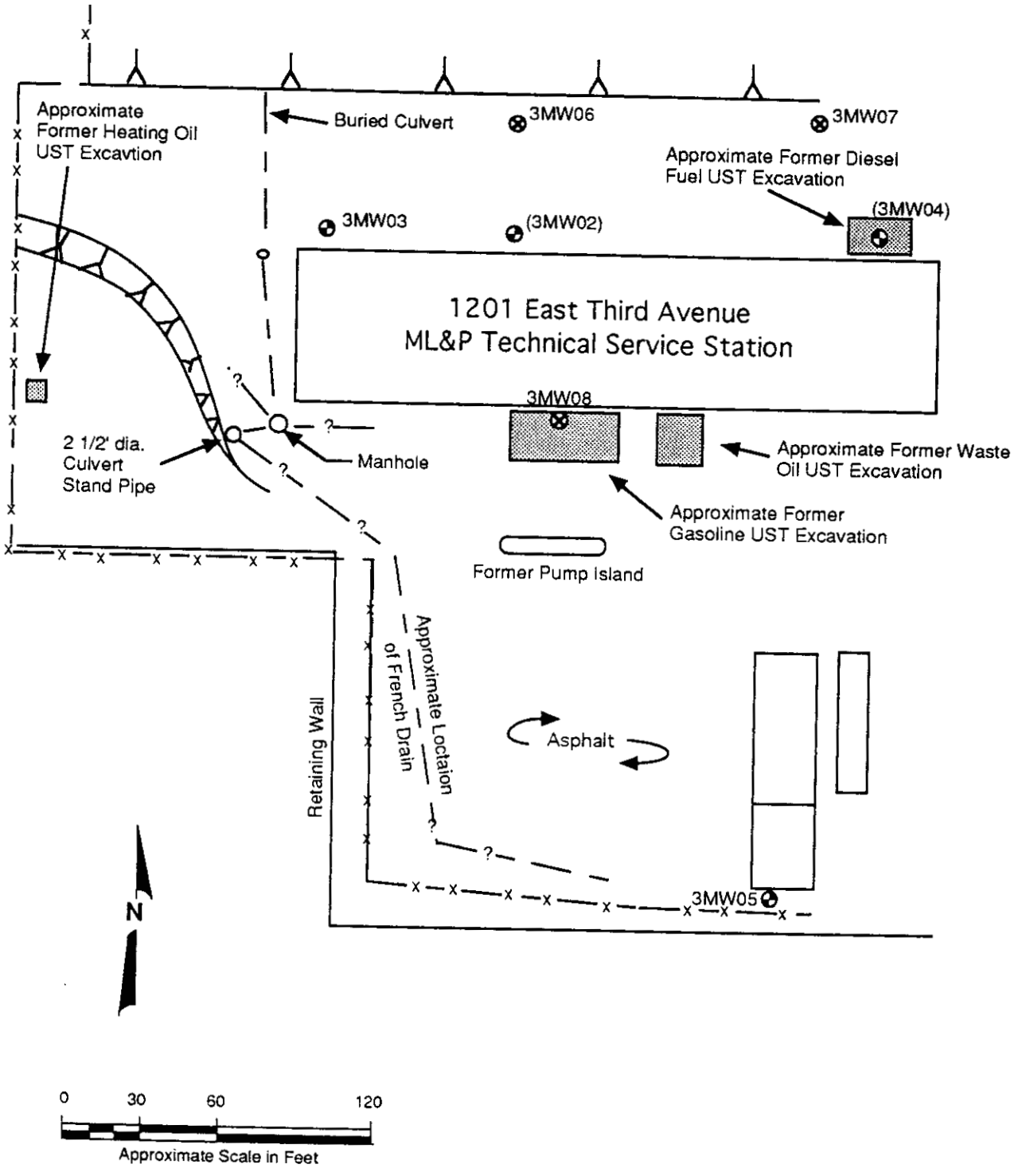


KEY

3MW04 — Number and approximate location of monitoring wells installed by Harding Lawson associates

(3MW04) — Number and approximate location of monitoring wells destroyed during utility excavation activities, September, 1993

3MW04 — Number and approximate location of proposed replacement and new monitoring wells

Site plan derived from Harding Lawson Associates, May 1993

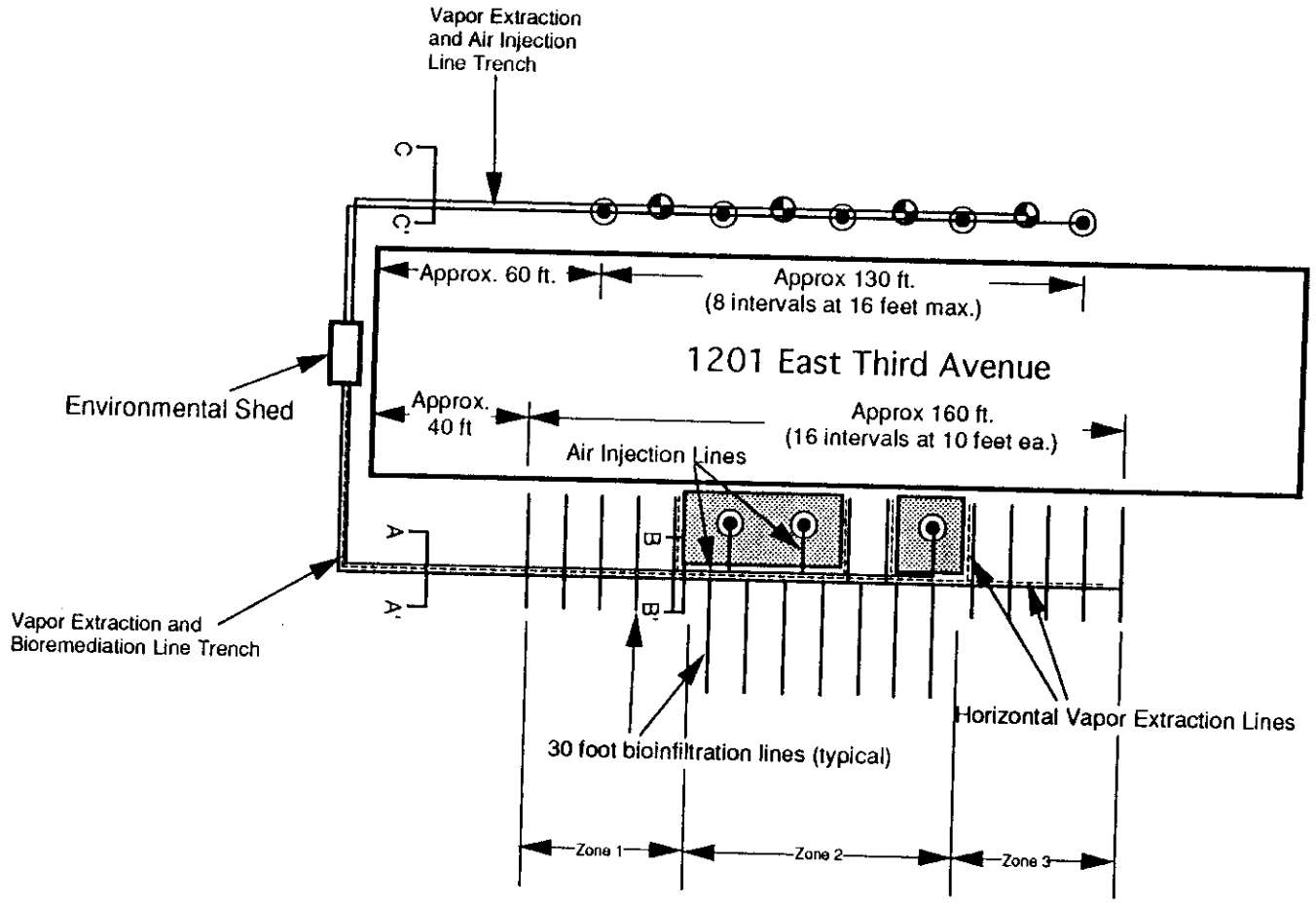
1201 East Third Avenue
Anchorage, Alaska

SITE PLAN

March, 1994 Y-5216

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

FIG. 1



KEY

- Co-located Vapor Extraction/Air Injection Wells
- Air Injection Wells
- A — A' Cross Section A-A', See Figures 3 and 3a for details
- Approximate Former Location of Gasoline and Waste Oil UST Excavations

0 25 50 100

Approximate Scale in Feet

N

1201 East Third Avenue
Anchorage, Alaska

REMEDIAL DESIGN PLAN

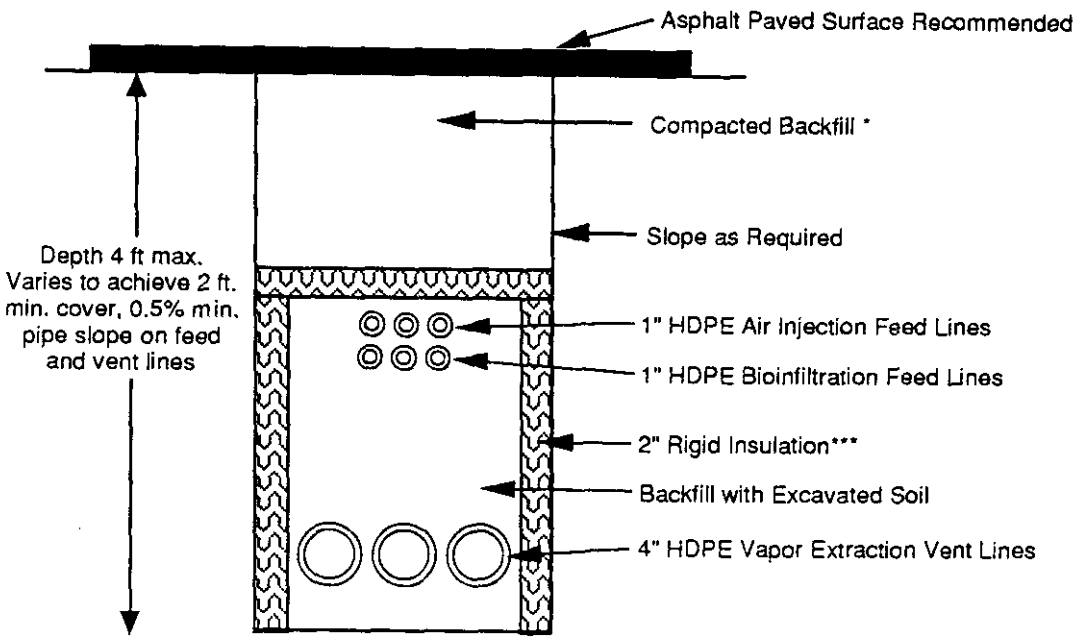
March, 1994

Y-5216

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

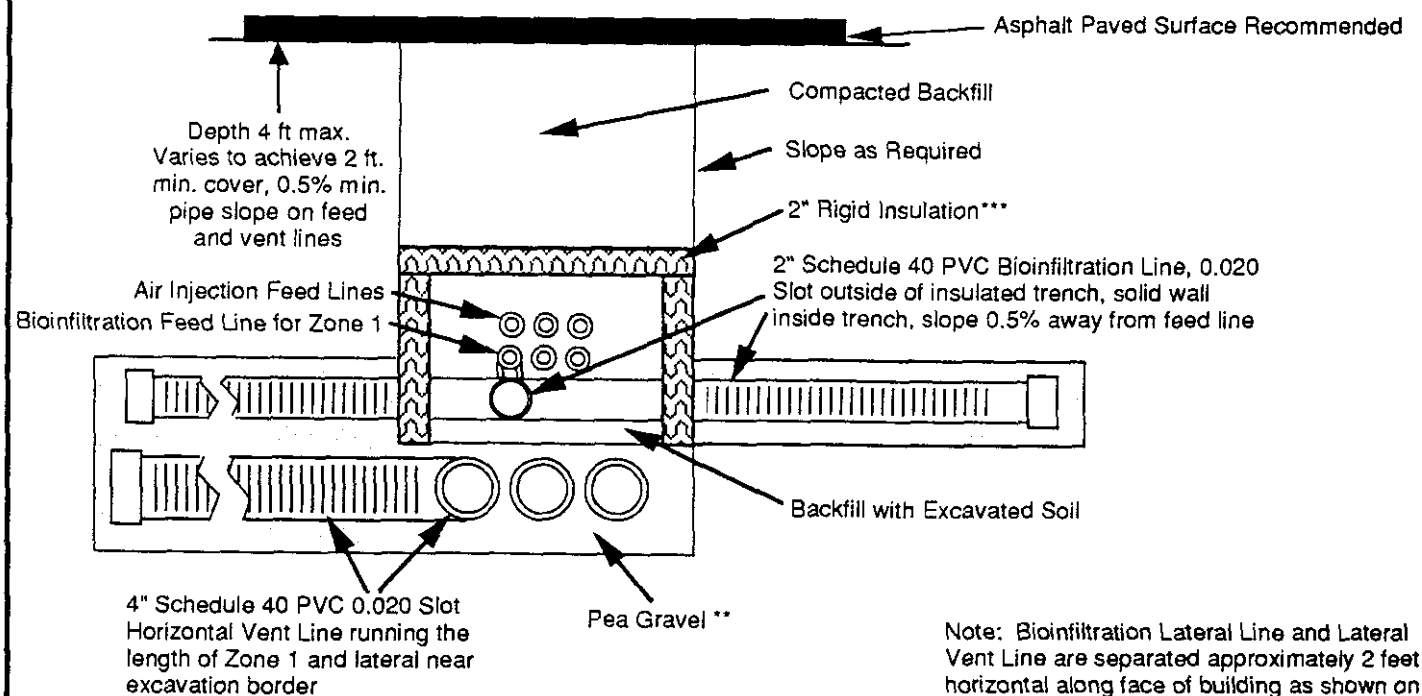
Fig. 2

000098



Section A-A'
Not to scale, See Figure 2 for location

All lengths and specifications are according to the plan.



Note: Bioinfiltration Lateral Line and Lateral Vent Line are separated approximately 2 feet horizontal along face of building as shown on Figure 2

Section B-B'
Not to scale, See Figure 2 for location

* Place in maximum 12" loose lifts. Densely compact first 1 ft of fill above insulation. Compact top 1 ft of fill to 95% of modified Proctor Maximum Density (ASTM D1557)

** Pea gravel of Leveling Course material which meets the Municipality of Anchorage Standard Spec. (MASS)

*** Insulation should consist of 2" extruded polystyrene insulation (such as DOW HI 40 or Formular 400). It should be covered top and bottom with at least one full wrap of 6 mil. polyethylene sheeting.

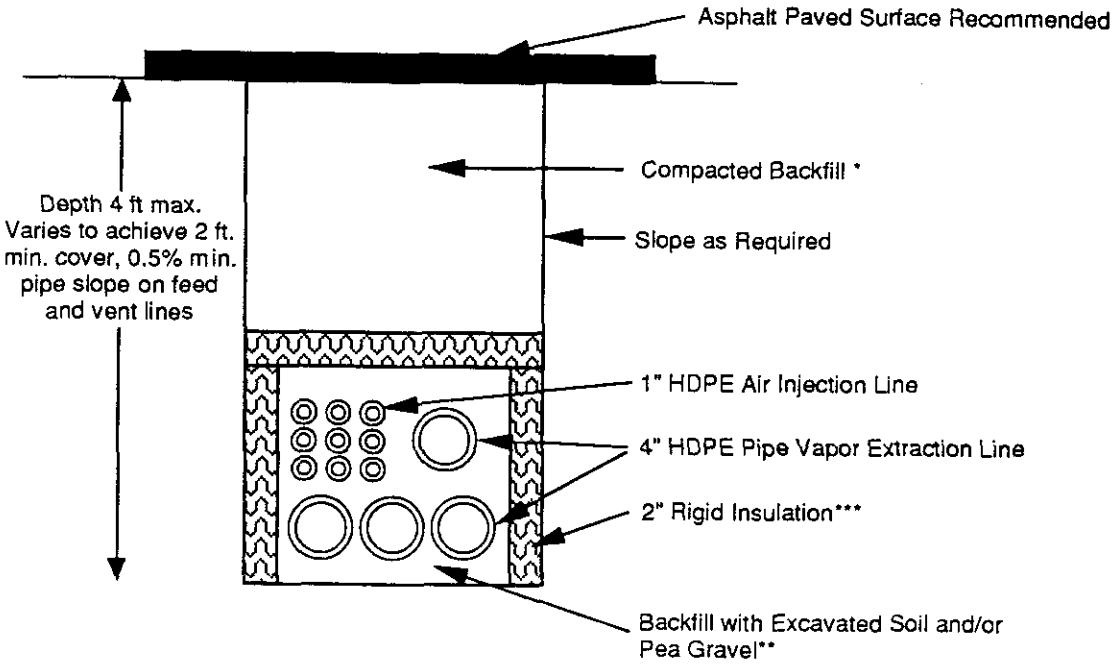
1201 East Third Avenue
Anchorage, Alaska

TRENCH DETAILS SHEET 1

March, 1994 Y-5216

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 3



Section C-C'
Not to Scale See Figure 2 for location

All lengths and specifications are according to the plan.

* Place in maximum 12" loose lifts. Densely compact first 1 ft of fill above insulation. Compact top 1 ft of fill to 95% of modified Proctor Maximum Density (ASTM D1557)

** Pea gravel of Leveling Course material which meets the Municipality of Anchorage Standard Spec. (MASS)

*** Insulation should consist of 2" extruded polystyrene insulation (such as DOW HI 40 or Formular 400). It should be covered top and bottom with at least one full wrap of 6 mil. polyethylene sheeting.

1201 East Third Avenue
Anchorage, Alaska

TRENCH DETAILS SHEET 2

March, 1994 Y-5216

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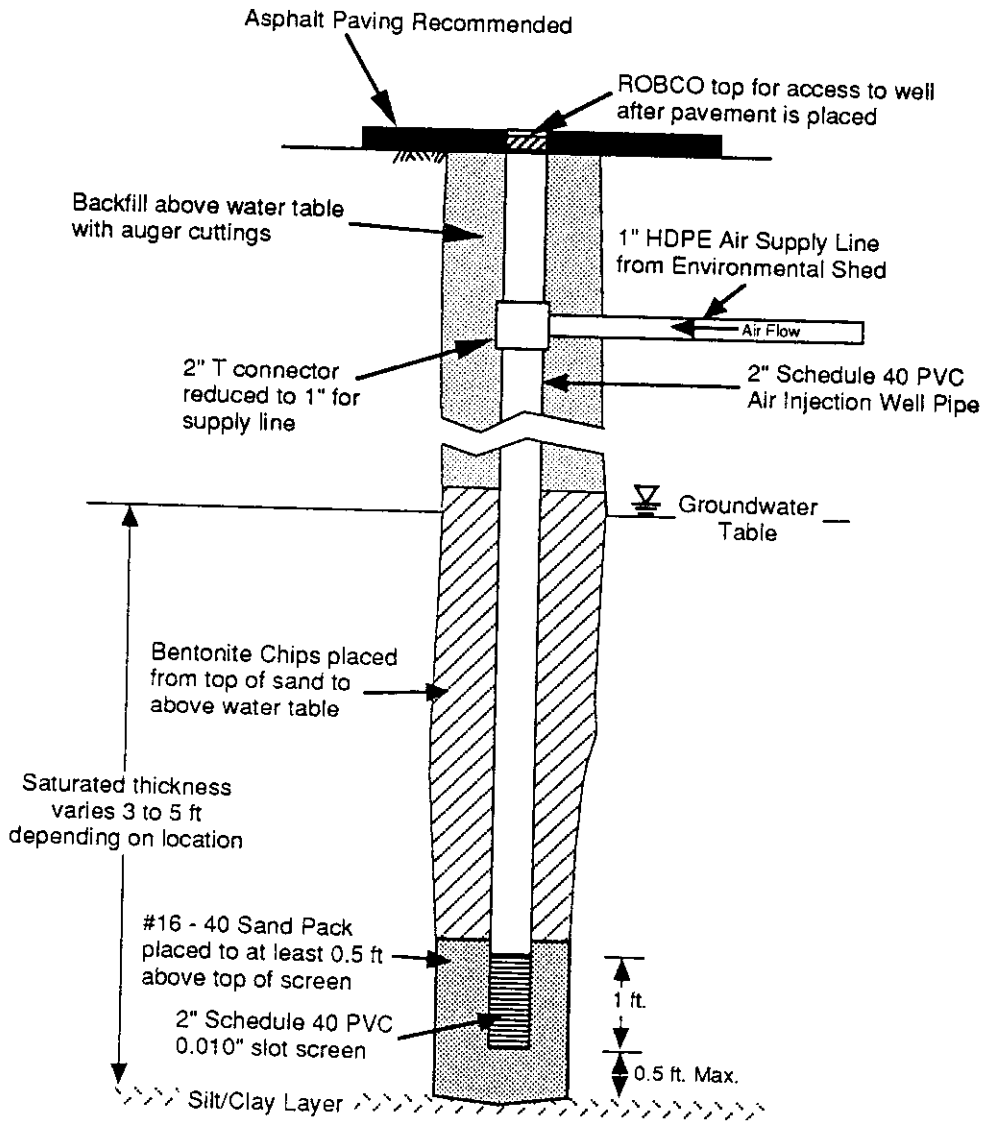
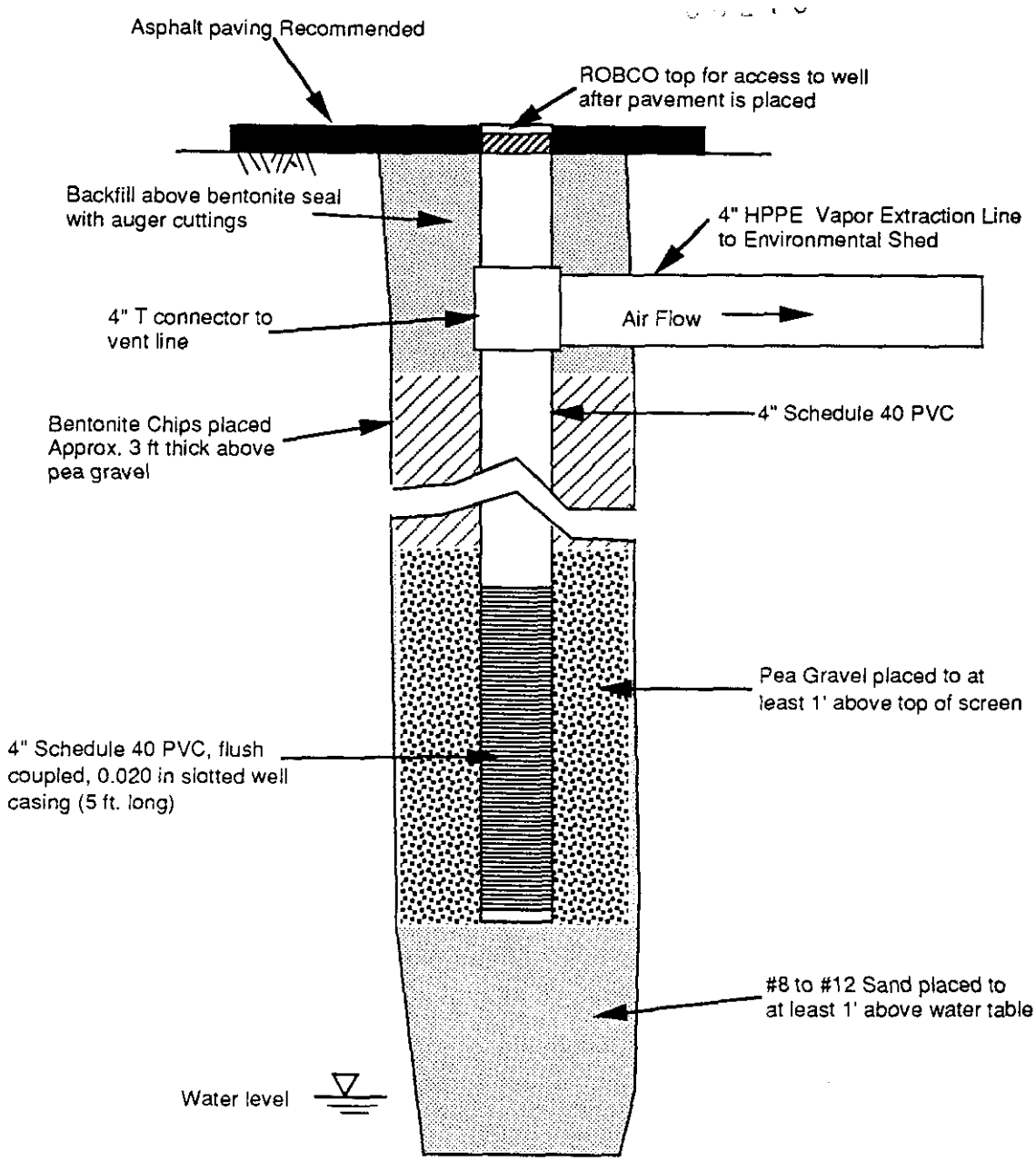
Fig. 3A



AIR INJECTION WELL DETAIL
NOT TO SCALE

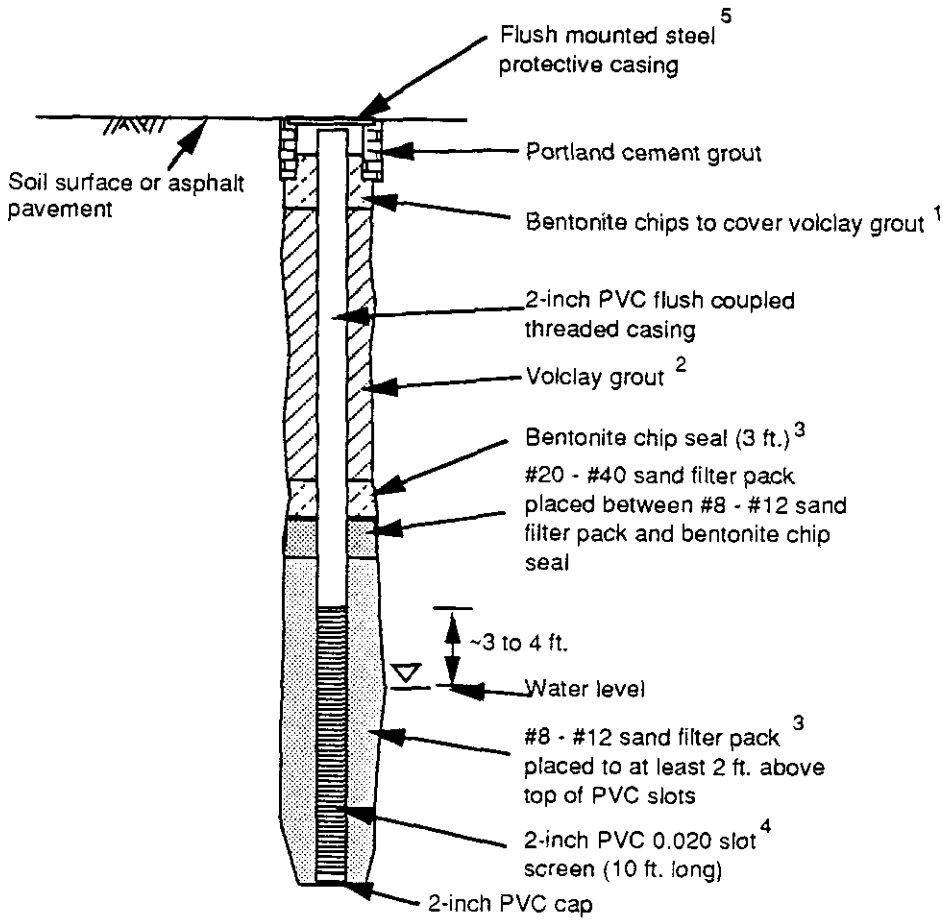
1201 East Third Avenue Anchorage, Alaska	
WELL DETAILS SHEET 1	
March, 1994	Y-5216
SHANNON & WILSON, INC. Geotechnical & Environmental Consultants	Fig. 4



VAPOR EXTRACTION WELL DETAIL

NOT TO SCALE

1201 East Third Avenue Anchorage, Alaska	
WELL DETAILS SHEET 2	
March, 1994	Y-5216
SHANNON & WILSON, INC. Geotechnical & Environmental Consultants	Fig. 4A



MONITORING WELL DETAIL

NOT TO SCALE

Notes:

1) Bentonite chips covering the volclay grout is placed solely for the purpose of giving the volclay time to "set". It may be eliminated in the field if not deemed necessary by the project engineer.

2) Volclay or hydrated bentonite chips to be placed through auger until auger bit is withdrawn above water table. Thereafter, auger will be withdrawn and voclay or bentonite chips will be placed through open hole.

3) All filter sand and bentonite seal materials to be placed through auger stem.

4) Screen section of PVC well casing to be placed so that the water table level is situated approximately 3 to 4 ft. below top of slots.

5) Above ground protective casing to be substituted in non-traffic areas.

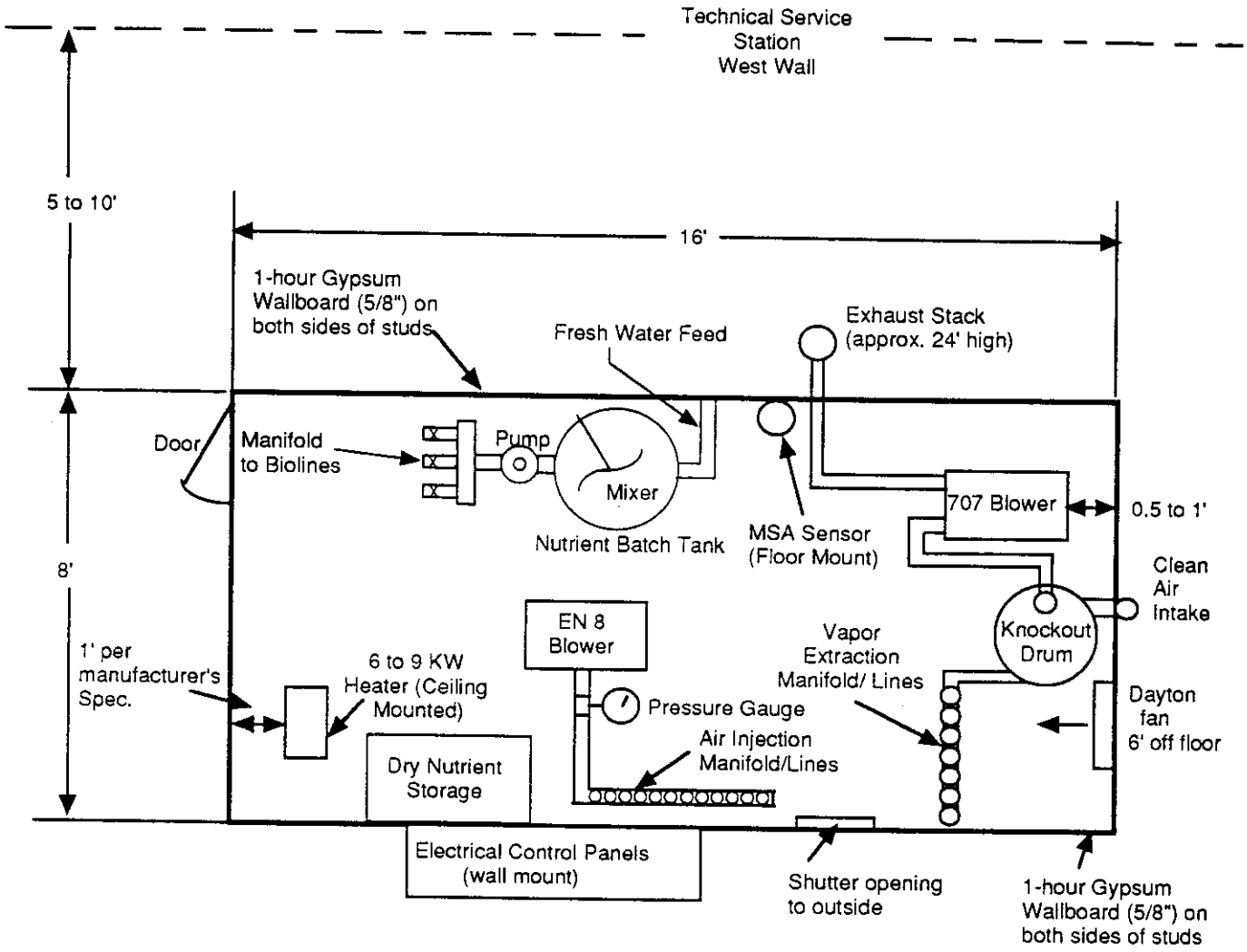
1201 East Third Avenue
Anchorage, Alaska

WELL DETAILS SHEET 3

March, 1994 Y-5216

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 4B



1201 East Third Avenue
Anchorage, Alaska

ENVIRONMENTAL SHED

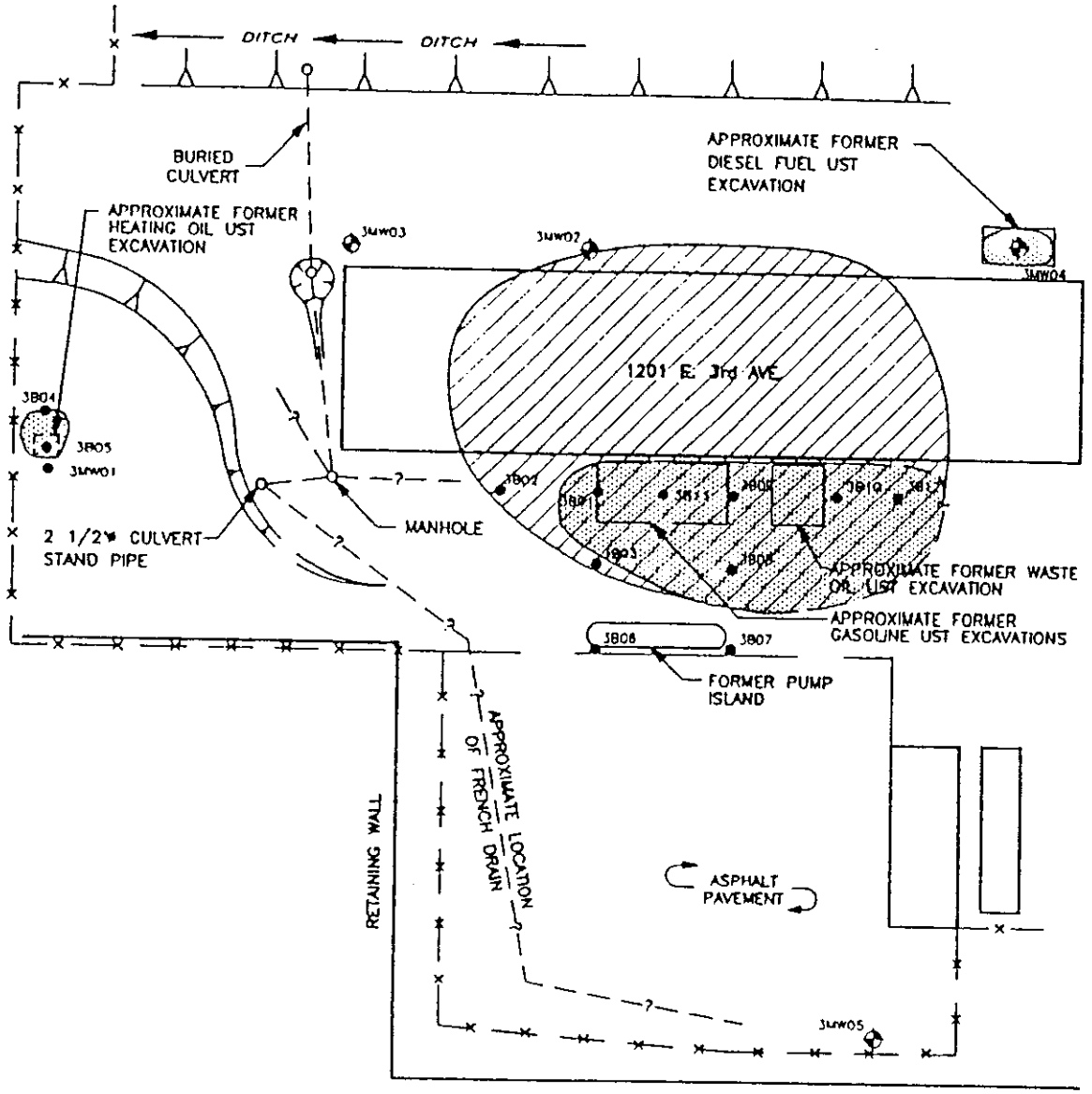
March, 1994 Y-5216

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 5

APPENDIX A

KEY INFORMATION EXTRACTED FROM HARDING LAWSON ASSOCIATES' PHASE II REMEDIAL INVESTIGATION, AUGUST 2, 1993



LEGEND

- APPROXIMATE EXTENT OF SHALLOW GROUNDWATER WITH BENZENE EXCEEDING 5 MICROGRAMS PER LITER
- APPROXIMATE EXTENT OF SOIL CONTAINING PETROLEUM HYDROCARBON EXCEEDING ADEC GUIDELINES
- 3MW03 HLA MONITORING WELL LOCATION
- 3B12 BORING LOCATION
- —×— CHAIN-LINK FENCE

NORTH

0 30 60 120
APPROXIMATE SCALE IN FEET

Harding Lawson Associates
Engineering and Environmental Services

Interpreted Extent of Soil and Groundwater Contamination at Site 3
ML&P Phase 2 Remedial Investigation
Anchorage, Alaska

PLATE 13

DRAWN	PROJECT NUMBER	APPROVED	DATE	FILE NAME
JP	10585	MAB	11/92	133J

LOG OF BORING 3B10

Equipment B-61 Truck/3-inch I.D. Hollow Stem
Elevation -- Date Drilled 5/18/92

Sample Number	Sampling Method	Blows/Foot	PID (ppm)
SA	3"SS	10	133
SB	3"SS	6	11
SC	3"SS	5	232
SD	3"SS	10	480
SE	3"SS	12	541
SF	3"SS	NR	409

Depth (ft): 0, 5

Samples

1.5 INCHES ASPHALT CEMENT CONCRETE
GRAVELLY SAND (SP)
loose to medium dense, moist to wet, brown

water level during drilling

CLAY (CL)
wet, gray

NR – No blow count was recorded

LOG OF BORING 3B11

Equipment B-61 Truck/3-inch I.D. Hollow Stem
Elevation -- Date Drilled 5/19/92

Sample Number	Sampling Method	Blows/Foot	PID (ppm)
SA	3"SS	7	783
SB	3"SS	7	516
SC	3"SS	5	487
SD	3"SS	4	35
SE	3"SS	5	206

Depth (ft): 0, 5, 10, 15

SANDY GRAVEL (GP)
moist, brown

FILL

6-mil visqueen membrane separates fill from native soil at approximately 7.5 to 8 feet depth

water level during drilling

SAND (SP)
loose, wet, gray, with scattered gravel, maximum particle size approximately 3/4 inch, strong petroleum odor (gasoline)

SANDY SILT (ML)
CLAY (CL)
SAND (SP)
CLAY(CL)
SANDY SILT (ML)
CLAY (CL)
SANDY SILT (ML)
CLAY (CL)

Interbedded SANDY SILT (ML) and CLAY (CL), medium stiff, wet, gray; SAND (SP) loose, wet, extends from 11.5 to 11.8 feet depth; strong petroleum odor decreases to slight odor with sample SD

* Note: Blow counts obtained by driving a 4-inch I.D. split-spoon sampler with a 300-pound hammer falling 30 inches.

Harding Lawson Associates
Engineering and Environmental Services

Log of Borings 3B10 and 3B11

ML&P Phase 2 Remedial Investigation
Anchorage, Alaska

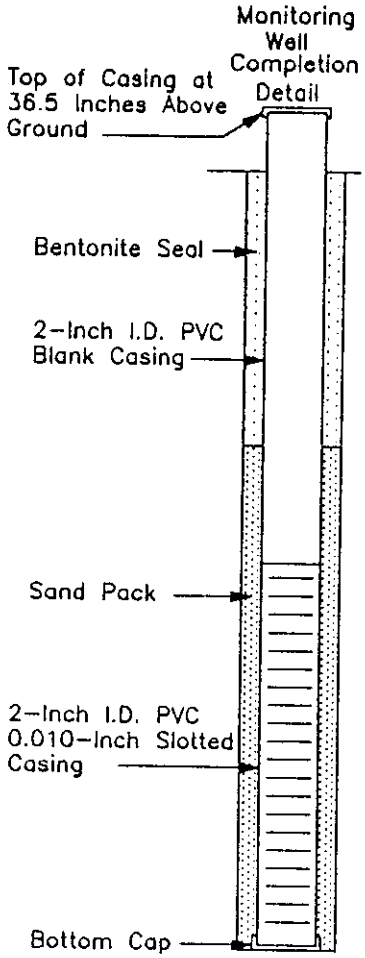
PLATE A13

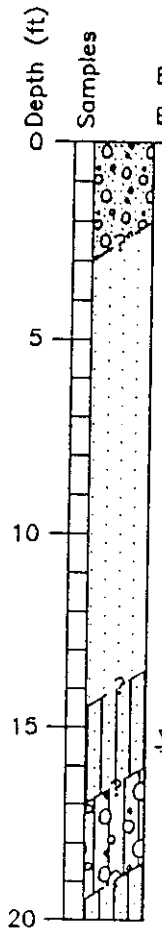
DRAWN	PROJECT NUMBER	APPROVED	DATE	FILE NAME
TZ	10585	MAB	11/92	014t

LOG OF BORING 3MW02

Equipment B-61 Truck/6-inch I.D. Hollow Stem

Elevation -- Date Drilled 5/13/92





SANDY GRAVEL (GP)
moist, brown, maximum particle size approximately 1.5 inches

FILL

SAND (SP)
moist, gray-brown, with scattered gravel, maximum particle size approximately 1 inch

SANDY SILT (ML)
wet, gray, contact logged based on auger cuttings

measured groundwater depth 15.4 feet below ground surface, June 30, 1992

SILTY SANDY GRAVEL (GM)
wet, gray, driller noted contact at 16.5 feet, depth based on rougher drilling

SILT (ML)
wet, gray, contact logged based on soil found on bit of auger

Note: Boring logged on the basis of drillers observations, drilling action, and auger return. Contacts between soil units should be considered approximate.

* Note: Blow counts obtained by driving a 4-inch I.D. split-spoon sampler with a 300-pound hammer falling 30 inches.

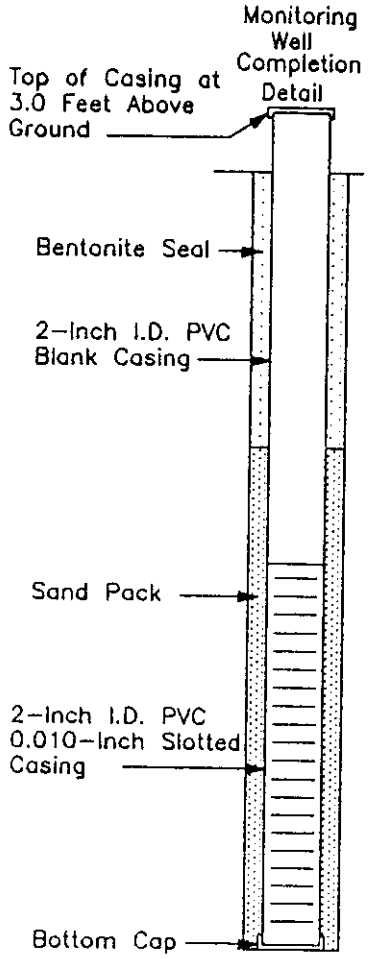
Harding Lawson Associates
Engineering and Environmental Services

Log of Boring 3MW02

ML&P Phase 2 Remedial Investigation
Anchorage, Alaska

PLATE A15

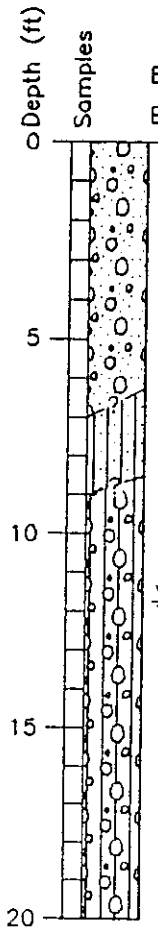
DRAWN	PROJECT NUMBER	APPROVED	DATE	FILE NAME
PB	10585	MAB	11/92	014t



LOG OF BORING 3MW03

Equipment B-61 Truck/6-inch I.D. Hollow Stem

Elevation -- Date Drilled 5/13/92



SANDY GRAVEL (GP)
moist, brown

SILTY SAND (SM)
moist, gray, scattered gravel, maximum particle size approximately 1.5 inches

SILTY SANDY GRAVEL (GM)
moist, gray, contains scattered wood debris

measured groundwater depth 11.7 feet below ground surface, June 30, 1992

maximum particle size in auger cuttings increases to approximately 3 inches

more gravel, rougher drilling reported by the driller

less drilling resistance

more gravel reported by the driller

Note: Boring logged on the basis of drillers observations, drilling action, and auger return. Contacts between soil units should be considered approximate.

* Note: Blow counts obtained by driving a 4-inch I.D. split-spoon sampler with a 300-pound hammer falling 30 inches.

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring 3MW03

ML&P Phase 2 Remedial Investigation
Anchorage, Alaska

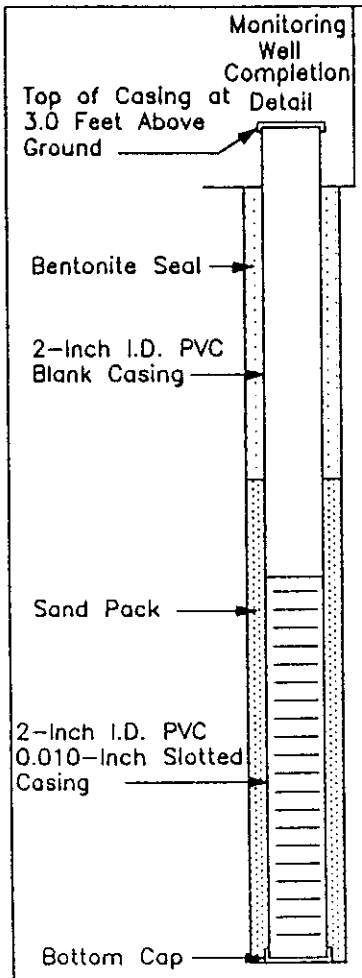
PLATE A16

DRAWN	PROJECT NUMBER	APPROVED	DATE	FILE NAME
PB	10585	MAB	11/92	014t

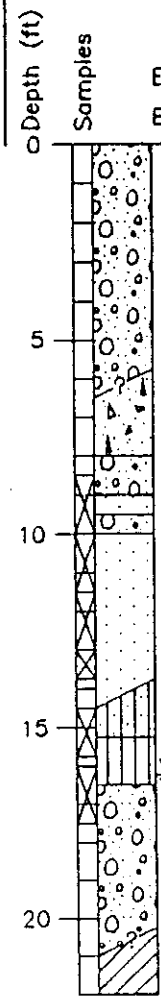
LOG OF BOR 04

Equipment B-61 Truck/6-inch I.D. Hollow Stem

Elevation -- Date Drilled 5/18/92



Sample Number	Sampling Method	Blows/Foot	PID (ppm)
SA	3" SS	4	12
SB	3" SS	9	12
SC	3" SS	9	40
SD	3" SS	6	32
SE	3" SS	5	16
SF	3" SS	17	4



SANDY GRAVEL (GP)
moist, brown

FILL

PORT CEMENT CONCRETE

SANDY GRAVEL (GP)
SAND (SP)
SANDY GRAVEL (GP)
SAND (SP)
interbedded sandy gravel and sand; loose, moist, gray

SILTY SAND (SM)
loose, moist, gray

SANDY SILT grading to GRAVELLY SANDY SILT (ML)
medium stiff, moist, gray, with organics between 16.0 and 16.5 feet depth

water level measured 6/30/92

SANDY GRAVEL (GP)
medium dense, wet, gray

CLAY (CL)
wet, gray

Note:

1. The boring was logged on the basis of drillers observations, drilling action, and auger return in the depth ranges 0.0 to 8.5 feet and 17.5 and 22.0 feet. Contacts and classifications shown in these intervals should be considered approximate.

* Note: Blow counts obtained by driving a 4-inch I.D. split-spoon sampler with a 300-pound hammer falling 30 inches.

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring 3MW04

ML&P Phase 2 Remedial Investigation
Anchorage, Alaska

PLATE A17

DRAWN	PROJECT NUMBER	APPROVED	DATE	FILE NAME
PB	10585	MAB	11/92	014t

000111 L69.07

RECEIVED

JUN 30 1994

DEPARTMENT OF ENVIRONMENTAL CONSERVATION ADO

SHANNON & WILSON, INC.

RELEASE NOTIFICATION FORM

1. SPILL DATE/TIME: Unknown	2. REPORT DATE/TIME: June 30, 1994, 1100 hrs
3. FACILITY NAME AND LOCATION: MLrP Site 3, Technical Service Station, 1201 East Third Ave, Anchorage	
4. NAME AND PHONE OF PERSON FINDING THE SPILL: Bill Burgess, Shannon & Wilson, 561-2120	
5. WAS SPILL REPORTED TO ADEC? Yes	6. NAME OF ADEC PERSON, PHONE, DATE AND TIME OF CALL: Robert Weimer, 349-7755, June 30/1994, 1100 hrs
7. ESTIMATED QUANTITY SPILLED: Unknown	8. HAZARDOUS SUBSTANCE SPILLED (GASOLINE ETC.): Probable waste oil product encountered in VES well
9. SPECIFIC AREA SPILLED (BLDG. ETC.): North side of Techoical Servic Station Building, approx. 60 to 80 feet west of the northeast corner of the building	
10. CAUSE AND SOURCE (OVERFILL, VALVE FAILURE, BACKHOE, ETC.): Unknown, possible source was former waste oil tank south of building, tank was removed in November, 1989	
11. POTENTIAL DAMAGE AND IMPACTS (SURFACE/GROUND WATER OR WILDLIFE REFUGE, ETC.): Known impact to subsurface soil, possible impact to groundwater as product is in contact with water, No known off-site impact	
12. CORRECTIVE ACTION (STOPPED PUMP, REPAIR, BUILT BERM, SHUT OFF LINE, ETC.): Comprehensive corrective action presently being installed at site (see S&W May 1994 Soil + Groundwater Corrective Action Plan)	
13. REMEDIATION (SKIM WATER, PUMP, ABSORBENT, EVAPORATE, REMOVE SOIL, ETC.): Implementing program to skim product from well repeatedly for Two week period while evaluating May 1994 CAP regarding changed conditions	
14. VOLUME RECOVERED TO DATE: less than 1 gallon, ongoing	
15. DISPOSAL (OVERPACK, PERMITTED LANDFILL, UNDECIDED, ETC.) INCLUDE LOCATION, METHOD, DATE: Undecided, presently holding product/water in open top drum on site	
16. SAMPLES OR PHOTOS TAKEN? Yes	17. COMPLETION DATE: ongoing response
18. ACTIONS TAKEN TO PREVENT REOCCURRENCE: Inventory other potential sources of waste oil on site, Evaluate for leaks, spills	
19. ADDITIONAL COMMENTS:	

NOTE: REPORT WILL NOT BE DELAYED DUE TO LACK OF INFORMATION ON AN INDIVIDUAL ITEM.
18AAC75.080 "Notification must be made as soon as the person has knowledge of the dicharge".

fax 349-9836

000-112 L69.07

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

SEATTLE
HANFORD
FAIRBANKS
ANCHORAGE
BOSTON
SAINT LOUIS

7/8/94
Waiting on additional info on file before
NO fuel sat soils back in ground + from Cu things from 1992 also onsite

July 7, 1994

Alaska Department of Environmental Conservation
800 East Dimond Boulevard, Suite 3-470
Anchorage, Alaska 99515

Attn: Mr. Robert Weimer

RE: SOIL DISPOSAL FOR MUNICIPAL LIGHT AND POWER SITE #3, 1201 EAST THIRD AVENUE, ANCHORAGE, ALASKA

As part of remediation activities conducted at the Municipal Light and Power Site #3, Shannon & Wilson monitored the drilling of 20 boreholes on May 4 through 25, 1994. Most of these borings were used for the installation of 2-inch or 4-inch vertical wells which are intended for air injection, vapor extraction, and groundwater monitoring. We are requesting the ADEC's approval to use the in-situ bioremediation and vapor-extraction systems being installed at the site to dispose of the soil cuttings generated during the drilling work. It is estimated that approximately 5 to 6 cubic yards (about 7 to 9 tons) of soil were generated during drilling operations. The soil is presently being stored on-site in 7 supersack soil bags.

A previous site assessment conducted by Harding Lawson Associates during the removal of USTs at the site indicated that the subsurface soils and groundwater were impacted with petroleum hydrocarbons. The source of these contaminants is presumed to be the former gasoline and waste oil USTs located directly to the south of the ML&P technical service facility on-site. These field observations were supported when Shannon & Wilson's began implementation of the corrective action plan by installing a total of 2 monitoring wells, 9 air injection wells and 4 VES wells on the north side of the technical service facility, and an additional 1 monitoring well and 2 air injection wells installed to the south of the facility. Visual field observations and soil sample screening conducted with a flame ionization detector (FID) indicated the presence of petroleum hydrocarbons in the subsurface soils. Two soil samples from the boreholes, including the one sample which exhibited the highest FID reading and the one sample which visually appeared to be the most heavily impacted, were submitted under chain-of-custody procedures to Northern Testing Laboratories, Inc. of Anchorage, Alaska for analysis. The results from this testing indicate the following:

- The sample which exhibited the highest FID reading was taken from well AIS 10, which is located in the vicinity of the former gasoline UST. Hydrocarbon concentrations include 1,230 ppm gasoline range organics, 40.3 ppm benzene, 9.22 ppm ethylbenzene, 3.16 ppm toluene, and 78.2 ppm xylenes. Non-detectable quantities of halogenated volatile organic compounds (HVOs) and PCBs were measured.

- The most visibly contaminated sample was taken from well VES 4, located to the north of the building. The soil in this borehole was interspersed with a dark, viscous, oily fluid and emitted a strong hydrocarbon odor. The fluid's origin is presently undetermined. Hydrocarbon concentrations measured in this sample include 29,100 ppm total petroleum hydrocarbons. No HVOs or PCBs were detected in the sample. A copy of the laboratory analytical results for both samples is enclosed.

5430 FAIRBANKS STREET • SUITE 3
ANCHORAGE, ALASKA 99518
907 • 561 • 2120 FAX 907 • 561 • 4483

SHANNON & WILSON, INC.

As outlined in Shannon & Wilson's May, 1994 corrective action plan for this site, the subsurface soils to the south of the service facility are to be remediated in-situ using vapor extraction technology in conjunction with nutrient-enhanced bioremediation. The installation of this system necessarily entails the digging of trenches to install the VES piping and nutrient feed lines. It is our desire to use the potentially impacted drill cuttings to backfill the trenches in the immediate vicinity of the nutrient feed lines. In this manner, the cuttings will be placed in the region of the site containing the greatest expected subsurface contamination and can be remediated using the technologies specifically chosen for this site.

With this letter, Shannon and Wilson would like to petition ADEC to use the drill cuttings generated at the ML&P #3 site as backfill in the bioremediation feed-line trenches being installed at the site. The ADEC can indicate approval for this disposal option by signing the line provided at the bottom of this letter. Please feel free to call the undersigned with any questions or comments on the contents of this letter.

Sincerely,

SHANNON & WILSON, INC.

Matthew Hemry
Engineer II

enc: laboratory results from Northern Testing Laboratories

cc: Mr. Ron Kuczek, ML&P
Mr. Mike Krueger, MOA

The drill cuttings disposal plan outlined herein approved by: _____
ADEC Representative

Not approved
See letter dated
7/28/94
RLC

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE
2505 FAIRBANKS STREET
FAIRBANKS, ALASKA 99701
ANCHORAGE, ALASKA 99503
(907) 456-3116 • FAX 456-3125
(907) 277-8378 • FAX 274-9645

Municipal Light & Power
P.O. Box 196650
Anchorage AK 99519-6650

Attn: Roger Reese

Report Date: 06/20/94

Date Arrived: 06/02/94
Date Sampled: 05/24/94
Time Sampled: 1615
Collected By:

* Definitions *
B = Below Regulatory Min.
H = Above Regulatory Max.
E = Estimated Value
M = Matrix Interference
D = Lost to Dilution
MDL = Method Detection Limit

Our Lab #: A131070
Location/Project: Y-5216-3
Your Sample ID: B 1554 (MLP 94-150)
Sample Matrix: Soil
Comments:

Lab Number	Method	Parameter	Units	Result	*	MDL	Date Prepared	Date Analyzed
A131070	8010/8260	Bromodichloromethane	mg/dry kg	<MDL		0.75	06/06/94	06/11/94
		Bromoform	mg/dry kg	<MDL		1.88		
		Bromomethane	mg/dry kg	<MDL		1.88		
		Carbon Tetrachloride	mg/dry kg	<MDL		0.75		
		Chlorobenzene	mg/dry kg	<MDL		0.75		
		Chloroethane	mg/dry kg	<MDL		1.88		
		2-Chloroethylvinylether	mg/dry kg	<MDL		1.88		
		Chloroform	mg/dry kg	<MDL		0.75		
		Chloromethane	mg/dry kg	<MDL		1.88		
		Dibromochloromethane	mg/dry kg	<MDL		0.75		
		1,2-Dichlorobenzene	mg/dry kg	<MDL		0.75		
		1,3-Dichlorobenzene	mg/dry kg	<MDL		0.75		
		1,4-Dichlorobenzene	mg/dry kg	<MDL		0.75		
		1,1-Dichloroethane	mg/dry kg	<MDL		0.75		
		1,2-Dichloroethane	mg/dry kg	<MDL		0.75		
		1,1-Dichloroethylene	mg/dry kg	<MDL		0.75		
		trans-1,2-Dichloroethylene	mg/dry kg	<MDL		0.75		
		1,2-Dichloropropane	mg/dry kg	<MDL		0.75		
		cis-1,3-Dichloropropene	mg/dry kg	<MDL		0.75		
		trans-1,3-Dichloropropene	mg/dry kg	<MDL		0.75		
		Methylene Chloride	mg/dry kg	<MDL		1.88		
		1,1,2,2-Tetrachloroethane	mg/dry kg	<MDL		0.75		
		Tetrachloroethylene	mg/dry kg	<MDL		0.75		
		1,1,1-Trichloroethane	mg/dry kg	<MDL		0.75		
		1,1,2-Trichloroethane	mg/dry kg	<MDL		0.75		
		Trichloroethylene	mg/dry kg	<MDL		0.75		
		Trichlorofluoromethane	mg/dry kg	<MDL		1.88		
		Vinyl Chloride	mg/dry kg	<MDL		1.88		
		cis-1,2-Dichloroethylene	mg/dry kg	<MDL		0.75		
		Surrogate Recovery	%	103				

Reported By: Anthony J. Lange
Chemistry Supervisor

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 4

To Tollie Forker	From Angie
Co. SLW	Co. NTL
Dept.	Phone # 277-8378
Fax #	Fax #

NORTHERN TESTING LABORATORIES, INC.
3330 INDUSTRIAL AVENUE
2505 FAIRBANKS STREET
FAIRBANKS, ALASKA 99701
ANCHORAGE, ALASKA 99503
(907) 456-3116 - FAX 456-3125
(907) 277-8378 - FAX 274-9645

Lab Number	Method	Parameter	Units	Result	*	MDL	Date Prepared	Date Analyzed
A131070	AK 101	Gasoline Range (C-6 thru C-10)	mg/dry kg	1230		37.7	06/06/94	06/09/94
		Surrogate Recovery	%	D				
A131070	EPA 160.3	Solids	%	89.5				06/06/94
A131070	EPA 8020	Benzene	mg/dry kg	40.3		0.75	06/06/94	06/11/94
		Chlorobenzene	mg/dry kg	<MDL		0.75		
		1,2-Dichlorobenzene	mg/dry kg	<MDL		0.75		
		1,3-Dichlorobenzene	mg/dry kg	<MDL		0.75		
		1,4-Dichlorobenzene	mg/dry kg	<MDL		0.75		
		Ethylbenzene	mg/dry kg	9.22		0.75		
		Toluene	mg/dry kg	3.16		1.13		
		Xylenes	mg/dry kg	78.2		1.51		
		Surrogate Recovery	%	103				
A131070	EPA 8080	Aroclor 1016	mg/dry kg	<MDL		0.007	06/06/94	06/08/94
		Aroclor 1221	mg/dry kg	<MDL		0.007		
		Aroclor 1232	mg/dry kg	<MDL		0.007		
		Aroclor 1242	mg/dry kg	<MDL		0.007		
		Aroclor 1248	mg/dry kg	<MDL		0.007		
		Aroclor 1254	mg/dry kg	<MDL		0.004		
		Aroclor 1260	mg/dry kg	<MDL		0.004		
		Spike Recovery	%	96				

Reported By: Anthony J. Lange
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE
2505 FAIRBANKS STREET
FAIRBANKS, ALASKA 99701
ANCHORAGE, ALASKA 99503
(907) 456-3116 • FAX 456-3125
(907) 277-8378 • FAX 274-9645

Municipal Light & Power
P.O. Box 196650
Anchorage AK 99519-6650

Attn: Roger Reese

Report Date: 06/20/94

Date Arrived: 06/02/94
Date Sampled: 05/25/94
Time Sampled: 1500
Collected By:

Our Lab #: A131071
Location/Project: Y-5216-3
Your Sample ID: B 2052 (MLP 94-151)
Sample Matrix: Soil
Comments:

• Definitions *
B = Below Regulatory Min.
H = Above Regulatory Max.
E = Estimated Value
M = Matrix Interference
D = Lost to Dilution
MDL = Method Detection Limit

Lab Number	Method	Parameter	Units	Result	•	MDL	Date Prepared	Date Analyzed
A131071	8010/8260	Bromodichloromethane	mg/dry kg	<MDL		1.34	06/06/94	06/11/94
		Bromoform	mg/dry kg	<MDL		3.36		
		Bromomethane	mg/dry kg	<MDL		3.36		
		Carbon Tetrachloride	mg/dry kg	<MDL		1.34		
		Chlorobenzene	mg/dry kg	<MDL		1.34		
		Chloroethane	mg/dry kg	<MDL		3.36		
		2-Chloroethylvinylether	mg/dry kg	<MDL		3.36		
		Chloroform	mg/dry kg	<MDL		1.34		
		Chloromethane	mg/dry kg	<MDL		3.36		
		Dibromochloromethane	mg/dry kg	<MDL		1.34		
		1,2-Dichlorobenzene	mg/dry kg	<MDL		1.34		
		1,3-Dichlorobenzene	mg/dry kg	<MDL		1.34		
		1,4-Dichlorobenzene	mg/dry kg	<MDL		1.34		
		1,1-Dichloroethane	mg/dry kg	<MDL		1.34		
		1,2-Dichloroethane	mg/dry kg	<MDL		1.34		
		1,1-Dichloroethylene	mg/dry kg	<MDL		1.34		
		trans-1,2-Dichloroethylene	mg/dry kg	<MDL		1.34		
		1,2-Dichloropropane	mg/dry kg	<MDL		1.34		
		cis-1,3-Dichloropropene	mg/dry kg	<MDL		1.34		
		trans-1,3-Dichloropropene	mg/dry kg	<MDL		1.34		
		Methylene Chloride	mg/dry kg	<MDL		3.36		
		1,1,2,2-Tetrachloroethane	mg/dry kg	<MDL		1.34		
		Tetrachloroethylene	mg/dry kg	<MDL		1.34		
		1,1,1-Trichloroethane	mg/dry kg	<MDL		1.34		
		1,1,2-Trichloroethane	mg/dry kg	<MDL		1.34		
		Trichloroethylene	mg/dry kg	<MDL		1.34		
		Trichlorofluoromethane	mg/dry kg	<MDL		3.36		
		Vinyl Chloride	mg/dry kg	<MDL		3.36		
		cis-1,2-Dichloroethylene	mg/dry kg	<MDL		1.34		
		Surrogate Recovery	%	92				

Reported By: Anthony J. Lange
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE
2505 FAIRBANKS STREET

FAIRBANKS, ALASKA 99701
ANCHORAGE, ALASKA 99503

(907) 456-3116 • FAX 456-3126
(907) 277-8378 • FAX 274-9645

Lab Number	Method	Parameter	Units	Result	*	MDL	Date Prepared	Date Analyzed
A131071	EPA 160.3	Solids	%	90.1				06/06/94
A131071	EPA 418.1	Total Petroleum Hydrocarbons	mg/dry kg	29100		4897	06/10/94	06/10/94
A131071	EPA 8080	Aroclor 1016	mg/dry kg	<MDL		0.022	06/06/94	06/08/94
		Aroclor 1221	mg/dry kg	<MDL		0.022		
		Aroclor 1232	mg/dry kg	<MDL		0.022		
		Aroclor 1242	mg/dry kg	<MDL		0.022		
		Aroclor 1248	mg/dry kg	<MDL		0.022		
		Aroclor 1254	mg/dry kg	<MDL		0.011		
		Aroclor 1260	mg/dry kg	<MDL		0.011		
		Spike Recovery	%	98				

Reported By: Anthony J. Lange
Chemistry Supervisor

L9689,678

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

SEATTLE
HANFORD
FAIRBANKS
ANCHORAGE
BOSTON
SAINT LOUIS

RECEIVED
AUG - 3 1994
DEPARTMENT OF
ENVIRONMENTAL CONSERVATION
ADO

July 8, 1994

Alaska Department of Environmental Conservation
800 East Dimond Boulevard, Suite 3-470
Anchorage, Alaska 99515

Attn: Mr. Robert Weimer

RE: SOIL DISPOSAL FOR MUNICIPAL LIGHT AND POWER SITE #3, 1201 EAST THIRD AVENUE, ANCHORAGE, ALASKA

The purpose of this letter is to obtain ADEC's approval to transport and dispose of drill cuttings generated at the Municipal Light and Power Site #3. In a previous submittal, Shannon & Wilson indicated the desire to use the cuttings as backfill in the on-site area to be remediated using in-situ bioremediation and vapor-extraction technologies. Prior to ADEC's approval of this plan, the approximately 5 to 6 cubic yards (about 7 to 9 tons) of soil were mistakenly placed in the UST excavation/bio-feed line trench located to the south of the transformer maintenance facility. Following a review of these actions, the ADEC determined that the misplaced soils need to be removed and otherwise disposed. In this context, we propose to excavate the impacted soil boring cuttings for transport to Anchorage Soil Recycling's (ASR) processing facility, where final disposal will consist of thermal treatment.

The source of contaminants at the subject site is presumed to be the former gasoline and waste oil USTs located directly to the south of the ML&P technical service facility on-site. An additional contaminant consisting of a black, viscous fluid was also encountered while drilling the VES and AIS wells on May 4 through 25, 1994. Although this fluid has not been conclusively identified, preliminary laboratory results indicate that it is likely an asphalt compound. Two soil samples from the boreholes, including the one sample which exhibited the highest FID reading and the one sample which visually appeared to be the most heavily impacted, were submitted under chain-of-custody procedures to Northern Testing Laboratories, Inc. (NTL) of Anchorage, Alaska for analysis. The results from this testing indicate that the soil boring cuttings contain petroleum hydrocarbon concentrations of up to 1,230 ppm gasoline range organics (GRO), 40.3 ppm benzene, and 29,100 ppm total petroleum hydrocarbons (TPH). Halogenated volatile organic compounds (HVOs) and PCBs were below detection limits in both samples. A copy of the laboratory analytical results is enclosed. These results are consistent with a previous investigation conducted by Harding Lawson Associates which found hydrocarbon concentrations in the vicintiy of the gasoline and waste oil excavations of up to 15,000 ppm TPH, 5,500 ppm GRO, 12,000 ppm DRO, 11 ppm benzene, and 630 ppm total BTEX.

Under the direction of Shannon and Wilson's field representative, Municipal Light & Power will provide labor and a backhoe to locate and excavate the contaminated soil boring cuttings. The resulting excavation will be filled with clean soil imported by BC Excavating. The removed material will be placed directly onto BC Excavating's truck and transported to ASR's 1800 East Second Avenue facility. Prior to treatment, the soil will be temporarily stockpiled at ASR until a complete characterization of the material is available. Characterization will consist of sampling the stockpile in accordance with Shannon & Wilson's ADEC-approved Quality

5430 FAIRBANKS STREET • SUITE 3
ANCHORAGE, ALASKA 99518
907 • 561 • 2120 FAX 907 • 561 • 4483

Assurance Project Plan for UST Site Assessments. Based on field screening results, two samples will be submitted to Superior Analytical Laboratories of Martinez, California for analytical testing. Since the range of GRO and TPH for these soils has already been established, the two samples will be tested for aromatic volatile organic compounds (BTEX). If the benzene concentration in either sample exceeds 5 ppm, that sample will be additionally analyzed for TCLP benzene.

With this letter, Shannon and Wilson would like to petition ADEC for approval to transport and thermally process the drill cuttings generated at the ML&P #3 site. The ADEC can indicate approval for this disposal option by signing the line provided at the bottom of this letter. Please feel free to call the undersigned with any questions or comments on the contents of this letter.

Sincerely,

SHANNON & WILSON, INC.

William S Burgess

William S. Burgess, P.E.
Principal Engineer

MSH/WSB/mac

enc: Laboratory Results from Northern Testing Laboratories

cc: Mr. Ron Kuczek, ML&P
Mr. Mike Krueger, MOA

The drill cuttings disposal plan outlined herein approved by: Robert Wilson
ADEC Representative

Drill cuttings to ASR

FAXED 8/4/94

000120L 69.07

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

SEATTLE
HANFORD
FAIRBANKS
ANCHORAGE
BOSTON
SAINT LOUIS

July 8, 1994

Alaska Department of Environmental Conservation
800 East Dimond Boulevard, Suite 3-470
Anchorage, Alaska 99515

Attn: Mr. Robert Weimer

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ANCHORAGE, ALASKA 99518
907 • 561 • 2120 FAX 907 • 561 • 4483

Assurance Project Plan for UST Site Assessments. Based on field screening results, two samples will be submitted to Superior Analytical Laboratories of Martinez, California for analytical testing. Since the range of GRO and TPH for these soils has already been established, the two samples will be tested for aromatic volatile organic compounds (BTEX). If the benzene concentration in either sample exceeds 5 ppm, that sample will be additionally analyzed for TCLP benzene.

With this letter, Shannon and Wilson would like to petition ADEC for approval to transport and thermally process the drill cuttings generated at the ML&P #3 site. The ADEC can indicate approval for this disposal option by signing the line provided at the bottom of this letter. Please feel free to call the undersigned with any questions or comments on the contents of this letter.

Sincerely,

SHANNON & WILSON, INC.

William S. Burgess

William S. Burgess, P.E.
Principal Engineer

MSH/WSB/mac

enc: Laboratory Results from Northern Testing Laboratories

cc: Mr. Ron Kuczek, ML&P
Mr. Mike Krueger, MOA

The drill cuttings disposal plan outlined herein approved by: _____
ADEC Representative

Drill cuttings to ASR

FAXED 8/4/94

000122-8 69.07

ASR

ALASKA SOIL RECYCLING
A Division of Anchorage Sand & Gravel Co. Inc.
1040 O'Malley Road • Anchorage, Alaska 99515
Phone (907) 349-3333 • FAX (907) 344-2844

RECEIVED
SEP - 8 1994
DEPARTMENT OF
ENVIRONMENTAL CONSERVATIO
ADO

September 2, 1994

State of Alaska
Department of Environmental Conservation
Anchorage District Office
800 Dimond Blvd., Suite 3-470
Anchorage, AK 99515

Attn: Robert Weimer

Re: ML&P Site #3 1201 E. 3rd Anchorage, Alaska

Dear Mr. Weimer:

On August 4, 1994 Alaska Soil Recycling (ASR) received 11.81 tons of petroleum contaminated soil on the referenced project. On August 17, 1994 thermal remediation of the soils was completed at ASR's 2nd Avenue facility in Anchorage, Alaska. Post remedial analysis revealed that this soil meets or exceeds the Alaska Department of Environmental Conservation's (ADEC's) most restrictive levels. Attached in Table 1 is the summary for analysis and also attached are the data deliverables.

This soil will be recycled for use in the construction industry.

Please contact me if you have any questions.

Sincerely,

ALASKA SOIL RECYCLING

James J. Rogers

James J. Rogers
Manager

cc: Matt Henry, Shannon & Wilson, Inc.

Attachments

JJR:cd

Table 1 - Chemical Analysis Summary
Project #8564-5 ML P 1201 E. 3rd Anchorage, Alaska

Method	8015	8020	8100	418.1
	Gasoline	BETX	Diesel	Residual Range
Regulatory Limits	50 ppm	10 ppm	100 ppm	2000 ppm
8564-5-151	N/D	0.024	N/A	N/D
8564-5-152	N/D	0.09	N/A	30

Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

ALASKA SOIL RECYCLING INC.
Attn: JIM ROGERS

Project 8564-5
Reported 26-August-1994

TOTAL PETROLEUM HYDROCARBONS BY EPA METHOD 418.1

Chronology

Laboratory Number 58596

Identification	Sampled	Received	Extracted	Analyzed	Run #	Lab #
151-8564-5	08/17/94	08/19/94	08/26/94	08/26/94		1
152-8564-5	08/17/94	08/19/94	08/26/94	08/26/94		2

Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

ALASKA SOIL RECYCLING INC.
Attn: JIM ROGERS

Project 8564-5
Reported 26-August-1994

TOTAL PETROLEUM HYDROCARBONS BY EPA METHOD 418.1

Laboratory Number	Sample Identification	Matrix
58596- 1	151-8564-5	Soil
58596- 2	152-8564-5	Soil

RESULTS OF ANALYSIS

Laboratory Number:	58596- 1	58596- 2
PETROLEUM HYDROCARBONS:	ND<10	30
Concentration:	mg/kg	mg/kg

Superior Precision Analytical, Inc.
1555 Burke, Unit I ▪ San Francisco, California 94124 ▪ (415) 647-2081 / fax (415) 821-7123

TOTAL PETROLEUM HYDROCARBONS BY EPA METHOD 418.1
Quality Assurance and Control Data - Soil

Laboratory Number 58596

Compound	Method Blank (mg/kg)	RL (mg/kg)	Spike Recovery (%)	Limits (%)	RPD (%)
PETROLEUM HYDROCARBONS:	ND<10	10	97/93	50-137	4%

Definitions:
ND = Not Detected
RPD = Relative Percent Difference
RL = Reporting Limit
mg/kg = Parts per million (ppm)
QC File No. 58596

Cecilia G Joaquin 8/26/94
Senior Chemist
Account Manager

Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

ALASKA SOIL RECYCLING INC.
Attn: JIM ROGERS

Project 8564-5
Reported 26-August-1994

ANALYSIS FOR GASOLINE, BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
by EPA SW-846 Methods 5030/8015M/8020.

Chronology

Laboratory Number 58596

Identification	Sampled	Received	Extracted	Analyzed	Run #	Lab #
151-8564-5	08/17/94	08/19/94	08/22/94	08/22/94		1
152-8564-5	08/17/94	08/19/94	08/22/94	08/22/94		2

Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

ALASKA SOIL RECYCLING INC.
Attn: JIM ROGERS

Project 8564-5
Reported 26-August-1994

ANALYSIS FOR GASOLINE, BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES

Laboratory Number	Sample Identification	Matrix
58596- 1	151-8564-5	Soil
58596- 2	152-8564-5	Soil

RESULTS OF ANALYSIS

Laboratory Number:	58596- 1	58596- 2
Gasoline Range:	ND<1	ND<1
Benzene:	ND<.005	0.013
Toluene:	ND<.005	0.025
Ethyl Benzene:	ND<.005	0.008
Total Xylenes:	0.024	0.044
Concentration:	mg/kg	mg/kg
-- Surrogate % Recoveries --		
Trifluorotoluene (SS):	116	123

Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

ANALYSIS FOR GASOLINE, BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
Quality Assurance and Control Data - Soil

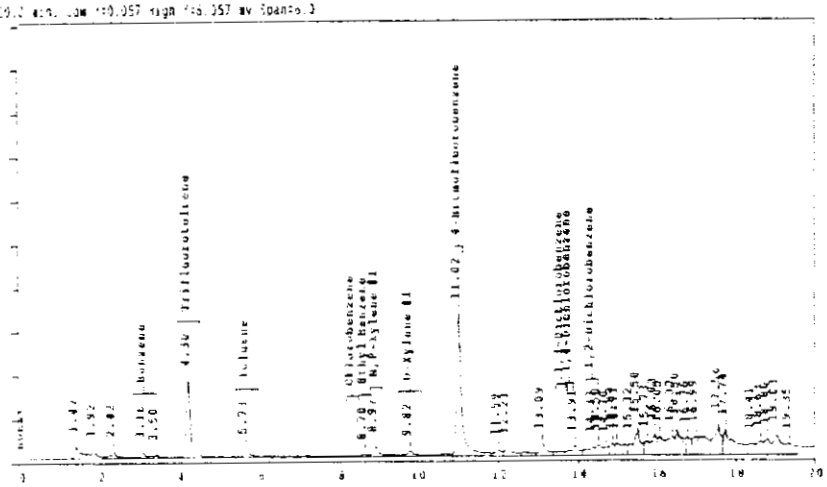
Laboratory Number 58596

Compound	Method Blank (mg/kg)	RL (mg/kg)	Spike Recovery (%)	Limits (%)	RPD (%)
Gasoline_Range:	ND<1	1	101/102	55-139	1%
Benzene:	ND<.005	.005	90/75	67-141	18%
Toluene:	ND<.005	.005	97/85	67-141	13%
Ethyl Benzene:	ND<.005	.005	95/85	67-141	11%
Total Xylenes:	ND<.005	.005	106/94	67-141	12%

Definitions:
ND = Not Detected
RPD = Relative Percent Difference
RL = Reporting Limit
mg/kg = Parts per million (ppm)
QC File No. 58596

Cecilia G. Joaquin 8/26/94
Senior Chemist
Account Manager

File:C:\CP\vpn\0822GCSP.16R Date printed:08-22-1994 Time: 23:36:42
Sample name:SAS1-58596-01
0.0 to 20.0 min. low =+0.057 high =+6.357 mv Sensitivity 3



** SUPERIOR ANALYTICAL LABORATORY--SAN FRANCISCO ** F <-
GC-5 #2950A27659

SAMPLE ID: SAS1-58596-01 DATA FILE: C:\CP\vpn\0822GCSP.16R

RUN DATE: ~~AUG~~ 22, 1994 23:36:01 INSTRUMENT: GAS/BTXE
OPERATOR: RB

METHOD: C:\CP\VPH\PVPHBTXE.MET SAMPLE WT/VOL: 1533
CALIB.: C:\CP\vpn\BTXE.CAL DILUTION: 1
LIMS METHOD: VPHBTXE RUN NUMBER:
ANAL/GC METHOD: 8020 INSTRUMENT SERIAL #:2950A26183
EXTRACTION METHOD: 5030

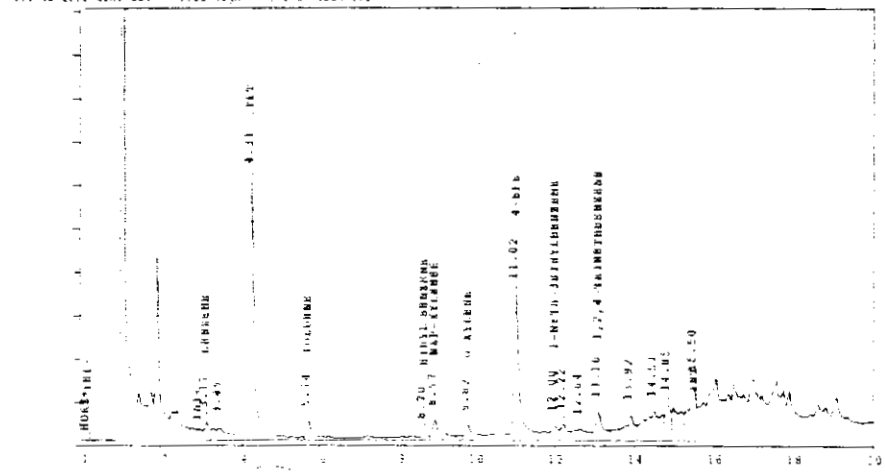
Peak No.	Ret Time (min)	Peak Area	Peak Height	Compound	Concentration (ug/L or ug/kg)	Amount (ng)
4	3.6	477	71	Benzene	4.46	2.32
5	4.20	9258	1047	Trifluorotoluene	229.98	145.58
7	5.72	1150	118	Toluene	11.18	7.08
8	8.28	3	0	Chlorobenzene	0.00	0.00
9	8.73	211	30	Ethyl Benzene	2.52	1.23
9	8.97	1294	126	M,P-Xylene #1	2.76	8.08
10	9.82	936	72	O-Xylene #1	10.62	6.72
11	11.02	27729	1959	4-Bromofluorobenzene	125.00	79.13
13	12.56	0	0	1,3-Dichlorobenzene	0.00	0.00
13	13.75	0	0	1,4-Dichlorobenzene	0.00	0.00
16	14.37	1653	104	1,2-Dichlorobenzene	21.32	13.49

1 Surrogate : Trifluorotoluene (SS)= 116.4679 %
2 TOTAL XYLENES : = 23.37973
3 QC Check : Purge Efficiency (LCS) = 95.18198 %

NDLO 0.05 mg/L
0.011 NC
ND LO 0.005
0.023 ✓

Checked by _____ Date _____

File:C:\CP\vpn\0822GCSP.16R Date printed:08-22-1994 Time: 23:58:42
Sample name:SAS1-58596-01
0.0 to 20.0 min. low =+0.05 high =+0.35 mv Sensitivity 1



SAMPLE ID: SAS1-58596-01 DATA FILE: C:\CP\vpn\0822GCSP.16R

RUN DATE: ~~AUG~~ 22, 1994 23:35:44 INSTRUMENT: GAS/BTXE
OPERATOR: RB

METHOD: C:\CP\VPH\PVPHBTXE.MET SAMPLE WT/VOL: 532
CALIB.: C:\CP\VPH\GAS.CAL DILUTION:
LIMS METHOD: vpnbtxe INSTRUMENT SERIAL#: 2950A19528
ANAL/GC METHOD: 8020
EXTRACTION METHOD: 5030

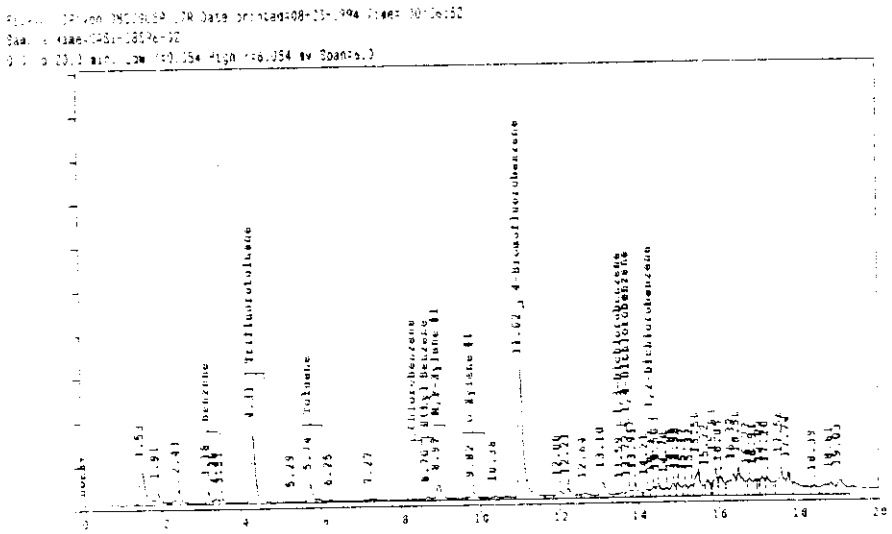
Ret Time (min)	Peak Name	Peak Area	Total
3.57	BENZENE	350	NA
4.21	TFT	7613	NA
5.77	TOLUENE	0	NA
8.74	ETHYL BENZENE	0	NA
9.01	M&P-XYLENES	0	NA
9.86	O-XYLENE	0	NA
11.02	4-BFB	20663	NA
12.34	1-METH-DIETHYLBENZ	0	NA
13.14	1,2,4-TRIMETHYLBEN	0	NA
30.00	GASINVERT	0	14905

TOTAL AREA = 27586
AREA OF TFT = 7614.848
AREA OF BFB = 3065.359
ADJUSTED TOTAL AREA = 14905.79
AMOUNT OF GASOLINE RANGE (ng) = 277.814
CONC. (ppb) = 428.4109

ND 2 ppm

Checked by _____ Date _____

00 0130



** SUPERIOR ANALYTICAL LABORATORY--SAN FRANCISCO ** F <-
GC-5 #2950A27659

SAMPLE ID: SAS1-58596-02

DATA FILE: C:\CP\vph\082CGC5P.17R

RUN DATE: AUG 23, 1994 00:16:12

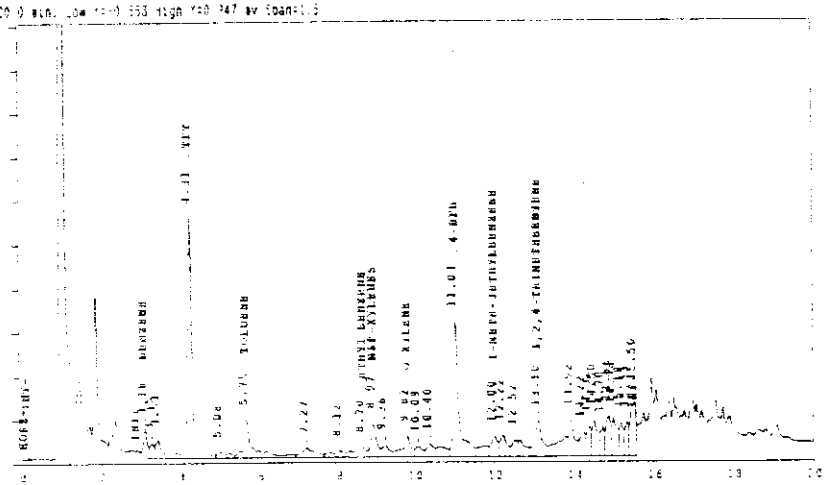
INSTRUMENT: GAS/BTXE
OPERATOR: RR

METHOD: C:\CP\VPH\PVPHBTXE.MET
CALIB.: C:\CP\VPH\VPHBTXE.CAL
GCMS METHOD: VPHBTXE
ANALYSIS METHOD: 8020
EXTRACTION METHOD: 5030

SAMPLE WT/VOL: 100
DIL. FACTOR:
RUN NUMBER:
INSTRUMENT SERIAL #: 2950A26187

Peak No.	Ret Time (min)	Peak Area	Peak Height	Compound	Concentration (ug/L or ug/kg)	Amount (ng)
1	[illegible]	[illegible]	[illegible]	Benzene	[illegible]	7.41
2	4.31	7856	964	Trifluorotoluene	247.98	153.75
3	5.74	2019	250	Toluene	22.67	14.05
4	6.28	0	0	Chlorobenzene	0.00	0.00
5	8.70	526	53	Ethyl Benzene	6.75	4.18
6	8.97	2051	215	M,P-Xylene #1	22.94	14.22
7	9.82	1570	108	O-Xylene #1	17.54	10.87
8	11.02	15953	1772	4-Bromofluorobenzene	125.00	77.50
11	12.89	786	64	1,3-Dichlorobenzene	12.68	7.80
12	13.27	822	87	1,4-Dichlorobenzene	9.49	5.88
15	14.27	950	140	1,2-Dichlorobenzene	13.90	8.62

Surrogate : Trifluorotoluene (SS): 122.9972 %
TOTAL XYLENES : = 40.58472
Purge Efficiency (1201) = 58.64907 %



SAMPLE ID: SAS1-58596-02

DATA FILE: C:\CP\vph\082CGC5P.17R

RUN DATE: AUG 23, 1994 00:15:54

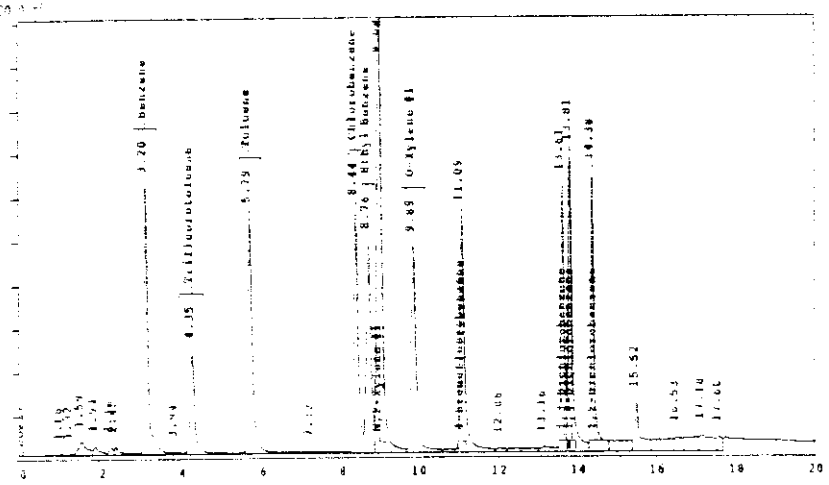
INSTRUMENT: GAS/BTXE
OPERATOR: RR

METHOD: C:\CP\VPH\PVPHBTXE.MET
CALIB.: C:\CP\VPH\VPHBTXE.CAL
GCMS METHOD: VPHBTXE
ANALYSIS METHOD: 8020
EXTRACTION METHOD: 5030

SAMPLE WT/VOL: 100
DIL. FACTOR:
RUN NUMBER:
INSTRUMENT SERIAL #: 2950A26187

Peak No.	Ret Time (min)	Compound	Peak Area	Concentration
1.18	[illegible]	BENZENE	[illegible]	ND
4.31	[illegible]	TFT	[illegible]	ND
[illegible]	[illegible]	TOLUENE	0	ND
8.74	[illegible]	ETHYLBENZENE	0	ND
8.91	[illegible]	M&P-XYLENES	0	ND
8.96	[illegible]	O-XYLENE	0	ND
[illegible]	[illegible]	4-BFB	[illegible]	ND
[illegible]	[illegible]	[illegible]-METHYL BENZENE	0	ND
[illegible]	[illegible]	[illegible]-METHYL[illegible]	0	ND
50.00	[illegible]	GASOLINE	[illegible]	24708

TOTAL AREA = [illegible]
AREA OF TFT = 6790.532
AREA OF BFB = 4718.836
ADJUSTED TOTAL AREA = 24307.75
AMOUNT OF GASOLINE_RANGE (ng) = 452.7408
CONC. (ppb) = 755.227



** SUPERIOR ANALYTICAL LABORATORY--SAN FRANCISCO **
GC-5 #2950A27659

SAMPLE ID: C1W1-08221-94-8020 DATA FILE: [illegible]

RUN DATE: AUG 22, 1994 08:50:04 INSTRUMENT: GAS/BTXE
OPERATOR: RB

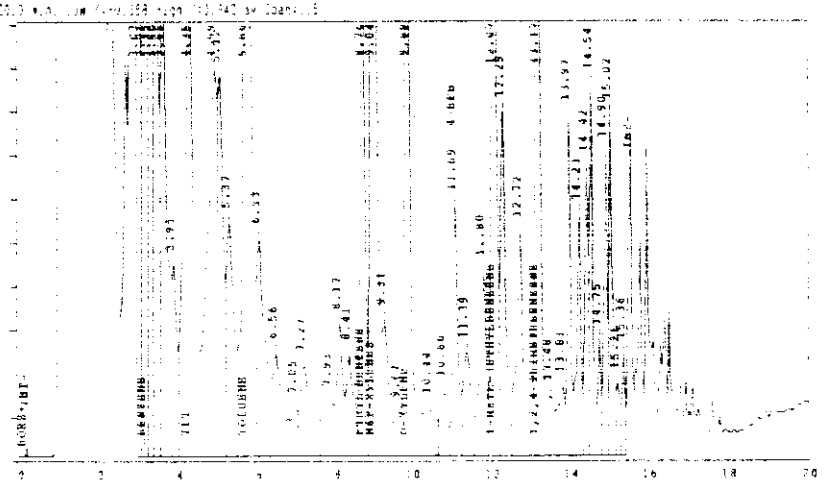
METHOD: [illegible]
CALIB.: [illegible]
LIMS METHOD: VPHBTXE
ANALYSIS METHOD: [illegible]
EXTRACTION METHOD: 5030

SAMPLE WT/VOL: 5
DILUTION: [illegible]
RUN NUMBER:
INSTRUMENT SERIAL #: [illegible]

Peak No.	Ret Time (min)	Peak Area	Peak Height	Compound	Concentration (ug/L or ug/Kg)	Amount (ug)
[illegible]	3.20	15168	1636	Benzene	19.34	74.21
[illegible]	4.35	11212	1083	Trifluorotoluene	24.39	124.24
[illegible]	5.79	25276	2021	Toluene	20.04	100.18
[illegible]	8.44	25224	1508	Chlorobenzene	19.73	98.67
[illegible]	8.76	22617	2849	Ethyl Benzene	20.50	102.51
[illegible]	9.84	55139	6580	M,P-Xylene #1	43.56	217.78
[illegible]	9.89	24004	1798	O-Xylene #1	21.83	109.16
[illegible]	11.09	28013	3221	4-Bromofluorobenzene	125.00	625.00
[illegible]	13.16	22506	3625	1,3-Dichlorobenzene	20.38	101.88
[illegible]	13.91	38564	4038	1,4-Dichlorobenzene	23.29	116.45
[illegible]	14.38	22746	3769	1,2-Dichlorobenzene	23.50	117.50

1) Surrogate : Trifluorotoluene (SS): 99.95 %
2) TOTAL XYLENES : = 65.38811
3) QC Check : Purge Efficiency (LCS) = 102.9951 %

Checked By _____ Date _____



SAMPLE ID: CCW1-08221-94-GAS

RUN DATE: AUG 22, 1994 [illegible] INSTRUMENT: GAS BTXE
OPERATOR: RB

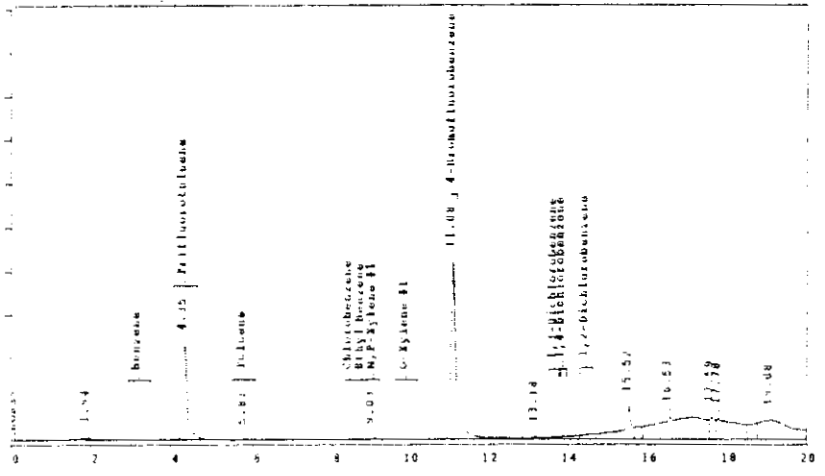
METHOD: [illegible]
CALIB.: [illegible]
LIMS METHOD: [illegible]
ANALYSIS METHOD: [illegible]
EXTRACTION METHOD: 5030

SAMPLE WT/VOL: [illegible]
DILUTION: 1
INSTRUMENT SERIAL: [illegible]

Ret Time (min)	Peak Name	Area	Height
3.21	BENZENE	[illegible]	[illegible]
4.20	[illegible]	[illegible]	[illegible]
5.77	TOLUENE	[illegible]	[illegible]
8.74	ETHYL BENZENE	[illegible]	[illegible]
9.01	M&P-XYLENES	[illegible]	[illegible]
9.86	O-XYLENE	[illegible]	[illegible]
11.09	4-BRB	[illegible]	[illegible]
12.04	1-METH-ETHYLBENZE	[illegible]	[illegible]
13.14	1,2,4-TRIMETHBENZE	[illegible]	[illegible]
30.00	GASINVEST	[illegible]	[illegible]

TOTAL AREA = 322115.4
AREA OF TFT = 28447.41
AREA OF BFB = 7614.022
ADJUSTED TOTAL AREA = 486284
AMOUNT OF GASOLINE_RANGE (ug) = 9231.759
CONC. (ppb) = 1846.352

Checked By _____ Date _____



** SUPERIOR ANALYTICAL LABORATORY--SAN FRANCISCO ** F <-
GC-5 #2950A27659

SAMPLE ID: MBW1-08221-94-BLANK DATA FILE: D:\CP\VPH\08220GSP.D3R

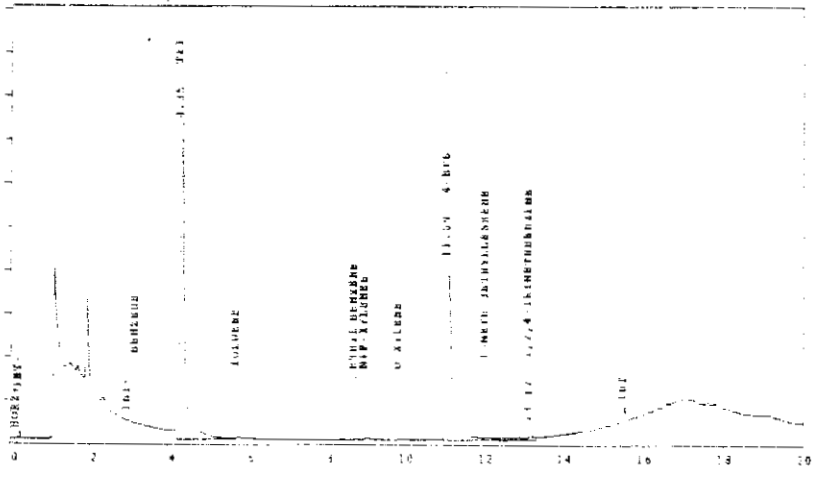
RUN DATE: AUG 22, 1994 09:42:44 INSTRUMENT: GAS/BTXE
OPERATOR: RB

METHOD: D:\CP\VPH\EVPHBTXE.MET SAMPLE WT./VOL: 5
CALIB.: D:\CP\VPH\GAS.CAL DILUTION: 1
LIMS METHOD: VPHBTXE RUN NUMBER:
ANALYSIS METHOD: 8020 INSTRUMENT SERIAL #:2950A26180
EXTRACTION METHOD: 5030

Peak No.	Ret Time (min)	Peak Area	Peak Height	Compound	Concentration (ug/L or ug/kg)	Amount (ng)
1	[illegible]	0	0	Benzene	0.00	0.00
2	4.35	1981	1299	Trifluorotoluene	26.00	133.51
3	5.21	94	12	Toluene	0.29	1.45
4	8.08	0	0	Chlorobenzene	0.00	0.00
5	8.69	0	0	Ethyl Benzene	0.00	0.00
6	9.03	180	17	M,P-Xylene #1	0.17	0.85
7	9.82	0	0	O-Xylene #1	0.00	0.00
8	11.08	22238	2429	4-Bromofluorobenzene	25.00	125.00
9	13.14	0	0	1,3-Dichlorobenzene	0.00	0.00
10	15.75	0	0	1,4-Dichlorobenzene	0.00	0.00
11	16.34	0	0	1,2-Dichlorobenzene	0.00	0.00

1 Surrogate : Trifluorotoluene (SS)= 106.8074 %
2 TOTAL XYLENES : = .1704261
3 QC Check : Purge Efficiency (LGC) = 85.8027 %

Reviewed by _____ Date _____



SAMPLE ID: MBW1-08221-94-BLANK

RUN DATE: AUG 22, 1994 09:42:27 INSTRUMENT: GAS/BTXE
OPERATOR: RB

METHOD: D:\CP\VPH\EVPHBTXE.MET SAMPLE WT./VOL: 5
CALIB.: D:\CP\VPH\GAS.CAL DILUTION: 1
LIMS METHOD: VPHBTXE
ANALYSIS METHOD: 8020
EXTRACTION METHOD: 5030

Ret Time (min)	Peak Name	Area	
3.20	BENZENE	[illegible]	[illegible]
4.35	TFT	[illegible]	[illegible]
5.77	TOLUENE	[illegible]	[illegible]
8.74	ETHYL BENZENE	[illegible]	[illegible]
9.01	M&P-XYLENES	[illegible]	[illegible]
9.86	O-XYLENE	[illegible]	[illegible]
11.09	4-BFB	[illegible]	[illegible]
12.94	1-METH-ETHYLBENZE	[illegible]	[illegible]
13.14	1,2,4-TRIMETHBENZE	[illegible]	[illegible]
50.00	GASINVERT	[illegible]	[illegible]

TOTAL AREA = 14965.71
AREA OF TFT = 9174.000
AREA OF BFB = 5627.343
ADJUSTED TOTAL AREA = 1564.1647
AMOUNT OF GASOLINE_RANGE (ng) = 3.058191
CONC. (ppb) = .0116381

Checked by _____ Date _____

000134

52596

Chain-of-Custody Record

Alaska Soil Recycling, Inc. — 1040 O'Malley Road, Anchorage, Alaska

DATE: 8/18/94 — Technician:

Sample No.	Date	Time	Analysis Required
150-8085-6	8-17-94	8:15	8015 8100
151-8564-5	8-17-94	10:30	418.1 8015 8020
152-8564-5	8-17-94	11:30	" " "
153-8000-7	8-17-94	12:00	418.1 8100
154-8000-7	8-17-94	2:45	" "
155-8000-7	8-17-94	3:45	" "

Remarks: ADEC Deliverables

Lab Sample Number: I 7509998171

Relinquished by:	Date	Time	Received by:	Date	Time
[illegible]	8/18/94	12:30 pm	Fed-Ex		
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time
			Tracy	8/19	9:05

Name and Address of Laboratory: Superior

[illegible] 8/19/94 5:pm

5°C

,0 4 4 35

L69.07
L69.07

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

SEATTLE
HANFORD
FAIRBANKS
ANCHORAGE
BOSTON
SAINT LOUIS

RECEIVED
SEP 20 1994
DEPARTMENT OF
ENVIRONMENTAL CONSERVA-
ADO

September 19, 1994

Alaska Department of Environmental Conservation
800 E. Dimond Blvd., Suite 3-470
Anchorage, Alaska 99515

Attn: Mr. Robert Weimer

RE: DISPOSAL OF WASTE SOILS FROM MUNICIPAL LIGHT & POWER SITES 1, 2, AND 3, ANCHORAGE, ALASKA

On behalf of our client, Municipal Light & Power (ML&P), Shannon & Wilson is requesting ADEC approval to dispose of an estimated 6 cubic yards of waste soils which were generated during assessment activities at ML&P Sites 1, 2, and 3 located at 1120 East 1st Avenue, 1121 East 1st Avenue, and 1201 East 3rd Avenue, respectively. The approximate location of the three sites is shown in the site map, Figure 1. This letter presents the information requested by the ADEC for authorization for disposal of the impacted soils at Alaska Soil Recycling (ASR) and Alaska Pollution Control (APC).

Select soil samples collected during the soil boring assessment activities conducted by both HLA and S&W were analyzed for petroleum hydrocarbon constituents and hazardous substances. The laboratory testing program consisted of one or more of the following analyses: total petroleum hydrocarbons (TPH) by EPA 418.1, diesel range organics (DRO)/extractable petroleum hydrocarbons (EPH) by EPA 3550/8100 Modified, gasoline range organics (GRO)/volatile petroleum hydrocarbons (VPH) by EPA 5030/8015 Modified, aromatic volatile organics (BTEX) by EPA 8020, halogenated volatile organics (HVOs) by EPA 8010, total metals by EPA 6000/7000 Series, extractable metals using the Toxic Characteristic Leaching Procedure (TCLP) by EPA 1311/6000/7000 and polychlorinated biphenyls (PCBs) by EPA 8080. The results of the laboratory testing programs are summarized on the attached tables taken from the various assessment reports completed by HLA and S&W. The analytical laboratory reports for each characterization sample are included in Appendix A. Analytical results of soil samples collected from each of the borings are used to characterize the cuttings for disposal.

Three soil borings, designated 1B01, 1B02, and 1B03, were drilled at Site 1 by HLA on May 21, 1992. The borings were located adjacent to a container storage area. Approximately 1 cubic yard of drill cuttings from these three borings was generated and placed in one super sack. The super sack is currently located on the south side of the warehouse building at Site 1 as shown in Figure 1. A total of five (5) samples, listed in Table 1, were tested for petroleum hydrocarbons and hazardous substances. The sample results are summarized in the attached HLA Tables 2 and 3 taken from their August 2, 1993 Phase II Remedial Investigation report. The soil samples contained up to 6,800 parts per million (ppm) TPH, 13 ppm GRO, 2,900 ppm DRO, 3,887 ppm residual range petroleum hydrocarbons (RPH) which is equal to the TPH concentration minus the DRO and GRO concentrations, 1.9 ppm BTEX, 2.9 ppm HVOs, and 0.31 ppm PCBs. The reported DRO and RPH quantities exceed the Alaska Department of Environmental Conservation's (ADECs) most stringent cleanup guidelines of 100 ppm DRO and 2,000 ppm RPH. In addition, the HVOs quantity exceeds the generally ADEC accepted cleanup guideline of 0.1 ppm. Due to the presence of detectable PCBs in two of the samples and the elevated levels of petroleum hydrocarbons and chlorinated solvents, we propose to dispose of the 1 cubic yard of drill cuttings through APC.

5430 FAIRBANKS STREET • SUITE 3
ANCHORAGE, ALASKA 99518
907 • 561 • 2120 FAX 907 • 561 • 4483

Y-5357

Five soil borings, designated 2B01 through 2B05, were drilled at Site 2 by HLA on May 19 and 20, 1994. The borings were positioned around a former waste oil underground storage tank location. Approximately 1 cubic yard of drill cuttings from these five borings was generated and placed in one super sack. The super sack is currently located on the north side of the garage at Site 2 as shown in Figure 1. A total of five (5) samples, listed in Table 1, were tested for petroleum hydrocarbons and chlorinated solvents. The sample results are summarized in the attached HLA Table 5 taken from their August 2, 1993 Phase II Remedial Investigation report. The soil samples contained up to 750 ppm TPH, non-detectable GRO, 16 ppm DRO, 734 ppm RPH, non-detectable BTEX, and 0.096 ppm total HVOs. These results do not exceed the ADECs most stringent cleanup guidelines for petroleum hydrocarbon constituents. In addition, the total HVO concentrations are less than the generally accepted cleanup level of 0.1 ppm. However, since detectable quantities of HVOs were found in the soil samples, we propose to dispose of the 1 cubic yard of drill cuttings through ASR.

Three soil borings, designated B1, B2 and B3, were drilled at Site 2 by S&W on July 16, 1993. The borings were positioned around the former waste oil tank to further define the extent of chlorinated solvent contamination at Site 2. Approximately 1 cubic yard of drill cuttings from these three borings was generated and placed in one super sack. The super sack is currently located on the north side of the garage at Site 2 as shown in Figure 1. Three (3) samples collected from the borings and one (1) composite sample collected from the cuttings, as listed in Table 1, were tested for petroleum hydrocarbons and hazardous substances. The sample results are summarized in the attached S&W Table 6 taken from their September 1993 Additional Soil and Groundwater Characterization report. The soil samples collected and tested from the borings contained up to 0.27 ppm total HVOs. The composite sample collected from the soil cuttings contained 210 ppm TPH, non-detectable BTEX, 0.661 ppm extractable barium using the Toxic Characteristic Leaching Procedure (TCLP), 0.01 ppm chromium using the TCLP, and 0.0007 ppm mercury using TCLP. Since DRO and GRO analyses were not completed as part of the soil testing program, we are equating the concentration of TPH to DRO and GRO for disposal characterization. The reported TPH quantity of 210 ppm exceeds the Alaska Department of Environmental Conservation's (ADECs) most stringent cleanup guidelines of 100 ppm DRO and 50 ppm GRO. In addition, the HVOs quantity exceeds the generally ADEC accepted cleanup guideline of 0.1 ppm. We propose to dispose of the 1 cubic yard of drill cuttings through ASR.

Fourteen soil borings, designated 3B01 through 3B12, 3MW01 and 3MW04, were drilled at Site 3 by HLA from May 8 to 19, 1992. Approximately 1.5 cubic yards of drill cuttings from these borings were generated and placed in two super sacks. The super sacks are currently located in the unheated storage area at Site 1 as shown in Figure 1. A total of fifteen (15) samples, listed in Table 1, were tested for petroleum hydrocarbons and hazardous substances. The samples collected from borings drilled in the vicinity of a former diesel fuel and heating oil underground storage tank (UST) areas were tested for TPH and DRO. Samples collected from the former gasoline and waste oil UST areas were tested for TPH, GRO, DRO, and BTEX. The sample results are summarized in the attached HLA Tables 7 and 8 taken from their August 2, 1993 Phase II Remedial Investigation report. The soil samples contained up to 15,000 ppm TPH, 5,500 ppm GRO, 12,000 ppm DRO, 9,270 ppm RPH, 11 ppm benzene, and 604.1 ppm BTEX. The reported GRO, DRO, RPH, benzene and total BTEX quantities exceed the Alaska Department of Environmental Conservation's (ADECs) most stringent cleanup guidelines of 50 ppm GRO, 100 ppm DRO, 2,000 ppm RPH, 0.1 ppm benzene, and 10 ppm total BTEX. We propose to dispose of the 1.5 cubic yard of drill cuttings through ASR.

Soil cuttings generated during the installation of vapor extraction well VES4 and air injection well AIS7 on May 25, 1994 were placed in a 55-gallon drum. Approximately 0.4 cubic yards are soil

are estimated to be contained in the drum which is currently located off of the northwest corner of the storage building at Site 3 as shown in Figure 1. The wells were installed as part of a treatment system for the remediation of petroleum impacted soil and groundwater at Site 3 and are located about 3 feet apart. One soil sample, B20S2 collected at a depth of 14 to 16 feet from VES4, was analyzed for TPH, HVOs and PCBs. Sample B20S2 contained 29,100 ppm TPH and non-detectable HVOs and PCBs. Equating the TPH concentration to DRO and GRO, the quantity of TPH in the sample exceeds the ADEC most stringent cleanup guidelines of 50 ppm GRO and 100 ppm DRO. We propose to dispose of the approximately 0.4 cubic yards of drill cuttings through ASR.

We are proposing to transport the contaminated soils to the ASR or APC for disposal. We estimate up to approximately 1 cubic yard of impacted soil will be disposed of through APC while the remaining estimated 5 cubic yards will be disposed of through ASR.

The contaminated soil transportation will be provided by BC Excavation for the soils disposed of through ASR while the soils disposed of through APC will be transported by APC to their disposal facility. The soils will be transported from the project site to the selected disposal site in covered loads. Shannon and Wilson will coordinate the transport of these soils from the site to the ASR or APC using chain-of-custody procedures.

With this letter, Shannon and Wilson would like to petition ADEC for approval for the ASR and APC to receive the estimated 6 cubic yards of contaminated soil from the ML&P Sites 1, 2, and 3. The scale receipts for disposal at ASR and APC will be submitted to the Department. The ADEC can indicate approval for disposal of the soils at ASR and APC by signing the line provided at the bottom of this letter.

Please feel free to call the undersigned with any questions or comments on the contents of this letter or the attached laboratory test results.

Sincerely,

SHANNON & WILSON, INC.

LeeAnne Osgood

LeeAnne Osgood
Senior Engineer

DLO/mac

Encl: Figures 1, Tables 1-3, 5-8, Appendix A

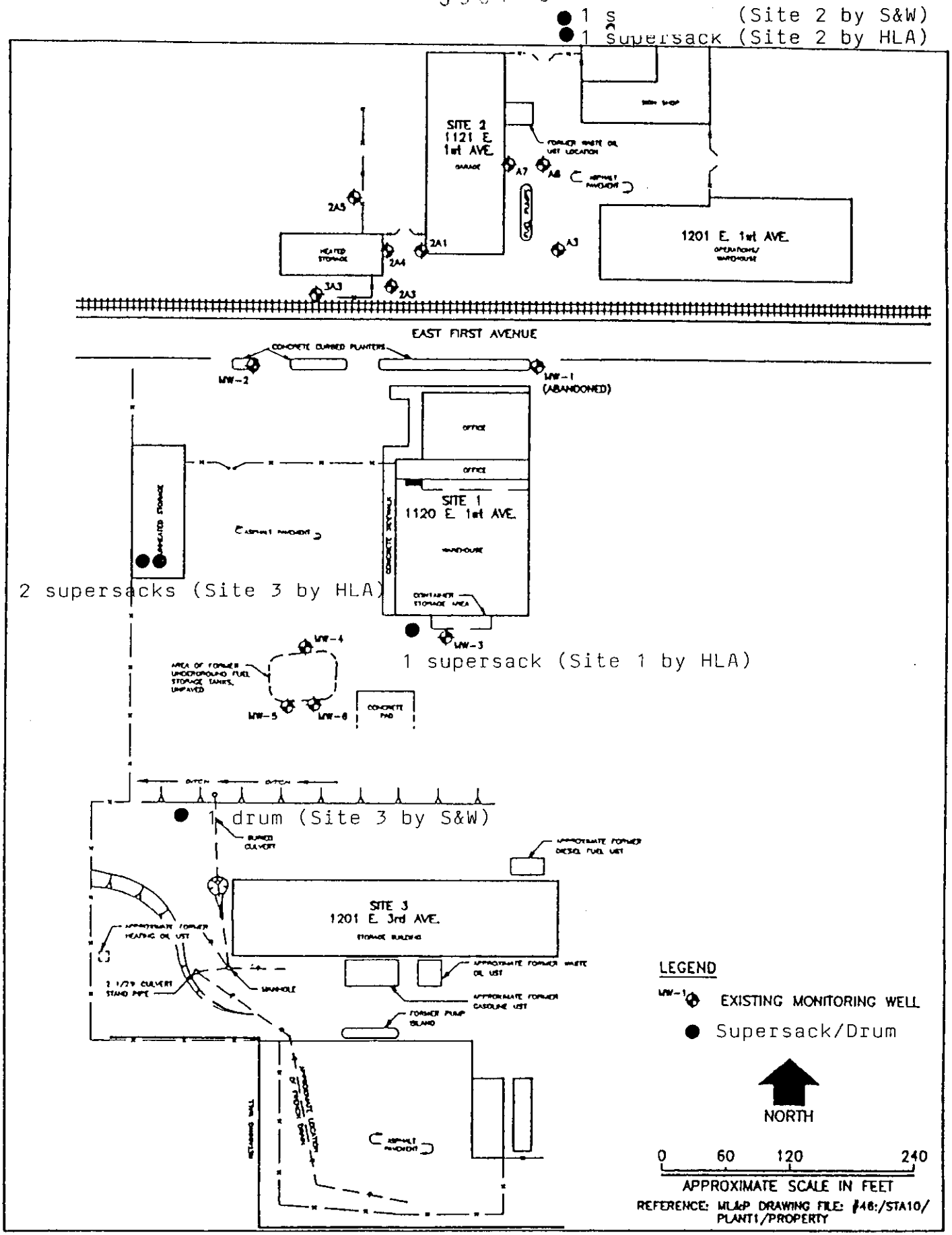
Disposal of Soils at Alaska Soil Recycling and/or Alaska Pollution Control approved by:

Robert Wekiner

ADEC Representative

Robert Wekiner
ADEC/ADO

cc: Mr. Ron Kuczek, ML&P
Mr. Jim Pfeifer, ML&P
Mr. Mike Krueger, MOA-DPW



Harding Lawson Associates
Engineering and Environmental Services

ML&P Project Site Map

ML&P Phase 2 Remedial Investigation
Anchorage, Alaska

Figure 1

DRAWN	PROJECT NUMBER	APPROVED	DATE	FILE NAME
JP	10585	MAB	11/92	131J

TABLE 1 - SAMPLE LOCATIONS AND DESCRIPTIONS

Source Area	Sample No.	Sample Location	Date Sampled	Sample Classification
Site 1 Auger Cuttings Super Sack - 1cy	1B01SB	Soil Sample from HLA Boring 1B01	5/21/92	Silty, sandy GRAVEL
	1B02SB	Soil Sample from HLA Boring 1B02	5/21/92	Gravelly SAND
	1B02SC1	Soil Sample from HLA Boring 1B02	5/21/92	Gravelly SAND
	1B02SC2	Soil Sample from HLA Boring 1B02	5/21/92	Gravelly SAND
	1B03SA	Soil Sample from HLA Boring 1B03	5/21/92	Gravelly SAND
Site 2 Auger Cuttings Super Sack - 1cy	2B01SB	Soil Sample from HLA Boring 2B01	5/19/92	Gravelly SAND
	2B02SB	Soil Sample from HLA Boring 2B02	5/20/92	Gravelly SAND
	2B03SA	Soil Sample from HLA Boring 2B03	5/20/92	Gravelly SAND
	2B04SB	Soil Sample from HLA Boring 2B04	5/20/92	Gravelly SAND
	2B05SB	Soil Sample from HLA Boring 2B05	5/20/92	Gravelly SAND
Site 2 Auger Cuttings Super Sack - 1cy	B1S3	Soil Sample from S&W Boring B-1MW	7/16/93	Sandy, gravelly SILT
	B2S2	Soil Sample from S&W Boring B-2MW	7/16/93	Silty, sandy GRAVEL
	B3S2	Soil Sample from S&W Boring B-3MW	7/16/93	Silty, gravelly SAND
	DC1	Drill Cuttings Composite Sample	7/16/93	Silty, gravelly SAND
Site 3 Auger Cuttings Super Sacks - 1.5cy	3B04SD	Soil Sample from HLA Boring 3B04	5/11/92	Gravelly SAND
	3B05SB	Soil Sample from HLA Boring 3B05	5/11/92	Silty SAND
	3MW01SA	Soil Sample from HLA Boring 3MW01	5/11/92	Gravelly SAND
	3MW04SC1	Soil Sample from HLA Boring 3MW04	5/18/92	SAND
	3B01SC	Soil Sample from HLA Boring 3B01	5/8/92	Silty SAND
	3B02SA	Soil Sample from HLA Boring 3B02	5/8/92	Gravelly SAND
	3B03SB	Soil Sample from HLA Boring 3B03	5/8/92	Gravelly SAND
	3B06SA	Soil Sample from HLA Boring 3B06	5/12/92	Sandy GRAVEL
	3B07SA	Soil Sample from HLA Boring 3B07	5/12/92	Sandy GRAVEL
	3B08SF	Soil Sample from HLA Boring 3B08	5/15/92	Sandy GRAVEL
	3B09SC1	Soil Sample from HLA Boring 3B09	5/15/92	SAND
	3B09SC2	Soil Sample from HLA Boring 3B09	5/15/92	SAND
	3B10SD	Soil Sample from HLA Boring 3B10	5/18/92	Gravelly SAND
	3B11SA	Soil Sample from HLA Boring 3B11	5/19/92	SAND
	3B12SE	Soil Sample from HLA Boring 3B12	5/19/92	Silty SAND
Site 3 Auger Cuttings Drum - 0.4cy	B20S2	Soil Sample from S&W Boring VES4	5/25/94	Sandy GRAVEL

Table 2. Petroleum Hydrocarbon-Related Analytes Detected In Site 1 Soil Samples

Sample Number	Sample Depth	IR Screen (mg/kg-wet)	TRPH (mg/kg-dry)	VPH (mg/kg-dry)	EPH (mg/kg-dry)	Benzene (µg/kg-dry)	Total BETX (µg/kg-dry)
1SS01	0 to 1.5	38					
1SS02	0 to 1.5	23					
1SS03	0 to 1.5	66					
1SS04	0 to 1.5	200					
1SS05	0 to 1.5	93					
1SS06	0 to 1.5	79					
1SS07	0 to 1.5	20					
1SS08	0 to 1.5	2300					
1SS09	0 to 1.5	53					
1SS10	0 to 1.5	99	190	<0.27	<11	<5	123
1SS10 dup	0 to 1.5	110	250	<0.27	<11	<5	0
1SS11	0 to 1.5	370					
1SS12	0 to 1.5	97					
1SS13	0 to 1.5	360					
1SS14	0 to 1.5	1400	1200	<0.27	<11	<6	22
1SS15	0 to 1.5	1600					
1SS16	0 to 1.5	180					
1SS17	0 to 1.5	4700	13000	21	2800	<110	1600
1SS18	0 to 1.5	1500					
1SS18 dup	0 to 1.5	1200					
1SS19	0 to 1.5	96					
1SS20	0 to 1.5	17	33	<0.27	<11	<6	0
1B01SA	0 to 1.5	310					
1B01SB	1.5 to 3	4400	4600	1.6	1300	<3	121
1B01SC1	3 to 4.5	300					
1B01SC2	3 to 4.5	310					
1B01SD	4.5 to 6	1000					
1B01SE	6 to 7.5	23					
1B01SF	7.5 to 9	20					
1B02SA1	0 to 1.5	190					
1B02SA2	0 to 1.5	80					
1B02SB	1.5 to 3	6900	6800	13	2900	<11	369
1B02SC1	3 to 4.5	41				<56	370
1B02SC2						<560	1900
1B02SD1	4.5 to 6	17					
1B02SD2	4.5 to 6	11					
1B02SE	6 to 7.5	9.1					
1B02SF	7.5 to 9	6.5					
1B03SA	0 to 1.5	62	710	<0.27	16	<3	0
1B03SB	1.5 to 3	11					
1B03SC	3 to 4.5	10					
1B03SD	4.5 to 6	7.9					
1B03SE	6 to 7.5	7.5					
1B03SF	7.5 to 9						

BETX = Benzene, ethylbenzene, toluene, and xylenes.
EPH = Diesel-range petroleum hydrocarbons.
mg/kg-dry = Milligrams per kilogram - dry.
mg/kg-wet = Milligrams per kilogram - wet.
NA = Not analyzed.
NRQ = Not requested.
0 = No individual BETX compound above method detection levels.
TRPH = Total recoverable petroleum hydrocarbons.
µg/kg-dry = Micrograms per kilogram - dry.
VPH = Gasoline-range petroleum hydrocarbons.
< = Less than the detection level shown.

Table 3. Non-Petroleum Hydrocarbon-Related Analytes Detected in Site 1 Soil Samples

Sample Number	Sample Depth	Methylene Chloride (ug/kg-dry)	Tetrachloro-ethene (ug/kg-dry)	1,1,1-Tri-chloroethane (ug/kg-dry)	1,2-Dichloro-benzene (ug/kg-dry)	1,3-Dichloro benzene (ug/kg-dry)	1,4-Dichloro-benzene (ug/kg-dry)	Arsenic (mg/kg-wet)	Cadmium (mg/kg-wet)	Chromium (mg/kg-wet)	Lead (mg/kg-wet)	PCB 1242/1016 (mg/kg-dry)	PCB 1254 (mg/kg-dry)
1801S8	1.5 to 3	<270	<54	<54	85	57	88	4	1.4	27	26	<0.017	0.035
1802S8	1.5 to 3	<27	<5	<5	710	<11	75	4.4	1.2	30	68	0.13	0.18
1802SC1	3 to 4.5	110	<56	<56	<110	<110	<110	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ
1802SC2	3 to 4.5	2900	<560	<560	<1100	<1100	<1100	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ
1803SA	0 to 1.5	16	<5	<5	<11	<11	<11	4.1	ND	29	14	<0.017	<0.017
1SS10	Surface	<27	<5	<5	<11	<11	<11	5	<0.5	30	18	<0.020	<0.020
1SS10 dup	Surface	<27	<5	<5	<11	<11	<11	5	<0.5	26	11	<0.020	0.029
1SS14	Surface	150	<6	<6	<11	<11	<11	5	<0.5	30	140	<0.020	0.32
1SS17	Surface	<540	<110	<110	<220	<220	<220	5.4	<0.5	27	70	<0.020	0.11
1SS20	Surface	<27	<6	<6	<11	<11	<11	3.3	<0.5	31	3.3	<0.020	<0.020

mg/kg-wet = Milligrams per kilogram - wet.
mg/kg-dry = Milligrams per kilogram - dry.
NRQ = Not requested.
PCB = Polychlorinated biphenyls.
ug/kg-dry = Micrograms per kilogram - dry.
< = Less than the detection level shown.

000141

Table 5. Analytes Detected in Site 2 Soil Samples

Sample Number	Sample Depth	IR Screen (mg/kg-wet)	TRPH (mg/kg-dry)	VPH (mg/kg-dry)	EPH (mg/kg-dry)	Benzene (mg/kg-dry)	Total BETX (mg/kg-dry)	Methylene Chloride (ug/kg-dry)	Tetrachloro-ethene (ug/kg-dry)	1,1,1-Tri chloroethane (ug/kg-dry)	1,2-Dichloro benzene (mg/kg-dry)	1,3-Dichloro benzene (mg/kg-dry)	1,4-Dichloro-benzene (mg/kg-dry)
2B01SA	0 to 1.5	67	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2B01SB	1.5 to 3	280	130	<0.26	12	<0.0026	0	31	<5	<5	<0.0026	<0.0026	<0.0026
2B01SC	3 to 4.5	27	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2B02SA	0 to 1.5	170	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2B02SB	1.5 to 3	670	97	<0.27	16	<0.0027	0	81	10	5	<0.0027	<0.0027	<0.0027
2B02SC	3 to 4.5	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2B03SA	0 to 1.5	170	83	<0.25	<11	<0.0026	0	56	5	5	<0.01	<0.01	<0.01
2B03SB	1.5 to 3	66	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2B03SC	3 to 4.5	140	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2B04SA	0 to 1.5	210	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2B04SB	1.5 to 3	280	720	<0.25	<11	<0.0026	0	55	6	6	<0.011	<0.011	<0.011
2B04SC	3 to 4.5	49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2B05SA	0 to 1.5	83	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2B05SB	1.5 to 3	240	750	<0.28	<10	<0.0026	0	77	6	10	<0.011	<0.011	<0.011
2B05SC	3 to 4.5	49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

BETX = Benzene, ethylbenzene, toluene, and total xylenes.
EPH = Diesel-range petroleum hydrocarbons.
mg/kg-dry = Milligrams per kilogram - dry.
mg/kg-wet = Milligrams per kilogram - wet.
NA = Not applicable.
NRQ = Not requested.
0 = No individual BETX compound above method detection limit.
PCB = Polychlorinated biphenyls.
TRPH = Total recoverable petroleum hydrocarbons.
ug/kg-dry = Micrograms per kilogram - dry.
VPH = Gasoline-range petroleum hydrocarbons.
< = Less than the detection level shown.

000142

Table 6. Summary of Analytical Results

Soil Results (mg/kg dry)

Location	Soil Sample #	Carbon Tetrachloride	Tetrachloroethylene (PCE)	1,1,1-Trichloroethane	Trichloroethylene (TCE)
B1/MW1	B1S3	0.03	0.09	0.07	0.08
B2/MW2	B2S2	<0.01	0.11	<0.01	0.06
B3/MW3	B3S2	0.02	0.02	<0.01	0.03

Drill Cuttings Composite Results (mg/kg dry)

Sample #	Total Petroleum Hydrocarbons	BTEX	TCLP Metals (mg/l)		
			Barium	Chromium	Mercury
DC1	210	ND	0.661	0.01	0.0007

Water Results (ug/l)

Location	Water Sample #	Chloroform	Tetrachloroethylene (PCE)	1,1,1-Trichloroethane	Trichloroethylene (TCE)
B1/MW1	W1	1.6	0.6	<0.2	1.1
B2/MW2	W2	<2.0	25	160	43
B3/MW3	W3	<0.2	2.5	<0.2	3.7

Biological Assay Results

Location	Water Sample #	Heterotrophic Plate Count	Iron Bacteria		
B1/MW1	W1	>8.0x10E9	Negative		
B2/MW2	W2	1.75x10E9	Negative		
B3/MW3	W3	8.5x10E8	Negative		

Table 7. Analytes Detected in Soil Samples from the Site 3 Diesel Fuel and Heating Oil Underground Storage Tank Areas

Sample Number	Sample Depth	IR Screen (mg/kg-dry)	TRPH (mg/kg-dry)	EPH (mg/kg-dry)
3B04SA	0 to 1.5	440	NRQ	NRQ
3B04SB	1.5 to 3	11	NRQ	NRQ
3B04SC	3 to 4.5	20	NRQ	NRQ
3B04SD	4.5 to 6	540	520	210
3B04SE	6 to 7.5	12	NRQ	NRQ
3B04SF	7.5 to 9	13	NRQ	NRQ
3B04SG	9 to 10.5	12	NRQ	NRQ
3B05SA	5 to 6.5	12000	NRQ	NRQ
3B05SB	6.5 to 8	13000	NRQ	3900
3B05SC	8 to 9.5	26	NRQ	NRQ
3B05SD	9.5 to 11	11	NRQ	NRQ
3MW01SA	0 to 1.5	40	NRQ	<11
3MW01SB	1.5 to 3	15	NRQ	NRQ
3MW01SC	3 to 4.5	7.4	NRQ	NRQ
3MW01SD	4.5 to 6	11	NRQ	NRQ
3MW01SE	6 to 7.5	5.4	NRQ	NRQ
3MW04SA	8.5 to 10	1100	NRQ	NRQ
3MW04SB	10 to 11.5	1900	NRQ	NRQ
3MW04SC1	11.5 to 13	15000	NRQ	980
3MW04SC2	11.5 to 13	16000	NRQ	NRQ
3MW04SD	13 to 14.5	19	NRQ	NRQ
3MW04SE	14.5 to 16	11	NRQ	NRQ
3MW04SF	16 to 17.5	130	NRQ	NRQ

EPH = Diesel-range petroleum hydrocarbons.
mg/kg-dry = Milligrams per kilogram - dry.
NRQ = Not requested.
TRPH = Total recoverable petroleum hydrocarbons.
< = Less than the detection level shown.

Table 8. Analytes Detected in Soil Samples from the Site 3 Gasoline and Waste Oil Underground Storage Tank Areas

Sample Number	Sample Depth	IR Screen (mg/kg-wet)	TRPH (mg/kg-dry)	VPH (mg/kg-dry)	EPH (mg/kg-dry)	Benzene (mg/kg-dry)	Toluene (mg/kg-dry)	Ethyl-benzene (mg/kg-dry)	Total Xylenes (mg/kg-dry)	Chloro-benzene (mg/kg-dry)	1,2 Dichloro-benzene (mg/kg-dry)	1 ,3 Dichloro-benzene (mg/kg-dry)	1,4-Dichloro-benzene (mg/kg-dry)
3B01SC	3 to 4.5	9400	NRQ	350	NRQ	8.1	1.1	4.1	21	0.37	1.0	0.98	0.92
3B02SA	0 to 1.5	610	NRQ	<0.26	NRQ	<0.0024	<0.0024	<0.0024	<0.0053	<0.0026	<0.0026	<0.0026	0.012
3B03SB	1.5 to 3	11	NRQ	<0.27	NRQ	0.016	<0.0027	<0.0027	<0.0053	<0.0027	<0.0027	<0.0027	0.0037
3B06SA	0 to 1.5	240	NRQ	<0.26	NRQ	<0.0026	<0.0026	<0.0026	<0.0053	<0.0026	NRQ	NRQ	NRQ
3B07SA	0 to 1.5	470	NRQ	<0.26	NRQ	<0.0026	<0.0026	<0.0026	<0.0053	<0.0026	NRQ	NRQ	NRQ
3B08SF	7.5 to 9	5100	NRQ	430	NRQ	<0.55	1.1	1.1	8.7	1.0	2.9	2.0	0.69
3B09SC1	3 to 4.5	13000	15000	5500	230	4.1	1.7	61	500	3.7	24	5.7	3.9
3B09SC2	3 to 4.5	13000	14000	3600	8400	9.2	160	41	420	2.8	28	<1.1	4.3
3B10SD	4.5 to 6	13000	10000	1800	12000	<0.56	0.79	1.1	160	2.4	28	1.8	4.6
3B11SA	8 to 9.5	7300	NRQ	810	NRQ	11	0.34	5.2	70	1.9	22	0.87	3.0
3B12SE	6 to 7.5	2600	4400	390	2200	0.21	0.18	4.5	37	0.72	2.0	1.3	1.1

EPH = Diesel-range petroleum hydrocarbons.
mg/kg-dry = Milligrams per kilogram - dry.
mg/kg-wet = Milligrams per kilogram - wet.
NRQ = Not requested.
TRPH = Total recoverable petroleum hydrocarbons.
VPH = Gasoline-range petroleum hydrocarbons.
< = Less than the detection level shown.

00014 5

000146 L69,07

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

SEATTLE
HANFORD
FAIRBANKS
ANCHORAGE
BOSTON
SAINT LOUIS

October 5, 1994

Alaska Department of Environmental Conservation
Western Regional District Office
800 E. Dimond Blvd., Suite 3-470
Anchorage, Alaska 99515

Attn: Mr. Robert Weimer

RE: START-UP OF REMEDIATION SYSTEM AT ML&P SITE NO. 3, 1201 EAST THIRD AVENUE, ANCHORAGE, ALASKA

As per our phone conversation of October 3, 1994, Shannon & Wilson is submitting this letter to inform you of our intent to begin continuous operation of the remediation system installed at the above-referenced site. The purpose of the remediation system is to provide an in-situ treatment method for subsurface soil and groundwater impacted with gasoline and waste oil associated with several former underground storage tanks (USTs). Components of the installed remediation system include a vapor extraction system (VES), an air injection system (AIS), and nutrient feed lines to enhance biological degradation.

Shannon & Wilson conducted feasibility testing of the proposed remediation technologies at this site between May 4 and 6, 1994. Based on the feasibility test results, the treatment system was installed by BC Excavating between May 23 and September 2, 1994. Following completion of a fire inspection and securing the appropriate Municipality of Anchorage (MOA) operating permits, the VES and AIS components were activated for a trial run on September 30, 1994. It is expected that further trial runs and other fine-tuning of the system will continue through October 7, 1994. Barring unexpected delays, we anticipate that continuous operation of the remediation system will begin on October 10, 1994.

All work performed as part of the remediation system installation was conducted in accordance with the specifications set forth in Shannon & Wilson's May, 1994 document titled "Soil & Groundwater Corrective Action Plan (CAP), 1201 East Third Avenue, Anchorage, Alaska." A verbal approval to proceed with the installation work was received from Robert Weimer of Department of Environmental Conservation (ADEC) in May, 1994. We assume that the ADEC is familiar with the project and approves of the remediation activities for this site, as outlined in the CAP.

5430 FAIRBANKS STREET • SUITE 3
ANCHORAGE, ALASKA 99518
907 • 561 • 2120 FAX 907 • 561 • 4483

We will continue to inform the ADEC of our ongoing remediation efforts at this site. Please contact us with any additional questions and/or comments you may have.

Sincerely,

SHANNON & WILSON, INC

Matthew Hemry
Engineer II

cc: Mr. Ron Kuczek, ML&P
Mr. Larry Frick, ML&P
Mr. Mike Krueger, MOA/Public Works

WALTER J. HICKEL, GOVERNOR

File

DEPT. OF ENVIRONMENTAL CONSERVATION
ANCHORAGE DISTRICT OFFICE
800 E. DIMOND BLVD., SUITE 3-470
ANCHORAGE, AK 99515

Telephone: (907) 349-7755
Fax: (907) 349-9836

July 28, 1994

Mr. Ron Kuczek
Asst. to the General Manager
Municipal Light & Power
1200 E First Avenue
Anchorage, AK 99501-1685

Re: Shannon & Wilson's Soil disposal request dated 7/7/94 and 7/27/94 meeting request for contaminated drill cuttings from ML&P sites #1, #2, and #3.
ADO File #'s: L69.09, L69.05, **L69.07**

Dear Mr. Kuczek:

The department has completed its review of Shannon & Wilson's soil disposal request dated 7/7/94 for the contaminated drill cuttings from ML&P site #3, located at 1201 E Third Ave. The department has also completed its review of Shannon & Wilson's soil disposal request presented in the 7/27/94 meeting for the contaminated drill cuttings from ML&P sites #1 (located at 1120 E 1st Ave), #2 (located at 1201 E 1st Ave), and #3 (located at 1201 E 3rd Ave).

The above referenced contaminated drill cuttings are **not approved** to be used as backfill. From discussions with Shannon & Wilson it appears that some of the contaminated drill cutting were mistakenly used as backfill without department approval. The department requests that all of the contaminated drill cuttings that have been used as backfill be excavated and a report documenting the removal of these soils be submitted to the department by August 19, 1994. The department also requests the submittal of a treatment/disposal plan for all of the contaminated drill cuttings from ML&P sites #1, #2, and #3 by August 31, 1994.

If you have any questions, please do not hesitate to contact me at 349-7755.

Sincerely,

Robert Weimer

Robert Weimer
Leaking UST Program

cc: Bill Burgess, Shannon & Wilson

000149 L69.07

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

SEATTLE
HANFORD
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BOSTON
SAINT LOUIS

RECEIVED
DEC 30 1994
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

December 27, 1994

Alaska Department of Environmental Conservation
800 E. Dimond Blvd., Suite 3-470
Anchorage, Alaska 99515

Attn: Mr. Robert Weimer

RE: DISPOSAL OF WASTE SOILS FROM MUNICIPAL LIGHT & POWER SITES 1, 2, AND 3, ANCHORAGE, ALASKA

As requested in our September 19, 1994 letter, waste soils generated during assessment activities at ML&P Sites 1, 2, and 3 located at 1120 East 1st Avenue, 1121 East 1st Avenue, and 1201 East 3rd Avenue, respectively, have been transported off-site to Alaska Soil Recycling (ASR) and Alaska Pollution Control (APC) for treatment and disposal. A total of 0.64 tons of soil were transported to APC for disposal on October 27, 1994. One (1) 55-gallon drum of soil and 2.16 tons of soil were transported to ASR for processing on October 25, 1994. Copies of the Bill of Lading (for APC) and scale receipts are included in Attachment A.

Please feel free to call the undersigned with any questions or comments on the contents of this letter or the attached laboratory test results.

Sincerely,

SHANNON & WILSON, INC.

LeeAnne Osgood

LeeAnne Osgood, P.E.
Senior Engineer

DLO/mac

Encl: Attachment A

cc: Mr. Ron Kuczek, ML&P
Mr. Jim Pfeifer, ML&P
Mr. Mike Krueger, MOA-DPW

5430 FAIRBANKS STREET • SUITE 3
ANCHORAGE, ALASKA 99518
907 • 561 • 2120 FAX 907 • 561 • 4483

Y-5357

ATTACHMENT A

BILL OF LADING AND SCALE RECEIPTS

P.01

STRAIGHT BILL OF LADING

ORIGINAL - NOT NEGOTIABLE

Shipper No. B 5827

CHEMRON ALASKA

Carrier No. AKD980984405

(Name of Carrier)

Date 10/22/94

TO:
Consignee Chemron Alaska AKD980984405
Street 13460 Hermann Ave.
Destination Palmer, AK. Zip Code 99645
Route

FROM:
Shipper Municipal Light & Power
Street 1120 E. 1st Ave
Origin Anchorage, AK.
Emergency Response Phone No. (907) 344-5036
Vehicle Number

No. Shipping Units	HM*	Kind of Packaging, Description of Articles, Special Marks and Exceptions	Weight (subject to correction)	Rate	CHARGES
1		Super SACK, Petroleum Contaminated Soil (not Regulated)			
		101810			
		- 8900			
		Profile # 94-1110-C 1280#			
		Emergency Response #907-344-5036			

When transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Communication Standard (HM-126C). Provide emergency response phone number in case of incident or accident in box above.

REMIT C.O.D. TO: ADDRESS:

COD Amt: $

C.O.D. FEE: PREPAID ☐ COLLECT ☐ $

NOTE – Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ _____ per _____

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.
_____ Signature

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
_____ (Signature of Consignor)

TOTAL CHARGES: $

FREIGHT CHARGES:
FREIGHT PREPAID except when box at right is checked
☐ Check box if charges are to be collect

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

NOTICE: Freight moving under this Bill of Lading is subject to the classifications and lawfully filed tariffs in effect on the date of this Bill of Lading. This notice supersedes and negates any claimed, alleged or asserted oral or written contract, promise, representation or understanding between the parties with respect to this freight, except to the extent of any written contract which establishes lawful contract carriage and is signed by authorized representatives of both parties to the contract.

SHIPPER M L + P
PER Larry J. Trivette

CARRIER CHEMRON ALASKA
PER [signature]
DATE 10/22/94

1

*"HAZARDOUS MATERIALS" MUST BE WITH "X" TO DESIGNATE HAZARDOUS MATERIALS AS REFERENCED IN 49CFR § 172.202.

QUALITY SAND & GRAVEL

P.O. Box 1456
Palmer, AK 99645

Pit: (907) 373-5211
1-800-478-5213
Evenings: (907) 746-0235

LOCATION MILE 37½ PARKS HWY.

INVOICE NO. 20836

JOB PHONE	DATE OF ORDER
JOB NAME / LOCATION	

To: W. Pollution

PHONE:

ORDER TAKEN BY:

TERMS:

DESCRIPTION OF WORK	AMOUNT
D 7:41A 10-29-94	
091 ID	
3712 CN	
19100 LD	

WEIGHED ON CERTIFIED SCALES

LABOR	HOURS	RATE	AMOUNT	TOTAL MATERIAL	
				TOTAL LABOR	
WORK ORDERED BY		DATE COMPLETED		TAX	
SIGNATURE (I hereby acknowledge the satisfactory completion of the above described work.)				PAY THIS AMOUNT →	

QUALITY SAND & GRAVEL

P.O. Box 1456
Palmer, AK 99645

Pit: (907) 373-5211
1-800-478-5213
Evenings: (907) 746-0235

LOCATION MILE 37½ PARKS HWY.

INVOICE NO. 20845

JOB PHONE	DATE OF ORDER
JOB NAME / LOCATION	

To: W. Pollution

PHONE:

ORDER TAKEN BY:

TERMS:

DESCRIPTION OF WORK	AMOUNT
D10:04A 11-01-94	
091 ID	
3715 CN	
8900 LD	

WEIGHED ON CERTIFIED SCALES

LABOR	HOURS	RATE	AMOUNT	TOTAL MATERIAL	
				TOTAL LABOR	
WORK ORDERED BY		DATE COMPLETED		TAX	
SIGNATURE (I hereby acknowledge the satisfactory completion of the above described work.)				PAY THIS AMOUNT →	

0000152

000153

ASR

ALASKA SOIL RECYCLING INC.

1040 O'Malley Road, Anchorage, Alaska 99515
Phone 349-3333

S-8

SOLD TO [redacted]

DELIVERY ADDRESS

Shannon & Wilson

SPECIAL INSTRUCTIONS

WE MAKE DELIVERIES INSIDE CURB LINE AND ON THE LOT AT CUSTOMER'S RISK ONLY AND ACCEPT NO RESPONSIBILITY WHATSOEVER FOR DAMAGE RESULTING FROM SUCH DELIVERIES.

DRIVER ON ☐ OFF ☐

14096

DATE [redacted]	CUST ACCT NO [redacted]	CUST PO NO	CUST JOB NO	CONTRACT NO	TICKET NO
FOB PLANT ☐	FOB JOB ☐	FOB PLANT + HAULING ☐			TIME OUT
TRK NO [redacted]	TRUCKER		ZONE		ARRIVE AT JOB
QUANTITY ORDERED	QUANTITY DELIVERED	QUANTITY TO GO			DEPART JOB
LOAD NO	GROSS WT [redacted]	NET WT 1 Drum	TARE WT [redacted]		STAND TIME
PRODUCT CODE [redacted]	DESCRIPTION PROCESSED AGGREGATE		ORDER NO		TIME IN 1.43
UNIT PRICE [redacted]	NET PRICE	HAUL CHG	SUB TOTAL	TAX	GRAND TOTAL	TRIP TIME
PRIVATE WEIGHMASTER				DEPUTY	TRIP MILES

DRIVER_____ RECEIVED BY_____

ASR

ALASKA SOIL RECYCLING INC.

1040 O'Malley Road, Anchorage, Alaska 99515
Phone 349-3333

SOLD TO

DELIVERY ADDRESS

Shannon & Wilson

SPECIAL INSTRUCTIONS

5-8

WE MAKE DELIVERIES INSIDE CURB LINE AND ON THE LOT AT CUSTOMER'S RISK ONLY AND ACCEPT NO RESPONSIBILITY WHATSOEVER FOR DAMAGE RESULTING FROM SUCH DELIVERIES.

DRIVER ON ☐ OFF ☐

14097

DATE / CUST ACCT NO	CUST PO NO	CUST JOB NO	CONTRACT NO	TICKET NO
FOB PLANT ☐	FOB JOB ☐	FOB PLANT + HAULING ☐		TIME OUT
TRK NO	TRUCKER		ZONE	ARRIVE AT JOB
QUANTITY ORDERED	QUANTITY DELIVERED	QUANTITY TO GO		DEPART JOB
LOAD NO	GROSS WT	NET WT 2.16 Tons	TARE WT	STAND TIME
PRODUCT CODE	DESCRIPTION PROCESSED AGGREGATE		ORDER NO	TIME IN 1.43
UNIT PRICE / NET PRICE	HAUL CHG	SUB TOTAL	TAX / GRAND TOTAL	TRIP TIME
PRIVATE WEIGHMASTER			DEPUTY	TRIP MILES

DRIVER_____ RECEIVED BY_____

L699755

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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ENVIRONMENTAL CONSERVATION
ADO

December 28, 1994

Municipal Light & Power
1201 East Third Avenue
Anchorage, Alaska 99501

Attn: Mr. Ron Kuczek

RE: SEPTEMBER 30 TO NOVEMBER 16, 1994 REMEDIATION MONITORING AT MUNICIPAL LIGHT AND POWER SITE NO. 3, 1201 E. THIRD AVENUE, ANCHORAGE, ALASKA

This letter report summarizes the status of the vapor extraction and air injection remediation system at Municpal Light and Power (ML&P) Site No. 3, 1201 E. Third Avenue, Anchorage, Alaska. Included are the sampling results and record of site activities for the system's pilot test and first month of operation, extending from September 30 through November 16, 1994. The results of quarterly groundwater monitoring conducted at the subject site are also presented. A site plan illustrating the general features at the project location is provided in Figure 1.

Pilot Testing

A pilot test of the remediation system's Vapor Extraction System (VES) component was conducted on September 30, 1994. The VES was operated for 2.5 hours to verify that the blower could produce a sufficient vacuum in each of the individual VES lines to achieve a positive air flow. While the blower was running with the dilution valve completely closed, six of the seven individual VES lines were sequentially opened. The temperature, gauge pressure, differential pressure (manometer), wellhead pressures, percent lower explosive limit (LEL), and flame-ionization detector (FID) readings were recorded for each line. The air flow rates were calculated for the six lines using the negative pressure measurements, and ranged from 157 standard cubic feet per minute (scfm) in Well VES2 to 199 scfm in VES Lines 1 and 2. Hydrocarbon concentrations, as measured with the FID, varied from 120 ppm in Well VES1 to greater than 10,000 ppm in VES Lines 1 and 2. A complete log of VES operation during the pilot test and the first month of continuous operation is presented in Table 1. The line to Well VES4 was not opened in order to prevent potential blower damage resulting from recovery of the asphaltic product previously observed in the well. Further details regarding the asphaltic product are provided under separate cover.

After each individual VES line was evaluated, the system was run with all six lines open. The system parameters listed above for the individual lines were monitored, and wellhead pressures was recorded for each of the three operating VES wells and Monitoring Wells MW03, MW06, MW07, and MW08. Based on the pressure observed in Monitoring Well MW07, the combined radius of influence of VES wells VES1 and VES2 is calculated to be about 50 feet. A non-zero pressure was not, however, discernible in Monitoring Well MW03, located about 63 feet from VES Well VES1. Following 70 minutes of operation, a vapor analytical sample was collected from the VES stack exhaust using a laboratory-supplied 1 liter stainless steel cylinder.

Pilot testing for the AIS was conducted on October 4 and 6, 1994. The purpose of this test was to verify that the AIS blower provided sufficient pressure to achieve sparging in each of the twelve AIS wells. The sparging pressure is defined as the pressure head required to displace the

Y-5216-3

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