ATTACHMENT II

ATTACHMENT II
(Additional Responses to Comments)

1. *Final Staff Recommendations for Site Specific Soil and Groundwater Cleanup Goals*
Submitted by SAIC on behalf of Texaco Inc. (September 10, 2009)

- Texaco's Comment #1 – *The character and nature of the groundwater beneath the site has changed since the land was reclaimed from the harbor and can not be characterized as ocean water.*

  Texaco stated that salinity data collected from the groundwater monitoring wells during the Second Quarter 2009 Groundwater Monitoring event indicated a range of salinity values, between 0.90 parts per thousand (ppt) and 16.35 ppt with an exception of the salinity data in well GMT-11 was 39.42 ppt. Salinity in the ocean typically ranges between 30 ppt and 50 ppt; therefore, the groundwater beneath the site is not "ocean water". Texaco also indicated that the salinity data indicated that the site is underlain by brackish water and not "ocean water". In addition, "Tidal influence is indicative of a pressure response to tidal fluctuation and is not a basis to define ocean water or to establish that groundwater and ocean water are mixing."

- Regional Board Staff's Response to Comment #1 – Regional Board staff agrees that salinity in the ocean ranges between 30 ppt and 50 ppt. From U.S. Geological Survey Site, parameters for saline water are defined as follow:

  - Fresh water – less than 1,000 ppm[1] (1 ppt);
  - Slightly saline water – from 1,000 ppm to 3,000 ppm (1 to 3 ppt);
  - Moderately saline water – from 3,000 ppm to 10,000 ppm (3 to 10 ppt);
  - Highly saline water – from 10,000 ppm to 35,000 ppm (10 to 35 ppt); and
  - Ocean water contains about 35,000 ppm (35 ppt) of salt.

  Regional Board staff also reviewed the salinity data from the prior monitoring reports and found that the salinity data from on-site groundwater monitoring wells consistently indicated ranges from 0.05% (or 0.5 ppt) to 1.2% (or 12 ppt) with GMT-11 salinity of 3.22% (or 32 ppt). This confirms that the groundwater on-site is not freshwater or ocean water but brackish water. Since the LAMT is located in an estuary, this finding is consistent with what is expected in an estuary. Therefore, Regional Board staff's assumption of groundwater beneath the site as being "part of ocean water" is "correct". Brackish water is mixture of a fresh water and ocean water. This is a result of tidal affects in estuaries, where fresh water from inland surface water mixes with ocean water.

[1] 1,000 ppm is equal to 1 ppt

Regional Board staff agrees that the tidal influence is indicative of a pressure response to tidal fluctuation; in addition, note that during low tide conditions, the groundwater flow direction on-site is towards the ocean, i.e., south east, and the sheen on the surface water of harbor is indicative of contaminant discharging from the on-site impacted groundwater that flows into the ocean. During high tide conditions, some degree of ocean water under pressure will mix with the groundwater beneath the site.

However, Regional Board staff did not say that the groundwater beneath the site is "ocean water", instead is "part of ocean water" or more appropriately to indicate the groundwater as "brackish water". Regional Board staff indicated that the groundwater beneath the site is brackish water so that values listed under "Criterion Maximum Concentrations, C1: and "Criterion Continuous Concentrations, C2" for salt water aquatic life, or Human Health protection for consumption of "Organisms Only, D2" are applicable to use for this LAMT.

- Texaco's Comment #2 – *The intent of the General NPDES Permits is to protect drinking water receptors.*

- Regional Board Staff's Response to Comment #2 – Regional Board staff agrees with Texaco that the surface water discharge limit of 100 µg/L for TPH in General NPDES Permit Nos. CAG834001 and CAG914001 are to protect creeks and streams which have a potential to recharge groundwater protected drinking waters. General NPDES permits are adopted to protect beneficial uses set forth in our Basin Plan.

  However, staff disagrees with Texaco that since LAMT does not discharge to a drinking water designated groundwater aquifer zone, 100 µg/l for TPH for groundwater can not be justified as a valid cleanup goal for this site. Staff believes that the groundwater TPH cleanup goal of 100 µg/l is necessary to meet Antidegradation policy and water quality objectives set forth in our Regional Board's Basin Plan to protect human health, water resources, aquatic habitats, prevent or minimize adverse nuisance conditions, emission of subsurface vapors to buildings, leaching and subsequent impacts to groundwater and migration to surface water.

  Note that TPH is the main contaminant of concern on the LAMT site. TPH concentrations on-site vary from "not detected" to "free product" in groundwater. In addition, TPH from the LAMT is discharged to the ocean. Currently, there are site-specific noncancerous human health risk assessment screening values[2] for the groundwater for the LAMT based on available on-site data. They are as follow:

[2] Based on Site Characterization and Risk Assessment Report (October 2008), prepared by AMEC Geomatrix for on behalf of Kinder Morgan, ConocoPhillips, and Texaco Inc.

TPH	Indoor commercial/Industrial Worker – Exposure to Indoor Air (Noncancer) µg/l	Construction Worker (Noncancer) µg/l	Hypothetical Swimmer (Noncancer) µg/l
Gasoline	74	-- [a]	--
C_5-C_8 Aliphatics	--	12,000	13,000
C_9-C_{18} Aliphatics	--	6,000	9,600
C_{19}-C_{36} Aliphatics	--	9,800	20,000
C_{11}-C_{22} Aromatics	--	18,000	18,000

(a) -- = not applicable

Other than LAMT site-specific noncancerous risk assessment for human health, there are no regulatory drinking water standards for TPH and petroleum (in general) that have been developed. However, there is a numerical value for TPH for Taste and Odor which is 100 µg/l. It is correct that the Taste and Odor value is the concentration of TPH that you can taste and/or smell when drinking the water. It is also correct that the General NPDES has the TPH value of 100 µg/l for surface water discharges.

Regional Board staff also evaluated numerical values in the November 2007 San Francisco's ESL document.

TPH	Taste and Odor [a] µg/l	Groundwater Screening Levels (groundwater is not a current or potential drinking water resource) [b] µg/l	Aquatic Life protection Fresh Water µg/l	Aquatic Life protection Salt Water µg/l	Nuisance and odor for non-drinking water from MADEP[b][c] µg/l
Gasoline		210	500	3,700	5,000
Diesel	100	210	640	640	2,500
Residual fuels		210	640	640	2,500

(a) Page 8-3, November 2007 San Francisco's ESL and Los Angeles Regional Board's General NPDES Permit Nos. CAG834001 and CAG914001
(b) Table F-1b from November 2007 San Francisco's ESL
(c) MADEP = Massachusetts Department of Environmental Protection risk assessment guidance 1997

Regional Board staff determined that the water quality parameters, nuisance and odor for non-drinking water from MADEP do not apply to the LAMT site because it is based on the solubility of the respective TPH categories. It is noted that the solubility of gasoline range compounds in freshwater is approximately 150,000 µg/l and the solubility of diesel range and heavier fuels compounds is assumed to be approximately 5,000 µg/l. These levels are intended to highlight the

potential presence of free product on groundwater. The groundwater beneath the LAMT is already impacted with free product and the free product is being discharged to the ocean; therefore, cleanup goals for TPH must consider and be below the solubility of any petroleum hydrocarbon within each of the various TPH categories as indicated in MADEP.

Although there are TPH numerical values for the protection of aquatic life in saltwater within the San Francisco's ESL document (ESL), these values were based on site-specific screening levels developed for use at the San Francisco Airport under the San Francisco Regional Board Order 99-045. Firstly, Regional Board staff does not have a site-specific toxicity-based study for Los Angeles estuaries where the LAMT site is located. Secondly, the Regional Board staff made an assumption that marine habitats and/or the ecological impacts in San Francisco Bay are different than those in the Los Angeles estuaries. Lastly, site-specific values in the ESL are based on the analytical data from the San Francisco Airport site; therefore, the site-specific values are not appropriate to use at the LAMT site.

In summary, in order to protect human health, water resources, and aquatic habitats, a choice between 100 µg/L and 210 µg/l for TPH (which are in the San Francisco's ESL) is considered to be protective of groundwater. Regional Board staff chose the 100 µg/l, Taste and Odor value, which will minimize the adverse nuisance condition and is consistent with the Los Angeles Regional Board's General NPDES permits to protect both groundwater and surface water beneficial uses.

Therefore, Regional Board staff believes that the cleanup goal of 100 µg/l for TPH in groundwater is most appropriate for both groundwater cleanup and permissible surface water discharges at the LAMT site and consistent with our permitting program to protect surface water beneficial uses.

- Texaco's Comment #3 – *The ESL document provides more appropriate groundwater cleanup guidance to protect sensitive receptors.*

Texaco stated that the protection of the marine habitat is the primary driver for establishing groundwater cleanup goals for the LAMT site. Texaco also recommended TPH screening levels in groundwater for the protection of saltwater aquatic life as referenced in the San Francisco's ESL document. With these cleanup goals, Texaco stated that the groundwater is protective of the beneficial uses of the San Francisco Bay waters and does not pose a significant risk to aquatic species or people using the Bay; therefore, Texaco requested the Regional Board to adopt the TPH cleanup goals as listed below for the LAMT site.

TPH	Aquatic Life protection Salt Water µg/l
Gasoline	3,700
Diesel	640
Residual fuels	640

- Regional Board Staff's Response to Comment #3 – Regional Board staff disagrees that the same site-specific cleanup goals for the San Francisco Airport are appropriate for the LAMT site. The marine habitats and/or ecological impacts data for the San Francisco Bay and the Los Angeles estuaries are different and a site-specific toxicity-based study is not available for the Los Angeles estuaries where the LAMT site is located.

  However, California Water Code Section 13304 authorizes the Regional Board to require complete cleanup of all waste discharges and the restoration of affected waters to background conditions (i.e., the water quality that existed before the discharge occurred.).

  Antidegradation Policy (State Board Resolution No. 68-16), which requires the attainment of background levels of water quality, or the highest level of water quality that is reasonable in the event that background levels cannot be technically or economically restored.

  Staff notes that prior to the initial operation of the petroleum terminal on-site, TPH concentrations in soil and groundwater were not expected to be present at the LAMT site. Regional Board's staff's proposed a TPH cleanup goal of 100 µg/l for groundwater which is consistent with the Los Angeles Regional Board's General NPDES permits to protect both groundwater and surface water. The groundwater TPH cleanup goal of 100 µg/l will also meet Antidegradation policy and water quality objectives set forth in our Regional Board's Basin Plan to protect human health, water resources, aquatic habitats, prevent or minimize adverse nuisance conditions, emission of subsurface vapors to buildings, leaching and subsequent impacts to groundwater and migration to surface water.

- Texaco's Comment #4 – *Site-specific soil cleanup goals for TPH should be developed based on site-specific conditions.*

  Texaco encompasses two different concerns.

  1. First, Texaco states that the Regional Board staff's proposed soil cleanup goals of 180 milligrams per kilogram (mg/kg) for TPH as gasoline and diesel is based on the soil leaching values intended to protect non-drinking water resources to a level of 210 µg/l which is based on the drinking water goal in the San Francisco's ESL document. Therefore, Texaco states that the proposed soil cleanup goals for TPH are improper and overly stringent for the protection of a marine habitat. The TPH soil cleanup goals in the San Francisco's Board Order No. 99-045 were developed based on site-specific testing for the protection of groundwater and marine aquatic habitats and they are 629 mg/kg for TPH as gasoline and 519 mg/kg of TPH as diesel.

  2. Second, Texaco states that they supported implementation of remedial alternative #2 as described in the Remedial Action Plan (RAP) (January 14, 2009). An excerpt of summary of alternative comparison from the RAP is enclosed in Attachment III.

A T T A C H M E N T II

- Regional Board Staff's Response to Comment #4 – First, Regional Board staff disagrees with Texaco that staff's proposed soil cleanup goals for TPH are improper and overly stringent for the LAMT. San Francisco's ESL document lists TPH groundwater screening level of 210 µg/l for the groundwater that is not a current or potential drinking water resource. Staff explains below why the TPH soil cleanup goals of 180 mg/kg for TPH as gasoline and diesel are selected, and 629 mg/kg for TPH as gasoline and 519 mg/kg of TPH as diesel are not selected.

  The LAMT site-specific cleanup goals for soil are developed based on the protection of human health, groundwater resources, and nuisance relating to the high level of COCs at the site. The equilibrium partitioning approach and a mass limit approach (*U.S. EPA's Supplement to the Soil Screening Guidance* (December 2002) were used to determine the site-specific cleanup goals for soil. The calculated soil cleanup values are based on site-specific soil parameters listed in Table 1 of AMEC Geomatrix Inc's *Calculation of Soil Concentrations Based on Leaching to Groundwater* (revised July 8, 2009), Table 1 of AMEC Geomatrix Inc's Shallow Soil Sampling and Organic Content Assessment Results (July 8, 2009), and look up table, Table B. Environmental Screening Levels, Shallow Soils (less than 3 meters below ground surface), Groundwater is not a Current or Potential Source of Drinking Water, San Francisco's November 2007 ESL. In addition, Regional Board staff provided Tetra Tech the parameters for SESOIL inputs that were used in the ESL and then requested Tetra Tech to calculate the TPH soil concentrations by using the groundwater concentration of 100 µg/L and the LAMT site-specific soil parameters listed on AMEC Geomatrix Inc's Table 1 (July 8, 2009). The calculated values are listed in the table below under "Equilibrium Approach using SESOIL".

  The following TPH for soil results are compared and considered for LAMT site-specific cleanup goals.

TPH	Equilibrium Approach[a] (mg/kg)	Mass Limit Approach[a] (mg/kg)	Look Up Table[b] Commercial/Industrial Land Use Only ESL (mg/kg)	Equilibrium Approach using SESOIL[c] (mg/kg)
Gasolines C_6-C_{12}	--	--	180	--
Middle Distillates C_9-C_{25}	--	--	180	--
Residual Fuels C_{24}-C_{40}	--	--	2,500	--
C_5-C_8 Aliphatics	210[d]	93[d]	--	5.69
C_6-C_8 Aromatics	--	--	--	0.29
C_9-C_{16} Aromatics	--	--	-	2.77
C_9-C_{18} Aliphatics	2,200[e]	47[e]	--	279
C_{11}-C_{22} Aromatics	320[f]	140[f]	--	--
C_{19}-C_{36} Aliphatics	240,000,000[g]	76[g]	--	--

-- Not calculated

(a) Table A-1 of AMEC Geomatrix Inc's *Revised Preliminary Cleanup Goals* (revised November 6, 2008) includes latest site-specific soil parameters listed on Table 1 of AMEC Geomatrix Inc's *Shallow Soil Sampling and Organic Content Assessment Results* (July 8, 2009)
(b) Table B. Environmental Screening Levels, Shallow Soils (<3 meters below ground surface), Groundwater is not a Current or Potential Source of Drinking Water
(c) August 7, 2009 Tetra Tech provided the results by inputting 100 µg/l of TPH and site-specific parameters into SESOIL with "Notes" as follows.
Notes: DTSC (2009) properties assumed for carbon chain fractions; DTSC guidance also suggests use of 50% aromatics and 50% aliphatics for TPH mixture. Equilibrium calculations conducted using LAMT site-specific soil parameters:

Dry Bulk Density (g/cm^3)	1.40
Volumetric Water Content (vol/vol)	0.085
Soil Organic Carbon Content	0.011
Air Porosity	0.36

(d) Based on a groundwater concentration of 12,000 µg/l (groundwater cleanup goal proposed by Kinder Morgan)
(e) Based on a groundwater concentration of 6,000 µg/l (groundwater cleanup goal proposed by Kinder Morgan)
(f) Based on a groundwater concentration of 18,000 µg/l (groundwater cleanup goal proposed by Kinder Morgan)
(g) Based on a groundwater concentration of 9,800 µg/l (groundwater cleanup goal proposed by Kinder Morgan)

Regional Board staff proposed the groundwater cleanup goal for TPH as 100 µg/l. AMEC calculated site-specific equilibrium and mass approach using TPH concentrations of 12,000 µg/l, 6,000 µg/l, 18,000 µg/l, and 9,800 µg/l, for C_5 to C_8, C_9 to C_{18}, C_{11} to C_{22}, and C_{19} to C_{36}, respectively. Regional Board staff found that the equilibrium and mass approach calculated by AMEC provides cleanup levels that do not support beneficial uses.

Regional Board staff selected the TPH soil concentrations listed on Table B "Environmental Screening Levels, Shallow Soils (< (less than) 3 meters below ground surface), Groundwater is not a Current or Potential Source of Drinking Water" from ESL because the groundwater level at LAMT varies from 3.5 to 10 feet below ground surface (ft. bgs) (i.e., 1 to 3 meters) and groundwater beneath the site is not currently used for drinking water nor considered a potential source of drinking water. Regional Board staff acknowledged that Table B uses a TPH groundwater concentration of 210 µg/l for the soil screening level in San Francisco's ESL document. Note that 210 µg/l is from the San Francisco's ESL document groundwater screening level where the groundwater is not a current or potential drinking water resource. Another note that the ESL does not provide TPH soil concentrations by using TPH groundwater concentration of 100 µg/l. In addition, the calculations by Tetra Tech provided to the Regional Board has different TPH carbon ranges and the calculations were not validated by a third party. To be consistent with the TPH carbon ranges set by the Regional Board, the values from the ESL are most appropriate at this time.

Second, at this time, Regional Board staff will not comment on the January 14, 2009 RAP and proposed alternatives because the review of this RAP by the Regional Board staff is not yet complete. Keep in mind that the final goal for the LAMT site and all other sites under our Site Cleanup Programs is to restore the polluted site to a maximum benefit to the people of the State and environment. Proposed remedial actions should consist of the best and most technologically achievable methods and remediation goals within a reasonable time period.

Please note that in this remedial alternative #2, "TPH LNAPL/hydrocarbon sheen critical concentration" was proposed. "The LNAPL/hydrocarbon sheen critical concentration" referred to a TPH concentration that will generate an oil sheen in groundwater. A bench study and pilot study were going to be conducted to determine the on-site soil samples for a range of known TPH concentrations (100 mg/kg to 10,000 mg/kg) and on-site groundwater free of TPHs and oil sheen. Following the California Waste Extraction Test or the USEPA Toxicity Characterization Leaching Procedure, a visual observation of the presence or absence of an oil sheen on the water surface will be based on determining TPH concentration ranges that form the sheen. Under remedial alternative #2, only soil in the intertidal zone (i.e., varies between 4 ft. bgs up to 7 ft. bgs) with TPH concentrations less than the "TPH LNAPL/sheen critical concentration" will be left in place for natural attenuation/bioremediation.

- Texaco's Comment #5 – *Staff's estimated cost to cleanup was based on November 14, 2008 cleanup goals, not the current proposed Cleanup Goals.*

  Regional Board staff indicated that the estimated cleanup cost of the site is 13.4 million dollars based on the cleanup goals presented in the Regional Board's November 14, 2008 letter. Texaco stated that a maximum cost to remediate the site to achieve the proposed revised cleanup goals would be 16.4 million dollars because the August 18, 2009 letter proposed more stringent cleanup goals for TPH in groundwater. In the January 14, 2009 RAP, remedial alternative #1 proposed to perform soil removal and groundwater treatment and remedial alternative #2 proposed to perform a partial soil removal and in-situ remediation, both include costs for groundwater remediation activities. Therefore, Texaco estimated the cost be increased between 1.5 million dollars to 3 million dollars if the revised Cleanup Goals were adopted.

- Regional Board Staff's Response to Comment #5 –Regional Board staff agrees with Texaco that staff used the same estimation, i.e., 13.4 million dollars, proposed in the January 14, 2009 RAP using groundwater TPH cleanup goal of 210 µg/l. In our November 14, 2008, letter, the TPH cleanup goal was 210 µg/l and our August 18, 2009, letter, staff proposed revised TPH cleanup goal of 100 µg/l. Please note that the new estimate, i.e., 16.4 million dollars, given by Texaco will make a difference of 1.5 million dollars to 3 million dollars is 11 to 22 percent (if based on 13.4 million dollars) or 9 to 18 percent (if based on 16.4 million dollars). The difference is within the bounds of accuracy for a cost estimate and it is expected to vary with built-in buffer zone. In addition, the responsible parties have not provided information that the staff's proposed site cleanup goals are not reachable technically or economically.

- Texaco's Comment #6 – *Closing: In conclusion, soil and groundwater cleanup goals for TPH should be consistent with the stated objectives of the Regional Board: to establish cleanup goals that mitigate human health risks and protect the marine aquatic habitat of the Los Angeles Harbor. Based on the above discussions, Texaco requests that the Regional Board adopt the TPH cleanup goals proposed above for remedial actions at the referenced site.*

- Regional Board Staff's Response to Comment #6 – Regional Board staff disagrees that Texaco's proposed TPH cleanup goals will meet the Basin Plan and California Water Code Section 13304 requirements.

  Our Basin Plan states as follows:

  > "The Water Code defines water quality objectives as "the allowable limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area." Thus, water quality objectives are intended to (i) to protect the public health and welfare and (ii) to maintain or enhance water quality in relation to the designated existing and potential beneficial uses of the water."

  Regional Board staff developed these proposed site-specific cleanup goals to protect human health, water resources, and aquatic habitats and to meet the State Board Antidegradation policy and water quality objectives and beneficial uses set forth in our Basin Plan. The proposed cleanup goals will restore water quality as close to original background level as possible, prevent or minimize adverse nuisance conditions, emission of subsurface vapors to buildings, leaching and subsequent impacts to groundwater and harbor water, allow future re-development of the property for industrial/commercial uses, improve the value of the property for future re-development, and the surrounding community.

  Regional Board staff strongly believes that the staff's proposed site-specific cleanup goals meet the Basin Plan and California Water Code Section 13304 requirements.

A T T A C H M E N T 11

2. *Response to Proposed Cleanup Goals dated August 17, 2009* Submitted by AMEC Geomatrix on behalf of Kinder Morgan (September 11, 2009)

- Kinder Morgan's Comment #1 – *TPH Goals*

  Kinder Morgan stated that the cleanup goals recommended by Regional Board staff for TPH in soil and groundwater are based on drinking water criteria that are not applicable to the site. Cleanup goals derived for groundwater protection that are based on the protection of marine aquatic life in the adjacent harbor or other designated beneficial uses are appropriate for the actual site conditions. For example, the cleanup goals (i.e., 1,200 µg/l for TPH as gasoline, 2,200 µg/l for TPH as diesel, and TPH as motor oil) proposed for groundwater within 150 feet of the shoreline at Point Molate Fuel Depot in San Francisco Bay, provide a useful and relevant example for protection of beneficial uses in the harbor.

- Regional Board Staff's Response to Comment #1 – Regional Board staff disagrees with Kinder Morgan that drinking water criteria is not applicable to LAMT. Staff did not propose groundwater cleanup goals for the site using drinking water criteria alone. It is noted that the groundwater at this site is brackish, non-potable, not utilized for drinking water, and no longer designated for municipal beneficial use. Therefore, proposed groundwater cleanup goals for the LAMT site are primarily based on *California Toxics Rule* (CTR).

  Basics for the site-specific groundwater cleanup goals determination are described on the following in order of selection:

  1. All responsible parties for the LAMT site agreed that the site is located in estuaries of the Los Angeles Harbor, Chapter 40, Part 131 of the Code of Federal Regulations (40 CFR 131), *California Toxics Rule* (CTR) (May 18, 2000) applies. Therefore, under the CTR, groundwater cleanup goals for the contaminants of concern (COCs) for organic compounds are first based on values listed under the following categories: (a) "Criterion Maximum Concentrations, C1" and "Criterion Continuous Concentrations, C2" for salt water aquatic life; or (b) Human Health Protection for Consumption of "Organisms Only, D2".

  2. Not all the COCs in groundwater for organic compounds detected at the LAMT have values listed under the CTR. For those compounds that are not listed in the CTR, Regional Board staff considered the following:

     a. Water quality objectives;
     b. Beneficial uses;
     c. The California Antidegradation Policy (Resolution No. 68-16) set forth in our Basin Plan;
     d. California's Maximum Contaminant Levels (MCLs), and Action Levels (ALs) for drinking water as established by the State Department of Pubic Health;

e. Taste and Odor Thresholds published by the U.S. Environmental Protection Agency; and
f. Site-specific risk-based screening levels calculated for this Site by Kinder Morgan, Inc.'s consultant, AMEC Geomatrix, Inc. Table 5, *Alternative Cleanup Goals for Chemicals Detected Groundwater.*

Other factors that were considered included: preventing or minimizing adverse nuisance conditions; preventing or reducing the emission of subsurface vapors to future buildings; and preventing or reducing the leaching from soil to groundwater; and preventing or reducing further subsequent impacts to groundwater.

Regional Board staff uses the appropriate approach to protect water quality, human health, and aquatic habitats. Groundwater beneath the LAMT is not designated for municipal water supply use. Therefore, under the site-specific human health risk-based screening levels, groundwater cleanup goals for those compounds that are not listed in the CTR were based on values calculated for a cancer-risk scenario of exposure to indoor air for commercial/industrial workers, construction workers and hypothetical swimmers. The most stringent values were selected.

3. For those COC organic compounds not considered under the items 1 and 2 above, Regional Board staff considered discharge limits listed in the General National Pollutants Discharge Eliminating System (NPDES) permits which address MCLs, ALs, Taste and Odor Threshold limits. Regional Board staff used this approach to protect marine-habitats, salt water aquatic life, and to address human health protection if toxicity values are not established.

4. Groundwater cleanup goals for the remainder of the COC organic compounds, not considered under the items 1 through 3 above, were based on values calculated for a non-cancerous risk scenario of exposure to impacted indoor air for commercial/industrial workers, construction workers and hypothetical swimmers under the site-specific human health risk-based screening levels. The most stringent values were selected.

Kinder Morgan also indicated that the TPH cleanup goals for the LAMT should be the same as the cleanup goals proposed for groundwater within 150 feet inland of the shoreline at Point Molate Fuel Depot. Cleanup levels, 1,200 µg/l for TPH as gasoline, 2,200 µg/l for TPH as diesel, and TPH as motor oil, are from "Final Fuel Product Action Level Development Report, Naval Fuel Depot Point Molate, Richmond, CA" (TetraTech EMI, August 31, 2001). However, Cleanup and Abatement Order No. R2-2008-0095, adopted by the San Francisco Bay Region on November 12, 2008, indicates that the Fuel Product Action Level report addresses the cleanup goals for pollutants below the ground surface but above groundwater and does not address cleanup levels for residual contamination at or below the groundwater table for Point Molate Fuel Depot. Order R2-2008-0095 requires dischargers to establish the cleanup levels for groundwater by March 30, 2009. However, San Francisco Bay Regional Board staff informed Los Angeles Regional Board staff that the cleanup levels for groundwater have not been submitted and the due date will be extended.

- Kinder Morgan's Comment #2 – *Silica Gel Methodology*

  First, Kinder Morgan indicated that using a silica gel cleanup on the TPH groundwater samples for gas chromatography analysis is "intended to remove the polar degradation byproducts that are no longer representative of the original petroleum mixture; it does not remove the petroleum hydrocarbons still present". Kinder Morgan stated that the polar byproducts associated with the petroleum hydrocarbons, which include alcohols, phenols, aldehydes, ketones, carboxylic acids, carbon dioxide, and water, are not themselves, petroleum hydrocarbons but are created by the biodegradation of petroleum hydrocarbons in the environment.

  Kinder Morgan proposed the use of silica gel cleanup for the LAMT samples because "the site conditions have created a favorable environment for biodegradation." The cleanup goals for TPH are for dissolved petroleum hydrocarbons mixtures, and not for biogenic breakdown products.

  Second, Kinder Morgan defines that an original mixture of petroleum is TPH and that polar degradation byproducts are not TPH. Kinder Morgan also stated that these polar byproducts are less toxic than their petroleum hydrocarbon precursors and they biodegrade rapidly with adequate oxygen, at the site. Some of the byproducts may be toxic to aquatic receptors in a laboratory setting; however, their actual risk is very low because they attenuate rapidly in the outside environment. Based on the site-specific data collected in seawater samples for TPH without silica gel cleanup, which showed "not detected" (Sediment and Seawater Investigation, AMEC Earth & Environmental, Inc, December 2008), Kinder Morgan concluded that the sediments were not toxic.

- Regional Board Staff's Response to Comment #2 – Regional Board staff disagrees that the silica gel cleanup for TPH analysis is necessary. Staff also disagrees with Kinder Morgan's identification of TPH, and TPH cleanup goals are for only dissolved petroleum hydrocarbons mixtures and not for biogenic breakdown products.

  Staff uses the determination of TPH mixtures based on the petroleum-related compounds defined in the San Francisco Bay's *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater* (ESL), dated November 2007.

  > "Petroleum is a complex mixture of hundreds of different compounds composed of hydrogen and carbon (i.e., hydrocarbon compounds). For the purposes of this document, petroleum mixtures are subdivided into gasolines, middle distillates, and residual fuels, following the methodology used by the American Petroleum Institute (API 1994).
  >
  > Gasolines are defined as petroleum mixtures characterized by a predominance of branched alkanes and aromatic hydrocarbons with carbon ranges of C_6 to C_{12} and lesser amounts of straight-chain alkanes, alkenes and cycloalkanes of the same carbon range.
  >
  > Middle distillates (e.g., kerosene, diesel fuel, home heating fuel, jet fuel, etc.) are characterized by a wider variety of straight, branched and cyclic alkanes, polynuclear

aromatic hydrocarbons (PAHs, particularly naphthalene and methyl naphthalenes) and heterocyclic compounds with carbon ranges of approximately C_9 to C_{25}.

Residual fuels (e.g., fuel oil Nos. 4, 5, and 6, lubricating oils, waste oils, and grease, asphalts, etc.) are characterized as complex, polar PAHs, naphthenoaromatics, asphaltenes and other high-molecular-weight, saturated hydrocarbon compounds with carbon ranges that is general fall between C_{24} and C_{40}.

Laboratory analysis for TPH as gasoline and middle-distillates is commonly carried out using EPA Method 8015 (or equivalent) modified for gasoline-range organics (Volatile Fuel Hydrocarbons) and diesel-range organics (Extractable Fuel Hydrocarbons), respectively. Analysis for TPH as residual fuels up to the C_{40} carbon range can generally be carried out by gas chromatograph methods (e.g., Method 8015 modified for motor oil and waste oil range organics) but can also include the use of infrared or gravimetric methods."

For approximately 75 years, the LAMT was used as a transshipment terminal for petroleum hydrocarbons, including crude oil and various refined products such as gasoline, diesel fuel, bunker oil, naphtha, and gas oil. The crude and refined products were stored in numerous aboveground storage tanks. The petroleum hydrocarbons were transferred to and from the LAMT via pipelines, trucks, barges, and ships. Terminal operations at the LAMT reportedly ceased in 1999 and Kinder Morgan demolished structures in 2003 and 2004. The soil and groundwater beneath the site and harbor water adjacent to the site have been impacted with TPH, TPH related compounds, and degraded TPH compounds.

In order to address some of the aforementioned issues, Regional Board staff ask the following questions:

1. Can Kinder Morgan or other responsible parties provide Regional Board staff the original mixtures of petroleum from the LAMT?
2. What chemicals existed in the original mixtures of petroleum released from the site?
3. Can Kinder Morgan or other responsible parties also provide the specific individual polar by-products that have degraded from the original mixtures of petroleum?
4. Can Kinder Morgan or other responsible parties differentiate the polar by-products in the original mixtures of petroleum and the degraded polar byproducts from the original mixtures of petroleum?

Crude oil and various refined products such as gasoline, diesel fuel, bunker oil, naphtha, and gas oil were stored in numerous aboveground storage tanks at the LAMT site; however, Regional Board staff was not: (a) provided with samples of original mixtures of petroleum that were stored or used during the operation of the LAMT or (b) able to differentiate the polar products that were originally in the original mixtures of petroleum or the degraded polar products from the original mixtures of petroleum products. The Regional Board staff does not have information on what were the polar products in the original mixtures of petroleum and whether they are the same

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polar products or different polar products after degrading from the original mixtures of petroleum products.

If the information for all the polar byproducts are available, then the samples can still be analyzed by EPA 8015C to identify the polar compounds because EPA Method 8015C, which is used to analyze TPH samples for the LAMT site, already allows separations of analytes from interfering compounds of a different chemical polarity including polar hydrocarbons. The method lists the silica-based capillary columns for gas chromatography for analysis of TPH. Cal Science and EMAX laboratories, which are the contract laboratories for the LAMT site, use silicon-based organic polymer capillary columns to analyze the TPH impacted samples from the LAMT site.

Other alternative methods are available, and preferred, EPA Method 8260B and/or 8270D which uses gas chromatography mass spectrometry or other available EPA methods can also identify the polar byproducts. With the information, the Regional Board staff can determine if cleanup goals for these individual polar compounds are necessary.

In addition, if the original petroleum hydrocarbons had not initially impacted soil and groundwater, their biodegraded polar byproducts would not have been present in soil or groundwater today. In other words, regardless of the strength of the toxic values, if available, these polar byproducts have already degraded the water quality beneath the site and the ocean.

Regional Board staff believes that all TPH components, including the by-products, shall be accounted for during the measurements of TPH impact at the site. Therefore, polar degradation by-products are part of the TPH contamination. This definition and analysis of TPH is consistent across other in-house regional programs - Remediation, Underground Storage Tanks, Watershed Regulatory, and Stormwater Permitting.

Therefore, silica gel cleanup is not appropriate and necessary for TPH analysis.

- Kinder Morgan's Comment #3 – *Sheen*

Kinder Morgan stated that from January 2009 to June 2009, monthly free product removal reports indicated that the sheen was not observed in the harbor. Therefore, existing interim remedial measures have made substantial progress in mitigating discharges of the sheen to the harbor from the site. As a result, removal of TPH in soil to the proposed cleanup goals would not be necessary for mitigation of the sheen.

- Regional Board Staff's Response to Comment #3 – Regional Board staff partially agrees that interim remedial measures control these waste discharges from the site to the harbor. However, staff disagrees that a removal of TPH in soil is not necessary because the interim remedial measures are in-place.

Upon review of the monthly free product removal reports for the LAMT site, Regional Board staff finds that the absorbent boom in many places were consistently disconnected and there was

no record of when the absorbent booms were disconnected prior to the time of observation for the containment area. In addition, there was no record from the Port of Los Angeles staff indicating that the booms were properly placed after the Tetra Teach staff notified the disconnection of the absorbent booms and requested to connect them. Therefore, it is inconclusive to indicate that because there was no sheen observed in the containment area from January 2009 to June 2009, existing remedial measures have made substantial progress in mitigating discharges of sheen from the site to the harbor. Note that sheen was observed from July 2009 to September 2009 in the containment area.

It is illegal to discharge TPH waste to the surface water. The remedial measures in place at this time on-site are part of an interim free product removal plan to control these waste discharges from the site to the harbor. This containment system is in place so that the discharges will not further pollute the rest of the harbor area. The absorbent booms are in place to remediate what already been discharged to the harbor.

The soil cleanup goals are to protect public health as well as groundwater and surface water resources. Removal of TPH in soil or any other impacted pollutant in soil will prevent pollutants including the sheen from being discharged to the ocean. Although the current mitigation plan is in-place via interim free product removal system, the final goal is to reduce or remove source area to prevent the discharge to the ocean. At this time, such source containment or removal has not been completed at the LAMT site.

- Kinder Morgan's Comment #4 – *Additional Cleanup Issues*

- Regional Board Staff's Response to Comment #4 – Kinder Morgan listed three separate issues and the following are the responses to each individual issue.

1. Regional Board staff proposed 5 µg/l for methyl tert-butyl ether (MTBE) and 12 µg/l for tert butyl alcohol (TBA). Note that there are no numerical values in CTR for MTBE and TBA. The next approach will be select the site-specific human health risk assessment values based on cancerous for MTBE and TBA. They are 65,000 µg/l and 69,000 µg/l, respectively.

   Although EPA's Office of Water has concluded that available data are not adequate to estimate potential health risks of MTBE at low exposure levels in drinking water but that the data support the conclusion that MTBE is a potential human carcinogen at high doses. MTBE is one of the groundwater pollutants of most widespread concern in the State and in addition, MTBE gives water an unpleasant taste at very low concentrations, 5 µg/l. Regional Board staff believes that the MTBE concentration of 65,000 µg/l in groundwater is very high concentration that will not prevent adverse nuisance conditions at the Site or comply with the Antidegradation Policy. Therefore, Regional Board staff proposed 5 µg/l, which is NPDES limit for MTBE.

Since TBA is a result of natural biodegradation from MTBE, Regional Board staff uses a consistent approach for TBA same as MTBE by preventing adverse nuisance conditions at the Site and complying with the Antidegradation Policy. Therefore, Regional Board staff proposed 12 µg/l, which is NPDES limit for TBA.

2. Based on the investigation and monitoring reports, only those compounds or analytes that exceeded the site-specific cleanup goals listed in Tables 2A for groundwater and Table 3A for soil are summarized in Table 1. If any compound listed in Table 1, Table 2A or Table 3A is not detected or below the site-specific cleanup goals, then the responsible parties do not need to perform remediation for that compound at LAMT.

   The soil cleanup goals for Molybdenum and selenium are now added to Table 1.

3. Site-specific cleanup goals for Organo lead are removed from Table 1 and Table 3A.

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3. *Proposed Revised Soil and Groundwater Cleanup Goals for Former GATX Los Angeles Marine Terminal* Submitted by The Port of Los Angeles (September 17, 2009)

- The Port of Los Angeles' Comment #1.a – *Soil Cleanup Goals For Organic Compounds: a. The mass limiting calculation, which assumes contaminant transport by rainwater infiltration only, is inappropriate for soils that are routinely inundated by tidal fluctuations.*

  The Port of Los Angeles (Port) stated that using equilibrium partitioning calculation for soil represents the actual conditions on-site. The mass limit calculation assumes that a finite mass of contaminants are available to leach into groundwater by rain water infiltration only. Since the tidal influent at the site varies 3.5 and 10 feet below ground surface, the contaminated site is in direct contact with groundwater; therefore, the mass limit calculation assumption is not applicable to the LAMT site condition.

  The Port also stated that the Regional Board staff's recommended cleanup goals for thirteen of the contaminants of concern were based on the mass limit approach and the differences in the values between using mass limit approach and equilibrium partitioning approach were dramatic.

- Regional Board staff's Response to Comment #1.a – Regional Board staff agrees with the Port that the mass limit calculation assumption is not applicable. To estimate potential impact of contaminants of concern in soil on-site above the groundwater, equilibrium partitioning approach and mass limit approach were presented in the *Revised Preliminary Cleanup Goal* (AMEC Geomatrix, September 26, 2008 and subsequent revised versions). In the September 26, 2008, Revised Preliminary Cleanup Goal, AMEC Geometrix recommended that "If a preliminary cleanup goal based on the equilibrium partitioning approach becomes the primary reason for remediation, additional organic carbon data may be needed to more accurately represent site conditions." Additional site-specific soil parameters were collected in June 2009, the results were presented in *Shallow Soil and Organic Carbon Content Assessment Results* (AMEC Geomatrix, July 8, 2009).

  The Regional Board staff evaluated the Port's and Kinder Morgan's comments. Therefore, soil cleanup goals using the Equilibrium partitioning approach which is based on site-specific soil parameters are selected. Table 1, Table 2A, Table 2B, Table 3A, and Table 3B reflect these changes.

- The Port of Los Angeles' Comment #1.b– *Soil Cleanup Goals For Organic Compounds: b. The mass limit calculation, if used, should assume an 8-foot layer of contaminated soil rather than a 4-foot layer.*

- Regional Board staff's Response to Comment #1.b – Mass limit calculation using 8-foot layer will not be modified because the cleanup goals for soil at the LAMT site are now based on the equilibrium partitioning approach using on-site soil parameters. (See also staff's Response to Comment #1.a.)

- The Port of Los Angeles' Comment #2.a– *Soil Cleanup Goals For Metals*
a. Cleanup Goals for Copper, Mercury, Selenium and Zinc Exceed Hazardous Waste Criteria.

The Port notes that the proposed cleanup goals for copper, mercury, selenium, and zinc in soil exceed their respective California hazardous waste levels based on the current total threshold limit concentrations (TTLCs). Most of them are also greater then ten (10) times the soluble threshold limit concentrations (STLCs), which is used as a screening level to determine the potential hazardous status of the soil when disturbed or excavated. Adoption of these exceptionally high metal concentrations by the RWQCB as proposed soil cleanup goals could be controversial and misleading. Additionally, any remediation action plan based on the proposed cleanup goals will require pre-remediation testing for soluble metals an additional soil management provisions. The Port recommends that the RWQCB reconsider the appropriateness and adequacy of the proposed soil metal cleanup goals.

Regional Board staff's Response to Comment #2.a – Regional Board staff here clarifies that a characterization of toxicity for disposal is necessary only if the impacted soil is excavated or removed at the LAMT site. Note that Regional Board staff has revised the site-specific cleanup goals for metals. The revised site-specific soil cleanup goals for copper, mercury, selenium and zinc were listed below and compared with the California State hazardous waste identification.

Analyte	Site-Specific Cleanup Goals (mg/kg)	STLC[(a)] (mg/l)	TTLC[(b)] (wet-weight, mg/kg)
Copper	69	25	2,500
Mercury	0.69	0.2	20
Selenium	0.23	1	100
Zinc	680	250	5,000

(a) soluble threshold limit concentration
(b) total threshold limit concentration
mg/l = milligram per liter
mg/kg = milligram per kilogram

The site-specific cleanup goals for copper, mercury, selenium, zinc and other metals were based on the following:

1. Background Concentrations of Trace and Major Elements in California Soils, Kearney Foundation Special Report (March 1996) and ninety five percent upper tolerance limits reported on Table 3-8 of *Site Characterization and Risk Assessment Report*, AMEC Geomatrix, October 2008),

2. Risk-based Soil Screening Levels for Protection of Groundwater, Risk-Based Concentration Table, Regional Screening Levels for Chemical Contaminants at Superfund Sites, July 7, 2008,

3. Site-specific screening levels calculated using cancer-risk basis, *Site Characterization and Risk Assessment Report*, (AMEC Geomatrix, October 2008), and

4. Site-specific screening levels calculated using non cancer-risk basis, *Site Characterization and Risk Assessment Report*, (AMEC Geomatrix, October 2008).

If these metals remain in place on site at or below the site-specific cleanup goals, then they are protective of beneficial uses and water quality. In another words, if a concentration of a contaminant of concern in soil is below the cleanup goal, then no remedial action plan is necessary; however, if a concentration of the contaminant of concern in soil is above the cleanup goal level, then the remedial measure must be proposed.

Note that if remedial action is a soil removal, then the excavated soil is now considered a "waste" and soil waste (overburdened soil) must be characterize and dispose properly under the California Code of Regulation (CCR). CCR, Title 22, Section 66261.2, defines that "waste" mean any discarded material of any form (for example, liquid, semi-solid, solid or gaseous). Total threshold limit concentration (TTLC) and the soluble threshold limit concentration (STLC) are maximum allowable threshold concentration values provided in CCR, Title 22, section 66261.24. for characteristic of toxicity for wastes. By "rule of thumb", if TTLC value of an analyte is 10 times the STLC value, the Waste Extraction Test (WET) should be used. If any analyte in the waste analyzed equals or exceeds the STLC value, it is considered a hazardous toxic waste.

Let's use mercury as an example (See table above). At an area where soil concentration is below the site-specific cleanup goal of 0.69 mg/kg, then no remediation is necessary. However, at another area where the soil concentration is above the site-specific cleanup goal of 0.69 mg/kg, then the area should be remediated. If a removal of soil is selected as a part of remediation, the soil that is removed become "waste" under the CCR's definition. TTLC for mercury is listed as 20 mg/kg; therefore, it is considered as California hazardous waste. The waste must then be transported properly to an appropriate disposal facility.

In summary, only if the impacted soil is excavated or removed during future activities at the LAMT site, then a characterization of toxicity for disposal is necessary.

- The Port of Los Angeles' Comment #2.b – *Soil Cleanup Goals For Metals*
  b. Cleanup Goals are An Ad Hoc Mix of Background Levels and Human Health Risk Criteria.

  With respect to metals, the RWQCB appears to have abandoned its mandate to protect water quality in favor of human health risk based criteria. However, since a human health risk analysis was only performed for certain metals, the resulting cleanup goals comprise an ad hoc mix of human health risk criteria and background levels reflecting a lack of consistency and scientific rigor.

  Presumably, water quality criteria were not imposed because these metals appear to be generally insoluble and have not yet been detected in significantly concentrations in

groundwater at the site. The danger in this approach is that by the time the groundwater detection occurs, the opportunity to prevent degradation of the water has been missed.

- Regional Board Staff's Response to Comment #2.b – Regional Board staff disagrees with the Port that the Regional Board abandoned its mandate to protect water quality in favor of human health risk based criteria for metals. All proposed site-specific metals cleanup goals in groundwater for the LAMT site are based on the CTR values listed under the following categories: (a) "Criterion Maximum Conc., C1" and "Criterion Continuous Conc., C2" for salt water aquatic life; or (b) Human Health Protection for Consumption of "Organisms Only, D2", which ever most stringent. Therefore, these site-specific metals cleanup goals in groundwater are developed to protect water resources, aquatic habitats, and human health.

  Proposed site-specific metals in soil cleanup goals for the LAMT site are based on the following in order of selection:

  1. Ninety-five percent upper tolerance limits from Background concentrations in California soils published in *Background Concentrations of Trace and Major Elements in California Soils*, Kearney Foundation Special Report, March 1996 (Kearney Report),

  2. Risk-based soil Screening Levels for Protection of Groundwater, Risk-Based Concentration Table, *Regional Screening Levels for Chemical Contaminants at Superfund Sites*, July 7, 2008, and

  3. The most protective of risk-based screening levels calculated and presented in AMEC Geomatrix, Inc., *Characterization and Risk Assessment Report*, October 2008.

  Using available on-site data and references listed above, site-specific metals in soil are consistently applied to the LAMT site.

- The Port of Los Angeles' Comment #3.a – *Groundwater Cleanup Goals*
  a. Use of Human Health Risk Criteria as a "Plug" Is Inappropriate

  Table 2 of the revised groundwater cleanup goals also uses a compilation of the California Toxics Rule (CTR) and human health risk-based criteria (in the absence of CTR). This approach resulted in a table containing two considerably different values of cleanup goals – a set of low or more restricted cleanup goals (from µg/L to low mg/L range) for constituents based on the CTR and another set of more liberal or high cleanup goals based on the human health risk considerations (examples are 830 mg/L for Acetone, 1,500 mg/L for 2-Butanone, 21 mg/L for Chlorobenzene, 17 mg/L for 1,2-DCB, 1,400 mg/L for 2-Hexanone, and 210 mg/L for o-Xylene, etc.)

  The Port is concerned about the RWQCB over-weighing human health risks in the place of water quality and marine ecological protection.

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Finally, the Port asks that the RWQCB confirm California Toxics Rule ("CTR") values for the following constituents: Acenaphthylene, Benzo(g,h,i)perylene, Bromodichloromethane, Naphthalene, and Phenanthrene. Additionally, we note that several of the cleanup goal references listed in Table 2 appear to be incorrect.

Regional Board Staff's Response to Comment #3.a – Regional Board staff did not over-weight human health risks in place of water quality and marine ecological protection. Rather, these proposed site-specific cleanup goals are protective to human health, groundwater and surface water resources, and aquatic habitats. They will prevent or minimize adverse nuisance conditions, emission of subsurface vapors to buildings, leaching and subsequent impacts to groundwater and surface water. They meet Antidegradation policy and water quality objectives set forth in our Regional Board's Basin Plan.

It is not appropriate to compare concentrations of two different compounds indicating a compound with lower concentration is more protective than a different compound with higher concentration. Each compound has its own toxicity and/or risk levels to marine habitats or to human. Note that the proposed site-specific groundwater cleanup goals for the LAMT site are based on the following in order of selection:

1. Under Chapter 40, Part 131 of the Code of Federal Regulations (40 CFR 131), California Toxics Rule (CTR)(May 18, 2008), cleanup goals for the contaminants of concern (COCs) for organic compounds are first based on values listed under the following categories: (a) "Criterion Maximum Concentrations, C1" and "Criterion Continuous Concentrations, C2" for salt water aquatic life; or (b) Human Health Protection for Consumption of "Organisms Only, D2", whichever most stringent.

2. Most protective of human health and are site-specific risk-based screening levels calculated using cancer-risk basis for this site by Kinder Morgan, Inc.'s consultant, AMEC Geomatrix, Inc. Table 5, *Alternative Cleanup Goals for Chemicals Detected Groundwater*,

3. General NPDES Permit Nos. CAG834001 and CAG914001
   a. Taste and Odor Thresholds published by the U.S. Environmental Protection Agency,
   b. California's Maximum Contaminant Levels (MCLs),
   c. Action Levels (ALs) for drinking water as established by the State Department of Pubic Health, and

4. Most protective of human health and are site-specific risk-based screening levels calculated using non cancer-risk basis for this site by Kinder Morgan, Inc.'s consultant, AMEC Geomatrix, Inc. Table 5, *Alternative Cleanup Goals for Chemicals Detected Groundwater*.

Lastly, Regional Board staff has revised the references noted in the Table 2A for all COCs including acenaphthlyene, benzo(g,h,i)perylene, bromodichloromethane, naphthalene, and phenanthrene to reflect all the changes noted in responses to comments.

ATTACHMENT III

Summary of Alternative Comparisons for Berths 171-173, Former GATX Los Angeles Marine Terminal

Remedial Objectives	1) Obtain regulatory closure, 2) remove contamination sources, 3) mitigate human health risks, 4) prevent potential migration of COPCs from impacted soils to groundwater and surface water, 5) maintain surface water and groundwater qualities consistent with their designated beneficial uses, and 6) provide for appropriate site development		
Alternatives	**Alternative #1**	**Alternative #2**	**Alternative #3**
General description	Excavation of most impacted soils (i.e., soils with COPCs exceeding the LARWQCB cleanup goals) in the vadose and intertidal zones, remediation of excavated soils offsite using thermal desorption, removal of LNAPL from open excavation areas using surface skimmers, reuse of treated soils as backfill and compaction, monitoring of groundwater quality for need of remediation, implementation of natural attenuation or in-situ enhanced bioremediation for groundwater remediation (if needed).	Excavation of most impacted soils from the vadose zone and a portion of soils from the intertidal zone (based on criterion of TPH concentration that will release sheen on groundwater), remediation of excavated soils offsite using thermal desorption, removal of LNAPL from open excavation areas using surface skimmers, reuse of treated soils as backfill and compaction, monitoring of groundwater quality for need of remediation, implementation of natural attenuation or in-situ enhanced bioremediation for residual COPCs in intertidal zone soil and groundwater (if needed).	Phase 1 (no development): Hot spot soil removal based on industrial health risk protection, installation of surface cap (to prevent infiltration) and slurry wall containment (sheen/LNAPL), installation of recovery trenches for LNAPL recovery, and implementation of natural attenuation to remediate contaminated groundwater. Phase 2 (development): When the site is redeveloped, excavation and soil management will be performed as necessary to allow installation of substructures. Systems to mitigate vapor intrusion into buildings will be required.
Overall protection of human health and the environment	Most protective. Removes contamination sources from soils in the vadose and intertidal zones. Allows maximum removal of LNAPL from groundwater. Aerates groundwater to speed up biodegradation of dissolved contaminants. Requires little or no additional mitigation measures to protect human health and environment.	Very protective. Removes majority of the contaminated soils including all soil suspected of creating oil sheen. Allows maximum removal of LNAPL from groundwater. Aerates groundwater to speed up biodegradation of dissolved contaminants. Requires long term monitoring and possible treatment of contaminated soils left in place.	Protective of industrial workers only through limited soil removal and vapor barrier. Allows ongoing release of oil sheen from intertidal soils to groundwater during tidal fluctuations. Limited LNAPL recovery using recovery trenches. No provision to prevent migration of contaminants off site.
Compliance with ARARs	Complies. BMPs and mitigation monitoring plans will implemented to address GHG and other emissions.	Complies except for portion of contaminated soil left in intertidal zone and pending effectiveness of bioremediation. BMPs and mitigation monitoring plans will be implemented to address GHG and other emissions.	Does not comply with the LARWQCB's soil cleanup goals.
Long term effectiveness and performance	Soil remediation will take less than one year to complete. Groundwater remediation of dissolved contaminants will most likely take less than five years to complete or may not be needed after the soil/LNAPL source removal. Depending on the residual contamination in groundwater and duration of groundwater remediation, potential vapor intrusion to building may need to be evaluated. Residual LNAPL/hydrocarbon sheen in the riprap may remain but excavation will likely facilitate more water flow through the riprap, enhancing the flushing effects.	Soil remediation will take slightly less time than Alternative #1 to complete. Natural attenuation for residual soil contamination in the intertidal zone will take a long time or may not be effective in meeting soil cleanup goals and may require more active or enhanced bioremediation. Groundwater remediation should be similar to that of Alternative #1, except that a longer time may be required due to potentially more leaching from residual contamination in the intertidal zone. Residual LNAPL/hydrocarbon sheen in the riprap may remain but excavation will likely facilitate more water flow through the riprap, enhancing the flushing effects. Depending on the residual contamination in groundwater and effectiveness of bioremediation of soils, potential vapor intrusion to buildings may need to be evaluated.	Installation of slurry wall to stop migration of oil sheen from the Site to the Harbor may also restrict nutrient/oxygen exchange and affect natural attenuation. Proposed LNAPL extraction trenches may not be sufficient to mobilize LNAPL from outside their zone of influence. Oxygen supply for natural attenuation may be restricted by surface cap. Soil cleanup goals will not likely be achieved. Plan contains no contingencies to address performance failures of LNAPL recovery and/or natural attenuation. Residual LNAPL/hydrocarbon sheen in the riprap to be remediated through flushing against the slurry wall. Potential migration of contaminants off site not addressed.

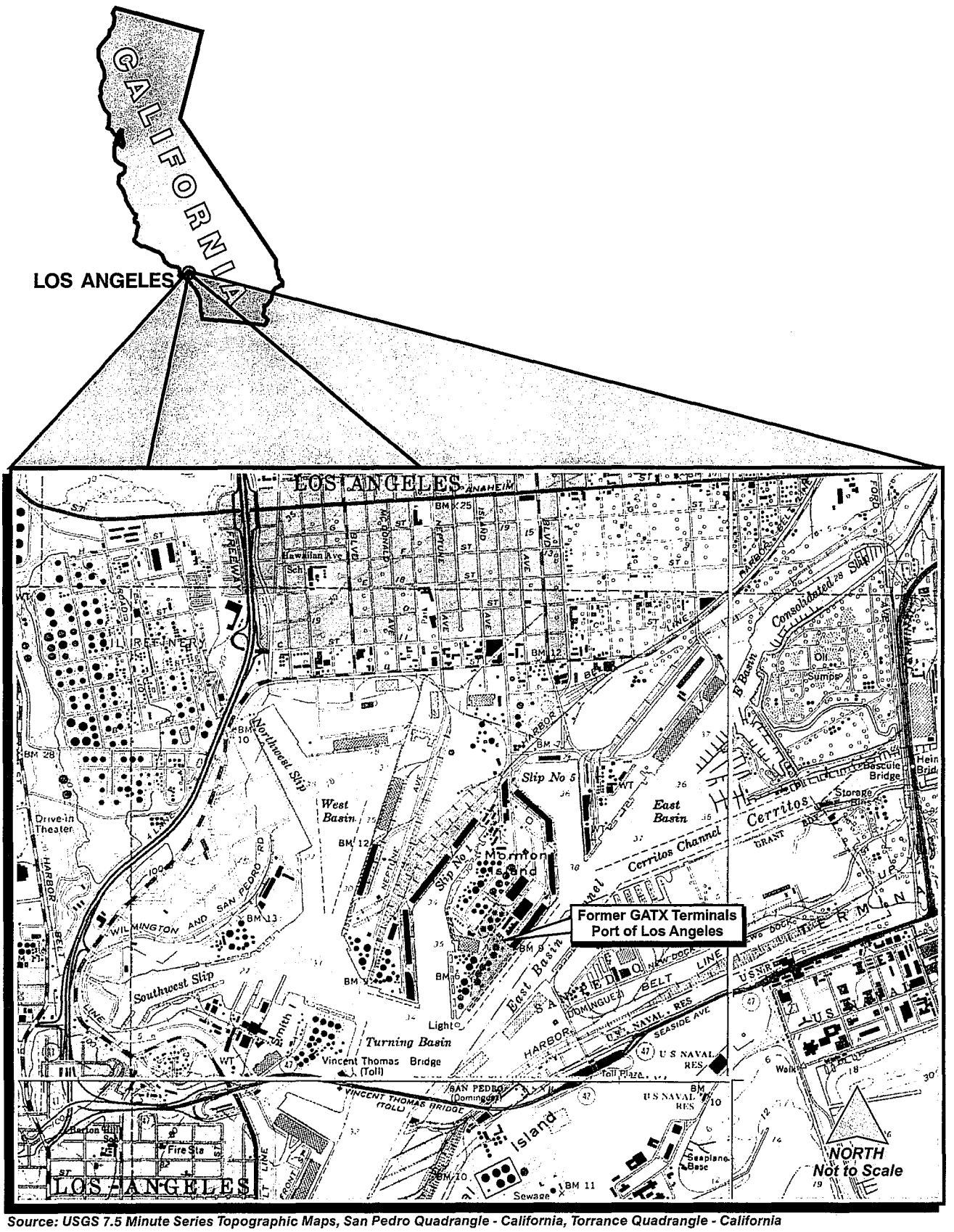
Summary of Alternative Comparisons for Berths 171-173, Former GATX Los Angeles Marine Terminal

Reduction of toxicity, mobility, or volume through treatment	Remediation of soil by removal and offsite thermal treatment effectively clean up organic COPCs, eliminating toxicity and mobility of the COPCs, as well as volume of contaminated soils. Remediation of dissolved contaminants in groundwater by natural attenuation or in-situ enhanced bioremediation also eliminates chemical toxicity, mobility, and volume of groundwater plume.	Removal of majority of impacted soils for offsite thermal treatment has similar advantages as Alternative #1. However, the extent that this criteria can be met will depend on the concentrations and volume of residual soil contamination left in the intertidal zone and the effectiveness of natural attenuation (uncertainty).	Neither capping nor slurry wall will have significant effects on controlling tidally-fluctuated groundwater in contact with contaminated soils in intertidal zone. This alternative also leaves most of contaminated soils in-place and may not be able to effectively remove LNAPL from soil pores and areas outside the influence of the proposed recovery trenches. These together with lack of active remediation approach for contaminated soils to meet soil cleanup goals shows uncertainty to meet the criterion of reducing toxicity, mobility, or volume through treatment.
Short term effectiveness	Remediation effort will have immediate results.	Remediation effort will have immediate results except for fraction of soils left in place for bioremediation/natural attenuation.	Only seeks to control migration of oil sheen to the Harbor in the short term.
Implementability	Easily implemented using conventional equipment and without business interruption. Soil remediation achieved through bench excavation with conventional earth moving equipment in sequential sections. Excavation in intertidal zone may need to be conducted during low tides or in wet. Thermal treatment facility is available and performance is guaranteed. Treated soil will be transported back to site for reuse. LNAPL skimming will be conducted using conventional surface skimmers. Groundwater remediation by natural attenuation or in-situ bioremediation can be easily performed without special equipment.	Same as Alternative #1.	Easily implemented using conventional equipment but presents obstacles to future development.
Cost	Estimated at $13.4M. Although it has the highest cost, the estimate for this alternative is the most certain. Requires very little long term O&M.	Estimated at $11.2M, subject to revision upon determination of the sheen critical concentration for soils to be left in place. Also subject to additional costs if additional remedies required (such as additional excavation) should natural attenuation of residual contamination in the intertidal zone fail to meet the LARWQCB's soil cleanup goals.	Estimated at $5.3M. Although it has the lowest initial cost, this alternative suffers the highest uncertainty and excludes the costs associated with future development such as design changes, schedule delays, regulatory review/approval, soil management, health and safety monitoring, and maintenance associated with COPCs. Similarly, no costs are included for remedial contingencies should any of the plan elements fail to perform and require additional remedial efforts. The life-cycle cost for this alternative is therefore unknown.
State acceptance	Fairly certain as it is the most protective of human health and environment, provides the most certainty, restores State Tidelands to productive use in the shortest time frame and does not burden the Tidelands with any long term environmental liabilities.	Likely as it is similar to Alternative #1 and is endorsed by two of the three operators of the former marine oil terminal at the site.	Questionable as this alternative does not anticipate achievement of groundwater cleanup goals for 20-30 years and does not anticipate achieving soil cleanup goals.

Summary of Alternative Comparisons for Berths 171-173, Former GATX Los Angeles Marine Terminal

Community acceptance	Likely. Most completely remediates hydrocarbon contamination attributable to operation of marine oil terminal. Provides most certain protection of Harbor waters. GHG and other engine emissions and fugitive dust will be mitigated through construction performance requirements (Tier II emissions standards for off-road equipment and and post-1994 EPA standards for on-road trucks). Remedial activities are sufficiently remote from residential areas and trucks will follow a prescribed route to minimize impacts.	Likely, as similar to Alternative #1.	Unlikely. Not completely protective of groundwater. Burdens State Tidelands with long term environmental liability. Uncertain ability to prevent oil sheen on Harbor. Potential for migration of contaminants off site. Incomplete sustainability analysis that does not address GHG/air emissions for remediating contaminated soils left in-place during the Phase 2 Site development. The combined GHG/air emissions from remedial actions in both phases will have significant impacts to the community.
Meets remedial objectives	Yes	Yes, except for uncertainty surrounding natural attenuation/bioremediation of residual soil contamination left in intertidal zone.	Doubtful and not in the near future.

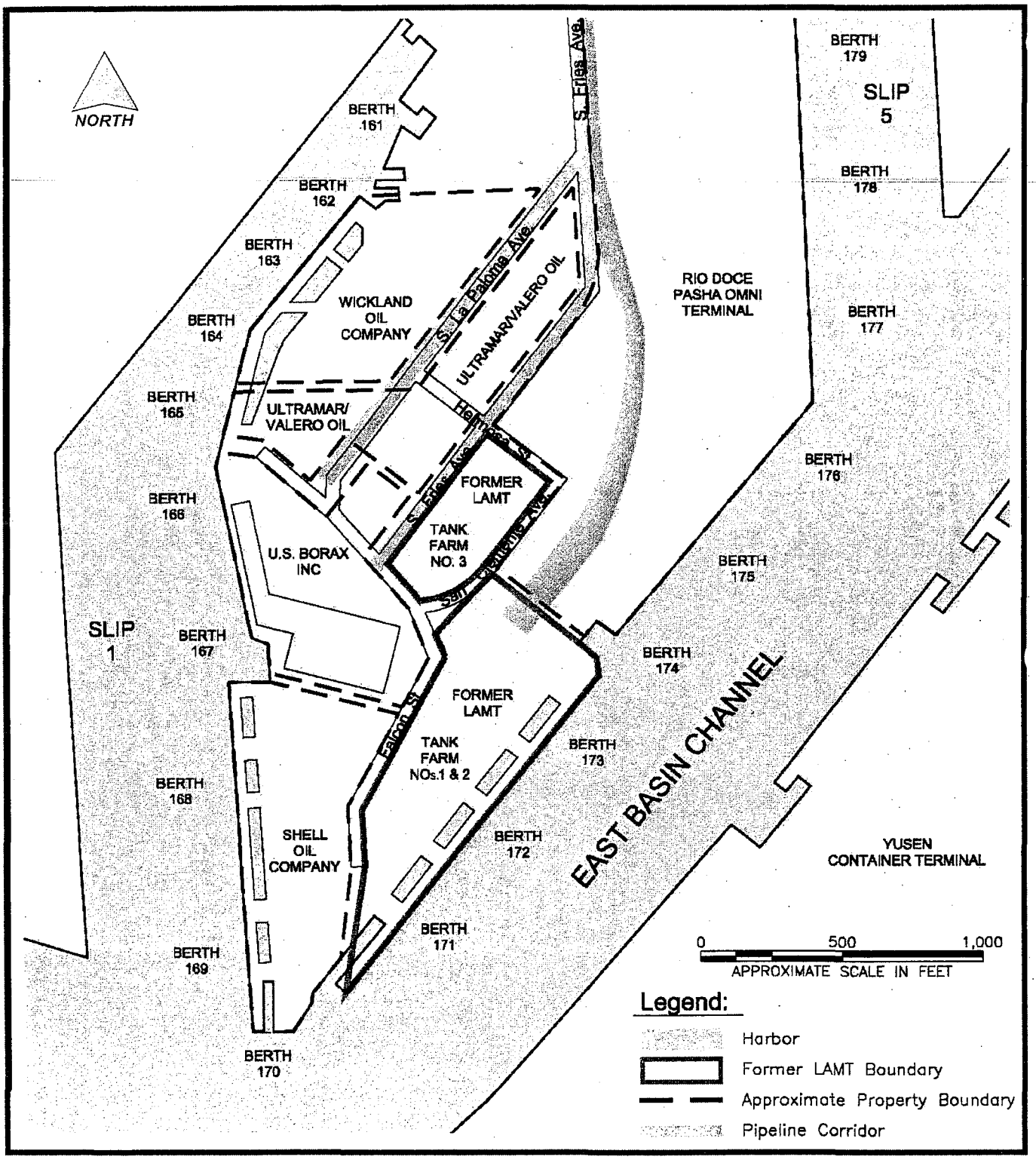
EXHIBIT 2



Source: USGS 7.5 Minute Series Topographic Maps, San Pedro Quadrangle - California, Torrance Quadrangle - California

Environmental Management Division PORT OF LOS ANGELES 425 South Palos Verdes St, San Pedro, CA 90733-0151	Tetra Tech, Inc. Engineers, Architects & Scientists 3475 E. Foothill Blvd. Pasadena, California 91107 626.351.4664	General Location Map Port of Los Angeles Berths 171-173		FIGURE 1
		TC#: 22437-19	Drawn By: JMT	Date: January 2009

EXHIBIT 3



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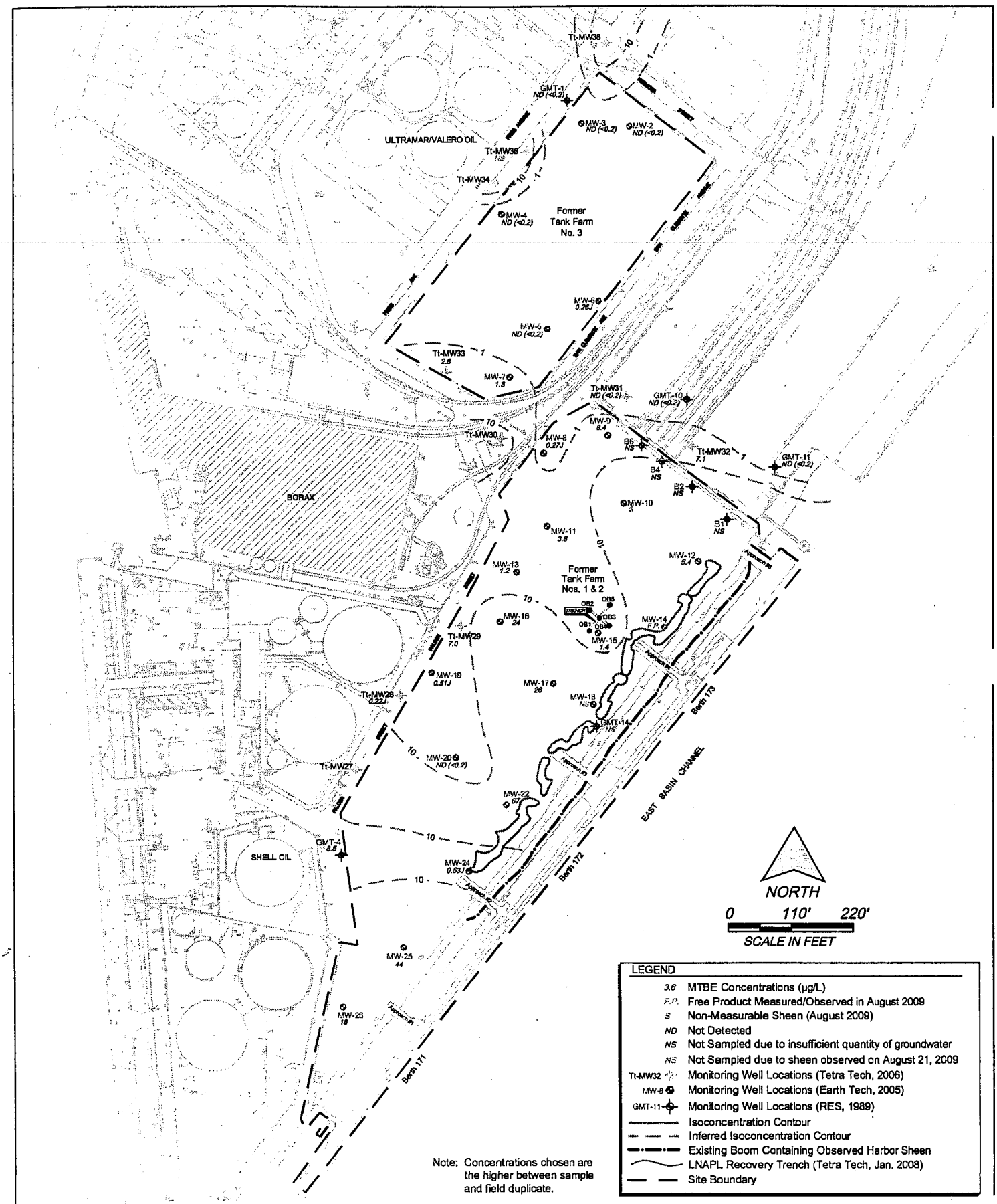
TETRA TECH 3475 E. Foothill Blvd. Pasadena, California 91107	PORT OF LOS ANGELES Environmental Management Division 425 South Palos Verdes St. San Pedro, CA 90733-0151	FIGURE 2 SITE VICINITY MAP	Drawn By: M.L.H. Date: October 2009 TC# 22437-35

EXHIBIT 4



Note: Concentrations chosen are the higher between sample and field duplicate.

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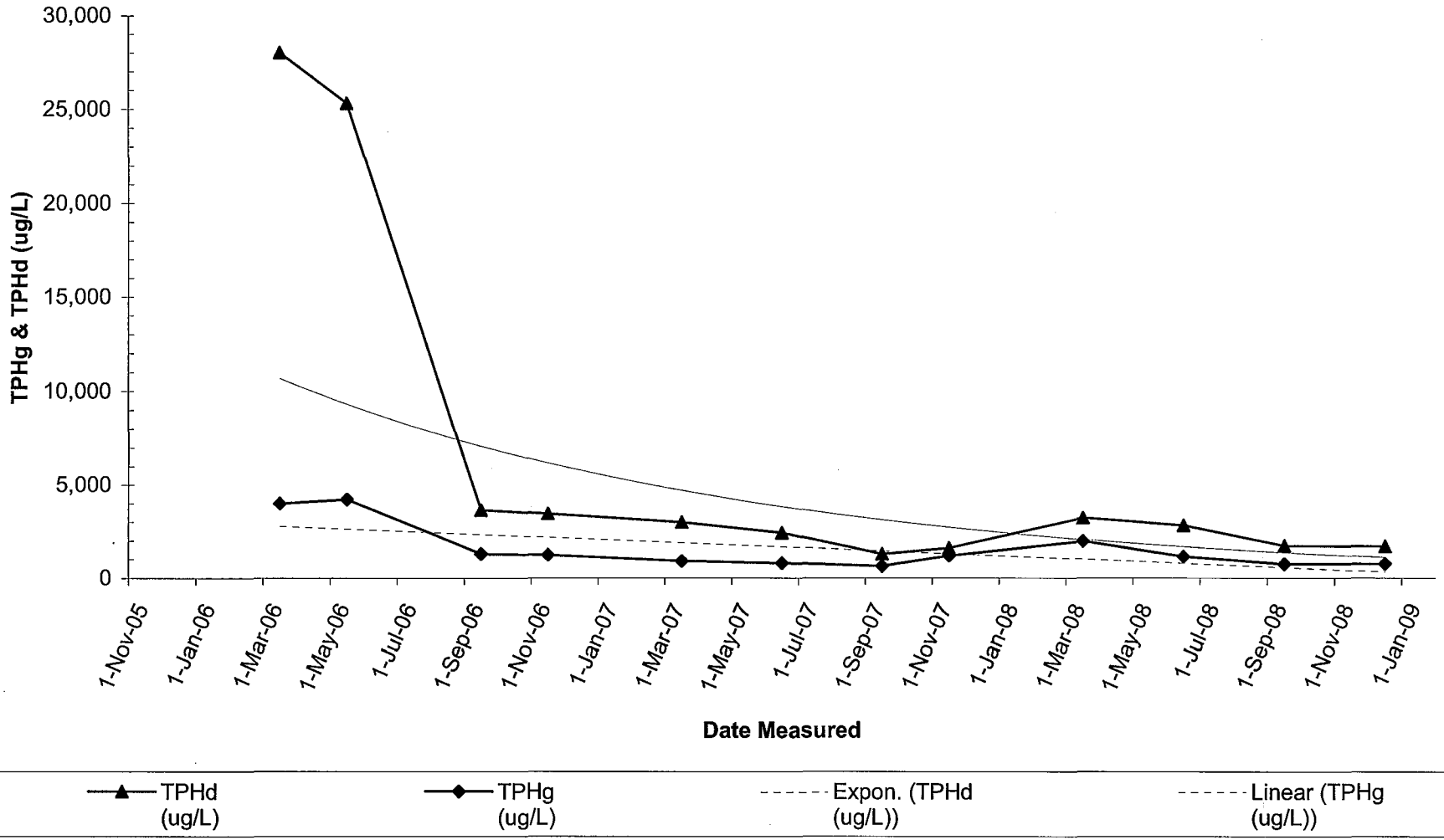
PROGRAM MANAGER: D.L. PREPARED BY: M.L.H. PROJECT MANAGER: H.B.	Prepared By: **Tetra Tech** 3475 E. Foothill Blvd. Pasadena, California 91107	Prepared For: **PORT OF LOS ANGELES** **Environmental Management Division** 425 South Palos Verdes St. San Pedro, CA 90733-0151	FIGURE 8 MTBE CONCENTRATIONS IN GROUNDWATER SAMPLES	DATE: October 2009 SCALE: 1"=220' TC#: 22437-35

EXHIBIT 5

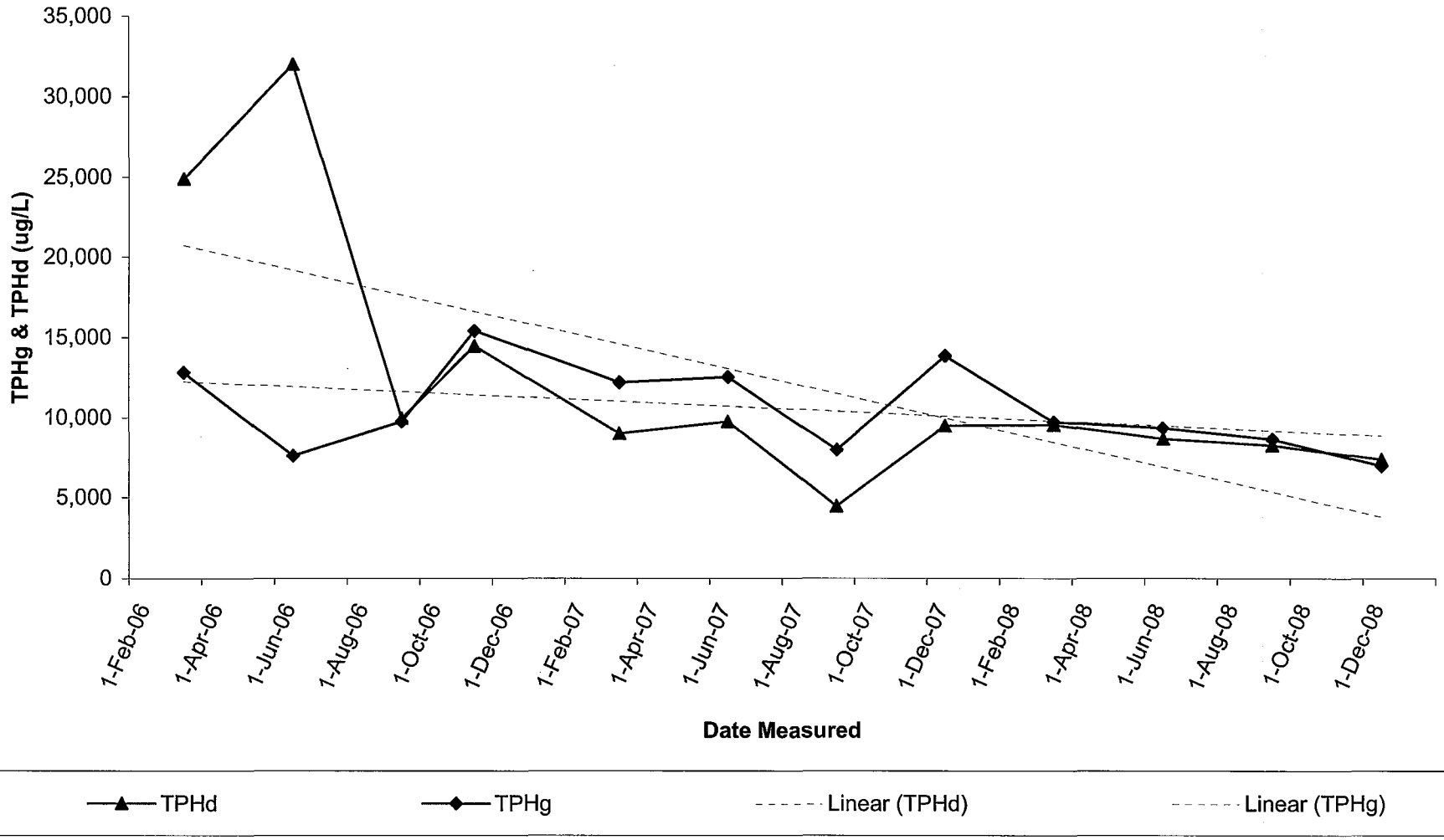
Groundwater Monitring Well MW-5

Former GATX Marine Terminals



Groundwater Monitoring Well MW-20

Former GATX Marine Terminals



Groundwater Monitoring Well MW-17

Former GATX Marine Terminals

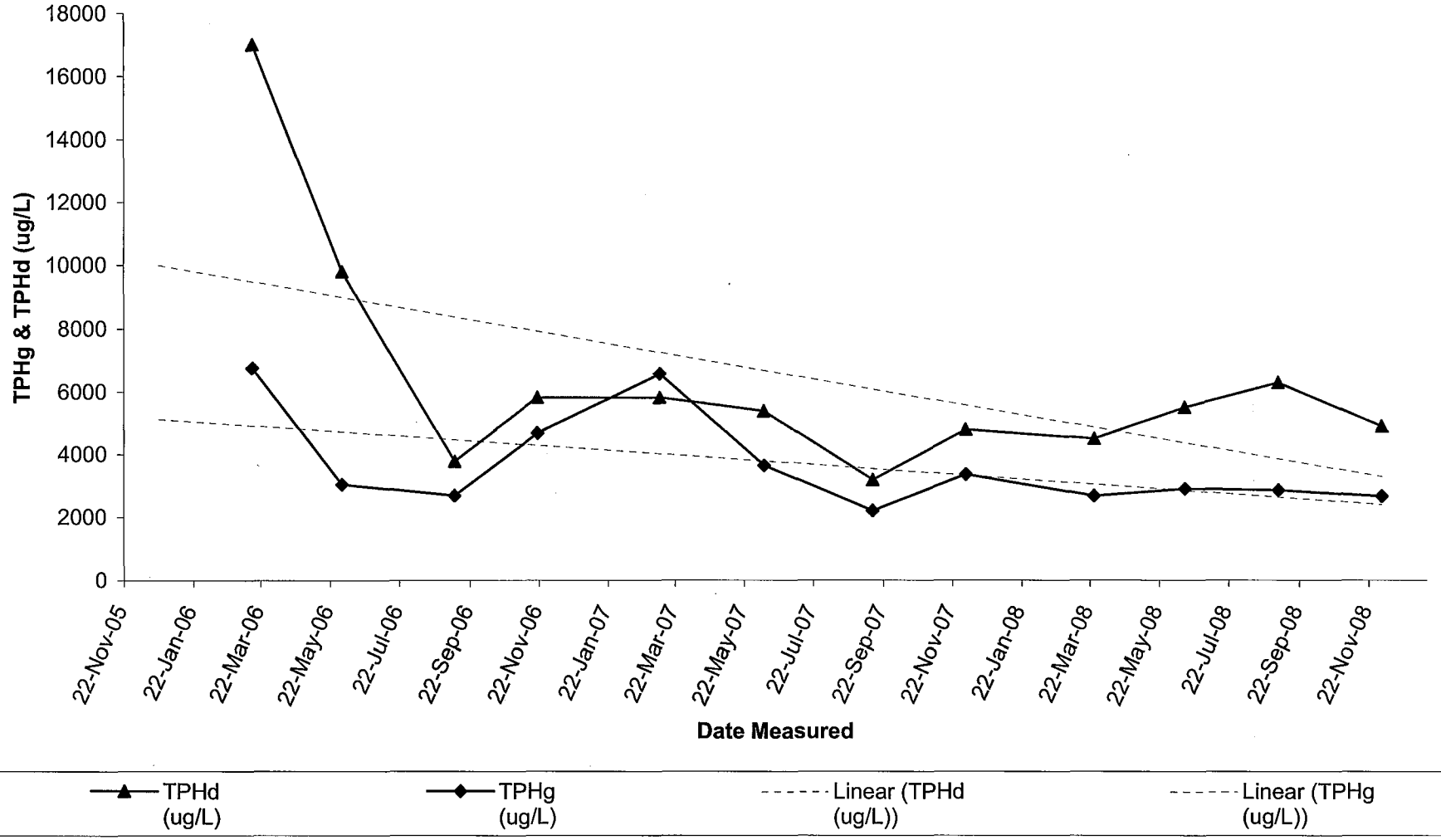


EXHIBIT 6

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September 13, 2006

Ms. Thizar Tintut-Williams
California Regional Water Quality Control Board
Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, California 90013

Re: *Former Marine Terminal, Port of Los Angeles, Berths 171-173 (Site ID No. 2040107, SLIC No. 621A)*

Dear Ms. Tintut-Williams:

We are in receipt of a letter issued over Mr. Jonathan Bishop's signature and dated August 24, 2006, regarding the former marine terminal at the Port of Los Angeles, Berths 171-173 (the "Site"). This letter lists you as a point of contact. The letter was a follow on to the August 10, 2006 meeting between Los Angeles Regional Water Quality Control Board ("RWQCB") staff, Kinder Morgan, ConocoPhillips, and Chevron Corporation ("Chevron").

We write to correct the record as to one point in the letter. It indicates that Kinder Morgan, ConocoPhillips, and Chevron all agreed to submit certain information to the RWQCB. In fact, at that meeting Kinder Morgan was the entity which offered to submit certain information to the RWQCB.

As the other parties are aware, Chevron has always maintained that it should not have been identified as a responsible party. Chevron never occupied the Site, nor is Chevron a successor-in-interest to any entity who occupied the Site. A separate entity, Texaco Inc. and its predecessors ("Texaco") occupied the Site from approximately 1923 until 1968, but obtained a broad release of restoration requirements from the City of Los Angeles in August 1969 in exchange for the transfer of all improvements and facilities Texaco had installed at the Site. The release was memorialized by the Board of Harbor Commissioners as Order No. 3793. Additionally, even if Texaco had ongoing obligations related to the Site – which it did not – those obligations were discharged as a result of Texaco's 1987 bankruptcy.

Please call me if you have any questions.

Sincerely,

Christopher J. McNevin

cc: Dr. Rebecca Chou

William W. Funderburk, Esq.
Kenneth F. Mattfield, Esq.
Richard G. Opper, Esq.
Laura J. Carroll, Esq.
Belynda B. Reck, Esq.

BEFORE THE STATE WATER RESOURCES CONTROL BOARD

In the Matter of the California Regional Water Quality Control Board – Los Angeles Region. Amendment to: Revised Cleanup & Abatement Order No. R4-2008-0006 (Issued April 9, 2008) Requiring Kinder Morgan Inc., Chevron Corporation, ConocoPhillips, and the City of Los Angeles, Harbor Department (a.k.a. Port of Los Angeles) To Assess, Cleanup and Abate the Effects of Contaminants Discharged to Soil, Groundwater, and Seawater (File No. 90-006)	)))))))))	**DECLARATION OF JOSEPH J. MUZZIO IN SUPPORT OF CHEVRON CORPORATION'S PETITION FOR REVIEW AND REQUEST FOR HEARING AND STAY**

I, Joseph J. Muzzio, based on my personal knowledge, declare as follows:

1. I am a Senior Geologist/Senior Program Manager with SAIC in Campbell, California. My project management duties include design and implementation of soil and groundwater investigations for characterization of petroleum hydrocarbon and chlorinated solvent plumes, remediation, remediation technology evaluation and implementation, facilities closure and demolition, multiple-party regulatory negotiations, site closure evaluations and requests, litigation and legal support, and detailed life-cycle cost estimating for the evaluation of long-term environmental liability. I have worked with SAIC from February 2003 through the present.

2. I hold a B.A. in Geology with a minor in Mathematics from California State University, Chico. I have conducted post-graduate studies in Engineering Geology at San Jose State University, and I hold a Juris Doctorate from Monterey College of Law.

3. I am a registered Professional Geologist in the State of California (No. 5249), a registered Certified Engineering Geologist in the State of California (No. 1672), and a licensed member of the California State Bar (No. 231831).

4. I have over twenty-four years of consulting experience in the fields of environmental geology, hydrogeology, and geotechnical engineering. I have worked extensively under State and Federal regulations concerning hazardous materials and

wastes, site characterization, and remediation of contaminated soil and groundwater associated with underground storage tanks, and tank farm sites. I have utilized this experience at hundreds of contaminated sites throughout California, Oregon, Washington, and Alaska. I also have experience in the evaluation of geologic hazards including landslide, fault zone, and liquefaction studies pertaining to residential and commercial developments.

5. I have over seventeen years consulting experience as a senior project manager responsible for all aspects of regulatory compliance of contaminated properties, including site assessment and remediation at over 200 retail gasoline service stations, bulk fuel terminals and chemical plants throughout the western states for several major oil companies.

6. SAIC is currently providing consulting services related to the site investigation and remediation project at the Former Los Angeles Marine Terminal at the Port of Los Angeles, Berths 171 to 173 in Wilmington, California ("LAMT").

7. I am the lead outside consultant to Texaco Inc. from SAIC at the LAMT property. I have worked on the LAMT project since July 2008. My primary duties have been to provide technical review and comment of assessment and remediation activities being performed at the LAMT site. These duties also have included the evaluation of site conditions and cleanup goals, and the technical development of remedial alternatives to address soil and groundwater impacted with petroleum hydrocarbons. I have also developed cost estimates based on selected remedial alternatives.

8. I have been directly involved in environmental assessment, monitoring, and remediation for the LAMT project.

9. I have participated in the drafting and reviewed all portions of Chevron Corporation's petition for review, request for hearing and request for a stay. To the best of my knowledge, the factual statements in Chevron's petition for review, request for hearing and request for stay are true and correct.

10. If the parties are required to submit and implement a revised RAP based on incorrect cleanup standards, they will be expending significant financial resources estimated at greater than $15,000,000 with the new RAP, which then should be overturned when this Board acts. This would make the expenditure of money, time and resources a costly exercise in futility.

11. However, if the parties decline to expend money, time and resources in an effort to produce a revised RAP based on these incorrect cleanup standards, they become exposed to significant daily penalties for non-compliance with the Amended CAO.

12. If a stay is not granted, the parties therefore would be in a Catch-22: substantial and likely worthless expenditures on a revised RAP based on incorrect standards, or substantial monetary penalties for failure to produce the Revised RAP. A stay until a determination is made as to the cleanup goals would solve this problem and save Petitioner from significant and substantial monetary harm.

13. Additionally, the public will be harmed without a stay because the limited resources of the Regional Board will be consumed in review of a revised RAP that is premised on incorrect goals. That review should occur once the cleanup goals are corrected and a proper RAP can be submitted.

14. Furthermore, if a stay is not granted and the issues surrounding cleanup goals are not resolved by the time the cleanup standards are implemented, the parties will be faced with yet another Catch-22. They will be required to expend substantial costs for implementation of excessive soil removal and groundwater treatment measures where the cleanup goals are inappropriately high, or again be exposed to substantial penalties for non-compliance with the Amended CAO.

15. Remediation has begun at the site. The parties have been removing free product since 2005 via a recovery trench program. Additionally, floating booms are in place to ensure that no sheen can reach the harbor. There is no significant threat to the marine environment or to public health from the site. (*See* Final Technical Report,

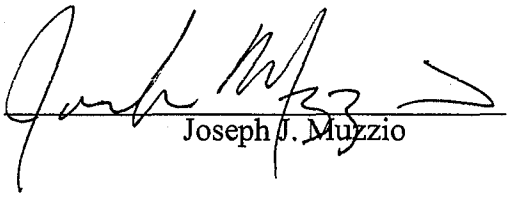
Sediment and Seawater Investigation, Former Los Angeles Marine Terminal, Berths 171-173, Wilmington CA, December 15, 2008, AMEC; and Site Characterization and Risk Assessment Report, Former Los Angeles Marine Terminal, Berths 171-173, Wilmington CA, October 2008, AMEC Geomatrix.) The requested stay would simply enable these efforts to proceed pending a decision on the merits.

16. As discussed in more detail in the Petition, there are significant questions being posed in this case, as to whether the cleanup goals set by the Regional Board are improper and defective and whether Chevron is a responsible party. Petitioner disputes the standards on which the Regional Board relied in issuing its cleanup order and contests that it is a responsible party in this case. There are significant issues of fact and law that are sufficient to warrant the granting of a stay.

17. I personally prepared the graphs marked as Exhibit 5 to Chevron's Petition based on data submitted to the Regional Board by POLA in its First Quarter 2009 Groundwater Monitoring Report, and they accurately depict that data.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Dated: March 1, 2010.



Joseph J. Muzzio