Terranext 9838 Old Placerville Road, Suite 100 Sacramento, CA 95827-3559

December 5, 1996

Project No. 05100695

Mr. Barney Chan
Alameda County Health Care Services Agency
Department of Environmental Health
Division of Hazardous Materials
1131 Harbor Bay Parkway
Alameda, California 94502

Re: Request for Site Closure
Southern Pacific Transportation Company
Railroad Right-of-Way Adjacent to 400 Lancaster Street
Oakland, California

Dear Mr. Chan:

As requested in your letter to Mr. Michael Grant of Southern Pacific Transportation Company (SPTCo) dated January 24, 1996, Terranext has evaluated all available data for the site designated as railroad right-of-way adjacent to 400 Lancaster Street (Figure 1, Attachment 1). Available data includes results from a February 23 and 24, 1995 site investigation and analytical results from a supplemental ground water grab sample collected at the site on April 19, 1996. Results from the February 1995 site investigation were provided to the Alameda County Health Care Services Agency (Alameda County) in a Terranext (then Industrial Compliance) report dated October 19, 1995, entitled: *Site Investigation Report, Southern Pacific Transportation Company, 400 Lancaster Street - Oakland, California*. Analytical results from the recent ground water grab sample have not been previously reported.

Based on this comprehensive review of site data, SPTCo/Terranext are requesting closure for the subject site. The following paragraphs summarize site investigation results to date and then evaluate the site in terms of evolving guidance on required activities at low risk fuel sites.

Summary of Site Investigations

On May 23, 1994, a construction contractor working for Del Monte reported encountering soil containing an "oily" substance while performing excavation work as part of a utility modification project at the former Del Monte Plant 26 property located at 400 Lancaster Street. The property is currently owned by Transmeridian Warehouses, Inc. The "oily" substance was observed to be seeping from the corners of the excavation adjacent to the SPTCo right-of-way. A second excavation was dug approximately 8 feet to the west of the

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first excavation. A similar substance was also observed in the soil in the second excavation and an oily sheen was reportedly observed on water which accumulated in the pit. Both excavations were backfilled with the excavated soil. The locations of the excavations are inferred to be within the area on Figure 2 (Attachment A) labelled as "area of new asphalt." Prior to backfilling, a sample of soil containing the substance was collected by employees of Del Monte's environmental contractor, CH_2M Hill, and submitted to Chromalab, Inc. to be analyzed for total extractable petroleum hydrocarbons (kerosene, diesel, and motor oil) by United States Environmental Protection Agency (EPA) Method 8015 Modified. Diesel range hydrocarbons were reported in the soil sample at a concentration of 1,100 milligrams per kilogram (mg/kg) and motor oil range hydrocarbons at a concentration of 1,200 mg/kg; kerosene was not detected. Based on these results, Alameda County requested that SPTCo perform a soil and ground water investigation at the site.

In February 1995, in accordance with a workplan approved by Alameda County, Terranext drilled six exploratory borings for soil sampling (B-1 through B-6) and installed one temporary monitoring well for collection of a ground water sample (B-1A). The locations of these borings are shown on Figure 2 (Attachment A). Analytical data from soil samples and the single ground water sample are provided in Tables 1 and 2 (Attachment B) and summarized on Figure 2 (Attachment A). The findings and conclusions of the February 1995 field investigation were as follows:

* The lateral extent of hydrocarbon impacted soil was defined within SPTCo property.

* The vertical extent of hydrocarbon impacted soil was defined based on data from borings B-1, B-2, and B-6. Hydrocarbon impacted soil appears to locally extend to depths of 5 to 10 feet below ground surface (bgs).

* Depth to ground water in temporary monitoring well B-1A was approximately 5.5 feet bgs.

* The petroleum hydrocarbons detected in the ground water sample were middle- and high-boiling constituents, which tend to have low water solubility. Given that the temporary monitoring well was screened across the water table, it is likely that separate-phase hydrocarbons (free product) at the water table was included in the ground water sample and that the hydrocarbons detected in the ground water sample were not dissolved.

* The chromatographic pattern of petroleum hydrocarbons detected in both soil and ground water samples did not match the laboratory diesel standard. The chromatographic patterns were indicative of a heavier (less water soluble) petroleum hydrocarbon (e.g. motor oil, lubricating oil).

* Benzene, toluene, ethylbenzene, and xylenes (BTEX) were not detected in the ground water sample from boring B-1A; ethylbenzene and xylenes were detected at very low concentrations in three of the 10 soil samples collected from borings B-1 and B-6. The relative absence of BTEX compounds supports the conclusion that the petroleum hydrocarbons present are heavy, low-solubility and low-mobility compounds.

On April 19, 1996, boring B-7 was installed at the site for the purpose of collecting an additional ground water grab sample. The boring was installed between and approximately 2 to 3 feet from the former locations of borings B-1 and B-1A (Figure 2, Attachment A). The boring was advanced using a vibratory/hammer drive rig equipped with 2-inch outer diameter casing. Continuous sampling for lithologic logging was performed using a 3 foot x 1.5 inch core barrel which was advanced inside the outer casing. Soil encountered at the site consisted of approximately 1 to 2 feet of silty gravel underlain by low and moderate plasticity clays. Silty sand and poorly-graded sands were noted from a depth of approximately 10 feet below ground surface (bgs) to total depth (16 feet bgs). Evidence of free ground water was first encountered at approximately 8.5 feet bgs. This is approximately 3 feet lower than the static ground water level measured in the temporary monitoring well installed during the February 1995 investigation. Free ground water, which was occasionally encountered perched on the clay (2 feet bgs) during the February 1995 investigation, was not observed during installation of boring B-7. The lithologic log for boring B-7 is included in Attachment C. No soil samples from this boring were submitted for laboratory analysis.

A ground water sample was collected from boring B-7 by removing the core barrel assembly from within the outer casing and replacing it with a 1-inch diameter polyvinyl chloride (PVC) casing assembly consisting of a threaded end cap, a 5-foot section of 0.020 inch slotted casing, and 15 feet of blank casing. The 5-foot section of slotted casing was purposely placed well below the apparent static water level to reduce the likelihood of incorporating non-water soluble material (i.e. free product sheen) into the water sample. After placement of the PVC casing assembly, the outer (stainless steel) casing was retracted approximately 3 feet. A clean small diameter stainless steel bailer was then used to collect ground water from the PVC casing assembly. The ground water was transferred from the bailer to a 1-liter amber glass bottle. The ground water sample was labelled, logged onto a standard chain-of-custody form, and then placed in an iced cooler for shipment to Friedman

& Bruya, Inc. for analysis. Upon completion of ground water sampling, the borehole was backfilled with a cement/bentonite mixture. The PVC casing was removed prior to placement of the cement/bentonite mixture, which was tremied in as the outer casing was removed.

The ground water sample from boring B-7 was analyzed for total petroleum hydrocarbons (TPH) as diesel and motor oil using EPA Method 8015M and for semivolatile organic compounds by EPA Method 8270. The 8015M analysis was performed on two splits of the original sample. One split was prepared using 3510 sample preparation procedures; preparation of the second split involved filtration (0.70 micron glass fabric filter) and silica gel column cleanup in addition to the 3510 procedures.

The filtration and silica gel cleanup steps were added to the preparation of the second sample split to eliminate non-dissolved petroleum hydrocarbons and biogenic material from the sample so that they would not be inappropriately reported as dissolved petroleum hydrocarbons. TPH measurements may be interfered with by the presence of non-dissolved petroleum hydrocarbons within the sample (e.g. petroleum hydrocarbons that adhere to sediment, emulsified petroleum hydrocarbons, non-dissolved separate phase) and/or by the presence of naturally soluble by-products resulting from intrinsic bioremediation in the subsurface.[1] Removal of these interferences prior to sample analysis provides a better indication of the actual dissolved fraction of petroleum hydrocarbons in ground water. Filtration removes petroleum hydrocarbons that adhere to particulate material greater than 0.7 microns; silica gel cleanup removes polar dissolved biogenic material.

TPH as diesel and motor oil were not detected in either of the ground water sample splits from boring B-7 (one analyzed without filtration and silica gel cleanup and one analyzed following filtration and silica gel cleanup); semivolatile organic compounds were not detected in the unfiltered sample analyzed. These results indicate that the petroleum hydrocarbons present in site soil are insoluble and have not impacted site ground water. Ground water analytical results for boring B-7 are summarized in Table 2 (Attachment B) and on Figure 2 (Attachment A). Laboratory data sheets and chain-of-custody documentation are provided in Attachment D.

1. Zemo, D. A., and Synowiec, K. A., 1995, TPH Detections in Ground Water: Identification and Elimination of Positive Interferences, Proceedings – Petroleum Hydrocarbons and Organic Chemicals in Ground Water Conference, NGWA/API, Houston, Texas, pp. 257-271.

Evaluation of Railroad Right-of-Way Adjacent to 400 Lancaster Street Site as a Low Risk Soil Case

The State Water Resources Control Board (SWRCB) recently recommended changes to the policies which direct local agencies in overseeing the cleanup of leaking underground fuel tank (LUFT) sites. These recommended changes are in response to an October 1995 report by Lawrence Livermore National Laboratory (LLNL) that challenged the effectiveness of the current LUFT regulations and presented recommendations for reform. Following the LLNL recommendations, the SWRCB, in a letter dated December 8, 1995, recommended seeking closure for low risk soil sites, and closure, or at most monitoring, for low risk ground water sites. Monitoring would be conducted, if necessary, to demonstrate that the plume is stable.

In a memorandum entitled: *Regional Board Supplemental Instructions to State Water Board, December 8, 1995, Interim Guidance on Required Cleanup at Low Risk Fuel Sites*, dated January 5, 1996, The California Regional Water Quality Control Board - San Francisco Bay Region (Regional Board) defined six criteria for low risk soil sites and for low risk ground water sites. The following paragraphs evaluate the railroad right-of-way adjacent to 400 Lancaster Street site in terms of the criteria proposed by the Regional Board as necessary to characterize a site as a low risk soil site. The six criteria are numbered and appear in boldface italic.

1) The leak has been stopped and ongoing sources, including free product, removed or remediated.

The source of the petroleum hydrocarbons detected at the site has not been identified. Field observations suggest that minor amounts of residual free product may exist in the vicinity of former borings B-1 and B-1A. Recent ground water grab sample results indicate that the residual free product at the site, if any, is not impacting site ground water and therefore is not a source. Regional Board supplemental instructions indicate that residual hydrocarbons in soil that do not impact ground water are not considered a source. Specifically, it is stated in the Fact Sheet attached to the supplemental instructions that: "Oil and grease, degraded crude oil, and degraded diesel may not be soluble enough to be considered a significant source and often do not degrade water quality or present a significant risk to human health or the environment."

2) The site has been adequately characterized.

Soil and ground water conditions at the site have been adequately characterized. Soil conditions at the site have been characterized through the installation and sampling of six soil borings. The soil borings have characterized the extent of petroleum hydrocarbon impact to soil (both lateral and vertical extent) on railroad property.

3) Little or no ground water impact currently exists and no contaminants are found at levels above established MCLs or other applicable water quality objectives.

Available analytical data indicate that there is no petroleum hydrocarbon impact to site ground water. Analytical results from the initial ground water grab sample collected at the site (boring B-1A) indicated TPH in the C_6 to C_{30} range. Given that the temporary monitoring point installed was screened at the water table, it is likely that the detected TPH was the result of particulate matter with attached petroleum hydrocarbons and/or free product being incorporated in the ground water sample rather than being indicative of dissolved hydrocarbon impact to ground water. The analytical data from soil samples and the initial ground water grab sample indicate that the petroleum hydrocarbons present at the site are predominantly heavier, low-mobility and low-solubility compounds (motor oil or lubricating oil, possibly degraded diesel). No soluble hydrocarbon compounds (i.e. benzene, toluene, ethylbenzene and xylenes) were detected in the initial ground water grab sample.

TPH as diesel and as motor oil and semivolatile organic compounds (which are often associated with petroleum hydrocarbons) were not detected in the recent ground water grab sample from the site (boring B-7). This temporary monitoring point was installed such that the screen was below the apparent water table, thereby reducing the potential of incorporating non-water soluble material in the water sample. The analytical results support a conclusion that the petroleum hydrocarbons present in site soil are insoluble and have not impacted site ground water.

4) No water wells, deeper drinking water aquifers, surface water, or other sensitive receptors are likely to be impacted.

Petroleum hydrocarbon impact to water supply wells or other sensitive receptors is very unlikely. Available site data indicate that petroleum hydrocarbons in site soil are heavy, low-solubility compounds and that there has been no impact to site ground water. Although a local ground water use survey has not been conducted, it is general knowledge that shallow ground water in the site vicinity is not used for drinking water or other domestic/industrial purposes, typically due to high concentrations of total dissolved solids. No water supply wells have been observed in the vicinity of the site. The Oakland-Alameda Channel, a salt water body, is located approximately 300 feet south southwest of the site. Wells withdrawing water from deeper drinking water aquifers are generally not located within a few hundred feet of bodies of salt water due to concerns over inducing salt water intrusion into a drinking water supply. The Oakland-Alameda Channel is a potential sensitive receptor, however, impact to this surface water body is very unlikely given that there has been no impact to ground water at the site and that the petroleum hydrocarbons in site soil are heavy, low-mobility and low-solubility compounds.

5) The site presents no significant risk to human health.

The site presents no significant risk to human health because the site is in an industrial area where excavations are controlled and because degraded middle- and high-boiling petroleum hydrocarbons in soil (such as the product at the site) have been shown to pose no significant risk to human health, especially under industrial use scenarios. Risk assessments at other sites in the Oakland area[2] have demonstrated that degraded and weathered diesel range hydrocarbons and heavier petroleum products pose little health risk even at elevated concentrations (1,000 mg/kg to 100,000 mg/kg) under industrial/commercial land use scenarios.

Comparison of site data to State of California or EPA health-risk-based standards or criterion supports a conclusion of no significant risk. For example, maximum detected concentrations of BTEX in soil samples from borings on site are compared to EPA Region IX preliminary soil remediation goals below.

Chemical	Maximum Detected Concentration in Soil (mg/kg)	Region IX Preliminary Remediation Goal* (PRGs) (mg/kg)	
		Residential PRG	Industrial PRG
Benzene	<0.025	1.4	3.2
Toluene	<0.025	1,900	2,800
Ethylbenzene	0.14	690	690
Xylenes	0.20	990	990

* EPA Region IX Preliminary Remediation Goals, September 1, 1995.

As seen above, benzene and toluene were not detected in any of the soil samples analyzed. The maximum detected concentrations of ethylbenzene and xylenes are more than three orders of magnitude below preliminary remediation goals for industrial or residential soil.

BTEX was not detected in the single sample of site ground water analyzed for these compounds. Detection limits achieved in comparison to State of California Department of Health Services maximum contaminant levels (MCLs) are shown below.

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2. Geomatrix Consultants, Inc., November 22, 1995, *Remedial Investigation and Baseline Risk Assessment Report, Former Bobo's Junkyard Operable Unit, 1401 Third Street, Oakland, California.*

Chemical	Reported Concentration (µg/L)	California MCLs* (µg/L)
Benzene	<0.50	1
Toluene	<0.50	150
Ethylbenzene	<0.50	700
Xylenes	<1.0	1,750

* California Regional Water Quality Control Board - Central Valley Region, July 1995, *A Compilation of Water Quality Goals*.

TPH as diesel and motor oil were not detected in the most recent ground water grab sample from the site (boring B-7; sample collected April 19, 1996). This sample was analyzed both with and without filtration and silica gel cleanup steps. TPH as diesel and motor oil were not detected in either of the sample splits. These results document that there are no dissolved petroleum hydrocarbons in site ground water. Given that site ground water has not been impacted by petroleum hydrocarbons and is not used as a water supply source for any purpose, site ground water clearly presents no significant risk to human health.

Although a qualitative assessment of site data indicates that the site presents no significant risk to human health, a risk-based corrective action (RBCA) Tier 1 evaluation has been performed to more fully evaluate risk to human health. The RBCA method was recently developed to assess the potential risk posed to human health and the environment at sites having had a petroleum release. The RBCA method was developed by the American Society for Testing and Materials (ASTM) and published in November 1995 as *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites, ASTM Designation E 1739-5*, (ASTM Guide). The RBCA method is currently being implemented at many federal, state and local agencies. It is assumed the reader has had some prior familiarity and experience with the RBCA method for this discussion.

The following evaluation does not include discussion of the Site Assessment and Site Classification steps as these steps have been addressed in the above text and in previous investigations and reports. This evaluation only compares maximum detected site constituents to a set of conservative risk based screening levels (RBSL) to assess whether site conditions satisfy criteria for site closure.

Based on the site's data, two chemicals of concern (COCs) for soil (toluene, and total xylenes) can be established. COCs for this discussion are any constituent having been detected at or above the laboratory method reporting limit. The following table presents a

comparison of the maximum detected COC concentration to residential RBSL values for one potential direct pathway; soil ingestion, inhalation of vapors, and dermal contact. Note that the following RBSL values were taken from the ASTM Guide (ASTM Guide Table X2.1). The equations and default parameters used to calculate the RBSL values are shown in Attachment E. The parameter values used to calculate the residential RBSL values are very conservative as compared to actual site conditions. The RBSL concentrations presented below are actually lower than would be calculated for actual site conditions.

Comparison of Maximum Detected Concentrations of Chemicals in Soil to Risk-Based Screening Levels

Chemical	Maximum Detected Soil Concentration (mg/kg)	RBSL Surficial Soil (Ingestion, Inhalation of Vapors, and Dermal Contact) (mg/kg)
Benzene	ND	5.82
Ethylbenzene	ND	7,830
Toluene	0.14	13,300
Xylenes	0.20	RES

ND Not detected at a detection limit of 0.025.
RES The risk level of $1x10^{-6}$ is not exceeded for pure compound at any concentration

The above table shows that all COCs are several orders of magnitude below calculated RBSLs. This result indicates that the site poses little risk to human health.

6) The site presents no significant risk to the environment.

The site presents no significant risk to the environment because it is located in an industrial area of the City of Oakland and there are no known wetlands or endangered species habitats in the immediate site vicinity. As noted previously, the Oakland-Alameda Channel is located approximately 300 feet to the south southwest and presumably downgradient of the site. Given that there has been no impact to site ground water and there will likely be no future impact because hydrocarbons in soil have low mobility and are insoluble, the site presents no significant risk to the Oakland-Alameda Channel.

Conclusions and Request for Closure

SPTCo/Terranext believe that the information and data summarized above justify characterization of the railroad right-of-way adjacent to 400 Lancaster Street site as a low risk soil case and request closure of the site. Please call the undersigned at (510) 238-9540 or (916) 369-8971 or Mr. Michael Grant of SPTCo at (415) 541-2838 if you have questions or would like to further discuss our interpretations and conclusions regarding this site.

Sincerely,

TERRANEXT

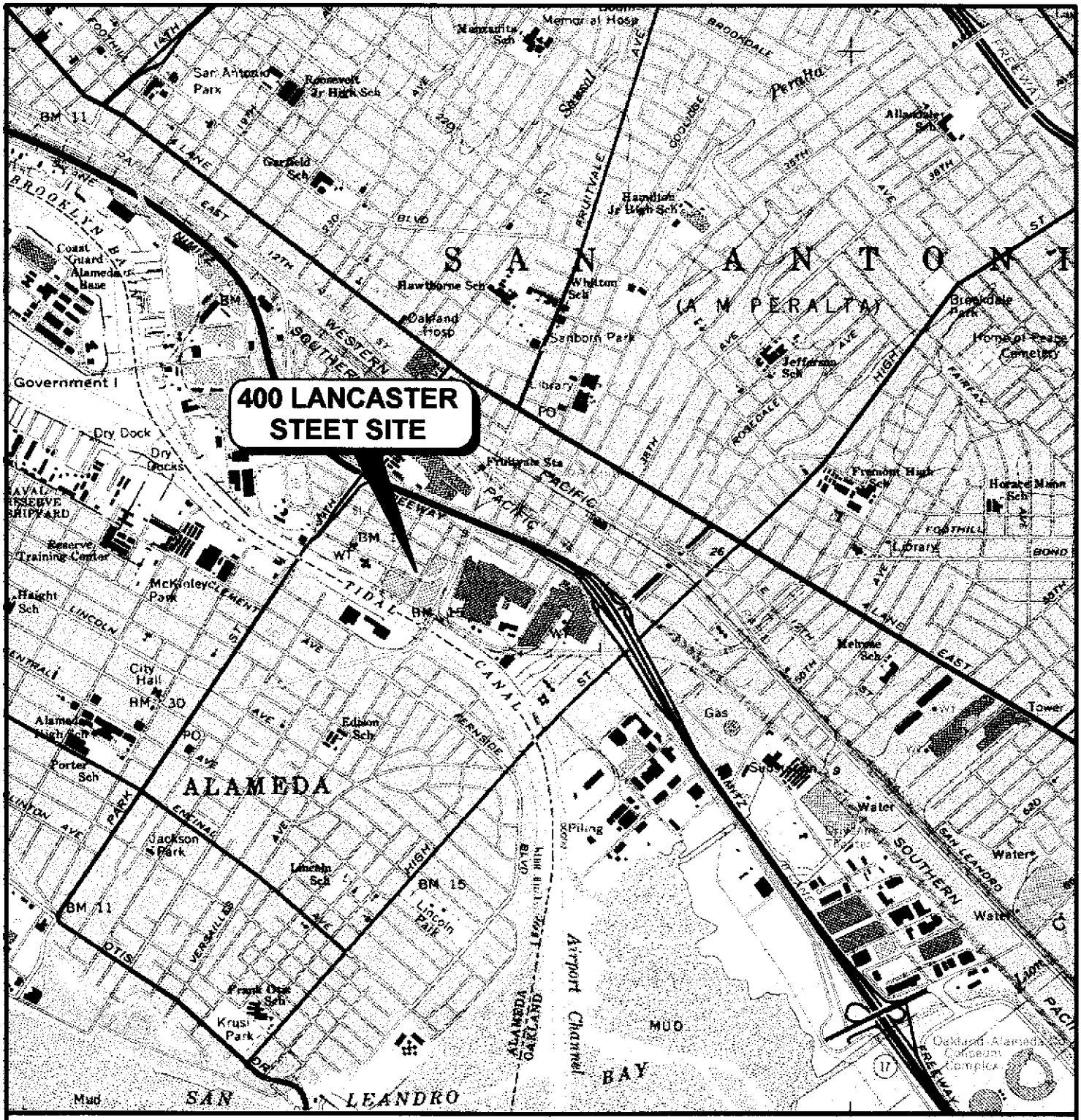
for Janice H. Zinky
John O. Cavanaugh, R.G.
Project Geologist

Richard L. Bateman, R.G.
Principal Hydrogeologist

JOC/RLB/dao

cc: Mr. Michael Grant, Southern Pacific Transportation Company

bcc: Mr. Winston Zirjacks, Terranext
Mr. Carl Taylor, Terranext
Ms. Janice Hubbard, Terranext



1/2 0 1 MILE

APPROXIMATE SCALE (MILES)

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

APPROXIMATE SCALE (FEET)

N

Reference:
U.S.G.S. 7.5 Minute Series (Topographic)
Oakland East Quadrangle
California
Dated: 1959, photorevised 1980

Project No.: 05100695	Figure No.: 1
Scale: As Above	Page No.:
File No.: 695sm	Drawn By: Patti Decker
Date: 07/01/96	Approved By: Richard Bateman

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SITE LOCATION MAP

SOUTHERN PACIFIC TRANSPORTATION COMPANY
RAILROAD RIGHT-OF-WAY
400 LANCASTER STREET
OAKLAND, CALIFORNIA

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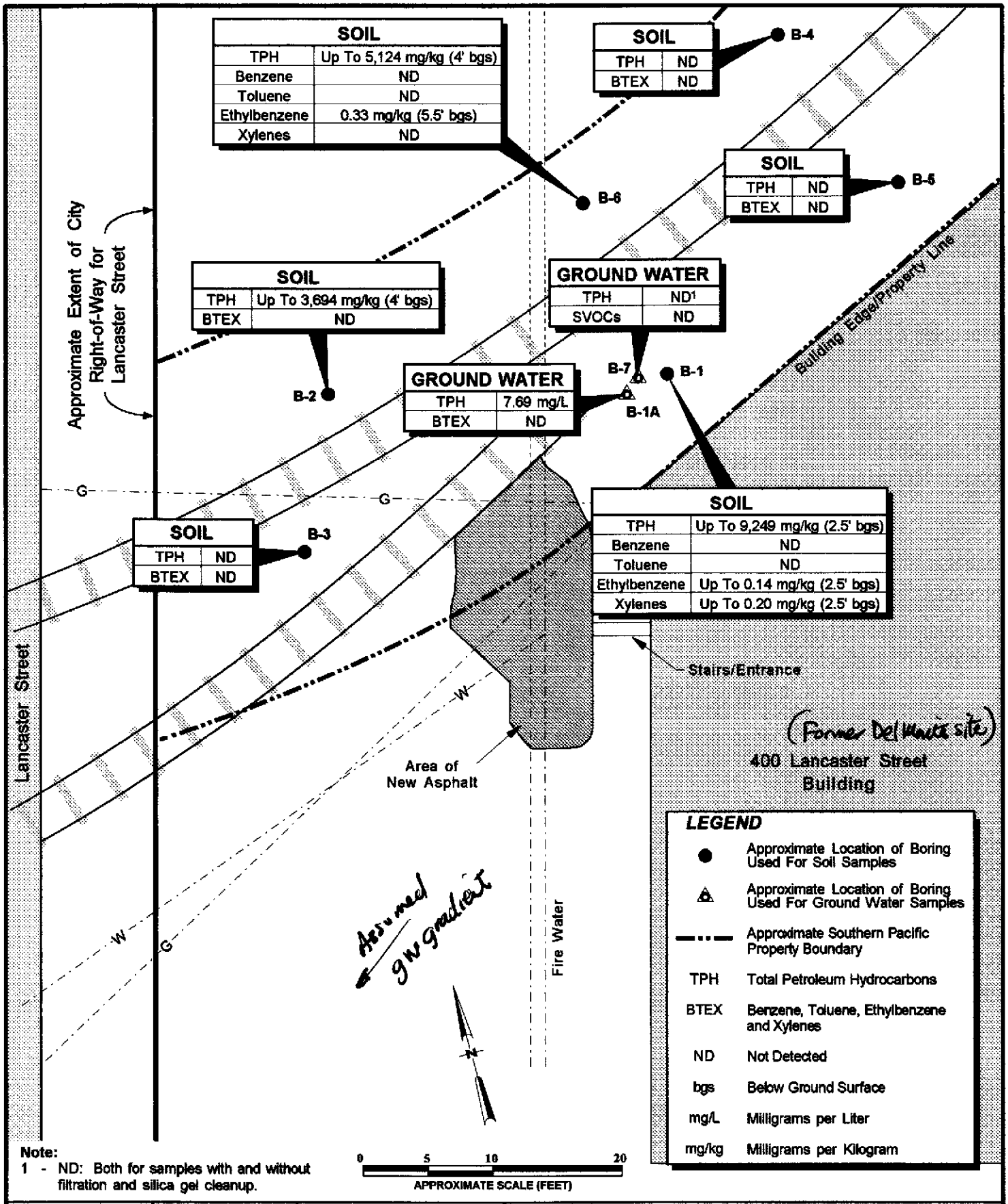

Note:
1 - ND: Both for samples with and without filtration and silica gel cleanup.

Project No.: 05100695	Figure No.: 2
Scale: As Above	Page No.:
File No.: D5000659	Drawn By: Patti Decker
Date: 09/26/96	Approved By: Richard Bateman

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BORING LOCATION MAP AND SUMMARY ANALYTICAL RESULTS

SOUTHERN PACIFIC TRANSPORTATION COMPANY
RAILROAD RIGHT-OF-WAY
400 LANCASTER STREET
OAKLAND, CALIFORNIA

ATTACHMENT B

SUMMARY OF SOIL AND GROUND WATER ANALYTICAL RESULTS

TABLE 1
ANALYTICAL RESULTS - SOIL SAMPLES

Boring	Date Sampled	Depth (feet bgs)	Total Petroluem Hydrocarbons[a] (mg/kg)		BTEX Compounds[b] (mg/kg)			
			Carbon Range (C_6 - C_{25})	Carbon Range (C_{25} - C_{30})	Benzene	Toluene	Ethylbenzene	Xylenes
B-1	02/23/95	2.5	**4,527**	**4,722**	<0.025	<0.025	**0.14**	**0.20**
		4	**4,044**	**4,085**	<0.025	<0.025	**0.11**	**0.20**
		5.5	**576**	**656**	<0.025	<0.025	<0.025	<0.050
		7	**183**	**219**	<0.025	<0.025	<0.025	<0.050
		10	**656**	**701**	<0.025	<0.025	<0.025	<0.050
		11.5	<20	<20	<0.025	<0.025	<0.025	<0.050
B-2	02/23/95	4	**1,425**	**2,269**	<0.025	<0.025	<0.025	<0.050
		5.5	<20	**26.2**	<0.025	<0.025	<0.025	<0.050
		7	<20	<20	<0.025	<0.025	<0.025	<0.050
B-3	02/23/95	4	<20	<20	<0.025	<0.025	<0.025	<0.050
		5.5	<20	<20	<0.025	<0.025	<0.025	<0.050
B-4	02/23/95	4	<20	<20	<0.025	<0.025	<0.025	<0.050
		5.5	<20	<20	<0.025	<0.025	<0.025	<0.050
B-5	02/23/95	4	<20	<20	<0.025	<0.025	<0.025	<0.050
		5.5	<20	<20	<0.025	<0.025	<0.025	<0.050
B-6	02/24/95	2.5	**87.3**	**254**	<0.025	<0.025	<0.025	<0.050
		4	**422**	**499**	<0.025	<0.025	<0.025	<0.050
		5.5	**2,434**	**2,690**	<0.025	<0.025	**0.033**	<0.050
		7	**557**	**613**	<0.025	<0.025	<0.025	<0.050

a Total petroleum hydrocarbons analyzed by EPA Method 8015 Modified.

b Benzene, toluene, ethylbenzene, and xylenes (BTEX) analyzed by EPA Method 8020.

mg/kg milligrams per kilogram

bgs Below ground surface

< Indicates the constituent was not detected at a concentration at or above the practical quantitation limit, as listed.

TABLE 2
ANALYTICAL RESULTS - FEBRUARY 1995 GROUND WATER SAMPLE

Boring	Date Sampled	Total Petroluem Hydrocarbons[a] (mg/L)		BTEX Compounds[b] (µg/L)			
		Carbon Range (C_6 - C_{25})	Carbon Range (C_{25} - C_{30})	Benzene	Toluene	Ethylbenzene	Xylenes
B-1A	02/24/95	**3.24**	**4.45**	<0.50	<0.50	<0.50	<1.0
Trip Blank	02/24/95	<2.0	<2.0	<0.50	<0.50	<0.50	<1.0

a Total petroleum hydrocarbons analyzed by EPA Method 8015 Modified.

b Benzene, toluene, ethylbenzene, and xylenes analyzed by EPA Method 8020.

mg/L Milligrams per liter

µg/L Micrograms per liter

< Indicates the constituent was not detected at a concentration at or above the detection limit, as listed.

TABLE 3
ANALYTICAL RESULTS
APRIL 1996 GROUND WATER SAMPLE

Boring	Date Sampled	Filtered and Silica Gel Cleanup[a]	Total Petroleum Hydrocarbons[b] (mg/L)		Semivolatile Organic Compounds[c] (µg/L)
			Diesel	Motor Oil	All Compounds
B-7	04/19/96	no	<0.050	<0.20	ND
		yes	<0.050	<0.20	NA

a The filtration and silica gel cleanup process consisted of filtration of the sample through a 0.70 micron glass fiber filter followed by EPA Method 3630 (M) silica gel column cleanup protocol.

b Total petroleum hydrocarbons analyzed by EPA Method 8015 Modified.

c Semivolatile organic compounds analyzed by EPA Method 8270.

mg/L Milligrams per liter

µg/L Micrograms per liter

< Constituent not detected at or above the reporting limit, as listed.

ND No constituents detected at or above the reporting limit; see laboratory data sheets for the reporting limit of each individual constituent.

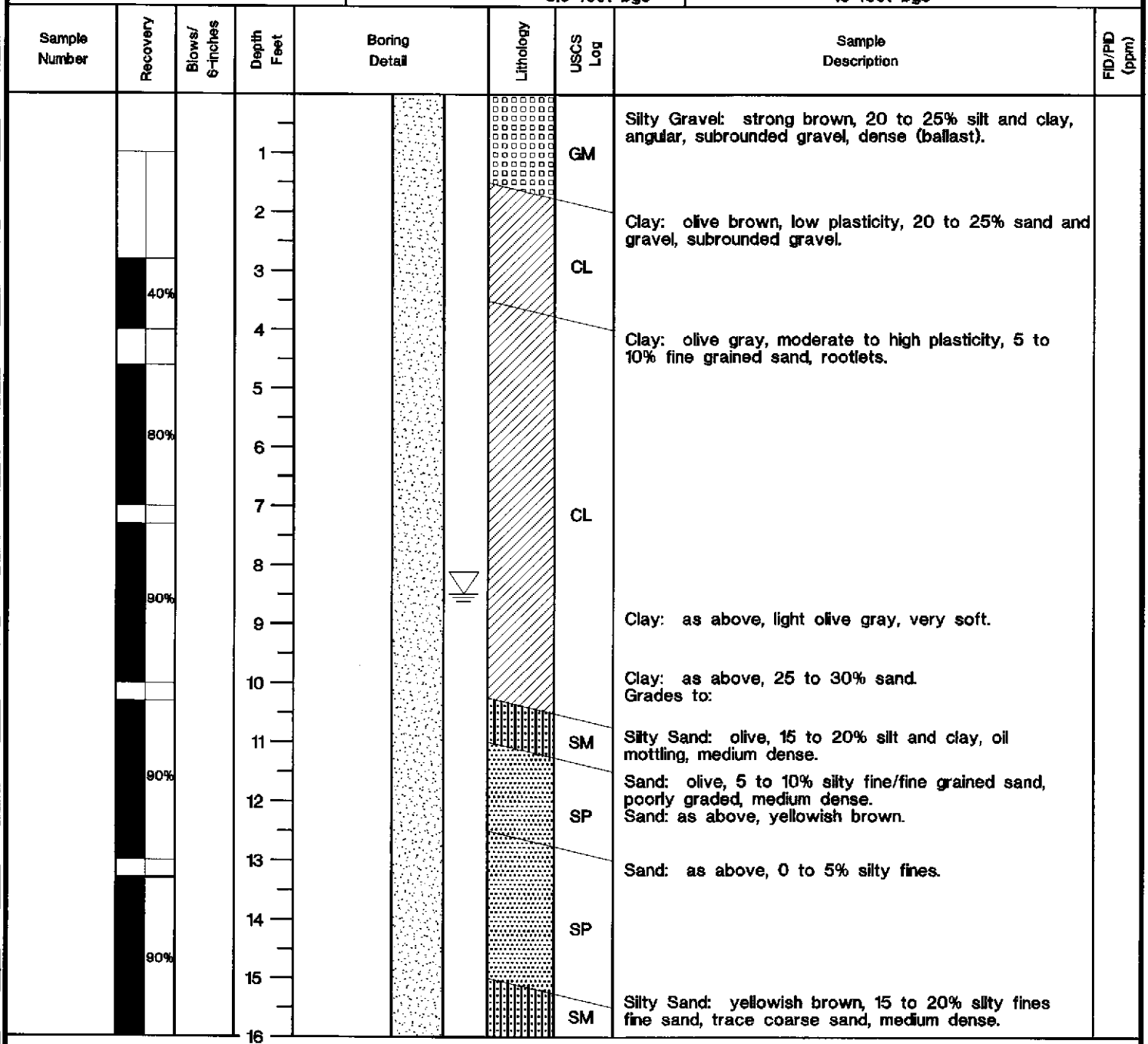
NA Not analyzed.

ATTACHMENT C

BORING LOG FOR B-7

Boring Log

Boring Location:	SPTCo Right-Of-Way, 400 Lancaster, Oakland			**Boring Name:**	B-7
Drilling Company:	Precision			**Project Name:**	400 Lancaster
Drilling Method:	Hammer Drive	**Rig Type:**	Bobcat	**Project Number:**	05100695
Hole Diameter:	2-inches	**Driller:** Chris	**Date:** 4/19/96	**Logged By:**	John Cavanaugh
Ground Elevation:		**Water Depth:**	8.5 feet bgs	**Total Depth:**	16 feet bgs



Total Depth 16 feet bgs.
Ground water encountered at 8.5 feet bgs.

ATTACHMENT D

CHAIN-OF-CUSTODY FORM AND LABORATORY DATA SHEETS BORING B-7 GROUND WATER GRAB SAMPLE

CHAIN-OF-CUSTODY RECORD

4.22.96 9:50

P.O. Box 24374 Oakland CA 94623-1374 No. 20789

INDUSTRIAL COMPLIANCE • ~~9930 OLD PLACERVILLE ROAD, SUITE 100 • SACRAMENTO, CA 95827-3559~~ • Phone 510-635-9545 • FAX ~~916-369-8370~~ 510-635-9545

PROJECT NAME: 400 Lancaster Railroad Right of Way	PROJECT LOCATION: Oakland CA		
PROJ. NO.: 0570695	PROJECT CONTACT: John Cavanaugh	PROJECT TELEPHONE NO.: (510) 235-9540	
CLIENT'S REPRESENTATIVE:	PROJECT MANAGER/SUPERVISOR: Richard Bateman		

ITEM NO.	SAMPLE NUMBER	DATE	TIME	COMP	GRAB	SAMPLE LOCATION (INCLUDE MATRIX AND POINT OF SAMPLE)	NUMBER OF CONTAINERS	PAHs 8270	TPH 8015/3510	TEPH 8015-*					REMARKS
1	B-7	9:30			X	Ground Water From Boring B-7 (13-16')	4	X	X	X	68192-95				3 Day TAT
2	B-8	10:40			X	Ground Water From Boring B-8 (13-16')	3				68196-98				Hold
3															
4															
5															
6															
7															
8															
9															
10															

TRANSFER NUMBER	ITEM NUMBER	TRANSFERS RELINQUISHED BY	TRANSFERS ACCEPTED BY	DATE	TIME
1	1 + 2	John Cavanaugh	Cathy Downing FAX	4.22 4-19	9:45
2					
3					
4					

REMARKS

* Sample to be filtered in lab (0.45 micron) and run through silica gel strip (Geomatrix method).

SAMPLER'S NAME: John Cavanaugh

SAMPLER'S SIGNATURE: John Cavanaugh

LAB COPY

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Andrew John Friedman
James E. Bruya, Ph.D.
(206) 285-8282

3012 16th Avenue West
Seattle, WA 98119-2029
FAX: (206) 283-5044

April 30, 1996

John Cavanaugh, Project Manager
Terranext
PO Box 24374
Oakland, CA 94623-1374

Dear Mr. Cavanaugh:

Enclosed are the results from the testing of material submitted on April 22, 1996 from your 05100695, Railroad Right of Way, 400 Lancaster project.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Bradley T. Benson

Bradley T. Benson
Chemist

keh
Enclosures
FAX: (570) 238-9145
NAA0430R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: April 30, 1996
Date Received: April 22, 1996
Project: 05100695, Railroad Right of Way, 400 Lancaster
Date Samples Extracted: April 22, 1996

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL BY GC/FID (Modified 8015) Extended to Include Motor Oil Range Compounds Samples Processed Using Method 3510

Results Reported as µg/L (ppb)

Sample ID	Diesel	Motor Oil	Surrogate (% Recovery)
B-7 (before silica & filtration)	<50	<200	99
B-7 (after silica & filtration)	<50	<200	113
Method Blank	<50	<200	109

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: April 30, 1996
Date Received: April 22, 1996
Project: 05100695, Railroad Right of Way, 400 Lancaster

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL BY GC/FID (Modified 8015)

Laboratory Code: Spike Blank

Analyte:	Reporting Units	Spike Level	% Recovery MS	% Recovery MSD	Acceptance Criteria	Relative Percent Difference
Diesel	ug/L (ppb)	5,000	103	93	63-135	10

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270

Client Sample ID:	B-7	Client:	Terranext
Date Received:	04/22/96	Project:	Railroad Right of Way, 400 Lancaster
Date Extracted:	04/23/96	Lab ID:	68194
Date Analyzed:	04/26/96	Data File:	042517.D
Matrix:	Water	Instrument:	GCMS#2
Units:	ug/L (ppb)	Operator:	kwilt

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	24	21	110
Phenol-d6	18	10	110
Nitrobenzene-d5	53	35	114
2-Fluorobiphenyl	45	43	116
2,4,6-Tribromophenol	46	10	123
Terphenyl-d14	45	33	141

Compounds:	Concentration ug/L (ppb)
Naphthalene	<1
2-Methylnaphthalene	<1
Acenaphthylene	<1
Acenaphthene	<1
Dibenzofuran	<1
Fluorene	<1
Phenanthrene	<1
Anthracene	<1
Carbazole	<1
Fluoranthene	<1
Pyrene	<1
Benzo[a]anthracene	<1
Chrysene	<1
Benzo(a)pyrene	<1
Benzo(b)flouranthene	<1
Benzo(k)flouranthene	<1
Indeno(1,2,3-cd)pyrene	<1
Dibenz(a,h)anthracene	<1
Benzo(g,h,i)perylene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270

Client Sample ID:	Method Blank	Client:	Terranext
Date Received:	04/22/96	Project:	Railroad Right of Way, 400 Lancaster
Date Extracted:	04/23/96	Lab ID:	Method Blank
Date Analyzed:	04/26/96	Data File:	042514.D
Matrix:	Water	Instrument:	GCMS#2
Units:	ug/L (ppb)	Operator:	kwilt

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	42	21	110
Phenol-d6	28	10	110
Nitrobenzene-d5	62	35	114
2-Fluorobiphenyl	60	43	116
2,4,6-Tribromophenol	65	10	123
Terphenyl-d14	63	33	141

Compounds:	Concentration ug/L (ppb)
Naphthalene	<1
2-Methylnaphthalene	<1
Acenaphthylene	<1
Acenaphthene	<1
Dibenzofuran	<1
Fluorene	<1
Phenanthrene	<1
Anthracene	<1
Carbazole	<1
Fluoranthene	<1
Pyrene	<1
Benzo[a]anthracene	<1
Chrysene	<1
Benzo(a)pyrene	<1
Benzo(b)flouranthene	<1
Benzo(k)flouranthene	<1
Indeno(1,2,3-cd)pyrene	<1
Dibenz(a,h)anthracene	<1
Benzo(g,h,i)perylene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: April 29, 1996
Date Received: 04/22/96
Project: Railroad Right of Way, 400 Lancaster

QUALITY ASSURANCE RESULTS FOR METHOD 8270

Laboratory Code: Blank Spike/Blank Spike Duplicate

Analyte:	Sample Conc.	Spiked Added.	Spike Conc.	Dup Conc.	MS %REC	MSD %REC	RPD	RPD Limit	QC Limits
Phenol	0.0	150	50	55	34	36	8	42	12-110
2-Chlorophenol	0.0	150	87	87	58	58	0	40	27-123
1,4-Dichlorobenzene	0.0	100	58	57	58	57	1	28	36-97
N-Nitroso-di-n-propyl	0.0	100	66	66	66	66	1	38	41-116
1,2,4-Trichlorobenze	0.0	100	59	59	59	59	1	28	39-98
4-Chloro-3-methylphenol	0.0	150	92	89	62	59	4	42	23-97
Acenaphthene	0.0	100	57	57	57	57	0	31	46-118
2,4-Dinitrotoluene	0.0	100	59	58	59	58	2	38	24-96
4-Nitrophenol	0.0	150	40	41	27	27	1	50	10-80
Pentachlorophenol	0.0	150	91	89	61	60	2	50	9-103
Pyrene	0.0	100	64	66	64	66	4	31	26-127

ATTACHMENT E

PARAMETERS USED TO CALCULATE RSBLs

Tier 1 Risk-Based Screening Levels (RBSLs) for Noncarcinogenic Compounds

Equations:

Potable ground water ingestion:

$$RBSL_w = \frac{(THQ \times RfD_i \times BW \times AT_n \times 365\ days/yr \times 10^3)}{(IR_{air} \times EF \times ED)}$$

Surficial soil ingestion, inhalation of vapors and particulates, and dermal contact:

$$RBSL_s = \frac{(THQ \times BW \times AT_n \times 365\ days/year)}{EF \times ED\ [((1x10^{-6}\ kg/mg) \times (IR_{soil} \times RAF_o + SA \times M \times RAF_d) / RfD_o) + ((SF_i \times IR_{air} \times (VF_{ss} + VF_p) / RfD_i)\ ]}$$

Subsurface soil leaching to ground water:

$$RBSL_s = \frac{RBSL_w}{LF_{sw}}$$

Tier 1 Risk-Based Screening Levels (RBSLs) for Carcinogenic Compounds

Equations:

Potable ground water ingestion:

$$RBSL_w = \frac{(TR \times BW \times AT_c \times 365\ days/yr)}{(SF_o \times IR_w \times EF \times ED)}$$

Surficial soil ingestion, inhalation of vapors and particulates, and dermal contact:

$$RBSL_s = \frac{(TR \times BW \times AT_c \times 365\ days/year)}{EF \times ED\ [((SF_o \times 10^{-6}\ kg/mg) \times (IR_{soil} \times RAF_o + SA \times M \times RAF_d)) + (SF_i \times IR_{air} \times (VF_{ss} + VF_p))\ ]}$$

Note: Equations from Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites, American Society for Testing and Materials (E 1739-95). Exposure parameters listed in table Tier 1 Risk-Based Screening Levels (RBSLs) - Exposure Parameters

Tier 1 Risk-Based Screening Levels (RBSLs) Equations for Voltalization and Leaching Factors

Equation:

Volatilization Factor - surficial soils ambient air (vapors):

$$VF_{ss} = \frac{W\rho_s d \times 1x10^{-3}}{U_{air}\delta_{air}}$$

Volatilization Factor - surficial soils ambient air (particulates):

$$VF_p = \frac{P_e W}{U_{air}\delta_{air}}$$

Leaching Factor - subsurface soils ground water:

$$LF_{sw} = \frac{\rho_s}{[\theta_{ws} + k_s\rho_s + H\theta_{as}] * (1 + ((U_{gw}\delta_{gw}) / IW))}$$

Note: Equations from Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites, American Society for Testing and Materials (E 1739-95). Volatilization and leaching parameters listed in table Tier 1 Risk-Based Screening Levels (RBSLs) - Soil, Building, Surface, and Subsurface Parameters

Tier 1 Risk-Based Screening Levels (RBSLs) - Exposure Parameters

Exposure Parameter	Definition (Units)	Residential Adult	Commercial/Industrial Construction
AT_c	Averaging time for carcinogens (yr)	70	70
AT_n	Averaging time for non-carcinogens (yr)	30	25
BW	Body Weight (kg)	70	70
ED	Exposure Duration (yr)	30	25
EF	Exposure Frequency (days/yr)	350	250
IR_{soil}	Ingestion Rate of Soil (mg/day)	100	50
IR_{air}-indoor	Inhalation rate indoors (m^3/day)	15	20
IR_{air}-outdoor	Inhalation rate outdoors (m^3/day)	20	20
IR_w	Ingestion Rate of Water (l/day)	2	1
LF_{sw}	Leaching Factor (mg/kg, mg/l)	Chemical Specific	
M	Soil to skin adherence factor (mg/cm^3)	0.5	0.5
RAF_d	Dermal relative absorption factor (volatiles or PAHs/10)	0.5	0.5
RAF_o	Oral relative absorption factor	1	1
$RBSL_i$	Risk-based screening level for media i (mg/kg, mg/l, ug/m^3)	Chemical, Media Exposure, Route Specific	
RfD_i	Inhalation chronic reference dose (mg/kg-day)	Chemical Specific	
RfD_o	Oral chronic refrence dose (mg/kg-day)	Chemical Specific	
SA	Skin surface area (cm^2/day)	3160	3160
SF_i	Ingestion cancer slope factor (mg/kg-day)$^{-1}$	Chemical Specific	
SF_o	Oral cancer slope factop (mg/kg-day)$^{-1}$	Chemical Specific	
THQ	Target Hazard Quotient	1	
TR	Target risk, individual lifetime cancer risk	For example $1x10^{-6}$ or $1x10^{-4}$	

Tier 1 Risk-Based Screening Levels (RBSLs) - Soil, Building, Surface, and Subsurface Parameters

Exposure Parameter	Definition (Units)	Residential Adult	Commercial/Industrial Construction
d	Lower depth of surficial zone (cm)	100	100
f_{oc}	fraction of organic carbon	0.01	0.01
H	Henry's Law coefficient (cm^3-H_2O/cm^3-air)	Chemical Specific	
I	Infilitration Rate of water through soil (cm/yr)	30	30
k_{oc}	Carbon-water sorption coefficient (cm^3-H_2O/g-C)	Chemical Specific	
k_s	Soil-water sorption coefficient (cm^3-H_2O/g-soil)	f_{oc} x k_{oc}	
P_e	Particulate Emmission Rate (g/cm^2-s)	6.90E-14	6.90E-14
W	Width of source area parallel to wind. ground water flow (cm)	1500	1500
U_{air}	Wind speed above ground surface in ambient mixing zone (cm/s)	225	225
U_{gw}	Ground water Darcy velocity (cm/year)	2500	2500
δ_{air}	Ambient air mixing zone height (cm)	200	200
δ_w	Ground water zone mixing zone thickness (cm)	200	200
θ_{as}	Volumetric air content in vados zone soils (cm^3/cm^3)	0.26	0.26
θ_{ws}	Volumetric water content in vados zone soils (cm^3/cm^3)	0.12	0.12
ρ_s	Soil bulk density (g/cm^3)	1.7	1.7

~82 l/yr
~6.6

TerraNext