THRIFTY OIL CO.

April 5, 1989

Lowell Miller
Alameda County
Environmental Health Services
470 27th Street
Suite 322
Oakland, CA 94612

RE: Thrifty Oil Co. Station #049
3400 San Pablo Avenue
Oakland, Ca 94608

Dear Mr. Miller,

Thrifty Oil Co. has contracted with Woodward-Clyde Consultants, Inc. to design a groundwater remediation system for the above referenced location. The site is owned by Thrifty Oil Co. and operated by Circle K Corporation.

Enclosed please find a copy of Woodward-Clyde Consultants' "Work Plan for Groundwater Remediation" dated April 4, 1989. If, upon review of the proposal you have any questions, please contact me at (213) 923-9876.

Very truly yours,

Peter D'Amico

Peter D'Amico
Manager
Environmental Affairs

PD/dmt
Enclosure

10000 Lakewood Boulevard, Downey, California 90240 (213) 923-9876

4-12-89

WORK PLAN
FOR GROUNDWATER REMEDIATION
THRIFTY SERVICE STATION 49
3400 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

Prepared for

Thrifty Oil Co.
10000 Lakewood Boulevard
Downey, CA 90240

April 4, 1989

Prepared by

Woodward-Clyde Consultants
500 12th Street, Suite 100
Oakland, CA 94607-4014

WORK PLAN FOR GROUNDWATER REMEDIATION

Thrifty Service Station 49
3400 San Pablo Avenue
Oakland, California

INTRODUCTION

This report outlines a plan to remediate subsurface petroleum product contamination at the Thrifty Service Station 49 located at 3400 San Pablo Avenue, in Oakland, California. It has been prepared to comply with the Alameda County Health Department (ACHD) requirements for remediating subsurface petroleum product contamination. The proposed activities described below are designed to satisfy the remedial requirements of both the ACHD and the Regional Water Quality Control Board. This work plan will, however, only address those items related to free product and groundwater remediation at the subject site. A site location map is provided in Figure 1. Detailed descriptions of the investigative activities conducted previously are included in Woodward-Clyde Consultants' (WCC) environmental assessment report submitted to the ACHD on December 10, 1986.

BACKGROUND

In November 1986, Thrifty Oil Company retained WCC to conduct a followup subsurface site assessment at the service station to further delineate the extent of the existing contamination. The initial site investigation was conducted by Groundwater Technology in August 1986 and consisted of advancing six borings and installing three 2-inch diameter monitoring wells. Boring and well locations are shown on Figure 2. Soil samples were taken at 5-foot intervals in all borings and field analyzed for volatile organic vapors using a photoionization detector. The samples taken at a

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Figure 1. SITE LOCATION MAP

depth of 9 feet in Borings SB-1, MW-1 and MW-2; and 4 feet in Borings SB-2, SB-3 and MW-3 were submitted to a laboratory for analysis. Only the samples from SB-1 and MW-3 were found to contain dectectable levels of total petroleum hydrocarbons (TPH) of 67 and 22 ppm, respectively. Groundwater samples were also taken from each well and analyzed for TPH and benzene, ethyl benzene, toulene and xylene (BTEX). Total dissolved hydrocarbons in MW-1, MW-2 and MW-3 were 85.3, 93.7 and 2.1 ppm, respectively. The total BTEX from each of the three wells was 54.1, 52.4 and 0.75 ppm, respectively.

The followup site assessment was conducted by WCC and consisted of advancing four 15-foot deep borings and installing four monitoring wells. Soil samples were taken at the approximate location of the water table at a depth of 7 feet in all of the borings except MW-5 where a sample could not be recovered. Only the samples from MW-4 and MW-7 exhibited hydrocarbon odors and were submitted to a laboratory for analysis. Only the sample from MW-4 was found to have detectable levels of TPH of 1,200 ppm and total BTEX of 107 ppm. Water samples were taken from each of the newly installed wells and submitted for laboratory analysis. Only the water samples from MW-4 and MW-7 had detectable levels of TPH of 97 and 38 ppm, respectively, and total BTEX of 18.8 and 13.9 ppm, respectively.

Subsequent to the WCC site assessment, water levels and product thicknesses (if any) have been monitored in each of the seven wells every three weeks. Free product, if present, has then been recovered by manual bailing. The thickest measured free product was found in MW-1 at 0.3 feet (measured during WCC site assessment). The product thicknesses vary in each of the wells, but have been decreasing over time since the well bailing was started. Recent product level measurements (March 10, 1989) indicate that product exists in only MW-1 at 0.1 feet in thickness.

PROPOSED REMEDIATION

The proposed remediation involves the installation of a 4- to 6-inch diameter recovery well. A two-phase pump system will be placed in the recovery well. The use of a two-phase recovery system will remove both the floating product as well as much of the contaminated groundwater. One pump will be situated at the bottom of the recovery well to depress the water table, while a second pump will be positioned at the oil/water interface to recover the product as it flows into the well. The water will be passed through an oil/water separator prior to treatment by activated carbon adsorption to ensure that free product does not reach the carbon beds. The recovered product will be pumped to the product tank. The product tank will be equipped with secondary containment and a high level switch to shut down the system should it become full. The product drain from the oil/water separator will also be connected to the product tank. Piping will be double contained and installed below grade between the tank and recovery well. A hazardous materials management plan (HMMP) will be prepared for storage of the recovered product. The water recovered from the oil/water separator will be pumped to the holding tank connected to the carbon filtration system.

The groundwater and dissolved hydrocarbons within the area of influence will migrate toward the recovery well and be removed by the depression pump. The groundwater will be pumped first through the oil/water separator and then to a holding tank and finally through a pair of activated carbon filters to remove the dissolved hydrocarbons before being discharged into the sanitary sewer or a storm drain. An NPDES or local discharge permit will be required prior to discharging the treated water. The recovery system will incorporate a series of controls and switches to regulate pumping rates and prevent the tank from overfilling. A diagram of the

system layout and potential area of influence limits are shown in Figure 2, while a conceptual schematic is shown in Figure 3.

Prior to installation of the system, a pump test will be conducted in the existing wells to evaluate various physical parameters of the local hydrogeological regime. The data acquired from these tests will be used to estimate recovery system pumping rates, area of influence and the rate of groundwater movement as well as to size the water table drawdown pump, oil/water separator and piping. Well spacing, should more than one well be required to cover the entire contaminated area, will also be estimated from the results of the pump test.

At this time, it is anticipated that the two-phase system will be installed in a recovery well located at the center of the current tank backfill location as shown on Figure 2. The existing tanks are scheduled to be replaced in the near future with the new tank complex located to the east of the current location. Situating the recovery well in the former tank complex, assuming it is backfilled with coarse-grained materials, should greatly increase the effective diameter of the well. The recovery well will be installed to a depth of approximately 25 feet below grade. A 0.020-inch slot well screen and #2 sand filter pack will be used in the installation of the recovery well. During the installation of the recovery well, samples will be taken at 5-foot intervals.

The recovery system will consist of separate water table depression and product recovery pumps, control panels, water and product tanks, oil/water separator, water treatment equipment, air compressor and associated wiring and hoses. All plumbing and control lines will be installed below grade in a shallow trench cut in the concrete and paved over. With the exception of the skimmer and depression pump, all of the equipment will be installed in a secure storage area constructed behind the station office. A diagram of the proposed system location is shown in Figure 2.

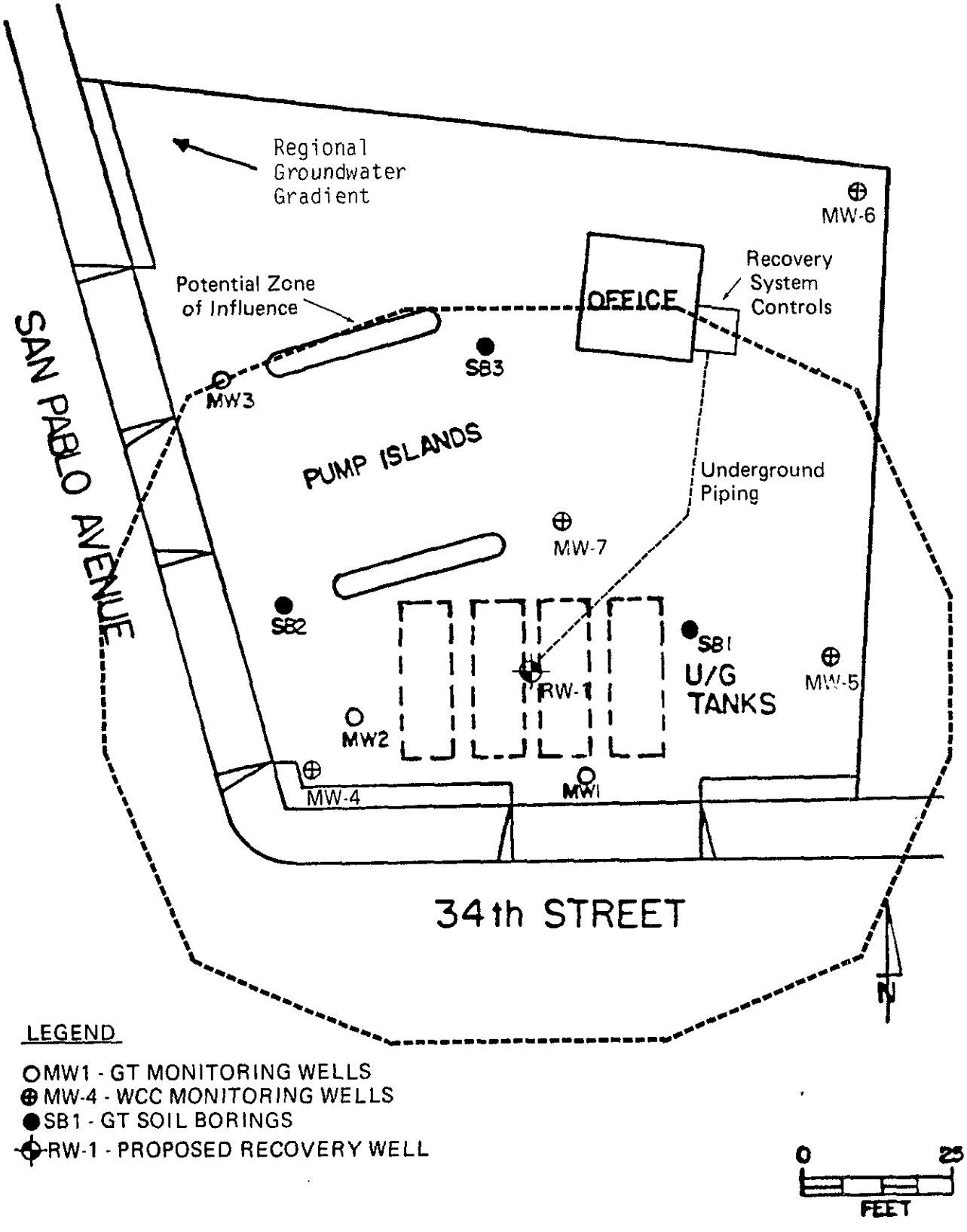

Figure 2. SITE PLAN AND RECOVERY SYSTEM LOCATION

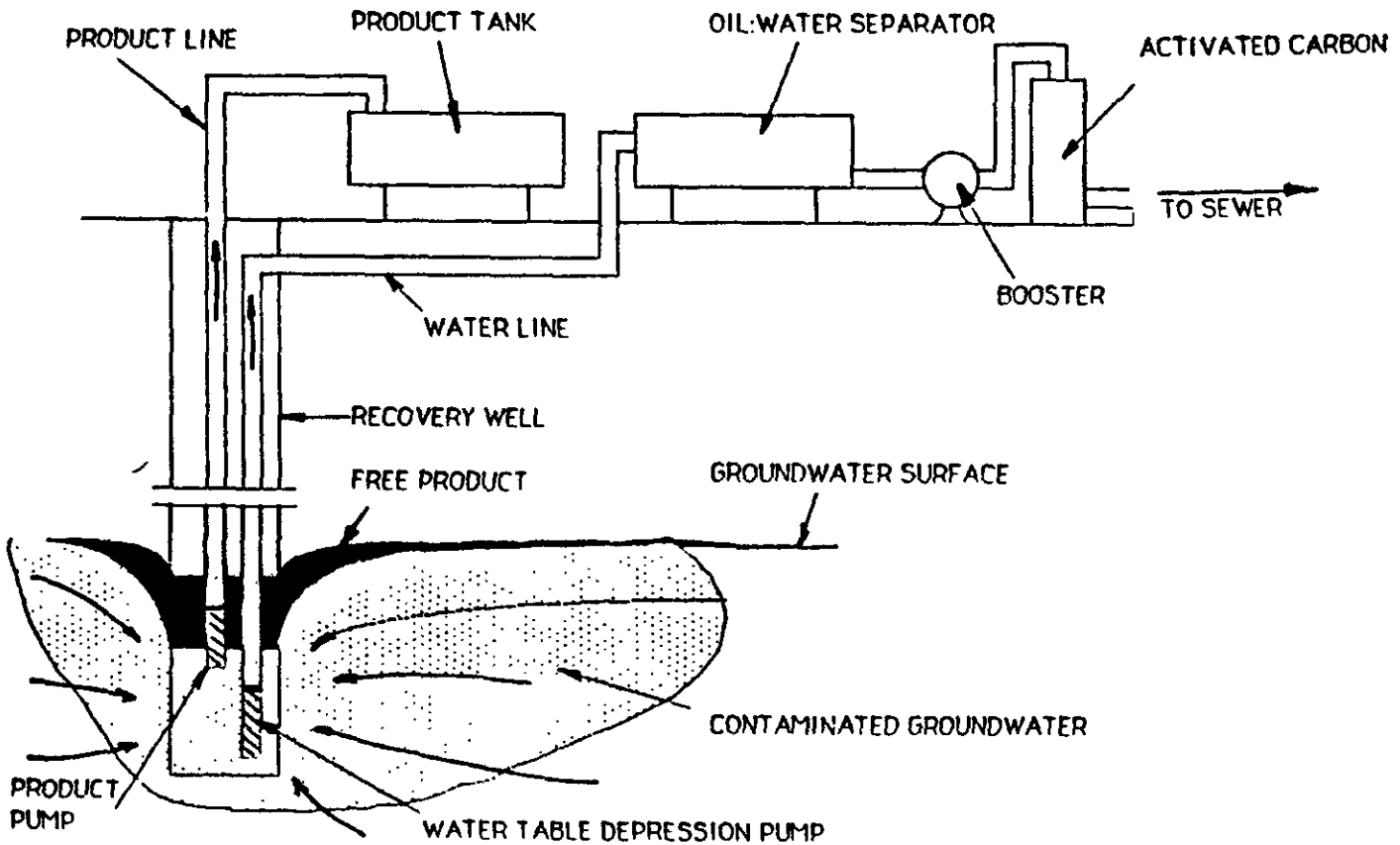

Figure 3. CONCEPTUAL RECOVERY SYSTEM SCHEMATIC

Woodward-Clyde Consultants

Following 30 days of continuous system operation, a report will be prepared evaluating the performance of the remedial system. Included in this evaluation will be a summary of water flow and product recovery rates, TPH concentrations in the effluent and water table contour maps showing the area of influence from pumping. Modifications will be proposed in the evaluation report should the system be deficient in complying with the effluent limitations or providing an adequate area of influence.

SCHEDULE

The station is currently being operated by Circle K, who will be responsible for replacing the underground storage tanks. Once the new tanks are in place, Thrifty Oil Co. will implement this remedial plan.