PORT OF OAKLAND

March 23, 2001

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MAR 27 2001

Mr. Barney Chan
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California 94502

#1222

Dear Mr. Chan:

Please find enclosed the January 2001 Fourth Quarterly Groundwater Monitoring Report and Request for Case Closure, Pacific Dry Dock Yard II, Oakland. The groundwater investigation at the site has been conducted in accordance with the work plan prepared by Baseline Environmental Consultants in the report *"Soil and Groundwater Quality Investigation/Human Health and Ecological Risk Evaluation,"* dated April 2000.

Data from future sampling activities during pipeline removal will be compared to applicable SFRWQCB RBSL's and provided under separate cover to Alameda County. I will contact your office at least two weeks prior to demolition and pipeline removal activities, which I estimate to begin within the next sixty days.

If you have any questions, please contact me at (510) 627-1184.

Sincerely,

Douglas P. Herman
Associate Port Environmental Scientist

Cc: w/encl: Betty Graham, RWQCB
Anne Henny

Cc w/o encl: Yane Nordhav, Baseline
Joyce Washington

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BASELINE

ENVIRONMENTAL CONSULTING

20 March 2001
98379-24

Mr. Douglas Herman
Port of Oakland
EH and SC Department
530 Water Street, 2nd Floor
Oakland, CA 94607

Subject: January 2001 Fourth Quarterly Groundwater Monitoring Report and Request for Case Closure, Pacific Dry Dock Yard II, 321 Embarcadero, Oakland, California

Dear Mr. Herman:

The purposes of this report are to document the fourth quarterly groundwater monitoring and to present a Request for Case Closure at Pacific Dry Dock Yard II, 321 Embarcadero, Oakland, California (the site) (Figures 1 and 2). The groundwater investigation at the site has been conducted in accordance with the work plan included in BASELINE's *Soil and Groundwater Quality Investigation/Human Health and Ecological Risk Evaluation,* dated April 2000 (BASELINE, 2000a). This monitoring report describes groundwater sampling procedures and presents the analytical results of groundwater samples collected from the site on 9 January 2001. The details of monitoring well installation were included in the April 2000 BASELINE report. This report also provides an evaluation of the groundwater data to support a Request for Case Closure for the site.

FIELD ACTIVITIES - JANUARY 2001

On 9 January 2001, groundwater samples were collected from the three on-site monitoring wells (MW-1, MW-2, and MW-3). The depth to groundwater and the presence of free product were checked in each well prior to well purging. Groundwater was slowly purged from each well using a peristaltic pump and clean polyethylene tubing until the temperature, conductivity, and pH of the purged water had stabilized, or a minimum of three well casing volumes had been removed. Purged water was temporarily stored on-site in 55-gallon drums awaiting off-site disposal by a Port contractor. Water levels were measured again prior to sampling to ensure that levels had recovered sufficiently to allow sample collection.

Groundwater samples were collected using a peristaltic pump and clean disposable tubing. Once filled, sample containers were sealed, labeled, stored in a plastic cooler containing blue ice, and transported under chain-of-custody procedures to STL Chromalab in Pleasanton, a California-certified analytical laboratory. Each sample was analyzed for total petroleum

hydrocarbons as diesel (TPHd) and as motor oil (TPHmo), benzene, toluene, ethylbenzene, and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), and cadmium, total chromium, lead, nickel, and zinc. The samples analyzed for TPHd and TPHmo were subjected to silica gel cleanup prior to analysis. The groundwater sampling activities are recorded on the Groundwater Sampling Forms included in Attachment A.

Groundwater Levels and Flow Direction

Groundwater levels measured in the on-site wells are summarized in Table 1. Free product was not identified in any of the three wells monitored. The calculated groundwater flow direction, based on measurements collected from the three wells on 9 January 2001, was N2°W (Figure 2) with a gradient magnitude of 0.01 (Table 1).

Analytical Results

The analytical results for the groundwater samples are presented in Table 2. TPHd was detected in groundwater sample MW-1 at 0.061 mg/L; the samples collected from monitoring wells MW-2 and MW-3 did not contain TPHd above the laboratory reporting limit of 0.05 mg/L. The laboratory indicated that the sample for MW-1 did not match the laboratory's diesel standard. TPHmo was not identified above the laboratory reporting limit of 0.5 mg/L in all samples analyzed.

Each BTEX compound was not identified above the laboratory reporting limit of 0.0005 mg/L for all three groundwater samples. Naphthalene was reported at a concentration of 0.011 mg/L in MW-1; all remaining PAHs were reported below their respective laboratory reporting limits in the three groundwater samples. Metals were not detected at concentrations exceeding the laboratory reporting limits in any of the samples except for zinc in MW-2 (0.028 mg/L) and nickel in MW-3 (0.0086 mg/L). A copy of the laboratory report is included in Attachment B.

REQUEST FOR CASE CLOSURE

This case closure report for the site provides evidence that the site meets the San Francisco Regional Water Quality Control Board (SFRWQCB) criteria for a low risk groundwater case (SFRWQCB, 1996). The criteria include:

- The leak must be stopped and free product removed. (This is described under Source Removal, below.)
- The site must be adequately characterized. (This is described under Site Characterization, below.)

- The dissolved plume must not be migrating. (This is described under Contaminant Fate and Transport, below.)

- Surface water or other sensitive receptors must not be impacted. (This is described under the Revised Human Health and Ecological Health Risk Evaluation, below.)

- There should be no significant risk to human health and the environment. (This is described under the Revised Human Health and Ecological Health Risk Evaluation, below.)

This request for case closure also includes responses to the five comments made by Alameda County Health Care Services Agency, Department of Environmental Health (Alameda County) in their 3 May 2000 letter to the Port of Oakland (Attachment C). Specific concerns expressed by Alameda County were:

- Future sampling along fuel pipelines located under the remaining building foundations when the foundations are removed. (This item was addressed in our third quarterly groundwater monitoring report of 7 November 2000 [BASELINE, 2000b] and is reproduced in the Soil and Groundwater Risk Management Plan presented in Attachment E to this report.)

- Evaluation of clean-up levels for PAHs and TPHmo. (This is described in the Revised Human Health and Ecological Health Risk Evaluation, below.)

- Evaluation of the potential impacts to ecological receptors from residual soil contaminants. (This is described in the Revised Human Health and Ecological Health Risk Evaluation, below.)

- Preparation of a soil and groundwater management plan, including provisions for future maintenance worker health and safety, assuming that the site would become a park. (This is addressed in the Soil and Groundwater Risk Management Plan presented in Attachment E.)

- Provision for a deed restriction (limiting future land use of the site and prohibiting the use of groundwater underlying the site), and either the installation of a cap or the covering of the site with clean soil in areas of known contamination. (This is described under Deed Restrictions, below.)

Source Removal

Source removal has been completed to the maximum extent possible at this time with the removal of two underground storage tanks (USTs) and some of the associated piping in June 1998. The two USTs had capacities of about 5,000 gallons each and were constructed of single-walled steel. The time of the tank installations is unknown, but is believed by Port staff to have been in the early 1940s, when the Navy occupied the site (BASELINE, 2000a). No holes were observed in any of the tank walls.[1]

Sidewall samples were collected after the UST removals by ITSI in 1998, and prior to replacing the excavated soils back into the excavation.[2] These soils were later re-excavated at the request of Alameda County in February 2000. Soils were re-excavated in February 2000 from the surface down to the groundwater interface at each former tank location, down to approximately 4.5 feet below the ground surface (bgs) for UST GF-11 and to 6 feet bgs for UST GF-12 (BASELINE, 2000a). Concentrations of TPHd in composited in-place sidewall samples collected from the second excavation are presented in Attachment D and ranged from 250 to 710 mg/kg for TPHd.[3] Total PAHs in these composited samples ranged from 1.24 to 6.93 mg/kg (BASELINE, 2000a). All materials generated during tank removal and overexcavation activities were disposed of off-site in accordance with local, State, and Federal regulations (BASELINE, 2000a).

Piping associated with the two USTs was removed to the maximum extent possible. The remainder of the piping will be removed when the foundations over the piping are removed in the future. Sampling will be conducted following removal of the piping in accordance with the approved workplan (see Soil and Groundwater Risk Management Plan in Attachment E

~500 gal (waste oil)

[1] A third UST was removed by Crowley Marine in 1994; Alameda County granted closure for this UST in March 1995.

[2] Soil samples collected of the excavation sidewalls (prior to replacing the soil into the excavation) ranged from 300 to 2,800 for TPHd, and 590 to 3,100 for TPHmo for GF-11 (samples were collected at 7 feet bgs); soil samples collected from the excavation sidewalls during removal of UST GF-12 ranged from 270 to 640 for TPHd, and 740 to 1,400 for TPHmo (samples were collected at 8 feet bgs) (ITSI, 1998, Attachment D). For the TPHd results, heavier hydrocarbons than the standard were reported in the samples, while some samples were also reported not to resemble the diesel standard. For the TPHmo samples, heavier hydrocarbons than the motor oil standard were reported, as well as lighter hydrocarbons than the standard. BTEX and MTBE were not reported above the laboratory reporting limit for the sidewall samples. Total PAHs in these sidewall samples ranged from 0.8 to 30.56 mg/kg. Chromium, lead, nickel and zinc were reported in composite soil samples collected during the tank removals above the laboratory reporting limits (See Attachment D for summary tables of all analyses performed).

[3] The samples exhibited a fuel pattern which did not resemble the laboratory standard. TPHmo was not requested to be analyzed.

outstanding issue

of this report). Data from soil samples to be collected during the removal of the piping will be promptly reported to Alameda County.

Site Characterization

Three groundwater monitoring wells were installed at the site in March 2000. Monitoring well MW-1 is located immediately adjacent to, and upgradient of the GF-11 excavation area. Monitoring well MW-2 is located approximately 23 feet downgradient of the location of former UST GF-11. Monitoring well MW-3 is located adjacent to and downgradient of the former UST GF-12 (Figure 2).

Soil samples were collected from the boreholes during installation of the three wells. These samples contained TPHd concentrations from less than the reporting limit of 1.0 to 7.1 mg/kg;[4] TPHmo concentrations ranged from less than the reporting limit of 10 to 51 mg/kg. All PAHs were reported below the laboratory reporting limits in all the soil samples. The concentration of TPHd, TPHmo, and PAHs in the soil samples collected during monitoring well installation were significantly less than those collected from the tank excavation sidewalls, indicating that impacted soils are very localized around the former tanks.

Groundwater samples were collected from the three wells in March, June, and September 2000 and January 2001 (Table 2). Depth to groundwater during sampling of the wells ranged from 1.89 to 5.11 feet bgs. The groundwater flow direction was generally to the north or northwest with gradients ranging from 0.0099 to 0.016 feet (Table 1).

During the four quarterly monitoring events, TPHd concentrations ranged from 0.061 to 0.41 mg/L in MW-1: less than the reporting limit of 0.05 to 0.45 mg/L in MW-2; and less than the reporting limit of 0.05 to 0.3 mg/L in MW-3.[5] TPHmo results ranged from less than the reporting limit to 0.25 mg/L in MW-1,[6] and less than the reporting limit of 0.25 to 0.26 mg/L

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[4] Unidentified hydrocarbons greater than Carbon 16 (C16) were present in the samples.

[5] The laboratory reported that unidentified hydrocarbons greater than C9-C24, and unidentified hydrocarbons greater than C16 were present in some of the samples. In addition, the laboratory reported that the sample collected from MW-1 on 9 January 2001 did not match the diesel standard.

[6] The laboratory reporting limit was 0.25 mg/L for the June and September 2000 sampling results, and 0.5 mg/L for the January 2001 sampling results.

for MW-2.[7] All TPHmo samples for MW-3 were reported as less than the reporting limit.[8] Benzene was detected only in MW-1 on two occasions, at concentrations ranging from 0.00067 to 0.0014 mg/L. Xylene was detected only once in MW-1 at 0.00084 mg/L. Ethylbenzene was reported in MW-1 on three occasions ranging from 0.00059 to 0.0036 mg/L and in MW-2 on two occasions at 0.0016 and 0.0044 mg/L. Toluene was not reported above the laboratory reporting limit in any groundwater samples collected during the four quarterly monitoring events. Total PAHs ranged from less than the reporting limit of 0.005 to 0.015 mg/L for groundwater samples collected from MW-1; less than the reporting limit of 0.00015 to 0.0663 mg/L for MW-2; and were reported below the laboratory reporting limit in all samples collected for MW-3. Chromium, lead, nickel, and zinc were also reported above the laboratory reporting limits in some of the groundwater samples collected during the four quarterly monitoring events (Table 2). No free product was observed in any of the wells on the site during the four quarterly monitoring events or during well installation and development activities.

Not all of the soil and groundwater contaminant concentrations have been reported below the laboratory reporting limits. However, according to guidance issued by SFRWQCB, delineating plumes to non-detect levels is not required at all sites; the extent of subsurface impacts should be defined to the degree necessary to determine if the site poses a threat to human health, the environment, or other sensitive receptors (SFRWQCB, 1996). There are no known horizontal and vertical conduits that could act as preferential pathways for the dissolved plume, and sufficient soil and groundwater data have been collected to assess potential impacts to human health and the environment (which are discussed in the Revised Human Health and Ecological Health Risk Evaluation section, below). Therefore, the site has been adequately characterized.

Contaminant Fate and Transport

The site is located in the East Bay Plain (Alameda County Flood Control and Water Conservation District, 1988). Existing beneficial uses of groundwater for the East Bay Plain include municipal and domestic water supply, industrial process water supply, industrial service water supply, and agricultural water supply (SFRWQCB, 1995). A well survey for the site vicinity indicated that there are no water supply wells within 2,000 feet of the site (Magallanes, 2000). Releases from the site are therefore not anticipated to impact groundwater uses for drinking water or other beneficial groundwater uses. Further, shallow groundwater immediately underlying the site is not considered a potential drinking water

[7] The laboratory reported that the sample chromatogram pattern contained unidentified hydrocarbons greater than C9-C25.

[8] The laboratory reporting limit was 0.25 mg/L for the March, June and September 2000 sampling results, and 0.5 mg/L for the January 2001 sampling results.

source based on high electrical conductivity readings. The electrical conductivity readings in the three groundwater monitoring wells over the past four quarterly sampling events ranged from 2,194 to 30,710 µmhos/cm.[9] The State Water Resources Control Board defines groundwater with an electrical conductivity greater than 5,000 µmhos/cm electrical conductivity not to be a potential drinking water source (SWRCB, Resolution 88-63).

The shallow groundwater plume does not appear to be migrating, as evidenced by the lowest contaminant concentration generally occurring in the furthest downgradient well (MW-3). In addition, chemical concentrations in groundwater remained relatively constant over the course of the four quarterly sampling events, indicating that contaminant concentrations in the groundwater are stable.

Risk Analysis for Human Health and the Environment

Preliminary Human Health and Ecological Risk Evaluation - April 2000

The April 2000 *Soil and Groundwater Investigation/Human Health and Ecological Risk Evaluation* (BASELINE, 2000a) presented a preliminary evaluation of human health risks posed by residual soil and groundwater contaminants associated with the two USTs removed in 1998. The ecological health risk evaluation was limited to evaluating groundwater contaminants since the only complete pathway for potential ecological receptors at the site is the discharge of groundwater into the Lake Merritt Channel. Groundwater was assumed to discharge into the Lake Merritt Channel, located about 40 feet northwest of former tank location GF-12. The evaluation was also conducted assuming the site will be a park, the future land use identified in the Oakland Estuary Plan. A well inventory for the site vicinity indicated that there are no water supply wells within 2,000 feet of the site (Magallanes, 2000).

Approach

The human health and ecological risk analyses were based on a comparison of the maximum site concentrations at the Pacific Dry Dock Yard II site with risk-based cleanup goals for human health and ecological protection developed for the San Francisco International Airport (SFIA) and the Catellus Eastshore Park Property; both projects are under SFRWQCB oversight. An additional screening of site concentrations against U.S. Environmental Protection Agency (U.S. EPA) Preliminary Remediation Goals for human health was also done for specific chemicals of potential concern (COPCs) that were not addressed for either project. Groundwater data from only the first groundwater monitoring event conducted in

[9] Note that the readings reported in the third quarterly groundwater monitoring report (BASELINE, 2000b) were incorrectly reported. The readings for MW-1 ranged from 28,290 to 28,690 µmhos/cm (not 28.29 to 28.60 µmhos/cm); for MW-2, 21,070 to 21,110 µmhos/cm (not 21.07 to 21.11 µmhos/cm); and for MW-3, 18,310 to 18,380 µmhos/cm (not 18.31 to 18.38 µmhos/cm).

March 2000 were available for comparison with the risk-based cleanup goals identified above at that time.

Conclusions of Preliminary Risk Evaluation

No adverse human health risks associated with residual contamination at the Pacific Dry Dock Yard II site were identified in the preliminary risk analysis. The maximum concentration of COPCs in soil and groundwater were below risk-based numbers developed for SFIA for maintenance, construction, and indoor workers. Further, the human health risk analysis concluded that the maximum concentration of COPCs identified at the site were either below Catellus' risk-based levels or within the acceptable U.S. EPA excess cancer risk range. No remediation of the site was therefore proposed for the protection of future park users or maintenance/construction workers at the site (BASELINE, 2000a).

The ecological health risk analysis identified no adverse risks associated with residual groundwater contamination at the site, since the maximum groundwater concentrations of COPCs were below risk-based levels developed for SFIA and/or the Catellus Eastshore property. However, since only one round of groundwater data was available at that time, it was recommended that quarterly sampling be conducted for three more quarters. After one year, all the data would be compared against the appropriate risk-based levels developed for ecological protection to confirm that no ecological impacts from residual groundwater contamination are expected at the Pacific Dry Dock Yard II site (BASELINE, 2000a).

Revised Human Health and Ecological Health Risk Evaluation - February 2001

Since the preparation of the preliminary human health and ecological risk evaluation in April 2000 (BASELINE, 2000a), the SFRWQCB has prepared a document entitled *Application of Risk-Based Screening Levels and Decision Making to Sites with Impacted Soil and Groundwater, Interim Final* (SFRWQCB, 2000). The document presents risk-based screening levels (RBSLs) for soil and groundwater that consider both human health and ecological protection.

For groundwater quality, the SFRWQCB RBSLs consider protection of human health by ingestion of contaminated groundwater and inhalation of vapors in indoor air, protection of aquatic life (by discharges to surface water), and protection against nuisance concerns (e.g., odors) and general resource degradation. The soil RBSLs take into account direct and indirect contact with impacted soil, inhalation of vapors into indoor air by humans, protection of groundwater quality (through leaching of constituents from the soil into the groundwater), protection of terrestrial ecological receptors, and protection against nuisance concerns and general resource degradation.

Under most circumstances, if chemical concentrations are below the corresponding RBSLs, it can be assumed there is no significant threat to human health or the environment (SFRWQCB, 2000). However, the presence of chemicals at concentrations above the RBSLs does not necessarily indicate that a significant risk exists at the site. It does, however, generally indicate that additional investigation and/or site-specific evaluation of potential risks is warranted (SFRWQCB, 2000). The RBSLs are presented in the SFRWQCB document in a series of four lookup tables. Each table reflects a specific combination of soil depths, groundwater use, and land-use characteristics.

Approach

The revised risk evaluation compares soil and groundwater quality data associated with the USTs against the SFRWQCB RBSLs. This approach is being used in lieu of the recommendation from the preliminary risk evaluation, which would have limited the current evaluation to just comparing the four quarters of groundwater data against SFIA and/or Eastshore Park Property cleanup goals. Using the SFRWQCB RBSLs will address both human health and ecological risk associated with all residual COPCs in the soil and groundwater at the site.

In this evaluation, RBSLs from Table B of the SFRWQCB document (SFRWQCB, 2000) for near-surface soils (shallower than 3 meters) where the groundwater is not a drinking water source were compared with COPCs in soil and groundwater associated with the two USTs. Site groundwater concentrations were compared against groundwater RBSLs listed for "Drinking Water Resource Not Threatened."[10] The table of RBSLs for surface soil less than 3 meters below ground surface (Table B) was selected because human receptors are most likely to contact near-surface soils. Soil contamination associated with the former USTs is also limited to these near-surface soils. Soil RBSLs listed for commercial/industrial land-use scenarios were chosen for comparison with site concentrations since the site may be redeveloped in the future as a park or with mixed land uses (commercial/retail and park uses). It is important to point out that park users, possible future users at the Pacific Dry Dock Yard II site, would be expected to have less exposure to site contaminants on a daily basis than commercial/industrial workers. The commercial/industrial RBSLs would therefore be

[10] Groundwater data from the site were not compared to groundwater RBSLs presented in Table B of the SFRWQCB document, which were developed to protect against "elevated threats to surface water." According to the SFRWQCB, the RBSLs developed to protect against "elevated threats to surface water" are intended to address potential bioaccumulation of chemicals in aquatic organisms and subsequent human consumption of these organisms. Consideration of the bioaccumulation criteria, according to the SFRWQCB, will be most appropriate for sites where the potential discharge of large plumes of impacted groundwater threaten long-term impacts to surface water quality (SFRWQCB, 2000). The Pacific Dry Dock Yard II site does not fall under this criterion of a potential discharge of a large plume with long-term impacts to surface water quality; therefore, comparisons with these additional RBSLs for groundwater were not made.

protective of future park recreational users and any future commercial/retail uses, under a mixed land use redevelopment of the site.

This revised human health risk assessment does not compare site concentrations to RBSLS developed for future construction/utility workers. A site-specific health and safety plan would be required to reduce potential exposures to contaminants in soil and/or groundwater during site redevelopment activities (including initial site activities for erosion control). The requirements for preparation of a health and safety plan are provided in the Soil and Groundwater Risk Management Plan (Attachment E).

Soil quality data associated with the two USTs are summarized in Attachment D of this report and groundwater quality data are in Table 2. A contaminant was considered a COPC if at least one sample contained the contaminant above the laboratory reporting limit. The first step was to compare the maximum contaminant concentration found among all soil and groundwater samples against the corresponding RBSL (Tables 3 and 4). If the maximum concentration were less than the RBSL, then no further evaluation was needed and these chemicals were not considered a threat to human health or the environment. However, if the maximum site concentration were found to exceed the applicable RBSL, the 95 percent Upper Confidence Limit (UCL) of the mean concentration was then calculated (Tables 5 and 6) for that chemical, and the 95 percent UCL was compared with the RBSL. A comparison of the 95 percent UCL with the SFRWQCB RBSLs is also provided in Tables 3 and 4.

If the 95 percent UCL were less than the RBSL, then no further calculation was performed. If the 95 percent UCL for any contaminant were greater than the RBSL, then the source of the RBSL was examined to ascertain whether the source criterion was appropriate for this site. A detailed discussion is provided below for each constituent where the 95 percent UCL exceeded the RBSL.

Conclusions of the Revised Risk Evaluation

Based on a comparison of maximum soil concentrations with the applicable RBSLs, TPHd, TPHmo, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and total chromium exceeded the soil RBSLs developed for ecological and human health protection (Table 3). In groundwater, the maximum concentrations of fluorene, phenanthrene, naphthalene, lead, nickel, and zinc exceeded the groundwater RBSLs (Table 4).

The 95 percent UCL on the mean for each of these COPCs was then calculated (Tables 5 and 6) and compared with the applicable soil and groundwater RBSLs. Based on this comparison, benzo(a)anthracene, benzo(b)fluoranthene, and benzo(k)fluoranthene were removed from further evaluation for soil, and fluorene, phenanthrene, naphthalene, and zinc were removed from further evaluation for groundwater (Tables 3 and 4).

TPHd, TPHmo, benzo(a)pyrene and total chromium for soil, and lead and nickel for groundwater were retained as COPCs for further analysis because the 95 percent UCL for these COPCs exceeded the applicable SFRWQCB RBSL (Tables 3 and 4). These chemicals are further evaluated below:

TPHd and TPHmo in soil. The 95 percent UCL for TPHd and TPHmo (991 and 1,459 mg/kg, respectively) exceeded the SFRWQCB RBSLs for TPHd and TPHmo of 500 mg/kg (for middle distillates) and 1,000 mg/kg (for residual fuels). These RBSLs were intended to protect groundwater quality from the mechanism of leaching of TPH from the soil into the groundwater, and assumed that no dilution of the groundwater would occur before discharge to surface water. These RBSLs were developed to protect aquatic life in surface waters. According to the SFRWQCB document, soil RBSLs for many of the petroleum related compounds and TPH were driven by the protection of groundwater quality and beneficial uses, but do not consider the widely recognized potential for natural attenuation (SFRWQCB, 2000). If actual threat to groundwater quality can be demonstrated to be minimal, then significantly less stringent screening levels (for soil) may be applicable (SFRWQCB, 2000).

The former USTs at the Pacific Dry Dock II site have not been used for possibly 40 or more years. Crowley began boat repair and dry dock operations at the site in the mid 1950s, but did not reportedly use the tanks from the time they first occupied the site (Herman, personal communication, 2001). Thus, releases from the tanks or associated piping are likely to have occurred sometime between tank installation in the early 1940s by the U.S. Navy, and the mid 1950s, when Crowley began site operations. Equilibrium between the petroleum in the soil and groundwater would be expected to have been established over the 40+ years. Ecological risk from petroleum hydrocarbons can therefore be best evaluated using the groundwater data (in lieu of soil quality), which reflects the water quality prior to discharge into the Estuary of Lake Merritt Channel, as described below.

Not necessarily leaks can occur over time.

The maximum concentrations of TPHd (0.45 mg/L) and TPHmo (0.26 mg/L) found in groundwater samples collected from the site were below the groundwater RBSL for these constituents (0.64 mg/L), which was developed for protection of human health and the environment. These data indicate that, even though the soil concentrations are above the soil RBSL, there is no actual threat to human health or aquatic receptors since the groundwater concentrations are below the groundwater RBSLs. No further action is needed for TPHd and TPHmo in soil.

Benzo(a)pyrene in soil. The soil RBSL for benzo(a)pyrene was based on direct contact between humans and the compound in the soil (ingestion and dermal contact). Calculation of the RBSL assumed that the industrial/commercial worker would spend 250 days a year at the site for 25 years, ingest 50 mg of soil per day, and other assumptions. These assumptions are extremely conservative for a future park user, who would be expected to visit the site only a

fraction of the time that an industrial/commercial worker would be present at the site. This RBSL was based on an excess lifetime cancer risk of 1 x 10^{-6} (one in one million). Exposure of the industrial/commercial worker to 0.68 mg/kg (95 percent UCL concentration) would contribute to a 3.8 x 10^{-6} excess lifetime cancer risk (which would be even lower for a future park user). This risk estimate is within the range of estimates considered by regulatory agencies to be of no significant risk (1 x 10^{-4} to 1 x 10^{-6}).[11] Further, the samples in which benzo(a)pyrene was reported above the laboratory reporting limit were found at depth (4.5 to 8.0 feet below ground surface), while benzo(a)pyrene was not reported above laboratory reporting limits in shallower samples collected at the site (Attachment D). Future park and/or commercial/retail users would not come into direct contact with soil contaminants found at this depth. For these reasons, benzo(a)pyrene concentrations in soil at the site do not present an unacceptable health risk for future site users; no further action related to this compound in soil is warranted at this time.

Total chromium in soil. The RBSL for total chromium was also based on direct human contact with soil by industrial/commercial workers and was back-calculated from an excess lifetime cancer risk of 1 x 10^{-6}. Exposure of the industrial/commercial worker to 42 mg/kg total chromium (95 percent UCL concentration) would contribute to a 3.5 x 10^{-6} excess lifetime cancer risk (which would be lower for future park users). As with benzo(a)pyrene above, this risk estimate is within the range of estimates considered of no significant risk by regulatory agencies. Total chromium concentrations in soil do not present an unacceptable health risk for future site users and therefore warrant no further action at this time.

Lead in groundwater. The RBSL for lead in groundwater was based on the Region 2 Basin Plan and is equivalent to the U.S. EPA fresh water criteria for continuous concentration (0.0032 mg/L) (SFRWQCB, 2000). The saltwater criterion for continuous concentration is 0.0081 mg/L under the California Toxics Rule (SFRWQCB, 20000). The 95 percent UCL concentration of 0.013 mg/L slightly exceeds this level.

The metals results reported for the groundwater samples are total concentrations, which are the summation of metals dissolved in the groundwater and metals adsorbed on particulates. Only that portion dissolved in groundwater can migrate downgradient and ultimately discharge into the Lake Merritt Channel/Estuary. Therefore, the results are likely overestimates of the dissolved concentrations. Since the 95 percent UCL calculated for lead reflects the total concentration and is only slightly greater than the more appropriate saltwater RBSL of 0.0081, the 95 percent UCL for dissolved lead concentrations in groundwater would very likely be below the RBSL.

[11] For example, risks from 1 x 10^{-4} to 1 x 10^{-6} are considered by the U.S. Environmental Protection Agency to pose no significant risk under the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations, part 300.430).

* If the SFRWQCB's RBSL's are to be observed, the water samples s/b filtered & rerun to obtain a dl < RBSL.

It is also important to note that lead was reported above the laboratory reporting limit in only one of twelve samples at 0.028 mg/L. In eight of twelve samples, the reporting limit was 0.020 mg/L; a value of one-half the reporting limit was used to calculate the 95 percent UCL, which was also above the more applicable of RBSL of 0.0081 mg/L. Therefore the calculated 95 percent UCL is artificially inflated and overestimates the lead concentrations in the groundwater. The concentration of lead in groundwater underlying the site does not pose a threat to ecological health, based on the reasoning presented above. No further actions are warranted or recommended for this contaminant.

Nickel in groundwater. The SFRWQCB RBSL for nickel (0.0082 mg/L) was based on the ecological saltwater criteria for continuous concentration under the California Toxics Rule. The calculated 95 percent UCL concentration of 0.012 mg/L slightly exceeded the RBSL (SFRWQCB, 2000). Nickel was detected in only three of twelve samples. Seven of the twelve samples were reported below a laboratory reporting limit that was greater than the RBSL. Therefore, the calculated 95 percent UCL was artificially inflated.

Similar to the case of the lead concentrations in the groundwater, the nickel results are for total nickel, and not dissolved concentrations. The 95 percent UCL calculated from dissolved concentration would likely be below the RBSL. No further actions are warranted or recommended for this contaminant.

Recommendations Based on Revised Risk Evaluation

Risk-based screening levels developed by the SFRWQCB for shallow soils (less than 3 meters) for sites where groundwater is not considered a current or potential source of drinking water were selected for comparison with site concentrations of COPC. Residual concentrations of COPCs in soil and groundwater associated with the two USTs removed in 1998 do not appear to contribute to adverse human health (commercial/retail and park users) or ecological health impacts, based on an evaluation of site data in accordance with SFRWQCB guidance for RBSLs.

Land-use restrictions should be enforced at the site in a deed restriction recorded for the property to prevent future unrestricted land uses or use of groundwater for drinking water or other potable uses.

Based on the revised human health and ecological health risk evaluation, institutional controls, such as capping of the site or import of clean fill onto the property to reduce potential future exposures to residual COPCs in soil, are not necessary to protect the health of future park users (and/or commercial/retail users) or ecological receptors. Land use controls, however, have been suggested by Alameda County for areas that are known to have shallow soil contamination (Alameda County, 1999). If land use controls are required under the deed restriction for the site by Alameda County, it is recommended that an Operation and

Maintenance Agreement is developed to ensure that any institutional controls implemented at the site for the purpose of eliminating or reducing potential exposures, are maintained (see Deed Restriction below, for further details).

Soil and Groundwater Risk Management Plan

A proposed Soil and Groundwater Risk Management Plan (RMP) for the site is provided in Attachment E. The RMP requires preparation of a health and safety plan for future construction and utility workers at the site to address Alameda County's request in their memorandum dated 3 May 2000 (Attachment C).

Detailed plans for redevelopment of the site have not yet been developed. However, initial plans for the site will include: removal of building foundations and Building G-305, grading of the site for drainage (with the use of additional fill material), addition of crushed rock and a growing medium, and finally, hydroseeding the property. These initial plans would be carried out for the purpose of erosion control, while the redevelopment plans for the site are being developed. A request for qualifications has been released by the Port for redevelopment of this site, Seabreeze, and the 9th Avenue Terminal in the Port area (Oak Street to 9th Avenue district).

An RMP is proposed in Attachment E. The procedures in the RMP would be followed, as applicable, during initial work at the site, and subsequent redevelopment of the property. The RMP includes procedures for dust management, soil management, dewatered groundwater management, storm water management, and site health and safety management for future construction and utility maintenance workers at the site. Risk management procedures to protect future park and commercial/retail users are also discussed.

Prior to redevelopment, the proposed RMP would be reviewed by the Port and/or its contractors and modified, as necessary, to control potential impacts to construction and utility workers, future site users, and the environment from unacceptable exposure to COPCs in the soil and groundwater. Alameda County would be sent a revised Risk Management Plan, if the Plan were revised, and notified prior to the beginning of redevelopment activities.

Deed Restriction

dont want a deed restriction before closure ?

Once case closure has been conditionally granted by Alameda County, the Port will provide evidence to Alameda County of filing a deed restriction on the property, limiting the future land use of the site, prohibiting the use of groundwater beneath the site, and requiring an impervious cap or clean soil covering over any areas of known shallow soil contamination, as requested by Alameda County in their 3 May 2000 letter, as applicable (Attachment C). The content of the deed restriction would be negotiated between the Port and Alameda County, however, it is envisioned that the deed restriction would include the requirement for an

Operations and Maintenance Plan, to ensure that risk management measures specified in the RMP (Attachment E), or as otherwise required by Alameda County, are implemented and maintained once the site has been redeveloped.

CONCLUSIONS AND RECOMMENDATIONS

The site should be considered for case closure since residual soil and groundwater contamination at the site does not pose an unacceptable risk to the environment or human health. The site also meets the other SFRWQCB criteria of a low risk groundwater case.

Data from future soil sampling activities during pipeline removal will be compared to applicable SFRWQCB RBSLs and provided in a report to Alameda County. These pipeline samples will be analyzed for TPHd and TPHmo with silica gel cleanup, BTEX, PAHs, and copper, total chromium, lead, nickel, and zinc. As stated above, the SFRWQCB RBSLs for TPHd and TPHmo were driven by the protection of groundwater. Since groundwater concentrations of TPH are below applicable RBSLs, TPH concentrations in the pipeline samples should be compared only to ceiling limits established, and not soil RBSLs. If data suggest that soil concentrations are above the ceiling limits at some locations, limited soil remediation may be required. All comparisons with RBSLs should be made within the context of the potential for exposures to occur. Future park and/or commercial/retail users would not likely be expected to come into contact with any contaminants associated with piping samples collected at depth.

This report should be submitted to Mr. Barney Chan at the Alameda County Department of Environmental Health for consideration of case closure. If case closure were granted, all existing wells should be abandoned in accordance with the requirements of Alameda County Public Works Agency. Purged and decontamination water stored in on-site drums should be properly disposed of at an off-site location in accordance with local, State, and Federal regulations.

If you have any questions or comments, please do not hesitate to contact us.

Sincerely,

Julie Pettijohn, MPH, IHIT
Environmental Health Scientist

Yane Nordhav
Principal
Reg. Geologist No. 4009

JP:YN:km
Attachments

98379-24.clo.wpd-3/20/01

REFERENCES

Alameda County Flood Control and Water Conservation District (ACFC & WCD), 1988, Geohydrology and Groundwater-Quality Overview, East Bay Plain Area, Alameda County, California, 205(J) Report, June.

American Society for Testing Materials (ASTM), Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites, E 1739-95.

BASELINE, 2000a, Soil and Groundwater Quality Investigation/Human Health and Ecological Risk Evaluation, Pacific Dry Dock II, April.

BASELINE, 2000b, Third Quarterly Groundwater Monitoring Report, Pacific Dry Dock Yard II, 321 Embarcadero, Oakland, California, Submitted to D. Herman, Port of Oakland, 7 November.

Herman, Douglas, Port of Oakland, EH&SC Department, 2001, personal communication with J. Pettijohn of BASELINE, 13 March.

Integrated Technical Solutions Incorporated (ITSI), 1998, Tank Closure Report; Port of Oakland Tank Numbers GF-11 and GF-12, 3 September.

Magallanes, Marlin, 2000, Alameda County Public Works Agency, Water Resources Section, personal communication with J. Kane of BASELINE, 14 April.

San Francisco Regional Water Quality Control Board (SFRWQCB), 2000, Application of Risk-Based Screening Levels and Decision Making to Sites with Impacted Soil and Groundwater, Interim Final.

San Francisco Regional Water Quality Control Board (SFRWQCB), 1996, Regional Board Supplemental Instructions to State Water Board December 8, 1995, Interim Guidance on Required Cleanup at Low-Risk Fuel Sites, Memorandum from K. Graves and S. Morse to San Francisco Bay Area Agencies Overseeing UST Cleanup and Other Interested Parties, 5 January, San Francisco Regional Water Quality Control Board.

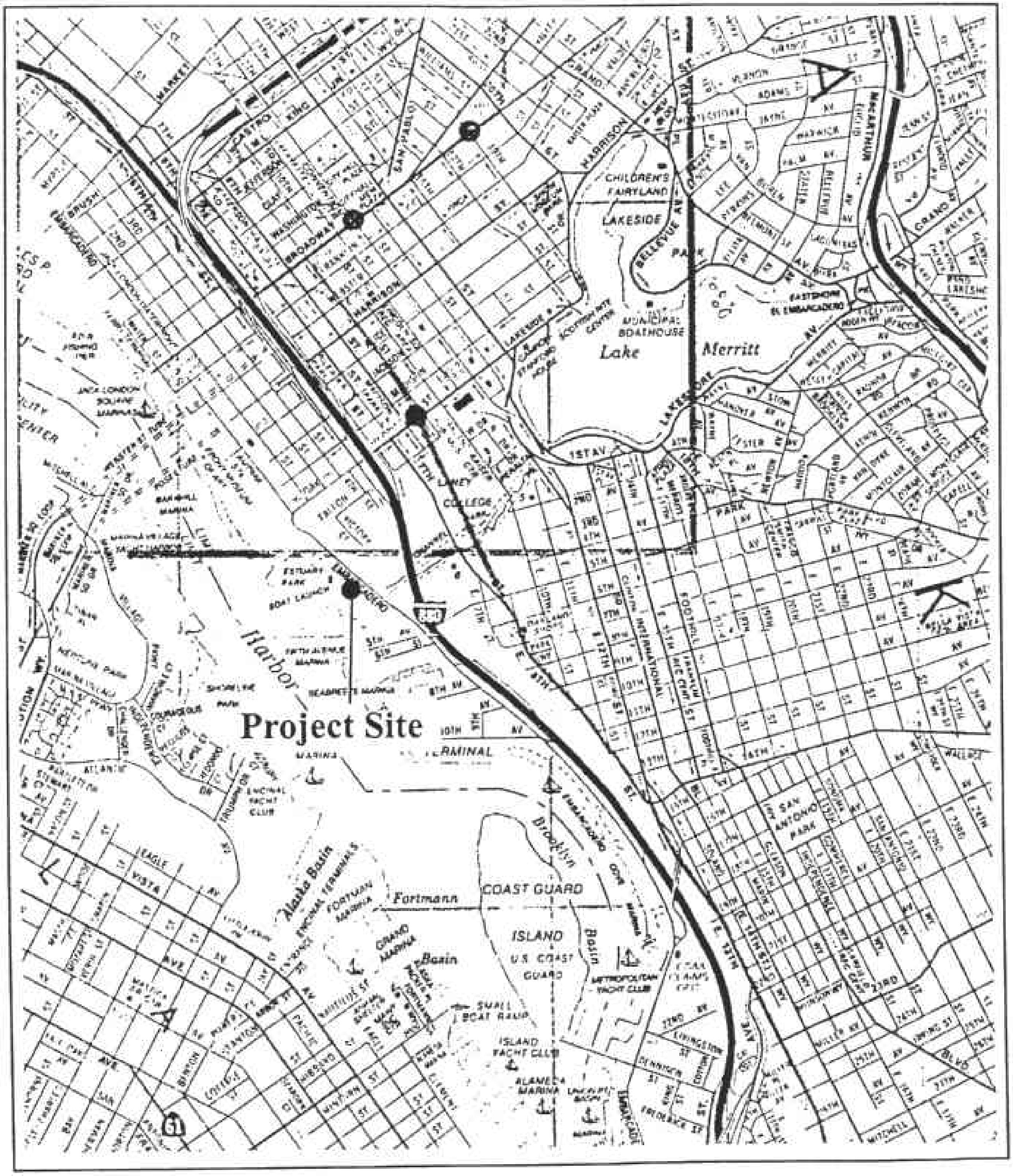
San Francisco Regional Water Quality Control Board (SFRWQCB), 1995, Water Quality Control Plan, San Francisco Bay Basin (Region 2), 21 June.

State Water Resources Control Board (SWRCB), Resolution 88-63, Adoption of Policy Entitled Sources of Drinking Water, adopted 19 May 1988.

U.S. Federal Regulations, 40 Code of Federal Regulations, Part 300.430.

REGIONAL LOCATION

Figure 1



Pacific Dry Dock Yard II
321 Embarcadero
Oakland, California

0 2000 Feet

BASELINE

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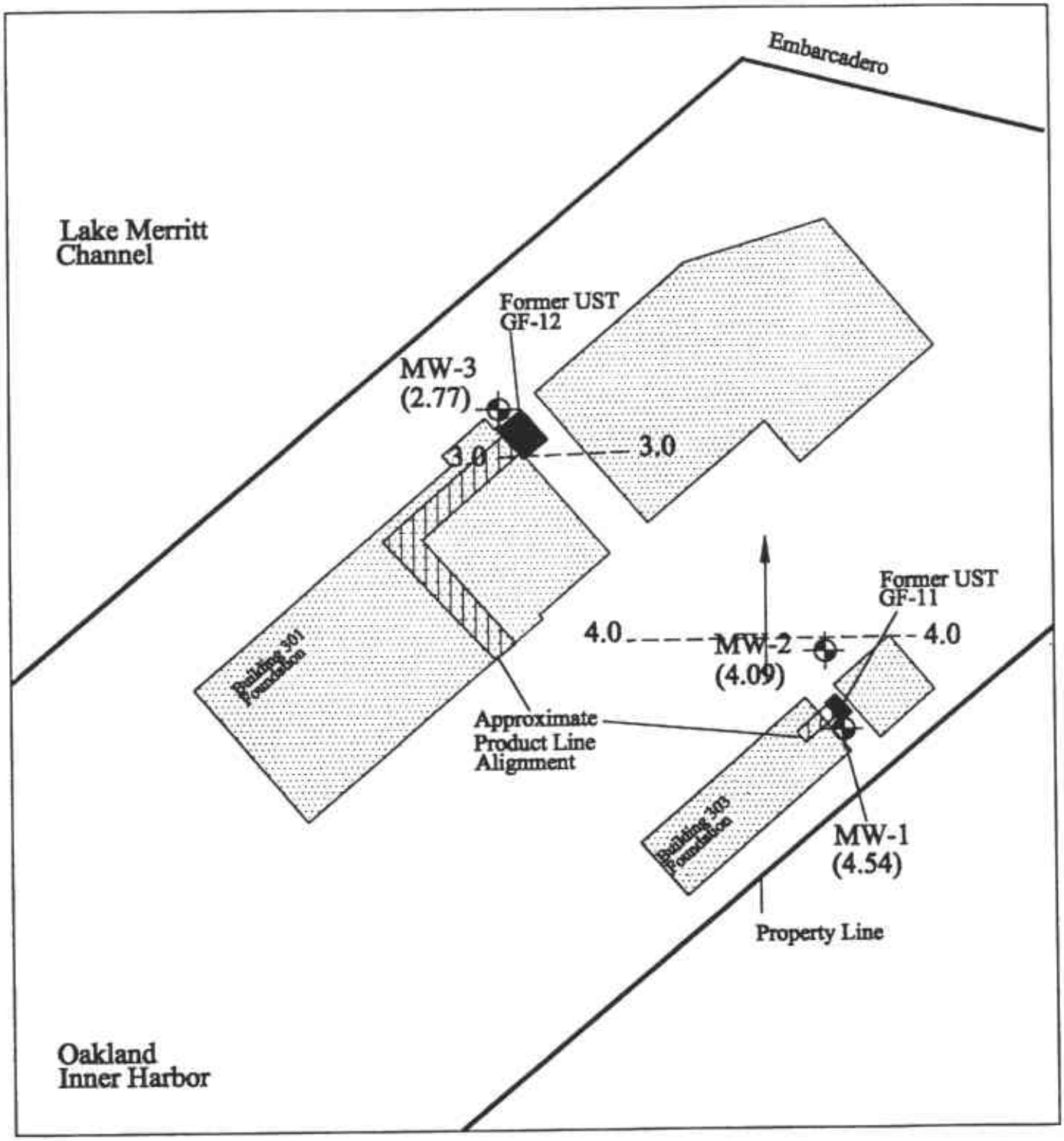
SITE PLAN AND GROUNDWATER CONTOURS
January 2001

Figure 2



Legend

Monitoring Well Location

Groundwater Flow Direction

3.0 – – – 3.0 Groundwater Elevation Contour

(4.54) Groundwater Elevation (feet msl)

N

0 75 Feet

BASELINE

Pacific Dry Dock Yard II
321 Embarcadero, Oakland

D:\Graphics\Seabreeze Cad\jan2001.dwg LT 1/22/01

TABLE 1

GROUNDWATER ELEVATIONS AND GRADIENT DETERMINATION

Pacific Dry Dock, Yard II

321 Embarcadero, Oakland, California

	MW-1[1]		MW-2[2]		MW-3[3]			
Date	Depth to Ground-water (ft)	Ground-water Elevations[4] (ft)	Depth to Ground-water (ft)	Ground-water Elevations[4] (ft)	Depth to Ground-water (ft)	Ground-water Elevations[4] (ft)	Ground-water Flow Direction[5]	Gradient Magnitude[5]
03/06/00	2.15	4.28	3.63	4.10	3.85	2.64	N76°W	0.0099
06/08/00	2.06	4.37	3.96	3.77	5.11	1.38	N15°W	0.0145
09/25/00	2.17	4.26	4.05	3.68	4.85	1.64	N0°W	0.016
01/09/01	1.89	4.54	3.64	4.09	3.72	2.77	N2°W	0.01

[1] Top of well casing elevation = 6.43 feet.
[2] Top of well casing elevation = 7.73 feet.
[3] Top of well casing elevation = 6.49 feet.
[4] Elevations are in feet above mean sea level.
[5] Flow direction and gradient magnitude determined by three-point method.

TABLE 2

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER

Pacific Dry Dock, Yard II

321 Embarcadero, Oakland, California

(µg/L)

Well	MW-1				MW-2				MW-3			
Sample Date	**3/6/00**	**6/8/00**	**9/25/00**	**1/9/01**	**3/6/00**	**6/8/00**	**9/25/00**	**1/9/01**	**3/6/00**	**6/8/00**	**9/25/00**	**1/9/01**
Petroleum Hydrocarbons (DHS LUFT Method or 8015M with silica gel cleanup)												
TPH as diesel	**120**[1,2]	**390**[3]	**410**[2]	**61**[4]	**240**[3]	**450**[3]	**230**[2]	<50	<50	<50	**300**[2]	<50
TPH as motor oil	**250**	<250	<250	<500	<250	**260**[3]	<250	<500	<250	<250	<250	<500
Volatile Organic Compounds (DHS LUFT Method or 8020)												
Benzene	**0.67**	**1.4**	<0.50	<0.50	<0.5	<0.50	<0.50	<0.50	<0.5	<0.50	<0.50	<0.50
Toluene	<0.5	<0.5	<0.50	<0.50	<0.5	<0.50	<0.50	<0.50	<0.5	<0.50	<0.50	<0.50
Ethylbenzene	**3.6**	**0.80**	**0.59**	<0.50	**4.4**	**1.6**	<0.50	<0.50	<0.5	<0.50	<0.50	<0.50
Xylenes (total)	<0.5	**0.84**	<0.50	<0.50	<0.5	<0.50	<0.50	<0.50	<0.5	<0.50	<0.50	<0.50
Polycyclic Aromatic Hydrocarbons (Method 8270B)												
Naphthalene	<5.0	**15**	**14**	**11**	**39**	**7.5**	**21**	<0.15	<5.0	<5.0	<5.0	<0.15
Acenaphthylene	<5.0	<5.0	<5.0	<0.1	<5.0	<5.0	<5.0	<0.1	<5.0	<5.0	<5.0	<0.1
Acenaphthene	<5.0	<5.0	<5.0	<0.1	**15**	<5.0	<5.0	<0.1	<5.0	<5.0	<5.0	<0.1
Fluorene	<5.0	<5.0	<5.0	<0.1	**5.8**	<5.0	<5.0	<0.1	<5.0	<5.0	<5.0	<0.1
Phenanthrene	<5.0	<5.0	<5.0	<0.1	**6.5**	<5.0	<5.0	<0.1	<5.0	<5.0	<5.0	<0.1
Anthracene	<5.0	<5.0	<5.0	<0.05	<5.0	<5.0	<5.0	<0.05	<5.0	<5.0	<5.0	<0.05
Fluoranthene	<5.0	<5.0	<5.0	<0.15	<5.0	<5.0	<5.0	<0.15	<5.0	<5.0	<5.0	<0.15
Pyrene	<5.0	<5.0	<5.0	<0.15	<5.0	<5.0	<5.0	<0.15	<5.0	<5.0	<5.0	<0.15
Benzo(a)anthracene	<5.0	<5.0	<5.0	<0.1	<5.0	<5.0	<5.0	<0.1	<5.0	<5.0	<5.0	<0.1
Chrysene	<5.0	<5.0	<5.0	<0.1	<5.0	<5.0	<5.0	<0.1	<5.0	<5.0	<5.0	<0.1
Benzo(b)fluoranthene	<5.0	<5.0	<5.0	<0.1	<5.0	<5.0	<5.0	<0.1	<5.0	<5.0	<5.0	<0.1
Benzo(k)fluoranthene	<5.0	<5.0	<5.0	<0.05	<5.0	<5.0	<5.0	<0.05	<5.0	<5.0	<5.0	<0.05
Benzo(a)pyrene	<5.0	<5.0	<5.0	<0.1	<5.0	<5.0	<5.0	<0.1	<5.0	<5.0	<5.0	<0.1

Table 2: **SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER-** ***continued***

Well	MW-1				MW-2				MW-3			
Sample Date	**3/6/00**	**6/8/00**	**9/25/00**	**1/9/01**	**3/6/00**	**6/8/00**	**9/25/00**	**1/9/01**	**3/6/00**	**6/8/00**	**9/25/00**	**1/9/01**
Dibenzo(a,h)anthracene	<5.0	<5.0	<5.0	<0.1	<5.0	<5.0	<5.0	<0.1	<5.0	<5.0	<5.0	<0.1
Benzo(g,h,i)perylene	<5.0	<5.0	<5.0	<0.1	<5.0	<5.0	<5.0	<0.1	<5.0	<5.0	<5.0	<0.1
Indeno(1,2,3-cd)pyrene	<5.0	<5.0	<5.0	<0.1	<5.0	<5.0	<5.0	<0.1	<5.0	<5.0	<5.0	<0.1
2-methylnaphthalene	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	--
Total polycyclic aromatic hydrocarbons	<5.0	**15**	**14**	**11**	**66.3**	**7.5**	**21**	<0.15	<5.0	<5.0	<5.0	<0.15
Metals (ICP Scan Method or 6010B)												
Cadmium	<10	<10	<10	<2	<10	<10	<10	<2	<10	<10	<10	<2
Chromium	**23**	<10	<10	<5	**24**	<10	<10	<5	<10	<10	<10	<5
Lead	<20	<20	<20	<5	<20	<20	<20	<5	<20	**28**	<20	<5
Nickel	**16**	<10	<10	<5	**29**	<10	<10	<5	<10	<10	<10	**8.6**
Zinc	<40	<20	<20	<10	<40	<20	<20	**28**	<40	<20	**29**	<10

Notes: <xx = Compound not identified above reporting limit of xx.
-- = Not analyzed.
µg/L = micrograms per liter.
TPH = Total petroleum hydrocarbons.

[1] Identified as discrete peaks in the laboratory report.
[2] Chromatogram pattern: Unidentified Hydrocarbons > C16.
[3] Chromatogram pattern: Unidentified Hydrocarbons > C9-C24.
[4] Hydrocarbon reported does not match the laboratory diesel standard.

TABLE 3

HUMAN HEALTH AND ECOLOGICAL HEALTH SCREENING; COPCs IN SOIL

Pacific Dry Dock, Yard II

321 Embarcadero, Oakland, California

Chemical of Concern at Pacific Dry Dock Yard II	Maximum Soil Concentration (mg/kg)	95 Percent UCL of Mean Soil Concentration	Soil RBSL (mg/kg)[1]	Maximum Soil Concentrations Exceed RBSL?	95 Percent UCL Soil Concentration Exceed RBSL?
Petroleum Hydrocarbons					
TPHg	14	--	400	No	No
TPHd	2,800	991	500	Yes	Yes
TPHmo	3,100	1,459	1,000	Yes	Yes
Oil & grease	650	--	1,000[2]	No	No
Volatile Organic Compounds					
Chlorobenzene	0.0061	--	3.0 ✓	No	No
1,4-dichlorobenzene	0.005	--	0.49	No	No
Polycyclic Aromatic Hydrocarbons					
Acenaphthene	0.35	--	16 ✓	No	No
Fluorene	0.47	--	5.1	No	No
Phenanthrene	3.8	--	11	No	No
Anthracene	1.1	--	2.9	No	No
Fluoranthene	6.4	--	40	No	No
Pyrene	5	--	55	No	No
Benzo(a)anthracene	3.1	1.3	1.8	Yes	No
Chrysene	3.4	--	4.7	No	No
Benzo(b)fluoranthene	2.45[3]	1.1	1.8	Yes	No
Benzo(k)fluoranthene	2.45[3]	1.0	1.8	Yes	No
Benzo(a)pyrene	1.2	0.68	0.18	Yes	Yes[4]
Indeno(1,2,3-cd)pyrene	0.98	--	1.8	No	No
Dibenz(a,h)anthracene	0.41	--	0.51	No	No
Benzo(g,h,i)perylene	0.7	--	5.3	No	No
Metals					
Lead	33	--	1,000 — Ceiling Val	No	No
Chromium (total)	65	42	12	Yes	Yes
Nickel	60	--	150	No	No
Zinc	180	--	600	No	No

Notes: "--" = Not calculated.

Only chemicals with at least one concentration reported above the laboratory reporting limit for soil are included in this table. The one-tailed 95 percent Upper Confidence Limit (UCL) of the mean was calculated assuming the underlying distributions were normally distributed. For samples in which an analyte was not detected above the laboratory reporting limit, a value of one-half the reporting limit was used in the calculation. See Table 5.

1 RBSLs are for industrial/Commercial land use for near-surface soils (<3 m) where groundwater is not a current or potential source of drinking water (Table B, SFRWQCB, 2000).

2 The RBSL for TPH residual fuels is provided.

3 The ISTI data was reported as a coelution of benzo(b)fluoranthene and benzo(k)fluoranthene. An RBSL does not exist for benzo(b,k)fluoranthene. One-half the concentration of benzo(b,k)fluoranthene was therefore assigned to benzo(b)fluoranthene and benzo(k)fluoranthene for the calculations.

4 For 3 of the 10 samples analyzed, the benzo(a)pyrene concentration did not exceed the laboratory reporting limit, which was greater than the RBSL.

TABLE 4

HUMAN HEALTH AND ECOLOGICAL HEALTH SCREENING; COPCs IN GROUNDWATER

Pacific Dry Dock, Yard II, 321 Embarcadero, Oakland, California

Chemical of Concern at Pacific Dry Dock Yard II	Maximum Groundwater Concentration (mg/L)	95 Percent UCL of Mean Groundwater Concentration (mg/L)	Groundwater RBSL (mg/L)[1]	Maximum Groundwater Concentration exceed RBSL?	95 Percent UCL Groundwater Concentration Exceed RBSL?
Petroleum Hydrocarbons					
TPHd	0.45	--	0.64	No	No
TPHmo	0.26	--	0.64	No	No
Volatile Organic Compounds					
Benzene	0.0014	--	0.046	No	No
Ethylbenzene	0.0044	--	0.29	No	No
Xylenes	0.00084	--	0.013	No	No
Polycyclic Aromatic Hydrocarbons					
Acenaphthene	0.015	--	0.023	No	No
Fluorene	0.0058	0.003	0.0039	Yes	No
Phenanthrene	0.0065	0.003	0.0046	Yes	No
Naphthalene	0.039	0.016	0.024	Yes	No
Metals					
Lead	0.028	0.013	0.0032	Yes	Yes[2]
Chromium (total)	0.024	--	0.18	No	No
Nickel	0.029	0.012	0.0082	Yes	Yes[3]
Zinc	0.029	0.019	0.023	Yes	No

Notes: "--" = Not calculated.
The 95 percent Upper Confidence Limit (UCL) was calculated assuming the underlying distributions were normally distributed. For samples in which an analyte was not detected above the laboratory reporting limit, a value of one-half the reporting limit was used in the calculation. See Table 6.
Only chemicals with at least one concentration reported above the laboratory reporting limit for groundwater are included in this table.

[1] RBSL for Drinking Water Resource not Threatened (groundwater is not a current or potential drinking water source) (Table B, SFRWQCB, 2000).

[2] For 8 of the 12 samples analyzed, lead was not detected above a laboratory reporting limit of 0.01 mg/L, which is greater than the RBSL; the actual concentrations of lead exceeded reporting limits in only one sample.

[3] For 7 of the 12 samples analyzed, nickel was not detected above a laboratory reporting limit of 0.01 mg/L, which is greater than the RBSL; the actual concentration of nickel exceeded reporting limits in three samples.

TABLE 5

CALCULATION OF 95 PERCENT CONCENTRATIONS, SOIL SAMPLES

Pacific Dry Dock, Yard II, 321 Embarcadero, Oakland, California

(mg/kg)

Sample ID	TPHd	TPHmo	Benzo(a) anthracene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Benzo(a)pyrene	Chromium (total)
ITSI Samples							
S-A-7'-N	2,800	3,100	0.77	0.6	0.6	0.54	41
S-A-7'-S	300	590	<0.33	0.145	0.145	<0.33	24
S-B-8'-N	270	1,400	3.1	2.45	2.45	1.2	26
S-B-8'-S	640	740	1.4	1.3	1.3	0.9	19
BASELINE Samples							
MW-1	2.6	<10	<0.10	<0.10	<0.10	<0.10	8.5
MW-2	<1.0	<10	<0.10	<0.10	<0.10	<0.10	31
MW-3	1.5	<10	<1.0	<1.0	<1.0	<1.0	65
MW-3	7.1	51	<1.0	<1.0	<1.0	<1.0	35
GF-11	250	--	0.55	0.87	0.32	0.55	--
GF-12	710	--	0.11	0.15	0.05	0.11	--
Statistical Evaluation							
Maximum	2,800	3,100	3.1	2.45	2.45	1.2	65
Average	498	737	0.72	0.66	0.60	0.46	31
Number of samples	10	8	10	10	10	10	8
Standard deviation	849.7	1,077	0.93	0.74	0.75	0.38	16.89
Standard error	268.7	380.9	0.30	0.24	0.24	0.12	6.0
t_{95}	1.833	1.895	1.833	1.833	1.833	1.833	1.895
95 percent UCL	991	1,459	1.3	1.1	1.0	0.68	42

Notes: A value of one-half of the reporting limit was used for results that were reported as being below the laboratory reporting limit.
See Appendix D for a summary of soil data.
Data from stockpile samples were excluded from the calculations, since these samples were of material that was removed from the site.

[1] The ISTI data was reported as a coelution of benzo(b)fluoranthene and benzo(k)fluoranthene. A RBSL does not exist for benzo(b,k)fluoranthene. One-half of the reported concentration for benzo(b,k)fluoranthene was therefore assumed to be benzo(b)fluoranthene and one-half to be benzo(k)fluoranthene.

TABLE 6

CALCULATION OF 95 PERCENT CONCENTRATIONS, GROUNDWATER SAMPLES

Pacific Dry Dock, Yard II, 321 Embarcadero, Oakland, California

(µg/kg)

Well, Sample ID	Fluorene	Phenanthrene	Naphthalene	Lead	Nickel	Zinc
MW-1, 3/6/00	<5.0	<5.0	<5.0	<20	16	<40
MW-1, 6/8/00	<5.0	<5.0	15	<20	<10	<20
MW-1, 9/25/00	<5.0	<5.0	14	<20	<10	<20
MW-1, 1/9/01	<0.1	<0.1	11	<5	<5	<10
MW-2, 3/6/00	5.8	6.5	39	<20	29	<40
MW-2, 6/8/00	<5.0	<5.0	7.5	<20	<10	<20
MW-2, 9/25/00	<5.0	<5.0	21	<20	<10	<20
MW-2, 1/9/01	<0.1	<0.1	<0.15	<5	<5	28
MW-3, 3/6/00	<5.0	<5.0	<5.0	<20	<10	<40
MW-3, 6/8/00	<5.0	<5.0	<5.0	2.5	28	5
MW-3, 9/25/00	<5.0	<5.0	<5.0	<20	<10	29
MW-3, 1/9/01	<0.1	<0.1	<0.15	<5	8.6	<10
Statistical Evaluation						
Maximum	5.8	6.5	39	28	29	29
Average	2.2	2.2	9.8	9.6	7.8	14.8
Number of samples	12	12	12	12	12	12
Standard deviation	1.6	1.7	11.4	6.7	7.6	8.3
Standard error	0.46	0.50	3.3	1.9	2.2	2.4
t_{95}	1.8	1.8	1.8	1.8	1.8	1.8
95 percent UCL	3	3	16	13	12	19

Notes: A value of one-half of the reporting limit was used for results that were reported as being below the laboratory reporting limit.
See Table 2 for the groundwater data.

ATTACHMENT A

GROUNDWATER SAMPLING FORMS

GROUNDWATER SAMPLING

Project no.:	98379-24	Well no.:	MW-1	Date:	1/9/01
Project name:	Pacific Dry Dock Yard II	Depth of well from TOC (feet):	10.03		
Location:	321 Embarcadero	Well diameter (inch):	2		
	Oakland, CA	Screened interval from TOC (feet):	2-10		
Recorded by:	WKS	TOC elevation (feet msl):	6.43		
Weather:	Showers	Water level from TOC (feet):	1.89	Time:	12:25
Precip in past 5 days (inch):	Trace	Product level from TOC (feet):	None	Time:	12:25
		Water level measurement device:	Dual-interface probe		

CALCULATION OF WELL VOLUME:

[(10.03 ft) -	(1.89 ft)] x	$(0.083\ ft)^2$ x	3.14 x 7.48 =	1.3	gallons in one well volume
well depth	water level	well radius		4.0	total gallons removed

CALIBRATION

	Time	Temp (° C)	pH	EC (µmho/cm)	NTU
Calibration Standard:	--	--	7.00/10.01	1,000	0.0/5.0
Before Purging:	12:30	16.2	7.00/10.01	1,000	0.0/5.0
After Purging:	14:30	16.3	7.09/10.12	1,029	0.0/5.0

FIELD MEASUREMENTS:

Time	Temp (° C)	pH	EC (µmho/cm)	Cumulative Gallons Removed	Appearance	NTU
13:52	14.0	7.45	30,710	1.5	Clear with black particles (algae)	1.11
14:02	14.3	7.43	29,920	2.5	Clear with black particles (algae)	0.25
14:16	14.3	7.44	29,800	4.0	Clear with black particles (algae)	0.13

DO calibration:	9.67 @ 17° C	DO results after purge:	0.06
Appearance of sample:	Clear, 0.13 NTU	Time:	14:25
Duplicate/blank number:	--	Time:	--
Purge method:	Peristaltic pump and disposable polyethylene tubing		
Sampling equipment:	Peristaltic pump and disposable polyethylene tubing	VOC attachment:	N/A
Sample containers:	2-liter amber glass, two 4-ml VOAs, 1liter poly		
Sample analyses:	TPHd, TPHmo, BTEX, Cd, Cr, Pb, Ni, Zn, PAHs	Laboratory:	STL Chromalab
Decontamination method:	TSP and water, DI water rinse	Rinsate disposal:	Drum on site

379-24gw.J01.wpd-2 26 01

GROUNDWATER SAMPLING

Project no.:	98379-24	Well no.:	MW-2	Date:	1/9/01
Project name:	Pacific Dry Dock Yard II	Depth of well from TOC (feet):	10.01		
Location:	321 Embarcadero	Well diameter (inch):	2		
	Oakland, CA	Screened interval from TOC (feet):	2-10		
Recorded by:	WKS	TOC elevation (feet msl):	7.73		
Weather:	Showers	Water level from TOC (feet):	3.64	Time:	12:23
Precip in past 5 days (inch):	Trace	Product level from TOC (feet):	None	Time:	12:23
		Water level measurement device:	Dual-interface probe		

CALCULATION OF WELL VOLUME:

[(10.01 ft) -	(3.64 ft)] x	$(0.083 \text{ ft})^2$ x	3.14 x 7.48 =	1.0	gallons in one well volume
well depth	water level	well radius		3.5	total gallons removed

CALIBRATION

	Time	Temp (° C)	pH	EC (µmho/cm)	NTU
Calibration Standard:	--	--	7.00/10.01	1,000	0.0/5.0
Before Purging:	12:30	16.2	7.00/10.01	1,000	0.0/5.0
After Purging:	14:30	16.3	7.09/10.12	1,029	0.0/5.0

FIELD MEASUREMENTS:

Time	Temp (° C)	pH	EC (µmho/cm)	Cumulative Gallons Removed	Appearance	Odor	NTU
13:15	16.3	7.51	22,460	1.0	Clear	Hydrogen sulfide	2.89
13:20	16.5	7.53	22,510	2.0	Clear	Hydrogen sulfide	1.69
13:30	16.5	7.58	22,510	3.5	Clear	Hydrogen sulfide	1.59

DO calibration:	9.67 @ 17° C	DO results after purge:	0.05
Appearance of sample:	Clear, 1.54 NTU	Time:	13:35
Duplicate/blank number:	--	Time:	--
Purge method:	Peristaltic pump and disposable polyethylene tubing		
Sampling equipment:	Peristaltic pump and disposable polyethylene tubing	VOC attachment:	N/A
Sample containers:	2-liter amber glass, two 4-ml VOAs, 1liter poly		
Sample analyses:	TPHd, TPHmo, BTEX, Cd, Cr, Pb, Ni, Zn, PAHs	Laboratory:	STL Chromalab
Decontamination method:	TSP and water, DI water rinse	Rinsate disposal:	Drum on site

BASELINE • 5900 Hollis Street, Suite D • Emeryville, CA 94608 • (510) 420-8686 • (510) 420-1707

GROUNDWATER SAMPLING

Project no.:	98379-24	Well no.:	MW-3	Date:	1/9/01
Project name:	Pacific Dry Dock Yard II	Depth of well from TOC (feet):	11.05		
Location:	321 Embarcadero	Well diameter (inch):	2		
	Oakland, CA	Screened interval from TOC (feet):	4-11		
Recorded by:	WKS	TOC elevation (feet msl):	6.49		
Weather:	Showers	Water level from TOC (feet):	3.72	Time:	12:19
Precip in past 5 days (inch):	Trace	Product level from TOC (feet):	None	Time:	12:19
		Water level measurement device:	Dual-interface probe		

CALCULATION OF WELL VOLUME:

[(11.05 ft) -	(3.72 ft)] x	(0.083 ft)^2 x	3.14 x 7.48 =	1.2	gallons in one well volume
well depth	water level	well radius		3.0	total gallons removed

CALIBRATION

	Time	Temp (° C)	pH	EC (µmho/cm)	NTU
Calibration Standard:	--	--	7.00/10.01	1,000	0.0/5.0
Before Purging:	12:30	16.2	7.00/10.01	1,000	0.0/5.0
After Purging:	14:30	16.3	7.09/10.12	1,029	0.0/5.0

FIELD MEASUREMENTS:

Time	Temp (° C)	pH	EC (µmho/cm)	Cumulative Gallons Removed	Appearance	NTU
12:35	17.2	7.05	14,320	1.0	Clear	0.5
12:45	17.2	6.98	14,180	2.0	Clear	0.32
12:55	16.9	6.99	14,280	3.0	Clear	0.34

DO calibration:	9.67 @ 17° C	DO results after purge:	0.08
Appearance of sample:	Clear, 0.34 NTU	Time:	13:00
Duplicate/blank number:	--	Time:	--
Purge method:	Peristaltic pump and disposable polyethylene tubing		
Sampling equipment:	Peristaltic pump and disposable polyethylene tubing	VOC attachment:	N/A
Sample containers:	2-liter amber glass, two 4-ml VOAs, 1liter poly		
Sample analyses:	TPHd, TPHmo, BTEX, Cd, Cr, Pb, Ni, Zn, PAHs	Laboratory:	STL Chromalab
Decontamination method:	TSP and water, DI water rinse	Rinsate disposal:	Drum on site

379-24gw.J01.wpd-2 26/01

ATTACHMENT B

LABORATORY REPORTS

Baseline Environmental
5900 Hollis Street, Suite D
Emeryville, CA 94608-2008

Attn.: Mr. Bill Scott

Project: 98379-24
Pacific Dry Dock Yard II, 321
Embarcadero, Oak

Dear Mr. Scott,

Attached is our report for your samples received on Wednesday January 10, 2001
This report has been reviewed and approved for release. Reproduction of this report is permitted only in its entirety.

Please note that any unused portion of the samples will be discarded after February 24, 2001 unless you have requested otherwise. We appreciate the opportunity to be of service to you.
If you have any questions, please call me at (925) 484-1919. You can also contact me via email.
My email address is: vvancil@chromalab.com

Sincerely,

Vincent Vancil

Polynuclear Aromatic Hydrocarbons (PNA)

Baseline Environmental

✉ 5900 Hollis Street, Suite D
Emeryville, CA 94608-2008

Attn: Bill Scott

Phone: (510) 420-8686 Fax: (510) 420-1707

Project #: 98379-24

Project: Pacific Dry Dock Yard II, 321 Embarcadero, Oak

Samples Reported

Sample ID	Matrix	Date Sampled	Lab #
MW-1	Water	01/09/2001 14:25	1
MW-2	Water	01/09/2001 13:35	2
MW-3	Water	01/09/2001 13:00	3

To: **Baseline Environmental**
Attn.: Bill Scott

Test Method: 8310
Prep Method: 3510/8310

Polynuclear Aromatic Hydrocarbons (PNA)

Sample ID:	**MW-1**	Lab Sample ID:	**2001-01-0170-001**
Project:	98379-24 Pacific Dry Dock Yard II, 321 Embarcadero, Oak	Received:	01/10/2001 18:55
		Extracted:	01/12/2001 08:57
Sampled:	01/09/2001 14:25	QC-Batch:	2001/01/12-01.18
Matrix:	Water		

Sample/Analysis Flag o (See Legend & Note section)

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Naphthalene	11	0.15	ug/L	1.00	01/12/2001 23:55	
Acenaphthylene	ND	0.10	ug/L	1.00	01/12/2001 23:55	
Acenaphthene	ND	0.10	ug/L	1.00	01/12/2001 23:55	
Fluorene	ND	0.10	ug/L	1.00	01/12/2001 23:55	
Phenanthrene	ND	0.10	ug/L	1.00	01/12/2001 23:55	
Anthracene	ND	0.050	ug/L	1.00	01/12/2001 23:55	
Fluoranthene	ND	0.15	ug/L	1.00	01/12/2001 23:55	
Pyrene	ND	0.15	ug/L	1.00	01/12/2001 23:55	
Benzo(a)anthracene	ND	0.10	ug/L	1.00	01/12/2001 23:55	
Chrysene	ND	0.10	ug/L	1.00	01/12/2001 23:55	
Benzo(b)fluoranthene	ND	0.10	ug/L	1.00	01/12/2001 23:55	
Benzo(k)fluoranthene	ND	0.050	ug/L	1.00	01/12/2001 23:55	
Benzo(a)pyrene	ND	0.10	ug/L	1.00	01/12/2001 23:55	
Dibenzo(a,h)anthracene	ND	0.10	ug/L	1.00	01/12/2001 23:55	
Benzo(g,h,i)perylene	ND	0.10	ug/L	1.00	01/12/2001 23:55	
Indeno(1,2,3-cd)pyrene	ND	0.10	ug/L	1.00	01/12/2001 23:55	
Surrogate(s)						
1-Methyl naphthalene	72.6	50-150	%	1.00	01/12/2001 23:55	

To: **Baseline Environmental**
Attn.: Bill Scott

Test Method: 8310
Prep Method: 3510/8310

Polynuclear Aromatic Hydrocarbons (PNA)

Sample ID:	**MW-2**	Lab Sample ID:	**2001-01-0170-002**
Project:	98379-24 Pacific Dry Dock Yard II, 321 Embarcadero, Oak	Received:	01/10/2001 18:55
		Extracted:	01/12/2001 08:57
Sampled:	01/09/2001 13:35	QC-Batch:	2001/01/12-01.18
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Naphthalene	ND	0.15	ug/L	1.00	01/13/2001 00:29	
Acenaphthylene	ND	0.10	ug/L	1.00	01/13/2001 00:29	
Acenaphthene	ND	0.10	ug/L	1.00	01/13/2001 00:29	
Fluorene	ND	0.10	ug/L	1.00	01/13/2001 00:29	
Phenanthrene	ND	0.10	ug/L	1.00	01/13/2001 00:29	
Anthracene	ND	0.050	ug/L	1.00	01/13/2001 00:29	
Fluoranthene	ND	0.15	ug/L	1.00	01/13/2001 00:29	
Pyrene	ND	0.15	ug/L	1.00	01/13/2001 00:29	
Benzo(a)anthracene	ND	0.10	ug/L	1.00	01/13/2001 00:29	
Chrysene	ND	0.10	ug/L	1.00	01/13/2001 00:29	
Benzo(b)fluoranthene	ND	0.10	ug/L	1.00	01/13/2001 00:29	
Benzo(k)fluoranthene	ND	0.050	ug/L	1.00	01/13/2001 00:29	
Benzo(a)pyrene	ND	0.10	ug/L	1.00	01/13/2001 00:29	
Dibenzo(a,h)anthracene	ND	0.10	ug/L	1.00	01/13/2001 00:29	
Benzo(g,h,i)perylene	ND	0.10	ug/L	1.00	01/13/2001 00:29	
Indeno(1,2,3-cd)pyrene	ND	0.10	ug/L	1.00	01/13/2001 00:29	
Surrogate(s)						
1-Methyl naphthalene	59.7	50-150	%	1.00	01/13/2001 00:29	

To: **Baseline Environmental**
Attn.: Bill Scott

Test Method: 8310
Prep Method: 3510/8310

Polynuclear Aromatic Hydrocarbons (PNA)

Sample ID:	**MW-3**	Lab Sample ID:	**2001-01-0170-003**
Project:	98379-24 Pacific Dry Dock Yard II, 321 Embarcadero, Oak	Received:	01/10/2001 18:55
		Extracted:	01/12/2001 08:57
Sampled:	01/09/2001 13:00	QC-Batch:	2001/01/12-01.18
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Naphthalene	ND	0.15	ug/L	1.00	01/13/2001 01:04	
Acenaphthylene	ND	0.10	ug/L	1.00	01/13/2001 01:04	
Acenaphthene	ND	0.10	ug/L	1.00	01/13/2001 01:04	
Fluorene	ND	0.10	ug/L	1.00	01/13/2001 01:04	
Phenanthrene	ND	0.10	ug/L	1.00	01/13/2001 01:04	
Anthracene	ND	0.050	ug/L	1.00	01/13/2001 01:04	
Fluoranthene	ND	0.15	ug/L	1.00	01/13/2001 01:04	
Pyrene	ND	0.15	ug/L	1.00	01/13/2001 01:04	
Benzo(a)anthracene	ND	0.10	ug/L	1.00	01/13/2001 01:04	
Chrysene	ND	0.10	ug/L	1.00	01/13/2001 01:04	
Benzo(b)fluoranthene	ND	0.10	ug/L	1.00	01/13/2001 01:04	
Benzo(k)fluoranthene	ND	0.050	ug/L	1.00	01/13/2001 01:04	
Benzo(a)pyrene	ND	0.10	ug/L	1.00	01/13/2001 01:04	
Dibenzo(a,h)anthracene	ND	0.10	ug/L	1.00	01/13/2001 01:04	
Benzo(g,h,i)perylene	ND	0.10	ug/L	1.00	01/13/2001 01:04	
Indeno(1,2,3-cd)pyrene	ND	0.10	ug/L	1.00	01/13/2001 01:04	
Surrogate(s)						
1-Methyl naphthalene	65.9	50-150	%	1.00	01/13/2001 01:04	

To: **Baseline Environmental**
Attn.: Bill Scott

Test Method: 8310
Prep Method: 3510/8310

Batch QC Report
Polynuclear Aromatic Hydrocarbons (PNA)

Method Blank | **Water** | **QC Batch # 2001/01/12-01.18**

MB: 2001/01/12-01.18-001 | Date Extracted: 01/12/2001 08:57

Compound	Result	Rep.Limit	Units	Analyzed	Flag
Naphthalene	ND	0.15	ug/L	01/12/2001 19:18	
Acenaphthylene	ND	0.10	ug/L	01/12/2001 19:18	
Acenaphthene	ND	0.10	ug/L	01/12/2001 19:18	
Fluorene	ND	0.10	ug/L	01/12/2001 19:18	
Phenanthrene	ND	0.10	ug/L	01/12/2001 19:18	
Anthracene	ND	0.05	ug/L	01/12/2001 19:18	
Fluoranthene	ND	0.15	ug/L	01/12/2001 19:18	
Pyrene	ND	0.15	ug/L	01/12/2001 19:18	
Benzo(a)anthracene	ND	0.10	ug/L	01/12/2001 19:18	
Chrysene	ND	0.10	ug/L	01/12/2001 19:18	
Benzo(b)fluoranthene	ND	0.10	ug/L	01/12/2001 19:18	
Benzo(k)fluoranthene	ND	0.05	ug/L	01/12/2001 19:18	
Benzo(a)pyrene	ND	0.10	ug/L	01/12/2001 19:18	
Dibenzo(a,h)anthracene	ND	0.10	ug/L	01/12/2001 19:18	
Benzo(g,h,i)perylene	ND	0.10	ug/L	01/12/2001 19:18	
Indeno(1,2,3-cd)pyrene	ND	0.10	ug/L	01/12/2001 19:18	
Surrogate(s)					
1-Methyl naphthalene	82.0	50-150	%	01/12/2001 19:18	

To: **Baseline Environmental**
Attn: Bill Scott

Test Method: 8310
Prep Method: 3510/8310

Batch QC Report

Polynuclear Aromatic Hydrocarbons (PNA)

Laboratory Control Spike (LCS/LCSD) **Water** **QC Batch # 2001/01/12-01.18**

LCS: 2001/01/12-01.18-002 Extracted: 01/12/2001 08:57 Analyzed 01/12/2001 19:52
LCSD: 2001/01/12-01.18-003 Extracted: 01/12/2001 08:57 Analyzed 01/12/2001 20:27

Compound	Conc. [ug/L]		Exp.Conc. [ug/L]		Recovery [%]		RPD	Ctrl. Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recovery	RPD	LCS	LCSD
Naphthalene	4.14	4.56	6.00	6.00	69.0	76.0	9.7	50-150	35		
Phenanthrene	4.66	4.87	6.00	6.00	77.7	81.2	4.4	50-150	35		
Pyrene	4.51	4.57	6.00	6.00	75.2	76.2	1.3	50-150	35		
Chrysene	5.06	5.21	6.00	6.00	84.3	86.8	2.9	50-150	35		
Benzo(a)pyrene	4.43	4.99	6.00	6.00	73.8	83.2	12.0	50-150	35		
Surrogate(s)											
1-Methyl naphthalene	10.3	11.3	15	15	68.7	75.3		50-150			

To: **Baseline Environmental**
Attn: Bill Scott

Test Method: 8310
Prep Method: 3510/8310

Legend & Notes

Polynuclear Aromatic Hydrocarbons (PNA)

Analysis Flags

o

Reporting limits were raised due to high level of analyte present in the sample.

Gas/BTEX Compounds by 8015M/8020

Baseline Environmental

✉ 5900 Hollis Street, Suite D
Emeryville, CA 94608-2008

Attn: Bill Scott

Phone: (510) 420-8686 Fax: (510) 420-1707

Project #: 98379-24

Project: Pacific Dry Dock Yard II, 321 Embarcadero, Oak

Samples Reported

Sample ID	Matrix	Date Sampled	Lab #
MW-1	Water	01/09/2001 14:25	1
MW-2	Water	01/09/2001 13:35	2
MW-3	Water	01/09/2001 13:00	3

To: **Baseline Environmental**
Attn.: Bill Scott

Test Method: 8020
Prep Method: 5030

Gas/BTEX Compounds by 8015M/8020

Sample ID:	**MW-1**	Lab Sample ID:	**2001-01-0170-001**
Project:	98379-24 Pacific Dry Dock Yard II, 321 Embarcadero, Oak	Received:	01/10/2001 18:55
		Extracted:	01/11/2001 13:39
Sampled:	01/09/2001 14:25	QC-Batch:	2001/01/11-01.02
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Benzene	ND	0.50	ug/L	1.00	01/11/2001 13:39	
Toluene	ND	0.50	ug/L	1.00	01/11/2001 13:39	
Ethyl benzene	ND	0.50	ug/L	1.00	01/11/2001 13:39	
Xylene(s)	ND	0.50	ug/L	1.00	01/11/2001 13:39	
Surrogate(s)						
Trifluorotoluene	99.7	58-124	%	1.00	01/11/2001 13:39	

To: **Baseline Environmental**
Attn.: Bill Scott

Test Method: 8020
Prep Method: 5030

Gas/BTEX Compounds by 8015M/8020

Sample ID:	**MW-2**	Lab Sample ID:	**2001-01-0170-002**
Project:	98379-24 Pacific Dry Dock Yard II, 321 Embarcadero, Oak	Received:	01/10/2001 18:55
		Extracted:	01/11/2001 14:15
Sampled:	01/09/2001 13:35	QC-Batch:	2001/01/11-01.02
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Benzene	ND	0.50	ug/L	1.00	01/11/2001 14:15	
Toluene	ND	0.50	ug/L	1.00	01/11/2001 14:15	
Ethyl benzene	ND	0.50	ug/L	1.00	01/11/2001 14:15	
Xylene(s)	ND	0.50	ug/L	1.00	01/11/2001 14:15	
Surrogate(s)						
Trifluorotoluene	98.6	58-124	%	1.00	01/11/2001 14:15	

To: **Baseline Environmental**
Attn.: Bill Scott

Test Method: 8020
Prep Method: 5030

Gas/BTEX Compounds by 8015M/8020

Sample ID:	**MW-3**	Lab Sample ID:	**2001-01-0170-003**
Project:	98379-24 Pacific Dry Dock Yard II, 321 Embarcadero, Oak	Received:	01/10/2001 18:55
		Extracted:	01/11/2001 14:50
Sampled:	01/09/2001 13:00	QC-Batch:	2001/01/11-01.02
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Benzene	ND	0.50	ug/L	1.00	01/11/2001 14:50	
Toluene	ND	0.50	ug/L	1.00	01/11/2001 14:50	
Ethyl benzene	ND	0.50	ug/L	1.00	01/11/2001 14:50	
Xylene(s)	ND	0.50	ug/L	1.00	01/11/2001 14:50	
Surrogate(s)						
Trifluorotoluene	94.2	58-124	%	1.00	01/11/2001 14:50	

To: **Baseline Environmental**
Attn.: Bill Scott

Test Method: 8015M
8020
Prep Method: 5030

Batch QC Report
Gas/BTEX Compounds by 8015M/8020

Method Blank **Water** **QC Batch # 2001/01/11-01.02**

MB: 2001/01/11-01.02-003 Date Extracted: 01/11/2001 10:06

Compound	Result	Rep.Limit	Units	Analyzed	Flag
Benzene	ND	0.5	ug/L	01/11/2001 10:06	
Toluene	ND	0.5	ug/L	01/11/2001 10:06	
Ethyl benzene	ND	0.5	ug/L	01/11/2001 10:06	
Xylene(s)	ND	0.5	ug/L	01/11/2001 10:06	
Surrogate(s)					
Trifluorotoluene	105.7	58-124	%	01/11/2001 10:06	

To: **Baseline Environmental**
Attn: Bill Scott

Test Method: 8020
Prep Method: 5030

Batch QC Report

Gas/BTEX Compounds by 8015M/8020

Laboratory Control Spike (LCS/LCSD) **Water** **QC Batch # 2001/01/11-01.02**

LCS: 2001/01/11-01.02-004 Extracted: 01/11/2001 10:42 Analyzed 01/11/2001 10:42
LCSD: 2001/01/11-01.02-005 Extracted: 01/11/2001 11:17 Analyzed 01/11/2001 11:17

Compound	Conc. [ug/L]		Exp.Conc. [ug/L]		Recovery [%]		RPD	Ctrl. Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recovery	RPD	LCS	LCSD
Benzene	115	109	100.0	100.0	115.0	109.0	5.4	77-123	20		
Toluene	111	103	100.0	100.0	111.0	103.0	7.5	78-122	20		
Ethyl benzene	113	105	100.0	100.0	113.0	105.0	7.3	70-130	20		
Xylene(s)	327	302	300	300	109.0	100.7	7.9	75-125	20		
Surrogate(s)											
Trifluorotoluene	541	470	500	500	108.2	94.0		58-124			

Metals

Baseline Environmental

5900 Hollis Street, Suite D
Emeryville, CA 94608-2008

Attn: Bill Scott

Phone: (510) 420-8686 Fax: (510) 420-1707

Project #: 98379-24

Project: Pacific Dry Dock Yard II, 321 Embarcadero, Oak

Samples Reported

Sample ID	Matrix	Date Sampled	Lab #
MW-1	Water	01/09/2001 14:25	1
MW-2	Water	01/09/2001 13:35	2
MW-3	Water	01/09/2001 13:00	3

To: **Baseline Environmental**
Attn.: Bill Scott

Test Method: 6010B
Prep Method: 3010A

Metals

Sample ID:	**MW-1**	Lab Sample ID:	**2001-01-0170-001**
Project:	98379-24 Pacific Dry Dock Yard II, 321 Embarcadero, Oak	Received:	01/10/2001 18:55
		Extracted:	01/12/2001 05:58
Sampled:	01/09/2001 14:25	QC-Batch:	2001/01/12-02.15
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Cadmium	ND	0.0020	mg/L	1.00	01/12/2001 16:29	
Chromium	ND	0.0050	mg/L	1.00	01/12/2001 16:29	
Lead	ND	0.0050	mg/L	1.00	01/12/2001 16:29	
Nickel	ND	0.0050	mg/L	1.00	01/12/2001 16:29	
Zinc	ND	0.010	mg/L	1.00	01/12/2001 16:29	

To: **Baseline Environmental**
Attn.: Bill Scott

Test Method: 6010B
Prep Method: 3010A

Metals

Sample ID:	**MW-2**	Lab Sample ID:	**2001-01-0170-002**
Project:	98379-24 Pacific Dry Dock Yard II, 321 Embarcadero, Oak	Received:	01/10/2001 18:55
		Extracted:	01/12/2001 05:58
Sampled:	01/09/2001 13:35	QC-Batch:	2001/01/12-02.15
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Cadmium	ND	0.0020	mg/L	1.00	01/12/2001 16:34	
Chromium	ND	0.0050	mg/L	1.00	01/12/2001 16:34	
Lead	ND	0.0050	mg/L	1.00	01/12/2001 16:34	
Nickel	ND	0.0050	mg/L	1.00	01/12/2001 16:34	
Zinc	0.028	0.010	mg/L	1.00	01/12/2001 16:34	

To: **Baseline Environmental**
Attn.: Bill Scott

Test Method: 6010B
Prep Method: 3010A

Metals

Sample ID:	**MW-3**	Lab Sample ID:	**2001-01-0170-003**
Project:	98379-24 Pacific Dry Dock Yard II, 321 Embarcadero, Oak	Received:	01/10/2001 18:55
		Extracted:	01/12/2001 05:58
Sampled:	01/09/2001 13:00	QC-Batch:	2001/01/12-02.15
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Cadmium	ND	0.0020	mg/L	1.00	01/12/2001 16:38	
Chromium	ND	0.0050	mg/L	1.00	01/12/2001 16:38	
Lead	ND	0.0050	mg/L	1.00	01/12/2001 16:38	
Nickel	0.0086	0.0050	mg/L	1.00	01/12/2001 16:38	
Zinc	ND	0.010	mg/L	1.00	01/12/2001 16:38	

To: **Baseline Environmental**
Attn.: Bill Scott

Test Method: 6010B
Prep Method: 3010A

Batch QC Report
Metals

Method Blank | **Water** | **QC Batch # 2001/01/12-02.15**

MB: 2001/01/12-02.15-040 | Date Extracted: 01/12/2001 05:58

Compound	Result	Rep.Limit	Units	Analyzed	Flag
Cadmium	ND	0.0020	mg/L	01/12/2001 15:47	
Chromium	ND	0.0050	mg/L	01/12/2001 15:47	
Lead	ND	0.0050	mg/L	01/12/2001 15:47	
Nickel	ND	0.0050	mg/L	01/12/2001 15:47	
Zinc	ND	0.010	mg/L	01/12/2001 15:47	

To: **Baseline Environmental**
Attn: Bill Scott

Test Method: 6010B
Prep Method: 3010A

Batch QC Report

Metals

Laboratory Control Spike (LCS/LCSD) **Water** **QC Batch # 2001/01/12-02.15**

LCS: 2001/01/12-02.15-041 Extracted: 01/12/2001 05:58 Analyzed 01/12/2001 15:52
LCSD: 2001/01/12-02.15-042 Extracted: 01/12/2001 05:58 Analyzed 01/12/2001 15:56

Compound	Conc. [mg/L]		Exp.Conc. [mg/L]		Recovery [%]		RPD	Ctrl. Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recovery	RPD	LCS	LCSD
Cadmium	0.491	0.507	0.500	0.500	98.2	101.4	3.2	80-120	20		
Chromium	0.494	0.509	0.500	0.500	98.8	101.8	3.0	80-120	20		
Lead	0.497	0.511	0.500	0.500	99.4	102.2	2.8	80-120	20		
Nickel	0.491	0.506	0.500	0.500	98.2	101.2	3.0	80-120	20		
Zinc	0.502	0.518	0.500	0.500	100.4	103.6	3.1	80-120	20		

TEPH w/ Silica Gel Clean-up

Baseline Environmental

✉ 5900 Hollis Street, Suite D
Emeryville, CA 94608-2008

Attn: Bill Scott

Phone: (510) 420-8686 Fax: (510) 420-1707

Project #: 98379-24

Project: Pacific Dry Dock Yard II, 321 Embarcadero, Oak

Samples Reported

Sample ID	Matrix	Date Sampled	Lab #
MW-1	Water	01/09/2001 14:25	1
MW-2	Water	01/09/2001 13:35	2
MW-3	Water	01/09/2001 13:00	3

To: **Baseline Environmental**
Attn.: Bill Scott

Test Method: 8015M
Prep Method: 3510/8015M

TEPH w/ Silica Gel Clean-up

Sample ID:	**MW-1**	Lab Sample ID:	**2001-01-0170-001**
Project:	98379-24 Pacific Dry Dock Yard II, 321 Embarcadero, Oak	Received:	01/10/2001 18:55
		Extracted:	01/11/2001 07:19
Sampled:	01/09/2001 14:25	QC-Batch:	2001/01/11-01.10
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	61	50	ug/L	1.00	01/13/2001 05:45	ndp
Motor Oil	ND	500	ug/L	1.00	01/13/2001 05:45	
Surrogate(s)						
o-Terphenyl	78.6	60-130	%	1.00	01/13/2001 05:45	

To: **Baseline Environmental**
Attn.: Bill Scott

Test Method: 8015M
Prep Method: 3510/8015M

TEPH w/ Silica Gel Clean-up

Sample ID:	**MW-2**	Lab Sample ID:	**2001-01-0170-002**
Project:	98379-24 Pacific Dry Dock Yard II, 321 Embarcadero, Oak	Received:	01/10/2001 18:55
		Extracted:	01/11/2001 07:19
Sampled:	01/09/2001 13:35	QC-Batch:	2001/01/11-01.10
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	ND	50	ug/L	1.00	01/13/2001 06:32	
Motor Oil	ND	500	ug/L	1.00	01/13/2001 06:32	
Surrogate(s)						
o-Terphenyl	74.0	60-130	%	1.00	01/13/2001 06:32	

To: **Baseline Environmental**
Attn.: Bill Scott

Test Method: 8015M
Prep Method: 3510/8015M

TEPH w/ Silica Gel Clean-up

Sample ID:	**MW-3**	Lab Sample ID:	**2001-01-0170-003**
Project:	98379-24 Pacific Dry Dock Yard II, 321 Embarcadero, Oak	Received:	01/10/2001 18:55
		Extracted:	01/11/2001 07:19
Sampled:	01/09/2001 13:00	QC-Batch:	2001/01/11-01.10
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	ND	50	ug/L	1.00	01/13/2001 07:19	
Motor Oil	ND	500	ug/L	1.00	01/13/2001 07:19	
Surrogate(s)						
o-Terphenyl	68.7	60-130	%	1.00	01/13/2001 07:19	

To: **Baseline Environmental**
Attn.: Bill Scott

Test Method: 8015M
Prep Method: 3510/8015M

Batch QC Report
TEPH w/ Silica Gel Clean-up

Method Blank | **Water** | **QC Batch # 2001/01/11-01.10**

MB: 2001/01/11-01.10-001 | Date Extracted: 01/11/2001 07:19

Compound	Result	Rep.Limit	Units	Analyzed	Flag
Diesel	ND	50	ug/L	01/13/2001 03:23	
Motor Oil	ND	500	ug/L	01/13/2001 03:23	
Surrogate(s)					
o-Terphenyl	90.5	60-130	%	01/13/2001 03:23	

To: **Baseline Environmental**
Attn: Bill Scott

Test Method: 8015M
Prep Method: 3510/8015M

Batch QC Report

TEPH w/ Silica Gel Clean-up

Laboratory Control Spike (LCS/LCSD) **Water** **QC Batch # 2001/01/11-01.10**

LCS: 2001/01/11-01.10-002 Extracted: 01/11/2001 07:19 Analyzed 01/13/2001 04:11
LCSD: 2001/01/11-01.10-003 Extracted: 01/11/2001 07:19 Analyzed 01/13/2001 04:58

Compound	Conc. [ug/L]		Exp.Conc. [ug/L]		Recovery [%]		RPD	Ctrl. Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recovery	RPD	LCS	LCSD
Diesel	1020	1040	1250	1250	81.6	83.2	1.9	60-130	25		
Surrogate(s)											
o-Terphenyl	22.5	22.4	20.0	20.0	112.5	112.0		60-130			

To: **Baseline Environmental**
Attn: Bill Scott

Test Method: 8015M
Prep Method: 3510/8015M

Legend & Notes

TEPH w/ Silica Gel Clean-up

Analyte Flags

ndp

Hydrocarbon reported does not match the pattern of our Diesel standard

2001-01-0170

CHAIN OF CUSTODY RECORD

BASELINE
5900 Hollis Street, Suite D
Emeryville, CA 94608
Tel: (510) 420-8686 Fax: (510) 420-1707

Turn-around Time: 5-Day Standard
Lab: Chromalabs - STL
BASELINE Contact Person: Bill Scott

Project No.	Project Name and Location:
98379-24	Pacific Dry Dock Yard II, 321 Embarcadero, Oak

Samplers: (Signature) William K Scott

56819

Sample ID No. Station	Date:	Time:	Media	Containers No.	Type	Preservative None	HCl	NO_3	SO_4	Other:	TPH as diesel + motor oil w/silica gel clean up	BTEX	PAHs	Cd, Pb, Ni, Zn, Cr Total					Remarks/ Composite
MW-1	1-9-01	14:25	W	2	liter amber	X					X		X						
MW-1			W	2	VOA's		X					X							
MW-1			W	1	poly	X								X					
MW-2		13:35	W	2	liter amber	X					X		X						
MW-2			W	2	VOA's		X					X							
MW-2			W	1	poly			X						X					
MW-3		13:00	W	2	liter amber	X					X		X						
MW-3			W	2	VOA's		X					X							
MW-3			W	1	poly			X						X					

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Conditions of Samples Upon Arrival at Laboratory:
William K Scott	1-10-01/13:50		1-10-01	5.0°C
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Remarks:
	1-10-01 1855	Denise Harrington	1/10/01 @ 1855	Plastic for sample MW-1 metals analysis was pH-adjusted upon receipt - DSH
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	

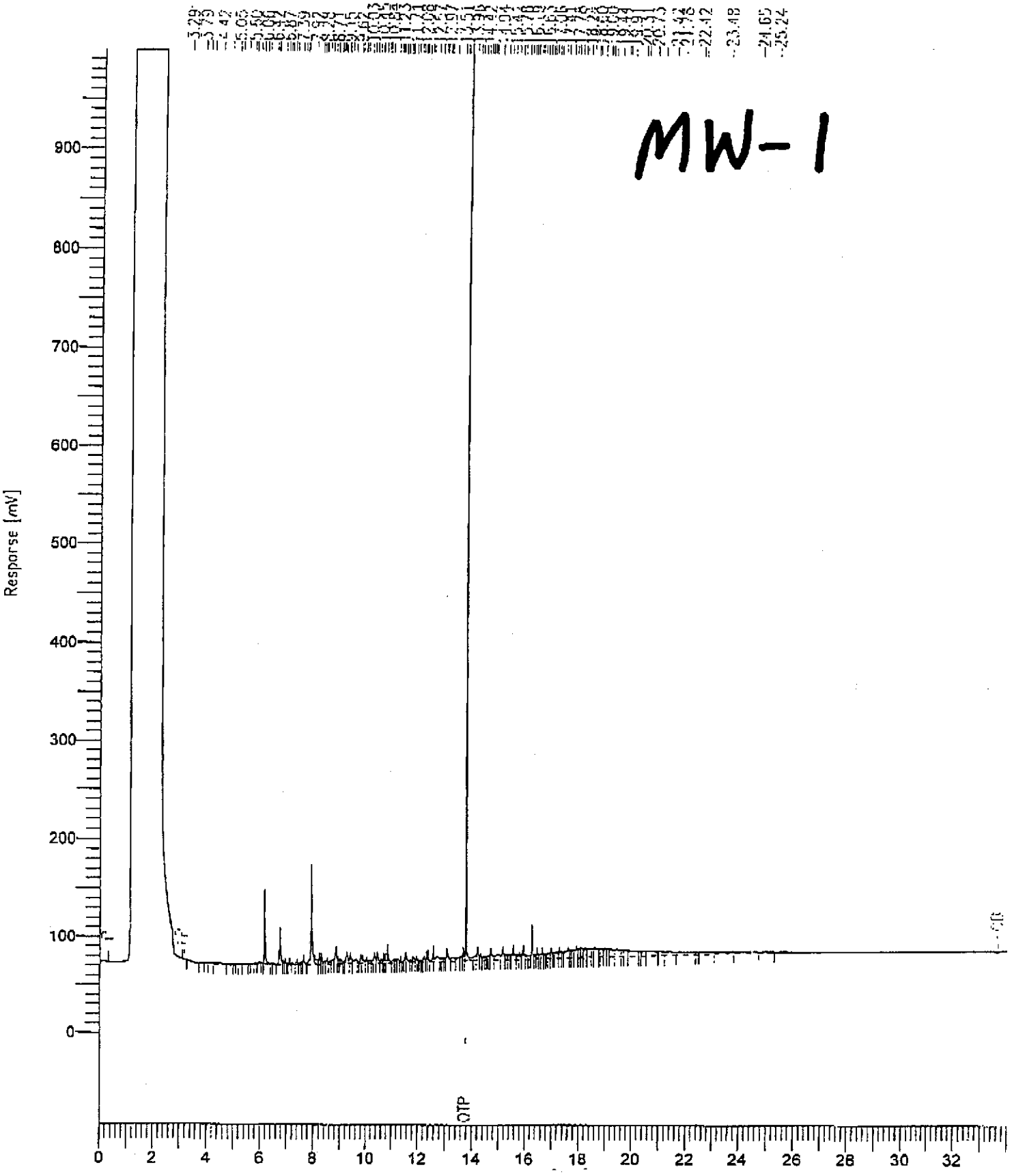
D:\Graphic\Chain of Custody Record\Master.cdr 4/12/00

Chromatogram

Sample Name : 010170-01
FileName : P:\200101\DATA\4112023.raw
Method : 4TPH1121
Start Time : 0.00 min End Time : 34.00 min
Scale Factor: 0.0 Plot Offset: 0 mV

Sample #: 011101 Page 1 of 1
Date : 01/15/2001 04:07
Time of Injection: 01/13/2001 05:45
Low Point : 0.00 mV High Point : 1000.00 mV
Plot Scale: 1000.0 mV

MW-1

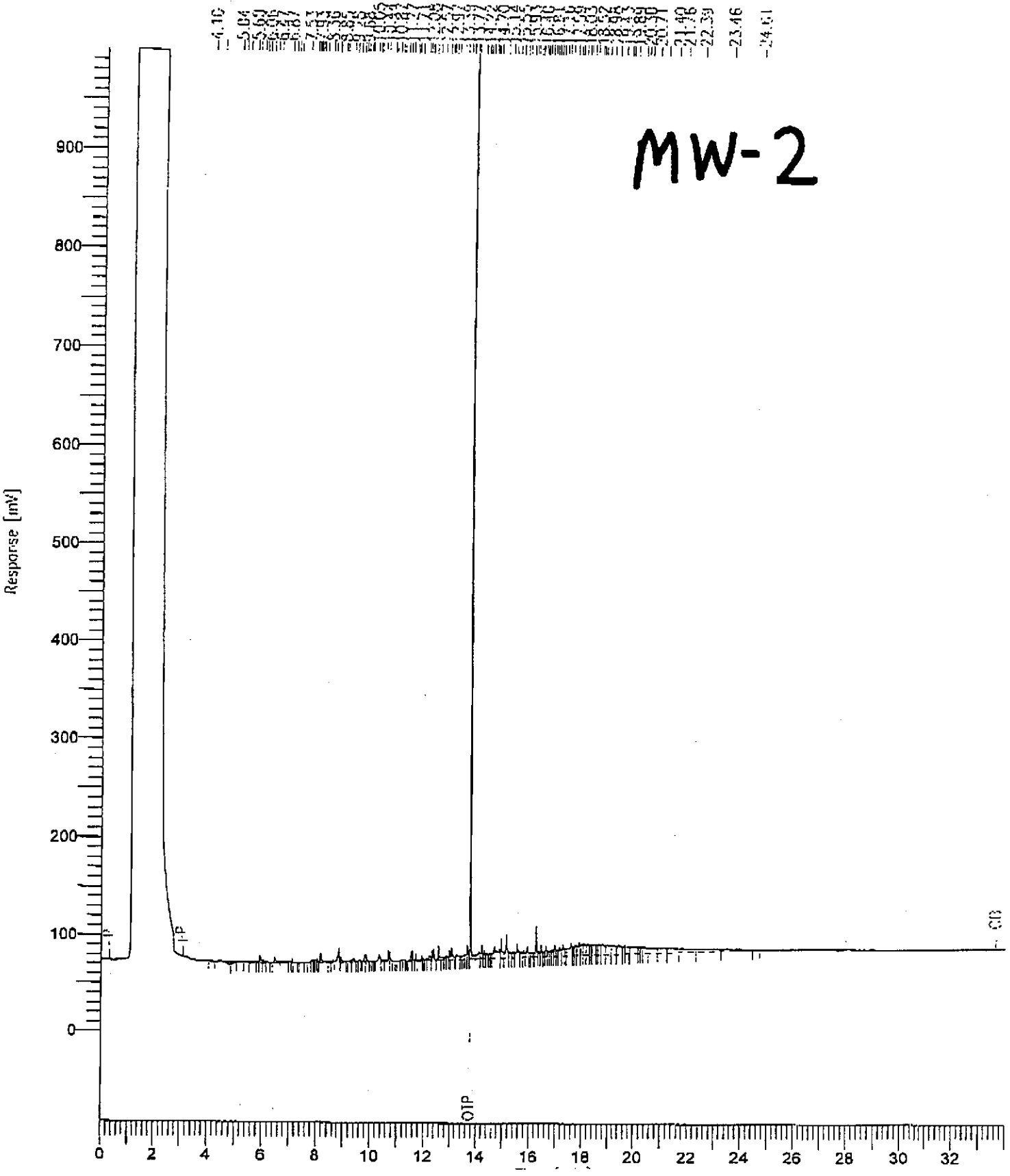


Chromatogram

Sample Name : 010170-02
FileName : P:\200101\DATA\4112024.RAW
Method : 4TPH1121.MTH
Start Time : 0.00 min End Time : 34.00 min
Scale Factor: 0.0 Plot Offset: 0 mV

Sample #: 011101 Page 1 of 1
Date : 01/15/2001 08:42
Time of Injection: 01/13/2001 06:32
Low Point : 0.00 mV High Point : 1000.00 mV
Plot Scale: 1000.0 mV

MW-2

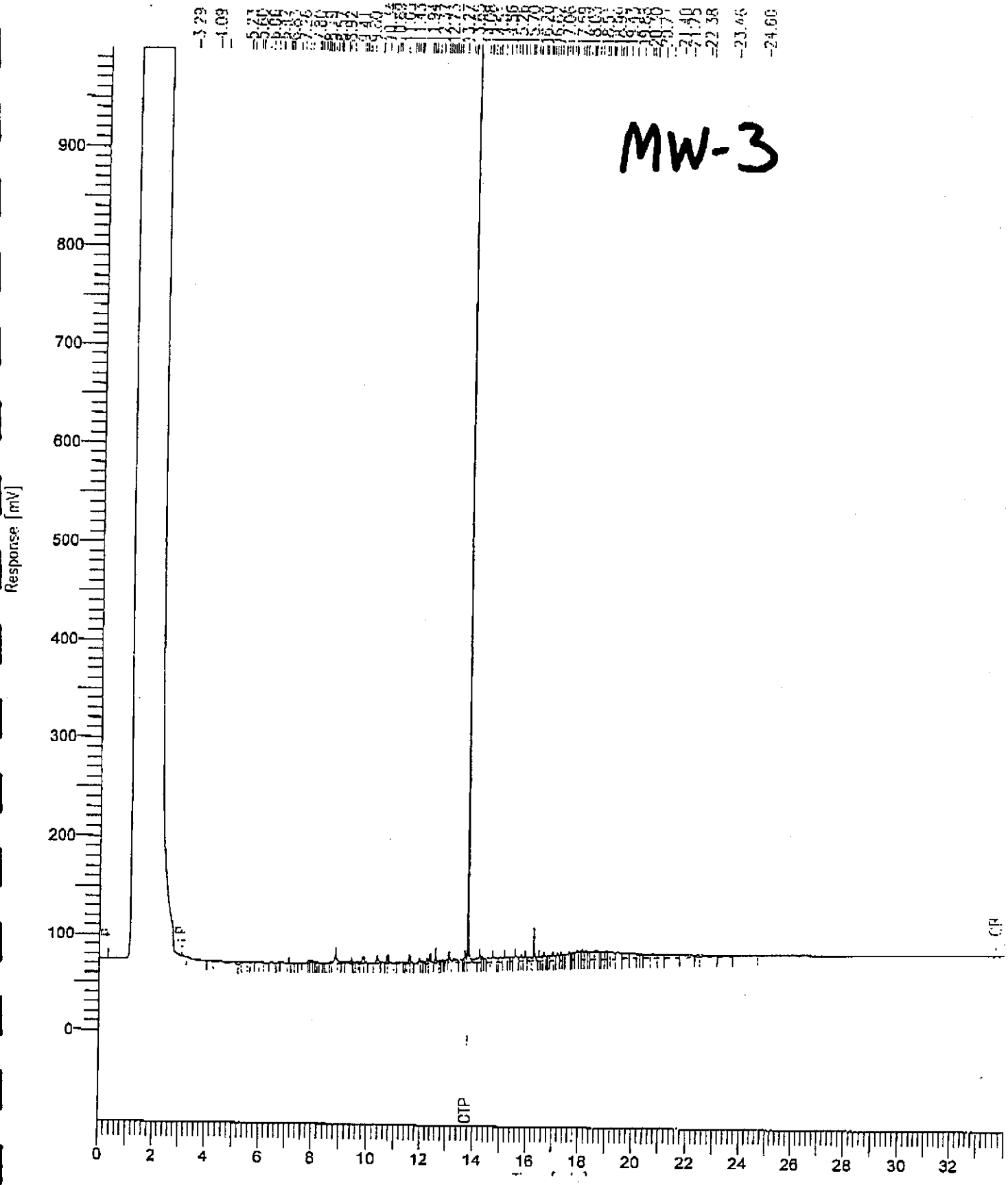


Chromatogram

Sample Name : 010170-03
FileName : P:\200101\DATA\4112025.raw
Method : 4TPH1121
Start Time : 0.00 min End Time : 34.00 min
Scale Factor: 0.0 Plot Offset: 0 mV

Sample #: 011101 Page 1 of 1
Date : 01/15/2001 04:07
Time of Injection: 01/13/2001 07:19
Low Point : 0.00 mV High Point : 1000.00 mV
Plot Scale: 1000.0 mV

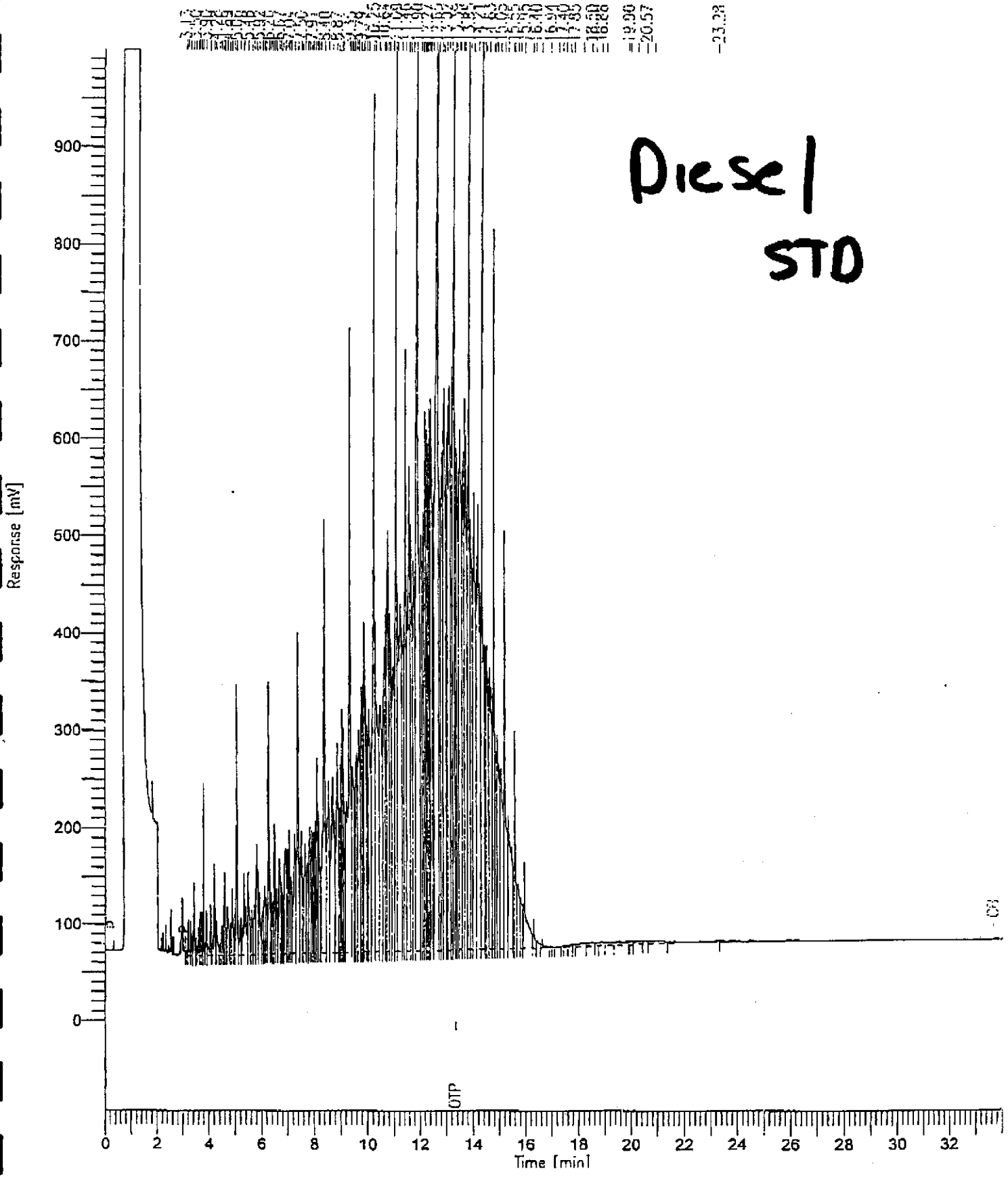
MW-3



Chromatogram

Sample Name : DIESEL 1000PPM
FileName : P:\200101\DATA\4122033.raw
Method : 4TPH1121
Start Time : 0.00 min End Time : 34.00 min
Scale Factor: 0.0 Plot Offset: 0 mV

Sample #: GC4872 Page 1 of 1
Date : 01/23/2001 09:46
Time of Injection: 01/23/2001 09:12
Low Point : 0.00 mV High Point : 1000.00 mV
Plot Scale: 1000.0 mV

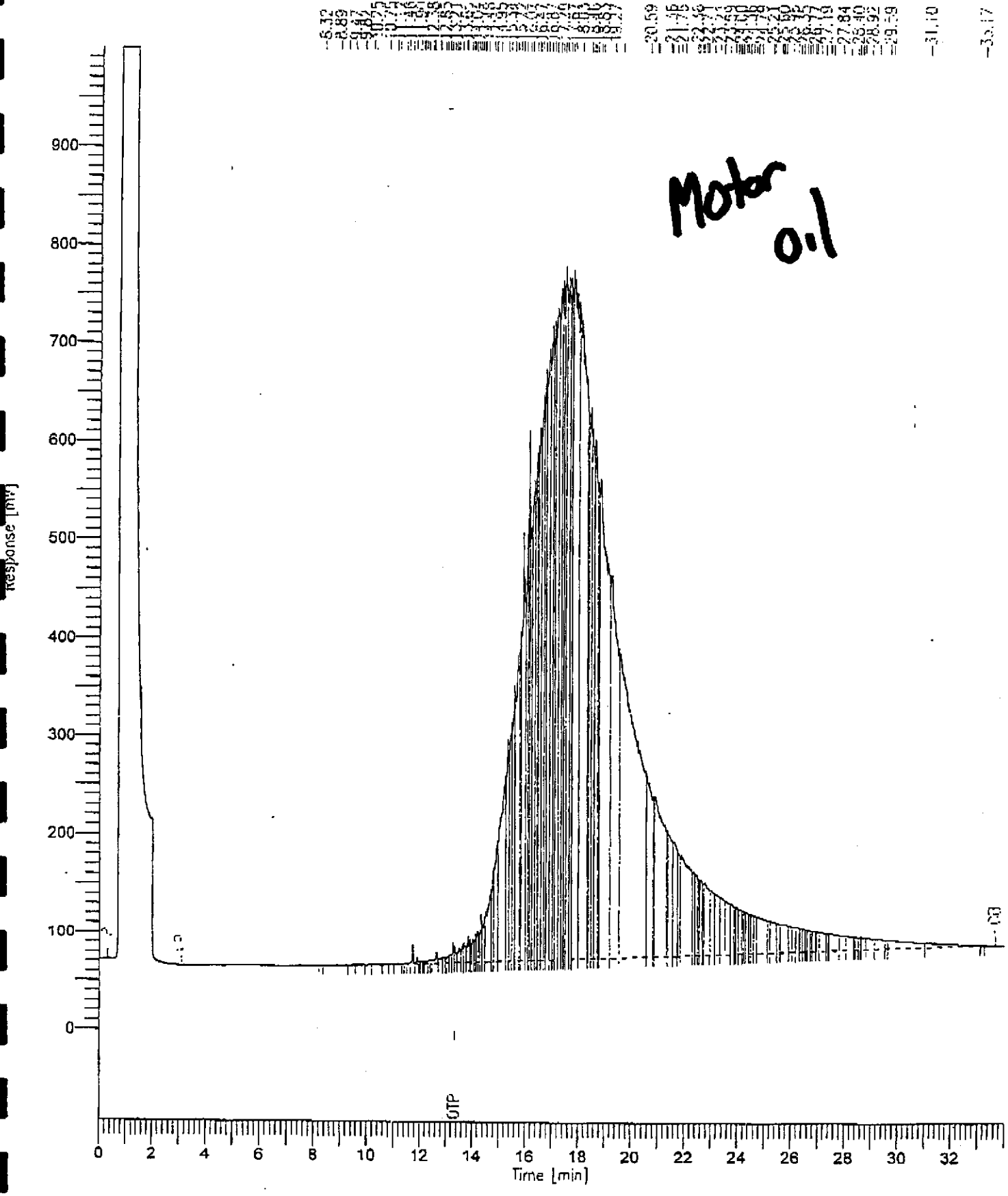


Diesel STD

Chromatogram

Sample Name : MO 1000PPM
FileName : P:\200101\DATA\4122032.raw
Method : 4TPH1121
Start Time : 0.00 min End Time : 34.00 min
Scale Factor: 0.0 Plot Offset: 0 mV

Sample #: GC4871 Page 1 of 1
Date : 01/23/2001 08:59
Time of Injection: 01/23/2001 08:25
Low Point : 0.00 mV High Point : 1000.00 mV
Plot Scale: 1000.0 mV



Quality Control Checklist
for Review of Laboratory Report

Job No.: 98379-24 Site: Pacific Dry Dock II

Laboratory: STL Chromalab Laboratory Report No: 2001-01-0170

Report Date: 1/17/01 BASELINE Review By: J. Pettijohn

	Yes	No	NA
GENERAL QUESTIONS **(Describe "no" responses below in "comments" section. Contact the laboratory, as required, for further explanation or action on "no" responses; document discussion in comments section.)**			
1a. Does the report include a case narrative? *(A case narrative MUST be prepared by the lab for all analytical work requested by BASELINE)*			✓
1b. Is the number of pages for the lab report as indicated on the case narrative/lab transmittal consistent with the number of pages that are included in report?	✓		✓
1c. Does the case narrative indicate which samples were analyzed by a subcontractor and the subcontractor's name?			✓
1d. Does the case narrative summarize subsequent requests not shown on the chain-of-custody (e.g., additional analyses requested, release of "hold" samples)?			✓
1e. Does the case narrative explain why requested analyses could not be performed by laboratory (e.g., insufficient sample)?			✓
1f. Does the case narrative explain all problems with the QA/QC data as identified in the checklist (as applicable) ?			✓
2a. Is the laboratory report format consistent and legible throughout the report?	✓		✓
2b. Are the sample and reported dates shown in the laboratory report correct?			✓
3a. Does the lab report include the original chain-of-custody form?	✓		✓
3b. Were all samples appropriately analyzed as requested on the chain-of-custody form?	✓		✓
4. Was the lab report signed and dated as being reviewed by the laboratory director, QA manager, or other appropriate personnel? (Some lab reports have signature spaces for each page). (This requirement also applies to any analyses subcontracted out by the laboratory)	✓		✓
5a. Are preparation methods, cleanup methods (if applicable), and laboratory methods indicated for all analyses?	✓		✓
5b. If additional analytes were requested as part of the reporting of the data for an analytical method, were these included in the lab report?			✓
6. Are the units in the lab report provided for each analysis consistent throughout the report?	✓		✓
7. Are the detection limits (DL) appropriate based on the intended use of the data? (e.g., DL below applicable MCLs for water quality issues?)	✓		✓
8a. Are detection limits appropriate based on the analysis performed? (i.e., not elevated due to dilution effects)	✓		✓
8b. If no, is an explanation provided by the laboratory?			✓

	Yes	No	NA
9a. Were the samples analyzed within the appropriate holding time? (generally 2 weeks for volatiles, and up to 6 months for total metals)	✓		☒
9b. If no, was it flagged in the report?			✓
10. If samples were composited prior to analysis, does the lab report indicate which samples were composited for each analysis?			✓
11a. Do the chromatograms confirm quantitative laboratory results? (petroleum hydrocarbons)	✓		
11b. Is a standard chromatogram(s) included in the laboratory report?	✓		
11c. Do the chromatograms confirm laboratory notes, if present (e.g., sample exhibits lighter hydrocarbon than standard)	✓		
12. Are the results consistent with previous analytical results from the site? *(If no, contact the lab and request review/reanalysis of data, as appropriate)*	✓		
13a. REVISED LAB REPORTS ONLY. Is the revised lab report or revised pages to a lab report signed and dated as being reviewed by the laboratory director, QA manager, or other appropriate personnel?			✓
13b. REVISED LAB REPORTS ONLY. Does the case narrative indicate the date of revision and provide an explanation for the revision?			✓
13c. REVISED LAB REPORTS ONLY. Does the revised lab report adequately address the problem(s) which triggered the need for a revision?			✓
13d. REVISED LAB REPORTS ONLY. Are the data included in the revised report the same as data reported in the original report, except where the report was revised to correct incorrectly reported data?			✓
QA/QC Questions Field/Laboratory Quality Control - Groundwater Analyses			
14. Are field blanks reported as "ND"? (groundwater samples) *A field blank is a sample of DI water which is prepared in the field using the same collection and handling procedures as the other samples collected, and used to demonstrate that the sampling procedure has not contaminated the sample.*			✓
15. Are trip blanks reported as "ND"? (groundwater samples/volatile analyses) *A trip blank is a sample of contaminant-free matrix placed in an appropriate container by the lab and transported with the field samples collected. Provides information regarding positive interference introduced during sample transport, storage, preservation, and analysis. The sample is NOT opened in the field.*			✓
16. Are duplicate sample results consistent with the original sample? (groundwater samples) *Field duplicates consist of two independent samples collected at the same sampling location during a single sampling event. Used to evaluate precision of the analytical data and sampling technique. (Differences between the duplicate and sample results may also be attributed to environmental variability).*			✓

	Yes	No	NA
Batch Quality Control (Samples are batched together by matrix [soil, water] and analyses requested. A batch generally consists of 20 or fewer samples of the same matrix type, and is prepared using the same reagents, standards, procedures, and time frame as the samples. QC samples are run with each batch to assess performance of the entire measurement process.)			
17. Do the sample batch numbers and corresponding laboratory QA/QC batch numbers match?	✓		
18a. Are method blanks (MB) for the analytical method(s) below the laboratory reporting limits? *Used to assess lab contamination and prevent false positive results. MBs should be "ND."*	✓		
18b. If no, is an explanation provided in the case narrative to validate the data?			✓
18c. Are analytes which may be considered laboratory contaminants reported below the laboratory reporting limit? *Common lab contaminants include acetone, methylene chloride, diethylhexyl phthalate, and di-n-octyl phthalate.*	✓		
18d. If no, was the laboratory contacted to determine whether reported analyte could be a potential laboratory contaminant and was an explanation included in the case narrative?			✓
19. Are laboratory control samples (LCS) and LCS duplicate (LCSD) [a.k.a., Blank Spike (BS) and BS duplicates (BSD)] within laboratory reporting limits? Limits should be provided on the report. *LCS is a reagent blank spike with a representative selection of target analyte(s) and prepared in the same manner as the samples analyzed. The LCS should be spiked with the same analytes as the matrix spike (below). The LCS is free from interferences from the sample matrix and demonstrates the ability of the lab instruments to recover the target analytes. Accuracy (recovery information) is generally reported as % spike recovery; precision (reproducibility of results) between the LCS and LCSD is generally reported as the relative percent difference (RPD). LCS/LCSD can be run in addition to or in lieu of, matrix QC data.*	✓		
20a. Are the Matrix QC data (i.e., MS/MSD) within laboratory limits? Limits should be provided on the lab report. *The lab selects a sample from the batch and analyzes a spike and a spike duplicate of that sample. Matrix QC data is used to obtain precision and accuracy information and is reported in the same manner as LCS/LCSD. If the MS/MSD fails, the results may still be considered valid if the MB and either the LCS/LCSD or BS/BSD is within the lab's limits (failure is probably due to matrix interference).*			✓
20b. If no, is the MB and either LCS/LCSD or BS/BSD within lab limits to validate the data?			✓

	Yes	No	NA
Sample Quality Control			
21a. Are the surrogate spikes reported within the lab's acceptable recovery limits? *A surrogate is a non-target analyte, which is similar in chemical structure to the analyte(s) being analyzed for, and which is not commonly found in environmental samples. A known concentration of the surrogate is spike into the sample or QA "sample" prior to extraction or sample preparation. Results are usually reported as % recovery of the spike. Failure to meet lab's limits for primary and secondary surrogates results in rebatching and reanalysis of the sample; failure of only the primary or the secondary surrogate may be acceptable under certain circumstances. Failure generally is due to coelution with the sample matrix.*	✓		
21b. If no, is an explanation given in the case narrative to validate the data?			✓

Comments:

ATTACHMENT C

ALAMEDA COUNTY
3 MAY 2000 LETTER

98379-15

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

May 3, 2000
StID # 1222

Mr. Douglas Herman
Port of Oakland
530 Water St.
Oakland CA 94604-2064

Re: Soil and Groundwater Investigation and Human and Ecological Risk Evaluation, Crowley Yard II, 321 Embarcadero, Oakland CA 94606

Dear Mr. Herman:

Our office has received and reviewed the referenced Baseline April 2000 report for Crowley Yard II, 321 Embarcadero. This report describes the results of the over-excavation of former USTs GF-11 and GF-12, the installation of three monitoring wells and provides a human and ecological risk evaluation for the residual soil and groundwater contamination.

The conservative evaluation compared the highest reported contaminant concentrations versus cleanup levels published in the Water Board Orders, 99-045 and 98-072, the SFIA and Catellus orders, respectively. Based upon the similarity in settings of these sites, this is a reasonable approach. Our office agrees that additional groundwater monitoring should be performed to verify the groundwater concentrations immediately down-gradient of the former USTs.

Our office has the following additional comments on this report:

- The Port is still responsible to sample along the piping runs when the building foundations are demolished as planned in the future.
- Although no specific cleanup levels may exist for specific compounds (specific PAHs, TPHmo) some evaluation will be required prior to requesting site closure.
- Be aware that the recommended ecological soil evaluation was omitted in the Ecological Health Screening. Some evaluation of this data will be required prior to requesting site closure.
- Assuming that this site will be developed into a park, the Port shall prepare a health and safety plan for future maintenance or construction workers. The Port shall prepare a soil and groundwater management plan.
- The Port shall provide evidence of filing a deed restriction limiting the future land use of the site, prohibiting the use of groundwater beneath the site and requiring an impervious cap or a clean soil covering over any areas of known shallow soil contamination.

Please contact me at (510) 567-6765 if you have any questions.

Sincerely,

Barney M Chan

Barney M. Chan
Hazardous Materials Specialist

C: B. Chan, file
Ms. Y. Nordhav, Baseline , 5900 Hollis St., Suite D, Emeryville, CA 94608
321EmbarcRA

ATTACHMENT D

SOIL QUALITY SUMMARY TABLES
SOURCES: BASELINE, 2000A; ITSI, 1998

TABLE D1
SUMMARY OF ANALYTICAL RESULTS, SOIL
Pacific Dry Dock, Yard II
321 Embarcadero, Oakland, CA
(mg/kg)

	MW-1;	MW-2;	MW-3;	MW-3;	GF-11	GF-12
Date	3/1/00	3/1/00	3/1/00	3/1/00	2/8/00	2/8/00
Petroleum Hydrocarbons[1]						
TPH as diesel	**2.6**[3,4]	<1.0	**1.5**[3,4]	**7.1**[4]	**250**[5,6]	**710**[5,6]
TPH as motor oil	<10	<10	<10	51	--	--
Polycyclic Aromatic Hydrocarbons						
Naphthalene	<0.10	<0.10	<1.0[7]	<1.0[7]	<1.7	<1.7
Acenaphthalene	<0.10	<0.10	<1.0[7]	<1.0[7]	<3.4	<3.4
Acenaphthene	<0.10	<0.10	<1.0[7]	<1.0[7]	<0.34	<0.34
Fluorene	<0.10	<0.10	<1.0[7]	<1.0[7]	<0.34	<0.34
Phenanthrene	<0.10	<0.10	<1.0[7]	<1.0[7]	<0.17	<0.17
Anthracene	<0.10	<0.10	<1.0[7]	<1.0[7]	<0.17	<0.17
Fluoranthene	<0.10	<0.10	<1.0[7]	<1.0[7]	**0.9**	**0.19**
Pyrene	<0.10	<0.10	<1.0[7]	<1.0[7]	**1.1**	**0.2**
Benzo(a)anthracene	<0.10	<0.10	<1.0[7]	<1.0[7]	**0.55**	**0.11**
Chrysene	<0.10	<0.10	<1.0[7]	<1.0[7]	**0.56**	**0.12**
Benzo(b)fluoranthene	<0.10	<0.10	<1.0[7]	<1.0[7]	**0.87**	**0.15**
Benzo(k)fluoranthene	<0.10	<0.10	<1.0[7]	<1.0[7]	**0.32**	**0.05**
Benzo(a)pyrene	<0.10	<0.10	<1.0[7]	<1.0[7]	**0.55**	**0.11**
Dibenz(a,b,)anthracene	<0.10	<0.10	<1.0[7]	<1.0[7]	**0.4**	<0.068
Benzo(g,h,i)perylene	<0.10	<0.10	<1.0[7]	<1.0[7]	**0.7**	**0.12**
Indeno(1,2,3-cd)pyrene	<0.10	<0.10	<1.0[7]	<1.0[7]	**0.98**	**0.19**
Total PAHs	<0.10	<0.10	<1.0	<1.0	**6.93**	**1.24**
Metals (ICP Scan)						
Cadmium	<0.50	<0.50	<0.50	<0.50	--	--
Chromium	**8.5**	**31**	**65**	**35**	--	--
Lead	**13**	**9.5**	**2.6**	**9.0**	--	--
Nickel	**9.0**	**32**	**60**	**40**	--	--
Zinc	**180**	**28**	**47**	**50**	--	--

Source: BASELINE, 2000a.

Notes: <x.x = Compound not identified above laboratory reporting limit of x.
-- = Not analyzed.
mg/kg = Milligrams per kilogram
TPH = Total petroleum hydrocarbons

1 Samples MW-1,2.5-3.0, MW-2; 3.5-4.0, MW-3; 3.0-3.5, and MW-3; 5.0-5.5 were analyzed using the DHS LUFT Method; samples GF-11 and GF-12 were analyzed using Method 8015M.
2 Samples MW-1,2.5-3.0, MW-2; 3.5-4.0, MW-3; 3.0-3.5, and MW-3; 5.0-5.5 were analyzed using Method 8270 B; samples GF-11 and GF-12 were analyzed using Method 8310.
3 Discrete peaks.
4 Chromatogram pattern: Unidentified Hydrocarbons > C16.
5 Sample exhibits fuel pattern that does not resemble laboratory standard.
6 Heavier hydrocarbons contributed to the quantitation.
7 Reporting limit for this sample has been raised due to high levels of non-target compounds.

ATTACHMENT E

PROPOSED SOIL AND GROUNDWATER RISK MANAGEMENT PLAN

PROPOSED SOIL AND GROUNDWATER RISK MANAGEMENT PLAN
Pacific Dry Dock, Yard II
Oakland, California

INTRODUCTION

This Soil and Groundwater Risk Management Plan (RMP) has been prepared to identify measures for managing risks associated with residual contaminants at the site. The RMP includes risk management measures for the following populations: construction workers, future utility workers, and future park and/or commercial/retail users. Initial plans for the site will include removal of building foundations and Building G-305, grading of the site for drainage (with the use of additional fill material), addition of crushed rock and a growing medium, and hydroseeding the property. These initial plans will be conducted for erosion control, pending redevelopment plans. The Port of Oakland has issued a request for qualifications for redevelopment of this parcel and others in the Oak Street to 9th Avenue district.

The procedures in this RMP would be followed during this initial work on the site, as applicable, and during site redevelopment activities. Before redevelopment of the site is initiated, this proposed RMP would be reviewed by the Port of Oakland (Port) (and/or its contractors) and modified, as necessary, to manage potential risks.

Based on previous investigations conducted at the site from 1998 to 2001 and a revised human health and ecological health risk evaluation, contaminants of concern include petroleum hydrocarbons, polycyclic aromatic hydrocarbons, volatile organics, and metals in soil and/or groundwater. The revised risk evaluation indicates that the site does not pose unacceptable human health risks for future park and/or commercial/retail users or ecological health risks. Human health risks for construction or utility workers were not evaluated in the revised risk evaluation. Measures to mitigate potential exposures of construction or utility workers to contaminants are described below.

CONSTRUCTION RISK MANAGEMENT MEASURES

This section identifies risk management measures that would be implemented during initial site work and redevelopment activities. The measures are to prevent adverse impacts to construction workers and the environment during demolition and redevelopment activities at the site.

Redevelopment activities (including initial erosion control activities) that could expose construction workers and the environment to site contaminants of concern in soil and groundwater may include, but are not limited to: removal of existing building foundations and Building G-305, soil excavation

and grading, removal of pipelines below building foundations,[1] dewatering of underlying groundwater, import of soil and other materials onto the site, and installation of utilities. Individual risk management measures are described below.

Dust Management

Construction and/or demolition activities at the site would generate dust. Soils exposed during demolition or removal activities, soil excavation, piping removal activities, site grading, and the import of soil onto the site would be subject to wind erosion. As a result, short-term dust emissions would cause a temporary increase in localized particulate concentrations. The highest potential for dust emissions would occur when soils are dry during late spring, summer, and fall. Particulates with an aerodynamic diameter of ten microns or less (PM_{10}) are often considered by air pollution control agencies to be the pollutant of greatest concern from construction activities.

Site redevelopment activities are subject to, and would comply with, the emission control measures established by the Bay Area Air Quality Management District for construction-related activities (BAAQMD, 1996). These include:

Basic Control Measures: for all construction sites

- Water all active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials, or require all trucks to maintain at least two feet of freeboard.
- Pave, apply water three times daily, or apply non-toxic soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.

Enhanced Control Measures: for construction sites greater than four acres in area[2]

- In addition to the measures above, hydroseed or apply non-toxic soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).

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[1] Procedures for pipeline removal activities were presented in an 8 October 1999 memorandum (Port of Oakland). The procedures for pipeline sampling are included in the RMP.

[2] The Pacific Dry Dock II site is approximately four acres in size. These enhanced control measures should be followed if the construction area on the site is determined to be greater than four acres.

- Enclose, cover, water twice daily, or apply non-toxic soil binders to exposed stockpiles.
- Limit traffic speeds on unpaved roads to 15 mph.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.

Optional control measures: encouraged for implementation at construction sites that are large in area, located near sensitive receptors, or which for any other reason may warrant additional emissions reductions

- Install wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site.
- Install wind breaks, or plant trees/vegetative wind breaks at windward side(s) of construction areas.
- Suspend excavation and grading when winds (instantaneous gusts) exceed 25 mph.
- Limit the area subject to excavation, grading, and other construction activity at any one time.

Based on the size and exact location of the redevelopment area(s), appropriate BAAQMD dust management practices would be followed during all site redevelopment activities. Daily logs of all dust control measures implemented would be documented by the Port or its contractors. These logs would be maintained at a designated location during site redevelopment activities.

Soil Management

Excavated Soil

Site redevelopment would likely include some excavation. Excavated soils would be stockpiled on-site and isolated from the public by fencing or other means of site control. Control measures (i.e., water spraying, cover) for the stockpiles would be implemented to minimize dust plumes. In the event that excavated soil were stockpiled during the rainy season, typically from October to April, the stockpiles would be covered with anchored plastic sheeting, or an equivalent cover, to minimize erosion of the stockpiled soil and mixing with storm water runoff.

All excess excavated soil would be disposed of off-site in accordance with all applicable Federal and State regulations. Prior to off-site disposal, the excavated soil would first be appropriately classified to determine whether the waste would constitute a hazardous or non-hazardous waste. Waste characterization would include waste stream delineation, representative sampling, analysis, and statistical evaluation in accordance with the guidelines contained in U.S. Environmental Protection Agency's (U.S. EPA) *Test Methods for Evaluating Solid Waste,*

Physical/Chemical Method, SW-846, Third Edition (U.S.EPA,1986). If the soil were found to be non-hazardous, then further evaluation may be needed to determine which non-hazardous waste landfills may be able to accept the waste.

Imported Soil

If soil were to be imported to the site as part of site redevelopment activities, the imported soil would consist of clean fill. A certificate would be obtained from the supplier of the soil regarding the chemical composition of the soil to ensure it was free of contamination.

Future Sampling under Fuel Pipelines

Future sampling along fuel pipelines located under the existing foundations would be conducted when the foundations are removed. The workplan for the removal of the foundations was presented in the Port's 8 October 1999 memorandum to Barney Chan of Alameda County (Port of Oakland, 1999), and approved by Alameda County in an 18 October 1999 memorandum (Alameda County, 1999). This workplan is reproduced below. Alameda County would be notified before the foundations are removed.

At the time that the foundations are removed, soil samples would be collected directly beneath the piping at intervals of 20 linear feet. The samples would be collected using a hand-operated slide hammer fitted with six-inch stainless steel tubes. The samples would be sealed, labeled, and placed in a cooled container prior to submission to a California-certified laboratory under chain-of-custody procedures. Rinsate from the sampling equipment would be placed in DOT-approved containers for future disposal, pending receipt of analytical results, by a Port contractor. The soil samples would be analyzed for TPHd and TPHmo (with silica gel cleanup), BTEX, PAHs, and copper, total chromium, lead, nickel, and zinc. Soil sample collection procedures and analytical results would be documented in a report to be submitted to Alameda County.

Dewatered Groundwater Management

Shallow groundwater at the site was encountered at depths ranging from 3.0 to 6.5 feet below ground surface during previous investigations. It is unknown whether redevelopment activities would require dewatering of the groundwater. In the event that groundwater dewatering were necessary, these activities would be conducted in accordance with the following risk management measures.

Appropriate engineering techniques would be employed to minimize the amount of dewatering necessary during site redevelopment. All dewatered groundwater would be contained (e.g., baker tanks). During the rainy season, the containment may be covered to prevent the accumulation of rain water. Dewatered groundwater would either be transported off-site for disposal or discharged into the City of Oakland's sewer system under a permit from the East Bay Municipal Utilities District. If dewatered groundwater were to be transported off-site, the groundwater would be first characterized to determine appropriate disposal options.

Storm Water Management

Hazardous materials in heavy equipment and contaminants in exposed soils (and possibly dewatered groundwater) may potentially adversely impact the quality of storm water runoff from the site. A Storm Water Pollution Prevention Plan (SWPPP) would be developed for redevelopment activities, as applicable, under the requirements of the National Pollutant Discharge Elimination System, General Permit for Discharges of Storm Water Associated with Construction Activities, Water Quality Order 99-08-DWQ, adopted by the State Water Resource Control Board (SWRCB). The purpose of the SWPPP is to minimize the potential for soil erosion and for discharge of pollutants during site redevelopment. The SWPPP would be consistent with guidance from the San Francisco Regional Water Quality Control Board (e.g., Best Management Practices) and the Manual of Standards for Erosion and Sedimentation Control Measures established by the Association of Bay Area Governments.

Site Health and Safety

During site redevelopment, construction workers that may directly or indirectly be exposed to on-site soil or groundwater would perform work in accordance with the California Occupational Safety and Health Administration (Cal OSHA) regulations. All site redevelopment activities associated with exposure to on-site soil or groundwater would be conducted in compliance with a site-specific Health and Safety Plan (HSP) to protect workers and the environment from site contaminants. The site-specific HSP would be prepared according to Title 8, California Code of Regulations, Section 5192 and Title 29 Code of Federal Regulations 1910.120. The HSP would include provisions for air monitoring and personal protective equipment to be worn by workers during site redevelopment activities.

FUTURE UTILITY MAINTENANCE RISK MANAGEMENT MEASURES

Future utility workers at the site could come into contact with shallow subsurface soil or groundwater. Utility workers would be required to conduct work in accordance with risk management measures specified for general redevelopment activities, above, as deemed applicable. These risk management measures would be included in an Operations and Maintenance Plan. The Operations and Maintenance Plan would be prepared by the Port (or its contractors) and referenced in the deed restriction established for the site.

FUTURE PARK AND/OR COMMERCIAL/RETAIL USERS RISK MANAGEMENT MEASURES

The Operations and Maintenance Plan and Deed Restriction would prohibit use of groundwater at the site for drinking water (or other potable) purposes, as requested by Alameda County in their 3 May 2000 letter (Alameda County, 2000). The Operations and Maintenance Plan would also describe procedures required to maintain any risk management measures required at the site (e.g., placement of pavement or clean imported fill brought onto the site).

IMPLEMENTATION AND EVALUATION

This RMP would be implemented during initial site activities for erosion control, site redevelopment, and future operations at the site. The Port would have overall responsibility for ensuring that the requirements of the RMP are implemented. The Port would reevaluate this Plan after a site redevelopment plan has been prepared, but prior to the initiation of site redevelopment activities, and would periodically evaluate the plan thereafter, to ensure that the risk management measures in the RMP are appropriate and effective.

REFERENCES

Alameda County, 2000, Memorandum Regarding Soil and Groundwater Investigation and Human and Ecological Risk Evaluation, Crowley Yard II, 321 Embarcadero, Oakland, CA 94606, from B. Chan, Alameda County, to D. Herman, Port of Oakland, 3 May.

Alameda County, 1999, Memorandum Regarding Port of Oakland Response Letter for Pacific Dry Dock, Yard II, 321 Embarcadero, Oakland, California, from B. Chan, Alameda County, to D. Herman, Port of Oakland, 18 October.

Bay Area Air Quality Management District (BAAQMD), 1996, BAAQMD CEQA Guidelines, Assessing the Air Quality Impacts of Projects and Plans, Table 2, Feasible Control Measures for Construction Emissions of PM_{10}, April.

Port of Oakland, 1999, Memorandum Regarding Response to Comments on Workplan for Pacific Dry Dock, Yard II, 321 Embarcadero, Oakland, from D. Herman, Port of Oakland, to B. Chan, Alameda County, 8 October.

State Water Resources Control Board (SWRCB), 1999, National Pollutant Discharge Elimination System General Permit for Discharges of Storm Water Associated with Construction Activities, Water Quality Order 99-08-DWQ, adopted by the SWRCB, 19 August.

U.S. Environmental Protection Agency (U.S. EPA), 1986, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, Third Edition, Office of Solid Waste and Emergency Response, November.