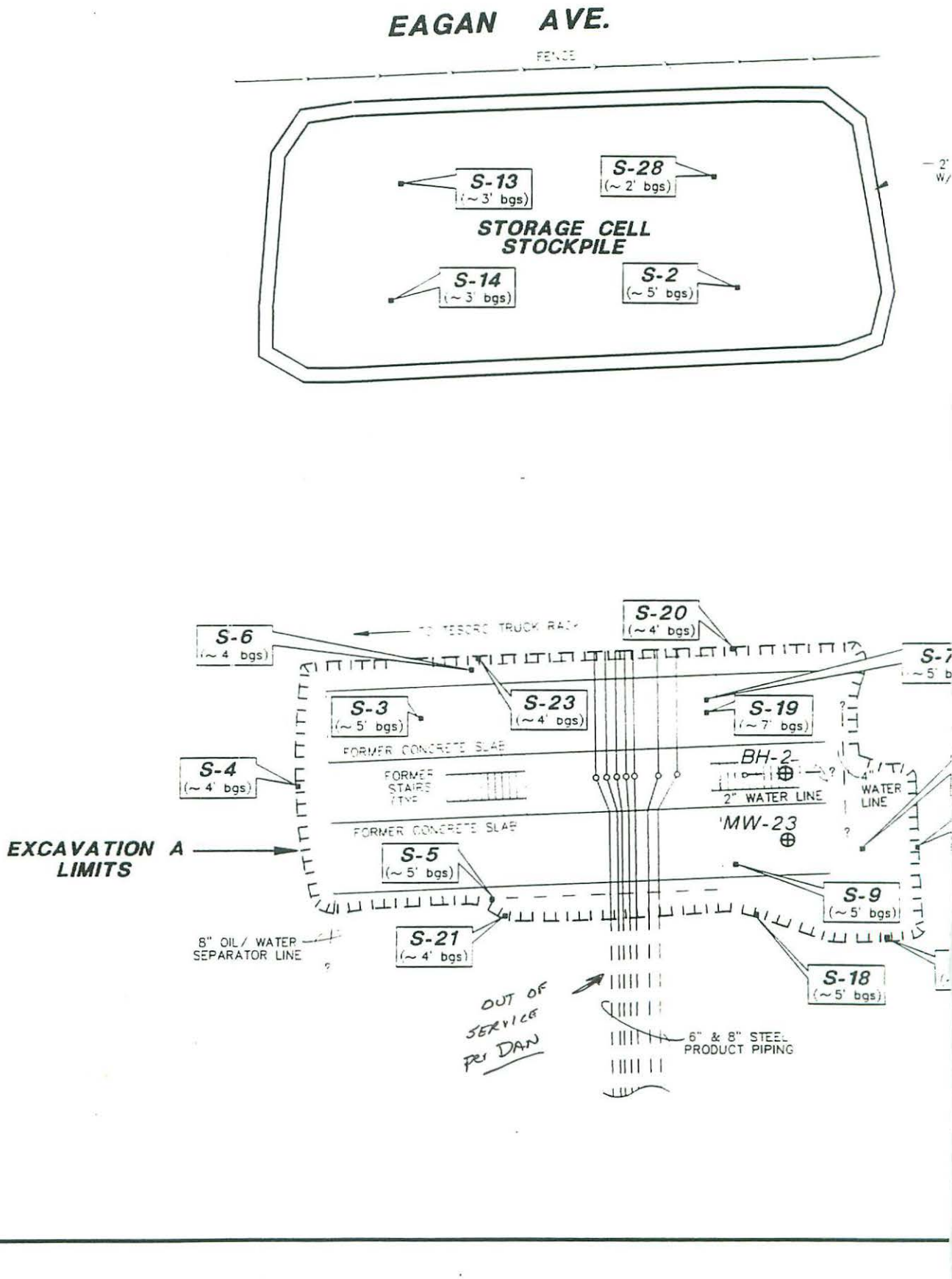

EAGAN AVE.
FENCE
S-13 (~3' bgs)
S-28 (~2' bgs)
STORAGE CELL STOCKPILE
S-14 (~3' bgs)
S-2 (~5' bgs)
S-6 (~4 bgs)
TO TESORO TRUCK RACK
S-20 (~4' bgs)
S-3 (~5' bgs)
S-23 (~4' bgs)
S-19 (~7' bgs)
FORMER CONCRETE SLAB
S-4 (~4' bgs)
FORMER STAIRS (TYP.)
BH-2
2" WATER LINE
4" WATER LINE
FORMER CONCRETE SLAB
MW-23
EXCAVATION AREA LIMITS
S-5 (~5' bgs)
S-9 (~5' bgs)
8" OIL / WATER SEPARATOR LINE
S-21 (~4' bgs)
S-18 (~5' bgs)
OUT OF SERVICE PER DAN
6" & 8" STEEL PRODUCT PIPING

EXPLANATION

SOIL SAMPLE LOCATION

SAMPLE IDENTIFICATION
(SAMPLE DEPTH BELOW GROUND SURFACE)

MW-23 ⊕ MONITORING WELL OR BORING BY OTHERS

BERM
LINER

gs)

S-8
(~4' bgs)

S-16
(~4' bgs)

S-17
~4' bgs)

APPROX. SCALE IN FEET

SOURCE
CHEVRON U.S.A. INC. DRAWING
GROUND PLAN DATED 1-26-

APR 2 2 1994

DEPARTMENT OF
ENVIRONMENTAL CONSERVATION
MSDO

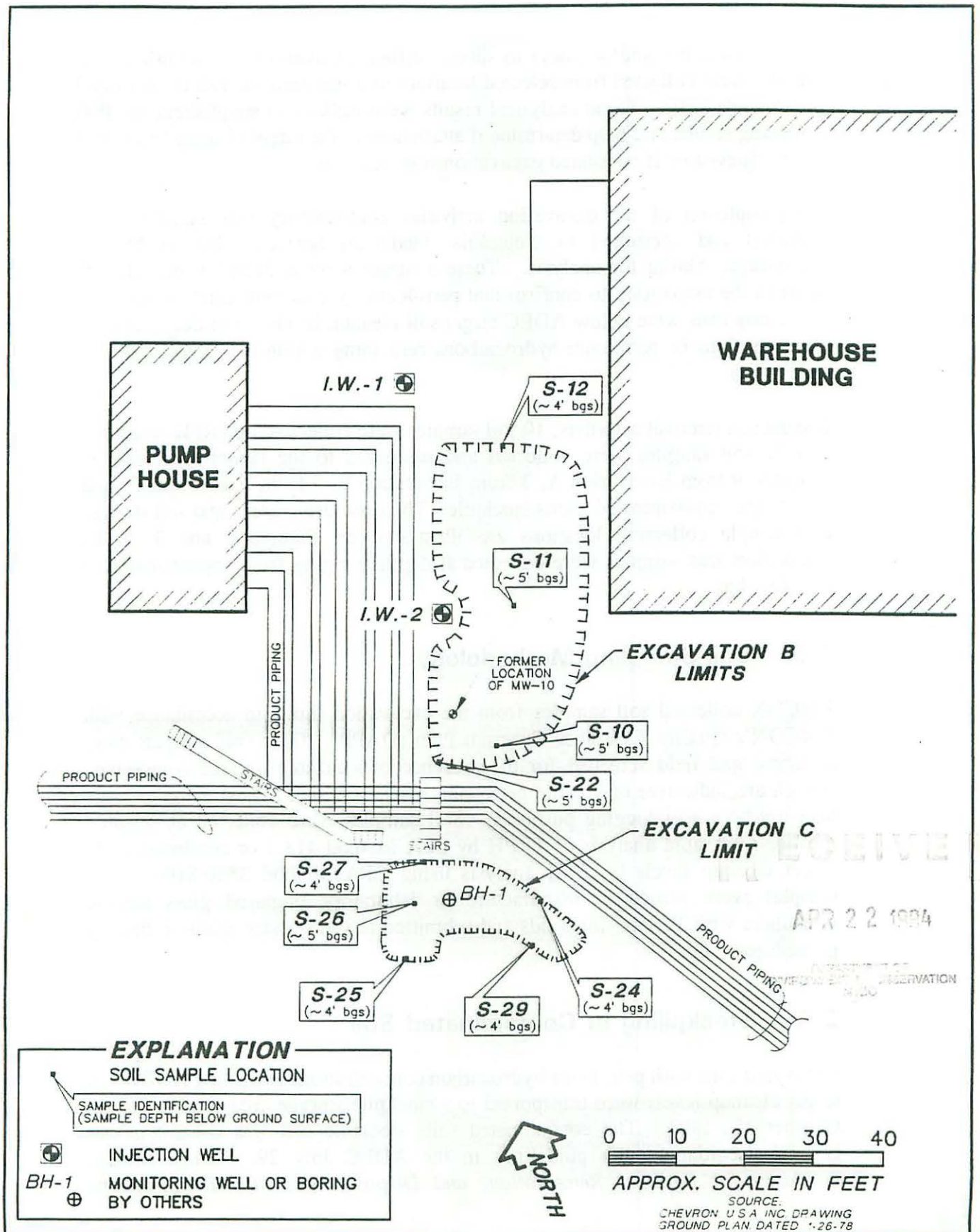
FIGURE 2

FORMER CHEVRON TERMINAL
Valdez, Alaska

FORMER LOADING RACK EXCAVATION/ SAMPLING DETAIL

DATE DEC. 1993
DWN. CDS93121SS
CKD. C.B./T.M.
REV.
PROJECT No. 5139-009.00

EMCON Alaska, Inc.



EMCON Alaska, Inc.
701 E. 56th Ave. Suite 300 Anchorage, Ak. 99518
(907) 562-3452 Fax (907) 563-2814

DATE DEC. 1993
DWN. CDS93121SS
CKD. C.B./T.M.
REV.
PROJECT No. 5139-009.00

FORMER CHEVRON TERMINAL
Valdez, Alaska

EXCAVATIONS B & C SAMPLING DETAIL

FIGURE 3

the soil (staining and/or odor) to direct further excavation. In addition, soil samples were collected from selected locations and analyzed for TRPH on a rapid turn-around basis. These analytical results were utilized to supplement the PID screening results and help determine if attainment of the target cleanup levels had been achieved or if continued excavation was necessary.

On completion of the excavation activities confirmatory soil samples were collected and submitted to Columbia Analytical Services, Inc. (CAS) of Anchorage, Alaska for analysis. These samples were collected from selected areas in the excavation to confirm that petroleum hydrocarbon concentrations in remaining soils were below ADEC target soil cleanup levels, or to document the concentrations of petroleum hydrocarbons remaining within the footprint of the excavation.

During soil removal activities, 10 soil samples were collected for TRPH screening and 21 soil samples were collected and submitted to the laboratory for EPH analysis: 9 from Excavation A, 3 from Excavation B, 5 from Excavation C, and 4 from the "contaminated" soils stockpile. The excavation areas and soil storage cell sample collection locations are illustrated on Figures 2 and 3. The excavation area samples were collected at depths ranging from approximately 4 to 7 feet bgs.

2.5 Soil Sampling Methodology

EMCON collected soil samples from the excavation limits in accordance with EMCON's Quality Assurance Program Plan (QAPP). Grab soil samples were observed and field screened for the presence of ionizable organic compounds (which are indicative of volatile petroleum hydrocarbons). These samples were also used for soil logging purposes. Soil samples were collected at selected locations for rapid analysis of TRPH by EPA Method 418.1 or confirmation of target cleanup levels by EPH analysis using EPA Method 3550/8100. The samples were placed in manufacture or laboratory prepared glass sample containers with Teflon®-lined lids and submitted to CAS under chain-of-custody procedures.

2.6 Stockpiling of Contaminated Soil

Excavated soils with petroleum-hydrocarbon concentrations exceeding ADEC soil target cleanup levels were transported to a stockpile storage area constructed on October 18, 1993. The contaminated soils stockpile cell was constructed in general accordance with guidelines in the ADEC July 29, 1991 document *Guidance for Storage, Remediation, and Disposal of Non-UST Petroleum-*

Contaminated Soils. The footprint of the stockpile cell, constructed by Harris Sand and Gravel on a gently sloping gravel pad, is approximately 40 feet by 90 feet in size and is bordered by a 2-foot berm (Appendix A, photograph 7 and 8). A 20-mil high density polyethylene (HDPE) liner is in place beneath the stockpiled soil, and the soil is covered with 12-mil HDPE sheeting to prevent rainwater infiltration. Perforated PVC piping was installed within the cell for soil aeration during future remediation efforts.

During the storage cell soil loading operations precipitation events in Valdez created excess water within the storage cell. The water was removed and placed in 55-gallon drums for storage and analytical testing. Approximately 600 gallons (11 drums) of water were collected from these operations. The water was discharged to the City of Valdez wastewater treatment plant after treatment by aeration and analytical testing confirmed the water quality was in compliance with the industrial pretreatment water quality standards for Valdez. The analytical testing results, both pretreatment and post treatment after aeration, are contained in Appendix C.

2.7 Remediation of Contaminated Soil

Excavated petroleum impacted soils will be stored in the soil storage cell over the winter for remediation in the summer of 1994. The exact method of remediation has not been determined but possible choices include cell bioremediation, thermal treatment, and soil washing. A remedial action plan will be prepared and submitted to ADEC prior to initiating the soil remediation efforts.

3 FINDINGS

3.1 Subsurface Conditions

In general, the subsurface conditions at the former Chevron Valdez Terminal consist of dense to very dense gray to gray-brown, silty, sandy gravel with cobbles and occasional boulders. These poorly sorted materials resemble glacial till and locally grade into sandy gravel or gravelly sand at a depth of approximately 10 feet. The distinction between these two units is subtle, as both units contain varying amounts of silt and cobbles. The soils encountered during the present excavation efforts were consistent with previous observations except in the vicinity the former truck loading rack where a lens of primarily silty sand material was encountered.

3.2 Soil Sample Analytical Results

Ten soil samples were collected for preliminary screening of petroleum hydrocarbon concentrations and 21 soil samples were collected for confirmation of target cleanup levels. The laboratory analytical results are presented in Table 1. Copies of the analytical reports produced by CAS are included in Appendix B.

Five of the seven preliminary screening samples collected from Excavation A and one of the three samples collected from Excavation B indicated TRPH concentrations in excess of 100 mg/kg. Additional soil excavation was performed in these areas prior to collection of confirmatory soil samples.

Diesel-range petroleum hydrocarbons were detected at concentrations above the ADEC soil target cleanup level of 100 mg/kg in 5 of the 17 excavation area soil samples. Three from Excavation A and one each from Excavations B and C.

The four soil samples collected from the stockpile storage cell exhibited EPH as diesel concentrations of 143 mg/kg to 9,300 mg/kg (Table 1, Figure 2).

TABLE 1: Soil Sample Analytical Data - Petroleum Hydrocarbons
Former Chevron Valdez Terminal
Valdez, Alaska

Sample Location	Sample Identification	Date Collected	Sample Depth (feet)	TRPH MRL (mg/Kg)	TRPH EPA Method 3550/418.1 (mg/Kg)	EPH MRL (mg/Kg)	EPH as Diesel EPA Method 3550/8100 (mg/Kg)
	S-3	18-Oct-93	5	25	26	10	ND
	S-4	18-Oct-93	4	25	ND	10	ND
	S-5	18-Oct-93	5	25	164		
	S-6	18-Oct-93	4	250 a	3,000		
	S-7	18-Oct-93	5	1,250 a	46,000		
	S-8	19-Oct-93	4	625 a	17,000		
Excavation A	S-9	19-Oct-93	5	250 a	3,200		
Former Truck	S-16	22-Oct-93	4			10	ND
Loading Rack	S-17	22-Oct-93	4			10	ND
	S-18	22-Oct-93	5			100 a	15,000
	S-19	22-Oct-93	7			100 a	4,000
	S-20	22-Oct-93	4			100 a	18,000
	S-21	22-Oct-93	4			10	ND
	S-23	22-Oct-93	4			10	25
	S-10	19-Oct-93	5	25	184		
Excavation B	S-11	19-Oct-93	5	25	61	10	55
Warehouse	S-12	19-Oct-93	4	25	42	10	23
	S-22	22-Oct-93	5			10	155
	S-24	22-Oct-93	4			10	201
Excavation C	S-25	22-Oct-93	4			10	56
Pipeline	S-26	22-Oct-93	5			10	12
	S-27	22-Oct-93	4			10	14
	S-29	22-Oct-93	4			10	84
Soil	S-2	18-Oct-93	NA			10	3,630
Storage	S-13	21-Oct-93	NA			100 a	9,300
Cell	S-14	21-Oct-93	NA			10	143
	S-28	22-Oct-93	NA			10	2,860

Notes:

EPA - U. S. Environmental Protection Agency

MRL - Method Reporting Limit

ND - Not detected (above MRL)

a - MRL is raised due to dilution of sample prior to analysis.

3.3 Discussion

Attainment of ADEC target soil cleanup levels was achieved during soil removal operations in all excavation areas except where facility structures prevented further excavation.

In excavation A, the former truck loading rack area, three samples exceeded the target soil cleanup level. Two samples (S-18 and S-20) were collected from the excavation sidewalls adjacent to the underground piping passing through the loading rack area (Figure 2). Excavation in these areas was discontinued due to the presence of this underground piping. Sample S-19 obtained from the base of the excavation was also in excess of the target soil cleanup level. The base of the excavation was extended to a depth of seven feet in this area in attempts to remove these contaminated soils. Prior to backfilling the excavation, a polyethylene liner was placed over the base and sides to provide a barrier between the clean backfill and native soils (Appendix A, photograph 3). The liner material will also serve to delineate the excavation limits.

Removal of soils exceeding the soil cleanup level was obtained for Excavation B with the exception of the southern sidewall edge where the dock pipeline prevented further excavation in that direction. Sample S-22 collected from this location contained 155 mg/kg EPH as diesel.

Clean closure was also obtained for Excavation C, except for the northeastern sidewall edge. The dock pipeline extends along the entire northern edge of Excavation C (Figure 3). Sample S-24 collected from the northeastern edge contained 201 mg/kg EPH as diesel. A Visqueen® liner was placed along this northern edge prior to backfilling of the excavation (Appendix A, photograph 5).

3.4 Conclusions

A total of approximately 725 cubic yards of soil were removed during the excavation activities at the former Chevron Valdez Terminal of which 50 cubic yards of screened debris were disposed at the Valdez landfill and 675 cubic yards were placed in the stockpile storage cell. Attainment of the ADEC target soil cleanup level of 100 mg/kg EPH as diesel was achieved at all excavation limits except where facility structures prevented further excavation. At least one sample from each of the three excavations exceeded the cleanup level. The soils remaining at the former truck loading rack area exhibited the greatest EPH concentrations at a maximum of 18,000 mg/kg. These petroleum impacted soils were adjacent to the underground pipeline formerly serving the loading rack. Cleanup of soils from this area will require removal of the underground pipeline or use of *in situ* treatment methods.

4 LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

The purpose of an environmental assessment is to reasonably evaluate the potential for or actual impact of past practices on a given site area. In performing an environmental assessment, it is understood that a balance must be struck between a reasonable inquiry into the environmental issues and an exhaustive analysis of each conceivable issue of potential concern. The following paragraphs discuss the assumptions and parameters under which such an opinion is rendered.

No investigation is thorough enough to exclude the presence of hazardous materials at a given site. If hazardous conditions have not been identified during the assessment, such a finding should not therefore be construed as a guarantee of the absence of such materials on the site, but rather as the result of the services performed within the scope, limitations, and cost of the work performed.

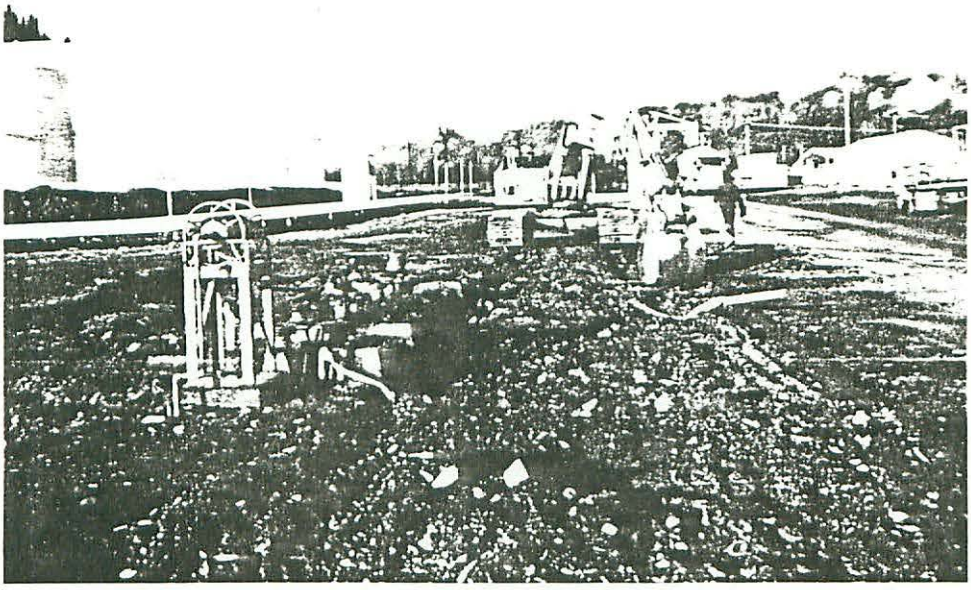
Environmental conditions may exist at the site that cannot be identified by visual observation. Where subsurface work was performed, our professional opinions are based in part on interpretation of data from discrete sampling locations that may not represent actual conditions at unsampled locations.

Except where there is express concern of our client, or where specific environmental contaminants have been previously reported by others, naturally occurring toxic substances, potential environmental contaminants inside buildings, or contaminant concentrations that are not of current environmental concern may not be reflected in this document.

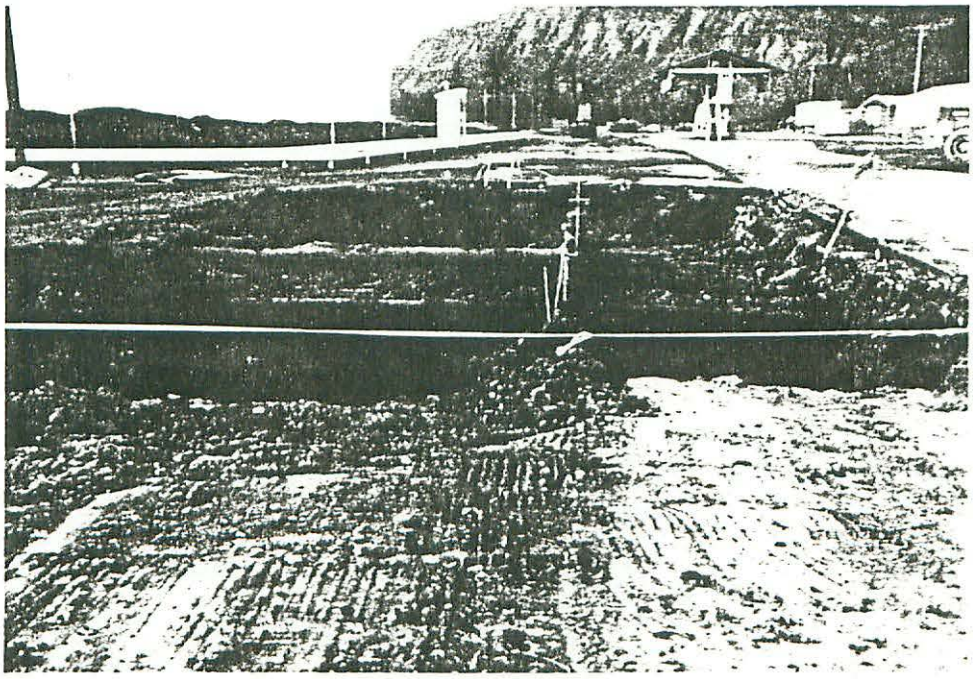
APPENDIX A

PHOTOGRAPHIC LOG

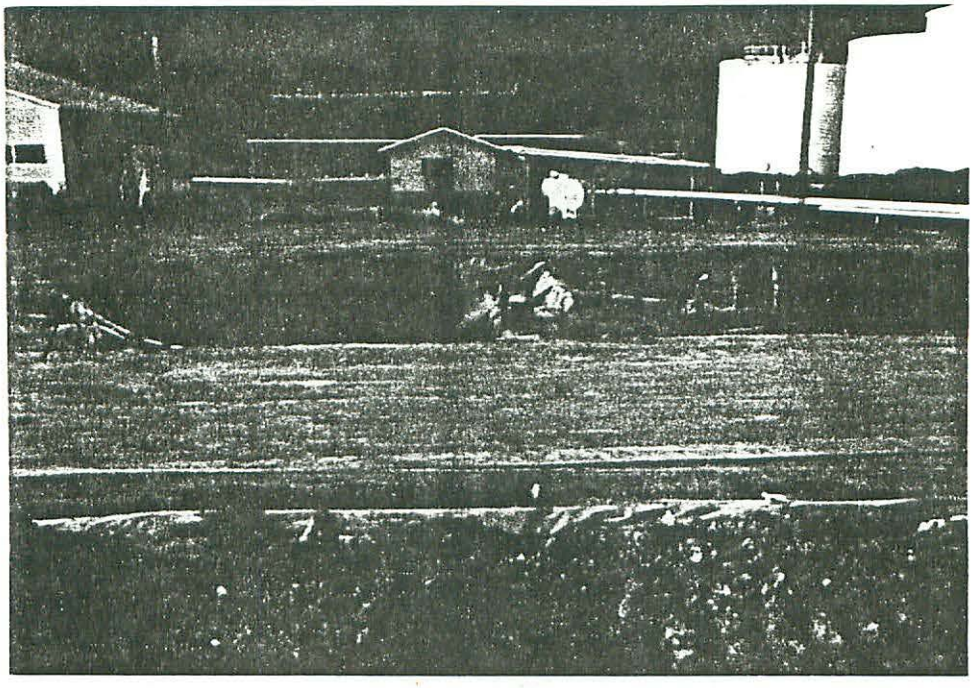
PHOTOGRAPHIC LOG
Former Chevron Valdez Terminal



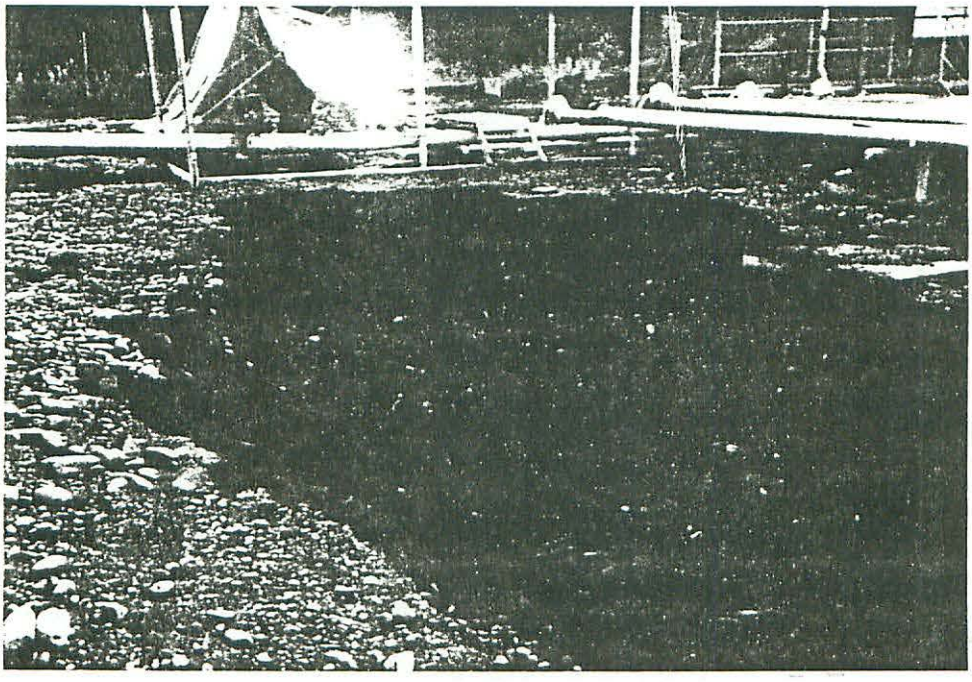
Photograph #1 - Former loading rack area prior to soil excavation.



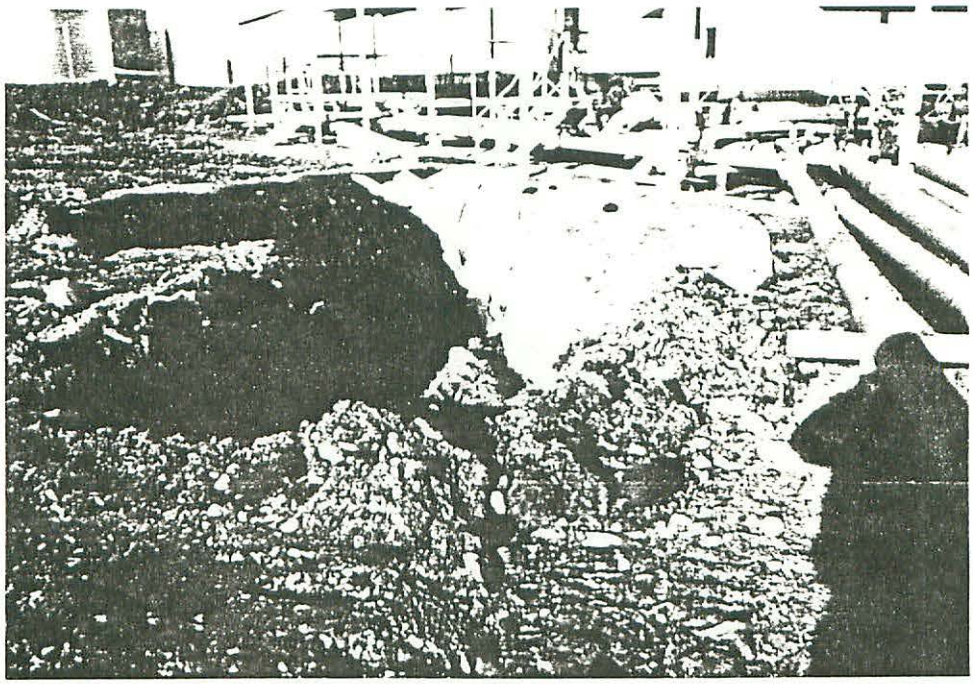
Photograph #2 - Former loading rack area after soil excavation (Excavation "A").



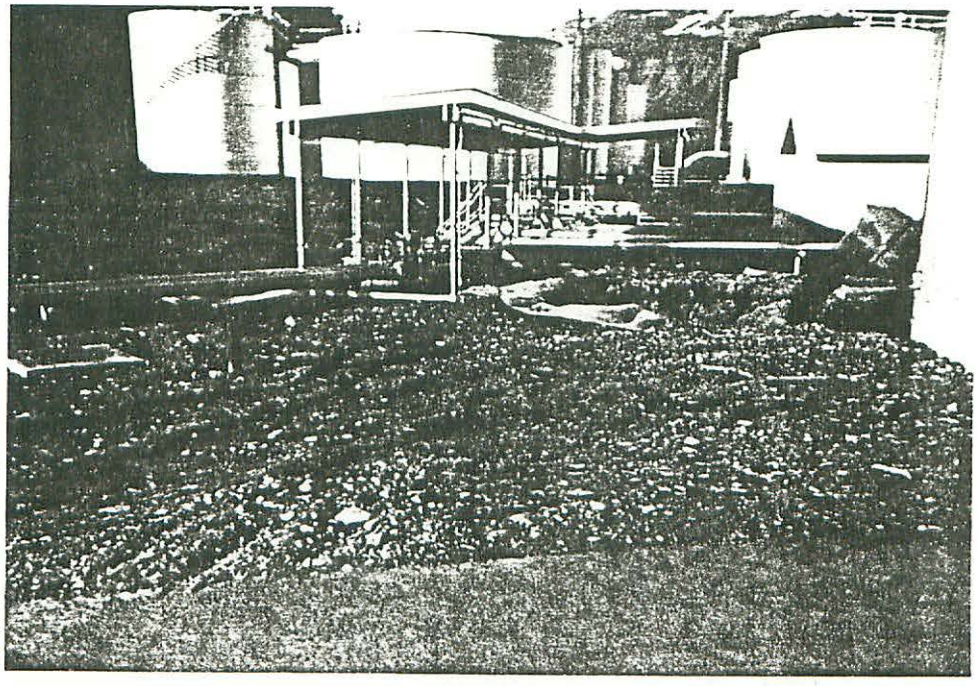
Photograph #3 - Excavation "A" prior to backfilling. Liner material placed in bottom of excavation to segregate backfill from native soils and define limits of excavation.



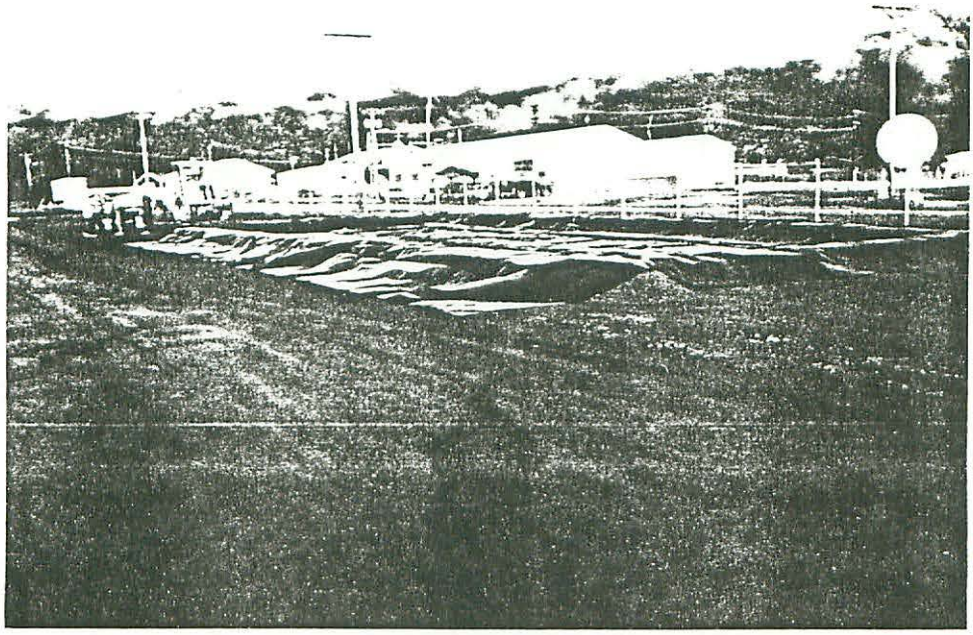
Photograph #4 - Excavation "B" looking south towards dock pipeline.



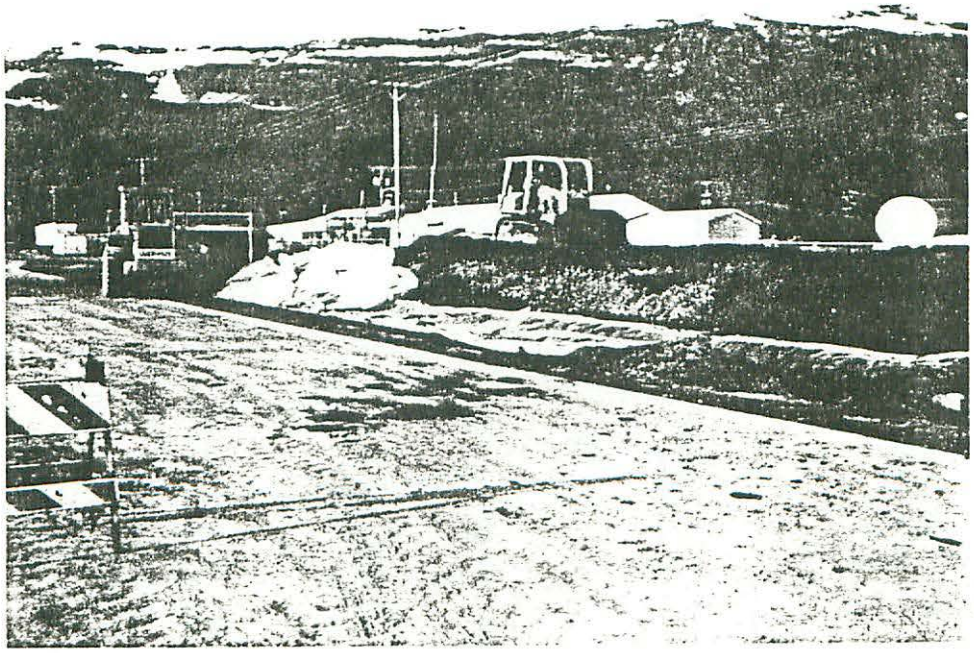
Photograph #5 - Excavation "C" during backfilling. Visqueen liner placed along edge of excavation to delimit extent of excavation area.



Photograph #6 - Backfilling operations. Excavation "B" on right and Excavation "C" on left of dock pipeline



Photograph #7 - Preparation of soil stockpile/treatment cell area. Shows 20-mil liner placed over bermed edges.



Photograph #8 - Loading of soil stockpile/treatment cell.