EXXON COMPANY, U.S.A.

POST OFFICE BOX 4032 • CONCORD, CA 94524-2032

ENVIRONMENTAL ENGINEERING

G. D. GIBSON
SENIOR ENVIRONMENTAL ENGINEER

91 JUN -6 AM 8:37

June 4, 1991

Exxon RAS 7-3006
720 High Street
Oakland, California

Mr. Larry Seto
Alameda County Health Agency
Division of Hazardous Materials
80 Swan Way, Suite 200
Oakland, California 94621

Dear Mr. Seto:

Attached for your review and comment is the Report on Supplemental Subsurface Environmental Investigation for the above referenced Exxon Company, U.S.A. facility in the City of Oakland. This report, by Applied GeoSystems of Fremont, California, details the results of the work performed in November and December, 1990. The work included the installation of 10 soil borings, the installation of 2 additional groundwater monitoring wells and a review of the environmental investigation being performed at an adjacent property.

Applied GeoSystems is currently designing a remediation system to address both the soil and groundwater problems at this site. Should you have any comments or concerns please contact me at (415) 246-8768. Thank you.

Sincerely,

Gary D. Gibson

GDG:hs
0651E
Attachments

c - w/attachment:
Mr. V. Chu
Mr. L. Feldman - San Francisco Bay Region Water Quality Control Board

w/o attachment:
Mr. D. J. Bertoch
Mr. P. J. Brininstool
Mr. J. R. Hastings
Mr. R. C. Witham - Applied GeoSystems

Applied GeoSystems 43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

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REPORT
LIMITED SUBSURFACE ENVIRONMENTAL INVESTIGATION

Oct 16 1989

at

Exxon Station No. 7-3006
720 High Street
Oakland, California

AGS Job No. 87042-6

Report prepared for

Exxon Company U.S.A.
P.O. Box 4415
Houston, Texas

by
Applied GeoSystems

JoEllen Kuszmaul
Project Geologist

Walter H. Howe
R.G. 730

October 16, 1989

Applied GeoSystems 43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

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REPORT
LIMITED SUBSURFACE ENVIRONMENTAL INVESTIGATION
at
Exxon Station No. 7-3006
720 High Street
Oakland, California

for Exxon Company, U.S.A.

INTRODUCTION

Applied GeoSystems performed a limited subsurface investigation at Exxon Station No. 7-3006 at the request of Exxon Company, U.S.A. (Exxon). The purpose of the investigation was to mitigate hydrocarbon contamination at the site by removing contaminated soil and water from the gasoline-storage tank pit area. Other work performed during this reporting period included monitoring of ground-water levels and product thicknesses in the onsite monitoring wells, periodic pumping of free product, and destroying a monitoring well in the path of the planned excavation.

SITE DESCRIPTION AND BACKGROUND

Exxon Station No. 7-3006 is at 720 High Street in Oakland, California, and the site is shown on the Site Vicinity Map, Plate P-1. The station is in an area of predominantly industrial use. The site is bounded on the northwest by High Street, on the southwest by Coliseum

Way, and on the south by Alameda Avenue. A freeway overpass for Interstate 880 is located across Coliseum Way. A building just northeast of the Exxon property was most recently used for the sale of auto parts. During our work at the Exxon station, our field geologist reported a large excavation on the former auto parts site and soil aeration in progress at that site. According to workers on the neighboring site, a dry-cleaning plant once was operated there, and solvent tanks were removed recently from the site. An Applied GeoSystems geologist reviewed records at the California Regional Water Quality Control Board, but found no additional information on the alleged underground storage tanks or possible soil contamination at the neighboring site. A review of aerial photographs indicated that before 1970, the auto parts lot and the lot now occupied by the Exxon station were part of what appears on the photograph to be an automobile junkyard. The Exxon station was built in 1970.

Three underground storage tanks were situated on the southern portion of the Exxon site; these 6,000-, 8,000-, and 10,000-gallon capacity tanks held super-unleaded, regular, and unleaded gasoline, respectively. A 1,000-gallon waste-oil-storage tank was located behind the station building. These four tanks were excavated and removed from the site in April 1987 by Exxon's contractor. The approximate former locations of the underground storage tanks and other station facilities are shown on the Generalized Site Plan, Plate P-2. We have no information regarding the condition of the tanks or soil in the tank pits at the time of tank removal.

Applied GeoSystems performed a first-phase soil contamination evaluation in April 1987 (Report No. 87042-1, dated May 13, 1987). This investigation included evaluation of hydrocarbon contamination in the soil above the underground storage tanks prior to tank removal. Five of the six soil samples collected from the top portion of the gasoline-storage tank pit contained levels of total volatile hydrocarbon greater than 1,000 parts per million (ppm). Laboratory analysis of a soil sample collected from above the waste-oil-storage tank indicated no detectable concentrations of total extractable hydrocarbons.

As part of the first-phase soil evaluation, a representative of Applied GeoSystems was present during excavation of the trenches by Exxon's contractor, Pacific Southwest Construction and Service, for removal of vapor recovery and product lines. Our representative used an organic vapor analyzer (OVA) to evaluate relative hydrocarbon-vapor concentrations of soil in the trenches. Areas of high (over 1,000 ppm) hydrocarbon-vapor concentrations were found, and a black, petroleum-like soil layer was exposed in the trenches and gasoline-tank pit at a depth of approximately 3 feet. Results of analysis of a soil sample taken from this layer indicated that the soil contained 434 ppm total extractable hydrocarbons. Further sampling and analyses of soil in the trenches was recommended where the OVA readings were greater than 1,000 ppm.

Exxon contracted EA Engineering, Science, and Technology, Inc., in June 1987 to perform a soil-vapor contaminant survey. The results of the survey, which the contractor provided to Applied GeoSystems, included a hydrocarbon-vapor plume map with the highest vapor concentrations between the former gasoline-storage tank pit and the southern pump islands, and extending southeastward towards Coliseum Way.

Applied GeoSystems performed a second phase of work at the site to evaluate and mitigate the hydrocarbon contamination present in the backfill and native soil of the gasoline-storage tank pit and beneath the former product and vapor recovery lines. During excavation, a lens of black, petroleum-like material was observed at approximately 14 feet below the ground surface in the southwest wall of the tank pit, and free product was later observed to seep into the pit from this lens. Further excavation to remove this material indicated that this lens became larger southwest of the tank pit (Applied GeoSystems Report No. 87042-2, dated July 10, 1987).

While the excavation was in progress, local workers informed our field geologist that heavy metals waste had been introduced to the soil and ground water at a nearby industrial site and that some of this waste was dumped on the subject site before the the present Exxon station was built in 1970. As a result, we investigated records concerning the historic use of the site. The records we searched did not reveal the type of material dumped at the Exxon station site, and no information relating to heavy-metals waste was discovered.

Because we could not identify specific compounds when we researched previous dumping at the site, a broad range of analyses was performed on a soil sample containing the black, petroleum-like material from the tank pit. Results of the analyses indicated 1) concentrations of heavy metals were below total threshold limit concentrations, as specified in Title 22 of the California Administrative Code; 2) purgeable priority pollutants were below detection limits, except benzene at 20 ppm, ethylbenzene at 60 ppm, toluene at 40 ppm, total xylene isomers at 180 ppm, and total oil and grease at 520 ppm. The results of this investigation are included in our Report No. 87042-2 (dated July 10, 1987).

In September 1988 Applied GeoSystems subcontracted a driller to drill borings B-2 through B-9 and in those borings we installed ground-water monitoring wells MW-2 through MW-9. In May 1988, we arranged for the drilling of offsite boring B-1 and in it we installed well MW-1. The work was conducted in accordance with our Work Plan (Applied GeoSystems Report 87042-3, dated July 20, 1987).

Laboratory analysis of a soil sample collected from boring B-1, located offsite and downgradient of the former underground storage tanks, indicated nondetectable to low levels (25 ppm) of total extractable hydrocarbons. Results of analyses of soil samples collected from borings B-2 through B-8 indicated low (0.48 part per million) to relatively

high (2,689 parts per million) levels of hydrocarbon contamination. A soil sample from B-9 contained no detectable hydrocarbon contamination.

Soon after the wells were installed, floating product up to 30 inches thick was measured in wells MW-2, MW-4, and MW-5 in the area of the former underground storage tanks and in well MW-8 in the area of the former product lines. Ground-water levels measured in May and July 1988 indicated that the direction of ground-water flow was to the southwest. Details regarding this investigation were described in Applied GeoSystems Report No. 87042-5, dated August 5, 1988.

GROUND-WATER MONITORING AND PRODUCT RECOVERY

A geologist visited the site on April 25, July 19, July 27, September 6, September 21, and September 25, 1989, to monitor ground-water levels and to perform subjective analyzed on the ground water in the onsite ground-water monitoring wells. The geologist performed the monitoring and subjective analyses according to the procedures outlined in Appendix A. Table 1 summarizes the data the geologist gathered on those site visits. A ground-water flow direction could not be evaluated from the limited data from the ground-water monitoring wells without free product. To estimate the gradient and ground-water flow direction, a geologist estimated the thickness of the ground water displaced by the product and calculated static water levels in the wells using the following procedure.

(1) A specific gravity of 0.92 (National Institute for Petroleum and Energy Research, 1981) was chosen for the free product, assumed to be diesel on the basis of laboratory analyses of soil (described in subsequent sections of this report);

(2) The amount of water displaced by the product was calculated by multiplying the product thickness by the ratio of product density to water density;

(3) The calculated displaced-ground-water thickness was added to the water level measured in the wells (van Dam, 1967).

Table 2 shows the Differences in Ground-Water Elevation data for April 25, 1989, and September 6, 1989. Ground-Water Surface Maps, Plates P-3 and P-4, were constructed using the data collected on those two dates. Plate P-3 indicates that ground water generally flows toward the southwest, in a manner consistent with previous data. Plate P-4 shows a ground-water depression centered near the former tank pit. That depression may be a result of dewatering of the tank pit during excavation.

The data in Table 1 show that the measurable ground-water levels have been decreasing during the past quarter. On July 19, August 11, and September 25, 1989, free product was pumped from the site wells and hauled away for disposal by Armour Petroleum Service and Equipment Corporation of Vacaville, California; a total of 27-1/2 gallons of product have been removed from the site. The floating product was described as dark brown in color. Fluctuations in free-product thickness were observed during this period. Product Thickness Maps, Plates P-5 and P-6, were constructed using data we obtained on April 25 and September 22, 1989. In April 1989 the greatest accumulations of product were in monitoring wells MW-2 and MW-8. By September 1989 the thicknesses in those two wells

had decreased, but increases in product thicknesses were seen in MW-3 and MW-4 and product was seen in MW-6 for the first time.

DESTRUCTION OF MONITORING WELL MW-5

On July 18, 1989, well MW-5 was destroyed to make way for the planned excavation. Before the work was carried out, Applied GeoSystems obtained a well-destruction permit from Alameda County Flood Control and Water Conservation District (Zone 7); a copy of the permit is in Appendix B. The drilling contractor, HEW Drilling Company of Palo Alto, California, destroyed the well using a CME 55 truck-mounted drill rig. Using 10-inch inside diameter, hollow-stem augers, the driller bored through and removed the PVC casing, cement seal, and sand pack from the surface to the bottom of the well. The boring was then backfilled with a tremied neat cement slurry from the bottom of the hole to a few inches from the ground surface. An Applied GeoSystems geologist observed the well destruction.

EXCAVATION OF SOIL

Before soil excavation began, Applied GeoSystems obtained an Excavation Permit from the City of Oakland; a copy of the permit is in Appendix B. At least 5 days before the excavation began, the Bay Area Air Quality Management District (BAAQMD) was notified

of Applied GeoSystems' intent to excavate contaminated soil. In addition, Applied GeoSystems notified Underground Service Alert to mark the locations of underground utilities at the site.

An Applied GeoSystems field geologist was onsite every day from July 20 through 26, 1989, to observe the excavation and to field screen and sample soil using the procedures described in Appendix A. An organic vapor meter (OVM) was used to evaluate the organic vapor concentrations present in soil samples collected from the excavation, in accordance with the procedures described in Appendix A. The OVM readings were used to assist the field geologist in guiding the excavation and in taking confirmation samples. The field geologist instructed the excavation contractor, L & L Construction of Antioch, California, to excavate soil containing subjective evidence of hydrocarbon contamination.

Along the southern boundary of the existing pit, soil was excavated to a depth of about 10 feet, which was just above the ground-water level. The materials encountered in the excavation were 3 to 5 feet of black sandy clay and 5 to 7 feet of blue-gray to blue-green sandy clay with a trace of small gravel. The upper black clay has a noticeable petroleum-product odor; the field geologist described the odor as diesel or oil. The lower blue clay also had a noticeable product odor, which the geologist described as resembling the odor of degraded gasoline.

A concrete structure, probably a former pump island, was uncovered just southeast of the former location of MW-5; steel piping running from the pump island south towards the street at a depth of about 4 feet was also found, as shown in Plate P-7, Detail of Excavation. The piping contained a black, oily substance. The island was excavated, and most of the piping was removed.

Debris consisting of lumber, bricks, sheet metal, and bottles was found in the southern part of the pit. The soil containing this material also contained the most apparent evidence of hydrocarbon contamination; OVM readings in this material were greater than 1,000 ppm. Soil was excavated from the southern and southeastern sides of the pit as far towards Coliseum Way as possible.

On the western side of the pit, soil was excavated in two exploratory trenches to evaluate the extent of contamination. OVM readings indicating moderate levels of gasoline hydrocarbons (200 to 500 ppm) were found in the soil along both trenches, and product discoloration was noted in the soil in both trenches. On July 26, 1989, two samples were collected at the northwest end of Trench 1; the samples were collected using the procedures in Appendix A. Plate P-8 shows the boundaries of the excavation and the sample locations. The samples collected at location 1 in the trench were labeled 1A and 1B. Sample 1A was collected at 5 feet below grade in soil with subjective evidence of diesel contamination and was analyzed for TPHd; sample 1B was collected at 9 feet in soil with subjective evidence of gasoline contamination and was analyzed for TPHg.

On August 4, 1989, the geologist collected samples for laboratory analysis, from locations 2, 3, and 4 at a depth of about 9 feet below grade in the pit walls, using the procedures outlined in Appendix A; excavation was temporarily halted pending laboratory results. Plate P-8 shows the sample locations and the boundary of the excavation.

Soil samples were delivered to the Applied GeoSystems laboratory in Fremont, California, which is certified by the State of California for analytical testing (California Hazardous Waste Testing Laboratory Certificate No. 153). Samples were analyzed for total petroleum hydrocarbons as gasoline (TPHg) using U.S. Environmental Protection Agency (EPA) Method 8015 and for the gasoline constituents benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) by EPA Method 8020. Three samples were analyzed for total petroleum hydrocarbons as diesel (TPHd) by EPA Method 8015. The completed Chain of Custody Records and laboratory reports for the tested samples are in Appendix C. Table 3 summarizes the results of analysis of the soil samples from the pit. The laboratory results showed low concentrations of TPHg (from 3.8 to 290 ppm). No TPHd was detected in the shallow sample from Trench 1. A concentration of 4,200 ppm TPHd was detected in a sample from the southern part of the pit; this sample also contained the greatest concentration of TPHg, 290 ppm.

An estimated 300 cubic yards of soil were excavated and stockpiled on the site. The stockpiled soil was covered with plastic. Four soil samples were collected to represent each 50 cubic yards of soil; each set of four samples was composited in the laboratory (a total of six composite samples) and analyzed for TPHg. The results of analysis showed TPHg

concentrations ranging from 63 to 330 ppm in the composite soil samples. The analysis results are shown in Table 4; the stockpiled soil and sampling locations are shown on Plate P-8. Laboratory reports and Chain of Custody records are in Appendix D.

On August 4, 1989, an estimated 50 cubic yards of soil with an average TPHg concentration of 110 ppm was spread to aerate. The project geologist notified the BAAQMD of the planned aeration 24 hours before the soil was spread. On August 9, 1989, a geologist used an OVA to evaluate the hydrocarbon concentrations in the aerating soil and found soil vapor concentrations ranging from 15 to 35 ppm. On September 5, 1989, the geologist collected four samples to be composited and analyzed for TPHd. A concentration of 920 ppm TPHd was detected in the composite soil sample. Plate P-9 shows the locations of aerating soil and from which the samples were taken.

On September 5, 1989, the geologist sampled the stockpiled soil for the second time, and the composited soil samples were analyzed for TPHd. The sampling locations were the same for both the August 4 and September 5, 1989, sampling dates, except for sample 1, which was from the soil spread to aerate. The sample locations for the stockpiled soil are shown on Plate P-8; the sample locations in the aerating soil (sample 1) are on Plate P-9. The results of analysis are shown in Table 4, and indicate TPHd concentrations ranging from 250 to 3,800 ppm.

CONCLUSIONS

Soil excavated from the tank pit contains moderate to high concentrations of TPHd (250 to 3,800 ppm) and low to moderate concentrations of TPHg (63 to 330 ppm). The bulk of the soil contamination appears to be from depths of 5 to 10 feet. Soil with high concentrations of TPHd (greater than 1,000 ppm) remains on the southern wall of the excavation at a depth of about 9 feet. TPHd concentrations are unknown in soil near the ground-water level on the other pit boundaries. The contamination by diesel fuel is from an unknown source. We understand from information supplied by Exxon that the tanks removed from the Exxon station were not used to store diesel fuel. The plume of soil contamination appears to extend from the tank pit an unknown distance to the south, southwest, and west.

Free-floating product is present in site monitoring wells along the western part of the site; the greatest accumulations of free product are in wells MW-2 and MW-8. Applied GeoSystems will install a product recovery system at this site, as authorized by Exxon. The system installation was postponed pending completion of the excavation to allow us to evaluate the effect of periodic product removal and the removal of contaminated soil on product recharge. The results indicate that sufficient fugitive product remains beneath the site to justify the installation of a product-recovery system. We will bail the free product from the wells on a weekly basis as an interim measure of product mitigation.

As previously authorized by Exxon, Applied GeoSystems plans to install an offsite well southwest of MW-8 to evaluate further the free-phase and dissolved hydrocarbon plumes. This work will proceed when Caltrans and the City of Oakland approve our encroachment permit application.

REFERENCES CITED

National Institute for Petroleum and Energy Research. 1981. Diesel Fuel Survey - 1981, Bartlesville, OK.

Office of Administrative Hearings. April 30, 1988. California Administrative Code. Title 22. State of California.

van Dam, J. 1967. "The Migration of Hydrocarbons in a Water-Bearing Stratum," in The Joint Problems of the Oil and Water Industries, ed. P. Hepple, Inst. Petrol., London.

APPLIED GEOSYSTEMS REFERENCES

Applied GeoSystems. May 13, 1987. Letter Report for First Phase Soil Contamination Investigation, Exxon Station No. 7-3006, Oakland, California, AGS No. 87042-1.

Applied GeoSystems. July 10, 1987. Report of Excavation, Aeration, and Removal of Contaminated Soil Including Soil Sampling and Analyses, Exxon Station No. 7-3006, Oakland, California, AGS No. 87042-2.

Applied GeoSystems. July 20, 1987. Work Plan -- Phase III Subsurface Environmental Investigation and Contamination Evaluation of Soil and Ground Water and Lining of Excavated Tank Pit, Exxon Station No. 7-3006, Oakland, California, AGS No. 87042-3.

Applied GeoSystems. August 5, 1988. Report of Subsurface Environmental Investigation, Exxon Station No. 7-3006, Oakland, California, AGS No. 87042-5.

TABLE 1
RESULTS OF SUBJECTIVE ANALYSES OF WATER SAMPLES
Exxon Station No. 7-3006
720 High Street
Oakland, California
April - September 1989
(page 1 of 2)

Well Number	Depth to Water	Depth of Well	Floating Product	Sheen	Emulsion
April 25, 1989					
MW-1	7.55	28.71	NONE	NONE	NONE
MW-2	9.27	---	2.16	---	NONE
MW-3	7.57	---	0.08	---	NONE
MW-4	7.26	---	0.16	---	NONE
MW-5	8.06	---	0.32	---	NONE
MW-6	8.02	34.37	NONE	NONE	NONE
MW-7	8.66	34.23	NONE	NONE	NONE
MW-8	8.31	---	0.66	---	NONE
MW-9	8.25	30.63	NONE	NONE	NONE
July 19, 1989					
MW-2	10.81	---	1.56	---	NONE
MW-3	10.33	---	0.66	---	NONE
MW-4	10.32	---	0.72	---	NONE
MW-8	10.97	---	1.25	---	NONE
		Product pumped on July 19, 1989			
July 27, 1989					
MW-1	10.16	---	NONE	SLIGHT	NONE
MW-2	10.18	---	0.13	---	HEAVY
MW-3 (covered by soil)					
MW-4 (covered by soil)					
MW-8	10.34	---	0.08	---	HEAVY
		Product pumped on August 11, 1989			

continued

Well depth and depth to water in feet below top of casing.
Product thickness in feet.
---: Not measured.

TABLE 1
RESULTS OF SUBJECTIVE ANALYSES OF WATER SAMPLES
Exxon Station No. 7-3006
720 High Street
Oakland, California
April - September 1989
(page 2 of 2)

Well Number	Depth to Water	Depth of Well	Floating Product	Sheen	Emulsion
September 6, 1989					
MW-1	10.88	---	NONE	V.SLIGHT	NONE
MW-2	10.89	---	0.09	---	SLIGHT
MW-3	11.22	---	0.07	---	SLIGHT
MW-4	11.40	---	0.07	---	SLIGHT
MW-5	(well destroyed)				
MW-6	13.64	---	0.08	---	SLIGHT
MW-7	11.72	---	NONE	SLIGHT	NONE
MW-8	11.09	---	0.17	---	SLIGHT
MW-9	(covered by soil pile)				
September 22, 1989					
MW-1	11.06	---	NONE	NONE	NONE
MW-2	11.56	---	0.56	---	SLIGHT
MW-3	11.38	---	0.28	---	SLIGHT
MW-4	11.64	---	0.19	---	SLIGHT
MW-5	(well destroyed)				
MW-6	13.79	---	0.07	---	SLIGHT
MW-7	11.89	---	NONE	NONE	NONE
MW-8	11.58	---	0.36	---	SLIGHT
MW-9	(covered by soil pile)				

Product pumped on September 25, 1989

Well depth and depth to water in feet below top of casing.
Product thickness in feet.
---: Not measured.

TABLE 2
DIFFERENCES IN GROUND-WATER ELEVATIONS
Exxon Station No.7-3006
720 High Street
Oakland, California

Well No.	DTW	PT	Corr. DTW	Casing Elev. Below Datum	GW Elev. Below Datum
April 25, 1989					
MW-1	7.55	0.0		1.96	9.51
MW-2	9.27	2.16	7.54	1.86	9.40
MW-3	7.57	0.08	7.51	1.89	9.40
MW-4	7.26	0.16	7.13	2.07	9.20
MW-5	8.06	0.32	7.80	1.57	9.37
MW-6	8.02	0.0		0.56	8.58
MW-7	8.66	0.0		0.00	8.66
MW-8	8.31	0.66	7.78	1.38	9.16
MW-9	8.25	0.0		0.19	8.44
September 6, 1989					
MW-1	10.88	0.0		1.96	12.84
MW-2	10.89	0.09	10.97	1.86	12.83
MW-3	11.22	0.07	11.28	1.89	13.17
MW-4	11.40	0.07	11.46	2.07	13.53
MW-5	well destroyed				
MW-6	13.64	0.08	13.71	0.56	14.27
MW-7	11.72	0.0		0.00	11.72
MW-8	11.09	0.17	11.25	1.38	12.63
MW-9	covered by soil pile				

Depth measurements are in feet.
Product thicknesses are in feet.
DTW = Depth to Water
PT = Product Thickness
Corrected DTW = DTW + 0.92 · PT

TABLE 3
RESULTS OF ANALYSES OF SOIL SAMPLES FROM EXCAVATION
Exxon Station No. 7-3006
720 High Street
Oakland, California
July - August 1989

Sample No.	TPHg	B	T	EB	X
S-0726-1B	61	NA	NA	NA	NA
S-0804-2A	3.8	<0.050	<0.050	<0.050	<0.050
S-0804-3A	290	0.77	0.15	0.30	0.63
S-0804-4A	93	<0.097	<0.050	<0.050	<0.050

Sample No.	TPHd
S-0726-1A▲	<5
S-0804-3A	4200

All results in milligrams per liter (mg/l), or parts per million (ppm).
Soil samples are from a depth of 9 feet unless otherwise noted.
TPHg:Total petroleum hydrocarbons as gasoline
TPHd:Total Petroleum hydrocarbons as diesel
B: Benzene
T: Toluene
EB: Ethylbenzene
X: Total xylene isomers
NA: Not analyzed
<: Below detection limit for test used
▲: Sample from a depth of 5 feet.
Sample designation: S- 0804- 3A

S- Soil sample
0804- Date sampled
3A Sample number

TABLE 4
RESULTS OF ANALYSES OF SOIL SAMPLES FROM STOCKPILED SOIL
Exxon Station No. 7-3006
720 High Street
Oakland, California
July - September, 1989

Sample No.	TPHg	B	T	EB	X
S-0727-1ABCD	110	<0.050	0.065	0.51	1.0
S-0727-2ABCD	170	<0.050	0.11	0.46	2.2
S-0727-3ABCD	330	<0.050	0.27	1.3	3.4
S-0727-4ABCD	210	<0.050	<0.050	1.5	5.4
S-0727-5ABCD	63	<0.050	<0.050	0.41	2.0
S-0727-6ABCD	110	<0.050	<0.050	0.12	0.78

Sample No.	TPHd
S-10-1ABCD▲*	920
S-10-2ABCD*	500
S-10-3ABCD*	860
S-10-4ABCD*	1,300
S-10-5ABCD*	250
S-10-6ABCD*	3,800

All results in milligrams per liter (mg/l), or parts per million (ppm)
TPHg: Total petroleum hydrocarbons as gasoline
B: Benzene
T: Toluene
EB: Ethylbenzene
X: Total xylene isomers
<: Below detection limit for test used
NA: Not analyzed
▲: Samples collected from soil spread for aeration
*: Samples collected on Septemb r 5, 1989

Sample designation: S- 0727- 6ABCD

- 6ABCD — Samples composited
- 0727 — Date sampled
- S — Soil sample

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
5997 PARKSIDE DRIVE ♦ PLEASANTON, CALIFORNIA 94566 ♦ (415) 484-2600

25 July 1989

Applied Geosystems
43255 Mission Boulevard, Suite B
Fremont, CA 94539

Gentlemen:

Enclosed are the destruction requirements and Groundwater Protection Ordinance permit 89407 for the destruction of well 2S/3W 8L80 at 720 High Street in Oakland for Exxon Company USA.

Please note that permit condition A-2 requires that a well destruction report be submitted after completion of the work. The report should include methods and materials used to destroy the well, location sketch, date of destruction, and permit number.

If you have any questions, please contact Wyman Hong or Craig Mayfield at 484-2600.

Very truly yours,

Mun J. Mar
General Manager

By J. Killingstad
J. Killingstad, Chief
Water Resources Engineering

WH:bkm
Enc.

19 July 1989

ZONE 7
WATER RESOURCES ENGINEERING
GROUNDWATER PROTECTION ORDINANCE

EXXON
720 HIGH STREET
OAKLAND
WELL 2S/3W 8L80
PERMIT 89407

Destruction Requirements

1. Drill out the well so that casing, seal, and gravel pack are removed to the bottom of the well.

2. Using a tremie pipe, fill the hole to 2 feet below the lower of finished grade or original ground with neat cement.

3. After seal has set, backfill the remaining hole with compacted material.

These destruction requirements as proposed by Jo Ellen Kuszmaul of Applied Geosystems meet or exceed the Zone 7 minimum requirements.

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE • PLEASANTON, CALIFORNIA 94566 • (415) 484-2600

GROUNDWATER PROTECTION ORDINANCE PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

(1) LOCATION OF PROJECT Exxon Service Station
720 High Street
Oakland, CA

(2) CLIENT
Name Exxon Company U.S.A.
Address P.O. Box 4415 Phone (713) 656-7755
City Houston, TX Zip 77210-4415

(3) APPLICANT
Name JoEllen Kuszmaul
Applied GeoSystems
Address 43255 Mission Phone (415) 651-1906
City Fremont, CA Zip 94539

(4) DESCRIPTION OF PROJECT
Water Well Construction ___ Geotechnical ___
Cathodic Protection ___ Well Destruction X

(5) PROPOSED WATER WELL USE
Domestic ___ Industrial ___ Irrigation ___
Municipal ___ Monitoring ___ Other ___

(6) PROPOSED CONSTRUCTION
Drilling Method:
Mud Rotary ___ Air Rotary ___ Auger X
Cable ___ Other ___

WELL PROJECTS
Drill Hole Diameter 10 in. Depth(s) 35 ft.
Casing Diameter ___ in. Number
Surface Seal Depth 35 ft. of Wells 1
Driller's License No. C57 # 384167

GEOTECHNICAL PROJECTS
Number ___
Diameter ___ in. Maximum Depth ___ ft.

(7) ESTIMATED STARTING DATE 7/12/89
ESTIMATED COMPLETION DATE 7/14/89

(8) I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE Jo Ellen Kuszmaul Date 7/6/89

FOR OFFICE USE

PERMIT NUMBER 89407
LOCATION NUMBER 2S/3W 8L80

Approved [signature] Date 17 Jul 8[illegible]
Todd N. Wendler

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Notify this office (484-2600) at least one day prior to starting work on permitted work and before placing well seals.
3. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or bore hole logs and location sketch for geotechnical projects. Permitted work is completed when the last surface seal is placed or the last boring is completed.
4. Permit is void if project not begun within 90 days of approval date.

B. WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie, or equivalent.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic, irrigation, and monitoring wells unless a lesser depth is specially approved.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie, or equivalent.

(E.) WELL DESTRUCTION. See attached.

91987

350-2 (REV. 12/85)

CITY OF OAKLAND

PERMIT TO EXCAVATE IN STREETS OR OTHER WORK AS SPECIFIED

No. 22041

Exxon Service Station

LOCATION: 720 High St., Oakland (street or address) BETWEEN Corner of High St (street) AND Coliseum Way (street)

NATURE OF WORK: excavation of soil on service station property

24-HOUR EMERGENCY PHONE NUMBER (415) 651-1906

APPLICANT: Jo Ellen Kuszmaul / Applied GeoSystems

ADDRESS: 43255 Mission Blvd.

CITY: Fremont STATE: CA ZIP: 94539

PHONE: (415) 651-1906

I hereby affirm that I am exempt from the Contractor's License Law for the following reason (Sec. 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he is licensed pursuant to the provisions of the Contractor's License Law Chapter 9 (commencing with Sec. 7000) of Division 3 of the Business and Professions Code, or that he is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by any applicant for a permit subjects the applicant to a civil penalty of not more than $500):

☐ I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professions Code: The Contractor's License Law does not apply to an owner of property who builds or improves thereon, and who does such work himself or through his own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he did not build or improve for the purpose of sale).

☐ I, as owner of the property, am exempt from the sale requirements of the above due to: (1) I am improving my principal place of residence or appurtenances thereto, (2) the work will be performed prior to sale, (3) I have resided in the residence for the 12 months prior to completion of the work, and (4) I have not claimed exemption in this subdivision on more than two structures more than once during any three-year period. (Sec. 7044, Business and Professions Code).

☒ I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractor's License Law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractor's License Law). agent for

☐ I am exempt under Sec. _____, B&P.C. for this reason _____

Signature Date

I hereby affirm that I have a certificate of consent to self-insure, or a certificate of Workers' Compensation Insurance, or a certified copy thereof (Sec. 3800, Lab. C.).

Policy # _____ Company Name _____

☐ Certified copy is hereby furnished.

☐ Certified copy is filed with the city building inspection department.

Signature Date

(This section need not be completed if the permit is for one hundred dollars ($100) or less.)

I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the Workers' Compensation Laws of California.

Signature Date

NOTICE TO APPLICANT: If, after making this Certificate of Exemption, you should become subject to the Workers' Compensation provisions of the Labor Code, you must forthwith comply with such provisions or this permit shall be deemed revoked.

CONTRACTOR L+L Construction

I hereby affirm that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect.

LICENSE # AND CLASS 542690 CITY BUSINESS TAX # TBD

Approximate Starting Date DATE 7/18/89

Approximate Completion Date DATE 7/21/89

LIMITED OPERATION AREA YES ✓ NO _____

DATE STREET LAST RESURFACED DATE NA

Pavement being replaced in excavations must match existing pavement.

Telephone 273-3668 Forty-eight (48) HOURS BEFORE ACTUAL CONSTRUCTION. This Permit Void 90 Days From Issue.

ATTENTION

State law requires that contractor/owner call Underground Service Alert two working days before excavating to have below-ground utilities located. This permit is not valid unless applicant has secured an inquiry identification number issued by Underground Service Alert.

Call Toll Free: 800-642-2444

This permit issued pursuant to all provisions of Chapter 6, Article 2 of the Oakland Municipal Code.

This permit is granted upon the express condition that the permittee shall be responsible for all claims and liabilities arising out of work performed under the permit or arising out of permittee's failure to perform the obligations with respect to street maintenance. The permittee shall, and by acceptance of the permit agrees to defend, indemnify, save and hold harmless the City, its officers and employees, from and against any and all suits, claims or actions brought by any person for or on account of any bodily injuries, disease or illness or damage to persons and/or property sustained or arising in the construction of the work performed under the permit or in consequence of permittee's failure to perform the obligations with respect to street maintenance.

X Jo Ellen Kuszmaul Date 7/7/89

Signature of Contractor Owner or Agent

☒ Agent for ☐ Contractor ☒ Owner

[redacted]

UTILITY COMPANY REPORT

Supervisor _____

Completion Date _____

CITY INSPECTOR'S REPORT

BACKFILL PAVING

Initials _____

Hours _____

Date _____

Concrete _____

Asphalt _____

Sidewalk _____

Size of Cut: Sq. Ft. _____ Inches _____

Paved by _____ Type _____

Bill No. _____

Charges Backfill _____

Paving _____

Paving Insp. _____

APPROVED

Engineering Services _____ Date _____

Field Services _____ Date _____

Construction _____ Date _____

Traffic Engineering _____ Date _____

Electrical Department _____ Date _____

APPROVED BY DIRECTOR OF PUBLIC WORKS

PER _____

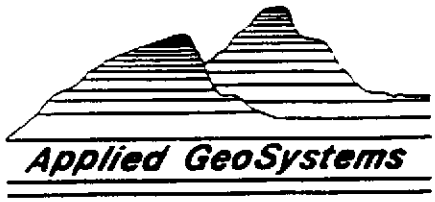
APPENDIX C

CHAIN OF CUSTODY RECORDS

AND ANALYSIS REPORTS

FOR SOIL IN THE EXCAVATION

CHAIN OF CUSTODY RECORD



43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

SAMPLER (signature): Jon DeFon

Phone: 651 1906

LABORATORY:
Applied Geo System
43255 Mission Blvd
Fremont 94538

TURNAROUND TIME: 24 hr

Project Leader: Jo Ellen Kustmaul

Phone No. 651 1906

SHIPPING INFORMATION:

Shipper _____

Address _____

Date Shipped _____

Service Used _____

Airbill No. _____ Cooler No. _____

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
Jon DeFon	Jo Ellen Kustmaul	7/26/89	9:00
Jo Ellen Kustmaul			
	Received for laboratory by:	7-26-89	1610

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
S-0726-1A	87042-6	7/26/89	TEH as diesel	ICED
S-0726-2.0. 1B	87042-6	7/26/89	TPH as gasoline	ICED

Applied GeoSystems 43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

0212lab.frm

Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: Joellen Kuszmaul

Date Received: 07-26-89
Laboratory Number: 90756S01
Project #: 87042-6
Sample #: S-0726-1B
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline	61		2.0		07-26-89	NR
TPH as Gasoline						
TEH as Diesel						NR
Benzene						NR
Toluene						NR
Ethylbenzene						NR
Total Xylenes						NR

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

07-28-89
Date Reported

Applied GeoSystems 43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

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ANALYSIS REPORT

0212lab.frm

Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: Joellen Kuszmaul

Date Received: 07-26-89
Laboratory Number: 90756S02
Project #: 87042-6
Sample #: S-0726-1A
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline	ND		10		07-26-89	NR
TPH as Gasoline						NR
TEH as Diesel						
Benzene						NR
Toluene						NR
Ethylbenzene						NR
Total Xylenes						NR

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

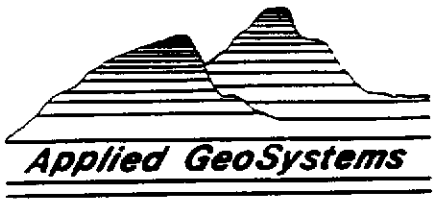
TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

07-28-89
Date Reported

CHAIN OF CUSTODY RECORD



43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

SAMPLER (signature): Keith McVay

Phone: (415) 651-1906

LABORATORY: APPLIED GEO SYSTEMS

TURNAROUND TIME: 2 Week

Project Leader: JO ELLEN KUSZMAUL

Phone No. (415) 651-1906

SHIPPING INFORMATION:

Shipper

Address

Date Shipped

Service Used

Airbill No. Cooler No.

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
Keith McVay			
	Received for laboratory by:	8-4-89	1200

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
S-0804-2A	87042-6	8-4-89	TPH/BTEX +TEH	ICED
S-0804-3A				
S-0804-4A				

Applied GeoSystems 43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

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ANALYSIS REPORT

0212lab.frm

Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: Joellen Kuszmaul

Date Received: 08-04-89
Laboratory Number: 90813S01
Project #: 87042-6
Sample #: S-0804-2A
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline	3.8		2.0		08-04-89	
TEH as Diesel						NR
Benzene	ND		0.050		08-04-89	
Toluene	ND		0.050		08-04-89	
Ethylbenzene	ND		0.050		08-04-89	
Total Xylenes	ND		0.050		08-04-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

08-10-89
Date Reported

Applied GeoSystems 43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

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ANALYSIS REPORT

0212lab.frm

Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: Joellen Kuszmaul

Date Received: 08-04-89
Laboratory Number: 90813S02
Project #: 87042-6
Sample #: S-0804-3A
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline	290		5.0		08-04-89	
TEH as Diesel	4200		100		08-18-89	
Benzene	0.77		0.050		08-04-89	
Toluene	0.15		0.050		08-04-89	
Ethylbenzene	0.30		0.050		08-04-89	
Total Xylenes	0.63		0.050		08-04-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

08-18-89
Date Reported

Applied GeoSystems 43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

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ANALYSIS REPORT

0212lab.frm

Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: Joellen Kuszmaul

Date Received: 08-04-89
Laboratory Number: 90813S03
Project #: 87042-6
Sample #: S-0804-4A
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline	93		2.0		08-04-89	
TEH as Diesel						NR
Benzene	0.097		0.050		08-04-89	
Toluene	ND		0.050		08-04-89	
Ethylbenzene	ND		0.050		08-04-89	
Total Xylenes	ND		0.050		08-04-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

08-10-89
Date Reported

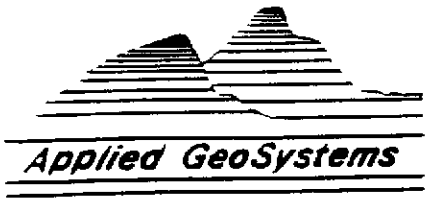
APPENDIX D

CHAIN OF CUSTODY RECORDS

AND ANALYSIS REPORTS

FOR STOCKPILED AND AERATING SOIL

CHAIN OF CUSTODY RECORD



Applied GeoSystems

43255 Mission Blvd Suite B Fremont CA 94539 (415)651-1906

SAMPLER (signature): Keith McVay

Phone: (415) 651-1906

LABORATORY: APPLIED GEOSYSTEMS

TURNAROUND TIME: 48 HOURS

Project Leader: JOELLEN

Phone No. (415) 651-1906

SHIPPING INFORMATION:

Shipper

Address

Date Shipped

Service Used

Airbill No. Cooler No.

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
Keith McVay			
	Received for laboratory by:	7-27-89	1440

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
S-0727-1A	87042-6	7-27-89	TPH & BTEX	ICED
S-0727-1B				
S-0727-1C				
S-0727-1D	KM	KM	KM	KM

COMPOSITE

Applied GeoSystems 43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

0212lab.frm

Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: Joellen Kuszmaul

Date Received: 07-27-89
Laboratory Number: 90766S01
Project #: 87042-6
Sample #: S-0727-1(ABCD)
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline	110		2.0		07-31-89	
TEH as Diesel						NR
Benzene	ND		0.050		07-31-89	
Toluene	0.065		0.050		07-31-89	
Ethylbenzene	0.51		0.050		07-31-89	
Total Xylenes	1.0		0.050		07-31-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

08-01-89
Date Reported

CHAIN OF CUSTODY RECORD

Applied GeoSystems
43255 Mission Blvd Suite B Fremont CA 94539 415/651-1906

SAMPLER (signature): Keith McVay
Phone: (415) 651-1906

LABORATORY: APPLIED GEOSYSTEMS

TURNAROUND TIME: 2 WEEKS

Project Leader: JO ELLEN
Phone No. (415) 651-1906

SHIPPING INFORMATION:
Shipper
Address
Date Shipped
Service Used
Airbill No. Cooler No.

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
Keith McVay			
	Received for laboratory by: Martha	7-27-89	1640

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

	Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
COMPOSITE	S-0727-2A	87042-6	7-27-89	TPH & BTEX	ICED
	S-0727-2B	〃	〃	〃	〃
	S-0727-2C				
	S-0727-2D				
COMPOSITE	S-0727-3A				
	S-0727-3B				
	S-0727-3C				
	S-0727-3D				
COMPOSITE	S-0727-4A				
	S-0727-4B				
	S-0727-4C				
	S-0727-4D				
COMPOSITE	S-0727-4A				
	S-0727-4D				
	S-0727-4C				
	S-0727-4D	〃	〃	〃	〃

CHAIN OF CUSTODY RECORD

Applied GeoSystems
43255 Mission Blvd Suite B Fremont, CA 94539 415/651-1906

SAMPLER (signature): Keith McVeigh
Phone: (415) 651-1906

LABORATORY: APPLIED GEOSYSTEMS

TURNAROUND TIME: 2 WEEKS

Project Leader: JO ELLEN
Phone No. (415) 651-1906

SHIPPING INFORMATION:
Shipper
Address
Date Shipped
Service Used
Airbill No. Cooler No.

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
Keith McVeigh			
	Received for laboratory by: [illegible]	7-27-89	1640

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
S-0727-6A (COMPOSITE)	87042-6	7-27-89	TPH & BTEX	ICED
S-0727-6B	"	"	"	"
S-0727-6C	"	"	"	"
S-0727-6D	"	"	"	"

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ANALYSIS REPORT

02121ab.frm

Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: Joellen Kuszmaul

Date Received: 07-27-89
Laboratory Number: 90767S01
Project #: 87042-6
Sample #: S-0727-2(ABCD)
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline	170		2.0		07-31-89	
TEH as Diesel						NR
Benzene	ND		0.050		07-31-89	
Toluene	0.11		0.050		07-31-89	
Ethylbenzene	0.46		0.050		07-31-89	
Total Xylenes	2.2		0.050		07-31-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

08-02-89
Date Reported

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: Joellen Kuszmaul

Date Received: 07-27-89
Laboratory Number: 90767S02
Project #: 87042-6
Sample #: S-0727-3(ABCD)
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline	330		2.0		07-31-89	
TEH as Diesel						NR
Benzene	ND		0.050		07-31-89	
Toluene	0.27		0.050		07-31-89	
Ethylbenzene	1.3		0.050		07-31-89	
Total Xylenes	3.4		0.050		07-31-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

08-02-89
Date Reported

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: Joellen Kuszmaul

Date Received: 07-27-89
Laboratory Number: 90767S03
Project #: 87042-6
Sample #: S-0727-4(ABCD)
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline	210		2.0		07-31-89	
TEH as Diesel						NR
Benzene	ND		0.050		07-31-89	
Toluene	ND		0.050		07-31-89	
Ethylbenzene	1.5		0.050		07-31-89	
Total Xylenes	5.4		0.050		07-31-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

08-02-89
Date Reported

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: Joellen Kuszmaul

Date Received: 07-27-89
Laboratory Number: 90767S04
Project #: 87042-6
Sample #: S-0727-5(ABCD)
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline	63		2.0		07-31-89	
TEH as Diesel						NR
Benzene	ND		0.050		07-31-89	
Toluene	ND		0.050		07-31-89	
Ethylbenzene	0.41		0.050		07-31-89	
Total Xylenes	2.0		0.050		07-31-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

08-02-89
Date Reported

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: Joellen Kuszmaul

Date Received: 07-27-89
Laboratory Number: 90767S05
Project #: 87042-6
Sample #: S-0727-6(ABCD)
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline	110		2.0		07-31-89	
TEH as Diesel						NR
Benzene	ND		0.050		07-31-89	
Toluene	ND		0.050		07-31-89	
Ethylbenzene	0.12		0.050		07-31-89	
Total Xylenes	0.78		0.050		07-31-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

08-02-89
Date Reported

CHAIN OF CUSTODY RECORD

Applied GeoSystems

43255 Mission Blvd Suite B Fremont, CA 94539 (415) 651-1906

SAMPLER (signature): [signature]

Phone:

LABORATORY: AGS

TURNAROUND TIME: 2 weeks

Project Leader: Jo Ellen

Phone No.

SHIPPING INFORMATION:

Shipper

Address

Date Shipped

Service Used

Airbill No. Cooler No.

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
[signature]			
	Received for laboratory by: ngulian	9/5/89	20

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

	Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
Composite	SW1A				
	SW1B				
	SW1C				
	SW1D				
Composite	SW2A				
	SW2B				
	SW2C	8/042-6	9-5-89	TEH as Desiel	ICED
	SW2D				
Composite	SW3A				
	SW3B				
	SW3C				
	SW3D				
Composite	SW4A				
	SW4B				
	SW4C				
	SW4D				
	SW5A				

CHAIN OF CUSTODY RECORD

Applied GeoSystems

43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

SAMPLER (signature): R. Mark [signature]

Phone:

LABORATORY: AGS

TURNAROUND TIME: 2 weeks

Project Leader: Jo Ellen

Phone No.

SHIPPING INFORMATION:

Shipper

Address

Date Shipped

Service Used

Airbill No. Cooler No.

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
R. Mark [signature]			
	Received for laboratory by: [signature]	9/5/89	20[10]

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
S10 5B	870426	9-5-89	TPH	Iced
S10 5C				
S10 5D				
S10 6A				
S10 6B				
S10 6C				
S10 6D				

Composite (S10 5B–5D)

Composite (S10 6A–6D)

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: Joellen Kuszmaul

Date Received: 09-05-89
Date Extracted: 09-15-89
Laboratory Number: 90906S01
Project #: 87042-6
Sample #: S-10-1(ABCD)
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline						NR
TEH as Diesel	920		10		09-21-89	
Benzene						NR
Toluene						NR
Ethylbenzene						NR
Total Xylenes						NR

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

09-25-89
Date Reported

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: Joellen Kuszmaul

Date Received: 09-05-89
Date Extracted: 09-15-89
Laboratory Number: 90906S02
Project #: 87042-6
Sample #: S-10-2(ABCD)
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline						NR
TEH as Diesel	500		10		09-21-89	
Benzene						NR
Toluene						NR
Ethylbenzene						NR
Total Xylenes						NR

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

09-25-89
Date Reported

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: Joellen Kuszmaul

Date Received: 09-05-89
Date Extracted: 09-15-89
Laboratory Number: 90906S03
Project #: 87042-6
Sample #: S-10-3(ABCD)
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline						NR
TEH as Diesel	860		10		09-21-89	
Benzene						NR
Toluene						NR
Ethylbenzene						NR
Total Xylenes						NR

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
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NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

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TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

09-25-89
Date Reported

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: Joellen Kuszmaul

Date Received: 09-05-89
Date Extracted: 09-15-89
Laboratory Number: 90906S04
Project #: 87042-6
Sample #: S-10-4(ABCD)
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline						NR
TEH as Diesel	1300		40		09-21-89	
Benzene						NR
Toluene						NR
Ethylbenzene						NR
Total Xylenes						NR

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

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TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

09-25-89
Date Reported

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: Joellen Kuszmaul

Date Received: 09-05-89
Date Extracted: 09-15-89
Laboratory Number: 90906S05
Project #: 87042-6
Sample #: S-10-5(ABCD)
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline						NR
TEH as Diesel	250		10		09-21-89	
Benzene						NR
Toluene						NR
Ethylbenzene						NR
Total Xylenes						NR

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

09-25-89
Date Reported

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ANALYSIS REPORT

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Report Prepared for:
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Attention: Joellen Kuszmaul

Date Received: 09-05-89
Date Extracted: 09-15-89
Laboratory Number: 90906S06
Project #: 87042-6
Sample #: S-10-6(ABCD)
Matrix: Soil

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline						NR
TEH as Diesel	3800		100		09-21-89	
Benzene						NR
Toluene						NR
Ethylbenzene						NR
Total Xylenes						NR

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

09-25-89
Date Reported

Source: U.S. Geological Survey
Oakland East
7.5-Minute Quadrangle

N

Approximate Scale

2000 1000 0 2000 4000

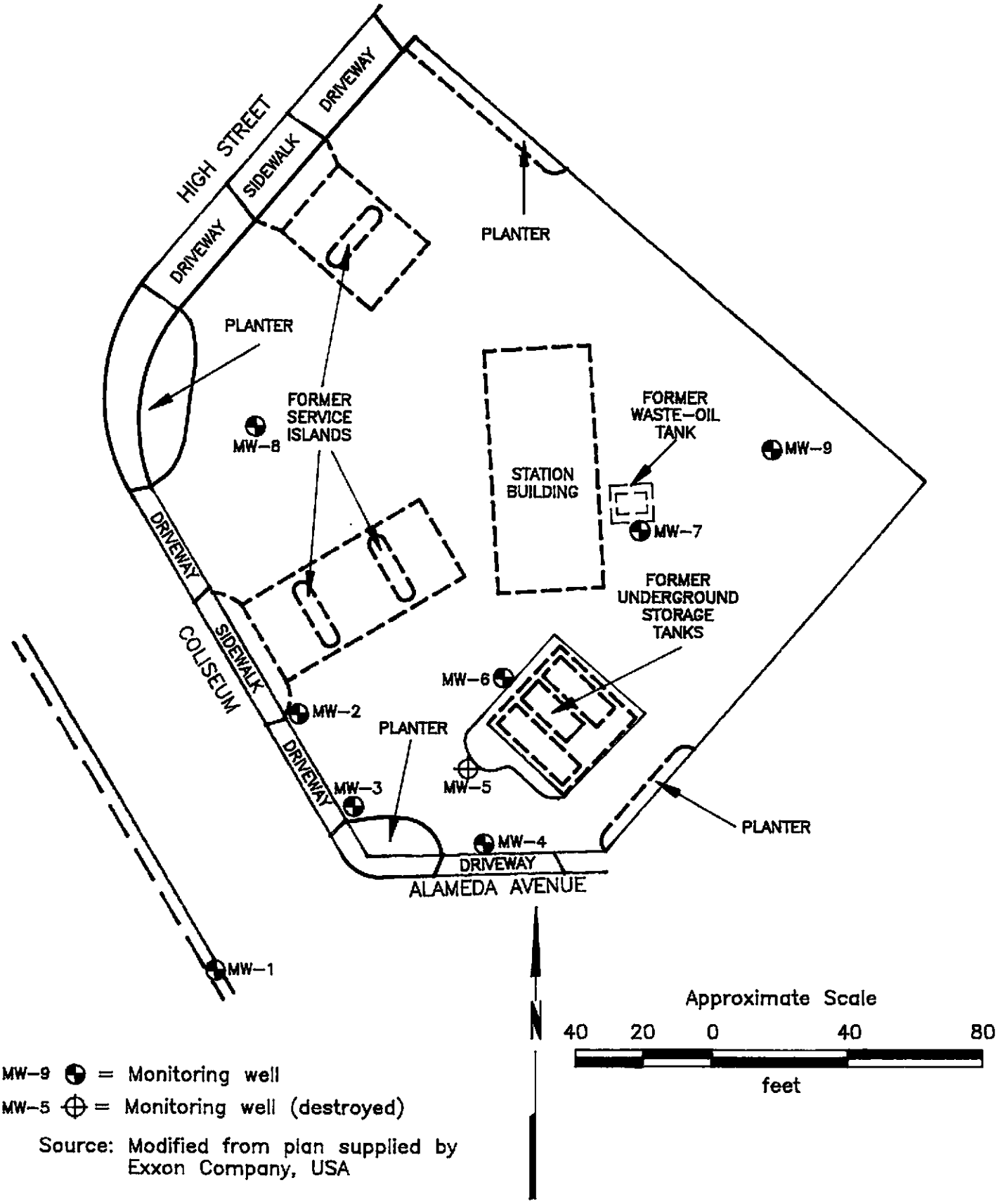
feet

Applied GeoSystems

PROJECT NO. 87042-6

SITE VICINITY MAP
Exxon Station No. 7-3096
720 High Street
Oakland, California

PLATE
P - 1



MW-9 ⊕ = Monitoring well

MW-5 ⊕ = Monitoring well (destroyed)

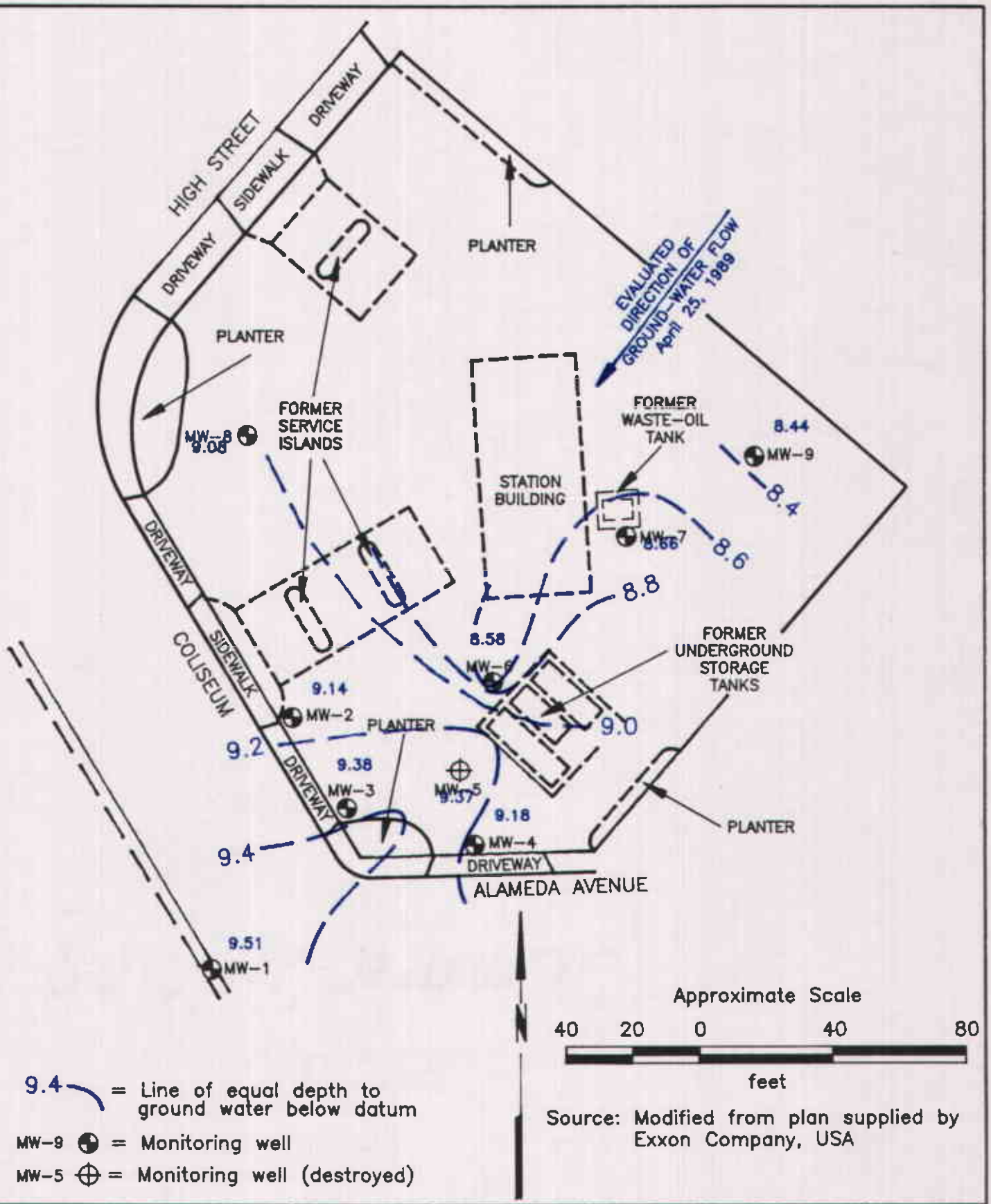
Source: Modified from plan supplied by Exxon Company, USA

Applied GeoSystems

PROJECT NO. 87042-6

GENERALIZED SITE PLAN
Exxon Station No. 7-3006
720 High Street
Oakland, California

PLATE
P - 2

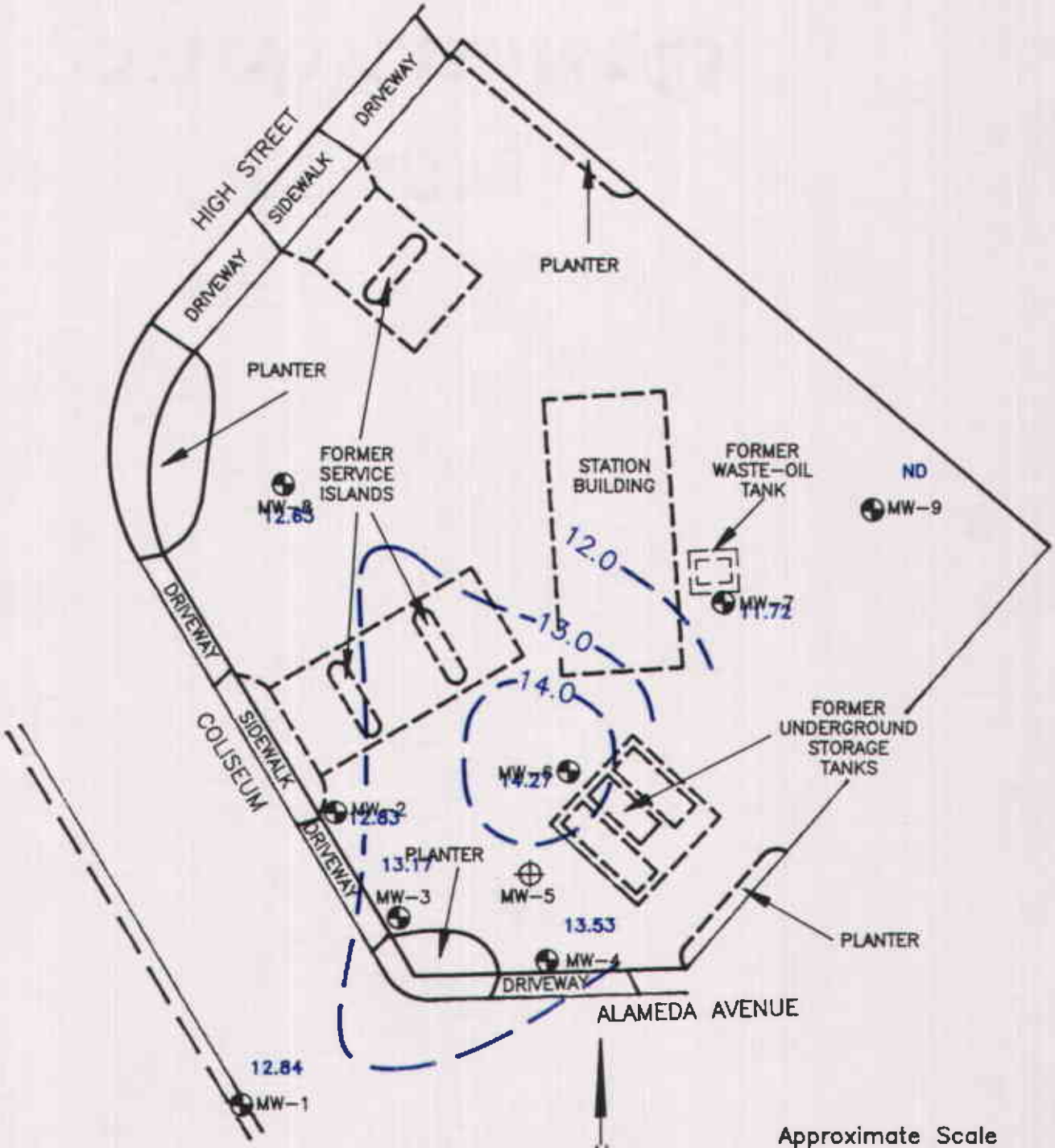


Applied GeoSystems

PROJECT NO. 87042-6

GROUND-WATER SURFACE MAP
April 25, 1989
Exxon Station No. 7-3006
720 High Street
Oakland, California

PLATE
P - 3



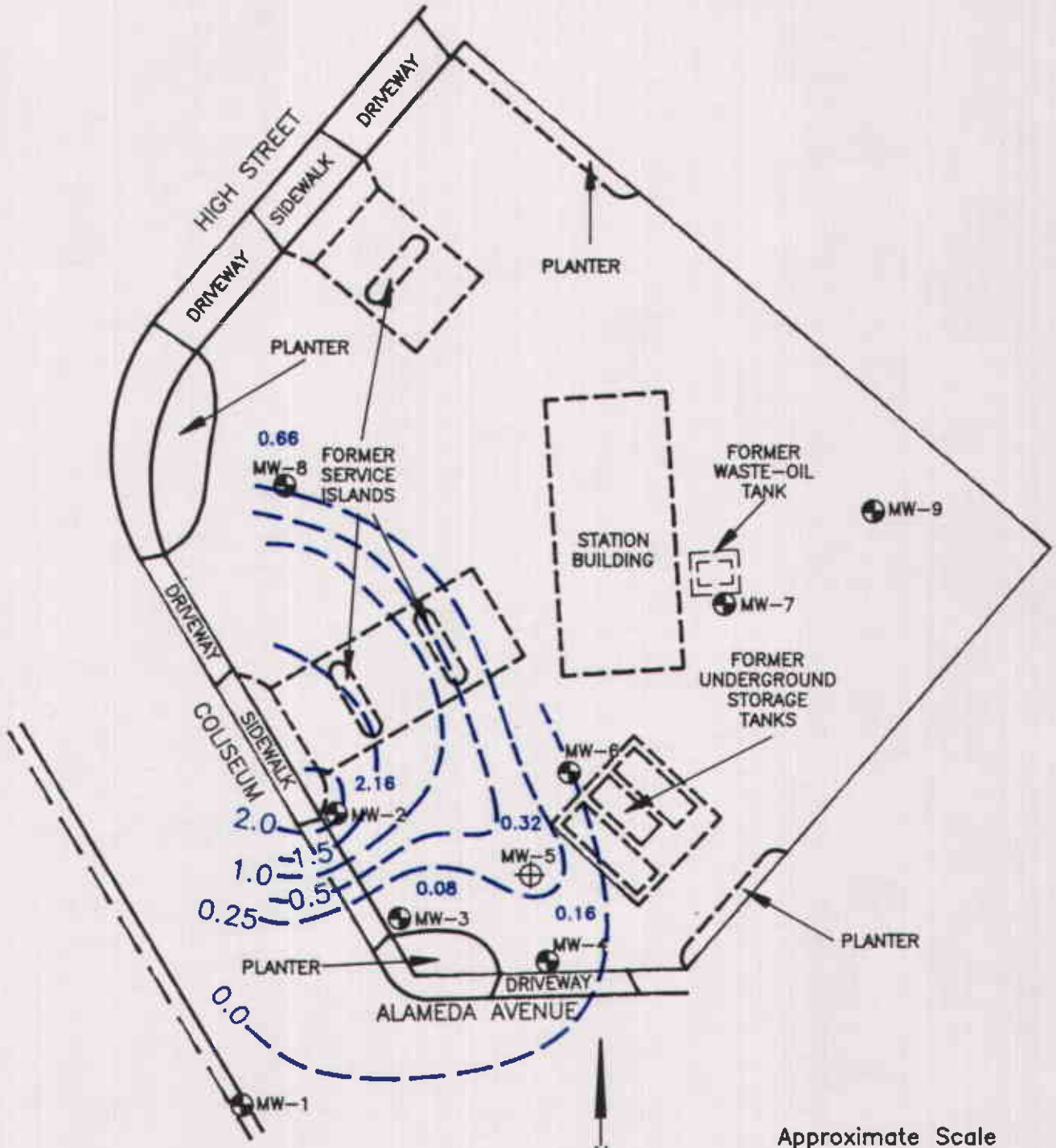
Applied GeoSystems

PROJECT NO. 87042-6

GROUND-WATER SURFACE MAP
September 6, 1989
Exxon Station No. 7-3006
720 High Street
Oakland, California

PLATE

P - 4



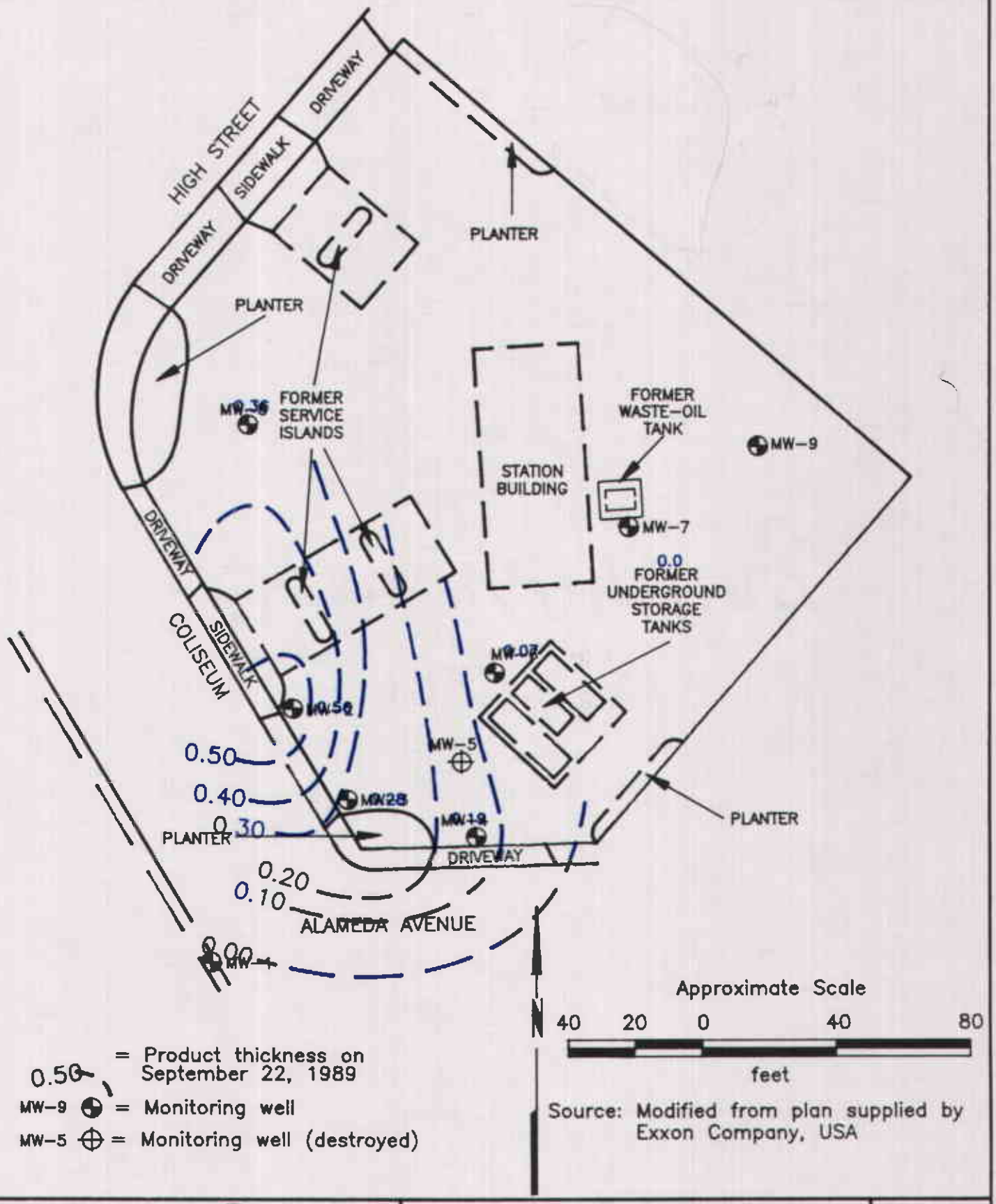
Applied GeoSystems

PROJECT NO. 87042-6

PRODUCT THICKNESS MAP
April 25, 1989
Exxon Station No. 7-3006
720 High Street
Oakland, California

PLATE

P - 5



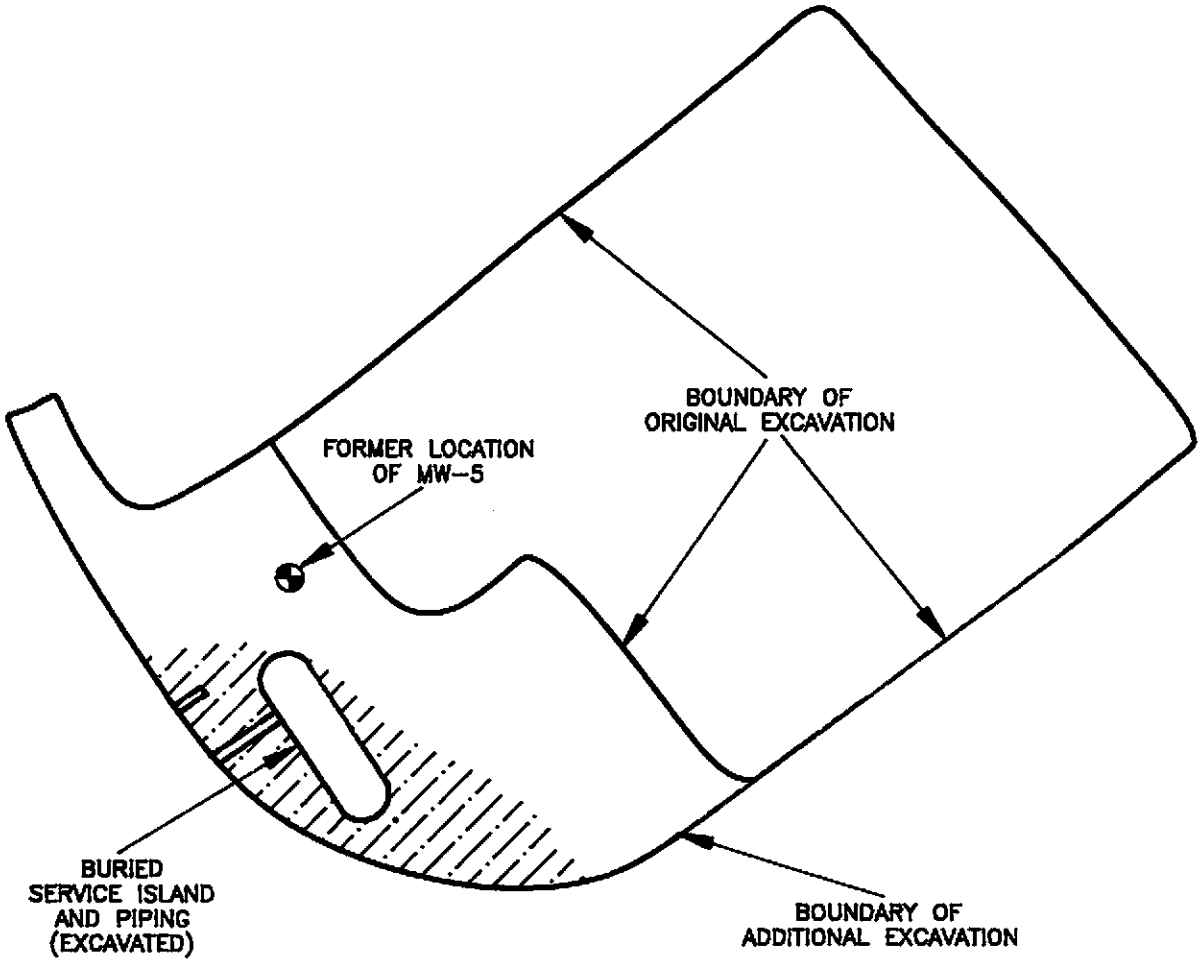
Applied GeoSystems

PROJECT NO. 87042-6

PRODUCT THICKNESS MAP
September 22, 1989
Exxon Station No. 7-3006
720 High Street
Oakland, California

PLATE

P - 6



= Fill

N

Approximate Scale

20 10 0 20 40

feet

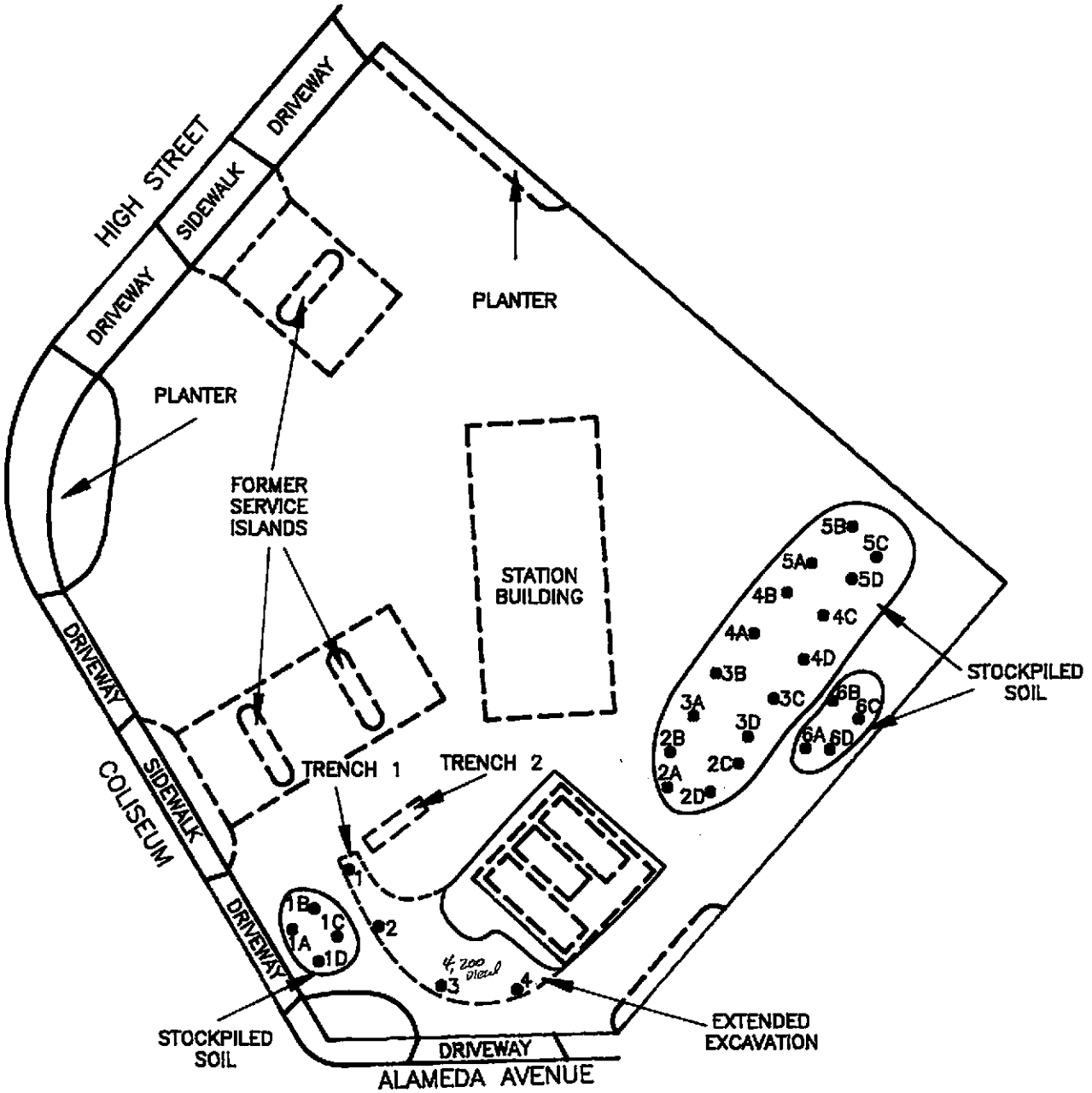
Applied GeoSystems

PROJECT NO. 87042-6

DETAIL OF EXCAVATION
Exxon Station No. 7-3006
720 High Street
Oakland, California

PLATE

P - 7



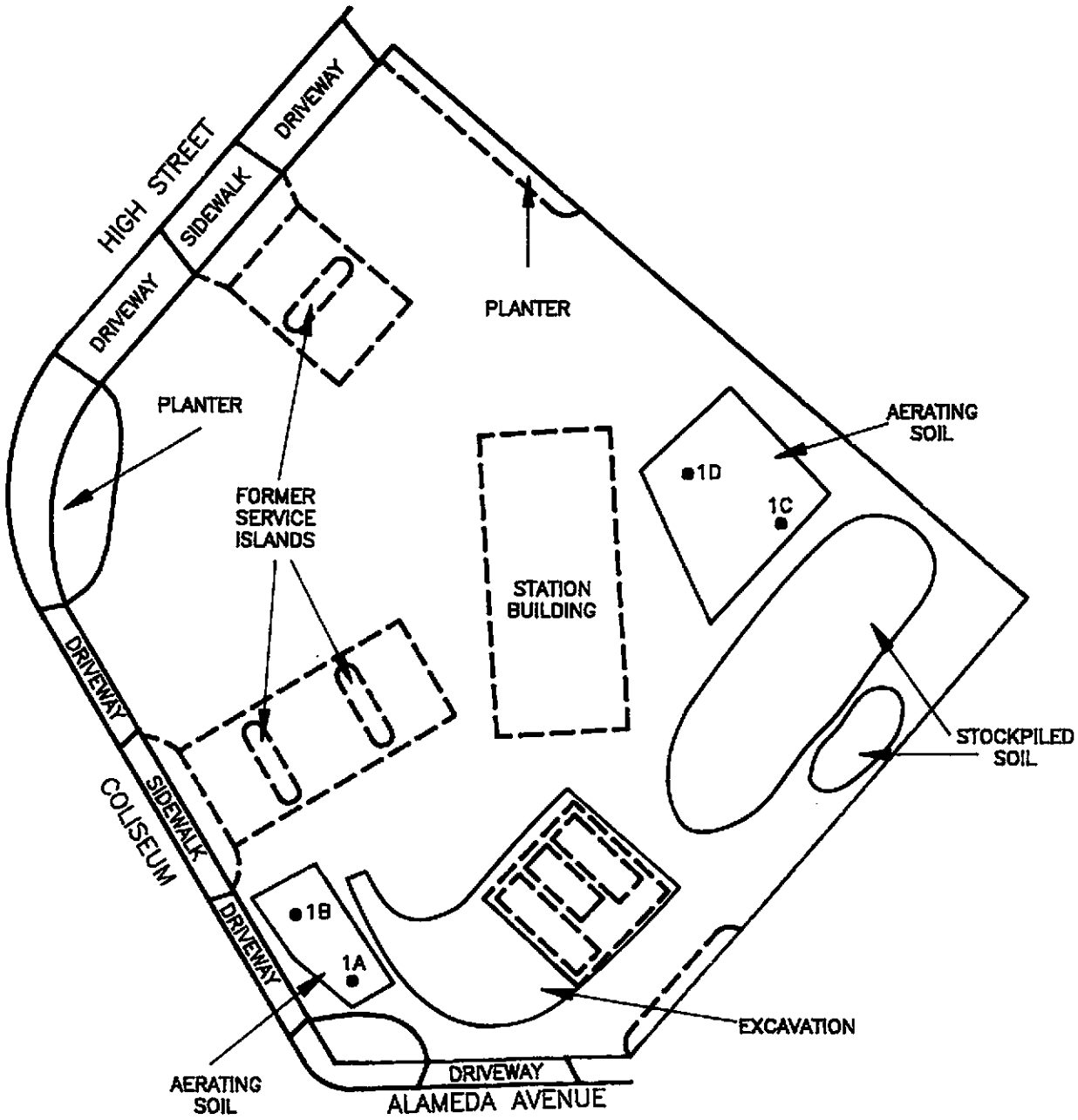
Source: Modified from plan supplied by Exxon Company, USA

Applied GeoSystems

PROJECT NO. 87042-6

SOIL SAMPLE LOCATION
Exxon Station No. 7-3006
720 High Street
Oakland, California

PLATE
P - 8



1D ● = Soil sample

Source: Modified from plan supplied by Exxon Company, USA

Applied GeoSystems

PROJECT NO. 87042-6

SOIL SAMPLE LOCATIONS IN AERATING SOIL
Exxon Station No. 7-3006
720 High Street
Oakland, California

PLATE
P - 9

APPENDIX A

SAMPLING PROCEDURES

SAMPLING PROCEDURES

Soil Sampling

To collect soil samples from the walls of the excavation, the geologist instructed the backhoe operator to retrieve a bucket of soil from the desired location in the excavation. The geologist then used a percussion sampler (2-1/2-inch inside diameter) lined with a brass sleeve into the freshly exposed soil in the backhoe bucket. To collect samples from stockpiled soil, the geologist used a hand auger to drill at least 2 feet into the soil pile and then used the percussion sampler to collect a sample at the base of the auger hole. The samples were sealed with aluminum foil, plastic caps, and tape, then labeled and placed on ice in an insulated cooler. The geologist initiated a Chain of Custody Record and Applied GeoSystems personnel observed chain-of-custody protocol throughout subsequent handling of the soil samples.

Head-Space Analysis of Soil Samples

The field geologist used an organic vapor meter (OVM) to analyze organic vapor concentrations in soil samples. Readings were collected using one of two procedures. In the first, the geologist placed a soil sample in a resealable plastic bag, sealed the bag, and then forced the wand of the OVM through the wall of the bag to take the reading. In the second, the geologist placed the rubber cup skirting the intake probe of the OVM flush against the end of the brass tube containing the soil sample just after the tube was removed from the sampler. Field instruments such as the OVM indicate relative organic vapor concentrations in soil but cannot assess the concentrations of hydrocarbon contaminants in the soil with the precision of laboratory analyses.

Subjective Analysis of Ground Water

Before water samples were collected for subjective analysis, the depth to static water level was measured to the nearest 0.01 foot with a Solinst electronic water-level indicator. In wells with free product, the geologist used an Oil Recovery Systems oil-water interface probe to measure the depth of the product and the depth of the product-water interface. The geologist then collected ground-water samples from each well by gently lowering approximately half the length of a Teflon bailer past the air-water interface. The bailer was washed with Alconox (a commercial biodegradable detergent) and rinsed with deionized water before each use. The samples were retrieved and examined for evidence of floating product, sheen, and emulsion.