December 5, 1989

JN 88199

Fauntleroy Associates
c/o General Pacific Constructors, Inc.
P.O. Box 13056
Seattle, Washington 98114

Attn: Mr. Leon Cohen

Subject: CLOSURE REPORT; Underground Storage Tanks
14-Unit Apartment Building
9212-45th Avenue Southwest
Seattle, Washington

Gentlemen:

In response to your request, the Environmental Services Division of Geotech Consultants, Inc. has completed field observation, documentation, and laboratory analyses associated with formal "closure" of the underground storage tanks (USTs) at the subject site. This activity was initiated to satisfy regulatory requirements imposed under 40 CFR, part 280.72 pertaining to site assessment at the time of closure. This report summarizes our approach to the project along with laboratory results and our tentative conclusions.

METHODOLOGY/SCOPE OF WORK

On several occasions between July 17 and August 18, 1989 an environmental engineer/hydrogeologist from Geotech Consultants, Inc., was present at the subject site to document the removal of six USTs.

Prior to each removal, the tank was conditioned in a manner consistent with guidelines offered for such work in API Recommended Practice 1604 (Removal and Disposal of Underground Petroleum Storage Tanks), and API Publication 2015. A representative of the Seattle Fire Department was present immediately prior to each tank removal to verify that any flammable vapors present in the UST had been inerted. The excavation and tank removal was performed using a large trackhoe under subcontract to General Pacific Constructors. Northwest Enviroservice, Inc. inerted the tanks and disposed of them off-site.

Objectives for our site visits included:

(1) Documentation of the condition of the USTs along along with soil appearance in the tank excavation.

(2) Sampling of soil for subsequent laboratory analysis.

Soil Sampling

Soil samples were taken from the sides and the bottom of each tank excavation. The samples were immediately placed in sterilized glass jars with teflon sealed lids furnished by the project laboratory. All samples were stored in an ice chest at the site and taken to the lab in this condition in an effort to preserve sample integrity by minimizing excessive dissipation of volatile fraction hydrocarbons. Each jar was clearly labeled as to sampling location, time of sampling, sampling person, project number, etc. EPA recommended protocol for sample management including maintenance of chain of custody documentation was observed during the course of the project.

Laboratory Analysis

The following laboratory test methods were used for analysis of selected samples:

Tank Contents	Analytical Methodology
Oil	IR EPA Method 418.1 for Total Petroleum Hydrocarbons
Gasoline	GC-PID EPA Method 8020 for benzene, toluene, ethylbenzene, and xylene (BTEX)

These analytical methods provided a basis for comparison of site conditions at the time of tank closure to the allowable residual hydrocarbon concentrations at UST sites published in current Washington Department of Ecology guidelines. The detection sensitivity for EPA Methods 418.1 and 8020 on soil samples are on the order of 5 parts per million (ppm) and 1 part per billion (ppb), respectively.

RESULTS OF CLOSURE INVESTIGATION

General Discussion

The site is located immediately northeast of the intersection of Southwest Wildwood Place and 45th Avenue Southwest in

Seattle, Washington. The property was previously occupied by a gasoline service station.

Our understanding of the subsurface soil conditions at the site is based on our observations during tank removal and the results of a previous geotechnical engineering study reported by Geotech Consultants Inc., on July 8, 1988. The soils on the southern half of the site are characterized by native silty sands. The soils on the northern half of the site are silty sand and silt fill soils that were placed some time ago to fill a ravine that crossed the property.

Observations During Tank Removal

A total of six USTs were removed from the site over a period of about one month. The approximate locations of the removed tanks are illustrated on the Tank Location Plan, Plate 1, which is appended to this report. The following table presents the general characteristics of the removed tanks:

Tank	Previous Contents	Date of Removal	Estimated Capacity (gallons)
1	Oil	7/17/89	150
2	Oil	7/17/89	330
3	Gasoline	7/19/89	5,000
4	Gasoline	7/19/89	5,000
5	Gasoline	8/18/89	1,000
6	Gasoline	8/18/89	1,000

All of the removed USTs were steel walled and cylindrical in shape. Tanks 1 through 4 were in good condition at the time of removal. A thorough review of these tanks revealed some corrosion on the outside of the tanks, but no holes, defects, or leaks of any kind. Our personnel were not present to observe the removal of tanks 5 and 6. From discussions with Northwest Enviroservice's representative we learned that these tanks were older than the previous four tanks and were rusted through in several locations. It is our understanding that no liquid was present in the tanks at the time they were interted.

During the excavation and removal of Tanks 1 and 2, no discoloration was observed in the soil. Photographs were

made of the excavation to document this observation. No hydrocarbon vapors were detected during the tank removal activity in either the excavated material or in the walls of the excavation.

Some soil discoloration was observed during the excavation and removal of Tanks 3 and 4. Hydrocarbon vapors were detected in the backfill surrounding Tanks 3 through 6. The remediation of the affected soil surrounding Tanks 3 through 6 is described in the following sub-section. No groundwater was observed at the time of tank removal.

Analysis Results and Soil Remediation

As noted earlier, samples were obtained from the sidewalls and bottom of each tank excavation. Laboratory analyses were conducted on select representative samples from those obtained. The following table provides a summary of the laboratory results for soil samples recovered during the removal of Tanks 1 and 2:

ANALYTICAL RESULTS - TOTAL PETROLEUM HYDROCARBONS
(Tanks 1 and 2 Immediately Following Tank Removal)

Sample Location	Hydrocarbon Concentration (ppm)
Tank 1 - Bottom of Excavation	<5
Tank 1 - South Excavation Wall	94
Tank 2 - Bottom of Excavation	1,150
Tank 2 - West Excavation Wall	890

NOTES:

(1) Analytical Methodology: EPA Method 418.1 using infrared spectrophotometry (IR)
(2) Maximum residual concentration of 200 ppm in soil permitted under current WDOE guidelines

As the above results suggest, soil around Tank 2 contained petroleum hydrocarbons at concentrations above the current Washington State Department of Ecology (WDOE) standard of 200 ppm. The residual petroleum hydrocarbon concentrations in the soil near Tank 1 were well below the 200 ppm guideline.

Following correspondance with the Seattle - King County Department of Public Health, a permit was obtained to allow the disposal of 3 to 5 cubic yards of petroleum contaminated soil from the Tank 2 excavation. Approximately 5 cubic yards of soil composed of the excavated tank bankfill and the affected soil removed from the bottom and sides of the existing excavation were disposed of at the Cedar Hills landfill. Soil samples taken from the Tank 2 excavation following removal of the affected soil revealed petroleum hydrocarbon concentrations of less than 5 ppm. The methodology for this laboratory analysis was also EPA Method 418.1.

As previously discussed, detectable petroleum vapors emanated from the soils excavated during removal of Tanks 3 through 6. As the tanks were known to have been used to store gasoline, the contaminated soils were removed from the excavation and remediated through aeration. The soil was placed on an impervious sheet of plastic and surrounded with soil berms to minimize the risk of contaminating the surrounding soil. The soil bed was frequently tilled to accelerate the rate of dissipation of the volatile hydrocarbons. The following table presents the results of the laboratory analyses for the four storage tank excavations:

ANALYTICAL RESULTS - BTEX
(Excavation of Tanks 3 Through 6)

Sample Location	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Total Xylene (ppb)
TANKS 3 AND 4 (Prior to Soil Aeration):				
Tank 3-Fill soil above the tank	<1	100	1,300	12,900
Soil between the ends of the tanks	<1	<50	40	2,800
Tank 4-East wall of excavation	<1	<1	<1	<1
Tank 4-Fill soil around the tank	<1	<1	<1	<1
TANKS 5 AND 6 (Following Removal of Soil for Aeration):				
Tank 5-Bottom of excavation	<1	<1	<1	6
Tank 6-Bottom of excavation	<1	<1	<1	<1

ANALYTICAL RESULTS - BTEX (continued)

NOTES:

(1) Analytical Methodology: EPA Method 8020 using gas chromatography (GC-PID)
(2) Maximum residual concentrations permitted in soil per current WDOE guidelines:
benzene - 660ppb
toluene - 143,000ppb
ethylbenzene - 14,000ppb
total xylene - no current guideline

As the results presented above suggest, the BTEX concentrations in the soil surrounding Tanks 3 and 4 were below the current WDOE guidelines prior to their on-site aeration. Also, the BTEX concentrations in the residual soils following excavation and removal of Tanks 5 and 6 were well below the current WDOE guidelines for those compounds.

CONCLUSIONS

Based on the information developed as a result of this closure investigation, it would appear that the concentrations of petroleum hydrocarbons/BTEX in the residual soil proximal to the former USTs are below the WDOE guidelines for UST removal. Having satisfied the site assessment requirements of 40 CFR, parts 280.71 and 280.72 in a manner consistent with the guidelines for such actions provided by the WDOE, and having found no residual hydrocarbon contamination exceeding limits prescribed under prevailing regulatory guidelines of this state, we conclude that no further characterization of these tank installations is required and that they have been properly closed in conformance with the intent and purpose of the aforementioned federal and state regulation guidelines.

LIMITATIONS

This report has been prepared for specific application to this project in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area. This report is for the exclusive use of Fauntleroy Associates and their representatives. No other warranty, expressed or implied, is made. If new information is developed in future site work which may include

excavations, borings, studies, etc., Geotech Consultants, Inc., should be allowed to reevaluate the conclusions of this report and to provide amendments as required.

We appreciate the opportunity to serve you on this project and we trust that the information provided here will serve your needs. If you have any questions or if we may be of further service, please do not hesitate to contact us.

Respectfully submitted,

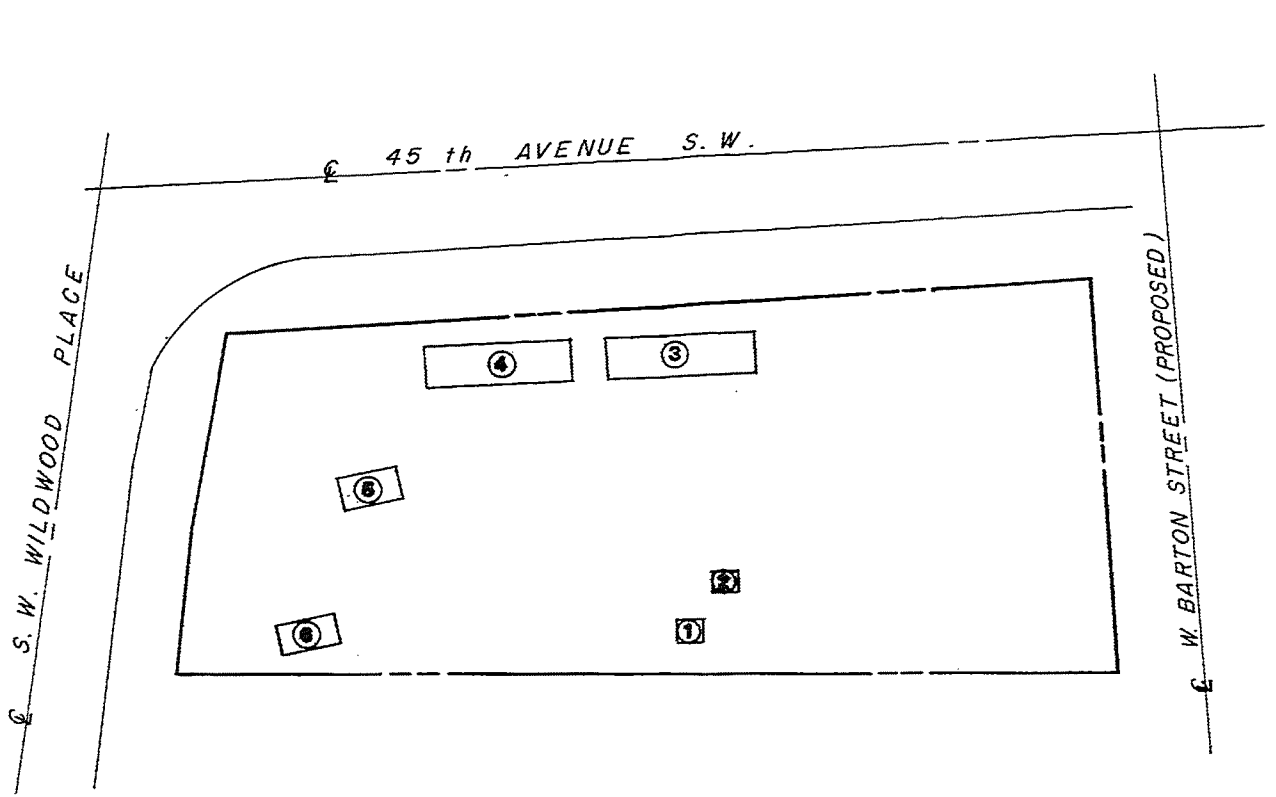
GEOTECH CONSULTANTS, INC.

Marc R. McGinnis
Environmental Engineer

Don W. Spencer, M.Sc.
Director-Environmental Services

Attachment: Tank Location Plan

MRM/DWS:mm



LEGEND

(1) APPROXIMATE TANK LOCATION
(See text for discussion of contents)

GEOTECH
CONSULTANTS

TANK LOCATION PLAN
9212 45th AVENUE S.W.
SEATTLE, WASHINGTON

Job No.: 88199	Date: OCT 88	Scale: 1"=80'	Plate: