RECOMMENDATIONS FOR UNDERGROUND STORAGE TANK CLOSURE FORMER NIELSEN FREIGHT LINES TRUCKING FACILITY EMERYVILLE, CALIFORNIA

Prepared for

The Martin Company
4265 Hacienda Drive, Suite 101
Pleasanton, California 94566

Prepared by

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August 26, 1987

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August 26, 1987

Project: 8710018B

The Martin Company
4265 Hacienda Drive, Suite 101
Pleasanton, California 94566

Attention: Mr. Walter Kaczmarek, Project Manager

Gentlemen:

Re: RECOMMENDATIONS FOR UNDERGROUND STORAGE TANK CLOSURE
FORMER NIELSEN FREIGHT LINES TRUCKING FACILITY
1605-64th Street
Emeryville, CA 94612

The enclosed report presents the results of our engineering field observations, laboratory studies, and resulting recommendations concerning closure of four underground fuel storage tanks, product lines, two product manifolds and an oil/water separator (not included in the original scope of work) located at the former Nielsen Freight Lines trucking facility in Emeryville, California. These engineering services were provided in accordance with our proposal to you, dated March 20, 1987.

Assessment services performed as part of tank closure included the following:

- o Observation during the removal and disposal of four underground storage tanks and their related product lines and manifolds by Tom Daniels Excavation of Danville, California;
- o Collection of soil and groundwater samples for laboratory analysis from the tank excavations and manifold trenches;
- o Chemical analysis of the soil and groundwater samples for fuel hydrocarbons; and
- o Assessment of the chemical test results to determine whether significant product leakage may have occurred from the tanks and manifolds.

The accompanying report includes descriptions of the field procedures used during the tank and manifold removals and of the soil and groundwater sampling. Based on our interpretations of the chemical analyses for total fuel hydrocarbons (TFH); benzene, toluene, and xylene (BTX); ethylbenzene

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and total lead in the soil and groundwater, recommendations are presented for limited supplemental field activities and final tank closure requirements.

This report, with your cover letter, should be submitted to the Alameda County Division of Environmental Health to fulfill the reporting requirements of the California Underground Storage Tank Regulations, Article No. 5. The report should be submitted to:

> Mr. Lowell Miller
> Public Health Engineer
> Alameda County Division of Environmental Health
> 420 - 27th Street
> Emeryville, CA 94612

We appreciate the opportunity to be of service to The Martin Company on this project and look forward to our continued working relationship. If you have any questions regarding this report, please contact Mr. Joel Kushins at 415-945-3080.

Sincerely,

WOODWARD-CLYDE CONSULTANTS

John McMillan

John McMillan, P.E.
Project Engineer

Joel R. Kushins

Joel R. Kushins, P.E.
Project Engineer

Enclosures

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1.0 INTRODUCTION

The Martin Company is proposing to develop a commercial structure and attendant parking at the former Nielsen Freight Lines trucking facility in Emeryville, California. Woodward-Clyde Consultants (WCC) was retained by The Martin Company to perform an environmental assessment of the proposed project site. The major components of this environmental assessment are as follows:

- Review of site history;
- Observation of underground fuel tank and manifold removals; submittal of required documentation to the appropriate regulatory agencies;
- Performance of field investigations including soil borings and sampling, and monitoring well installations and sampling;
- Chemical testing of selected soil and groundwater samples; and
- Assessment and presentation of the study results in this report.

The second of these items, observation and documentation of tank and manifold removals, is the subject of this report. Based on observations of fuel-contaminated soil during field exploration operations, the scope of work was expanded to include the formulation and presentation of recommendations for site remediation measures which will be necessary for proper closure of the tanks and manifolds.

1.1 Site Description

The proposed development site consists of two adjacent parcels of land near the intersection of Christie Avenue and 64th Street in Emeryville, California (Figure 1). The northern parcel is the former location of Nielsen Freight Lines shown on Figures 2 and 3. The southern parcel is an area of the Marketplace development which borders the Nielsen property on the south side. The subject underground tanks and manifolds are all located on the Nielsen Freight Line parcel. Discussions in this report are, therefore, restricted to the Nielsen parcel.

The Nielsen site is bordered on the north by 64th Street, on the south by the Marketplace property, on the east by the Southern Pacific Railroad right-of-way, and on the west by two commercial low-rise buildings and by Christie Avenue. The site is occupied by a single building which includes an 80-foot by 340-foot cross-dock trucking terminal. A truck repair shop with office space has recently been demolished and removed from the site. The remainder of the site is paved with asphalt concrete.

Underground tanks and piping at the site requiring removal and closure under California State, Alameda County, and local tank laws included the following:

- A 10,000-gallon leaded gasoline tank and attendant fueling manifold;
- A 10,000-gallon diesel tank and attendant fueling manifold;
- A 500-gallon waste oil tank; and
- A 500-gallon lubrication (motor) oil tank.
- An oil/water separator (not included in the original scope of work).

These tanks and manifolds are shown in Figure 2.

1.2 Project Scope and Objective

The objective of the field observation, sampling, and testing program described in this report is to perform proper closure of the site underground tanks, piping, and manifolds in accordance with the applicable regulations for underground storage tanks. Major elements of the work scope included:

- On-site observations during removal of the tanks and manifolds by Tom Daniels Excavating of Danville, California;
- Collection and chemical analyses of soil and groundwater samples from the tank and manifold excavations; and
- Preparation of this report documenting the field activities and observations, the soil and groundwater analytical test results, and recommendations for additional work necessary for proper closure of the tanks and associated pipes and manifolds.

2.0 STATE AND LOCAL AGENCY COORDINATION

This closure plan was developed considering the specific conditions at the site and the applicable guidelines of California State Water Resources Control Board, Alameda County Division of Environmental Health, and local regulatory agencies having jurisdiction concerning underground storage tanks. The following regulations and guidelines were used:

- "California Underground Storage Tank Regulations," California State Water Resources Control Board, August, 1985.
- "Guidelines for Addressing Fuel Leaks," California Regional Water Quality Control Board, San Francisco Bay Region, September 1985.

3.0 TANK AND MANIFOLD REMOVAL PROCEDURES

Woodward-Clyde provided technical oversight and field sampling and testing services for soil and groundwater during removal of the four underground tanks, product lines, and product manifolds at the site. Tom Daniels Excavating, Inc. (TDE) of Danville, California performed the excavations and tank removals under separate contract with The Martin Company. H & H Shipyard (HHS) transported and disposed of the tanks at their San Francisco TSD facility. The associated product lines and product manifolds were excavated and are stored at the site, to be disposed during forthcoming building demolition work. Soil from the tank and manifold excavations was stockpiled at the site and covered with plastic sheets if potential product contamination was evident in the soil.

3.1 Tanks and Product Lines

The two underground storage tanks were removed and disposed on April 7 and 8, 1987. On April 7, HHS pumped and cleaned the tanks and TDE excavated the area around the tanks in preparation for their removal the next day.

On April 8, 1987, Mr. Joel Kushins of WCC and representatives of the Emeryville Fire Department were present at the project site to observe the procedures used to remove the tanks. Dry ice was used to purge vapors from the tanks, to below lower explosive limits. The tanks were then removed from their excavations, visually inspected for corrosion and perforations, and loaded onto flat bed trucks for transport to HHS's San Francisco TSD facility. Final disposal by HHS consisted of cutting the tanks and salvaging the cleaned scrap metal.

<u>3.1.1 Diesel Tank - 10,000-Gal. Steel Tank</u> - During the tank removal, the following observations were made:

- Inspection of the tank and product lines revealed no corrosion or perforations. The diesel product line was steel pipe.

- The tank was coated with an outer tar lining.

- The bottom of the diesel tank was below the groundwater depth of 7 to 8 feet observed in the excavation just after tank removal.

- Free product of less than 1/16-inch thickness was observed floating on the groundwater.

- Soil stains were observed at the bottom of the product line trench.

- Vent lines and electrical conduits were left in place.

3.1.2 Gasoline Tank - 10,000-Gal. Steel Tank - During the tank removal, the following observations were made:

- Inspection of the tank and product lines revealed no corrosion or perforations. The gasoline product line was steel pipe.

- The tank was coated with an outer tar lining.

- The bottom of the gasoline tank was at the a depth of approximately 10 feet, about the same as the groundwater depth in the excavation just after tank removal.

- No substantial floating product was observed on the groundwater.

- Vent lines and electrical conduits were left in place.

3.1.3 Waste Oil Tank - 500-Gal. Steel Tank - During the tank removal, the following observations were made:

- Inspection of the tank and product lines revealed no corrosion or perforations. The waste oil product line was steel pipe and was left in place.

- The tank was coated with an outer tar lining.

- Groundwater was not encountered in the waste oil tank excavation at the time of tank removal. The tank excavation was approximately 7 feet deep.

- No soil staining was observed at the bottom of the tank excavation.

- Vent lines and electrical conduits were left in place.

3.1.4 Lube Oil Tank - 500-Gal. Steel Tank - During the tank removal, the following observations were made:

- Inspection of the tank and product lines revealed no corrosion or perforations. The lube oil product line was a steel pipe and was left in place.

- The tank was coated with an outer tar lining.

- Groundwater was not encountered in the lube oil tank excavation at the time of tank removal. The tank excavation was approximately 7 feet deep.

- No soil staining was observed at the bottom of the tank excavation.

- Vent line and electrical conduits were left in place.

3.2 Product Manifolds

The gasoline and diesel manifolds were excavated and removed on April 7 and

8, 1987, respectively. According to TDE, the gasoline manifold was flushed with water from the western-most fueling port toward the gasoline tank. The water exited the manifold at the port nearest the tank. As little product was present in the gasoline manifold, TDE elected not to flush the diesel manifold prior to removal. Soil from around each manifold withdrawal port and along the lengths of the manifolds was excavated and stockpiled at the site and the manifolds were removed.

Mr. Joel Kushins of WCC was present at the project site on April 8 to observe the diesel manifold removal procedure and to document the results of the gasoline manifold removal performed on April 7. Both product manifolds were visually inspected for corrosion and perforations after removal from their excavations. The manifold piping has not yet been removed from the site.

<u>3.2.1 Diesel Manifold - 210 Lin. Ft. of 2-Inch Diameter Steel Pipe</u> - During the diesel manifold removal, the following observations were made:

- Inspection of the manifold revealed no corrosion or perforations. The diesel manifold was a steel pipe buried at a depth of about 2 feet.

- Soil stains were found in the trenches immediately below the former locations of the product manifold withdrawal ports. This staining indicates that some diesel fuel spillage occurred during the trucking facility operation.

- A small amount of diesel fuel was observed leaking from lengths of the manifold after removal. Measures were taken to contain this fuel.

<u>3.2.2 Gasoline Manifold - 260 Lin. Ft. of 2-Inch Diameter Steel Pipe</u> - During the manifold inspection, the following observations were made:

- Inspection of the product manifold revealed no corrosion or perforations. The gasoline manifold was a steel pipe buried at a depth of about 2 feet.

- Minor soil stains were found in the trenches immediately below the former locations of most product withdrawal ports. The stains indicate that some gasoline spillage occurred during the trucking facility operation.

- During the excavation of this manifold, TDE damaged the 2-1/4-inch main water line to the Nielsen building. The water supply line was shut off at the street meter prior to this damage. The piping has not been repaired.

4.0 SOIL AND GROUNDWATER SAMPLING

The soil and groundwater sampling activities related to the tank manifold and piping removals were performed April 8 and 9, 1987.

The soil samples were taken from the tank and manifold excavations using a manual drive sampler equipped with a 2-inch diameter by 4-inch long brass sampler sleeve. After sampling, the ends of each tube were covered with teflon film and a plastic slip cap. Each cap was sealed to the brass tube with vinyl tape. The groundwater samples were obtained from the tank excavations using a bailer. All sampling tools and equipment, including the sample tubes and bailer, were cleaned using a detergent solution (Alconox) followed by a triple tap water rinse and distilled water rinse or by steam cleaning. All soil and groundwater samples were properly labeled and stored in an ice chest at the project site. At the end of each field day, the samples were transported to Brown and Caldwell Laboratories in Emeryville, California, for chemical analysis. Chain-of-custody records were kept to document the handling and transfer of the samples to the analytical laboratory. The locations of samples submitted for analytical testing are shown in Figure 2.

4.1 Tanks and Product Lines

Where the bottom of the excavations were not below the groundwater table, two soil samples were taken from immediately beneath each removed tank. One soil sample was taken from below the fill pipe at the end of the tank and the second from the opposite end of the tank. Stockpiles of the excavated soil were also sampled to determine whether the stockpiles contained significant fuel concentrations. Soil samples were also taken from below the diesel product line, i.e., the pipe running from the tank to the pump and manifold system.

Groundwater samples were taken from the diesel fuel tank excavation because the groundwater surface was observed to have free floating product (less than 1/16 inch), and the bottom of the diesel tank was located below groundwater. No sample was taken from the gasoline tank excavation because no substantial floating product was observed.

4.2 Product Manifolds

Some soil contamination was apparent below the fueling ports of the gasoline manifold and also along the diesel fuel manifold. The fueling ports of both manifolds were spaced at about 40-foot centers. Because there is little value in testing soil in which high concentrations of fuel are visually evident, an additional 1.5 feet of soil was excavated from the base of the gasoline manifold trench at the fueling port locations. The diesel manifold trench was extended down an additional 2.5 feet over its entire length. The total depth of the gasoline and diesel trenches was about 3.5 feet and 4.5 feet, respectively.

On-site headspace analyses were conducted on soil samples collected from the gasoline manifold trench every 20 lineal feet. The headspace analysis method consisted of placing soil in a clean 2-inch diameter by 4-inch long brass tube sealed at one end with teflon film and at the other end with aluminum foil. The brass tube, filled approximately 1/3 with soil, was placed in the sun for approximately 3-5 minutes. An H-Nu organic vapor meter was then used to measure organic vapor concentrations in the air space of the tube by punching the H-Nu meter sampling probe through the aluminum foil and observing the reading. This technique provided a means of assessing the relative fuel hydrocarbon concentrations in soil samples.

Soil samples for laboratory analysis were taken from the gasoline manifold trench at headspace sample locations for which higher relative H-Nu test results were obtained. These locations are shown in Figure 2 and generally correspond to the manifold port locations.

Staining was observed at a number of locations along the base of the diesel manifold trench after it was deepened. Thus, a headspace survey was not done. Rather, samples were taken at about 50 foot intervals to confirm the continued presence of diesel fuel in the soil. These sampling locations are also shown in Figure 2.

Groundwater was not encountered in the product manifold trenches. At the time of exploration, it is estimated that the groundwater depth was 2 to 3.5 feet below the gasoline manifold trench and 0.5 to 1.5 feet below the diesel manifold trench.

5.0 CHEMICAL ANALYSES OF SOIL AND GROUNDWATER SAMPLES

The detection and quantification of total fuel hydrocarbons and fuel constituents are based on the analytical procedures set forth in "Guidelines for Addressing Fuel Leaks," California Regional Water Quality Control Board, San Francisco Bay Region, September 1985. The techniques presented in the Guidelines were followed when a suspected or confirmed fuel leak required evaluation. The following EPA test methods were used for analyses of soil and groundwater samples:

- Total Fuel Hydrocarbons (TFH) - EPA Method No. 8015 (modified)
- Benzene, Toluene, Xylene (BTX) - EPA Method No. 8020
- Ethylbenzene - EPA Method No. 8020
- Total Lead - EPA Method No. 7420

Refer to TABLE 1 - SUMMARY OF SOIL AND GROUNDWATER CHEMICAL ANALYSIS and APPENDIX A - CERTIFIED ANALYTICAL REPORTS.

The soil and groundwater sample numbers are coded on Figure 2 and are listed in the next two subsections for clarity. Refer to Figure 2 - SOIL AND GROUNDWATER SAMPLING LOCATIONS.

5.1 Tanks and Product Lines

5.1.1 Diesel Tank - 10,000-Gal. Steel Tank -

Soil sample Nos.: STS-17D (product line)
Groundwater sample Nos.: W/A, W/B, and W/C

5.1.2 Gasoline Tank - 10,000-Gal. Steel Tank -

Soil samples Nos.: S4a
Groundwater sample Nos.: None

5.1.3 Waste Oil Tank - 500-Gal. Steel Tank -

Soil sample Nos.: S2a, S2b, and S2c
Groundwater sample Nos.: None

5.1.4 Lube Oil Tank - 500-Gal. Steel Tank -

Soil sample Nos.: S3a, S3b, and S3c
Groundwater sample Nos.: None

5.2 Product Manifolds

5.2.1 Diesel - 210 Lin. Ft. of 2-Inch Diameter Steel Pipe -

Soil sample Nos.: STS-13D, STS-14D, STS-15D, STS-16D, STS-17D, STS-18D, STS-19D, STS-20D, STS-21D, STS-22D, STS-23D, AND STS-24D

Groundwater sample Nos.: None

5.2.2 Gasoline - 260 Lin. Ft. of 2-Inch Diameter Steel Pipe -

Soil sample Nos.: STN-1G, STN-4G, STN-5G, STN-6G, STN-8G, STN-10G, and STN-12G

Groundwater sample Nos.: None

5.3 Groundwater Data

As noted in Section 1.0, observation of the tank removals and closure planning are part of a larger site assessment effort. That effort includes the installation of eight groundwater monitoring wells at the locations shown in Fig. 3. Well B-5 was installed on the Marketplace property as part of a previous study (WCC, 1982). Based on existing regional groundwater hydrology, Wells W2, W4, and W5A were located in positions projected to be down-gradient of the diesel, oil, and gasoline tanks, respectively. These monitoring wells are about 30 to 50 feet from the former tank locations. The laboratory test results for TFH, BTX, and ethylbenzene for groundwater samples from monitoring Wells W2, W4, and W5A are indicated on Figure 3. Refer to Figure 3 - MONITORING WELL LOCATIONS. Additional site groundwater information is contained in an accompanying environmental assessment report (WCC, 1987).

6.0 INTERPRETATION OF CHEMICAL TEST RESULTS

Interpretation of chemical test results for soil and groundwater samples was based on "Guidelines for Addressing Fuel Leaks," CRWQCB, September 1985. The Board's Guidelines state the following:

> "These [remedial] actions will include removal and/or repair of the tank or piping and excavation of contaminated soil as appropriate to prevent the soil contamination from being a continuing source of discharge. This will require excavation to less than 1000 ppm total hydrocarbons in most instances."

> "Soil removal should be sufficient to minimize continuing discharge to groundwater, and to prevent nuisance or health hazard from fumes in the soil. Excavation to less than 1000 ppm total fuel hydrocarbons will almost always be necessary for that purpose. In some instances, excavation to much lower concentrations may be necessary to protect sensitive groundwater."

> "In general, soil may be replaced in the on-site excavation if total hydrocarbon concentrations are below 100 mg/kg [ppm], based on an appropriate number of verification samples taken from the soil after aeration."

> "Regional Board staff field experience, although supported by limited data, indicates that it should almost never be acceptable to leave concentrations higher than 1000 ppm, and that concentrations less than 10 ppm do not generally constitute a threat to groundwater or cause a nuisance or hazard conditions."

> "If concentrations higher than 100 ppm are detected in any of the soil samples, then a monitoring well...should be installed... and [an] investigation to document the source of contamination should be completed."

6.1 Soil Samples

The range of TFH concentrations for soil from the gasoline tank excavation and product manifold trench are as follows:

Less than 10 to 100 ppm	-	3 samples
100 to 1000 ppm	-	4 samples
1000 to 1100 ppm	-	1 sample

The analytical results indicate that only minor soil contamination remains in these excavations.

The range of TFH for soil from the diesel product line and product manifold trenches are as follows:

Less than 10 to 100 ppm	-	7 samples
100 to 1000 ppm	-	0 samples
1000 to 8600 ppm	-	5 samples

The analytical results indicate that moderate soil contamination remains in these excavations. The amount of contaminated soil does not appear excessive as the areas with TFH greater than 1000 ppm is estimated to be limited to two areas in the manifold trenches. Three of the 5 samples with TFH greater than 1000 ppm are samples taken from the stockpiled soil. That is, soil already removed from the tank excavations and manifold trenches.

No evidence of fuel hydrocarbon contamination was found in the four soil samples taken from below the waste oil and lube oil tanks.

Analytical test results for soil samples indicate contamination has occurred from the product lines and manifolds due to input and withdrawal of gasoline and diesel fuel during trucking facility operations. There are areas with locally elevated concentrations of total fuel hydrocarbons (TFH) which will require remedial action but appear to be limited in area and depth. Refer to TABLE 1 - SUMMARY OF SOIL AND GROUNDWATER ANALYSIS and APPENDIX A - CERTIFIED ANALYTICAL REPORT.

Two soil samples were collected and tested for total lead during the field investigation for the gasoline tank and manifold closure. The two samples yielded lead concentrations of 14 and 83 mg/kg, the higher value being found in the sample with the higher fuel hydrocarbon concentration. Both these lead values are significantly below the average soil lead concentration of 180 mg/kg obtained for the soil samples taken during the concurrent environmental assessment (WCC, 1987). Analytical results do not necessarily indicate the presence of consequential concentrations of residual organic lead from the gasoline.

6.2 Groundwater Samples

Three groundwater samples were collected from the diesel tank excavation, and yielded TFH concentrations from less than 1 mg/L to 630 mg/L. At the time of the sampling, a thin film of free product was present. The sample yielding 630 mg/L TFH was also tested for BTX. No dissolved fuel constituents were detected in this sample.

Based on groundwater data presented in subsection 5.3, BTX isomers were detected in groundwater samples from monitoring well W-2. There is no conclusive evidence the diesel fuel tank contributed to these positive analytical results.

Groundwater level data taken in the area in 1982 and 1985 showed the regional shallow groundwater gradient to be towards the west-southwest.

Groundwater level measurements taken from the new Nielsen wells showed a groundwater flow direction at the north end of the Nielsen property toward the west. A piezometric highpoint was seen near the southwest area of the site and is thought to be due to the presence of low permeability tar materials in the fill at the well location (WCC, 1987).

7.0 RECOMMENDED REMEDIAL MEASURES FOR COMPLETION OF CLOSURE

The objective of this study was to conduct the necessary field investigations and provide recommendations for proper closure of the underground fuel tanks, piping, and manifolds at the site. The recommendations presented below for remedial closure measures are based on Regional Water Quality Control Board's published clean-up guidelines and WCC's experience with similar fuel spill projects.

Options typically used for handling soils containing elevated levels of fuel hydrocarbons include hauling the affected soil to a landfill approved to receive fuel-contaminated soil. The two most commonly used on-site treatment techniques are to aerate the soil or to promote bio-degradation of the fuel hydrocarbons in the soil. The first of these on-site techniques, aeration, is usually effective in reducing gasoline concentrations in soil. The second technique, bio-degradation, is usually effective for treating diesel fuel in soil. The backfilling of excavations with soil containing less that 100 ppm of fuel hydrocarbons is usually allowed by regulatory agencies if to do so is unlikely to have a significant adverse impact on groundwater quality. Backfilling of excavations with soil containing TFH concentrations greater than 100 ppm but less that 1000 ppm is discouraged by the regulatory agencies but may be allowed with an approved groundwater monitoring well down-gradient of the backfilled excavation.

In summary, based on the Board's published clean-up levels, in most instances soil with fuel hydrocarbon concentrations greater than 100 ppm will require excavation. If soil with a TFH concentration above 100 ppm is left in the ground, the guidelines require installation of monitoring wells and monitoring of groundwater quality down-gradient of the former tank locations. Refer to Section 6.0 - INTERPRETATION OF CHEMICAL TEST RESULTS.

Cleanup of groundwater containing trace levels of fuel hydrocarbons is less standard and more site-specific than for soil, and is often handled on a case-by-case basis by the regulatory agencies. At this site, cleanup of groundwater should be addressed in the context of the entire site, as discussed in the accompanying environmental assessment report (WCC, 1987). For this reason, recommendations regarding the presence of fuel in groundwater at the site will be restricted to the possible need to perform ongoing groundwater monitoring.

Based on the field study findings, WCC recommends that the following remedial steps be performed to bring the former Nielsen Freight Lines trucking facility into compliance with the local and State underground tank closure regulations.

7.1 Waste Oil and Lube Oil Tanks

- Identify abandoned pipes that were unearthed and severed during excavation of the tanks. They should be capped and sealed prior to backfill operations.

- Backfill the tank excavation with the same clean soil that was removed and stockpiled during initial tank closure activities.

- Confirm that additional clean, imported backfill required to finish the excavation to grade has a total fuel hydrocarbon (TFH) concentration of less than 100 ppm.

- Consult a geotechnical engineer for backfill compaction specifications. Any proposed building foundation footprint may superimpose these former tank locations.

- Product fill lines, vent lines and electrical conduits should be removed prior to site development.

- Dispose of the product fill lines in the same manner as the tanks.

7.2 Gasoline Tank

- Aerate the soil that was removed and stockpiled during tank closure activities.

- Obtain a soil aeration permit from the Bay Area Air Quality Management District.

- Identify abandoned pipes that were unearthed and severed during excavation of the tank. They should be capped and sealed prior to backfill operations.

- Backfill the tank excavation with the aerated soil when confirmation is made that the TFH concentration is less than 100 ppm.

- Confirm that additional clean, imported backfill required to finish the excavation to grade has a TFH concentration of less than 100 ppm.

- Consult a geotechnical engineer for backfill compaction specifications. Any proposed building foundation footprint may superimpose this former gasoline tank location.

- Product fill lines, vent lines, and electrical conduit should be removed prior to site development.

- Dispose of the product fill lines in the same manner as the tanks.

7.3 Gasoline Manifold

- Excavate additional soil from the manifold trench where TFH concentrations are reported to the greater than 100 ppm.

- Aerate the soil that was removed and stockpiled during manifold closure activities.

- Obtain a soil aeration permit from the Bay Area Air Quality Management District.

- Identify abandoned pipes that were unearthed and severed during excavation of the manifold. They should be capped and sealed prior to backfill operations.

- Backfill the trench with the aerated soil when confirmation is made that the TFH concentration is less than 100 ppm.

- Confirm that additional clean, imported backfill required to finish the excavation to grade has a TFH concentration of less than 100 ppm.

- Consult a geotechnical engineer for backfill compaction specifications. Any proposed building foundation footprint may superimpose this former gasoline manifold location.

- If soil in the trench is confirmed to have TFH concentrations greater than 100 ppm when groundwater is encountered, then a groundwater monitoring well(s) should be installed down-gradient of the local contamination and monitored periodically. The groundwater monitoring well location(s) should be approved by the regulatory agency.

- Dispose of the gasoline manifold in the same manner as the tanks.

- Repair the existing 2.25 inch copper water main damaged during initial manifold closure activities.

- Avoid damage to existing natural gas main and any other utility lines that may be encountered during excavation activities.

7.4 Diesel Tank

- At a designated on-site location treat the soil, removed and stockpiled during initial tank closure activities, with bio-degradation techniques.

- Identify abandoned pipes that were unearthed and severed during excavation of the tank. They should be capped and sealed prior to backfill operations.

- Backfill the tank excavation with soil treated by bio-degradation when confirmation is made that the TFH concentration is less than 100 ppm.

- Confirm that additional clean, imported backfill required to finish the excavation to grade has a TFH concentration of less than 100 ppm.

- Consult a geotechnical engineer for backfill compaction specifications. Any proposed building foundation footprint may superimpose this former diesel tank location.

- If soil in the excavation is confirmed to have TFH concentrations greater than 100 ppm, then a groundwater monitoring well should be installed down-gradient of the local contamination and monitored periodically. The groundwater monitoring well location should be approved by the regulatory agency.

- If soil treated by bio-degradation is confirmed to have TFH concentrations above 100 ppm, then this soil should be removed from the site and hauled to an appropriate disposal facility.

- Product lines, vent lines and electric conduit should be removed prior to site development.

- Dispose of the product fill lines in the same manner as the diesel tank.

7.5 Diesel Manifold

- Excavate additional soil from the manifold trench were TFH concentrations are reported to be greater than 100 ppm.

- Identify abandoned pipes that were unearthed and severed during excavation of the diesel manifold. They should be capped and sealed prior to backfill operations.

- At a designated on-site location treat the soil, removed and stockpiled during all diesel manifold closure activities, with bio-degradation techniques.

- Backfill the trench with soil treated by bio-degradation when confirmation is made that the TFH concentration is less than 100 ppm.

- Confirm that additional clean, imported backfill required to finish the excavation to grade has a TFH concentration of less than 100 ppm.

- Consult a geotechnical engineer for backfill compaction specifications. Any proposed building foundation footprint may superimpose a portion of this former diesel manifold location.

- If soil in the trench is confirmed to have TFH concentrations greater than 100 ppm when groundwater is encountered, then a groundwater monitoring well(s) should be installed down-gradient of the local contamination and monitored periodically. The groundwater monitoring well location(s) should be approved by the regulatory agency.

- If soil treated by biodegradation is confirmed to have TFH concentrations above 100 ppm, then this soil should be removed from the site and hauled to an appropriate disposal facility.

- Dispose of the diesel manifold in the same manner as the diesel tank.

- Avoid damage to any utility line that may be encountered during excavation activities.

7.6 Oil/Water Separator

Observation of an existing oil/water (O/W) separator removal was not included in the original scope of work. This O/W separator is located south of the former tank repair shop. It was the final physical treatment step for a steam cleaning process used at the truck repair facility. Truck parts were steam cleaned and the waste oil/water mixture entered the O/W separator for physical separation prior to final disposal of the oil and water components. The wastewater was gravity fed to the sanitary sewer, and the waste oil remained in the concrete O/W separator until pumped out and properly disposed.

The O/W separator acted as a secondary containment to the concrete apron where the steam cleaning process was enforced. The separated waste oil was stored in the concrete sump between scheduled pump out and disposal. Since the O/W separator appeared to act as a primary containment vessel for the waste oil, WCC recommends that the sump be cleaned of all residual waste oil and sludge and closed in accordance with the state and local underground storage tank regulation

7.7 Tank Registration

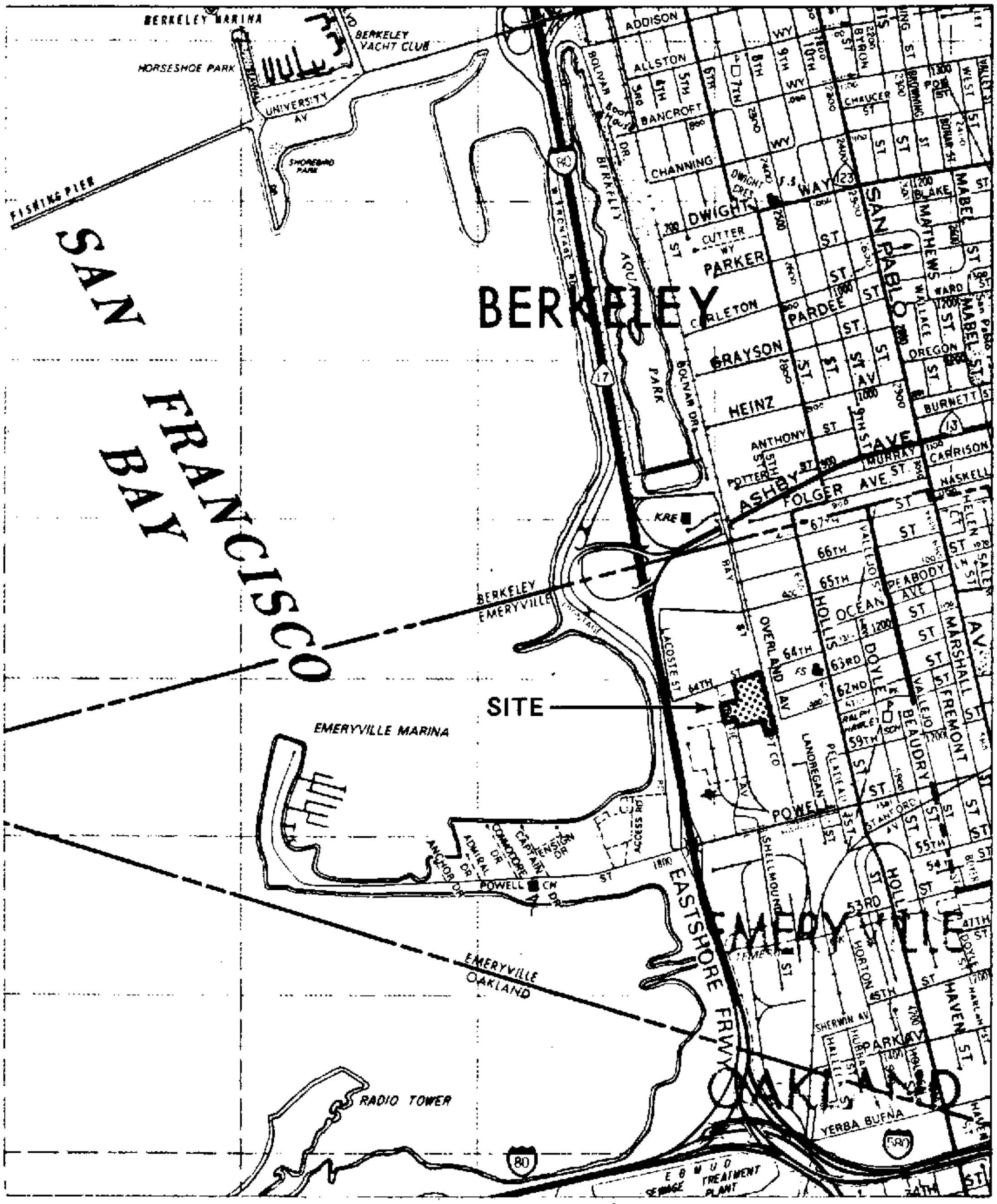
Prior to May of 1984, all underground storage tanks were to have been registered in the State of California. Woodward-Clyde has checked the State Water Resources Control Board's "Underground Hazardous Substance Storage Container Inventory," dated June 12, 1985 for Nielsen Freight Lines' tanks. Nielsen's tanks were not found on the inventory list. Final closure of all tanks may require that the registration issue be resolved.

TABLE 1 - SUMMARY OF SOIL AND WATER CHEMICAL ANALYSIS

SOIL SAMPLE	TOTAL FUEL HYDROCARBONS (mg/kg)	BENZENE (mg/kg)	TOLUENE (mg/kg)	XYLENE (mg/kg)	ETHYLBENZENE (mg/kg)	TOTAL LEAD (mg/kg)
		PARAMETER*				
S2a	<10	--	--	--	--	--
S2b	<10	--	--	--	--	--
S2c	<10	--	--	--	--	--
S3a	<10	--	--	--	--	--
S3b	<10	--	--	--	--	--
S3c	<10	--	--	--	--	--
S4a	<10	<0.5	<0.5	<0.5	--	14
STN-1G	670	--	--	--	--	--
STN-4G	32	--	--	--	--	--
STN-5G	490	--	--	--	--	--
STN-6G	110	--	--	--	--	--
STN-8G	520	<0.5	2.1	20.0	3.4	83
STN-10G	1100	--	--	--	--	--
STN-12G	<10	--	--	--	--	--
STS-13D	<10	--	--	--	--	--
STS-14D	33	--	--	--	--	--
STS-15D	<10	<0.5	<0.5	<0.5	<0.5	--
STS-16D	<10	--	--	--	--	--
STS-17D	86	--	--	--	--	--
STS-18D	1200	--	--	--	--	--
STS-19D	45	<0.5	<0.5	<0.5	<0.5	--
STS-20D	1900	--	--	--	--	--
STS-21D	<10	<0.5	<0.5	<0.5	<0.5	--
STS-22D	8600	--	--	--	--	--
STS-23D	2500	--	--	--	--	--
STS-24D	2600	--	--	--	--	--

GROUND WATER SAMPLES	TOTAL FUEL HYDROCARBONS (mg/kg)	BENZENE (mg/kg)	TOLUENE (mg/kg)	XYLENE (mg/kg)	ETHYLBENZENE (mg/kg)
W/A	72	--	--	--	--
W/B	630	<0.5	<0.5	<0.5	<0.5
W/C	<1	--	--	--	--

* PARAMETER	EPA METHOD
TFX	No. 8015 (modified)
BTX AND E	No. 8020
TOTAL LEAD	No. 7420

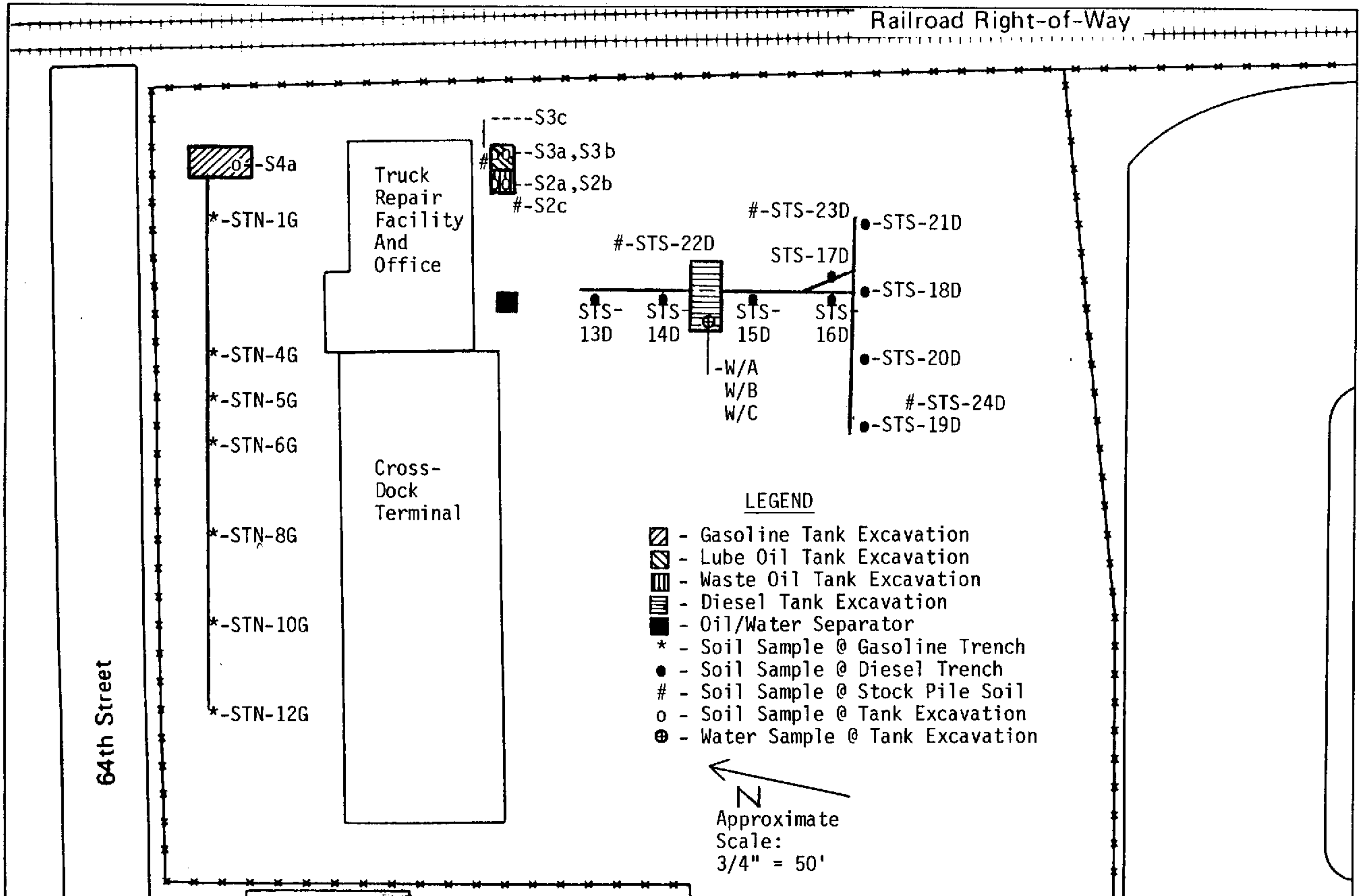


0 1,000 2,000 3,000

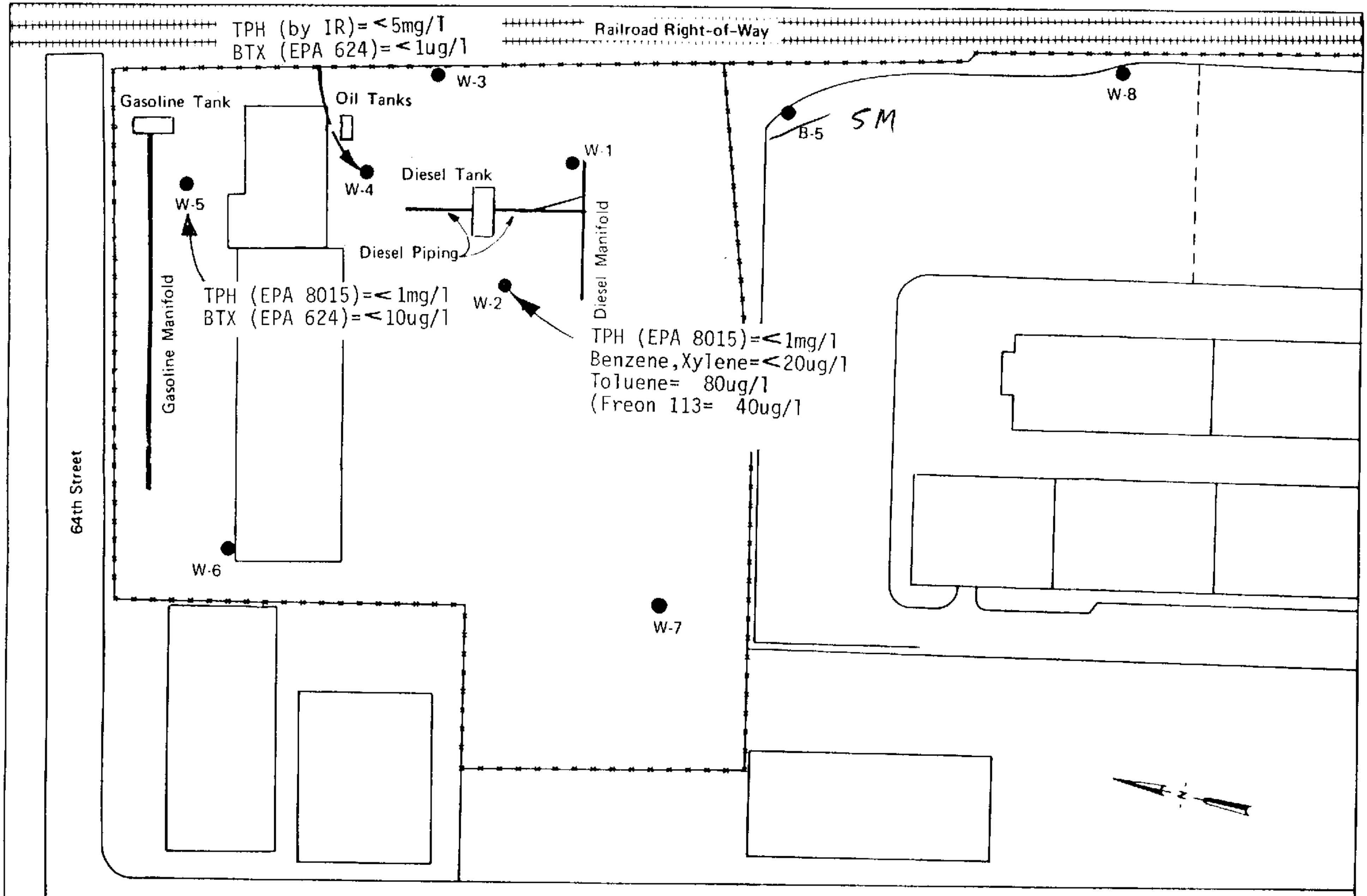
Approx. Scale (feet)

N

Project No. 8710018 B	Nielsen Freight Line Site The Martin Company	SITE LOCATION	AUG. 1987
Woodward-Clyde Consultants			Figure 1



Project No. 8710018B	Nielsen Freight Line Site The Martin Company	SOIL AND GROUND WATER SAMPLING LOCATIONS	AUG. 1987
Woodward-Clyde Consultants			Figure 2



Project No. 870018 B	Nielsen Freightline Site The Martin Company	MONITORING WELL LOCATION	AUG. 1987
Woodward-Clyde Consultants			Figure 3

REFERENCES

California Regional Water Quality Control Board, San Francisco Bay Region, "Guidelines for Addressing Fuel Leaks," September 1985.

California State Water Resources Control Board, "California Underground Storage Tank Regulations," August 1985.

Woodward-Clyde Consultants, "Assessment of Subsurface Contaminants, Marketplace Property, Emeryville, California," May 1982. Consultant report prepared for Equity Financial and Management Company.

Woodward-Clyde Consultants, "Environmental Assessment, Former Nielsen Freight Line Site and Adjacent Parcel, Emeryville, California," August 1987. Consultant report prepared for The Martin Company.

BROWN AND CALDWELL LABORATORIES

1255 POWELL STREET EMERYVILLE, CA 94608 • (415) 428-2300

ANALYTICAL REPORT

LOG NO: E87-04-212

Received: 10 APR 87
Reported: 23 APR 87

Mr. John McMillan
Woodward-Clyde Consultants
100 Pringle Avenue
Walnut Creek, California 94596

Project: 8710018 A

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-212-1	B5-1-3	08 APR 87

PARAMETER	04-212-1
Purgeable Priority Pollutants	
Extraction	04.18.87
1,1,1-Trichloroethane, mg/kg	<0.2
1,1,2,2-Tetrachloroethane, mg/kg	<0.2
1,1,2-Trichloroethane, mg/kg	<0.2
1,1-Dichloroethane, mg/kg	<0.2
1,1-Dichloroethylene, mg/kg	<0.2
1,2-Dichloroethane, mg/kg	<0.2
1,2-Dichloropropane, mg/kg	<0.2
1,3-Dichloropropene, mg/kg	<0.2
2-Chloroethylvinylether, mg/kg	<0.2
Acrolein, mg/kg	<2
Acrylonitrile, mg/kg	<2
Bromodichloromethane, mg/kg	<0.2
Bromomethane, mg/kg	<0.2
Benzene, mg/kg	<1
Chlorobenzene, mg/kg	<0.2
Carbon Tetrachloride, mg/kg	<0.2
Chloroethane, mg/kg	<0.2
Bromoform, mg/kg	<0.2
Chloroform, mg/kg	<0.2
Chloromethane, mg/kg	<0.2
Dibromochloromethane, mg/kg	<0.2
Ethylbenzene, mg/kg	<0.2
Methylene Chloride, mg/kg	<1

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1255 POWELL STREET EMERYVILLE, CA 94608 • (415) 428-2300

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Woodward-Clyde Consultants
100 Pringle Avenue
Walnut Creek, California 94596

Project: 8710018 A

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-212-1	B5-1-3	08 APR 87

PARAMETER	04-212-1
Tetrachloroethylene, mg/kg	<0.2
Trichloroethylene, mg/kg	<0.2
Trichlorofluoromethane, mg/kg	<0.2
Toluene, mg/kg	0.2
Vinyl Chloride, mg/kg	<0.2
trans-1,2-Dichloroethylene, mg/kg	<0.2
trans-1,3-Dichloropropene, mg/kg	<0.2
Semi-Quantified Results **	
C_7H_{14}, mg/kg	2

** Quantification based upon comparison of total ion count of the compound with that of the nearest internal standard.

D. A. McLean, Laboratory Director

BROWN AND CALDWELL LABORATORIES

ANALYTICAL REPORT

1255 POWELL STREET EMERYVILLE, CA 94608 • (415) 428-2300

LOG NO: E87-04-028

Received: 01 APR 87
Reported: 23 APR 87

Mr. John McMillan
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100 Pringle Avenue
Walnut Creek, California 94596

Project: 8710018A

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-028-1	W3-1-4	01 APR 87
04-028-2	W31-1-3	01 APR 87

PARAMETER	04-028-1	04-028-2
Polychlorinated Biphenyls		
Date Extracted	04.07.87	---
Date Analyzed	04.17.87	---
Aroclor 1016, mg/kg	<0.05	---
Aroclor 1221, mg/kg	<0.05	---
Aroclor 1232, mg/kg	<0.05	---
Aroclor 1242, mg/kg	<0.05	---
Aroclor 1248, mg/kg	<0.05	---
Aroclor 1254, mg/kg	<0.05	---
Aroclor 1260, mg/kg	<0.05	---
Aroclor 1262, mg/kg	<0.05	---
Total PCB's, mg/kg	<0.05	---

D. A. McLean, Laboratory Director

BROWN AND CALDWELL LABORATORIES
1255 POWELL STREET EMERYVILLE, CA 94608 • (415) 428-2300

ANALYTICAL REPORT

LOG NO: E87-04-046

Received: 02 APR 87
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Mr. John McMillan
Woodward-Clyde Consultants
100 Pringle Avenue
Walnut Creek, California 94596

Project: 8710018A

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-046-1	W4-1-4	02 APR 87
04-046-2	W4-1-2	02 APR 87
04-046-3	W2-2-4	02 APR 87
04-046-4	W2-4-3	02 APR 87

PARAMETER	04-046-1	04-046-2	04-046-3	04-046-4
Beryllium, mg/kg	---	---	<0.2	---
Cadmium, mg/kg	---	---	<0.2	---
Copper, mg/kg	---	---	22	---
Silver, mg/kg	---	---	<1.0	---
Thallium, mg/kg	---	---	7	---
Antimony, mg/kg	---	---	<10	---
Arsenic, mg/kg	---	---	<0.2	---
Selenium, mg/kg	---	---	0.4	---
Mercury, mg/kg	---	---	0.03	---
Hydrocarbons by IR, mg/kg	650	160	<50	---
Chromium, mg/kg	6.8	---	25	---
Cobalt, mg/kg	---	---	10	---
Lead, mg/kg	460	---	11	---
Nickel, mg/kg	49	---	29	---
Zinc, mg/kg	760	---	41	---
Nitric Acid Digestion, Date	04.10.87	---	04.10.87	---

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ANALYTICAL REPORT

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Reported: 23 APR 87

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100 Pringle Avenue
Walnut Creek, California 94596

Project: 8710018A

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-046-1	W4-1-4	02 APR 87
04-046-2	W4-1-2	02 APR 87
04-046-3	W2-2-4	02 APR 87
04-046-4	W2-4-3	02 APR 87

PARAMETER	04-046-1	04-046-2	04-046-3	04-046-4
Polychlorinated Biphenyls				
Date Extracted	04.07.87	---	04.07.87	---
Date Analyzed	04.17.87	---	04.17.87	---
Aroclor 1016, mg/kg	<0.05	---	<0.05	---
Aroclor 1221, mg/kg	<0.05	---	<0.05	---
Aroclor 1232, mg/kg	<0.05	---	<0.05	---
Aroclor 1242, mg/kg	<0.05	---	<0.05	---
Aroclor 1248, mg/kg	<0.05	---	<0.05	---
Aroclor 1254, mg/kg	<0.05	---	<0.05	---
Aroclor 1260, mg/kg	<0.05	---	<0.05	---
Aroclor 1262, mg/kg	<0.05	---	<0.05	---
Total PCB's, mg/kg	<0.05	---	<0.05	---
Total Fuel Hydrocarbons, mg/kg	---	---	---	<10

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Project: 8710018A

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-046-1	W4-1-4	02 APR 87
04-046-2	W4-1-2	02 APR 87
04-046-3	W2-2-4	02 APR 87
04-046-4	W2-4-3	02 APR 87

PARAMETER	04-046-1	04-046-2	04-046-3	04-046-4
B/N,A Ext. Priority Pollutants				
Extraction	---	04.08.87	---	---
Date Analyzed	---	04.14.87	---	---
1,2,4-Trichlorobenzene, mg/kg	---	<1	---	---
1,2-Dichlorobenzene, mg/kg	---	<1	---	---
1,2-Diphenylhydrazine, mg/kg	---	<1	---	---
1,3-Dichlorobenzene, mg/kg	---	<1	---	---
1,4-Dichlorobenzene, mg/kg	---	<1	---	---
2,4,6-Trichlorophenol, mg/kg	---	<1	---	---
2,4-Dichlorophenol, mg/kg	---	<1	---	---
2,4-Dimethylphenol, mg/kg	---	<1	---	---
2,4-Dinitrotoluene, mg/kg	---	<1	---	---
2,4-Dinitrophenol, mg/kg	---	<10	---	---
2,6-Dinitrotoluene, mg/kg	---	<1	---	---
2-Chloronaphthalene, mg/kg	---	<1	---	---
2-Nitrophenol, mg/kg	---	<1	---	---
2-Chlorophenol, mg/kg	---	<1	---	---
2-Methyl-4,6-dinitrophenol, mg/kg	---	<1	---	---
3,3'-Dichlorobenzidine, mg/kg	---	<1	---	---
4-Bromophenylphenylether, mg/kg	---	<1	---	---
4-Chloro-3-methylphenol, mg/kg	---	<1	---	---
4-Chlorophenylphenylether, mg/kg				

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Project: 8710018A

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-046-1	W4-1-4	02 APR 87
04-046-2	W4-1-2	02 APR 87
04-046-3	W2-2-4	02 APR 87
04-046-4	W2-4-3	02 APR 87

PARAMETER	04-046-1	04-046-2	04-046-3	04-046-4
4-Nitrophenol, mg/kg	---	<20	---	---
Acenaphthene, mg/kg	---	<1	---	---
Acenaphthylene, mg/kg	---	<1	---	---
Anthracene, mg/kg	---	<1	---	---
Bis(2-ethylhexyl)phthalate, mg/kg	---	<100	---	---
Benzidine, mg/kg	---	<40	---	---
Bis(2-chloroethyl) Ether, mg/kg	---	<1	---	---
Bis(2-Chloroisopropyl)ether, mg/kg	---	<1	---	---
Bis(2-chloroethoxy)methane, mg/kg	---	<1	---	---
Benzo(a)anthracene, mg/kg	---	<1	---	---
Benzo(a)pyrene, mg/kg	---	<1	---	---
Benzo(b)fluoranthene, mg/kg	---	<1	---	---
Benzo(g,h,i)perylene, mg/kg	---	<1	---	---
Benzo(k)Fluoranthene, mg/kg	---	<1	---	---
Butylbenzylphthalate, mg/kg	---	<1	---	---
Chrysene, mg/kg	---	<1	---	---
Di-n-octylphthalate, mg/kg	---	<1	---	---
Dibenzo(a,h)anthracene, mg/kg	---	<1	---	---
Dibutylphthalate, mg/kg	---	<1	---	---
Diethylphthalate, mg/kg	---	<1	---	---
Dimethylphthalate, mg/kg	---	<1	---	---
Fluorene, mg/kg	---	<1	---	---

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Project: 8710018A

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-046-1	W4-1-4	02 APR 87
04-046-2	W4-1-2	02 APR 87
04-046-3	W2-2-4	02 APR 87
04-046-4	W2-4-3	02 APR 87

PARAMETER	04-046-1	04-046-2	04-046-3	04-046-4
Fluoranthene, mg/kg	---	<1	---	---
Hexachlorobenzene, mg/kg	---	<1	---	---
Hexachlorobutadiene, mg/kg	---	<1	---	---
Hexachlorocyclopentadiene, mg/kg	---	<1	---	---
Hexachloroethane, mg/kg	---	<1	---	---
Indeno(1,2,3-c,d)Pyrene, mg/kg	---	<1	---	---
Isophorone, mg/kg	---	<1	---	---
N-Nitrosodi-n-propylamine, mg/kg	---	<1	---	---
N-Nitrosodimethylamine, mg/kg	---	<1	---	---
N-Nitrosodiphenylamine, mg/kg	---	<1	---	---
Naphthalene, mg/kg	---	<1	---	---
Nitrobenzene, mg/kg	---	<1	---	---
Pentachlorophenol, mg/kg	---	<1	---	---
Phenanthrene, mg/kg	---	<1	---	---
Phenol, mg/kg	---	<1	---	---
Pyrene, mg/kg	---	<1	---	---

BROWN AND CALDWELL LABORATORIES

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ANALYTICAL REPORT

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Walnut Creek, California 94596

Project: 8710018A

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-046-1	W4-1-4	02 APR 87
04-046-2	W4-1-2	02 APR 87
04-046-3	W2-2-4	02 APR 87
04-046-4	W2-4-3	02 APR 87

PARAMETER	04-046-1	04-046-2	04-046-3	04-046-4
Purgeable Priority Pollutants				
Extraction	---	04.18.87	---	---
1,1,1-Trichloroethane, mg/kg	---	<0.2	---	---
1,1,2,2-Tetrachloroethane, mg/kg	---	<0.2	---	---
1,1,2-Trichloroethane, mg/kg	---	<0.2	---	---
1,1-Dichloroethane, mg/kg	---	<0.2	---	---
1,1-Dichloroethylene, mg/kg	---	<0.2	---	---
1,2-Dichloroethane, mg/kg	---	<0.2	---	---
1,2-Dichloropropane, mg/kg	---	<0.2	---	---
1,3-Dichloropropene, mg/kg	---	<0.2	---	---
2-Chloroethylvinylether, mg/kg	---	<0.2	---	---
Acrolein, mg/kg	---	<2	---	---
Acrylonitrile, mg/kg	---	<2	---	---
Bromodichloromethane, mg/kg	---	<0.2	---	---
Bromomethane, mg/kg	---	<0.2	---	---
Benzene, mg/kg	---	<1	---	---
Chlorobenzene, mg/kg	---	<0.2	---	---
Carbon Tetrachloride, mg/kg	---	<0.2	---	---
Chloroethane, mg/kg	---	<0.2	---	---
Bromoform, mg/kg	---	<0.2	---	---
Chloroform, mg/kg	---	<0.2	---	---
Chloromethane, mg/kg	---	<0.2	---	---

BROWN AND CALDWELL LABORATORIES

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Project: 8710018A

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-046-1	W4-1-4	02 APR 87
04-046-2	W4-1-2	02 APR 87
04-046-3	W2-2-4	02 APR 87
04-046-4	W2-4-3	02 APR 87

PARAMETER	04-046-1	04-046-2	04-046-3	04-046-4
Dibromochloromethane, mg/kg	---	<0.2	---	---
Ethylbenzene, mg/kg	---	<0.2	---	---
Methylene Chloride, mg/kg	---	<1	---	---
Tetrachloroethylene, mg/kg	---	<0.2	---	---
Trichloroethylene, mg/kg	---	<0.2	---	---
Trichlorofluoromethane, mg/kg	---	0.7	---	---
Toluene, mg/kg	---	<0.2	---	---
Vinyl Chloride, mg/kg	---	<0.2	---	---
trans-1,2-Dichloroethylene, mg/kg	---	<0.2	---	---
trans-1,3-Dichloropropene, mg/kg	---	<0.2	---	---

D. A. McLean, Laboratory Director

BROWN AND CALDWELL LABORATORIES
1255 POWELL STREET EMERYVILLE, CA 94608 • (415) 428-2300

ANALYTICAL REPORT

LOG NO: E87-04-178

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J. McMillan
Woodward-Clyde Consultants
100 Pringle Avenue
Walnut Creek, California 94596

Project: 8710018 A

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-178-1	B3-2-4	08 APR 87

PARAMETER	04-178-1
Beryllium, mg/kg	0.64
Cadmium, mg/kg	<0.2
Chromium, mg/kg	20
Copper, mg/kg	28
Lead, mg/kg	33
Nickel, mg/kg	45
Silver, mg/kg	<1
Thallium, mg/kg	7
Zinc, mg/kg	62
Antimony, mg/kg	<10
Arsenic, mg/kg	3.3
Selenium, mg/kg	<0.2
Mercury, mg/kg	0.04
Cobalt, mg/kg	25
Nitric Acid Digestion, Date	04.14.87

BROWN AND CALDWELL LABORATORIES
1255 POWELL STREET EMERYVILLE, CA 94608 • (415) 428-2300

ANALYTICAL REPORT

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J. McMillan
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100 Pringle Avenue
Walnut Creek, California 94596

Project: 8710018 A

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-178-1	B3-2-4	08 APR 87

PARAMETER	04-178-1
B/N,A Ext. Priority Pollutants	
Extraction	04.19.87
Date Analyzed	04.20.87
1,2,4-Trichlorobenzene, mg/kg	<2
1,2-Dichlorobenzene, mg/kg	<2
1,2-Diphenylhydrazine, mg/kg	<2
1,3-Dichlorobenzene, mg/kg	<2
1,4-Dichlorobenzene, mg/kg	<2
2,4,6-Trichlorophenol, mg/kg	<2
2,4-Dichlorophenol, mg/kg	<2
2,4-Dimethylphenol, mg/kg	<2
2,4-Dinitrotoluene, mg/kg	<2
2,4-Dinitrophenol, mg/kg	<20
2,6-Dinitrotoluene, mg/kg	<2
2-Chloronaphthalene, mg/kg	<2
2-Nitrophenol, mg/kg	<2
2-Chlorophenol, mg/kg	<2
2-Methyl-4,6-dinitrophenol, mg/kg	<2
3,3'-Dichlorobenzidine, mg/kg	<2
4-Bromophenylphenylether, mg/kg	<2
4-Chloro-3-methylphenol, mg/kg	<2
4-Chlorophenylphenylether, mg/kg	<2
4-Nitrophenol, mg/kg	<40
Acenaphthene, mg/kg	<2
Acenaphthylene, mg/kg	<2

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Walnut Creek, California 94596

Project: 8710018 A

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-178-1	B3-2-4	08 APR 87

PARAMETER	04-178-1
Anthracene, mg/kg	<2
Bis(2-ethylhexyl)phthalate, mg/kg	<200
Benzidine, mg/kg	<80
Bis(2-chloroethyl) Ether, mg/kg	<2
Bis(2-Chloroisopropyl)ether, mg/kg	<2
Bis(2-chloroethoxy)methane, mg/kg	<2
Benzo(a)anthracene, mg/kg	<2
Benzo(a)pyrene, mg/kg	<2
Benzo(b)fluoranthene, mg/kg	<2
Benzo(g,h,i)perylene, mg/kg	<2
Benzo(k)Fluoranthene, mg/kg	<2
Butylbenzylphthalate, mg/kg	<2
Chrysene, mg/kg	2
Di-n-octylphthalate, mg/kg	<2
Dibenzo(a,h)anthracene, mg/kg	<2
Dibutylphthalate, mg/kg	<2
Diethylphthalate, mg/kg	<2
Dimethylphthalate, mg/kg	<2
Fluorene, mg/kg	<2
Fluoranthene, mg/kg	6
Hexachlorobenzene, mg/kg	<2
Hexachlorobutadiene, mg/kg	<2
Hexachlorocyclopentadiene, mg/kg	<2
Hexachloroethane, mg/kg	<2
Indeno(1,2,3-c,d)Pyrene, mg/kg	<2

BROWN AND CALDWELL LABORATORIES
1255 POWELL STREET EMERYVILLE, CA 94608 • (415) 428-2300

ANALYTICAL REPORT

LOG NO: E87-04-178

Received: 09 APR 87
Reported: 24 APR 87

J. McMillan
Woodward-Clyde Consultants
100 Pringle Avenue
Walnut Creek, California 94596

Project: 8710018 A

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-178-1	B3-2-4	08 APR 87

PARAMETER	04-178-1
Isophorone, mg/kg	<2
N-Nitrosodi-n-propylamine, mg/kg	<2
N-Nitrosodimethylamine, mg/kg	<2
N-Nitrosodiphenylamine, mg/kg	<2
Naphthalene, mg/kg	<2
Nitrobenzene, mg/kg	<2
Pentachlorophenol, mg/kg	<2
Phenanthrene, mg/kg	6
Phenol, mg/kg	<2
Pyrene, mg/kg	6
Semi-Quantified Results **	
A Complex Matrix, mg/kg	6000

** Quantification based upon comparison of total ion count of the compound with that of the nearest internal standard.

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REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-178-1	B3-2-4	08 APR 87

PARAMETER	04-178-1
Purgeable Priority Pollutants	
Extraction	04.18.87
1,1,1-Trichloroethane, mg/kg	<0.2
1,1,2,2-Tetrachloroethane, mg/kg	<0.2
1,1,2-Trichloroethane, mg/kg	<0.2
1,1-Dichloroethane, mg/kg	<0.2
1,1-Dichloroethylene, mg/kg	<0.2
1,2-Dichloroethane, mg/kg	<0.2
1,2-Dichloropropane, mg/kg	<0.2
1,3-Dichloropropene, mg/kg	<0.2
2-Chloroethylvinylether, mg/kg	<0.2
Acrolein, mg/kg	<2
Acrylonitrile, mg/kg	<2
Bromodichloromethane, mg/kg	<0.2
Bromomethane, mg/kg	<0.2
Benzene, mg/kg	<1
Chlorobenzene, mg/kg	<0.2
Carbon Tetrachloride, mg/kg	<0.2
Chloroethane, mg/kg	<0.2
Bromoform, mg/kg	<0.2
Chloroform, mg/kg	<0.2
Chloromethane, mg/kg	<0.2
Dibromochloromethane, mg/kg	<0.2
Ethylbenzene, mg/kg	<0.2
Methylene Chloride, mg/kg	<1

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REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-178-1	B3-2-4	08 APR 87

PARAMETER	04-178-1
Tetrachloroethylene, mg/kg	<0.2
Trichloroethylene, mg/kg	<0.2
Trichlorofluoromethane, mg/kg	<0.2
Toluene, mg/kg	<0.2
Vinyl Chloride, mg/kg	<0.2
trans-1,2-Dichloroethylene, mg/kg	<0.2
trans-1,3-Dichloropropene, mg/kg	<0.2

D. A. McLean, Laboratory Director

BROWN AND CALDWELL LABORATORIES
1255 POWELL STREET EMERYVILLE, CA 94608 • (415) 428-2300

ANALYTICAL REPORT

LOG NO: E87-04-128

Received: 07 APR 87
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Mr. John McMillan
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100 Pringle Avenue
Walnut Creek, California 94596

Project: 8710018A/3000

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-128-1	W1-1-4	06 APR 87
04-128-2	W8-1-4	06 APR 87
04-128-3	W8-3-4	06 APR 87

PARAMETER	04-128-1	04-128-2	04-128-3
Purgeable Priority Pollutants			
Extraction	04.15.87	---	---
1,1,1-Trichloroethane, mg/kg	<0.2	---	---
1,1,2,2-Tetrachloroethane, mg/kg	<0.2	---	---
1,1,2-Trichloroethane, mg/kg	<0.2	---	---
1,1-Dichloroethane, mg/kg	<0.2	---	---
1,1-Dichloroethylene, mg/kg	<0.2	---	---
1,2-Dichloroethane, mg/kg	<0.2	---	---
1,2-Dichloropropane, mg/kg	<0.2	---	---
1,3-Dichloropropene, mg/kg	<0.2	---	---
2-Chloroethylvinylether, mg/kg	<0.2	---	---
Acrolein, mg/kg	<2	---	---
Acrylonitrile, mg/kg	<2	---	---
Bromodichloromethane, mg/kg	<0.2	---	---
Bromomethane, mg/kg	<0.2	---	---
Benzene, mg/kg	<0.2	---	---
Chlorobenzene, mg/kg	<0.2	---	---
Carbon Tetrachloride, mg/kg	<0.2	---	---
Chloroethane, mg/kg	<0.2	---	---
Bromoform, mg/kg	<0.2	---	---
Chloroform, mg/kg	<0.2	---	---
Chloromethane, mg/kg	<0.2	---	---
Dibromochloromethane, mg/kg	<0.2	---	---

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ANALYTICAL REPORT

LOG NO: E87-04-128

Received: 07 APR 87
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Mr. John McMillan
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100 Pringle Avenue
Walnut Creek, California 94596

Project: 8710018A/3000

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-128-1	V1-1-4	06 APR 87
04-128-2	V8-1-4	06 APR 87
04-128-3	V8-3-4	06 APR 87

PARAMETER	04-128-1	04-128-2	04-128-3
Ethylbenzene, mg/kg	<0.2	---	---
Methylene Chloride, mg/kg	<0.2	---	---
Tetrachloroethylene, mg/kg	<0.2	---	---
Trichloroethylene, mg/kg	<0.2	---	---
Trichlorofluoromethane, mg/kg	<0.2	---	---
Toluene, mg/kg	<0.2	---	---
Vinyl Chloride, mg/kg	<0.2	---	---
trans-1,2-Dichloroethylene, mg/kg	<0.2	---	---
trans-1,3-Dichloropropene, mg/kg	<0.2	---	---

D. A. McLean, Laboratory Director

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ANALYTICAL REPORT

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Mr. Joel Kushius
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100 Pringle Avenue
Walnut Creek, California 94596

Project: 8710018 A

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-206-1	STN-1G	09 APR 87
04-206-2	STN-4G	09 APR 87
04-206-3	STN-5G	09 APR 87
04-206-4	STN-6G	09 APR 87
04-206-5	STN-10G	09 APR 87

PARAMETER	04-206-1	04-206-2	04-206-3	04-206-4	04-206-5
Total Fuel Hydrocarbons, mg/kg	670	32	490	110	1100

BROWN AND CALDWELL LABORATORIES

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ANALYTICAL REPORT

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Mr. Joel Kushius
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100 Pringle Avenue
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Project: 8710018 A

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-206-6	STN-12G	09 APR 87
04-206-7	STS-13D	09 APR 87
04-206-8	STS-14D	09 APR 87
04-206-9	STS-16D	09 APR 87
04-206-10	STS-17D	09 APR 87

PARAMETER	04-206-6	04-206-7	04-206-8	04-206-9	04-206-10
Total Fuel Hydrocarbons, mg/kg	<10	<10	33	<10	86

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REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-206-11	STS-18D	09 APR 87
04-206-12	STS-20D	09 APR 87
04-206-13	STS-22D	09 APR 87
04-206-14	STS-23D	09 APR 87
04-206-15	STS-24D	09 APR 87

PARAMETER	04-206-11	04-206-12	04-206-13	04-206-14	04-206-15
Total Fuel Hydrocarbons, mg/kg	1200	1900	8600	2500	2600

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REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-206-16	STN-8G	09 APR 87
04-206-17	STS-15D	09 APR 87
04-206-18	STS-19D	09 APR 87
04-206-19	STS-21D	09 APR 87

PARAMETER	04-206-16	04-206-17	04-206-18	04-206-19
Lead, mg/kg	83	---	---	---
Nitric Acid Digestion, Date	04.14.87	---	---	---
Benzene,Toluene,Xylene Isomers				
Benzene, mg/kg	<0.5	<0.5	<0.5	<0.5
Toluene, mg/kg	2.1	<0.5	<0.5	<0.5
Total Xylene Isomers, mg/kg	20	<0.5	<0.5	<0.5
Additional Compounds:				
Ethylbenzene, mg/kg	3.4	<0.5	<0.5	<0.5
Total Fuel Hydrocarbons, mg/kg	520	<10	45	<10

D. A. McLean, Laboratory Director

BROWN AND CALDWELL LABORATORIES

ANALYTICAL REPORT

1255 POWELL STREET EMERYVILLE, CA 94608 • (415) 428-2300

LOG NO: E87-04-153

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Mr. Joel Kushius
Woodward-Clyde Consultants
100 Pringle Avenue
Walnut Creek, California 94596

Project: 8710018 A

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-153-1	S2a	08 APR 87
04-153-2	S2b	08 APR 87
04-153-3	S2c	08 APR 87
04-153-4	S3a	08 APR 87
04-153-5	S3b	08 APR 87

PARAMETER	04-153-1	04-153-2	04-153-3	04-153-4	04-153-5
Total Fuel Hydrocarbons, mg/kg	<10	<10	<10	<10	<10

See p. A-3 of Earth Metrics 9570A(i)

See A-4 for

BROWN AND CALDWELL LABORATORIES

1255 POWELL STREET EMERYVILLE, CA 94608 • (415) 428-2300

ANALYTICAL REPORT

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Mr. Joel Kushius
Woodward-Clyde Consultants
100 Pringle Avenue
Walnut Creek, California 94596

Project: 8710018 A

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
04-153-6	S3c	08 APR 87
04-153-7	S4a	08 APR 87

PARAMETER	04-153-6	04-153-7
Lead, mg/kg	---	14
Nitric Acid Digestion, Date	---	04.14.87
Benzene,Toluene,Xylene Isomers		
Benzene, mg/kg	---	<0.5
Toluene, mg/kg	---	<0.5
Total Xylene Isomers, mg/kg	---	<0.5
Total Fuel Hydrocarbons, mg/kg	<10	<10

under tank
P A34 Earthmover
9570.A1

BROWN AND CALDWELL LABORATORIES
1255 POWELL STREET EMERYVILLE, CA 94608 • (415) 428-2300

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Walnut Creek, California 94596

Project: 8710018 A

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, WATER SAMPLES	DATE SAMPLED
04-153-8	W/A	08 APR 87
04-153-9	W/C	08 APR 87
04-153-10	W/B	08 APR 87

PARAMETER	04-153-8	04-153-9	04-153-10
Benzene,Toluene,Xylene Isomers			
Benzene, mg/L	---	---	<0.05
Toluene, mg/L	---	---	<0.05
Total Xylene Isomers, mg/L	---	---	<0.05
Additional Compounds:			
Ethylbenzene, mg/L	---	---	<0.05
Total Fuel Hydrocarbons, mg/L	72	<1	630

D. A. McLean, Laboratory Director