TANK PROTECT ENGINEERING
Of Northern California, Inc.

LETTER OF TRANSMITTAL

DATE 1/26/93	JOB NO. 250
ATTENTION	
RE:	

TO: Mr. George Haywood

132 Ivy Drive

Orinda, CA. 94563

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change Order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1	1/25/93		Workplan For Remediation Of Stockpiled Soil, 834 Blossom Way
			Hayward, CA.

THESE ARE TRANSMITTED as checked below:

☒ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval

☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution

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☒ For review and comments ☐ _____

☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS Copies Have Been Sent TO:

Juliet Shin
Alameda County
Health Care Services Agency
80 Swan Way, Room 200
Oakland, CA. 94521

Sumadhu Arigala
California Regioal Water
Quality Control Board
2101 Webster Street, Suite 500
Oakland, CA. 94612

COPY TO file

SIGNED: John Markowski

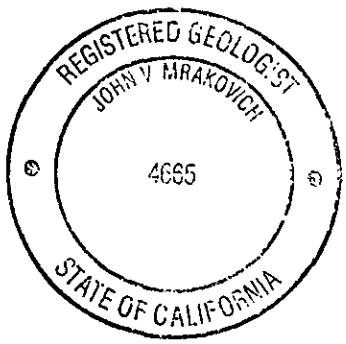
If enclosures are not as noted, kindly notify us at once.

WORKPLAN
FOR
REMEDIATION OF STOCKPILED CONTAMINATED SOIL
834 BLOSSOM WAY
HAYWARD, CA

Mr. George Haywood
132 Ivy Drive
Orinda, Ca 94563

Submitted By:
TANK PROTECT ENGINEERING
Of Northern California, Inc.
January 25, 1993

John V. Mrakovich, Ph.D.
Registered Geologist



WORKPLAN
FOR
REMEDIATION OF STOCKPILED
CONTAMINATED SOIL
834 BLOSSOM WAY
HAYWARD, CA

January 25, 1993

This workplan has been prepared by the staff of **Tank Protect Engineering** under the direction of an Engineer and/or Geologist whose seal(s) and signature(s) appear hereon.

The findings, recommendations, specifications or professional opinions are presented, within the limits prescribed by the client, after being prepared in accordance with generally accepted professional engineering and geologic practice. We make no other warranty, either expressed or implied.

Jeff J. Farhoomand, M.S.
Civil Engineer

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1.0 INTRODUCTION

The subject site is a residence located at 834 Blossom Way in Alameda County, California. The owner of the property is Mr. George Haywood [telephone no. (510) 376-4117] who resides at 132 Ivy Drive in Orinda, California 94563. The following background discussion is based on information provided by Mr. Haywood and from written correspondence from the Alameda County Health Care Services Agency (ACHCSA) to Mr. Haywood.

In 1989, one 500-gallon, underground diesel tank, one 1,000-gallon, underground gasoline tank, and associated dispensers and piping were removed from the subject site. On May 15, 1991, soil samples collected in native soil from beneath the location of the former tanks at depths ranging from 7 to 12.5 feet detected total petroleum hydrocarbons as gasoline (TPHG) up to 24,000 parts per million (ppm).

Fuel contaminated soil was removed from the floor of the excavation to a depth of about 15 feet and stockpiled on site. About 130 cubic yards (cyds) of soil are stockpiled on site as a result of tank removal activities and excavation of contaminated.

Two discrete soil samples were collected by Trace Analysis Laboratory, Inc. (TAL), located in Hayward, California, from the floor of the excavation on September 23, 1991 to verify that all contaminated soil had been removed. TAL analyzed the 2 samples for total petroleum hydrocarbons as diesel (TPHD) and TPHG by the California Department of Health Services (DHS) Method, and for benzene, toluene, ethylbenzene, and xylenes (BTEX) by the United States Environmental Protection Agency (EPA) Method 8020. All analytical results were nondetectable.

The contaminated stockpiled soil was remediated, on site, by aeration under the direction of Mr. Haywood. Aeration was accomplished by using a front-end loader to turn the soil. TAL sampled the stockpile on April 13, 1992 to evaluate the effectiveness of the aeration. TAL collected 1 discrete soil sample from each side of the stockpile (4 sides) and composited the 4 samples in the laboratory for analysis for TPHD, TPHG, and BTEX by the above analytical methods. TPHD and TPHG were detected at concentrations of 340 ppm and 680 ppm, respectively. Ethylbenzene and xylenes were detected at concentrations of .0082 ppm and .042 ppm, respectively.

Because contamination was still present, the stockpile was again aerated under the supervision of Mr. Haywood and sampled a second time by TAL on October 1, 1992; the stockpile was sampled as above but analyzed only for TPHD. TPHD was detected at a concentration of 42 ppm.

Because Mr. Haywood desires to reuse the stockpiled soil on site to backfill the excavation and because the stockpiled soil requires additional remediation for that use, Mr. Haywood contracted with Tank Protect Engineering of Northern California, Inc. (TPE) on January 20, 1993 to bioremediate and aerate the soil in an attempt to achieve contaminant concentrations acceptable for on-site reuse of the soil.

2.0 PROPOSED REMEDIATION OF CONTAMINATED STOCKPILED SOIL

TPE proposes the following scope of work:

- Conduct on-site bioremediation and aeration of the contaminated stockpiled soil for reuse to backfill the excavation.
- Conduct verification soil sampling (discrete) of the remediated stockpiled soil and analyze the samples for TPHD, TPHG, and BTEX.
- If remediation is successful for on-site reuse of the soil, backfill the excavation with the remediated stockpiled soil and imported fill material, if necessary.
- If remediation is not successful for on-site reuse of the soil, recommend to the client that the soil be disposed of at an appropriate landfill and to backfill the excavation with imported fill material.
- Prepare a Soil Remediation/Excavation Closure Report.

Details of the proposed scope of work are presented below.

2.1 Prefield Activities

Prior to beginning remediation activities TPE will collect a sample of the soil for a bio-inhibition test to establish that bioremediation of the soil is a viable option.

Prior to beginning bioremediation and aeration of the stockpiled soil, TPE will notify the Bay Area Air Quality Management District (BAAQMD).

2.2 Proposed Bioremediation and Aeration of Stockpiled Soil

Bioremediation of the soil will be accomplished by inoculating the soil with a proprietary bacterial culture formulated to destroy TPHD and TPHG chemicals. Initially, the soil will be turned with a front-end loader while simultaneously applying nutrients to prepare the soil for inoculation. Within 1 to 2 days of applying the nutrients, the soil will again be turned with a front-end loader while inoculating the soil with the bacterial culture. After about 4 weeks, the soil will be aerated by turning with a front-end loader. Four weeks later the soil will be sampled and analyzed for TPHD, TPHG, and BTEX to test the effectiveness of remediation. If the soil has been remediated to appropriate contaminant concentrations for on-site reuse, the analytical results will be provided to the ACHCSA for their approval to reuse the soil to backfill the excavation.

Aeration will be accomplished when the soil is being turned by the front-end loader. The soil will be aerated by shaking the soil out of the bucket from an elevated position.

If remediation of the stockpiled soil can not be accomplished for on-site reuse, TPE will recommend to Mr. Haywood that the soil be disposed of to a Class III landfill and the excavation be backfilled with imported material.

2.2.1 Proposed Verification Soil Sampling Plan

Verification soil sampling will be conducted by collecting 1 discrete soil sample from about each 20 cyds of soil to document an appropriate contaminant concentration for on-site reuse of the soil. This sampling frequency is recommended in the California Regional Water Quality Control Board-San Francisco Bay Region (CRWQCB) draft January 11, 1990 letter which discusses on-site disposal of contaminated stockpiled soil.

Prior to sampling, the stockpile will be shaped into a rectangle or square about 2 to 3 feet in height. The stockpile will be gridded by rows and columns, such that, each resulting cell contains about 20 cyd of soil. Each cell will be numbered in a systematic numerical order and will be further subdivided into 4 quadrants labeled A, B, C, and D. One sample will be collected from 1 quadrant of each cell in a systematic, random sampling plan. Soil samples will be collected in numerical and alphabetical order from each cell, i.e., cell 1 from quadrant A, cell 2 from quadrant B, cell 3 from quadrant C, etc. The depth of collecting each soil sample will also vary systematically, i.e., soil sample 1-A will be collected at a depth of 1.0 foot; soil sample 2-B will be collected at a depth of 2.0 feet; soil sample 3-C will be collected at a depth of 3.0 feet; and then repeating the depth cycle with 4-D collected at a depth of 1.0 foot. This systematic random sampling plan assures that the stockpile is uniformly sampled with no relatively large areas remaining unsampled.

Soil samples will be collected by augering or digging a hole to the target depth into the stockpile to expose a fresh surface and quickly driving a 2-inch diameter by 6-inch long brass tube into the newly exposed surface with a slide-hammer corer. After collecting each sample, the brass tube ends will be quickly covered with Teflon sheeting, capped with plastic end-caps, and sealed in plastic bags. The tubes will be labeled and placed in an iced-cooler for transport to a DHS certified laboratory accompanied by chain-of-custody documentation (see Appendix A for TPE's protocol relative to sample handling procedures).

2.3 Proposed Cleanup Concentrations for On-Site Reuse of Stockpiled Soil

It is TPE's understanding that the CRWQCB will allow on-site reuse of the remediated soil when concentrations of TPHD and TPHG are <10 ppm and concentrations of BTEX are below analytical detection limits ($<.005$ ppm).

TPE proposes cleanup concentrations of <10 ppm for TPHD and TPHG, and $<.005$ ppm for BTEX for on-site reuse of the remediated soil.

2.3.1 Proposed Chemical Analyses

All verification soil samples will be analyzed for TPHD and TPHG by the DHS Method, and for BTEX by EPA Method 8020.

2.4 Excavation Closure

Backfill material will consist of reuse of the remediated soil and/or imported clean fill. The fill will be placed in the excavation in 2 foot to 3 foot compacted lifts to about 1 foot below final grade. The final foot of excavation will be filled with aggregate base and sealed with asphalt.

2.5 Soil Remediation/Excavation Closure Report

TPE will document all work performed and will provide all certified analytical results with a diagram of the stockpile showing sampling locations in a report signed by a California registered geologist.

3.0 TIME SCHEDULE

The projected time schedule for implementation of the activities described in this workplan is presented below. The schedule reflects a relatively problem-free program.

However, delays in the workplan review, permitting, or laboratory analyses could lengthen the project schedule. Access difficulties and adverse weather conditions could also delay the proposed time schedule. TPE will make every effort to adhere to the project schedule.

Week 1: Submit Workplan to Client and Regulators for Review and Approval.

Week 7: Aerate Stockpile, Add Nutrients, and Bio-Culture.

Week 11: Aerate Stockpile.

Week 15: Conduct Verification Soil Sampling.

Week 16: Receive Chemical Analyses; Backfill Excavation.

Week 18: Deliver Soil Remediation/Excavation Closure Report to Client.

APPENDIX A

SAMPLE HANDLING PROCEDURES

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Soil and groundwater samples will be packaged carefully to avoid breakage or contamination, and will be delivered to the laboratory at proper storage temperatures. The following sample packaging requirements will be followed.

- Sample bottle/sleeve lids will not be mixed. All sample lids will stay with the original containers and have custody seals affixed to them.
- Samples will be secured in coolers to maintain custody, control temperature, and prevent breakage during transportation to the laboratory.
- A chain-of-custody form will be completed for all samples and accompany the sample cooler to the laboratory.
- Ice, blue ice, or dry ice (dry ice will be used for preserving soil samples collected for the Alameda County Water District) will be used to keep samples at a constant temperature during transport to the laboratory.
- Each sample will be identified by affixing a pressure sensitive, gummed label, or standardized tag on the container(s). This label will contain the site identification, sample identification number, date and time of sample collection, and the collector's initials.

All groundwater sample containers will be precleaned and will be obtained from a State Department of Health Services certified analytical laboratory.

Sample Control/Chain-of-Custody: All field personnel will refer to this work plan to verify the methods to be employed during sample collection. All sample gathering activities will be recorded in the site log book; all sample transfers will be documented in the site logbook; samples are to be identified with TPE labels and all sample

bottles are to be custody-sealed. All information is to be recorded in waterproof ink. All TPE field personnel are personally responsible for sample collection and the care and custody of collected samples until the samples are transferred or properly dispatched.

The custody record will be completed by the field technician who has been designated by the TPE project manager as being responsible for sample shipment to the appropriate laboratory. The custody record will include, among other things, the following information: site identification, name of person collecting the samples, date and time samples were collected, type of sampling conducted (composite/grab), location of sampling station, number and type of containers used, and signature of the TPE person relinquishing samples to a non-TPE person with the date and time of transfer noted. The relinquishing individual will also put all the specific shipping data on the custody record.

Site log books will be maintained by a designated TPE field employee to record, for each sample, site identification, sampling locations, station numbers, dates, times, sampler's name, designation of the samples as a grab or composite, notation of the type of sample (e.g. groundwater, soil boring, etc.), preservatives used, on-site measurement data, and other observations or remarks.