FUGRO WEST, INC.

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August 14, 1996
Project No. 9537-0430C

Alameda County Health Care Services Agency
Environmental Health Division
1131 Harbor Bay Parkway
Alameda, California 94502-6577

Attention: Ms. Juliet Shin, Senior Hazardous Materials Specialist

Work Plan for Further Free Product and Ground Water Assessment
Former Bill Chun Service Station
2301 Santa Clara Avenue
Alameda, California

Dear Ms. Shin:

Fugro West, Inc., (Fugro) is pleased to provide you with this work plan to perform additional free product and ground water assessment at the former Bill Chun Service Station located at 2301 Santa Clara Avenue in Alameda, California (subject property). Details regarding general site history and the results of previous subsurface assessment at the subject property are included in the report by Fugro titled *Results of Free Product Recovery, Additional Ground Water Assessment, and Quarterly Ground Water Monitoring Activities*, dated January 30, 1996. The scope of work addressed within this work plan is based on a letter from Ms. Juliet Shin of the Alameda County Environmental Health Division (ACEHD) to Mr. Wayne Chun, dated April 3, 1996.

As requested by ACEHD, this work plan addresses further characterization of the lateral extent of free product beneath the subject property, further characterization of the lateral extent of dissolved-phase hydrocarbons in ground water downgradient of the subject property, and source removal to address potential human health hazard and reduce hydrocarbon concentrations in ground water. The following sections describe the tasks that are proposed to address the above concerns.

TASK 1 - ASSESSMENT OF THE LATERAL EXTENT OF FREE PRODUCT

Free floating product has been detected at the subject property in monitoring wells MW-5 and MW-7. The free product detected in MW-5 and MW-7 likely originated from the former underground storage tanks (USTs) located on the subject property. The lateral extent of free product adjacent to and downgradient of MW-5 is characterized by monitoring wells MW-4, MW-6, and MW-10. The lateral extent of free product adjacent to and downgradient of MW-7 is not sufficiently characterized. The ground water gradient direction at the subject property has consistently been towards the northwest to northeast.

Fugro proposes to assess the extent of free product by installing two ground water monitoring wells inside the existing service garage. The proposed monitoring wells MW-11 and MW-12 will be constructed within soil borings drilled approximately 40 feet northeast, and 25 feet north, respectively, of existing monitoring well MW-7 (see attached Figure 2).

Prior to commencing field work, Fugro will acquire monitoring well installation permits from the Zone 7 Water Agency. Prior to commencing field activities, Fugro will notify Underground Service Alert (USA) at least 48 hours prior to assist in locating and avoiding damage to underground utilities. At each proposed monitoring well location, a 10-inch-diameter hole will be cored through the concrete foundation slab of the existing building.

Soil borings will be advanced using a limited-access drill rig equipped with 8-inch hollow stem augers. Soil samples will be collected at 3 to 5 foot intervals from the surface to the maximum depth of approximately 15 feet below ground surface (bgs). The Fugro site geologist will log the lithologic characteristics of each hole and screen soil samples for the presence of hydrocarbon vapors using a portable photoionization detector (PID).

Two soil samples collected from each well will be submitted to a state-certified laboratory for analysis for total petroleum hydrocarbons as gasoline (TPH-g), benzene, toluene, ethylbenzene, and xylenes (BTEX), total petroleum hydrocarbons as diesel (TPH-d), and halogenated volatile organic compounds (HVOC). The samples will be placed in a cooled ice chest pending delivery to the laboratory. Chain-of-custody records will be completed in the field and will accompany the samples to the laboratory.

Two-inch-diameter PVC well casing will be installed within the soil borings to a maximum depth of 15 feet bgs. Screened casing will extend from the bottom of the boring to approximately 5 feet bgs. The sand filter pack, bentonite transition seal, and bentonite/grout seal will be installed in accordance with Zone 7 Water Agency requirements. Following installation, the well will be developed by manual surging with a mechanical surge block and bailed to remove suspended soil particles. Soil generated by drilling activities will be stored on site in labeled U.S. Department of Transportation (DOT)-approved 55 gallon steel drums.

At least 72 hours following completion of well development, the wells will be monitored for the presence of free product. The depth to water and free product, if present, will be measured using an electronic oil-water interface probe. If no free product is present, the well will be sampled during the next scheduled quarterly ground water monitoring event.

TASK 2 - ADDITIONAL ASSESSMENT OF THE LATERAL EXTENT OF DISSOLVED-PHASE HYDROCARBONS IN GROUND WATER

Previous ground water monitoring and assessment indicate that groundwater beneath and adjacent to the subject property is impacted by detectable levels of dissolved petroleum hydrocarbons. Results of an assessment conducted by Fugro in October and November 1995 indicate that the lateral extent of dissolved-phase hydrocarbons is not adequately characterized in the northeast direction. The ACEHD requested that additional groundwater assessment be conducted to define the downgradient extent of the dissolved hydrocarbons.

On the basis of previous assessment results, Fugro believes that a preferential pathway for contaminant migration may exist parallel to and south of the sidewalk on the south side of Oak Street. Fugro will inspect existing structures and utilities adjacent to the site to assess whether an artificial preferential pathway exists. In addition, Fugro will review public records at the City of Alameda Building Department and Engineering Department to locate subsurface structures, such as electrical vaults, old trenches, and pipelines.

Fugro will collect ground water samples downgradient of the subject property using a Powerpunch® ground water sampling device. Five borings will be located in the parking lot and on Oak Street along the west side of the Times-Star building at 1516 Oak Street (Figure 2). The Powerpunch® sampling devices will be advanced using direct penetration technology, which does not generate soil cuttings.

Prior to installing the Powerpunch® borings, Fugro will acquire excavation permits from the City of Alameda Central Permit Office for borings that are located in the City of Alameda right of way. Fugro will notify Underground Service Alert at least 48 hours prior to subsurface drilling activities. In addition, Fugro will utilize a private subsurface location service to assist in locating and avoiding damage to underground utilities. Ground water samples collected using the Powerpunch® will be analyzed by a state-certified laboratory for TPH-g, BTEX, TPH-d, and HVOC.

If the analytical results for the Powerpunch® delineate the northern offsite extent of dissolved hydrocarbons in ground water Fugro will install a two-inch-diameter ground water monitoring well in the area near the Powerpunch® locations. The specific location of the proposed monitoring well will be based on the results of the Powerpunch® sampling. The monitoring well will be installed in an eight-inch-diameter soil boring drilled using a hollow-stem auger drill rig. Soil samples will be logged every five feet and at observed changes in lithology. Soils will be screened in the field for presence of hydrocarbons using a potable photoionization detector (PID). The monitoring well will be screened approximately ten feet below and five feet above the observed ground water surface. Three soil samples collected from the boring will be analyzed for TPH-g, BTEX, TPH-d, and HVOC. Soil generated by drilling activities will be stored at the subject property DOT-approved 55-gallon steel drums. Following installation, a horizontal and vertical survey of the well will be performed by a California-licensed land surveyor. The well will be sampled during the next scheduled quarterly ground water monitoring event.

If the analytical results for the Powerpunch® ground water samples indicate that the extents of dissolved hydrocarbons in ground water have not been delineated to the north, Fugro will evaluate additional downgradient sampling locations on the north side of the Alameda Times-Star Building. Following completion of Powerpunch® assessment, Fugro will propose to ACEHD to install one or more ground water monitoring wells. Fugro will attempt to complete groundwater assessment using the least practical number of borings and monitoring wells.

TASK 3 - SOURCE REMOVAL

In a letter dated April 3, 1996, the ACEHD requested that this work plan address source removal to address potential human health hazard and reduce hydrocarbon concentrations in ground water. Fugro is

currently performing free product recovery from monitoring wells MW-5 and MW-7 using passive free product recovery bailers (PRBs). Fugro believes that, until characterization of the lateral extent of free product is complete, the current program of free product recovery using PRBs is the most effective approach of source removal.

TASK 4 - PREPARE A REPORT OF FINDINGS

Fugro will prepare a technical report presenting the findings of the free product and ground water assessment activities. The report of findings will include background project information, field activities/method, well logs, findings, and conclusions. The report will include an evaluation of feasible corrective action alternatives to address the remediation of hydrocarbon-impacted soil and groundwater on the subject property.

SCHEDULE

Following the approval of this work plan, Fugro will commence field work within two weeks of the notice to proceed. Field activities are expected to require a total of one week to complete. A final report will be submitted to the ACEHD within 60 days following the completion of the field work. Fugro will notify the ACEHD at the time the notice to proceed is received and at the start of the field work.

If you have questions or comments regarding this project, please contact us at (415) 296-1041.

Sincerely,

FUGRO WEST, INC.

Peter B. Hudson
Project Geologist

Stephen J. Boudreau
Regional Branch Manager
Senior Environmental Engineer

PBH:lah

Attachment: Figures

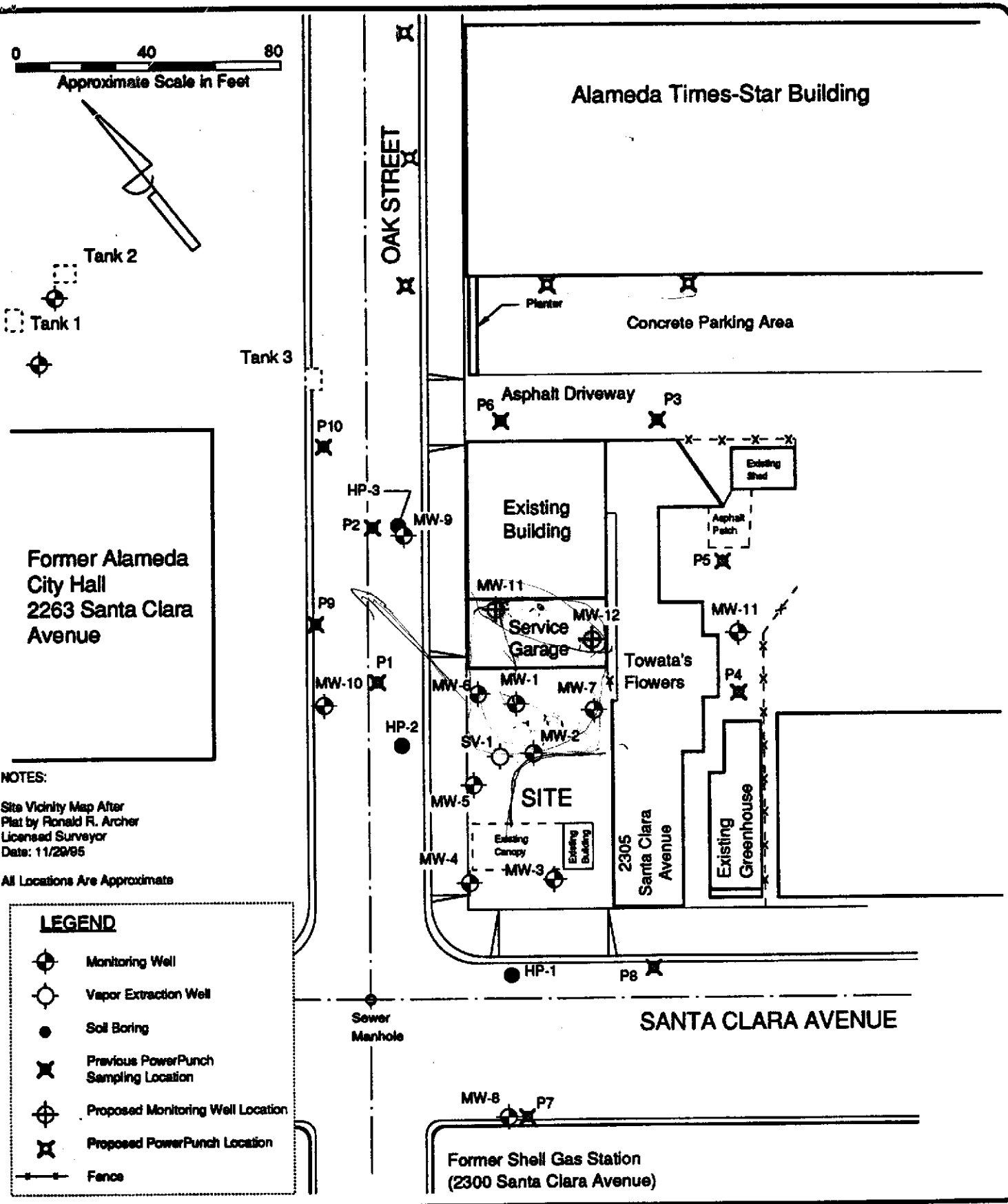
c: Wayne Chun

GENERAL NOTES:

BASE MAP FROM USGS
7.5 MINUTE TOPOGRAPHIC
OAKLAND EAST & WEST, CA

0 2000 4000
Approximate Scale in Feet

FUGRO	DRAWN BY: D. Hada DATE: January 5, 1995 REVISED BY: DATE:	SITE LOCATION MAP Former Bill Chun's Service Station 2301 Santa Clara Avenue Alameda, CA	FIGURE 1 PROJECT NUMBER: 95-37-0431



FUGRO

DRAWN BY: J. Scruggs
DATE: January 3, 1996
REVISED BY: J. Paradis
DATE: August 13, 1996

SITE MAP AND LOCATIONS OF PROPOSED GROUND WATER WELLS & SAMPLING POINTS

Former Bill Chun Service Station
2301 Santa Clara Avenue
Alameda, CA

FIGURE 2

PROJECT NUMBER: 95-37-0431