



California Regional Water Quality Control Board

San Francisco Bay Region



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SUBJECT: Transmittal of Order No. R2-2004-0056 – Waste Discharge Requirements and Rescission of Order No. 99-083, Golden Eagle Refinery, Martinez, Contra Costa County.

Dear Sirs:

Enclosed is Order No. R2-2004-0056, Updated Waste Discharge Requirements for the Tesoro Golden Eagle Refinery located at 150 Solano Way in Martinez. The Order was adopted by the Regional Board in its July 21, 2004 hearing. Should you have any questions please contact me at 510-622-2509 or by Email at dce@rb2.swrcb.ca.gov.

Sincerely,

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**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION**

Order No. R2-2004-0056

**UPDATED WASTE DISCHARGE REQUIREMENTS AND RESCISSION OF ORDER
NO. 99-083**

**TESORO REFINING AND MARKETING COMPANY, CONOCOPHILLIPS COMPANY,
AND TEXACO, INC.
TESORO GOLDEN EAGLE REFINERY
MARTINEZ, CONTRA COSTA COUNTY**

The California Regional Water Quality Control Board, San Francisco Bay Region, hereinafter called the Board, finds that:

FINDINGS

FACILITY DESCRIPTION

1. Tesoro Refining and Marketing Company (Tesoro) owns and operates the Golden Eagle Refinery (the facility). The facility has an approximate daily throughput capacity of 145,000 barrels of petroleum crude oil and produces primarily gasoline and diesel fuels. Other products are liquid petroleum gas, heating oil, jet fuel, and petroleum coke (Figure 1).

The facility was formerly called the Avon Refinery and has been operating since 1913. Tesoro has owned the facility since May 17, 2002. Ultramar, Inc. owned and operated the facility from September 1, 2000 to May 17, 2002. Tosco Refining Company and Tosco Corporation (Tosco) owned and operated the facility from 1976 to September 1, 2000. Phillips Petroleum (Phillips) owned and operated the facility from 1966 to 1976. From 1913 to 1966 the former Avon Refinery was owned by three related companies whose names changed through mergers and acquisitions: Associated Oil Company, Tide Water Associated Oil Company, and Tidewater Oil Company. Presented below is a table summarizing the facility ownership history.

OWNERSHIP HISTORY		
Owner	Dates	Current Successor in Interest
Tesoro	2002 – Present	Tesoro
Ultramar	2000 – 2002	Tesoro
Tosco	1976 - 2000	ConocoPhillips
Phillips	1966 –1976	ConocoPhillips
Associated/Tide Water Associated/Tidewater	1913 –1966	Texaco, Inc.

Tesoro is the successor to Ultramar's interest in the refinery real property and assets. ConocoPhillips Company (ConocoPhillips) is the successor in interest to Phillips and

Tosco. Texaco, Inc. (Texaco) is the successor in interest to Texaco Refining and Marketing, Inc., Associated Oil Company, Tidewater Associated Oil Company, and Tidewater Oil Company.

Tesoro, ConocoPhillips, and Texaco are hereinafter referred to as Dischargers.

2. Tosco, Phillips, and Texaco finalized a Joint Investigation and Remediation Agreement in July 1993 to complete investigation and remediation work at the site. The agreement created a committee that was named the Joint Environmental Investigation and Remediation Committee (hereinafter called JEIRC). To date, due to mergers and acquisitions, the JEIRC is composed of ConocoPhillips and Texaco, Inc..
3. The 2,100-acre facility is located about three miles east of the City of Martinez on the southern shore of Suisun Bay in Contra Costa County. The facility is bounded on the west by Pacheco Creek/Slough and Walnut Creek, on the north by wetlands and Suisun Bay, on the south by Highway 4, and on the east by Memory Gardens cemetery, Mallard Reservoir, Hastings Slough, and wetlands. The facility also includes an approximately 100-acre loading/unloading terminal known as the Amorco Terminal, which is located about two miles west of the refinery (Figure 1).
4. Within the facility, seven parcels and facilities are owned and operated by other companies: Chevron Products Company owns and operates a bulk fuel terminal; Monsanto owns and operates a catalyst and chemical manufacturing plant; Shell Oil Company owns and operates a crude oil pump station and pipeline; Kinder Morgan owns and operates a refined product pump station and the Santa Fe pipeline located on the refinery property; Foster Wheeler owns and operates a cogeneration plant, but leases the property; Air Liquide owns and operates a plant where CO₂ and compressed natural gas are manufactured; Air Products owns and operates a hydrogen gas plant and provides hydrogen gas to Tesoro for use in their refining operations; Wickland Oil Company and Shore Terminals LLC own and operate pipelines on the refinery real property; and Tosco (via its successor ConocoPhillips) holds a long-term lease for a parcel that includes Tank 241 and its associated piping, valves, connections, and containment structures.

PURPOSE OF ORDER

5. The purpose of this Order is to update the Waste Discharge Requirements to account for changes in site characteristics and ownership, to update maintenance and monitoring requirements, and to specify deadlines for tasks which include: 1) the closure of solid waste management units (WMUs), former surface impoundments, and process canals including the preparation and submittal of closure and post-closure maintenance plans; 2) the verification of clay liner integrity beneath Class II surface impoundments used in the waste water treatment process; 3) the implementation of a separate Class II surface impoundment self monitoring program; 4) the preparation and submittal of a Class II surface impoundment operation and maintenance plan, 5) the preparation and submittal of a unified well list and map 6) the update of the Dischargers' Self-Monitoring Program for

waste management units, including revision of a trigger level implementation plan; 7) the review of the August 15, 1999 Human Health and Ecological Risk Assessment; and 8) to rescind the previous Order.

REPORT OF WASTE DISCHARGE

6. Tosco submitted a January 1988 "Report of Waste Discharge", and a Solid Waste Assessment Test (SWAT) report dated June 30, 1989 and its January 12, 1990 addendum. The SWAT reports identified several waste disposal sites that received petroleum hydrocarbon based refinery wastes. Based on the SWAT findings, Tosco proposed to further characterize the waste disposal sites and to assess the environmental impacts.

RELATED ORDERS

Resolutions

7. The Board adopted Resolution 576 on July 16, 1964 to regulate the Tidewater Oil Company's discharge of various wastes to surface waters and onto land.
8. The Board adopted Resolution No. 67-31 on June 13, 1967 prescribing Waste Discharge Requirements for Phillips Petroleum.

NPDES Requirements

9. The Board adopted Waste Discharge Requirements Order No. 88-053, National Pollutant Discharge Elimination System (NPDES) Permit No. CA0004961, which was amended on December 12, 1990, to regulate the discharge of treated wastewater to Suisun Bay. This Order was subsequently rescinded and replaced by Order No. 93-068, which was rescinded and replaced by Order No. 00-011, the current NPDES Order. Order No. 00-011 includes requirements to manage industrial storm water for the entire facility.

Waste Discharge Requirements

10. On June 20, 1990, the Board adopted Waste Discharge Requirements Order No. 90-083, which required Tosco to drill soil borings and install additional monitoring wells to further characterize the solid waste management units at the facility.
11. On July 15, 1992, the Board adopted Waste Discharge Requirements Order No. 92-078, which required a work plan specifying corrective actions to be taken to bring fourteen waste management units into compliance with California Code of Regulations, Title 22, Chapter 15 requirements. Order No. 92-078 amended Order No. 90-083.
12. On October 20, 1999, the Board adopted Waste Discharge Requirements Order No. 99-083, which required: 1) the establishment of risk-based trigger levels for contaminants associated with the solid waste management units (SWMUs); 2) the elimination of

ponded water on all SWMUs, especially SWMUs 10, 11, and 14; 3) the submittal of groundwater and free-phase liquid hydrocarbon (FPLH) collection and control system performance evaluation to be included in the annual report; 4) the submittal of a leak detection plan for all above-ground storage tanks; 5) tank bottom testing for all AGTs; 6) secondary containment for all AGTs; 7) the identification, investigation, and remediation of FPLH detected at the Amorco Terminal; 8) the submittal of a report and map identifying all wells containing FPLH; 9) the submittal of an FPLH recovery program report; and 10) the submittal of a report with an evaluation of the benefits of installing groundwater monitoring wells along perimeter segments 1, 7, 11, and 15 and SWMU-10.

Site Cleanup Requirements

13. On June 20, 1990, the Board adopted Site Cleanup Requirements Order No. 90-088, which was related to free-phase liquid hydrocarbon (FPLH) recovery activities.
14. On July 21, 1993, the Board adopted Site Cleanup Requirements (SCR) Order No. 93-079 that related to specified FPLH recovery activities. Order No. 93-079 named Tosco, Phillips Petroleum Company, and Tidewater Oil Company as Dischargers and rescinded Order No. 90-088.
15. On March 15, 2000, the Board adopted Site Cleanup Requirements Order No. 00-021 that specified requirements to: establish trigger levels for known contaminants; remediate subsurface petroleum contamination; complete leak detection, tank bottom testing, and secondary containment of all above ground storage tanks (AGTs); and investigate releases at the Amorco Terminal. In addition Order No. 00-021 and a June 20, 2002 Water Code 13267 Request for Technical Report required the augmentation of the FPLH extraction system in areas that are consistently producing FPLH without evidence of a reduction of FPLH. The Dischargers are required to reduce the mass of free phase petroleum hydrocarbon source areas at the facility where hydrocarbons may be present in recoverable quantities. Order No. 00-021 rescinded Order No. 93-079.

RCRA Order

16. On March 13, 1989 the Federal Environmental Protection Agency (EPA) adopted RCRA Order No. 09-89-0013. The Order required a RCRA Facility Investigation (RFI) to be conducted and a report to be prepared and submitted. The Order also required that a Corrective Measures Study (CMS) be completed and submitted subsequent to the RFI approval. The RCRA order was amended on September 6, 1990 to require additional groundwater investigation and to revise the CMS schedule.

ADDITIONAL SIGNIFICANT INVESTIGATIONS, REMEDIATIONS AND RISK ASSESSMENTS

February 1988 RCRA Facility Assessment

16. The February 1988 RCRA Facility Assessment was performed in response to a U.S. EPA request to identify and assess WMUs and areas of concern (AOC). The study revealed 94 WMUs and four areas of concern.

June 1989 Water Quality Solid Waste Assessment Test Report

17. The June 1989 Water Quality Solid Waste Assessment Test (SWAT) Report was submitted to the RWQCB in response to California Water Code Section 13273 that requires owners/operators of solid waste disposal site to submit SWAT Reports for Rank 3 sites. The SWAT evaluates ten inactive solid waste management units (WMU 3, 4, 5, 6, 8, 9, 10, 11, 13, 32).

September 1992 Hydrogeology of the Tosco Avon Refinery

18. The 1992 report was submitted to the U.S. EPA and evaluates the hydrogeologic units of Tracts 1, 2, 3, 4, and 6.

October 1992 Draft RCRA Facility Investigation Report

19. The 1992 RCRA Facility Investigation (RFI) Report was submitted to U.S. EPA in response to the U.S. EPA Order RCRA-09-89-0013. The RFI investigated 24 SWMUs and AOCs: SWMU 1 to 11, 13 to 16, 20, 31, 32, Oily Wastewater Canal, API Separator, Deacon's Pond, Cardox Pond, Pacheco Slough, and Hastings Slough.

1992 Title 22 Chapter 15, Article 6 Monitoring Plan

20. The 1992 Monitoring Plan for the Oily Waste Impoundment (OWI) was submitted to the Department of Toxic Substances Control in response to an October 9, 1992 letter requesting an amended monitoring plan in compliance with revised article 6, Chapter 15, Title 22 of the California Code of Regulations. The amended water quality sampling and analysis plan proposed an alternative point of compliance rather than the immediate perimeter of the OWI. The plan proposed combining the OWI and the adjacent SWMU into a Corrective Action Management Unit (CAMU).

January 1993 Corrective Action Plan

21. The 1993 Corrective Action Plan (CAP) defined units where corrective action could proceed, units requiring corrective measures studies, and units requiring additional site characterization. The CAP also defined a refinery-wide groundwater perimeter protection

system.

June 1994 Perimeter Groundwater Monitoring Plan

22. The June 1994 Perimeter Groundwater Monitoring Plan (PGMP) was submitted to the RWQCB in response to SCR Order 93-079. The plan describes monitoring wells and locations; establishes monitoring frequency, monitoring constituents, and tentative water quality criteria; and the perimeter control process.

May 1995 Perimeter Groundwater Monitoring Plan Amendment

23. The May 1995 Perimeter Groundwater Monitoring Plan Amendment amended the PGMP by: 1) proposing revised constituents for groundwater monitoring and 2) amending or clarifying other protocols and decision processes described in the PGMP.

May 1995 Final Technical Report for Installation and Development of Perimeter Groundwater Monitoring Program Wells in Tracts 1, 2, 3, 4 and 6

24. The May Final Technical Report documented the installation and development of 31 shallow and 10 deep zone perimeter groundwater monitoring program wells in Tracts 1, 2, 3, 4 and 6.

December 1995 Perimeter Groundwater Monitoring Plan Amendment

25. The December 14, 1995 Tosco Refining Company letter amended the Perimeter Groundwater Monitoring Plan.

April 1997 RCRA Facility Investigation Phase II Report

26. The 1997 RFI Phase II Report was submitted in response to U.S. EPA comments and to fill additional data needs identified in the initial RFI Report. The report describes additional investigations for 11 SWMUs: SWMU 4, 5, 7, 8, 9, 10, 11, 13, 14, 31, and 32.

June 1997 Phase I HHERA

27. The 1997 Human Health and Ecological Risk Assessment (HHERA) was a scoping assessment designed to develop WMU and AOC conceptual site models. The models were used to identify potential complete exposure pathways.

November 1998 Facility Wide Soil Management Plan

28. The 1998 Facility Wide Soil Management Plan presents a methodology for the reuse of petroleum hydrocarbon-contaminated soil within the Refinery and the Amoco Terminal.

April 1999, Revised August 2000, Final Phase II HHERA

29. The 2000 Phase II HHERA addressed historical contamination issues at specific WMUs and AOCs, which were separated from operating units. The purpose was to evaluate human and ecological risks associated with exposure to chemicals in media identified in the Phase I HHERA as requiring further evaluation. The Phase II HHERA did not address risks posed to outside workers.

May 2000 Development of Perimeter-Specific Parameters and Trigger Levels

30. The May 2000 Development of Perimeter-Specific Parameters and Trigger Levels was submitted to the RWQCB in response to Provision 3 of the WDR 99-083 and Task 2 of SCR 00-021. This document includes the preparation of updated lists of semi-annual monitoring parameters and 5-year monitoring parameters; development of numerical trigger levels for evaluating concentrations of parameters detected; and methods for validating data and statistically evaluating whether an exceedance of a trigger level concentration in a perimeter groundwater monitoring well is significant.

November 2003 CMS Volume I Work Plan for Category 1 Sites

31. This Work Plan response was submitted in response to the USEPA letter dated July 2003, which approved the RFI, Phase II HHERA, and the AOC and SWMU and Other Project Area Table.

February 2004 CMS Volume II Work Plan for Category 2 through 4 Sites

32. This Work Plan response was submitted in response to the USEPA letter dated July 2003, which approved the RFI, Phase II HHERA, and the AOC and SWMU and Other Project Area Table.

GEOLOGIC SETTING

33. The active Concord fault runs through the western side of the facility and special studies have delineated this area as a zone of concern.
34. A portion of the facility was built on marshlands or wetlands. Therefore, fill is the first subsurface material encountered in much of the flat portions of the facility. The second subsurface material generally encountered is Bay Mud, which is interbedded with Bay Peat and sandy units. The Bay Peat is composed primarily of black or brown organic matter derived from vegetation deposited in marshes. The Bay Mud ranges in thickness from zero to forty feet throughout the region.
35. There are four offsite drinking water wells located south of the facility approximately 3,000 feet from Mallard Reservoir. Groundwater in parts of the facility is a potential drinking water source. However, the shallow groundwater within the northern portion of

the facility, located closer to the bay, exceeds 3,000 mg/l total dissolved solids, and thus does not meet the State Board definition of a potential drinking water source. Groundwater and surface water from the facility flows toward nearby wetlands and Suisun Bay. The flow direction and gradient varies significantly across the facility (Figures 3 and 4).

GENERAL REQUIREMENTS FOR THE GROUNDWATER PROTECTION PROGRAM

36. The facility contains several commingled contaminated soil and groundwater areas that were caused by leakage of solid waste disposal sites, spills, piping leaks, and other discharges to land during the facility's operation. To effectively monitor releases to groundwater that have been impacted by numerous pollutant sources, general groundwater corrective action implementation requirements for the facility are defined as follows:
- a. The Dischargers will monitor each waste management unit's downgradient perimeter for increasing concentration trends of the unit's Constituents of Concern. The Executive Officer may require the implementation of corrective action on any unit or tributary or adjacent area downgradient of the unit where monitoring data confirms an ongoing release.
 - b. The facility's perimeter has been divided into 16 perimeter segments (Figures 5, 5a, and 5b). The area monitored by each perimeter segment may contain waste disposal units, spill areas, or other contaminated areas. Each perimeter segment contains unique constituents of concern (COC) that emanate from each tributary area towards each perimeter segment. The Dischargers will monitor the perimeter of the facility for COCs, which are derived from each waste management unit (WMU) and other contamination source areas within each perimeter segment tributary area. If established Trigger Levels are exceeded at the perimeter, resampling and analysis will be performed. If resampling and analysis validates an exceedance of a Trigger Level, corrective action will be required. The final determination of the need for corrective action will be made by the Board's Executive Officer.
 - c. Dischargers submitted an April 20, 2000 constituent of concern and trigger level implementation plan in response to Provision three of Order No. 99-083. This Order includes a provision to revise the April 20, 2000 plan to include TPH, interior wells, and other revisions outlined in a July 16, 2002 letter prepared by Staff.

WASTE MANAGEMENT UNITS

37. All existing waste management units and surface impoundments listed in this Order are subject to this Order.
38. Dischargers have utilized a number of on-site solid and liquid waste management units (WMUs) for the treatment, storage, or disposal of wastes from the refinery (Figure 2, and

2a – 2c). The WMUs identified below are specified as either active or inactive and contain primarily non-hazardous Class II waste, but may contain CCR Title 22 hazardous concentrations of certain contaminants.

Included in the WMU list are twelve surface impoundments. Six are used in the current wastewater treatment process or for the storage of petroleum coke. One surface impoundment was used in the historical wastewater treatment process, and five impoundments are used to retain storm water. These units have been separated from the WMU list and are under the heading “Surface Impoundments”, which is Finding No. 39.

To date, none of the WMUs comply with the construction standards of Title 27, except WMU-17. The Provisions of this Order establish deadlines for the submittal of a Closure and Postclosure Maintenance Plan and the closure of all inactive units. Below are brief descriptions of each unit, which are based on available information. The history of each unit will be updated by Dischargers as additional work is completed on each unit.

- a. **WMU-1 (EPA No. 4.17) - Tetraethyl Lead (TEL) Landfill:** This unit is an inactive unlined, approximately one-acre landfill, with a period of disposal from 1947-1971. This unit reportedly contains tetraethyl lead sludge from leaded gasoline tank bottoms and oil soaked wood. Depth to groundwater is about 72 feet below ground surface (bgs).
 - i. Contamination: The unit’s waste contains petroleum hydrocarbons, metals (i.e. lead) and various organic compounds. Arsenic concentrations in soil may exceed Environmental Protection Agency Preliminary Remediation Goals (PRGs). Analysis for TEL concentrations in soil and groundwater have not been completed and will be added to the self monitoring program analyte list for wells associated with this WMU.
 - ii. Closure Status: The majority of WMU-1 appears to be covered with gravel. The hydraulic performance of this cover is unknown. No exposed waste is visible, but as mentioned above, elevated arsenic concentrations in soil may be of concern.

- b. **WMU-2 (EPA No. 4.18) - Arsenic Trioxide Landfill:** This unit is an inactive and unlined 0.46-acre landfill, with a period of disposal from 1973 to 1974. Arsenic trioxide was disposed in this area, either in drums or dumped directly onto the ground. Depth to groundwater ranges from 25 to 47 feet bgs.
 - i. Contamination: The unit’s waste contains petroleum hydrocarbons, metals (i.e. lead and arsenic) and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected lead and arsenic. No surface soil samples have been collected or analyzed. Arsenic concentrations above background have been detected in groundwater samples.
 - ii. Closure Status: The cover is mostly vegetated with evidence of small animal burrows and a sewer manhole that may act as a conduit because significant erosion

has occurred adjacent to its concrete foundation. The hydraulic performance of the cover is unknown. Exposed waste is not visible.

- c. **WMU-3 (EPA No. 4.19) - Tetraethyl Lead and Arsenic Trioxide Landfill:** This unit is an inactive and unlined 0.11-acre landfill with a period of disposal from 1949-1965. Waste is not exposed at the surface of the unit. The area consists of more than 29 burial cells, containing gasoline tank bottom sludges, TEL sludge, arsenic waste and aluminum chloride waste. It is documented that 47 drums were buried in Cells 2, 15, and 22. Depth to groundwater ranges from 20 to 25 feet bgs.
- i. Contamination: The unit's waste contains petroleum hydrocarbons, metals (i.e. lead and arsenic) and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected lead, arsenic, chromium VI, and petroleum hydrocarbons. Samples have not been historically analyzed for TEL or aluminum; therefore these analytes will be added to the self-monitoring program. The aluminum analysis shall be conducted if groundwater pH measurements indicate that conditions exist for the solubilizing of aluminum.
 - ii. Closure Status: The cover is not graded properly and ponds during winter months. Evidence of disking exists immediately adjacent to the WMU, which may increase infiltration. The hydraulic performance of the cover is unknown.
- d. **WMU-4 (EPA No. 4.20) - Acid and Caustic Wastewater Pond:** This unit is an inactive and unlined landfill located east of the Cardox Canal with a period of disposal from 1950 through the 1960s. The unit received liquid and sludge waste, residue from handling caustic cleaning solution, acidic wastes, tetraethyl lead sludge, oily coke, kerosene residues, solvents, and catalytic reformer bottoms. The unit's waste fill varies from 3 to 10 feet thick. Depth to groundwater ranges from 1 to 4 feet bgs.
- i. Contamination: The unit's waste contains petroleum hydrocarbons, metals (i.e. lead and arsenic), organic lead, and various organic compounds. Vanadium and TEL shall be added to the self-monitoring program for interior wells. If TEL is detected in groundwater samples collected from interior wells adjacent to WMU-4, TEL shall be added to the analyte list for the perimeter wells.
 - ii. Closure Status: The existing cover is disked, which likely increases storm water infiltration. The unit is not properly graded to prevent ponding during winter months. The hydraulic performance of the cover is unknown.
- e. **WMU-5 (EPA No. 4.21) - Oily Waste landfill:** This unit is an inactive and unlined 8.8-acre landfill with a period of disposal from the late 1950's to early 1970's. The unit was used for disposal of about 40,000 cubic yards of spent catalysts, tetraethyl lead sludge, aluminum chloride, solvents, and oily coke. The unit's waste fill varies from zero

to seven feet thick. Depth to groundwater ranges from one to eight feet bgs and generally flows toward Hastings Slough.

- i. Contamination: The unit's waste contains petroleum hydrocarbons, metals (i.e. lead, arsenic, and nickel) and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected lead, arsenic, chromium, and petroleum hydrocarbons. Elevated vanadium concentrations and polynuclear aromatic hydrocarbons have been detected in soil samples. TEL, vanadium, and aluminum shall be added to the interior well analyte list for the self-monitoring program. The aluminum analysis shall be conducted if groundwater pH measurements are less than 5.5 or greater than 9.0, which are the conditions for the solubilizing of aluminum.
 - ii. Closure Status: The hydraulic performance of the cover is unknown. The WMU is located in the vicinity of the facility flares making access for further investigation or additional work problematic.
- f. **WMU-6 (EPA No. 4.22) - Oily Sewer Outfall:** This unit is an inactive and unlined 2.8-acre unit with a period of disposal from the 1950s to 1960s. The unit was previously known as the refinery's Oily Sewer Outfall and received oily waste. It is reported that oily material was excavated from WMU-6 and moved to WMU-8 during the construction of the Iso-cracker Unit in 1961. In 1982, approximately 2,900 cubic yards of arsenic contaminated soil, with concentrations greater than the TTLC value of 500 mg/kg, were excavated from WMU-6 and disposed of at an offsite Class I facility. The Dischargers reported that the presence of high concentrations of arsenic within the unit is not related to the oily material the unit received, but rather from Iso-cracker discharges. Depth to groundwater ranges from 6-9 feet bgs. The area is currently covered by an active process unit and asphalt.
- i. Contamination: The unit's waste contains petroleum hydrocarbons, metals (i.e. arsenic, and zinc) and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected lead, arsenic, chromium, benzene, and other petroleum hydrocarbons.
 - ii. Closure Status: This WMU is located beneath an active process unit, and is covered with asphalt. The competence of the asphalt in the vicinity of the WMU is not known, and therefore the hydraulic performance of the asphalt cover is also not known.
- g. **Former WMU-7:** This unit was a tetraethyl lead landfill. The WMU footprint is currently occupied by the Alkylation Plant and No.2 Catalytic Reformer Plant. Historical aerial photographs indicated that an oily pond and stained soil existed on the area now occupied by the Alkylation Plant. Investigations of the unit found little evidence of a former waste disposal site. The Dischargers requested in the April 1997 Phase II RFI that since no waste has been found, WMU-7 should not be classified as a waste unit. Board

staff have reviewed the information related to WMU-7 and concur with the Dischargers that WMU-7 does not require further investigative or remedial efforts.

- h. **WMU-8 (EPA No. 4.23) - Oily Sludge Landfill:** This unit is an unlined and inactive 3.4-acre landfill located east of the Oily Wastewater Canal with a period of disposal from 1957 to the 1960's. The unit reportedly received catalyst fines, aluminum chloride waste, oily waste excavated from WMU-6 in 1961, and litharge (a lead-based compound). The unit's waste fill varies from 5 to 10 feet thick. Depth to groundwater ranges from 1-10 feet bgs.
- i. Contamination: The unit's waste contains petroleum hydrocarbons, metals (i.e. lead and arsenic), and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected lead, arsenic, chromium VI, and petroleum hydrocarbons. TEL and aluminum shall be added to the self-monitoring program analyte list. The aluminum analysis shall be conducted if groundwater pH measurements are less than 5.5 or greater than 9.0, which are the conditions for the solubilizing of aluminum.
- ii. Closure Status: Petroleum coke is exposed at the surface of this WMU. The coke may: 1) have been placed at the surface of the WMU as a coke stockpile; 2) be the result of spillage during coke handling at the coke pond; or 3) be from storm water transport of the coke from the coke stockpile. The WMU needs grading and the hydraulic performance of the cover is not known.
- i. **WMU-9 (EPA No. 4.24) - Antimony Trichloride Landfill:** This unit is an unlined inactive, 2.5 acre landfill, with a period of disposal from the late 1940's to the mid 1950's. The unit reportedly received antimony trichloride waste, spent catalyst, and miscellaneous construction and demolition waste. Depth to groundwater ranges from 3 to 15 feet bgs.
- i. Contamination: The unit's waste contains petroleum hydrocarbons, metals (i.e. lead, and antimony), TEL, and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected lead, arsenic, antimony, nickel, benzene and other petroleum hydrocarbons. TEL, cadmium, copper, mercury, molybdenum, and barium shall be added to the self-monitoring program analyte list for interior wells.
- ii. Closure Status: The cover needs grading to promote storm water runoff and the hydraulic performance of the cover is not known.
- j. **WMU-10 (EPA No. 4.25) - Oily Sludge Land Farm:** This unit is an unlined inactive, 10.4-acre land-farm made up of two cells that operated from 1966-1976. The land treatment unit received approximately 10,600 cubic yards of oily wastes, and waste from the API Separator and dissolved air flotation (DAF) units. The unit is located in the 100-year flood plain, and is protected from flooding by 3 to 4-foot high dikes constructed around the perimeter. Depth to groundwater beneath the unit ranges from 1 to 7 feet bgs.

- i. Contamination: The unit's waste contains petroleum hydrocarbons, metals (i.e. lead, and chromium), TEL, and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected lead, arsenic, and petroleum hydrocarbons. The August 15, 1999 Phase II Human Health and Ecological Risk Assessment (HHERA) recommended corrective action or a Phase III HHERA based on exceedances of both human health and ecological bench marks. To date, neither corrective action nor additional risk assessment have been completed. TEL and TPH motor oil shall be added to the self-monitoring program analyte list for interior wells.
 - ii. Closure Status: During the wet season, ponded water can be found on the unit. Interim measures to mitigate this condition include the application of a fiber-bonded matrix to minimize dust and physical contact and the pumping of ponded water from the unit. The unit does not have a soil cover, and therefore, contains exposed waste.
- k. **WMU-11 (EPA No. 4.25) - Oily Sludge Land Farm:** This unit is an unlined and inactive 7.2-acre land farm with a period of disposal from 1966-1976. The land treatment unit received oily wastes, petroleum sludges, and waste from the API Separator and DAF units. This unit is located in the 100-year flood plain, and is protected from flooding by the dikes constructed around the perimeter.
- i. Contamination: The unit's waste contains petroleum hydrocarbons, metals (i.e. lead, and chromium), TEL, and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected lead, chromium, arsenic, and petroleum hydrocarbons. The August 15, 1999 Phase II Human Health and Ecological Risk Assessment (HHERA) recommended corrective action or a Phase III HHERA based on exceedances of both human health and ecological bench marks. To date, neither corrective action nor additional risk assessment have been completed. TEL, petroleum oil and grease, TPH motor oil, and nickel shall be added to the self-monitoring program analyte list.
 - ii. Closure Status: During the wet season, ponded water can be found on the unit. Interim measures to mitigate this condition include the application of a fiber-bonded matrix to minimize dust and physical contact. In addition, ponded water is pumped from the unit to the refinery's water treatment plant. The unit does not have a cover, and therefore contains exposed waste.
- l. **WMU-13 (EPA No. 4.26) - Acid-Sludge Landfill:** This unit is an unlined, inactive, and 6-acre former pond waste unit system with a period of disposal from 1957 to 1969. The unit received approximately 1 million cubic yards of oily acidic petroleum sludges.
- i. Contamination: The unit's waste contains petroleum hydrocarbons, metals (i.e. lead), TEL, low pH soils, and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected lead, chromium, benzene, and other petroleum

hydrocarbons. Free product is also found within the vicinity of the unit. TEL shall be added to the self-monitoring program analyte list.

- ii. Closure Status: This unit is partially covered and used as a staging area. A significant portion of the unit has exposed waste, with no soil cover. The hydraulic performance of the partial cover is unknown.
- m. **WMU-14 (EPA No. 4.13) - Oily Sludge Land farm:** This unit is an unlined inactive, 9.1-acre pond system that was constructed over the western portion of WMU-10 in 1976. The unit is made up of four sludge-drying beds that received sludge until the late 1970's from biologically treated refinery wastewater. This unit is located in the 100-year flood plain, and is protected from flooding by 2 to 5 foot high dikes constructed around the perimeter of the unit. However, during the wet season the unit may contain ponded water.
- i. Contamination: The unit's waste contains petroleum hydrocarbons, metals (i.e. lead, selenium, and chromium), TEL, and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected arsenic, lead, chromium, hexavalent chromium, and petroleum hydrocarbons. The August 15, 1999 Phase II Human Health and Ecological Risk Assessment (HHERA) recommended corrective action or a Phase III HHERA based on exceedances of both human health and ecological benchmarks. To date, neither corrective action nor additional risk assessment have been completed. Selenium, TEL, and TPH motor oil shall be added to the self-monitoring program analyte list for interior wells.
 - ii. Closure Status: During the wet season, ponded water can be found on the unit. Interim measures to mitigate this condition include the application of a fiber-bonded matrix to minimize dust and physical contact and the pumping of ponded water from the unit. The unit does not have a cover, and therefore contains exposed waste.
- n. **WMU 17 (EPA No. 4.1) Oily - Waste Impoundments:** This unit was closed in December 1988. The investigation and closure of this unit occurred under DTSC oversight. Therefore, this unit was not addressed in either the RCRA Facility Investigation Report or the HHERA for the site.
- i. Contamination: The unit, which consisted of two cells, received oily waste, including API Separator sludge, DAF unit waste, unleaded and crude tank bottom sludge, and slop oil emulsion solids from 1976 to 1983.
 - ii. Closure Status: Closure of the unit consisted of the removal of liquid and oily waste from the unit, installation of a synthetic cover, a cover drainage layer and a vegetated soil cover. The closure was performed under a workplan approved by USEPA and DTSC. A post-closure permit was issued July 30, 1998, pursuant to Section 25200 of the California Health and Safety Code. The monitoring data and inspection reports are provided to DTSC for regulatory review.

- o. **Former WMU-20:** This unit was initially identified in the 1988 RCRA Facility Assessment Report. The unit was described as an inactive landfill located near WMU-1 that received weathered TEL sludge. The January 1993, Draft Corrective Action Plan Report reported that no evidence of the unit had been encountered and that further investigation would not be productive. Board Staff have reviewed the Dischargers' information and concur that no evidence presented indicated the existence of the former unit. Board staff have reviewed the information related to WMU-20 and concur with the Dischargers that WMU-20 does not exist.
- p. **WMU-31 (EPA No. 4.29) - Oil Sludge Landfill:** This unit is an approximately 21-acre unlined and inactive landfill, with a period of disposal from the 1950s to 1960s. A TEL blending facility was located on the west side of the unit, and may have impacted the unit. Adjacent to the site is a former drum storage area and oil skim ponds. The unit received oily wastes and dredge spoils from the former Oily Water Canal. This unit is underlain by up to 6.5 feet of oily sludge and is partially underlain by free-phase petroleum hydrocarbons (FPLH). During wet weather, portions of the unit may pond.
- i. Contamination: The unit's waste contains petroleum hydrocarbons, metals (i.e. lead), TEL, and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected lead, chromium, zinc, and petroleum hydrocarbons. TEL, petroleum oil and grease, and TPH motor oil shall be added to the self-monitoring program analyte list for interior wells. Provision No. 7 of this Order requires that monitoring wells be installed outside the clean water canal and adjacent to the marsh.
- ii. Closure Status: The site currently contains former ponds, pits, and an open tank with petroleum waste. Other waste in the form of glass and rubbish is evident. The unit does not have a cover, and therefore, in general, contains exposed waste.
- q. **WMU-32 (EPA No. 4.27):** This unit is a 10.7-acre area located adjacent to WMU-16. There are impacts to the area that indicate that releases have occurred. A drum reconditioning facility was located 700 feet east of the unit where historical aerial photographs reveal stockpiles containing thousands of drums. The unit's area at one time contained north and south trending drainage canals, which may have received oily and contaminated water. The unit is partially underlain by FPLH, which likely emanates from the Tract 3 tank farm. The unit has recently been the subject of further investigation and interim corrective measures to mitigate low pH conditions.
- i. Contamination: The unit's waste contains petroleum hydrocarbons, metals (i.e. lead), TEL, low pH soil, and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected arsenic, nickel, chromium, zinc, benzene, and other petroleum hydrocarbons. Low pH has also been reported in groundwater beneath the unit. TEL, TPH gasoline, TPH diesel, and TPH motor oil shall be added to the self-monitoring program analyte list for interior wells.

- ii. Closure Status: The soil cover needs grading and the hydraulic performance of the partial cover is unknown.

SURFACE IMPOUNDMENTS

39. The facility contains twelve surface impoundments that are subject to Title 27 regulation as described below:
 - a. **WMU 15 (EPA Nos. 4.5 and 4.6) - Surge Pond 1 and Surge Pond 2:** This unit consists of two active surface impoundments that receive refinery wastewater. Specifically, effluent from the API separator, ammonia recovery unit, foul water stripper, sulfur plant, coke storage pile, and cooling towers is treated in the unit. The ponds, which were constructed from in-place Bay Mud in about 1967, consist of Surge Pond 1 that covers 14-acres and Surge Pond 2 that covers 6-acres. It has been estimated that approximately 74,000 cubic yards of sediment remain in the two ponds. The ponds are dredged regularly.
 - i. Contamination: The unit's waste contains petroleum hydrocarbons, metals (i.e. lead), low pH soils, and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected lead, nickel, chromium, zinc, low pH water, and petroleum hydrocarbons. The dredged material is disposed at a Class I landfill due to elevated vanadium concentrations.
 - ii. Title 27 Compliance Status: At this time, the performance of the Bay Mud clay liner is not known and formal Title 27-compliant Operation and Maintenance and self-monitoring plans have not been submitted to the Board for regulatory review. The majority of the monitoring wells located adjacent to the ponds are not sampled due to FPLH. The source of the FPLH may be from historical petroleum releases to soil. The current SMP does not adequately monitor the integrity of the liner and will need to be revised to address this data gap. Provisions 11 through 14 have been included in this Order to address these concerns.
 - b. **WMU 16 (EPA No. 4.7) - Bio-Oxidation Pond:** This unit is a Bay Mud-lined active refinery wastewater storage and treatment pond. The 108-acre pond began operation in 1966 and receives partially treated wastewater from Surge Pond No. 2 and storm water. Effluent from the pond flows to the treatment plant where it is discharged into the Clean Water Canal. Several aerators are located in the southern end of the pond. Sediment contained within the pond varies in thickness from zero to five feet. Sediment samples collected from the pond indicate that the sediments are only marginally contaminated. However, groundwater near the unit contains metals and petroleum hydrocarbons. The Dischargers reported that the groundwater contamination around the pond may be the result of nearby historic discharges.
 - i. Contamination: The unit's waste contains petroleum hydrocarbon, metals, and various organic compounds. Groundwater monitoring in the vicinity of the unit has

detected arsenic, lead, chromium, nickel, benzene, and other petroleum hydrocarbons. There is concern that the pond sludge may be a source of contamination, especially metals.

- ii. Title 27 Compliance Status: At this time, the performance of the Bay Mud clay liner is not known and formal Title 27 compliant Operation and Maintenance and self-monitoring plans have not been submitted to the Board for regulatory review. A provision has been included in this Order to address these concerns.
- c. **The Inner Coke Pond:** The Coke Storage Pile and Inner Pond make up the active coke storage area and are changing in size and shape on a daily basis due to coke production and sales. The outer pond periodically takes overflow from the inner coke pond. Water in the ponds is treated wastewater used to sluice coke from the coker. This water is treated to below the NPDES permit requirements prior to discharge to the pond.
- i. Contamination: To date, no unacceptable risk has been associated with the petroleum coke.
 - ii. Title 27 Compliance Status: At this time, the performance of the Bay Mud clay liner is not known and formal Title 27-compliant operation and maintenance and self-monitoring plans have not been submitted to the Board for regulatory review. A provision has been included in this Order to address these concerns. Issues related to storm water best management practices including berms, run-on and run-off storm water management, and house keeping while loading coke have been identified and shall be mitigated through an update of the facility Storm Water Pollution Prevention Plan, which is regulated through the site's NPDES permit.
- d. **The Outer Coke Pond:** This unit is a bermed area of approximately 48-acres located east of the Coke Storage Pile and Inner Pond. The outer pond periodically takes overflow from the inner coke pond. The Outer Pond receives seasonal rainfall, and will dry out periodically during the summer. The Outer Coke Pond is adjacent to undeveloped land to the northeast and a portion of Hastings Slough to the east.
- i. Contamination: Elevated chromium concentrations as high as 1,020 ppm have been detected in soil samples collected from the outer coke pond. These results shall be re-evaluated (Provision 15), as no known historical chromium source has been identified.
 - ii. Title 27 Compliance Status: At this time, the performance of the Bay Mud clay liner is not known and formal Title 27 compliant Operation and Maintenance and self-monitoring plans have not been submitted to the Board for regulatory review. A provision has been included in this Order to address these concerns.

- e. **Oily Wastewater Canal (EPA No. 4.4):** This unit is an unlined 2,300-foot long drainage canal that was used until 1990 to transport partially treated refinery wastewater. Prior to 1952 the canal extended from WMU-6 to Suisun Bay. During this period several oil skimmers and skim pits were located along the alignment, which is now occupied by a portion of the Clean Water Canal. Currently, the canal receives approximately 100 gallons per minute of wastewater from the surge ponds (WMU-15), where the water is recirculated through the canal to control odors. The canal is no longer part of the active wastewater treatment process.
- i. Contamination: The unit's waste contains petroleum hydrocarbons, metals, and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected arsenic, nickel, benzene, other petroleum hydrocarbons and free-phase petroleum product. Corrective action consisting of treating sediments and surface water has been implemented on a 200-foot section of the canal. The August 15, 1999 Phase II Human Health and Ecological Risk Assessment (HHERA) recommended corrective action or a Phase III HHERA based on exceedances of ecological benchmarks. Corrective action to date has included the circulation of water and the removal of vegetation.
- ii. Title 27 Compliance Status: This unit is currently an inactive impoundment with exposed waste, and does not comply with Title 27 closure requirements.
- f. **Clean Water Canal and Skim Pond (EPA No. 4.15):** This unit was constructed in 1957 and is located east of the Oily Water Canal. Prior to 1952 the Oily Water Canal discharged oily wastewater through the present day Clean Water Canal. The portion of the Clean Water Canal that is an area of concern, as defined by the USEPA, is that portion located north of Waterfront Road. This portion of the canal is the subject of the Human Health and Ecological Risk Assessment.
- i. Contamination: Benzene, benzo (a) anthracene, benzo (a) pyrene, dibenzo (a,h) anthracene and chromium have been identified as constituents of concern based on risk. The August 15, 1999 Phase II Human Health and Ecological Risk Assessment (HHERA) recommended corrective action or a Phase III HHERA based on exceedances of both human and ecological benchmarks. To date, no additional corrective action or additional risk assessment has been completed.
- ii. Title 27 Compliance Status: This surface impoundment is an active part of the wastewater treatment system. At this time, the performance of the Bay Mud clay liner is not known and formal Title 27 compliant Operation and Maintenance and self-monitoring plans have not been submitted to the Board for regulatory review.
- g. **Deacon's Storm Water Impoundment:** This unit is an active, unlined, 2.35-acre storm water collection basin located within Tract 4. The pond has operated as a storm water collection pond since the 1920's.

- i. **Contamination:** The Dischargers historically reported that the pond was not used for the storage of waste, although historical petroleum hydrocarbon spills from the tank farm may have periodically entered the pond. However, based on staff review of historical records, it is likely that petroleum waste may have been deposited in the impoundment until the early 1990s.
 - ii. **Title 27 Compliance Status:** This surface impoundment is part of the facility's storm water management system. Prior to the Discharger's reporting of the possible waste discharge history, the impoundment appeared to be in compliance. Since the impoundment may have been used for waste discharge, it shall be required to comply with Title 27. This Order's Provisions Nos. 9 and 10 require further delineation of this waste and closure in compliance with Title 27.
- h. **Tract 4 Storm Water Impoundment:** This unit, also known as the South Pond, is an HDPE-lined storm water pond that launders to the Tract 6 Storm Water Impoundment via a concrete lined open trench.
- i. **Contamination:** FPLH was visually identified in this pond during Summer 2003 and gasoline from the adjacent Kinder Morgan facility appears to have migrated beneath the pond. Both Tesoro and Kinder Morgan are evaluating the source of the FPLH. In addition, based on staff review of historical records, it is likely that petroleum waste was deposited in the impoundment until the early 1990s and prior to the installation of the HDPE impoundment liner.
 - ii. **Title 27 Compliance Status:** This surface impoundment is part of the facility's storm water management system. Prior to the Discharger's reporting of the possible waste discharge history, the impoundment appeared to be in compliance. Since the impoundment may have been used for waste discharge, it shall be required to comply with Title 27. This Order's Provisions Nos. 10 and 11 shall require further delineation of this waste and closure in compliance with Title 27.
- i. **Tract 3 West Canal Impoundment:** This unit historically received oily water and storm water and laundered into the speeder pond and clean canal, bypassing the API separator and wastewater treatment plant.
- i. **Contamination:** The canal was partially dredged in the early 1990s. Information regarding the exact nature of the contamination deposited in this canal has not been provided to the Board.
 - ii. **Title 27 Compliance Status:** Since the impoundment may have been used for waste discharge, it shall be required to comply with Title 27. This Order's Provisions Nos. 10 and 11 shall require further delineation of this waste and closure in compliance with Title 27.

- j. **Tract 3 East Canal Impoundment:** This unit historically received oily water and storm water and contaminated groundwater seeped into the canal. Historically, the water was then pumped into the West Canal discussed above.
- i. Contamination: Information regarding the exact nature of the contamination deposited in this canal has not been provided to the Board.
 - ii. Title 27 Compliance Status: This surface impoundment is part of the facility's storm water management system. Prior to discovering the possible waste discharge history, the impoundment appeared to be in compliance as a storm water impoundment, which would not be regulated by Title 27. Since the impoundment may have been used for waste discharge, it shall be required to comply with Title 27. This Order's Provisions Nos. 10 and 11 shall require further delineation of this waste and closure in compliance with Title 27.
- k. **Main Amorco Overflow Basin:** This unit historically received oily water and storm water. It is currently lined with HDPE plastic and is connected to an oily sump via a gate valve.
- i. Contamination: Information regarding the exact nature of the contamination deposited in this impoundment prior to the liner installation has not been provided to the Board.
 - ii. Title 27 Compliance Status: This surface impoundment is part of the facility's storm water management system. Prior to discovering the possible waste discharge history, the impoundment appeared to be in compliance as a storm water impoundment, which would not be regulated by Title 27. Since the impoundment may have been used for waste discharge, it shall be required to comply with Title 27. This Order's Provisions Nos. 10 and 11 shall require further delineation of this waste and closure in compliance with Title 27.
- l. **Amorco Basin by Wharf:** This unit historically received oily water and storm water. It is currently lined with HDPE plastic and accumulated storm water is currently pumped back to the main refinery's wastewater treatment system.
- i. Contamination: Information regarding the exact nature of the contamination deposited in this canal prior to the liner installation has not been provided to the Board.
 - ii. Title 27 Compliance Status: This surface impoundment is part of the facility's storm water management system. Prior to discovering the possible waste discharge history, the impoundment appeared to be in compliance as a storm water impoundment, which would not be regulated by Title 27. Since the impoundment may have been used for waste discharge, it shall be required to comply with Title 27. This Order's Provisions

Nos. 9 and 10 shall require further delineation of this waste and closure in compliance with Title 27.

BASIN PLAN

40. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on June 21, 1995. This updated and consolidated plan represents the Board's master water quality control planning document. The State Water Resources Control Board and the Office of Administrative Law approved the revised Basin Plan on July 20 and November 13, respectively, of 1995. A summary of regulatory provisions is contained in Title 23 of the California Code of Regulations at Section 3912. The Basin Plan defines beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater.

The Basin Plan provides that all groundwater are considered suitable, or potentially suitable, for municipal or domestic water supply (MUN) and that, in making any exceptions, the Board will consider the criteria referenced in Board Resolution No. 89-39, "Sources of Drinking Water", where: 1) the total dissolved solids exceed 3,000 mg/l (5,000 μ S/cm, electrical conductivity), and it is not reasonably expected by the Board that the groundwater could supply a public water system; 2) there is contamination, either by natural processes or human activity (unrelated to the specific pollution incident), that cannot reasonably be treated for domestic use using best management practices or best economically achievable treatment practices; and 3) the water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day.

BENEFICIAL USES OF SURFACE AND GROUNDWATER

41. The existing and potential beneficial uses of the groundwater in the area are:
- a. Drinking water; municipal supply;
 - b. Industrial process and service supply; and
 - c. Agricultural supply.
42. The existing and potential beneficial uses of the Suisun Bay are:
- a. Industrial process and service supply;
 - b. Navigation;
 - c. Water contact recreation;
 - d. Non-contact recreation;

- e. Ocean commercial and sport fishing;
- f. Wildlife habitat;
- g. Preservation of rare and endangered species;
- h. Fish migration and spawning; and
- i. Estuary habitat.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

43. This action relates to permitting existing waste management units and is thus exempt from provisions of the California Environmental Quality Act pursuant to Section 15301, Title 14 of the California Code of Regulations

NOTIFICATIONS AND MEETING

44. The Board has notified the Dischargers and interested agencies and persons of its intent to update waste discharge requirements and has provided them with an opportunity to submit their written views and recommendations.
45. The Board, in a public meeting, heard and considered all comments pertaining to the proposed waste discharge requirements for the site.

IT IS HEREBY ORDERED that the Dischargers, their agents, successors and assigns shall meet the applicable provisions contained in Title 27, Division 2, of the California Code of Regulations and Division 7 of the California Water Code, and shall comply with the following:

PROHIBITIONS

1. Leachate or ponded water containing leachate or in contact with waste shall not be discharged to waters of the State or of the United States unless specifically authorized under an NPDES permit.
2. The treatment, storage, and discharge of groundwater or leachate shall not create a condition of pollution or nuisance as defined in Section 13050(m) CWC, nor degrade the quality of waters of the State or of the United States.
3. The creation of any new waste management unit is prohibited without prior Board staff concurrence.
4. The relocation of wastes is prohibited without prior Board staff concurrence.

5. The relocation of wastes to or from waste management units shall not create a condition of pollution or nuisance as defined in Section 13050 (1) and (m) CWC. Any relocated waste shall not be placed in or allowed to contact ponded water from any source whatsoever. Wastes shall not be relocated to any location where they can be discharged into waters of the State or of the United States.
6. Excavation within or reconfiguration of any existing waste management unit is prohibited without prior concurrence of Board staff. Minor excavation or reconfiguration activities such as for installation of signs or landscaping, or for routine maintenance and repair do not require prior staff concurrence.
7. Waste shall not be exposed at the surface of any WMU.
8. Disking of WMU covers is prohibited without prior Board staff concurrence. Alternate methods of controlling vegetative growth, which do not affect the integrity of the waste management unit cap, are preferred.
9. Surface drainage from tributary areas and internal site drainage from surface or subsurface sources shall not contact or percolate through wastes during the life of the site.
10. Migration of pollutants through subsurface transport to waters of the State is prohibited.
11. There shall be no discharge of wastes to surface waters except as permitted under the National Pollutant Discharge Elimination System.
12. The treatment, discharge or storage of materials which may impact the beneficial uses of ground or surface water shall not be allowed to create a condition of pollution or nuisance as defined in Sections 13050 (l) and (m), respectively, of the California Water Code.
13. The discharge of hazardous waste at the facility is prohibited. For the purpose of this Order, the term hazardous waste is as defined in Title 23, Article 2 of Chapter 15.
14. Activities associated with subsurface investigations and cleanup that will cause significant adverse migration of pollutants are prohibited.
15. The Dischargers shall not cause the following conditions to exist in waters of the State at any place outside the waste management facility:
 - a. **Surface Waters:**
 - i. Floating, suspended, or deposited macroscopic particulate matter or foam;
 - ii. Bottom deposits or aquatic growth;

- iii. Alteration of temperature, turbidity, or apparent color beyond natural background levels;
- iv. Visible, floating, suspended or deposited oil or other products of petroleum origin; or
- v. Toxic or other deleterious substances to be present in concentrations or quantities which may cause deleterious effects on aquatic biota, wildlife or waterfowl, or which render any of these unfit for human consumption either at levels created in the receiving waters or as a result of biological concentrations.

b. Groundwater

- i. The groundwater shall not be degraded as a result of the waste disposal operation.

SPECIFICATIONS

REPORTING SPECIFICATIONS

1. All reports submitted pursuant to this Order shall be prepared under the supervision of and signed by a California registered civil engineer, registered geologist, and/or certified engineering geologist.
2. The Dischargers shall implement Corrective Action Programs, pursuant to 27CCR, Section 20430 to remediate releases from waste management units and to achieve compliance with the Water Quality Protection Standard (WQPS) established by the Board. The WQPS includes the following:
 - a. The list of Constituents of Concern (COCs) established for the waste management units includes all organic and inorganic compounds identified in this Order (Findings Sections 27 and 28), and in the SMP attached to this Order, or any future amendments thereof.
 - b. The Dischargers shall propose concentration limits (CLs) for all COCs detected at the specified points of compliance. CLs must be based on evaluation of background concentrations for each COC, pursuant to 27 CCR, Section 20400.
 - c. A Point of Compliance (POC) exists at every location along the perimeter of the waste management unit where waste exists. The point of compliance extends vertically through the uppermost aquifer beneath the landfill. Each monitoring well and sampling point located along the downgradient waste management unit perimeter, specified in this Order or the attached SMP to this Order, or any future amendments thereof, shall represent a point of compliance.
3. At any time, the Dischargers may file a written request (including supporting documentation) with the Executive Officer, proposing modifications to the attached SMP.

If the proposed modifications are acceptable, the Executive Officer may issue a letter of approval that incorporates the proposed revisions into the SMP.

TITLE 27 COMPLIANCE SPECIFICATIONS

4. Final cover systems for waste management units shall be graded and maintained to promote lateral runoff and prevent ponding and infiltration of water.
5. The Dischargers shall notify the Board immediately of any failure that threatens the integrity of any containment and control facilities, structures, or devices. Any such failure shall be promptly corrected after approval of the method and schedule by the Executive Officer.
6. The Dischargers shall maintain the waste management units so as to prevent a statistically significant increase in water quality parameters at points of compliance as provided in 27CCR, Section 20420.
7. The Dischargers shall maintain the waste units to prevent discharges, such that the units do not constitute a pollution source.
8. The Board considers the property owner and site operator to have continuing responsibility for correcting any problems, which arise in the future as a result of waste discharge or related operations or site use.
9. The Dischargers shall comply with all applicable provisions of Title 27 that apply to the closure and post-closure of WMUs and the design and maintenance of surface impoundments.
10. Waste management units shall be closed according to a closure plan prepared according to all applicable requirements of Title 27, and approved by the Executive Officer.

REMEDIATION FACILITY MAINTENANCE SPECIFICATIONS

11. The Dischargers shall **annually demonstrate** (include results in the Annual Report) that all installed groundwater remedial systems including, but not limited to, groundwater containment, treatment, and/or extraction systems are functioning as intended and designed.
12. Containment, collection, drainage, and monitoring systems at the facility, shall be maintained as long as contaminated waste, soil, or water is present and poses a threat to water quality.
13. The Dischargers shall maintain groundwater or remediation devices or design features installed in accordance with this Order such that they continue to operate as intended without interruption, with the exception of periodic maintenance.

REMEDIATION FACILITY AUGMENTATION SPECIFICATIONS

14. If the Executive Officer determines the existence of an imminent threat to the beneficial uses of surface or subsurface waters of the State, the Dischargers may be required to install additional groundwater monitoring wells and/or undertake corrective action measures.
15. The Dischargers shall install any additional groundwater and leachate monitoring devices required to fulfill the terms of any future Self-Monitoring Program (SMP) issued by the Executive Officer.
16. The Dischargers shall install, maintain in good working order, and operate efficiently any facility, alarm, groundwater extraction system, or hydraulic/contaminant migration control system necessary to assure compliance with these Waste Discharge Requirements.
17. If it is determined by the Executive Officer, based on groundwater monitoring information, that water quality impairment immediately outside the boundary of any waste management unit continues to degrade, the Dischargers will be required to submit and implement a site specific groundwater corrective action proposal.

MONITORING SPECIFICATIONS

18. The Dischargers shall conduct monitoring activities according to the SMP attached to this Order and as may be amended by the Executive Officer, to verify the effectiveness of groundwater remediation and containment systems and waste management unit closure systems.
19. The Dischargers shall provide reasonable access to any property they own or lease at the site to allow for installation, sampling, monitoring, etc., of all devices and equipment necessary for compliance with the requirements of this Order.
20. The Dischargers shall conduct monitoring activities as specified in this Order. Should monitoring results show evidence of plume migration, additional plume characterization of pollutant extent shall be required.
21. Dischargers shall submit photographic documentation of any soil or groundwater corrective action features installed at the facility, and of any petroleum spill, which is required to be reported. A map shall be provided which identifies the location of any petroleum spill.
22. All monitoring wells shall be constructed in a manner that maintains the integrity of the drill hole, prevents cross-contamination of saturated zones, and produces representative groundwater samples from discrete zones within the groundwater zone each well is intended to monitor.

23. All borings for monitoring wells shall be continuously cored. The drill holes shall be logged during drilling under the direct supervision of a registered geologist whose signature appears on the corresponding well log. Logs of monitoring wells shall be filed with the Department of Water Resources. All information used to construct the wells shall be submitted to the Board upon completion of the wells.
24. All monitoring instruments and devices used by the Dischargers to fulfill the approved self-monitoring program shall be properly maintained and calibrated as necessary to ensure their continued accuracy. All flow measurements devices shall be calibrated at least once per year, or more frequently, to ensure continued accuracy of the devices. Annually, the Dischargers shall submit to the Executive Officer a written statement signed by a registered professional engineer certifying that all flow measurement devices have been calibrated and will reliably achieve the accuracy required.

All analyses shall be conducted at a laboratory certified for such analyses by the State Department of Health Services. The Board Executive Officer may allow use of an uncertified laboratory under exceptional circumstances, such as when the closest laboratory to the monitoring location is outside the State boundaries and therefore not subject to certification. All analyses shall be required to be conducted in accordance with the latest edition of "Guidelines Establishing Test Procedures for Analysis of Pollutants" (40 CFR Part 136] promulgated by the U.S. Environmental Protection Agency. [CCR Title 23, Section 2230]

25. The groundwater sampling and analysis program shall ensure that groundwater quality data are representative of the groundwater in the area that is monitored.
26. The Dischargers will monitor the perimeter of the facility for Constituents of Concern (COC), which are derived from each unit and within each perimeter area segment. If established Trigger Levels are exceeded at the perimeter, corrective action at the interior and the perimeter shall be required.
27. The Dischargers shall monitor for all COC **once every five years** and for each Constituent of Concern at intervals determined in the Self Monitoring Plan (SMP). The next all-inclusive COC monitoring events shall be completed September of 2007, 2012, 2017, and 2022.
28. In the event of a release of a COC at a concentration greater than the Trigger Levels beyond the Perimeter Compliance Point (Perimeter Segment) or evidence of plume instability detected at an interior point of compliance, the Dischargers shall evaluate the need for corrective action.

SURFACE IMPOUNDMENT SPECIFICATIONS

29. If it is determined by the Executive Officer that any surface impoundment is degrading beneficial uses, there shall be no discharges to a surface impoundment, and residual liquids and sludges shall be removed expeditiously.
30. The impoundments will be operated such that scouring at points of discharge and by wave action at the water line will not degrade the pond containment features.
31. Pipeline discharge to surface impoundments shall be either equipped with devices, or fail-safe operating procedures, to prevent overfilling. The surface impoundments shall always maintain at least two-feet of freeboard.
32. Dischargers shall operate the surface impoundments according to a detailed operating, maintenance, and contingency plan, which will include at a minimum, procedures for routine inspection of the surface impoundments, discharge into a pond, discharge out of a pond, contingency measures if problems with the containment structures are found, and notification of agencies.

PROVISIONS

1. **Compliance:** The Dischargers shall comply with all Prohibitions, Specifications and Provisions of this Order. All required submittals must be acceptable to the Board's Executive officer. The Dischargers must also comply with the conditions of these Waste Discharge Requirements. Violations may result in enforcement actions, including Board Orders or court Orders requiring corrective action or imposing civil monetary liability, or in modification or revocation of these waste discharge requirements by the Board [CWC Section 13261, 13262, 13265, 13267, 13268, 13300, 13301, 13304, and 13350]
2. **Reporting Requirements:** All technical and monitoring reports required to be submitted pursuant to this Order are being requested pursuant to Section 13267 of the California Water Code. Failure to submit reports in accordance with schedules established by this Order or failure to submit a report of sufficient technical quality to be acceptable to the Executive Officer may subject the Dischargers to enforcement action pursuant to Section 13268 of the California Water Code.
3. **Technical Reports:** Technical reports/plans submitted by the Dischargers, in compliance with the Prohibitions, Specifications, and Provisions of this Order shall be submitted to the Board on the schedule specified herein. These reports/plans shall consist of a letter report that includes the following:
 - a. Identification of any obstacles which may threaten compliance with the schedule;
 - b. In the event of non-compliance with any Prohibition, Specification or Provision of this Order, written notification which clarifies the reasons for non-compliance and which

proposes specific measures and a schedule to achieve compliance. This written notification shall identify work not completed that was projected for completion, and shall identify the impact of non-compliance on achieving compliance with the remaining requirements of this Order; and,

- c. In the self-monitoring reports (see Attachment B), an evaluation of the current groundwater monitoring system and a proposal for modifications as appropriate.
4. **Closure and Post-Closure Maintenance Plan:** The Dischargers shall submit a Closure and Post-Closure maintenance plan that is acceptable to the Executive Officer and that addresses the closure of all inactive WMUs, surface impoundments, and wastewater process canals. The proposed closure methods shall comply with Title 27, Subchapter 5 requirements as is appropriate for each unit. Dischargers shall also include a schedule detailing the closure time-line for each unit. This plan will be submitted concurrently to the EPA as a Corrective Measures Study Report.

Due Date: March 30, 2005

5. **Closure Implementation Dates:** Dischargers shall begin construction of all closure remedies for WMUs 1, 2, 3, 4, 5, 6, 8, 9, 13, and 17 by **July 15, 2006**. The construction activities shall continue without interruption until each WMU closure has been completed. Dischargers shall begin construction of all closure remedies for WMUs 10, 11, 14, 31, 32 and the oily water canal by **July 15, 2007**. The construction activities shall continue without interruption until each WMU or former surface impoundment closure has been completed.
6. **Closure Completion Date:** The inactive WMUs, surface impoundments, and process canals with July 2006 implementation due dates shall be closed by **October 15, 2007**. The inactive WMUs, surface impoundments, and process canals with July 2007 implementation due dates shall be closed by **October 15, 2009**.
7. **Revised Self Monitoring Plan:** The revised Self-Monitoring plan shall include the following revisions:
 - a. Dischargers shall review the point of compliance well locations that monitor groundwater in the vicinity of each WMU and Class II surface impoundment. The submitted review shall present a separate figure and analysis of each unit, and shall demonstrate that the number and locations of wells are sufficient to monitor the groundwater immediately adjacent and downgradient to the units, thereby monitoring the highest groundwater contamination concentrations.
 - b. Points of compliance shall be specified for each unit and shall include a summary of water bearing zones immediately beneath each unit, and shall verify that the point of

compliance effectively monitors each zone. The review shall also propose the addition of monitoring wells to fill in any data gaps identified in the study.

- c. Dischargers shall review all tables submitted in the self-monitoring program reports and verify that all required analytes are included and that each table is linked consistently with subsequent tables (i.e. if the initial required analyte table lists benzene as a sampling analyte for well MW-1, the result for this analyte should be easily found in subsequent tables. If well MW-1 is called an interior well, then results for this well must be included in tables presenting analytic results for interior wells).
- d. Dischargers shall propose standard observation stations for each WMU and surface impoundment and shall monitor these stations weekly (see Attachment – A, Self-Monitoring Program, B-1, 2, and 3).
- e. Dischargers shall prepare a new table summarizing the rationale for the inclusion or exclusion of all analytes for all monitoring wells. This table will memorialize how analytes have been selected and minimize future unnecessary review.
- f. If not included in sampling requirements for the facility NPDES permit, Dischargers shall propose additional sampling stations for surface water, storm water, and leachate such that all waters of the state in the vicinity of WMUs or surface impoundments are monitored and sampled.
- g. Dischargers shall compile a unified well list and figure for all wells at the facility, including wells on leased properties.
- h. The Dischargers shall submit a report which evaluates the benefits of installing additional downgradient groundwater monitoring wells along the perimeter of WMU-10, and along Perimeter Segments 1, 7, 11, and 15 where current well spacing may not detect offsite migration.

Due Date: January 31, 2005

8. **Clean Water Canal Additional Wells Workplan:** Existing monitoring wells that are located between WMUs 16 and 31 and the Clean Water Canal do not represent groundwater conditions in the marsh. Therefore, the Dischargers shall prepare an investigation workplan acceptable to the Executive Officer proposing monitoring well locations between the clean water canal and adjacent marshland to monitor potential impacts to the marsh for regulatory review.

Due Date: October 29, 2004

9. **Clean Water Canal Investigation Report:** Subsequent to installing and sampling the monitoring wells, the Dischargers shall submit an investigation results report

acceptable to the Executive Officer presenting analytic data collected during the well installation and sampling. These wells shall also be added to the SMP.

Due Date: April 29, 2005

10. **Deacons, Tract 4, Tract 3 East Canal, Tract 3 West Canal, Main Amorco Overflow Basin, and Amorco Basin by Wharf Storm Water Impoundment Workplans:** In a November 2003 letter and subsequent meetings, Dischargers revealed that petroleum waste may have been deposited in these impoundments. Therefore, additional investigation work is required to evaluate the horizontal and vertical extent of petroleum waste in soil and groundwater in the vicinity of these six storm water impoundments. Dischargers shall prepare workplans acceptable to the Executive Officer to address these concerns.

Deacons and Tract 4 - Due Date: August 16, 2004

Tract 3 East Canal and Tract 3 West Canal - Due Date: September 15, 2004

Main Amorco Overflow Basin, and Amorco Basin by Wharf - Due Date: October 15, 2004

11. **Deacons, Tract 4, Tract 3 East Canal, Tract 3 West Canal, Main Amorco Overflow Basin, and Amorco Basin by Wharf Storm Water Impoundment Investigation Summary Reports:** Dischargers shall prepare a summary report presenting the results of the investigative work proposed in the workplans required by Provision No. 9, above, and if necessary shall propose corrective actions. Should evidence of waste discharge be confirmed, these units shall be included in both the closure plan and post-closure maintenance plan required by Provision 4 of this order.

Deacons and Tract 4 - Due Date: November 15, 2004

Tract 3 East Canal and Tract 3 West Canal - Due Date: December 15, 2005

Main Amorco Overflow Basin, and Amorco Basin by Wharf - Due Date: January 17, 2005

12. **Active Class II Surface Impoundment Evaluation Workplan:** Dischargers shall prepare a workplan to evaluate the as-built construction of the Bay Mud clay liner for all active Class II surface impoundments currently used in the waste water treatment process. The evaluation shall include the surge ponds, the bio-oxidation pond, and all clay-lined or unlined wastewater conveyance trenches. The objective of the evaluation is to evaluate whether the impoundments comply with Title 27 construction standards. Therefore, the workplan shall propose evaluation methods that will achieve this objective.

Due Date: November 19, 2004

13. **Active Class II Surface Impoundment As-Built Documentation Report:** Dischargers shall submit a technical report documenting the results of the study proposed in the Active Class II Surface Impoundment Evaluation Workplan. The report shall explicitly discuss compliance with Title 27 requirements for Class II surface impoundments and present detailed as-built drawings of each unit.

Due Date: May 20, 2005

14. **Revised Active Class II Surface Impoundment Self Monitoring Program:** Dischargers shall prepare a self monitoring program specific to the monitoring of Class II Surface Impoundments currently used in the wastewater treatment process. The program shall comply with Title 27 monitoring requirements, and shall be modified to address monitoring challenges posed by the FPLH located in the vicinity of the impoundments. Points of compliance shall be specified for each unit and shall include a summary of water bearing zones immediately beneath each unit, and shall verify that the point of compliance effectively monitors each zone. The report shall also propose the addition of wells to fill in any data gaps identified in the study.

Due Date: December 1, 2004

15. **Class II Surface Impoundment Operation, Maintenance and Contingency Plan:** Dischargers shall prepare a Title 27 - compliant operation and maintenance plan. The plan shall include schedules for maintenance, including the removal of contaminated sludge and sediment.

Due Date: February 18, 2005

16. **Coke Pond Chromium Evaluation:** Elevated chromium concentrations have been detected in soil samples collected from the outer coke pond. These results shall be re-evaluated, as no known historical chromium source has been identified and presented in a report acceptable to the Executive Officer.

Due Date: October 29, 2004

17. **Coke Pond BMP Revision:** Issues related to storm water best management practices including berms, run-on and run-off storm water management, and house keeping while loading coke have been identified and shall be mitigated through an update of the facility's Storm Water Pollution Prevention Plan (SWPPP), which is regulated through the site's NPDES permit. Dischargers shall contact the Board's NPDES permit caseworker and submit a revised SWPPP that addresses these concerns. All correspondence regarding this issue shall be copied to the Board's WDR caseworker.

Due Date: September 24, 2004

18. **Human Health and Environmental Risk Assessment:** The April 15, 1999 Human Health and Environmental Risk Assessment (HHERA) was scoped and completed when the facility owner (Tosco) was a member of the Joint Environmental Investigation and Remediation Committee (JEIRC). The HHERA included assumptions used in the risk analysis that required institutional controls to manage risk such as ensuring limited access and providing fencing to minimize physical contact with the waste. To date, the new facility owner and operator (Tesoro) has not formally reviewed or committed to installing and maintaining these institutional controls. In addition, the HHERA did not comment on human health risks to site workers from the WMUs.
- a. The Dischargers shall complete an evaluation of the HHERA and assess whether: 1) the assumed institutional controls for each WMU are implemented and maintained; 2) Tesoro shall adopt responsibility for maintaining these institutional controls (see Provision 17c and d below); and 3) the human health risk to site workers is adequately addressed by the facility health and safety plan. The results of this evaluation shall be presented in a report acceptable to the Executive Officer.

Due Date: November 30, 2004

- b. Dischargers shall summarize the assumed institutional controls outlined in the HHERA for each unit and submit a technical report presenting the summary. Included in this summary shall be a list of proposed institutional controls for inactive units not included in the HHERA, but that pose a risk to human health, and a summary of the institutional controls required by the facility's health and safety plan to mitigate any exposure risks to facility workers that are associated with the WMUs. These summaries shall be presented in a report acceptable to the Executive Officer.

Due Date: February 11, 2005

- c. If the current owner/operator decides to implement the institutional controls presented in the HHERA, then the current owner/operator shall submit a letter of acceptance to the Executive Officer detailing the institutional controls that shall be maintained by the facility owner and pledging to maintain these controls as long as is necessary (final closure of the units will likely render much of the institutional controls unnecessary).

Due Date: June 1, 2005

- d. If the current owner/operator decides not to adopt the institutional controls in the HHERA, as is, then Dischargers shall re-evaluate the institutional controls in the HHERA and prepare a technical report that shall propose solutions to resolve any institutional control disparities and that is appropriate for the existing ownership and site conditions.

Due Date: September 2, 2005

19. **Trigger Level Implementation Plan Revision:** Dischargers shall prepare and submit a revised Trigger Level Implementation plan that address the comments presented below. The plan shall also include an assessment of potential impacts from active surface impoundments.

Due Date: September 30, 2004

- a. Comments: As discussed in Finding No. 24b and a July 16, 2002 Board comment letter, staff reviewed and approved of the methods and numeric values used to generate risk-based trigger levels, including the fate and transport calculations included in the April 20, 2000 plan. Staff also approved of the validation and statistical procedures proposed to assess whether groundwater from a specific segment should continue to be analyzed for a specific constituent and whether an actual exceedance has occurred. Staff approved of the proposed corrective measures outlined in the plan.

Staff did not approve of the proposed use of the trigger levels in perimeter wells as the only mechanism to initiate corrective action. The proposal would allow degradation of waters of the State in areas where a well is located downgradient of a plume edge, and uncontaminated groundwater exists between the plume and the downgradient monitoring well. The proposed plan would allow the plume to migrate through clean groundwater towards the perimeter well under the auspices of not exceeding a risk-based threshold as outlined in the April 20, 2000 plan.

- b. Requirements: A trigger level exceedance at the perimeter shall not be the only determination used as the signal to begin assessing whether additional investigative or remedial efforts are warranted. Plume instability at the waste management unit point of compliance shall also be used as a signal.

A plan that includes a periodic Mann-Kendall non-parametric statistical analysis of concentration trends in the interior wells, to assess whether concentrations are increasing and plume stability has been compromised shall be prepared. The detailed statistical analysis must be completed semiannually and the results of the analysis shall be presented in each Self-Monitoring Program semiannual report.

Any indication that a contaminant plume is migrating or that plume stability has been compromised shall immediately begin a corrective action process. The indication may include, but is not limited to, increasing concentrations, evidence of COC transport, or the exceedance of a risk-based trigger level.

For extremely soluble COCs that tend to exhibit plug flow, such as MTBE, a decrease of COC concentration in a source area well is not a valid indication of plume stability or degradation. Therefore, investigation and remediation approaches shall be modified appropriately to assess the location or concentration of soluble COCs. The modifications might include fate and transport modeling or strategically placed monitoring wells.

- c. Notification: Immediate verbal notification and written notification is to be provided to the Board within seven days of a trigger level exceedance or when increasing concentration trends are noted. At that time an individual investigative or remedial scope of work shall be recommended.

20. **Monitoring Program:** The Dischargers shall implement the Self Monitoring Program approved by the Executive Officer.
21. **Financial Assurance:** The Dischargers shall obtain and maintain three Financial Assurance Instruments acceptable to the Executive Officer until the end of the Post-Closure Maintenance Period for each waste management unit (California Code of Regulations Title 27, Chapter 6, Subchapter 2, Articles 1,2, and 4 specifies which units shall require each specific financial assurance). The Financial Assurances shall assure waste management unit closure, post-closure maintenance, and corrective action. The Dischargers shall submit a report every five years that either validates the Instrument's ongoing viability or proposes and substantiates any needed changes (e.g., a documented increase in the monitoring systems' ability to provide reliable early detection of a release can cause a decrease in the Instrument's financial coverage). For the purposes of planning the amount of the fund, The Dischargers shall assume a post-closure period of at least 30 years. However, the post-closure maintenance period shall extend as long as the wastes pose a threat to water quality.

Initial Report Due Date: November 30, 2004 and every five years thereafter.

22. **Earthquake Inspection:** Dischargers shall submit a detailed Post Earthquake Inspection Report acceptable to the Executive Officer, in the event of any earthquake generating ground shaking of Richter Magnitude 7 or greater at or within 30 miles of the facility. The report shall describe the containment features, groundwater monitoring, and

control facilities potentially impacted by the static and seismic deformations of any waste management unit. Damage to any waste containment facility, which may impact State waters, must be reported immediately to the Executive Officer.

Due Date: Within 2 weeks of Earthquake

23. **Change in Ownership:** In the event of any change in control or ownership of the facility presently owned or controlled by Tesoro, Tesoro shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to this office. To assume operation of this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of this Order within 30 days of the change of ownership. The request must contain the requesting entity's full legal name, the address and telephone number of the persons responsible for contact with the Board. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code.
24. **Duty to Comply:** The Dischargers must comply with all conditions of these waste discharge requirements. Violations may result in enforcement actions, including Board Orders or court Orders requiring corrective action or imposing civil monetary liability, or in modification or revocation of these waste discharge requirements by the Board. [CWC Section 13261, 13263, 13265, 13268, 13300, 13301, 13304, 13340, 13350].
25. **Availability:** A copy of these waste discharge requirements shall be maintained at the facility and available at all times to operating personnel. [CWC Section 13263]
26. **Change in Discharge:** In the event of a material change in the character, location, or volume of a discharge, the Dischargers shall file with this Board a new Report of Waste Discharge. [CWC Section 13260(c)]. A material change includes, but is not limited to, the following:
 - a. Addition of a major industrial waste discharge to discharge of essentially domestic sewage, or the addition of a new process or product by an industrial facility resulting in a change in the character of the waste.
 - b. Significant change in disposal method, e.g., change from a land disposal to a direct discharge to water, or change in the method of treatment, which would significantly alter the characteristics of the waste.
 - c. Significant change in the disposal area, e.g., moving the discharge to another drainage area, to a different water body, or to a disposal area significantly removed from the original area potentially causing different water quality or nuisance problems.
 - d. Increase in flow beyond that specified in the waste discharge requirements.

- e. Increase in area or depth to be used for solid waste disposal beyond that specified in the waste discharge requirements [CCR Title 23 Section 2210]
27. **Revision:** These waste discharge requirements are subject to review and revision by the Board. [CCR Section 13263]
28. **Termination:** Where the Dischargers become aware that it failed to submit any relevant facts in a Report of Waste Discharge or submitted incorrect information in a Report of Waste Discharge or in any report to the Board, it shall promptly submit such facts or information. [CWC Sections 13260 and 13267]
29. **Vested Rights:** This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, do not protect the Dischargers from his liability under Federal, State or local laws, nor do they create a vested right for the Dischargers to continue the waste discharge. [CWC Section 13263(g)]
30. **Severability:** Provisions of these waste discharge requirements are severable. If any provision of these requirements is found invalid, the remainder of these requirements shall not be affected. [CWC 9213]
31. **Operation and Maintenance:** The Dischargers shall, at all times, properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Dischargers to achieve compliance with conditions of this Order. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls including appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this Order. [CWC Section 13263(f)]
32. **Releases:** Except for a discharge which is in compliance with these waste discharge requirements, any person who, without regard to intent or negligence, causes or permits any hazardous substance or sewage to be discharged in or on any waters of the State, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the State, shall, as soon as (a) that person has knowledge of the discharge, (b) notification is possible, and (c) notification can be provided without substantially impeding cleanup or other emergency measures, immediately notify the office of Emergency Services of the discharge in accordance with the spill reporting provision of the state toxic disaster contingency plan adopted pursuant to Article 3.7 (commencing with Section 8574.7) of Chapter 7 of Division 1 of Title 2 of the Government Code, and immediately notify the State Board or the appropriate Regional Board of the discharge. This provision does not require reporting of any discharge of less than a reportable quantity as provided for under subdivisions (f) and (g) of Section 13271 of the Water Code unless the Dischargers are in

violation of a prohibition in the applicable water Quality Control Plan. [CWC Section 13271(a)]

33. **Entry and Inspection:** Tesoro shall allow the Board, or an authorized representative upon the presentation of credentials and other documents as may be required by law, to:
- a. Enter upon Tesoro's premises, in accordance with Tesoro's health and safety procedures, where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Order;
 - b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order;
 - c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and
 - d. Sample or monitor at reasonable times, for the purposes of assuring compliance with this Order or as otherwise authorized by the California Water Code, any substances or parameters at any location. [CWC Section 13267]
34. **Endangerment of Health and Environment:** The Dischargers shall report any noncompliance, which may endanger health or the environment. Any such information shall be provided orally to the Executive officer within 24 hours from the time the Dischargers become aware of the circumstances. A written submission shall also be provided within five days of the time the Dischargers become aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected; the anticipated time it is expected to continue and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. The Executive Officer, or an authorized representative, may waive the written report on a case-by case basis if the oral report has been received within 24 hours. The following occurrences must be reported to the Executive Officer within 24 hours;
- a. Any bypass from any portion of the treatment facility.
 - b. Any discharge of treated or untreated wastewater resulting from sewer line breaks, obstruction, surcharge or any other circumstances.
 - c. Any treatment plant upset, which causes the effluent limitation of this Order to be exceeded. [CWC Sections 13263 and 13267]
35. **Maintenance of Records:** The Dischargers shall retain records of all monitoring information including all calibration and maintenance records, all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order.

Records shall be maintained for a minimum of five years from the date of the sample, measurement, report, or application. This period may be extended during the course of any unresolved litigation regarding this discharge or when requested by the Board Executive Officer.

- a. Records of monitoring information shall include:
 - i. The date, exact place, and time of sampling or measurements;
 - ii. The individuals who performed the sampling or measurements;
 - iii. The date(s) analyses were performed.
 - iv. The individuals who performed the analyses;
 - v. The analytical techniques or method used; and
 - vi. The results of such analyses.
- b. All application reports or information to be submitted to the Executive Officer shall be signed and certified as follows:
 - i. For a corporation, by a principal executive officer or the level of vice president.
 - ii. For a partnership or sole proprietorship, by a general partner or the proprietor, respectively.
 - iii. For a municipality, state, federal, or other public agency, by either a principal executive officer or ranking elected official.
 - iv. A duly authorized representative of a person designated in paragraph (a) of this provision may sign documents if:
 - (1) The authorization is made in writing by a person described in paragraph (a) of this provision.
 - (2) The authorization specifies either an individual or position having responsibility for the overall operation of the regulated facility or activity; and
 - (3) The written authorization is submitted to the Executive Officer.
 - v. Any person signing a document under this Section shall make the following certification: "I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for

obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. [CWC Sections 13263, 13267, and 13268]

36. Order No. 99-083 is herewith rescinded.
37. **Board Review:** This Order is subject to Board review and updating, as necessary, to comply with changing State or Federal laws, regulations or policies, or guidelines; changes in the Boards Basin Plan; or changes in discharge characteristics.

I, Bruce Wolfe, Executive Officer, do hereby certify that the foregoing is a full, complete, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on July 21, 2004.



Bruce H. Wolfe
Executive Officer

Figures -

1. Location Map
- 2, 2A-2C. Tract, WMU and Impoundment Map
3. Shallow Groundwater Flow Direction Map
4. Deep Groundwater Flow Direction Map
- 5, 5A-5B. Perimeter Segment Map
- 6, 6A-6E. Well Location Map

Attachment -

- A - Provision Due Date Summary Table
- B - Self-Monitoring Program (SMP)



Legend

--- Operations Perimeter



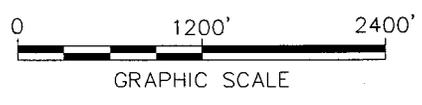
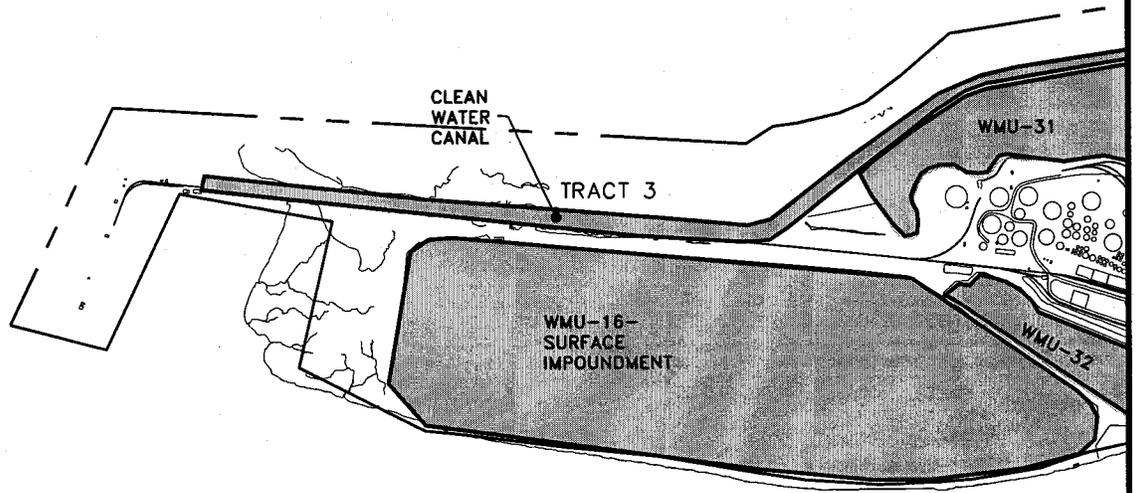
GOLDEN EAGLE REFINERY
MARTINEZ, CALIFORNIA

LOCATION MAP

FIGURE 1

LEGEND:

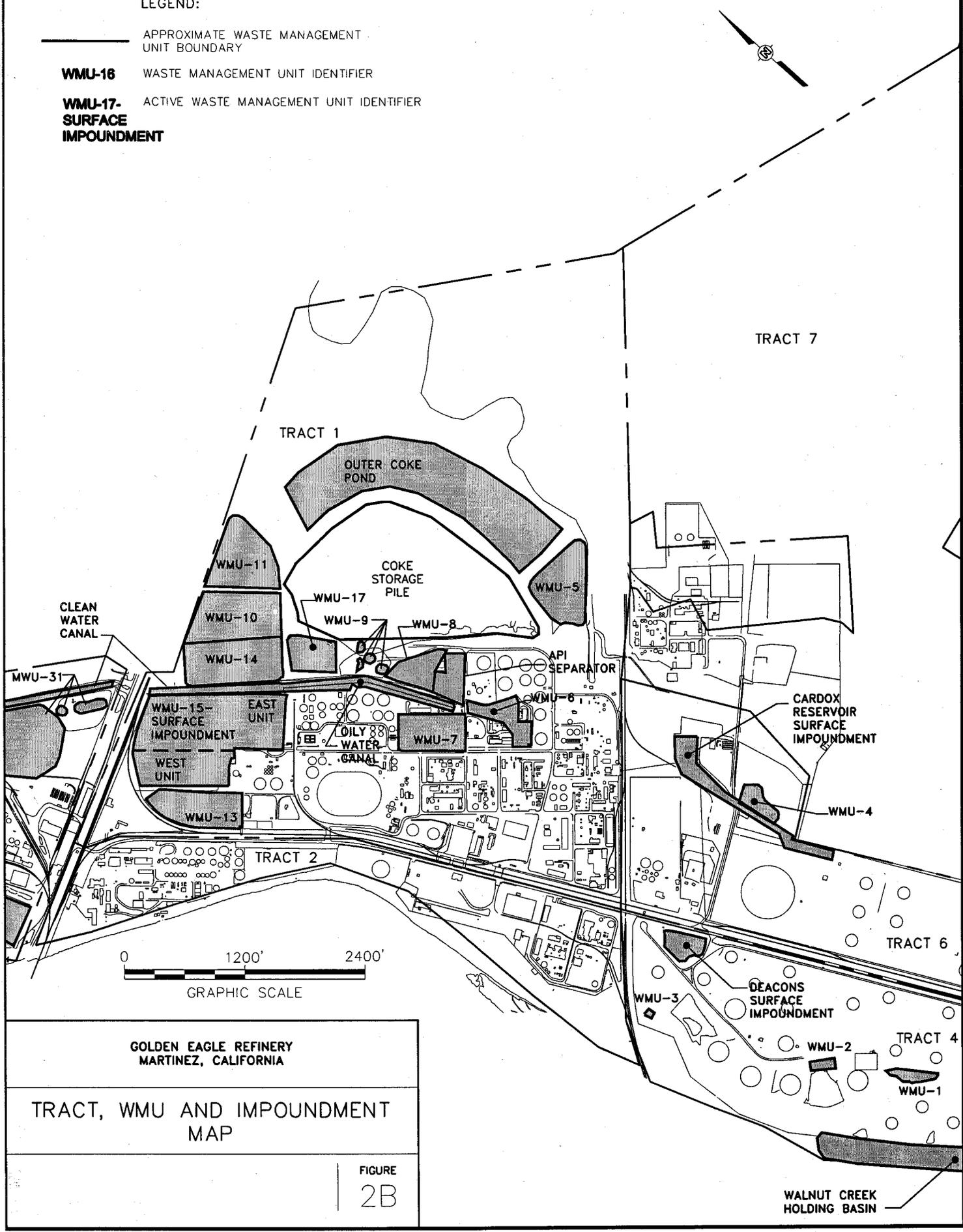
- APPROXIMATE WASTE MANAGEMENT UNIT BOUNDARY
- WMU-16** WASTE MANAGEMENT UNIT IDENTIFIER
- WMU-17-SURFACE IMPOUNDMENT** ACTIVE WASTE MANAGEMENT UNIT IDENTIFIER



GOLDEN EAGLE REFINERY MARTINEZ, CALIFORNIA	
TRACT, WMU AND IMPOUNDMENT MAP	
FIGURE	2A

LEGEND:

- APPROXIMATE WASTE MANAGEMENT UNIT BOUNDARY
- WMU-16** WASTE MANAGEMENT UNIT IDENTIFIER
- WMU-17-SURFACE IMPOUNDMENT** ACTIVE WASTE MANAGEMENT UNIT IDENTIFIER

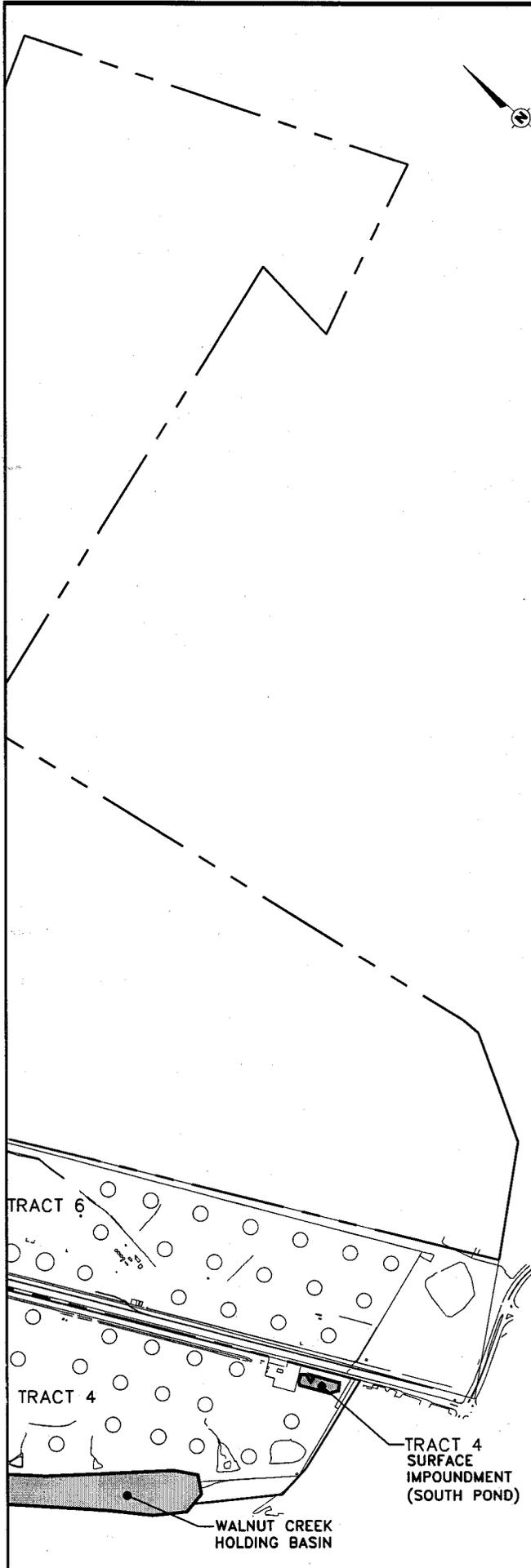


GOLDEN EAGLE REFINERY
MARTINEZ, CALIFORNIA

TRACT, WMU AND IMPOUNDMENT
MAP

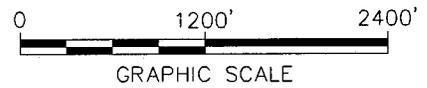
FIGURE
2B

WALNUT CREEK
HOLDING BASIN



LEGEND:

- APPROXIMATE WASTE MANAGEMENT UNIT BOUNDARY
- WMU-16 WASTE MANAGEMENT UNIT IDENTIFIER
- WMU-17- SURFACE IMPOUNDMENT ACTIVE WASTE MANAGEMENT UNIT IDENTIFIER

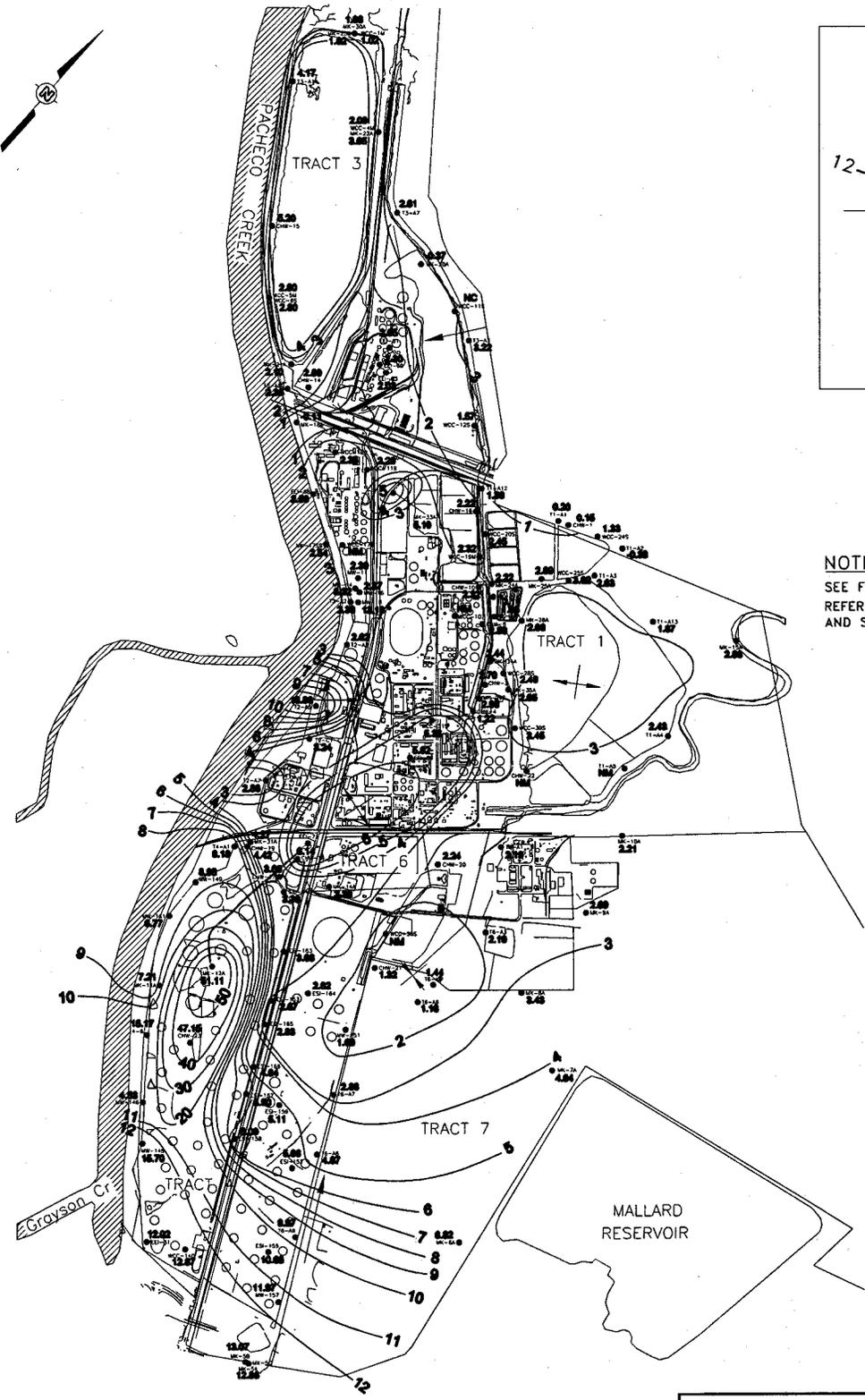


GOLDEN EAGLE REFINERY
MARTINEZ, CALIFORNIA

TRACT, WMU AND IMPOUNDMENT
MAP

FIGURE

2C



LEGEND	
	GROUNDWATER MONITORING WELL (SHALLOW ZONE) AND WELL IDENTIFICATION
	GROUNDWATER ELEVATION (FT MSL)
	GROUNDWATER ELEVATION CONTOUR LINE (FT MSL)
	APPROXIMATE GROUNDWATER FLOW DIRECTION
	NOT MEASURED
	ANTICLINE AND TREND DIRECTION
	SYNCLINE

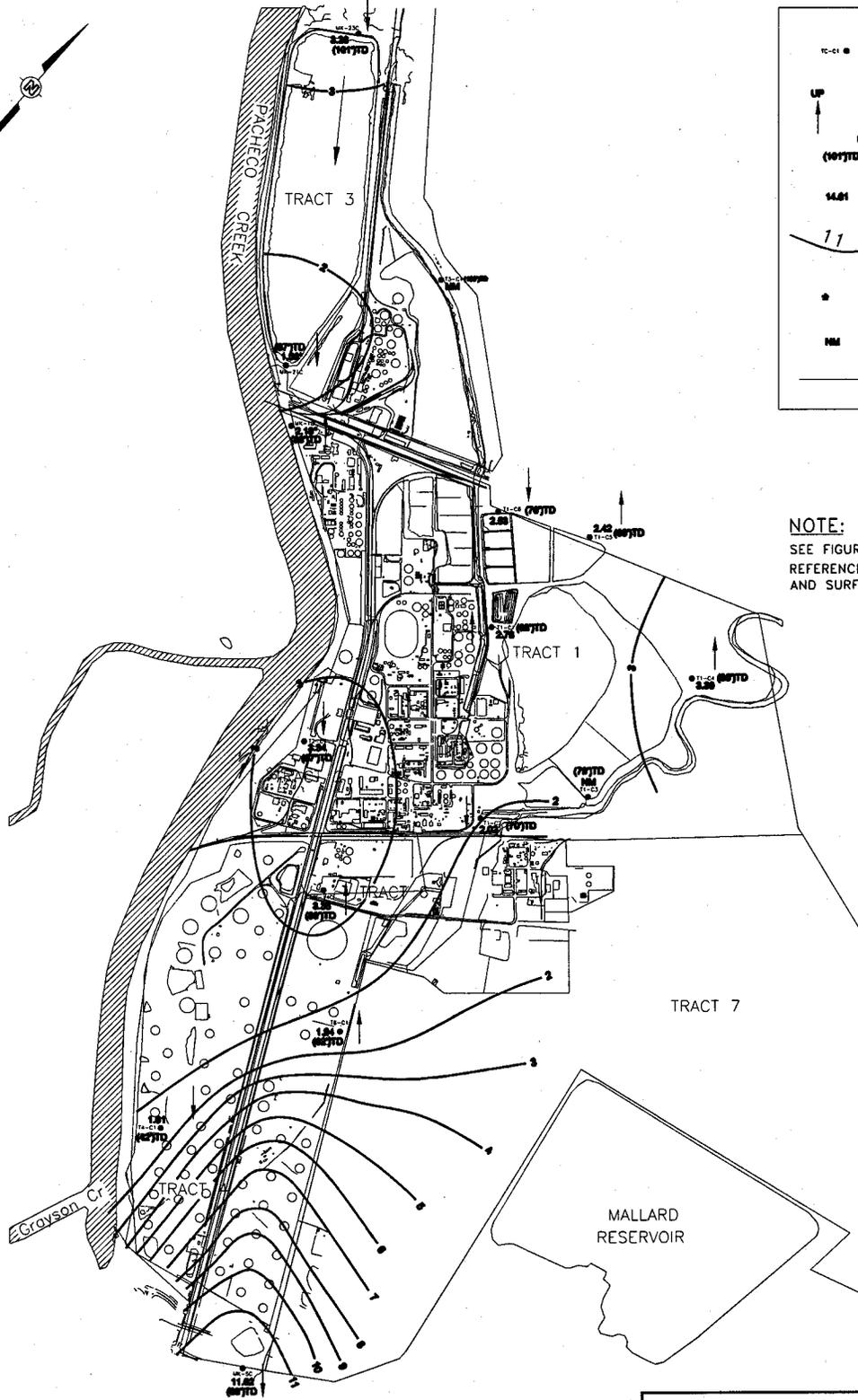
NOTE:
SEE FIGURES 2, 2A, 2B AND 2C FOR A COMPLETE REFERENCE TO WASTE MANAGEMENT UNITS (WMU) AND SURFACE IMPOUNDMENTS.

APPROXIMATE SCALE
0 750 1500
FEET

**GOLDEN EAGLE REFINERY
MARTINEZ, CALIFORNIA**

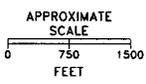
**SHALLOW GROUNDWATER FLOW DIRECTION MAP
(SEPTEMBER 2003) SUMMER/FALL SEMI-ANNUAL
AND ANNUAL MONITORING REPORT**

FIGURE
3



LEGEND	
	GROUNDWATER MONITORING WELL (POTENTIOMETRIC) AND WELL IDENTIFICATION
	VERTICAL HYDRAULIC GRADIENT DIRECTION
	TOTAL DEPTH OF MONITORING WELL
	POTENTIOMETRIC SURFACE ELEVATION (FT MSL)
	GROUNDWATER ELEVATION CONTOUR LINE (FT MSL) (DASHED WHERE INFERRED)
	POTENTIOMETRIC SURFACE ELEVATION NOT CORRECTED
	NOT MEASURED
	APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTE:
SEE FIGURES 2, 2A, 2B AND 2C FOR A COMPLETE REFERENCE TO WASTE MANAGEMENT UNITS (WMU) AND SURFACE IMPOUNDMENTS.



**GOLDEN EAGLE REFINERY
MARTINEZ, CALIFORNIA**

**DEEP GROUNDWATER FLOW DIRECTION MAP
(SEPTEMBER 2003) SUMMER/FALL SEMI-ANNUAL
AND ANNUAL MONITORING REPORT**

FIGURE
4

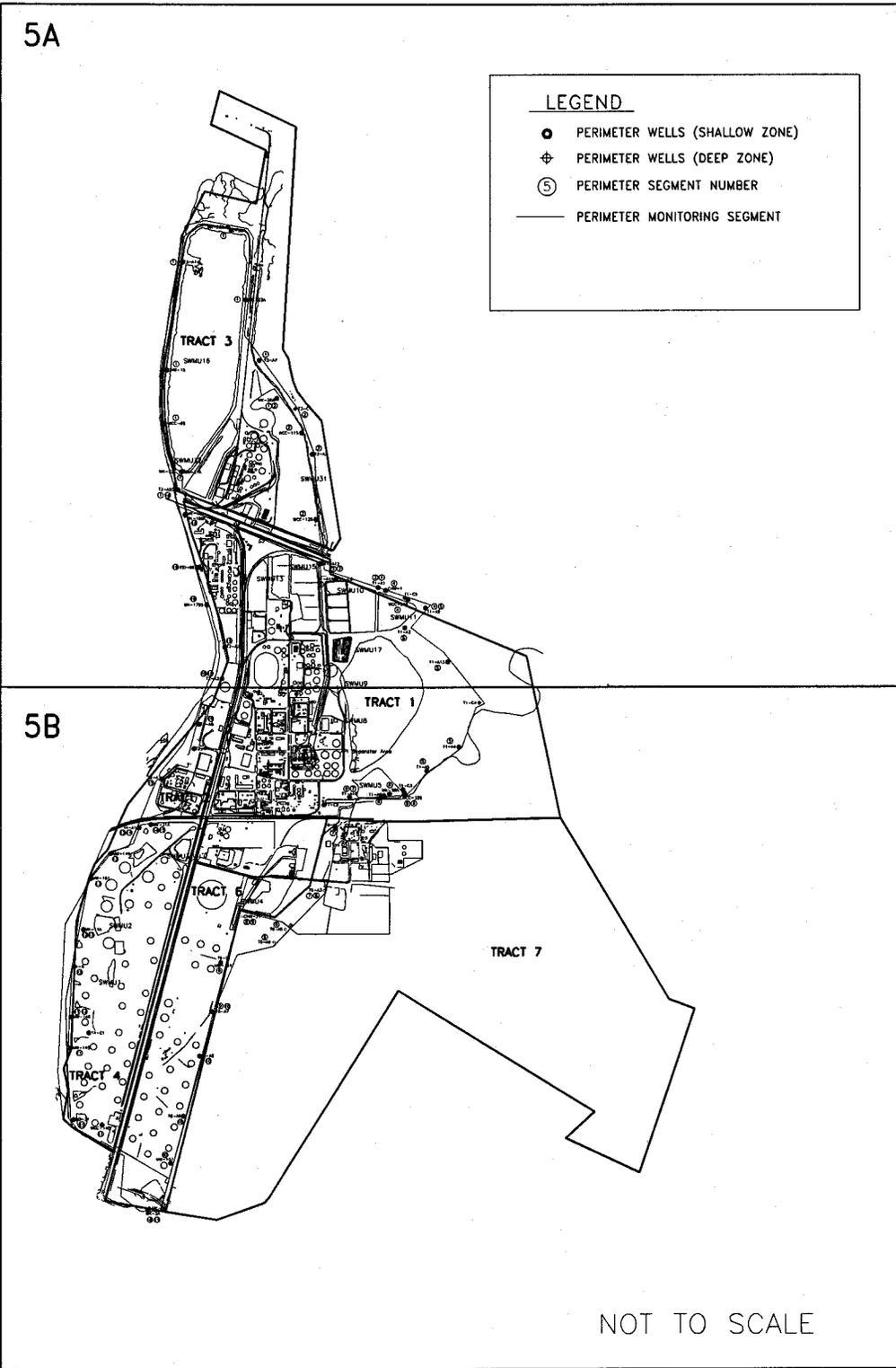
5A



LEGEND

- PERIMETER WELLS (SHALLOW ZONE)
- ⊕ PERIMETER WELLS (DEEP ZONE)
- ⑤ PERIMETER SEGMENT NUMBER
- PERIMETER MONITORING SEGMENT

5B



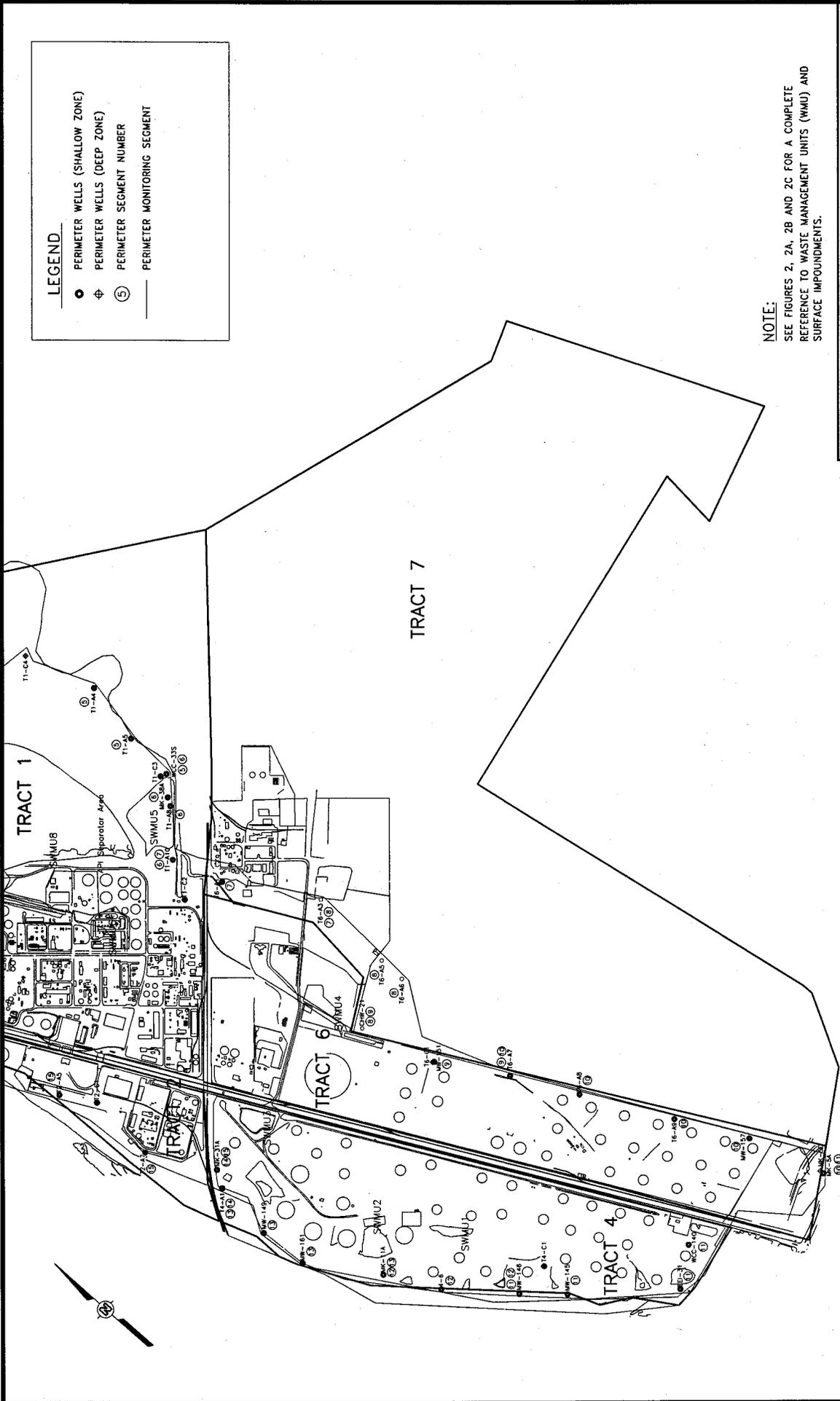
NOT TO SCALE

NOTE:
 SEE FIGURES 2, 2A, 2B AND 2C FOR A COMPLETE
 REFERENCE TO WASTE MANAGEMENT UNITS (WMU) AND
 SURFACE IMPOUNDMENTS.

**GOLDEN EAGLE REFINERY
 MARTINEZ, CALIFORNIA**

**PERIMETER SEGMENTS AND GROUNDWATER
 MONITORING WELLS FOR PGMP SUMMER/FALL
 2003 SEMIANNUAL MONITORING REPORT**

FIGURE
 5



LEGEND

- PERIMETER WELLS (SHALLOW ZONE)
- ⊕ PERIMETER WELLS (DEEP ZONE)
- ⑤ PERIMETER SEGMENT NUMBER
- PERIMETER MONITORING SEGMENT

NOTE:
 SEE FIGURES 2, 2A, 2B AND 2C FOR A COMPLETE
 REFERENCE TO WASTE MANAGEMENT UNITS (WMU) AND
 SURFACE IMPOUNDMENTS.

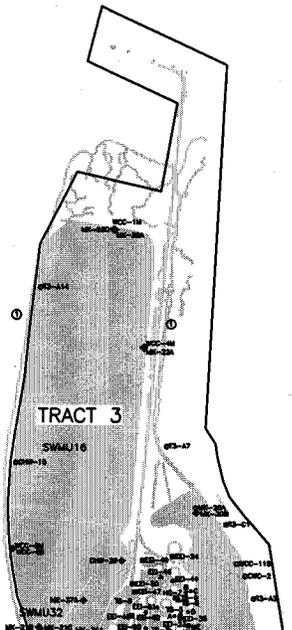
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**GOLDEN EAGLE REFINERY
 MARTINEZ, CALIFORNIA**

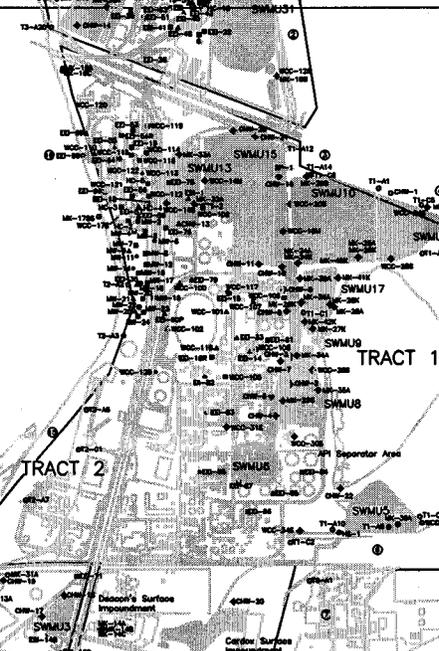
**PERIMETER SEGMENTS AND GROUNDWATER
 MONITORING WELLS FOR PGMP SUMMER/FALL
 2003 SEMIANNUAL MONITORING REPORT**

FIGURE | 5B

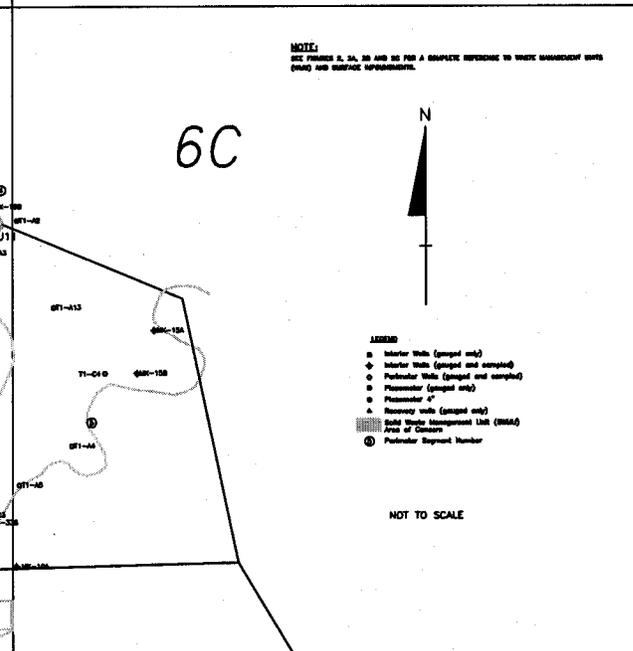
6A



6B



6C

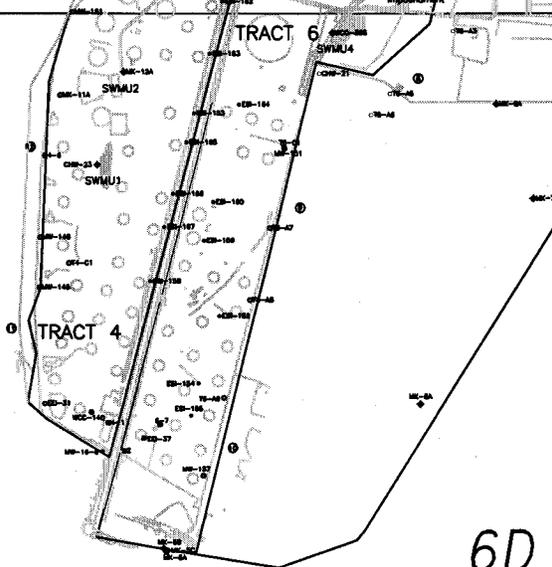


NOTE:
SEE FIGURES 6, 3A, 3B AND 3C FOR A COMPLETE REFERENCE TO WELLS SHOWN ON THIS MAP AND THEIR IDENTIFICATIONS.

- LEGEND**
- Interior Wells (pumped only)
 - ◆ Interior Wells (pumped and completed)
 - Potentiometer Wells (pumped and completed)
 - ⊙ Potentiometer (pumped only)
 - ⊕ Potentiometer "T"
 - ▲ Recovery wells (pumped only)
 - Solid Waste Management Unit (SWMU) Area of Concern
 - ⊖ Potentiometer Segment Number

NOT TO SCALE

6D

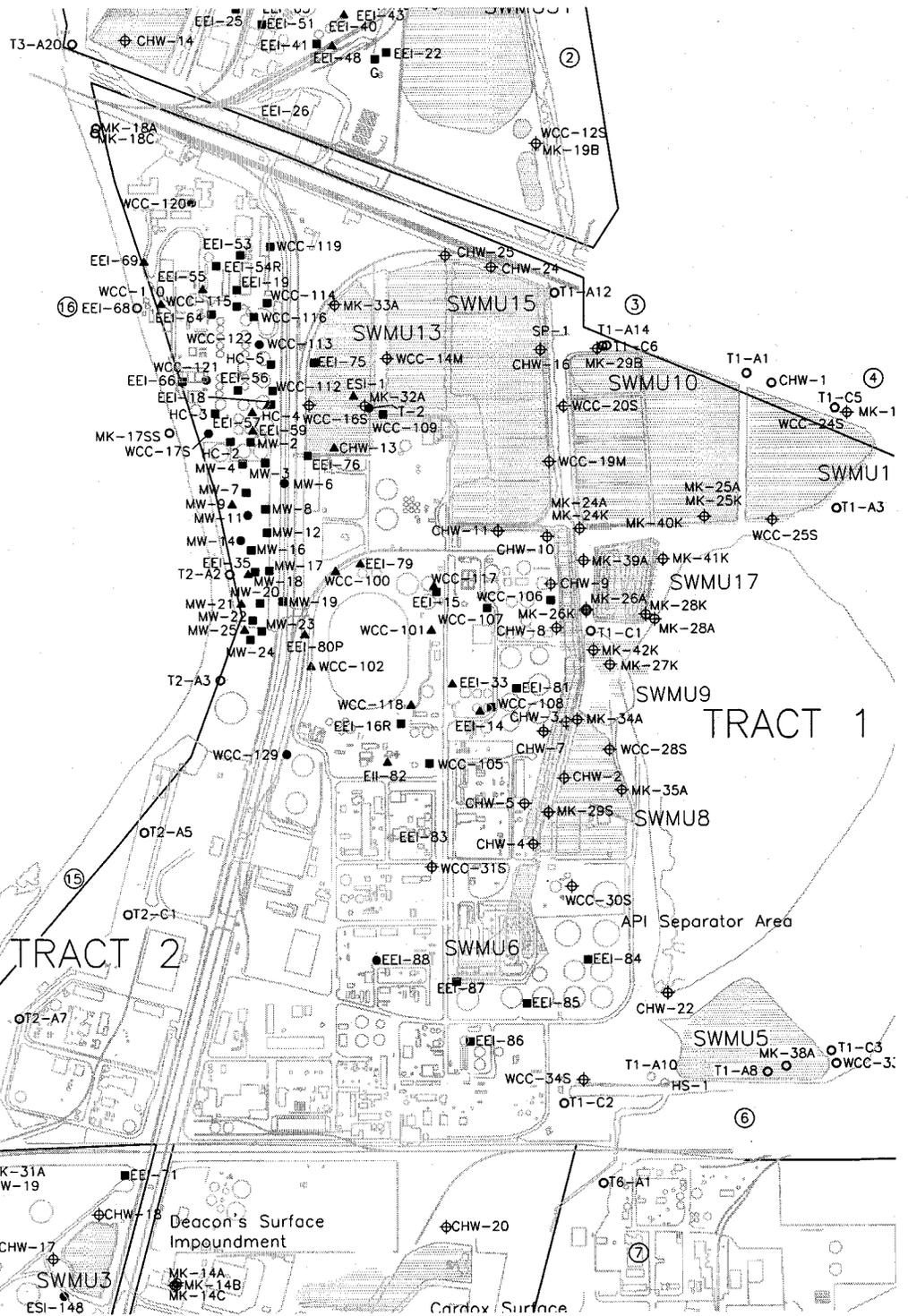


TRACT 7

6E

6D

GOLDEN EAGLE REFINERY MARTINEZ, CALIFORNIA	
WELL LOCATION MAP	
FIGURE	6



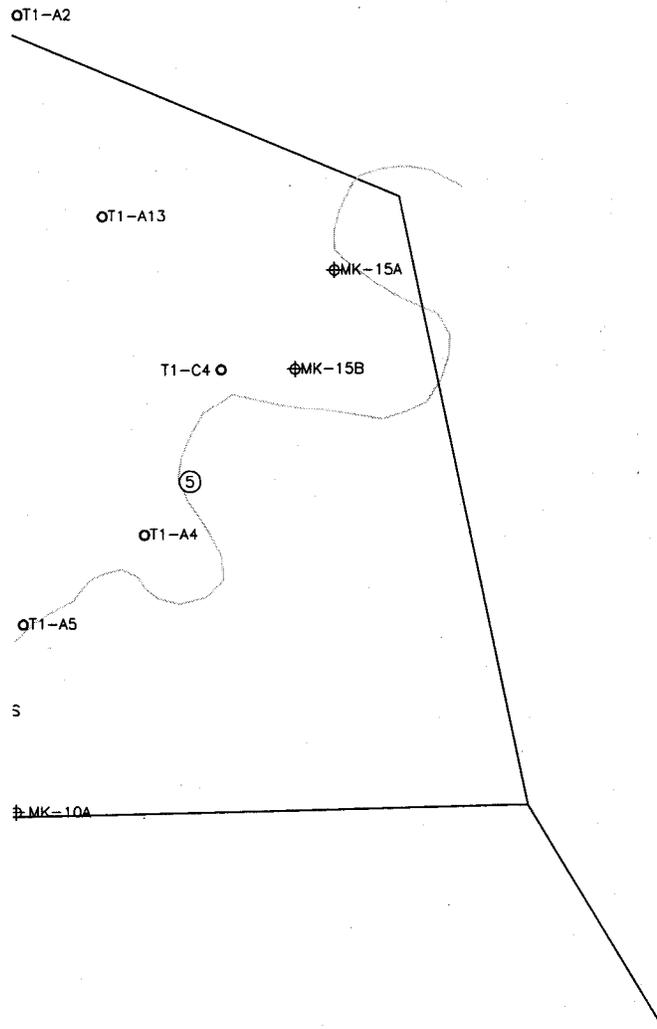
LEGEND

- Interior Wells (gauged only)
- ⊕ Interior Wells (gauged and sampled)
- Perimeter Wells (gauged and sampled)
- Piezometer (gauged only)
- Piezometer 4"
- ▲ Recovery wells (gauged only)
- ▨ Solid Waste Management Unit (SWMU)
- ▨ Area of Concern
- ⑤ Perimeter Segment Number

NOTE:
SEE FIGURES 2, 2A, 2B AND 2C FOR A COMPLETE REFERENCE TO WASTE MANAGEMENT UNITS (WMU) AND SURFACE IMPOUNDMENTS

NOT TO SCALE

GOLDEN EAGLE REFINERY MARTINEZ, CALIFORNIA	
WELL LOCATION MAP	
FOUR	6B



LEGEND

- Interior Wells (gauged only)
- ⊕ Interior Wells (gauged and sampled)
- Perimeter Wells (gauged and sampled)
- Piezometer (gauged only)
- Piezometer 4"
- ▲ Recovery wells (gauged only)
- ▨ Solid Waste Management Unit (SWMU)
- ▨ Area of Concern
- ⑤ Perimeter Segment Number

NOTE:

SEE FIGURES 2, 2A, 2B AND 2C FOR A COMPLETE REFERENCE TO WASTE MANAGEMENT UNITS (WMU) AND SURFACE IMPOUNDMENTS

NOT TO SCALE

GOLDEN EAGLE REFINERY MARTINEZ, CALIFORNIA	
WELL LOCATION MAP	
	FIGURE 6C

TRACT 7



LEGEND

- Interior Wells (gauged only)
- ⊕ Interior Wells (gauged and sampled)
- Perimeter Wells (gauged and sampled)
- Piezometer (gauged only)
- Piezometer 4"
- ▲ Recovery wells (gauged only)
- ▨ Solid Waste Management Unit (SWMU)
Area of Concern
- ⑤ Perimeter Segment Number

NOTE:

SEE FIGURES 2, 2A, 2B AND 2C FOR A COMPLETE REFERENCE TO WASTE MANAGEMENT UNITS (WMU) AND SURFACE IMPOUNDMENTS

NOT TO SCALE

GOLDEN EAGLE REFINERY MARTINEZ, CALIFORNIA	
WELL LOCATION MAP	
FIGURE	6E

Attachment – A

Provision Due Date Summary Table

Attachment A - Provision Due Date Summary Table

No.	Provision	Due Date
4	Closure and Post-Closure Maintenance Plan	03/30/05
5	Closure Implementation Date	07/15/06
5	Closure Implementation Date	07/15/07
6	Closure Completion Date	10/15/07
6	Closure Completion Date	10/15/09
7	Revised Self Monitoring Plan	01/31/05
8	Clean Water Canal Additional Wells Workplan	10/29/04
9	Clean Water Canal Investigation Report	04/29/05
10	Deacons and Tract 4 Storm Water Impoundment Workplan	08/16/04
10	Tract 3 East Canal and Tract 3 West Canal Workplan	09/15/04
10	Main Amorco Overflow Basin, and Amorco Basin Workplan	10/15/04
11	Deacons and Tract 4 Investigation Report	11/15/04
11	Tract 3 East Canal and Tract 3 West Canal Workplan	12/15/05
11	Main Amorco Overflow Basin, and Amorco Basin Workplan	01/17/05
12	Active Class II Surface Impoundment Evaluation Workplan	11/19/04
13	Active Class II Surface Impoundment As-Built Documentation Report	05/20/05
14	Revised Active Class II Surface Impoundment Self Monitoring Program	12/01/04
15	Class II Surface Impoundment O & M, Maint. and Contingency Plan	02/18/05
16	Coke Pond Chromium Evaluation	10/29/04
17	Coke Pond BMP Revision	09/24/04
18a	Human Health and Environmental Risk Assessment	11/30/04
18b	Human Health and Environmental Risk Assessment	02/11/05
18c	Human Health and Environmental Risk Assessment	06/01/05
18d	Human Health and Environmental Risk Assessment	09/02/05
19	Trigger Level Implementation Plan Revision	09/30/04
21	Financial Assurance	11/30/04

Attachment – B

Self-Monitoring Program

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION**

SELF-MONITORING PROGRAM

FOR

**TESORO REFINING AND MARKETING COMPANY
CONOCOPHILLIPS COMPANY
CHEVRON ENVIRONMENTAL SERVICES COMPANY**

**TESORO GOLDEN EAGLE REFINERY
MARTINEZ, CONTRA COSTA COUNTY**

ORDER NO. R2-2004-0056

CONSISTS OF

PART A

AND

PART B

PART A

A. AUTHORITY AND PURPOSE

For discharges of waste to land, water quality monitoring is required pursuant to the California Code of Regulations, Division 2, Title 27, Subdivision 1, Chapter 3, Subchapter 3, Sections 20380 through 20435. The principal purposes of a self-monitoring program (SMP) are: (1) to document compliance with waste discharge requirements and prohibitions established by the Regional Board, (2) to facilitate self-policing by the waste Discharger(s) in the prevention and abatement of pollution arising from the waste discharge, (3) to develop or assist in the development of effluent standards of performance, and toxicity standards, and (4) to assist the Discharger(s) in complying with the requirements of Title 27.

B. MONITORING REQUIREMENTS

Monitoring refers to the measurement and sampling of environmental media, the making of standard observations in and around waste management units (WMUs) and Class II surface impoundments (surface impoundments), the inspection of containment and control facilities, and the monitoring of waste disposed in each WMU or surface impoundment. Part B of this SMP indicates the specific types of monitoring required as well as the monitoring frequency and reporting schedule. The following defines the types of monitoring that shall be required in Part B of this SMP.

Monitoring of Environmental Media

The Regional Board shall require monitoring of any of the following environmental media:

1. Groundwater
2. Surface water (streams, stormwater runoff, etc.)
3. Leachate

Sample collection, storage, and analyses shall be performed according to the most recent version of EPA Standard Methods or in accordance with an approved sampling and analysis plan. Water and waste analyses shall be performed by a California State-approved laboratory for the required analyses. The director of the laboratory whose name appears on the certification shall supervise all analytical work in his/her laboratory and shall sign all reports of such work submitted to the Regional Board. All monitoring instruments and equipment shall be properly calibrated and maintained to ensure accuracy of measurements.

Standard Observations

Standard observations refers to observations within the limits of each WMU and surface impoundment, at their perimeter, and of the receiving waters beyond their limits. Standard observations include:

1. WMUs and surface impoundments:
 - a. Evidence of ponded water at any point on the WMU;

- b. Evidence of odors, including their presence or absence, characterization, source, and distance of travel from the WMU or surface impoundment;
 - c. Evidence of erosion at a WMU or surface impoundment; and
 - d. Daylighted waste at a WMU.
2. Perimeter of WMUs and surface impoundments:
 - a. Evidence of liquid leaving or entering the WMU or surface impoundment, estimated size of affected area and flow rate (show affected area on map);
 - b. Evidence of odors, including their presence or absence, characterization, source, and distance of travel from the WMU or surface impoundment;
 - c. Evidence of erosion at a WMU or surface impoundment; and
 - d. Daylighted waste at a WMU.
3. Receiving Waters:
 - a. Floating and suspended materials of waste origin: including their presence or absence, source, and size of affected area;
 - b. Discoloration and turbidity: description of color, source, and size of affected area;
 - c. Evidence of odors, presence or absence, characterization, source, and distance of travel from source;
 - d. Evidence of beneficial use: presence of water associated with wildlife;
 - e. Flow rate; and
 - f. Weather conditions: wind direction and estimated velocity, total precipitation.

Facilities Inspections

Facilities inspections refers to the inspection of all containment and control structures and devices associated with WMUs and surface impoundments. At this time, most units do not have these facilities. However, future closure of units will likely include construction of similar facilities. Containment and control facilities include the following:

1. Leachate Collection and Removal System(s);
2. Sedimentation Pond(s);
3. Leachate Collection Tank(s);
4. Perimeter diversion channels;
5. Underdrain system(s); and
6. Soil and groundwater remediation systems.

C. REPORTING REQUIREMENTS

Reporting responsibilities of waste Discharger(s) are specified in Sections 13225(a), 13267(b), 13383, and 13387(b) of the California Water Code and this Regional Board's Resolution No.73-16 and Title 27. The monitoring frequency and reporting schedule are indicated in Part B of this SMP. Each monitoring report shall include the following information:

1. **Transmittal Letter:** A letter transmitting essential points shall be included in each monitoring report. The transmittal letter shall discuss any violations during the reporting period and actions taken or planned to correct the problem. The letter shall also certify the completion of all monitoring requirements. The letter shall be signed by the Discharger's principal executive officer or his/her duly authorized representative, and shall include a statement by the official, under penalty of perjury, that the report is true and correct to the best of the official's knowledge.

2. **Compliance Evaluation Summary:** Each monitoring report shall include a compliance evaluation summary containing the following information:
 - a. A summary and certification of completion of all environmental media monitoring, standard observations, and facilities inspections;
 - b. A graphic presentation of the velocity and direction of groundwater flow under/around each waste management unit and surface impoundment, based upon the past and present water level elevations and pertinent visual observations;
 - c. A graphic demonstration (e.g., piezometric surface contour maps) of hydraulic containment and/or separation from groundwater beneath and around the perimeter of waste management units and surface impoundments where required;
 - d. The quantity and types of wastes disposed of during the past quarter, and the locations of the disposal operations;
 - e. A description of the waste stream including the percentage of each waste type (e.g., residential, commercial, industrial, construction/demolition, etc.);
 - e. Map(s) or aerial photograph(s) showing observation and monitoring station locations;
 - f. A written discussion of the groundwater analyses indicating any change in the quality of the groundwater. Increasing pollutant concentration trends as indicated by a Mann-Kendall non-parametric statistical analysis of concentration trends at the point of compliance for any WMU or surface impoundment shall be noted and flagged, and any exceedance of Trigger Levels within any perimeter segment well shall be noted and flagged;
 - g. An evaluation of the effectiveness of the leachate monitoring/control facilities, including a summary of leachate management procedures, an evaluation of leachate buildup within each WMU and surface impoundment, a summary of leachate volumes removed from the units, and a discussion of the leachate disposal methods and leachate containment capacity for each WMU and surface impoundment; and
 - h. The signature of the laboratory director whose name appears on the laboratory certification, indicating that he/she has supervised all analytical work in his/her laboratory.

3. **Appendices:** Include the following information in appendices, unless the information is already contained in an approved Sampling and Analysis Plan:
 - a. New boring and well logs;
 - b. Method and time of water level measurements;
 - c. Purging methods and results including the type of pump used, pump placement in the well, pumping rate, equipment and methods used to monitor field pH, temperature, and conductivity, calibration of the field equipment, pH, temperature,

- conductivity, and turbidity measurements, well recovery time, and method of disposing of the purge water;
- d. Sampling procedures, field and travel blanks, number and description of duplicate samples, type of sample containers and preservatives used, the date and time of sampling, the name and qualifications of the person actually taking the samples, and any other relevant observations;
 - e. Documentation of laboratory results, analytical methods, detection limits, and quality assurance/quality control (QA/QC) procedures for the required sampling, including:
 - (1) Laboratory statements of results of analyses;
 - (2) Descriptions of analytical methods used (note, if methods other than EPA approved methods or Standard Methods are used, the exact methodology must be submitted for review and approval by the Executive Officer prior to use);
 - (3) Actual detection limits for each sample results (**The methods of analyses and detection limits must be appropriate for the expected contaminants and concentrations**); and
 - (4) Laboratory QA/QC information and results including analytical methods, detection limits, recovery rates, explanations for low recovery rates (less than 80%), equipment and method blanks, spikes and surrogates, and QA/QC sample frequency.
 - f. A semiannual Mann-Kendall non-parametric statistical analysis of concentration trends.

The appendices need not include the actual laboratory analytical data sheets and QA/QC report summary, however, this information shall be provided upon request.

D. ANNUAL REPORTING

The Discharger(s) shall submit an annual self-monitoring report to the Regional Board covering the previous calendar year. The annual report must summarize all monitoring, investigation, and remedial activities that have occurred in the previous year. The annual report shall include the following information **for each monitoring event during the year** required pursuant to this self-monitoring program, in addition to the transmittal letter and appendices described in Sections C.1 and C.3 of this self-monitoring program:

1. **Graphic Presentation:** Include site maps (plot plans) for each aquifer or water-bearing zone monitored that are drawn to a scale that remains constant from reporting period to reporting period. These maps shall include the following information:
 - a. Known or probable contaminant sources;
 - b. Well locations;
 - c. Groundwater elevation contours;
 - d. Inferred groundwater flow direction(s);
 - e. Extent of phase-separated product (NAPL);
 - f. Extent of dissolved chemical constituents (isoconcentration maps); and
 - g. Appropriate analytical results.

Line or bar graphs are helpful to illustrate variations in groundwater elevations, phase-separated product thickness, and dissolved chemical concentrations with time. Geologic cross sections are required if new data is available and/or the previous interpretation of subsurface conditions has changed. When required, geologic cross sections shall include the following:

- h. Vertical and lateral extent of contamination;
 - i. Contaminant sources;
 - j. Geologic structures;
 - k. Soil lithology;
 - l. Water table/piezometric surfaces;
 - m. Sample locations;
 - n. Sample analytical results; and
 - o. Subsurface utilities and any other potential natural or manmade conduits for contaminant migration.
2. **Tabular Presentation:** Present all of the following data in one or more tables to show a chronological history and allow quick and easy reference:
- a. Well designations;
 - b. Well location coordinates (latitude and longitude);
 - c. Well construction (including top of well casing elevation, total well depth, screen interval depth below ground surface, and screen interval elevation);
 - d. Groundwater depths;
 - e. Groundwater elevations;
 - f. Horizontal groundwater gradients;
 - g. Vertical groundwater gradients (including comparison wells from different zones);
 - h. Phase-separated product elevations;
 - i. Phase-separated product thicknesses;
 - j. Current analytical results (including analytical method and detection limits for each constituent);
 - k. Historical analytical results (including the past five years unless otherwise requested);
 - l. Measurement dates;
 - m. Groundwater extraction, including:
 - (1) Average daily extraction rate;
 - (2) Total volume extracted for monitoring period; and
 - (3) Cumulative total volume extracted since system inception.
 - n. Contaminant mass removal, including:
 - (1) Average daily removal rate;
 - (2) Total mass removed for monitoring period; and
 - (3) Cumulative total mass removed since system inception.
 - o. Leachate volumes removed and disposed of, including leachate buildup in disposal units
3. **Discussion:** Provide a discussion of the field and laboratory results that includes the following information:

- a. Data Interpretations;
- b. Conclusions;
- c. Recommendations;
- d. Newly implemented or planned investigations & remedial measures;
- e. Data anomalies;
- f. Variations from protocols;
- g. Conditions of wells; and
- h. Effectiveness of leachate monitoring and control facilities.

E. CONTINGENCY REPORTING

1. The Discharger(s) shall report by telephone to the Regional Board, any discharge from the disposal area immediately after it is discovered. The Discharger(s) shall submit a written report with the Regional Board within five days of discovery of any discharge. The written report shall contain the following information:
 - a. a map showing the location(s) of discharge;
 - b. approximate flow rate;
 - c. nature of effects (e.g., all pertinent observations and analyses); and
 - d. corrective measures underway or proposed.
2. The Discharger(s) shall submit a written report to the Regional Board within seven days of determining that a statistically significant difference occurred between a self-monitoring sample set and an approved Water Quality Protection Standard (WQPS) or a trigger level exceedance in a perimeter segment-monitoring well. The written report shall indicate what WQPS(s) have been exceeded. The Discharger(s) shall immediately resample at the compliance point(s) where this difference has been found and analyze another sample set of at least four portions split in the laboratory from the source sample.
3. If re-sampling and analysis confirms the earlier finding of a statistically significant difference between self-monitoring results and WQPS(s) the Discharger(s) shall submit to the Regional Board an amended Report of Waste Discharge as specified in Title 27, Section 20420 for establishment of an Evaluation Monitoring program meeting the requirements of Title 27, Section 20425.
4. Within 180 days of determining statistically significant evidence of a release, the Discharger(s) shall submit to the Regional Board an engineering feasibility study for a Corrective Action Plan (CAP) necessary to meet the requirements of Title 27, Section 20430. At a minimum, the feasibility study shall contain a detailed description of the corrective action measures that could be taken to achieve background concentrations for all constituents of concern.

F. ELECTRONIC REPORTING FORMAT

In addition to print submittals, all reports submitted pursuant to this self-monitoring program must be submitted as electronic files in PDF format. The Regional Board has implemented a

document imaging system, which is ultimately intended to reduce the need for printed report storage space and streamline the public file review process. Documents in the imaging system may be viewed, and print copies made, by the public, during file reviews conducted at the Regional Board's office. PDF files can be created by converting the original electronic file format (e.g., Microsoft Word) and/or by scanning printed text, figures & tables.

Monitoring results shall also be provided electronically in Microsoft Excel[®] or similar spreadsheet format to provide an easy to review chronological summary of monitoring data, and to facilitate data computations and/or plotting that Regional Board staff may undertake during their review. Data tables submitted in electronic spreadsheet format will not be included in the case file for public review. Electronic tables shall include the following information:

1. Well designations;
2. Well location coordinates (latitude and longitude);
3. Well construction (including top of well casing elevation, total well depth, screen interval depth below ground surface, and screen interval elevation);
4. Groundwater depths and elevations (water levels);
6. Phase-separated product thicknesses and elevations;
8. Current analytical results by constituent of concern (including detection limits for each constituent);
9. Historical analytical results (including the past five years unless otherwise requested);
and
10. Measurement dates.

All electronic files must be submitted on CD or diskette and included with the print report or uploaded to the Water Board's FTP site.

G. MAINTENANCE OF WRITTEN RECORDS

Information required pursuant to this Self-Monitoring Program shall be maintained by the Discharger(s) for a minimum of five years. The five-year period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by the Regional Board.

PART B

A. GENERAL MONITORING LOCATIONS AND FREQUENCY

1. Groundwater, Surface Water, Storm Water, Leachate, and Landfill Gas

Environmental media shall be monitored at locations to be proposed by Discharger(s) twice per year and as required by facility NPDES permit

2. Standard Observations

Standard observations shall be made for all WMUs and surface impoundments once per week and the results of the observations shall be documented.

3. Facilities Inspections

All WMU and surface impoundment facilities shall be inspected at least once per week and the results of the inspections shall be documented.

4. Waste Monitoring

Waste monitoring in surface impoundments shall occur as specified in Discharger's NPDES permit and the results of the monitoring shall be documented.

B. DESCRIPTION OF OBSERVATION STATIONS AND SCHEDULE OF OBSERVATIONS

(to be proposed by Discharger(s) in revised Self-Monitoring Plan)

C. POND WASTEWATER MONITORING

1. Observe monthly and record a description of wastewater to include: type and volume of wastewater.

D. ON-SITE OBSERVATIONS

(to be proposed by Discharger(s) in revised Self-Monitoring Plan)

Stations XX to XX: Weekly standard observations at receiving water stations (see section B., 2), a. above).

Stations XX to XX: Weekly standard observations of the WMUs and surface impoundment perimeter (see section B above).

Stations XX to XX: Weekly Standard observations of the WMUs and surface impoundments (see section B above).

E. SURFACE WATER, STORM WATER, GROUNDWATER, WASTEWATER, AND LEACHATE MONITORING

The Discharger(s) shall sample surface water, storm water, groundwater, wastewater, and leachate if not completed as part of NPDES permit. Sampling frequency and analytes shall be proposed in revised SMP.

F. FACILITIES MONITORING

The Discharger(s) shall inspect all facilities to ensure proper and safe operation **once per week** and report **biannually**. The facilities to be monitored shall include, but not be limited to:

- a) Leachate Collection and Removal System;
- b) Valves and piping in wastewater transfer piping;
- c) Exposed WMU or surface impoundment liners;
- d) Sedimentation ponds;
- e) Leachate collection tanks;
- f) Perimeter diversion trenches or channels;
- g) Underdrain systems; and
- h) Groundwater remediation systems.

G. REPORTING SCHEDULE

The Discharger(s) shall submit self-monitoring reports per the schedule indicated in Table B. Reports due at the same time may be combined into one report for convenience, as long as monitoring activities and results pertaining to each monitoring period are clearly distinguishable.

Table B Reports and Due Dates

Report	Period Covered	Period That Samples Are to be Collected	Report Due Date
Winter/Spring	January 1 to June 30	March 1 to April 30	June 30 th
Summer/Fall	July 1 to December 31	September 1 to October 31	December 30 th
Annual	January 1 To December 31	-	December 30 th

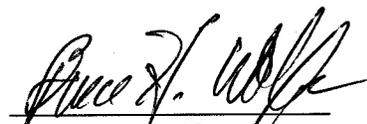
Note: The annual report can be combined with the Discharger's summer/fall semiannual report.

H. CURRENT APPROVED ANALYTES FOR SMP

Attached Tables 1 – 3 summarize the current analytes fro the current SMP.

I, Bruce H. Wolfe, Executive Officer, hereby certify that the foregoing Self-Monitoring Program:

1. Has been developed in accordance with the procedures set forth in this Regional Board's Resolution No. 73-16 in order to obtain data and document compliance with waste discharge requirements established in this Regional Board's Order No. R2-2004-0056.
2. Is effective on the date shown below.
3. May be reviewed or modified at any time subsequent to the effective date, upon written notice from the Executive Officer.



Bruce H. Wolfe
Executive Officer

Date Ordered: July 21, 2004

Attachments: Tables 1-3

Table 1: Interior Wells and analytical parameters

Well ID	SWMU/AOC	Analytical Parameters
CHW-23	SWMU-1	As; Cr; Cr+6; Pb; organo Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-12A	SWMU-2	As; Cr; Cr+6; Pb; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-13A	SWMU-3	As; Cr; Cr+6; Pb; organo Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
CHW-19	SWMU-3	As; Cr; Cr+6; Pb; organo Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
WCC-36S	SWMU-4	As; Cr; Cr+6; Pb; organo Pb; Hg; Ni; V; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
CHW-22	SWMU-5	As; Cr; Cr+6; Pb; organo Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
WCC-34S	SWMU-5	As; Cr; Cr+6; Pb; organo Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
WCC-30S	SWMU-6	Sb; As; Cr; Cr+6; Pb; Hg; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
WCC-31S	SWMU-6	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
CHW-2	SWMU-8	As; Cr; Cr+6; Pb; organo Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-29S	SWMU-8	As; Cr; Cr+6; Pb; organo Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-35A	SWMU-8	As; Cr; Cr+6; Pb; organo Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
WCC-28S	SWMU-8	As; Cr; Cr+6; Pb; organo Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-34A	SWMU-9	Sb; As; Ba; Cd; Cu; Cr; Cr+6; Pb; organo Pb; Hg; Mo; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-29B	SWMU-10&14	Sb; As; Cr; Cr+6; Pb; organo Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-16B	SWMU-11	Sb; As; Cr; Cr+6; Pb; organo Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
WCC-25S	SWMU-11	Sb; As; Cr; Cr+6; Pb; organo Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
CHW-13	SWMU-13	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-32A	SWMU-13	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-33A	SWMU-13	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
WCC-16S	SWMU-13	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
WCC-14M	SWMU-14	As; Cr; Cr+6; Pb; organo Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
WCC-19M	SWMU-14	As; Cr; Cr+6; Pb; organo Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
WCC-20S	SWMU-14	As; Cr; Cr+6; Pb; organo Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
CHW-11	SWMU-15	As; Cr; Cr+6; Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
CHW-16	SWMU-15	As; Cr; Cr+6; Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
CHW-24	SWMU-15	As; Cr; Cr+6; Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
CHW-25	SWMU-15	As; Cr; Cr+6; Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-24A	SWMU-17	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-24K	SWMU-17	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-25A	SWMU-17	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-25K	SWMU-17	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-26A	SWMU-17	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-26K	SWMU-17	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-27K	SWMU-17	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-28A	SWMU-17	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-28K	SWMU-17	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-39A	SWMU-17	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-40K	SWMU-17	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-41K	SWMU-17	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-42K	SWMU-17	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-21B	SWMU-16	As; Cr; Cr+6; Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
WCC-1M	SWMU-16	As; Cr; Cr+6; Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
WCC-4M	SWMU-16	As; Cr; Cr+6; Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
WCC-5M	SWMU-16	As; Cr; Cr+6; Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-19B	SWMU-31	Sb; As; Cr; Cr+6; Pb; organo Pb; Hg; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-20B	SWMU-31	Sb; As; Cr; Cr+6; Pb; organo Pb; Hg; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
CHW-14	SWMU-32	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
CHW-26	SWMU-32	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-36A	SWMU-32	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)

MK-37A	SWMU-32	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
CHW-17	Deacon's Pond	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
CHW-18	Deacon's Pond	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
CHW-20	Cardox	As; Cr; Cr+6; Pb; Ni; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
CHW-4	API separator	As; Cr; Cr+6; Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-15A	Hasting's Slough	Sb; As; Cr; Cr+6; Pb; Hg; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-15B	Hasting's Slough	Sb; As; Cr; Cr+6; Pb; Hg; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
CHW-5	FPLH Pool	As; Cr; Cr+6; Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
CHW-7	FPLH Pool	As; Cr; Cr+6; Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
CHW-3	OWC	As; Cr; Cr+6; Pb; organo Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
CHW-8	OWC	As; Cr; Cr+6; Pb; organo Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
CHW-10	OWC	As; Cr; Cr+6; Pb; organo Pb; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-14A	Tract 6 north	Sb; As; Cr; Cr+6; Pb; Hg; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-14B	Tract 6 north	Sb; As; Cr; Cr+6; Pb; Hg; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-6A	Tract 7 east	Sb; As; Cr; Cr+6; Pb; Hg; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-7A	Tract 7 east	Sb; As; Cr; Cr+6; Pb; Hg; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-8A	Tract 7 east	Sb; As; Cr; Cr+6; Pb; Hg; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-9A	Tract 7 east	Sb; As; Cr; Cr+6; Pb; Hg; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-10A	Tract 7 east	Sb; As; Cr; Cr+6; Pb; Hg; Ni; Se; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)
MK-5B	background	Sb; As; Cr; Cr+6; Pb; Hg; Mo; Ni; Se; Ag; V; Zn; BTEX; TPH(C4-C12); TPH(C13-C22)

Well ID	Perimeter Segment	Parameters for Semi-Annual Monitoring
T3-A20	1 & 16	Sb, As, Cr, Cr+6, Cu, Pb, Ni, Se, Ti, V, Zn, btex, carbon disulfide, 4-methylphenol, naphthalene, TCE, PCE, 1,1-DCE, 1,2-DCE
MK-21A	1	Sb, As, Cr, Cr+6, Cu, Pb, Ni, Se, Ti, V, Zn, btex, carbon disulfide, naphthalene
WCC-6S	1	Sb, As, Cr, Cr+6, Cu, Pb, Ni, Se, Ti, V, Zn, btex, carbon disulfide, naphthalene
CHW-15	1	Sb, As, Cr, Cr+6, Cu, Pb, Ni, Se, Ti, V, Zn, btex, carbon disulfide, naphthalene
T3-A14	1	Sb, As, Cr, Cr+6, Cu, Pb, Ni, Se, Ti, V, Zn, btex, carbon disulfide, naphthalene
MK-30A	1	Sb, As, Cr, Cr+6, Cu, Pb, Ni, Se, Ti, V, Zn, btex, carbon disulfide, naphthalene
MK-22A	1	Sb, As, Cr, Cr+6, Cu, Pb, Ni, Se, Ti, V, Zn, btex, carbon disulfide, naphthalene
T3-A7	1 & 2	Sb, As, Ba, Cr, Cr+6, Cu, Pb, organo Pb, Ni, Se, Ti, V, Zn, btex, carbon disulfide, naphthalene
MK-20A	2	Sb, As, Ba, Cr, Cr+6, Cu, Pb, organo Pb, Ni, Se, Ti, V, Zn, btex, carbon disulfide, naphthalene
T3-A3	2	Sb, As, Ba, Cr, Cr+6, Cu, Pb, organo Pb, Ni, Se, Ti, V, Zn, btex, carbon disulfide, naphthalene
WCC-11S	2	Sb, As, Ba, Cr, Cr+6, Cu, Pb, organo Pb, Ni, Se, Ti, V, Zn, btex, carbon disulfide, naphthalene
WCC-12S	2	Sb, As, Ba, Cr, Cr+6, Cu, Pb, organo Pb, Ni, Se, Ti, V, Zn, btex, carbon disulfide, naphthalene
T1-A12	2 & 3	Sb, As, Ba, Cr, Cr+6, Cu, Co, Pb, organo Pb, Ni, Se, Ag, Ti, V, Zn btex, carbon disulfide, naphthalene
T1-A14	3	Sb, As, Cr, Cr+6, Co, Cu, Pb, organo Pb, Ni, Se, Ti, Ag, V, Zn, btex, phenol
T1-A1	3 & 4	Sb, As, Cr, Cr+6, Co, Cu, Pb, organo Pb, Ni, Se, Ti, Ag, V, Zn, btex, phenol
CHW-1	4	Sb, As, Cr, Cr+6, Co, Cu, Pb, organo Pb, Ni, Se, Ti, Ag, V, Zn, btex, phenol
WCC-24S	4	Sb, As, Cr, Cr+6, Co, Cu, Pb, organo Pb, Ni, Se, Ti, Ag, V, Zn, btex, phenol
T1-A2	4 & 5	Sb, As, Cr, Cr+6, Co, Cu, Pb, organo Pb, Ni, Se, Ti, Ag, V, Zn, btex, phenol
T1-A3	5	Sb, Cr, Pb, Ni, tex
T1-A13	5	Sb, Cr, Pb, Ni, tex
T1-A4	5	Sb, Cr, Pb, Ni, tex
T1-A5	5	Sb, Cr, Pb, Ni, tex
WCC-33S	5 & 6	Sb, As, Cr, Pb, organo Pb, Ni, Zn, tex
MK-38A	6	Sb, As, Pb, organo Pb, Zn, tex
T1-A8	6	Sb, As, Pb, organo Pb, Zn, tex
T1-A10	6 & 7	Sb, As, Pb, organo Pb, Zn, tex
T6-A1	7	Zn
T6-A3	7 & 8	Cu, Pb, organo Pb, Zn
T6-A5	8	Cu, Pb, organo Pb
T6-A6	8	Cu, Pb, organo Pb
CHW-21	8 & 9	Cu, Pb, organo Pb, MTBE, btex
MW-151	9	Cu, Pb, MTBE, btex
T6-A7	9 & 10	Cu, Pb, MTBE, btex
T6-A8	10	Cu, Pb, MTBE, btex
T6-A9	10	Cu, Pb, MTBE, btex
MW-157	10	Cu, Pb, MTBE, btex
MK-5A	10 & 11	As, Cu, Pb, Zn, MTBE, btex, cresols, naphthalene, Sb, Cr, Cr+6, Co, Hg, Mo, Ni, Se, Ag, Ti

WCC-140	11	As, Pb, Zn, btex, cresols, naphthalene
EEl-31	11	As, Pb, Zn, btex, cresols, naphthalene
MW145	11	As, Pb, Zn, btex, cresols, naphthalene
MW-146	11 & 12	As, Pb, Zn, btex, cresols, naphthalene
4-6	12	Pb, btex
MK-11A	12 & 13	Cu, Ag, btex, organo Pb
MW-161	13	Cu, Ag, btex, organo Pb
MW-149	13	Cu, Ag, btex, organo Pb
T4-A1	13 & 14	As, Cu, Ag, btex, carbon disulfide, organo Pb
MK-31A	14 & 15	As, Cu, Ni, Ag, btex, carbon disulfide, organo Pb
T2-A7	15	As, Ni, Ag, carbon disulfide
T2-A5	15	As, Ni, Ag, carbon disulfide
T2-A3	15 & 16	As, Cr, Pb, Ni, Ag, V, Zn, btex, carbon disulfide, 4-methylphenol, naphthalene
T2-A2	16	Sb, As, Cr, Cr+6, Pb, Ni, V, Zn, btex, carbon disulfide, 4-methylphenol, naphthalene
MK-17SS	16	Sb, As, Cr, Cr+6, Pb, Ni, V, Zn, btex, carbon disulfide, 4-methylphenol, naphthalene
EEl-68	16	Sb, As, Cr, Cr+6, Pb, Ni, V, Zn, btex, carbon disulfide, 4-methylphenol, naphthalene
MK-18A	16	Sb, As, Cr, Cr+6, Pb, Ni, V, Zn, btex, carbon disulfide, 4-methylphenol, naphthalene
T1-C6	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
T1-C5	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
T1-C1	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
T1-C4	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
T1-C3	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
T1-C2	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
MK-18C	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
MK-21C	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
MK-23C	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
T3-C1	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
T2-C1	S. Alluvial	Sb, Ba, Cr, Co, Cu, Pb, Mo, Ni, Se, V, btex, carbon sulfide, 1,2-DCA
T4-C1	S. Alluvial	Sb, Ba, Cr, Co, Cu, Pb, Mo, Ni, Se, V, btex, carbon sulfide, 1,2-DCA
MK-14C	S. Alluvial	Sb, Ba, Cr, Co, Cu, Pb, Mo, Ni, Se, V, btex, carbon sulfide, 1,2-DCA
T6-C1	S. Alluvial	Sb, Ba, Cr, Co, Cu, Pb, Mo, Ni, Se, V, btex, carbon sulfide, 1,2-DCA
MK-5C	S. Alluvial	Sb, Ba, Cr, Co, Cu, Pb, Mo, Ni, Se, V, btex, carbon sulfide, 1,2-DCA

Bold type indicates analyte will be added to sample list.

Table 3: 5-year analytical parameters, PGMP

Well ID	Segment	Analytical Parameters for 5-year Monitoring
T3-A20	1 & 16	Sb, As, Cr, Cr+6, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, Cresols, 2,4DMP, naphthalene
MK-21A	1	Sb, As, Cr, Cr+6, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, Cresols, 2,4DMP, naphthalene
WCC-6S	1	Sb, As, Cr, Cr+6, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, Cresols, 2,4DMP, naphthalene
CHW-15	1	Sb, As, Cr, Cr+6, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, Cresols, 2,4DMP, naphthalene
T3-A14	1	Sb, As, Cr, Cr+6, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, Cresols, 2,4DMP, naphthalene
MK-30A	1	Sb, As, Cr, Cr+6, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, Cresols, 2,4DMP, naphthalene
MK-22A	1	Sb, As, Cr, Cr+6, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, Cresols, 2,4DMP, naphthalene
T3-A7	1 & 2	Sb, As, Ba, Cr, Cr+6, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, Cresols, 2,4 DMP, naphthalene, Organo Pb
MK-20A	2	Sb, As, Ba, Cr, Cr+6, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, MEK, Organo Pb
T3-A3	2	Sb, As, Ba, Cr, Cr+6, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, MEK, Organo Pb
WCC-11S	2	Sb, As, Ba, Cr, Cr+6, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, MEK, Organo Pb
WCC-12S	2	Sb, As, Ba, Cr, Cr+6, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, MEK, Organo Pb
T1-A12	2 & 3	Sb, As, Ba, Cr, Cr+6, Cu, Pb, Mo, Ni, Se, Ag, Ti, V, Zn, btex, MEK, Cresols, Organo Pb
T1-A14	3	Sb, As, Ba, Cr, Cr+6, Cu, Pb, Mo, Ni, Se, Ag, Ti, V, Zn, btex, MEK, Cresols, Organo Pb
T1-A1	3 & 4	Sb, As, Ba, Cr, Cr+6, Cu, Pb, Mo, Ni, Se, Ag, Ti, V, Zn, btex, MEK, Cresols, Organo Pb
CHW-1	4	Sb, As, Ba, Cr, Cr+6, Cu, Pb, Mo, Ni, Se, Ag, Ti, V, Zn, btex, MEK, Cresols, Organo Pb
WCC-24S	4	Sb, As, Ba, Cr, Cr+6, Cu, Pb, Mo, Ni, Se, Ag, Ti, V, Zn, btex, MEK, Cresols, Organo Pb
T1-A2	4 & 5	Sb, As, Ba, Cr, Cr+6, Cu, Pb, Mo, Ni, Se, Ag, Ti, V, Zn, btex, MEK, Cresols, Organo Pb
T1-A3	5	Sb, Cr, Co, Pb, Ni, Se, V, Zn, tex
T1-A13	5	Sb, Cr, Co, Pb, Ni, Se, V, Zn, tex
T1-A4	5	Sb, Cr, Co, Pb, Ni, Se, V, Zn, tex
T1-A5	5	Sb, Cr, Co, Pb, Ni, Se, V, Zn, tex
WCC-33S	5 & 6	Sb, As, Cr, Cr+6, Co, Pb, Mo, Ni, Se, V, Zn, tex, MEK, Organo Pb
MK-38A	6	Sb, As, Cr ⁺⁶ , Mo, Se, Zn, tex, MEK, Pb, Organo Pb
T1-A8	6	Sb, As, Cr ⁺⁶ , Mo, Se, Zn, tex, MEK, Pb, Organo Pb
T1-A10	6 & 7	Sb, As, Cr+6, Mo, Se, V, Zn, tex, carbon disulfide, MEK, Pb, Organo Pb
T6-A1	7	Sb, Cr+6, V, Zn, carbon disulfide, MEK
T6-A3	7 & 8	Sb, Cr+6, Cu, V, Zn, carbon disulfide, MEK, Pb, Organo Pb
T6-A5	8	Cu, V, Zn, carbon disulfide, Pb, Organo Pb
T6-A6	8	Cu, V, Zn, carbon disulfide, Pb, Organo Pb
CHW-21	8 & 9	Cu, Pb, V, Zn, MTBE, btex, carbon disulfide, Organo Pb
MW-151	9	Cu, Pb, V, Zn, MTBE, btex, carbon disulfide
T6-A7	9 & 10	Cu, Pb, V, Zn, MTBE, btex, carbon disulfide
T6-A8	10	Cu, Pb, V, Zn, MTBE, btex, carbon disulfide

Table 3: 5-year analytical parameters, PGMP

Well ID	Segment	Analytical Parameters for 5-year Monitoring
T6-A9	10	Cu, Pb, V, Zn, MTBE, btex, carbon disulfide
MW-157	10	Cu, Pb, V, Zn, MTBE, btex, carbon disulfide
MK-5A	10 & 11	As, Cu, Pb, V, Zn, MTBE, btex, carbon disulfide, cresols, 2,4-DMP, naphthalene, Sb, Cr, Cr+6, Co, Hg, Mo, Ni, Se, Ag, Tl
WCC-140	11	As, Pb, Zn, btex, carbon disulfide, cresols, 2,4-DMP, naphthalene
EELI-31	11	As, Pb, Zn, btex, carbon disulfide, cresols, 2,4-DMP, naphthalene
MW-145	11	As, Pb, Zn, btex, carbon disulfide, cresols, 2,4-DMP, naphthalene
MW-146	11 & 12	As, Pb, Se, Zn, btex, carbon disulfide, cresols, 2,4-DMP, naphthalene
4-6	12	As, Pb, Se, Zn, btex, carbon disulfide, naphthalene
MK-11A	12 & 13	As, Cu, Se, Ag, V, Zn, btex, carbon disulfide, naphthalene, Organo Pb
MW-161	13	As, Cu, Se, Ag, V, Zn, btex, carbon disulfide, Organo Pb
MW-149	13	As, Cu, Se, Ag, V, Zn, btex, carbon disulfide, Organo Pb
T4-A1	13 & 14	As, Cu, Se, Ag, V, Zn, btex, carbon disulfide, Organo Pb
MK-31A	14 & 15	As, Cu, Se, Ag, V, Zn, btex, carbon disulfide, Organo Pb
T2-A7	15	As, Ni, carbon disulfide
T2-A5	15	As, Ni, carbon disulfide
T2-A3	15 & 16	As, Cr, Pb, Ni, V, Zn, btex, carbon disulfide, MEK, Cresols, 2,4-DMP, naphthalene
T2-A2	16	Sb, As, Cr, Cr+6, Pb, Ni, V, Zn, btex, carbon disulfide, MEK, Cresols, 2,4-DMP, naphthalene
MK-17SS	16	Sb, As, Cr, Cr+6, Pb, Ni, V, Zn, btex, carbon disulfide, MEK, Cresols, 2,4-DMP, naphthalene
EELI-68	16	Sb, As, Cr, Cr+6, Pb, Ni, V, Zn, btex, carbon disulfide, MEK, Cresols, 2,4-DMP, naphthalene
MK-18A	16	Sb, As, Cr, Cr+6, Pb, Ni, V, Zn, btex, carbon disulfide, MEK, Cresols, 2,4-DMP, naphthalene
T1-C6	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
T1-C5	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
T1-C1	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
T1-C4	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
T1-C3	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
T1-C2	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
MK-18C	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
MK-21C	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
MK-23C	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
T3-C1	N. Alluvial	Sb, As, Cr, Cr+6, Co, Cu, Pb, Mo, Ni, Se, Ti, V, Zn, btex, carbon disulfide, MEK, phenol, naphthalene
T2-C1	S. Alluvial	Sb, Ba, Cr, Co, Cu, Pb, Mo, Ni, Se, V, btex, carbon sulfide, 1,2-DCA
T4-C1	S. Alluvial	Sb, Ba, Cr, Co, Cu, Pb, Mo, Ni, Se, V, btex, carbon sulfide, 1,2-DCA
MK-14C	S. Alluvial	Sb, Ba, Cr, Co, Cu, Pb, Mo, Ni, Se, V, btex, carbon sulfide, 1,2-DCA
T6-C1	S. Alluvial	Sb, Ba, Cr, Co, Cu, Pb, Mo, Ni, Se, V, btex, carbon sulfide, 1,2-DCA

Table 3: 5-year analytical parameters, PGMP

Perimeter

Well ID Segment Analytical Parameters for 5-year Monitoring

MK-5C S. Alluvial Sb, Ba, Cr, Co, Cu, Pb, Mo, Ni, Se, V, btex, carbon sulfide, 1,2-DCA