# Subsurface Consultants, Inc.

R. William Rudolph, P.E.
President

April 10, 1997
SCI 133.005

Mr. Barney Chan
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, 2nd Floor
Alameda, CA 94502

**Transmittal**
**Site Investigation Update**
**Ninth Avenue Terminal**
**Oakland, California**

Dear Mr. Chan:

As discussed, attached please find color coded copies of the 9th Avenue Terminal Site Plan. The colors correspond to different phases of investigations conducted by Subsurface Consultants, Inc. (SCI) and others to date as well as proposed sampling. The analytical tables are also color coded to match the different phases of investigation. Also included is the analytical testing program for the next phase of investigation at the site as proposed in SCI's letter of March 26, 1997.

Yours very truly,

Subsurface Consultants, Inc.

for

Jeriann Alexander
Associate Engineer

JNA:ly 133.005\tl0497.doc

1 copy submitted

Attachments: Color Coded Analytical Tables and Site Maps
Analytical Testing Program for the next phase of investigation

cc: Mr. Jonathan Redding, Esq.
Fitzgerald, Abbott & Beardsley, LLP
1221 Broadway, 21st Floor
Oakland, CA 94606

# I EXECUTIVE SUMMARY

During October and November 1992, the United States Coast Guard traced the source of an Oakland Inner Harbor hydrocarbon release to an active, aboveground diesel storage tank system at the Keep on Trucking Company, Inc. (KOT) Facility located at 370 8th Avenue, Oakland, California which is situated within the Port of Oakland's Ninth Avenue Terminal. Investigations conducted subsequent to the 1992 release at the KOT facility were limited to areas immediately adjacent to the point of release identified by the United States Coast Guard. Preliminary investigations and site research suggested there is a likely potential for preferential migration pathways for releases from the KOT spill to impact other locations at the Ninth Avenue Terminal. Site research also suggested that other sources of contamination exist within the Ninth Avenue Terminal area.

Pursuant to an August 2, 1996 written request from the Alameda County Health Care Services Agency (ACHCSA) for a work plan for further site characterization, a site characterization study was implemented. To date, two phases of investigation have been completed by Subsurface Consultants Inc. (SCI). As documented in SCI's Interim Report dated August 9, 1996, petroleum hydrocarbon impacted soils and groundwater were identified throughout the Ninth Avenue Terminal. Other potentially hazardous chemicals were also identified in localized areas. Numerous tenants operating many underground and aboveground storage tanks have also been present at the site. In addition, a myriad of underground utilities were identified in the area. Further site characterization was performed as documented in this report. These latest studies were focused on evaluating impacts to groundwater

as well as investigating areas which had not been investigated previously. New potential source areas which were identified included the following:

- A suspected solvent source release in the vicinity several former tenants including AMCO Chemical Co., C&C Metal Processing Co., Eden National Steel Corp., and Lakeside Non-Ferrous Metals and the former location of the KOT vehicle servicing facility. Operations by these former and current tenants likely included the use/and or storage of solvents.
- PCB and heavy metal concentrations in shallow soils near a metal working and recycling facility operated within a building formerly owned by Sam Kalman & Company. C&C Metal Processing Co., Eden National Steel Corp., and Lakeside Non-Ferrous Metals companies are known to have occupied the Kalman building and performed metal working and recycling activities.
- Free floating petroleum product was identified at several additional locations.

Additional investigation is necessary to better define areas of impact, as well as to complete site characterization. These studies need to be completed prior to preparing the Corrective Action Plan requested by the ACHCSA in their letter dated December 2, 1996.

## II INTRODUCTION

This is the second interim report for a Site Characterization study conducted by Subsurface Consultants, Inc. (SCI) at the Keep on Trucking Company, Inc. (KOT) and other facilities located within the Ninth Avenue Terminal of the Port of Oakland (Port). The Terminal is bordered by Embarcadero Road, Interstate 880 and Southern Pacific Railroad tracks to the north, Clinton Basin to the west, the Inner Harbor Channel to the south and Brooklyn Basin to the east. The streets at the Terminal consist of 7th through 10th Avenues, and DeFremery Avenue. Eighth Avenue, the main entrance to KOT's facility, extends through the western portion of the Ninth Avenue Terminal. The location of the Ninth Avenue Terminal is shown on the Site Vicinity Map, Plate 1, and the Site and Utility Location Plan, Plate 2.

The study described herein was performed in general accordance with a work plan prepared by SCI entitled "Work Plan Addendum for Further Site Characterization, Ninth Avenue Terminal Area" dated August 14, 1996. The work plan addendum was approved by the ACHCSA in their letter dated August 30, 1996. A primary purpose of this phase of study is to further evaluate impacts to the site, identify additional potential source areas and evaluate groundwater flow patterns as required to further understand the site conditions prior to developing the ACHCSA requested Corrective Action Plan. SCI previously prepared a report regarding our initial field investigation entitled "Interim Report, Site Characterization, Eighth Avenue Area, Ninth Avenue Terminal" dated August 9, 1996.

## III SITE DESCRIPTION

The Ninth Avenue Terminal area is an irregularly-shaped parcel encompassing approximately 30 acres as shown on the Site and Utility Location Plan, Plate 2. The Terminal is generally flat with elevations ranging from approximately 9 to 14 feet above Port of Oakland datum. The entire study area is currently owned by the Port, however, the majority of the area is either 1) being leased to tenants who presently occupy the following buildings or 2) being used by tenants without a written occupancy agreement:

| | |
|---|---|
| Keep-on-Trucking Maintenance Shop | H-107 |
| Keep-on-Trucking Offices | H-228 |
| Keep-on-Trucking Warehouse | H-229 |
| National Furniture Liquidators (M&N Trucklines) | H-232 |
| Marine Terminals Corporation | H-309 |
| Lakeside Nonferrous Metals (Sam Kalman & Co.) | H-314 |
| Harbor Forklift Service | H-318 |
| Liquid Carbonic | Unnumbered |

Concrete wharves extend along the southeast and southwest sides of the Terminal, separated from land by a concrete bulkhead (retaining wall). The majority of the Terminal not occupied by buildings is paved with asphaltic concrete. Various aboveground and underground utilities do exist throughout the area. Rail spurs extend partially along 7th Avenue and in between the structures occupied by National Furniture Liquidators (H-232) and Lakeside Nonferrous Metals (H-314). Rail spurs also extend along the south side of Tenth Avenue as shown on the Site Plan.

Storm water runoff from the majority of the Terminal is collected by numerous on-site catch basins and conveyed via below grade storm drains along 8th Avenue to the Inner Harbor and Clinton Basin. Storm water runoff from a segment of the Embarcadero is also conveyed to the 8th Avenue storm drain system. Storm water runoff from the east and southeast sides of the Terminal is collected by a series of catch basins along 9th and 10th Avenues that also drain into the Inner Harbor south of 10th Avenue. Sanitary sewer improvements consist of laterals extending from buildings to a main sewer line below 8th Avenue and another below 10th Avenue. The sanitary sewer mainlines flow toward Embarcadero Road. Other subsurface utilities in the area include, but are not necessarily limited to, the following: gas, electric, water and fire alarm.

## IV FIELD INVESTIGATION

### A. Purpose and Scope of Work

A primary purpose of this phase of study is to comply with ACHCSA requests to further evaluate impacts to the site resulting from the known KOT pipeline leak, as well as from other identified and as yet, uninvestigated potential sources, so that a Corrective Action Plan can be developed and implemented. The scope of services for this phase of investigation is in general accordance with the Work Plan Addendum dated August 14, 1996 and approved by the ACHCSA in a letter dated August 30, 1996. The rationale for further study is outlined herein.

The preliminary field investigation indicated that shallow groundwater throughout much of the site has been impacted by petroleum hydrocarbons and other contaminants, most notably

heavy metals and methylethylketone (MEK). Therefore, monitoring wells were installed near the perimeter and center of the site to evaluate groundwater flow patterns and the extent of dissolved and floating contaminant impacts.

Based on the results of previous studies, as well as to comply with ACHCSA requests, additional exploration was necessary in selected areas to supplement existing chemical data and to provide new data in areas not yet studied by SCI. Monitoring wells and test borings were installed and soil and groundwater samples were collected in the following areas:

- The former Port Petroleum/American Bitumuls leaseholds to further evaluate impacts due to a 1973 oil spill.
- In close proximity to the existing KOT aboveground diesel storage tank where previous analytical results suggested that there were impacts in this area from diesel releases.
- Down-gradient of the suspected locations of two underground fuel oil storage tanks situated west of Building H-232 in the proximity of KOT's current office trailer location.
- In the proximity of observed surface staining near a historic metal working and recycling facility operated within Building H-314. Sam Kalman & Company owns this building. C&C Metal Processing Co., Eden National Steel Corp., and Lakeside Non-Ferrous Metals companies are known to have occupied the Kalman building and performed metal working and recycling activities.

SCI continued its investigation of the manhole located south of the American Bitumuls/Port Petroleum leaseholds where floating product has been observed since SCI began its

investigation earlier this year. An attempt was made during this phase of the investigation to drain the manhole to evaluate the orientation of any pipes that may enter or exit it.

A more detailed description of the services performed by SCI is outlined below.

**B. Site Utility Survey**

Prior to this phase of the investigation, accessible subsurface utilities within new portions of the study area were located using electronic and acoustic instrumentation by California Utility Surveys (C.U. Surveys). C.U. Surveys began their utility survey by first locating all visible surface appurtenances such as catch basins, manholes, cleanouts, exposed electrical conduits, electrical utility boxes, fire hydrants, water and gas valves, etc. C.U. Surveys then opened all manholes and catch basins and inspected each vault for the following:

- Pipes leading into and out of the vault,
- Pipeline orientations,
- Pipe construction material and diameter,
- Pipe flowline depths, and
- Significant indications of petroleum based liquids.

Not all vaults were accessible due to surface obstructions and some vaults could not be inspected due to the presence of water, silt or other media. A copy of C.U. Survey's report for this extended study area is presented in Appendix B.

C.U. Surveys also probed any storm drain or sanitary sewer pipeline where the alignment leading away from a vault was not readily apparent (i.e., did not obviously connect with an adjacent manhole or catch basin). A probe transmitting a specific radio frequency was inserted into the pipe

along its length as far as possible. The alignment of the pipeline was located above ground by a radio frequency receiver. Metal pipes such as water and gas pipes and electrical conduits were similarly located by transmitting a signal either directly from aboveground appurtenances such as valves or through the groundsurface directly to the utility below. Other metallic pipes were located using a magnetometer and electromagnetic induction techniques. The location of identified subsurface pipelines and conduits were marked on the groundsurface with spray paint.

The horizontal and vertical locations of all visible above-ground utility appurtenances and marked utilities, except for gas pipes and electric lines, were surveyed by A-N West, Inc., a licensed land surveyor. In addition to utilities, A-N West surveyed all recently installed monitoring well and borehole locations. All elevations were referenced to two City of Oakland monuments with known elevations located within the Embarcadero right-of-way. The elevations were adjusted to Port of Oakland datum for consistency with the previous survey. The maps presented in this report are based on the A-N West survey.

## C. UST Locating

In addition to locating subsurface utilities, C.U. Surveys screened two additional suspected UST areas using electro-magnetic induction techniques. Metallic anomalies which were located are shown on Plate 2.

Historical research indicated that two gasoline USTs were known to be installed in 1958 just south of Building H-229 (1-5,000 gallon tank and 1-2,000 gallon tank). Research indicates that the tanks were installed for use by the Vic Adelson Drayage company which operated within Building H-208 formally located adjacent to the south side of Building H-229. C.U. Survey's detected a metallic

anomaly approximately 10 feet wide and 22 feet long, near the south corner of Building H-229. Records discovered to date do not indicate whether or not other tenants may also have used the tanks.

Research also indicated that underground oil tanks had existed in the vicinity of the current KOT offices. These tanks may have been associated with boilers which were operated at the former cannery which occupied within Buildings H-211 and H-212. Port of Oakland site maps indicate that United Packing Corp. was operating the cannery as early as 1937. Records indicate that the Oakland Canning Co., Rexford Pre-Pakt, and Safeway Stores, Inc. also operated the cannery. Since the existing KOT offices were constructed over the top of the oil tanks, C.U. Surveys was unable to screen the area for anomalies.

While conducting utility surveys in the area, C.U. Surveys identified an irregularly shaped metallic anomaly just north of the KOT office trailer measuring about 26 feet wide and 24 feet long. Even though the groundsurface in this area is composed of heavily reinforced concrete, C.U. Surveys was able to adjust their electro-magnetic induction equipment to tune out the signal reflected by the concrete reinforcement and thereby receive distinct signals from these metallic anomalies. The source of this anomaly is currently unknown.

## D. Monitoring Well Installation/Analytical Testing

Monitoring wells were installed previously by others in the area of the 1992 KOT pipeline leak at former Building H-213 (MW-1 through MW-6) and in the area of the former KOT maintenance UST at Building H-107 (MW-7). SCI also previously installed three monitoring wells (SCIMW-1 through SCIMW-3) within the study area. For this phase of the investigation, SCI installed 17 additional monitoring wells (SCIMW-4 through SCIMW-20) within the study area. Twelve monitoring

wells were installed around the perimeter of the study area and two wells were installed within the central portion of the study area to investigate the extent of dissolved and floating contamination, as well as further evaluate groundwater flow direction by measuring groundwater elevations. Three additional monitoring wells were installed specifically within the former American Bitumuls/Port Petroleum leaseholds to further evaluate the impacts to soil and groundwater in this portion of the site. All monitoring well locations are shown on Plate 2.

Prior to well installation, a drilling application permit was submitted to and approved by the Alameda County Flood Control and Water Conservation District, Zone 7. Underground Service Alert (USA) was contacted 2 business days before work began so they could contact their subscribers to clear all proposed boring locations for utilities. The field protocols for drilling, sampling, and well installation are presented in Appendix C and a copy of the drillling permit is included in Appendix E. SCI's field engineer observed drilling operations, prepared detailed logs of the test borings and obtained undisturbed samples of the soils encountered. The test boring logs and well completion details are presented on Plates 4 through 20. Soils are classified in accordance with the Unified Soil Classification System described on Plate 25.

Following well installation and development, groundwater samples were collected from all SCI monitoring wells (SCIMW-1 through SCIMW-20) and existing wells MW-6 and MW-7. The samples were transported under Chain-of-Custody documents to Curtis & Tompkins, Ltd., an analytical laboratory certified by the State of California Department of Toxic Substances Control (DTSC). All samples were analyzed for petroleum hydrocarbons, volatile and semi-volatile organic compounds, heavy metals and PCBs. The analytical testing program is presented on Table 1. Chain-of-Custody

forms and analytical test reports are presented in Appendix F. Analytical data is presented in Tables 2 through 7.

Groundwater elevations were measured in the aforementioned wells on a weekly basis for one month and then on a monthly basis for 2 months following development to determine groundwater flow direction trends over time. Initially, the wells were checked for free floating product using a steel tape coated with petroleum sensitive paste. The depth to water below the top of casing (TOC) was then measured in the wells using an electric well sounder. A summary of groundwater elevation data is presented in Table 8. Well development and groundwater measurement forms are presented in Appendix E.

Are there analytical results?

**E. Soil and Groundwater Sampling/Analytical Testing**

Test borings have been drilled previously by others throughout the Ninth Avenue Terminal (B-1 through B-21). SCI also previously drilled 31 test borings (SCI-1 through SCI-31) throughout the study area to assess contamination at various locations. For this phase of study, subsurface conditions were explored by drilling 8 additional test borings (SCI-32 through SCI-39) at the locations shown on Plate 2. The locations were selected to provide preliminary coverage of uninvestigated areas of potential impact and to supplement existing data as required to comply with ACHCSA requests to commence evaluation of appropriate remedial response actions. Drilling and sampling protocol is described in Appendix C.

SCI's field engineer observed drilling operations, prepared detailed logs of the test borings, and obtained undisturbed samples of the soils encountered. Groundwater samples were obtained through temporary wells placed into the test borings. The temporary wells were removed following collection

of groundwater samples and the resulting boreholes were backfilled with cement grout and finished to match the surrounding pavement. The test boring logs are presented on Plates 21 through 24. Soils are classified in accordance with the Unified Soil Classification System described on Plate 25.

Selected soil and grab groundwater samples were collected from the temporary borings. These samples were transported under Chain-of-Custody documentation to Curtis & Tompkins, Ltd. All samples were analyzed for petroleum hydrocarbons. Selected samples were further analyzed for other potential contaminants of concern. The testing program is presented on Table 1. Chain-of-Custody forms and analytical test reports are presented in Appendix F. Analytical data is presented in Tables 2 through 7.

## F. Petroleum Based Liquid Removal From Manhole/Cannery Line Investigation

In May 1996, during the utility locating phase of SCI's initial investigation, approximately 17 inches of floating diesel was observed in a manhole south of the American Bitumuls/Port Petroleum area as shown on the Site and Utility Location Plan. Historical Port maps indicate that the manhole may be connected to an abandoned concrete storm drain line referred to as the "Cannery Line" which extends along 8th Avenue and parallel to the KOT Pipeline Leak area. C.U. Surveys observed two 4-inch steel pipes entering near the top of the manhole. One pipe entered from the northeast and the other pipe entered from the southeast as shown on Plate 2. The extent or use of these lines has not been determined. C.U. Surveys also observed that the Cannery Line was blocked with bricks and concrete in the area of the KOT pipeline leak. Records are unclear as to when the line was blocked. However, references are made in several Uribe &

Associates reports to the blocking of various drain lines in an attempt to prevent further migration of diesel to the estuary immediately following the KOT 1992 release.

Dillard Environmental Services (Dillard), a certified hazardous materials transporter, was retained by the Port to remove the petroleum liquids from the manhole. On May 13, 1996, about two weeks after the diesel was discovered, more than 700 gallons of free product and water were removed. However, the level of the liquid inside the manhole remained static due to inflow from undetermined sources below the liquid surface. A Dillard employee probed and located two possible pipes entering and/or exiting the manhole below the liquid surface. The additional pipes appear to be oriented in directions similar to the orientation of the Cannery Line as shown on Port maps and duplicated on Plate 2. The actual existence and location of the pipes could not be confirmed since the liquid level could not be drawn down enough to expose them due to the rate of liquid recharge into the manhole.

On October 16, 1996, Dillard removed an additional 8,700 gallons of free product and water from the manhole. The petroleum based liquid and water removed from the manhole, including that originally stored on site in fourteen 55 gallon drums, was pumped into two 4,800 gallon vacuum trucks. Once again, the level of the liquid inside the manhole could not be drawn down enough to expose the suspected inflow/outflow pipes even though the vacuum trucks were filling at more than 200 gallons per minute. Dillard noted that inflow could be seen in the manhole below the liquid level.

Samples of the free product and water were collected from the manhole at the following intervals: before pumping began, and after the removal of 2,000 gallons, 6,500 gallons, and 8,700

gallons. The samples were transported under Chain-of-Custody to Curtis & Tompkins, Ltd. The samples were analyzed for petroleum hydrocarbons, volatile and semi-volatile organics, and PCBs. The sample collected before pumping began was also tested for heavy metals, boiling point, and bottom sediment and water. Chain-of-Custody forms and analytical test reports are presented in Appendix F. Analytical data is presented in Tables 5 through 7. All liquids removed from the manhole were subsequently removed from the site and properly disposed of at an environmental facility in Southern California.

F.P

SCI originally planned to dig four test pits along the Cannery Line to confirm its existence. In addition, SCI planned to inspect its condition by breaking it, observing its contents, collecting sediment and/or water samples, and analyzing the samples for the contaminants of concern found at the site. Because the suspected inflow/outflow pipes could not be located and probed and because SCI was concerned that free product may still be present within the pipe, the investigation regarding the Cannery Line was suspended. Further plans to investigate, and remove debris and wastes from the storm drain lines will be considered by the Port at a later date, once it has fully evaluated the site, developed a corrective action plan and discussed mitigation measures with its' insurance carriers.

# V SUBSURFACE CONDITIONS

The study area is blanketed by miscellaneous, non-homogeneous fill. The fill typically ranges from 3 feet to 7 feet thick, but measures more than 10 feet thick in localized areas toward Clinton Basin and the concrete marginal wharf to the south. The fill consists of a mixture of silty and sandy clays, clayey and sandy silts, sandy and clayey gravels, and miscellaneous debris including brick, wood and rock fragments.

Bay sediments underlie the miscellaneous fill. The bay sediments consist of soft, highly organic clayey silt, interlayered with thin lenses of sand. The sediments are soft and compressible and extend to the depths drilled, which ranged from 13 feet to 18 feet bgs.

Groundwater was encountered within the monitoring wells at depths ranging typically from less than 4 feet to more than 7 feet bgs in September and October 1996. These depths correlate to groundwater elevations ranging from about 4 feet to about 7 feet above the Port of Oakland Datum. The approximate groundwater elevation contours for September 1996 are presented on Plate 3.

Generally, groundwater elevations were found to be approximately 1-1/2 to 2-1/2 feet higher near the center of the site as compared to those measured near Clinton Basin and Embarcadero Road. The groundwater elevation contours shown on Plate 3 suggest that the concrete may be acting as a barrier to significant groundwater leaching to the estuary. Groundwater is however flowing toward Clinton Basin and toward the Embarcadero where an 84 inch diameter sanitary sewer interceptor pipe is located.

## VI RECENT STUDY BY R. MORRISON & ASSOCIATES FOR KEEP-ON-TRUCKING

In November 1996, KOT retained the services of R. Morrison & Associates, Inc. (RMA) to conduct additional subsurface investigation at the Ninth Avenue Terminal. As we understand, the purpose was to study areas not investigated by consultants retained by KOT and to confirm existing analytical data. RMA subcontracted Transglobal Environmental Geochemistry (TEG) to collect soil and groundwater sample from 28 locations. RMA concentrated their study in the following areas:

- Chemical Warehouse (Building H-215) (P)
- Two gasoline USTs at Building H-209 (C - next to D)
- KOT pipeline leak at Building H-213 (P)
- Suspected oil tanks west of Building H-232 (H) (beneath KOT office)
- 10,000 gallon UST northeast of Building H-227 (A)
- American Bitumuls/Port Petroleum bulk fuel processing facilities (J)
- Bay City/East Bay Oil Company bulk fuel processing facilities (N)
- Britz Chemical Company chemical warehouse and fertilizer manufacturing at Buildings H-206 and H-207 (Q)

The Port retained SCI to observe the field investigation and collect selected split soil and groundwater samples for additional analytical testing. SCI observed the presence of free floating petroleum product in 15 of the 28 sampling locations. The analytical results of the RMA study have not been released to the Port by KOT, and therefore we are unable to comment further on

the study. The analytical results of the selected samples obtained by SCI have not been reviewed by the date of this report.

## VII FINDINGS AND CONCLUSIONS

On a preliminary basis it appears that soil and groundwater conditions in the areas investigated by SCI to date have been impacted by petroleum hydrocarbons. In addition, other chemicals of concern including solvents have been detected in localized areas. Our conclusions regarding the significance of the investigation findings to date are as follows.

- The predominant petroleum hydrocarbons identified at the site are within the diesel and motor oil range. Petroleum hydrocarbons were found in shallow soils and groundwater in all suspected areas of concern. The extent of impacts have not been defined.

- Free floating petroleum product and sheen were observed in several monitoring wells and temporary well points. The sources and extent of impacts have not been fully defined.

- Groundwater samples from SCIMW-7 contain solvents. The source and extent of impacts has not been defined.

- Groundwater samples from wells along Clinton Basin contain selected heavy metals and petroleum hydrocarbons. Free floating product has not been observed in these wells to date.

- Groundwater samples from interior selectively tested temporary well points and monitoring wells also contain several heavy metals and 2-Butanone (a.k.a. MEK).

- Numerous subsurface utilities exist throughout impacted soil and groundwater areas. The utility pipelines extend both above as well as below groundwater levels rendering them potential conduits for contaminant migration. The reason for, and in some cases, the extent of utility pipelines are currently unknown.

possible Source of F.P.

- Studies performed by RMA indicated the presence of free floating product in the area west of the current AST that KOT is operating, in the area of the former bulk fuel processing facilities operated by Port Petroleum and American Bitumuls, in the area of the former bulk fuel processing facilities operated by Bay City Fuel Company/East Bay Oil Company, and along the former rail line spur extending toward the bulk fuel processing facility.

- Given the varied use of the terminal, suspected USTs and ASTs, as well as chemical storage areas may have been situated in areas not yet investigated to date.

## VIII RECOMMENDATIONS

This report should be submitted to the Alameda County Environmental Health Services. In addition, we recommend the following tasks be performed, so that among other studies and submittals, a Corrective Action Plan can be developed in accordance with the ACHCSA requests:

- The floating product within the manhole located south of the former bulk fuel processing area should be periodically checked to measure the recovery of floating diesel. & removed as accumulated

- Additional research and investigation should be conducted of the areas of newly discovered contamination and or potential source areas to 1) identify potentially responsible parties, 2) determine the extent of contamination and 3) determine impacts to other areas. & Continue monitoring the perimeter wells.

- A tidal influence study should be conducted to evaluate the bulkheads response to tidal fluctuations and its apparent ability to limit groundwater migration. — what about Sampling & analysis.

- Due to extensive and substantial soil and groundwater contamination, Port representatives and SCI should meet with the County to discuss the findings to date and to agree upon the scope of effective subsequent investigations. — possible containment zone. — also need RWQCB for estuarine C.V. levels

- Work plans should be prepared which outline supplemental investigations, as necessary, pursuant to negotiations with the County to complete investigation of the site prior to preparation of a corrective action plan. To do otherwise could lead to unnecessary expenditures.

- Properly close all non-permitted USTs. or permit

## IX LIMITATIONS

This study was intended to provide a preliminary means of evaluating soil and groundwater contamination that exists beneath the site, based on limited subsurface investigation and analytical testing. Contamination may exist in other areas not investigated by SCI. Environmental sampling studies, such as presented herein, are by nature non-comprehensive and subject to limitations including those presented herein.

SCI has prepared this report in a professional manner, using that degree of skill and care exercised for similar projects under similar conditions by reputable and competent environmental consultants. SCI shall not be responsible for conditions or consequences arising from relevant facts that were concealed, withheld, or not fully disclosed at the time the report was prepared. SCI also notes that the facts and conditions referenced in this report may change over time and the conclusions and recommendations set forth herein are applicable only to the facts and conditions as described at the time of this report. SCI believes that conclusions stated herein to be factual, but no guarantee is made or implied.

This report has been prepared for the benefit of Port of Oakland and its counsel. The information contained in this report, including all exhibits and attachments, may not be used by any other party without the express written consent of SCI.

**List of Tables:**



**List of Illustrations:**



**Appendix:**

D Analytical Test Reports and Chain-of-Custody Forms for Manhole Samples

E Well Development and Groundwater Measurement Forms.
Permits

F Analytical Test Reports and Chain-of-Custody Forms for SCI's Soil and Groundwater Investigation

**Distribution:**

2 copies: Mr. Jonathan Redding, Esq.
Fitzgerald, Abbott & Beardsley

2 copies: Ms. Michele Heffes, Esq.
Deputy Port Attorney

1 copy: Mr. Jeff Rubin
Port of Oakland - Environmental Health and Safety Compliance Department

1 copy: Mr. Barney Chan
Alameda County Health Care Services Agency

1 copy: Mr. Rich Hiett
Regional Water Quality Control Board