

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

ORDER NO. 97-027

**UPDATED WASTE DISCHARGE REQUIREMENTS AND RESCISSION OF
ORDER NO. 95-209
UNOCAL CORPORATION
RODEO, CONTRA COSTA COUNTY**

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

1. Unocal Corporation, 76 Products Company, referred to herein as the discharger, owns and operates a petroleum refinery (San Francisco Refinery) located in Rodeo, Contra Costa County as shown on Figure 1. The refinery produces fuels and lubricants and is classified as a lube refinery as defined by the U. S. Environmental Protection Agency in 40 CFR 419.40. Daily crude throughput consists of approximately 90,000 barrels of oil. The refinery began operations at this location in 1896. Wastes generated from the refining and manufacturing processes were disposed of at various locations at the refinery in the past.

PURPOSE OF UPDATING ORDER

2. The primary purpose of this Order is to establish schedules for the investigations and development of remediation plans for the next phase of soil and groundwater remediation at the facility. The primary remediation projects consist of: the installation of aboveground petroleum tank leak detection systems, and the remediation of various petroleum impacted groundwater sites located at the refinery.

SITE DESCRIPTION

3. The site is in a flat floored valley lying between Crockett and Rodeo adjacent to San Pablo Bay. The valley drains an area of approximately 1,100 acres, all part of the refinery property. The valley is a syncline with an eastwest axis dipping to the west towards San Pablo Bay. The formations of the northern limb dip almost vertically and the formations of the southern limb dip at an approximate angle of 35 degrees. More than 95% of the area drainage flows towards San Pablo Bay. Some small amount of drainage flows northward into Canyon Del Cierbo, towards the north. The site is bisected by Highway I-80 with approximately 40% located west of the highway, the area hosting the refinery and the majority of storage tanks. The area east of I-80 is mostly unutilized, except some portions which were utilized for waste disposal and hosts the seasonal products storage tanks.

SITE HISTORY

4. On December 13, 1989 the Board adopted Waste Discharge Order 89-180 ordering the discharger to further investigate the onsite waste management units, undertake plume tracking at the Land Treatment Area, investigate potential leakage from the

Primary Storm, Main Storm and the Effluent Safety Basins, detail the geology of the site, increase perimeter monitoring and determine the extent of floating hydrocarbon pools found in the western part of the refinery, in close proximity to the San Pablo Bay shoreline. The Board adopted Site Cleanup Order No. 93-046 on May 19, 1993 requiring the discharger to prepare a corrective studies work plan to prevent migration of polluted groundwater into San Pablo Bay, perform additional groundwater monitoring at the Seasonal Products Tank Farm, develop a recovery system for floating hydrocarbons, make an assessment of the acceptability of existing monitoring wells and install several additional wells.

GEOLOGIC SETTING OF THE SITE

5. In descending stratigraphic order, the lithologic units of the bay sediments that are represented along the Bay front are fill, bay mud, bay sand and old bay mud. The hydrogeologic units of the bay sand and bay mud are significantly different and an understanding of their distribution is critical in performing a groundwater quality monitoring program. The distribution of these major lithologic units deviates from this sequence in some areas where the bay mud or bay sand are absent. There also is considerable spatial variation of the thickness of these units. These upper unconsolidated units overly the nearly flat lying Montezuma Formation composed of a series of estuarine and continental deposits which overlies the downward warped consolidated Miocene San Pablo Group of sediments forming a syncline. Geotechnical borings identified two major buried valleys beneath the bay front sediments. These two valleys are bayward extensions of the buried drainages which follow the synclinal axis of the San Pablo Group and lie beneath the Primary and Main Storm Basins and extend underneath the Effluent Safety Basin.
6. Coarse bay sand was deposited in the area of present day San Pablo Avenue which formed an elevated beach ridge. Further from the shoreline in deeper water the beach sand graded into finer grained sand. The bay front, previous to construction of the Southern Pacific Railroad, was an embayment created by the presently buried stream discharges which was cut-off from the Bay by the railroad embankment. Unocal disposed of various wastes and placed fill in this depression to bring it up to grade. The elevated bay sand is not overlain by bay mud, whereas the finer grained sand was deposited in deeper water and is covered by bay mud.
7. Groundwater south of the P G & E saltwater outfall occurs from 6 to 10 feet above mean sea level along most areas of the bay front, with the gradient towards San Pablo Bay. There are two water-bearing zones near the bay front, the A zone which hosts the water table and the deeper bay sand and the B zone. The A zone occurs in bay mud deposits which are overlain by fill or occurs in the fill itself. The lower water bearing zone (B zone) occurs below the bay mud in shallow surface drainages of the San Pablo Formation which hosts fine to very fine grained bay sand deposits varying in thickness from 4 to 8 feet. This fine grained sand extends towards the bay front and underlies a short section of the extraction trench. The A zone is located in bay sand or fill, in areas where the bay mud is absent, and in bay mud and fill areas where bay mud is present. In most areas of the bay front the groundwater table is within the low permeability bay mud and fill and flow of contaminants in the groundwater table is slow. The fine grained deeper bay sand of the B zone has low

permeability and contaminant flow is very slow. The B zone becomes finer and less hydraulically conductive near the bay front.

8. The main groundwater basin on site underlies the San Francisco Refinery area. The basin occupies the area underlain by the axis of the syncline and groundwater gradient has a general north-west direction. The basin drains into San Pablo Bay. A smaller groundwater basin on site is the Tormey groundwater basin which is present in the northeast of the site along the Tormey Hill ridge with groundwater gradient producing migration into Canyon de Cierbo. This basin underlies a small portion of the upper tank farm. (Figure 2)
9. In 1994, the discharger installed approximately 2,500 linear feet of groundwater extraction trenches along the property boundary near the present day bay shore. The extraction trench is designed to capture contaminated groundwater and floating hydrocarbons migrating within the A zone into San Pablo Bay. The trench is tied into topographically elevated basement rocks at each end to prevent groundwater from flowing around the trench terminals. This Order requires the discharger to install additional remedial systems at the refinery.
10. The objectives of the groundwater quality program are:
 - 1) Monitoring of off-site contamination migration pathways located near the perimeter of the refinery.
 - 2) Monitoring of source areas in the interior of the refinery where hydrocarbons may be present in recoverable quantities (e.g. aboveground storage tanks with a history of bottom repairs).
 - 3) Monitoring at site interior Waste Management Units (WMUs).

ABOVEGROUND PETROLEUM STORAGE TANKS

11. The Discharger operates several aboveground petroleum storage tanks at the facility. The tanks are required to comply with the requirements of Chapter 6.67 Section 25270 of the Health and Safety Code, and with Part 112, Title 40 of the Federal Code of Regulations. The Discharger has instituted a program to upgrade the regulated tanks with leak detection bottoms. Presently 50 percent of all regulated tanks have been upgraded, with the remaining to be upgraded by November 2017.

RESULTS OF INVESTIGATIONS

12. **Active waste management units**
 - a. Groundwater chemistry results of subsurface investigations were conducted at the Primary and Main Storm Basins and at the Effluent Safety Basin. The Primary Storm Basin has a capacity of 2.3 million gallons and receives a mixture of process wastewater and stormwater runoff when the storage capacity of the wastewater treatment plant and storm water aboveground tanks is exceeded. The basin is concrete lined. The Main Storm Basin has a

capacity of 7.2 million gallons and receives stormwater runoff only when the capacity of the tankage at the wastewater treatment plant and the Primary Storm Basin are exceeded; The effluent Safety Basin has a capacity of 1.3 million gallons and receives once-through saltwater cooling water. The basin has earthen sides and an earthen bottom.

- b. Groundwater wells in the vicinity of the Primary Storm Basin and Main Storm basin contain dissolved and free phase petroleum hydrocarbons. Additionally, elevated concentrations of arsenic (0.06 mg/l), and barium (0.43 mg/l) have been reported in wells adjacent to the two storm basins.

The results of the discharger's 1996 subsurface investigation along the northern perimeter of the Main Storm Basin indicate that the area is contaminated with petroleum hydrocarbons. A petroleum seep at the north end of the Main Storm Basin is visible along the bottom and sideslopes of the drainage channel which flows under San Pablo Avenue.

- c. Groundwater monitoring wells in the vicinity of the Effluent Safety Basin contain dissolved and free phase petroleum hydrocarbons. Additionally, elevated concentrations of arsenic and barium have been reported in wells adjacent to the Effluent Safety Basin.

13. Inactive Waste Management Units (Figure 3)

- a. The Land Treatment Area was used to dispose of biologically degradable refinery waste. Groundwater quality in the vicinity of the unit does not appear to be affected downgradient or beneath the unit.
- b. Inactive waste sites 2 and 3 are located in the upper tank farm which is traversed by the Groundwater Basin Divide separating the Refinery Groundwater Basin from the Tormey Hill Groundwater Basin. Both sites are located in the Tormey Hill groundwater basin. The Tormey Hill site is underlain by bedrock. These sites were cleaned up under the direction of the Department of Health Services. No contamination was found to migrate into Canyon Del Cierbo (Tormey Hill Groundwater Basin).
- c. Inactive waste site 4 is located in the central portion of the refinery where leaded tank bottom sludges were disposed. TPH was not detected in the downgradient wells from the site. Barium, cobalt, vanadium, zinc and molybdenum were present in groundwater downgradient of Site 4 at concentrations slightly above the detection limit and below Maximum Contaminant Levels (MCLS) and generally below or comparable to concentrations measured upgradient of the site.
- d. Inactive waste sites 5 and 8 are located adjacent to each other in close proximity to the San Pablo Bay shoreline. Site 5 was used for the disposal of leaded gasoline tank bottom sludges (LGTBS). Site 8 served for the disposal of acid sludge. Waste constituents are primarily petroleum hydrocarbons, metals, semivolatile and volatile organic and acidic residues. Investigations

showed that metals were migrating downgradient from Site 8. Dissolved phase hydrocarbon was present in both the A and B groundwater zones and in perimeter wells downgradient of both sites. Cadmium, chromium and arsenic are present downgradient of the sites which exceeded their applicable MCLS. Several floating hydrocarbon pools are in the near vicinity of these sites and hydrocarbons may be migrating towards San Pablo Bay.

- e. Inactive waste sites 6, 6A and 6B are located southeast of the plant site, south of Interstate I-80. These sites served as ground surface disposal sites for refinery wastes. The discharger conducted soils investigations at the sites which showed soil contamination which rapidly decreased with depth. Groundwater monitoring at the sites showed that with the exception of a maximum contaminant level of 0.79 mg/l quantified as gasoline and diesel in one well at Site 6A, no TPH has migrated to the groundwater. Benzene, toluene and xylene at concentrations of 26, 84 and 130 ug/l also were identified at low levels in this sample. No volatile or semivolatile organics were detected in groundwater. No other groundwater sample showed migration of wastes to the groundwater.
- f. Inactive waste Site 6C is located in the southeastern portion of the refinery, and underlies the Container Storage Unit (CSU) and Tanks 156 and 158. The discharger submitted a December 1995 report entitled: Final Reconnaissance Evaluation of the Areal Extent of Former Inactive Waste Unit 6C. The report indicated that hydrocarbon contaminated soils were found beneath the CSU during the CSU closure investigation, and upon further investigation of aerial photographs the waste site (Site 6C) was discovered. Investigations within Site 6C have indicated that Site 6C soil is contaminated with the following:
- coke waste
 - TPH, as high as 11,000 mg/kg (Tank 109 area)
 - lead, as high as 1,900 mg/kg (Tank 109 area)
 - lead, average STLC of 24.74 mg/l (Soil Pile T2A)
 - mercury, in six of eight samples ranging from 0.17 to 2.0 mg/kg (CSU)
 - TPH as motor oil, as high as 1500 mg/kg (CSU area)
 - PCB 1254, as high as 760 ug/kg (CSU area)
 - Ten semivolatile organic compound (CSU area)
- A complete investigation of Site 6C and remediation plan has not been prepared.
- g. Site 7 was used for the disposal of oily tank bottom sludges and is located along Tormey Hill Ridge partially within the Tormey Hill groundwater basin just southeast of the seasonal product storage tanks on the southeast part of the site. Two monitoring wells at the site (MW-7-18 and MW-7-24) contained concentrations of 0.22 and .20 mg/l of TPH identified as diesel respectively. No volatile or semivolatile organics were detected in groundwater samples.
- h. Inactive waste sites 9A and 9B are located on the southeast side of highway I-80. The sites were used for disposal of wastewater, primary treatment sludge, slop oil emulsion solids and oily tank bottom sludges. Wastes were spread on the surface and tilled into the soil. A variety of metals were present

in groundwater at site 9A at concentrations below their applicable MCLs and were only slightly above their detection limits. Chromium was detected in one well at a concentration limit of 0.051 mg/l which is slightly above the MCL (0.05 mg/l). TPH was detected in one monitoring well at a concentration of 0.2 mg/l

- i. An area located southeast of inactive waste site 4 is utilized as a biotreated soil laydown area which has 3 monitoring wells, one upgradient and two downgradient. One downgradient well detected TPH at the detection limit of 0.1 mg/l.

14. Additional Petroleum Contaminated Areas

- a. Pacific Gas and Electric Company Salt Water Intake: A PG&E power plant located adjacent to the San Francisco Refinery obtained once through salt cooling water from San Pablo Bay via a large diameter intake tunnel that runs under the western portion of the refinery. This power plant was shutdown by PG&E in the mid 1980's. During the winter of 1994/1995 oil was observed entering San Pablo Bay at the mouth of the abandoned tunnel. To prevent the oil from entering the Bay, Unocal sealed the mouth of the tunnel with large steel plates and began recovering the accumulated oil via vacuum truck. This recovery process continues to the present. In 1995, Unocal conducted a hydrogeological assessment in the vicinity of the tunnel to determine the source of the oil. This assessment concluded that oil from historical releases was likely entering cracks in the tunnel in that portion of the tunnel that was above the water table near the tunnel mouth. Oil is observed in the mouth of the tunnel primarily during the winter when the water table rises due to the winter rains.
- b. Pacific Gas and Electric Company Outfall Salt Water Ditch: Once through salt cooling water from the PG&E power plant was returned to San Pablo Bay via a ditch that runs through the western portion of the San Francisco Refinery. PG&E sealed the outfall pipe from this ditch to San Pablo Bay to prevent oil that entered the ditch from the San Francisco Refinery from entering the Bay. Unocal removes oil that accumulates on the water table at the western end of the ditch via routine vacuum truck skimming.
- c. Tank 302 and Well 181 Area: In November 1995, Unocal conducted a hydrogeological assessment of the soil and groundwater in the vicinity of groundwater monitoring well MW-181 located in the western portion of the Refinery adjacent to Butane Tank 302. This assessment was conducted to determine the source of elevated TPH concentrations observed in monitoring well MW-181 during previous quarterly groundwater monitoring events. Unocal is preparing the final report for this assessment. The results indicate that the source is due to historical releases that likely occurred east of the Southern Pacific Railroad tracks. Residual petroleum hydrocarbons were quantified for soils in concentrations ranging from non-detectable to 100,000 mg/kg. Total petroleum hydrocarbons were quantified in both A-zone and B-zone wells near Tank 302 in concentration ranging from 0.3 mg/L to 16 mg/L. Well

MW-181 contained 0.01 feet of free phase hydrocarbon and was not sampled. This portion of the Refinery is leased from the State Lands Commission.

15. **B-Zone Groundwater Investigation**

The discharger conducted an investigation of the influence the perimeter extraction trench has on B-Zone groundwater between the PG&E Salt Water Outfall and the Effluent Safety Basin. The investigation concluded the following:

- The A-Zone groundwater is hydraulically separated from the B-Zone groundwater, although the two to six foot aquitard is considered leaky.
- The perimeter extraction trench does not impart a significant hydraulic influence on the B-Zone groundwater. B-Zone groundwater is not contained or collected by the A-Zone trench.
- Volatile and semi-volatile organic compounds have been detected in five B-Zone wells.
- Trace amounts (<0.03 feet) of free phase product were detected in two B-Zone wells.
- Groundwater modeling of the B-Zone indicated that extraction from the five existing B-Zone wells located between the "B" and "C" trench alignment will provide hydrodynamic containment and collection of the pollutants.

The discharger has recommended the installation of a B-Zone recovery system.

FREE PRODUCT RECOVERY PROGRAM

16. The discharger has established a free phase liquid hydrocarbon (free product) recovery program at the refinery. The program is designed to remove free product from beneath the refinery. Currently, three types of systems are used for free product removal: active skimming systems, passive recovery systems (in situ canisters), and periodic free product recovery (vacuum truck) program.

SOILS MANAGEMENT PLAN

17. The discharger submitted two technical reports (February 1996, Facility Wide Soils Management Plan, and October 1996, Technical Memorandum -Soils Management Plan Addendum) which addressed the reuse of low-level petroleum contaminated soils at the refinery. The reports were approved by Regional Board staff in October 1996.

ANALYTICAL RESULTS

18. The chief contaminants at the Unocal Refinery are various types of hydrocarbons ranging from crude oil to different types of refined products and their derivatives occurring in a wide range of concentrations. Accompanying the hydrocarbons are a variety of heavy metals, chiefly lead.

BASIN PLAN

19. The Regional 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 revised Basin Plan was approved by the State Water Resources Control Board and the Office of Administrative Law 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 groundwaters.

BENEFICIAL USES

20. Beneficial uses of San Pablo Bay and San Francisco Bay are:
 - a. Wildlife habitat
 - b. Brackish and saltwater marshes
 - c. Fish spawning
 - d. Fish migration
 - e. Commercial fishing
 - f. Sport fishing
 - g. Water contact recreation
 - h. Non-water contact recreation
 - i. Water fowl resting and feeding areas
 - j. Preservation of rare and endangered species
 - k. Estuarine habitat

The existing and potential beneficial uses of the groundwater under and in the vicinity of the Unocal Refinery are:

- a. Industrial process water supply
- b. Industrial service supply

CALIFORNIA ENVIRONMENTAL QUALITY ACT

21. This action is exempt from the provisions of the California Environmental Quality Act pursuant to Section 15301, Title 14 of the California Code of Regulations.
22. All the waste management units listed in this Order are subject to this Order.
23. The Board notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for discharges from the site and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
24. The Board in a public hearing heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED that Unocal, their agents, successors and assigns shall meet the applicable provisions contained in Title 23, Division 3, Chapter 15, of the California Code of Regulations and Division 7 of the California Water Code, and shall comply with the following:

A. **PROHIBITIONS**

1. Migration of pollutants through subsurface transport to waters of the State is prohibited.
2. There shall be no discharge of wastes to surface waters except as permitted under the National Pollutant Discharge Elimination System.
3. 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 (1) and (m), respectively, of the California Water Code.

B. **SPECIFICATIONS**

1. The discharger shall maintain the waste units to prevent discharges which diminish water quality at the point of compliance.
2. The discharger shall install any reasonable additional groundwater devices required to fulfill the terms of any Discharge Monitoring Program required by the Executive Officer.
3. This 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.
4. The discharger shall maintain any devices or design features, including the peripheral groundwater extraction trench, installed in accordance with this Order such that they continue to operate as intended without interruption.
5. The discharger shall conduct monitoring activities as specified in this Order. Should monitoring results show evidence of plume migration, additional plume characterization of pollutant extent may be required.
6. All reports pursuant to this Order shall be prepared under the supervision of a registered civil engineer, a California registered geologist or certified engineering geologist.
7. The discharger shall comply with all applicable provisions of Chapter 15.
8. Aboveground Petroleum Storage Tanks:
The Discharger shall comply with the requirements of Chapter 6.67 Section 25270 of the Health and Safety Code, and with Part 112, Title 40 of the Federal Code of Regulations.

Leak Detection Systems: All regulated tanks shall be monitored to assure that petroleum products will not discharge to surface and subsurface waters of the State. All tanks shall be fitted with leak detection bottoms, leak prevention systems, or with a tank leak detection monitoring system/method approved by the Executive Officer.

C. **PROVISIONS**

Unless otherwise noted, any reference to Sections and Articles refer to Title 23, Division 3, Chapter 15 of the California Code of Regulations.

1. The discharger shall comply with Prohibitions A.1. through A.3. immediately upon adoption of this Order.
2. All report submittals must be acceptable to the Executive Officer.
 - a. The Discharger shall submit an updated plan and schedule for each of the remaining regulated aboveground petroleum tanks which are scheduled to be upgraded with leak detection systems. All regulated tanks must be fully upgraded by November 2017.
PLAN AND SCHEDULE DUE: August 1, 1997
 - b. All regulated tanks shall have their bottoms tested (using API Standard 653 or the most current regulatory approved standard) for integrity and thickness. The inspection time interval shall be no more than 20 years and the interval will be dependent on the likelihood of tank bottom corrosion and the age of the tank. A summary of inspection results shall be reported to the Board annually.
REPORT DUE: Annually, by February 1st
 - c. The discharger shall submit a remediation plan and schedule for the removal and containment of contaminants found in B-Zone groundwater between the PG&E channel and the Effluent Safety Basin discharge channel.
PLAN AND SCHEDULE DUE: April 4, 1997
 - d. The discharger shall submit in tabular form an updated Free Phase Liquid Hydrocarbon (FPLH) schedule. The table shall identify the well, FPLH thickness, groundwater zone, type of system used for FPLH recovery, and frequency of FPLH recovery. The results of the FPLH program shall be submitted in each quarterly monitoring report.
TABLE DUE: May 2, 1997
FPLH PROGRAM RESULTS DUE: QUARTERLY
 - e. The discharger shall submit a remediation plan and schedule for implementing the remediation of FPLH impacted groundwater located in the Well 181 area.
PLAN AND SCHEDULE DUE: June 6, 1997

- f. The discharger shall submit a remediation plan and schedule for implementing the remediation of FPLH impacted groundwater located in the Gasoline Blending Unit area.
PLAN AND SCHEDULE DUE: June 6, 1997
- g. The discharger shall submit a remediation plan and schedule for implementing the remediation of FPLH impacted groundwater located in the vicinity of the API Separator. The plan must address: FPLH in the area, the seeps observed in the stormwater discharge channel located near the northern corner of the Main Storm Basin, and FPLH found in the vicinity of well EEI-29.
PLAN AND SCHEDULE DUE: June 6, 1997
- h. The discharger shall submit a report which evaluates the benefits of installing an automated FPLH skimming system for the Pacific Gas and Electric Company Outfall Saltwater Ditch.
EVALUATION DUE: September 5, 1997
- i. The discharger shall submit a report which evaluates the benefits of installing an automated FPLH skimming system for the Pacific Gas and Electric Company Saltwater Intake.
EVALUATION DUE: September 5, 1997
- j. The discharger shall submit a workplan and schedule for the investigation Site 6C. Based on the results of the investigation, the discharger shall prepare a remediation plan and schedule for Site 6C.
WORKPLAN AND SCHEDULE DUE: May 2, 1997
REMEDATION PLAN AND SCHEDULE: August 1, 1997
- k. The discharger shall implement any Discharge Monitoring Program issued by the Executive Officer. The purpose of the Discharge Monitoring Program is to detect, at the earliest opportunity, any unauthorized discharge of waste constituents from any waste management unit, or any unreasonable impairment of beneficial uses associated with the facility's past and present activities.
- l. Monitoring of groundwater Wells must include the Land Treatment Area as specified under monitoring requirements of the Post Closure Permit pursuant to 40 CFR 264. Each inactive waste management unit, the refinery perimeter and the biotreated soil laydown area must be monitored with the exception of WMUs 1, 2 and 3 which were clean closed under the direction of the Department of Health Services (DHS). The Primary and Main Storm Basins remain dry during the majority of the year and must be monitored when stormwater runoff is stored in these basins.
- m. Groundwater quality monitoring requirements for WMUs 4, 5, 6, 6A, 6B, 7, 8, 9A and 9B are specified in Section 2550.7 Article 5 of Chapter 15. The monitoring of groundwater must include a sufficient

number of wells to detect a release to the uppermost aquifer. Pursuant to Section 2550.1 of Article 5, Chapter 15, either a detection, evaluation or corrective action monitoring program is required for each WMU.

- n. Wells containing floating hydrocarbons shall not be sampled for groundwater analyses. A map showing the location of these wells can be combined with the well location map which must accompany the monitoring reports.
- o. The discharger shall evaluate the effectiveness of the refinery's groundwater collection and control systems. The evaluation shall include but not necessarily be limited to: an establishment of flow capture zones by modeling, establishment of localized extraction system gradients by field measurement, pump performance, and presentation of chemical monitoring data, all of which demonstrates containment, capture, and removal of pollutants.

3. The discharger shall sample and analyze groundwater and surface water samples for the chemical parameters presented in Table 1 of Attachment B of the Discharge Monitoring Program.

4. CHANGE IN OWNERSHIP

In the event of any change in control or ownership of the facility presently owned or controlled by the discharger, the discharger 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.

5. DUTY TO COMPLY

The discharger must comply with all conditions of these waste discharge requirements. Violations may result in enforcement actions, including Regional 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 Regional Board. [CWC Section 13261, 13263, 13265, 13268, 13300, 13301, 13304, 13340, 13350].

6. GENERAL PROHIBITION

Neither the treatment nor the discharge of waste shall create a pollution, contamination or nuisance, as defined by Section 13050 of the California Water Code (CWC). [H & SC Section 5411, CWC Section 13263]

7. AVAILABILITY

A copy of these waste discharge requirements shall be maintained at the discharge facility and be available at all times to operating personnel. [CWC Section 13263]

8. CHANGE IN DISCHARGE

In the event of a material change in the character, location, or volume of a discharge, the discharger shall file with this Regional 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]

9. REVISION

These waste discharge requirements are subject to review and revision by the Regional Board. [CCR Section 13263]

10. TERMINATION

Where the discharger becomes 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 Regional Board, it shall promptly submit such facts or information. [CWC Sections 13260 and 13267]

11. 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 discharger from his liability under Federal, State or local laws, nor do they create a vested right for the discharger to continue the waste discharge. [CWC Section 13263(g)]

12. SEVERABILITY

Provisions of these waste discharge requirements are severable. If any provision of these requirements are found invalid, the remainder of these requirements shall not be affected. [CWC 9213]

13. OPERATION AND MAINTENANCE

The discharger 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 discharger 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)]

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

15. PETROLEUM 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 oil or petroleum product 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) such 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 oil spill contingency plan adopted pursuant to Article 3.5 (commencing with Section 8574.1) of Chapter 7 of Division 1 of Title 2 of the Government Code. This provision does not require reporting of any discharge of less than 42 gallons unless the discharge is also required to be reported pursuant to Section 311 of the Clean Water Act or the discharge is in violation of a prohibition in the applicable Water Quality Control Plan. (CWC Section 13272]

16. ENTRY AND INSPECTION

The discharger shall allow the Regional Board, or an authorized representative upon the presentation of credentials and other documents as may be required by law, to:

- (a) Enter upon the discharger's premises, in accordance with the discharger'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]

17. MONITORING DEVICES

All monitoring instruments and devices used by the discharger to fulfill the prescribed 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 discharger 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.

Unless otherwise permitted by the Regional Board Executive officer, all analyses shall be conducted at a laboratory certified for such analyses by the State Department of Health Services. The Regional 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]

18. TREATMENT

In an enforcement action, it shall not be a defense for the discharger that it would have been necessary to halt or to reduce the permitted activity in order to maintain compliance with this Order. Upon reduction, loss, or failure of the treatment facility, the discharger shall, to the extent necessary to maintain compliance with this Order, control production or all discharges, or both, until the facility is restored or an alternative method of treatment is provided. This provision applies, for example, when the primary source of power of the treatment facility fails, is reduced, or is lost. (CWC Section 13263(f))

19. DISCHARGES TO NAVIGABLE WATERS

Any person discharging or proposing to discharge to navigable waters from a point source (except for discharge of dredged or fill material subject to Section 404 of the Clean Water Act and discharge subject to a general NPDES permit must file an NPDES permit application with the Regional Board. (CCR Title 2 Section 22357)

20. ENDANGERMENT OF HEALTH AND ENVIRONMENT

The discharger 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 discharger becomes aware of the circumstances. A written submission shall also be provided within five days of the time the discharger becomes 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]

21. MAINTENANCE OF RECORDS

The discharger 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 three 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 Regional Board Executive officer.

Records of monitoring information shall include:

- (a) The date, exact place, and time of sampling or measurements;
 - (b) The individuals who performed the sampling or measurements;
 - (c) The date(s) analyses were performed.
 - (d) The individuals who performed the analyses;
 - (a) The analytical techniques or method used; and
 - (f) The results of such analyses.
22. (a) All application reports or information to be submitted to the Executive officer shall be signed and certified as follows:
- (1) For a corporation -- by a principal executive officer or the level of vice president.
 - (2) For a partnership or sole proprietorship -- by a general partner or the proprietor, respectively.
 - (3) For a municipality, state, federal, or other public agency -- by either a principal executive officer or ranking elected official.
- (b) 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.

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]

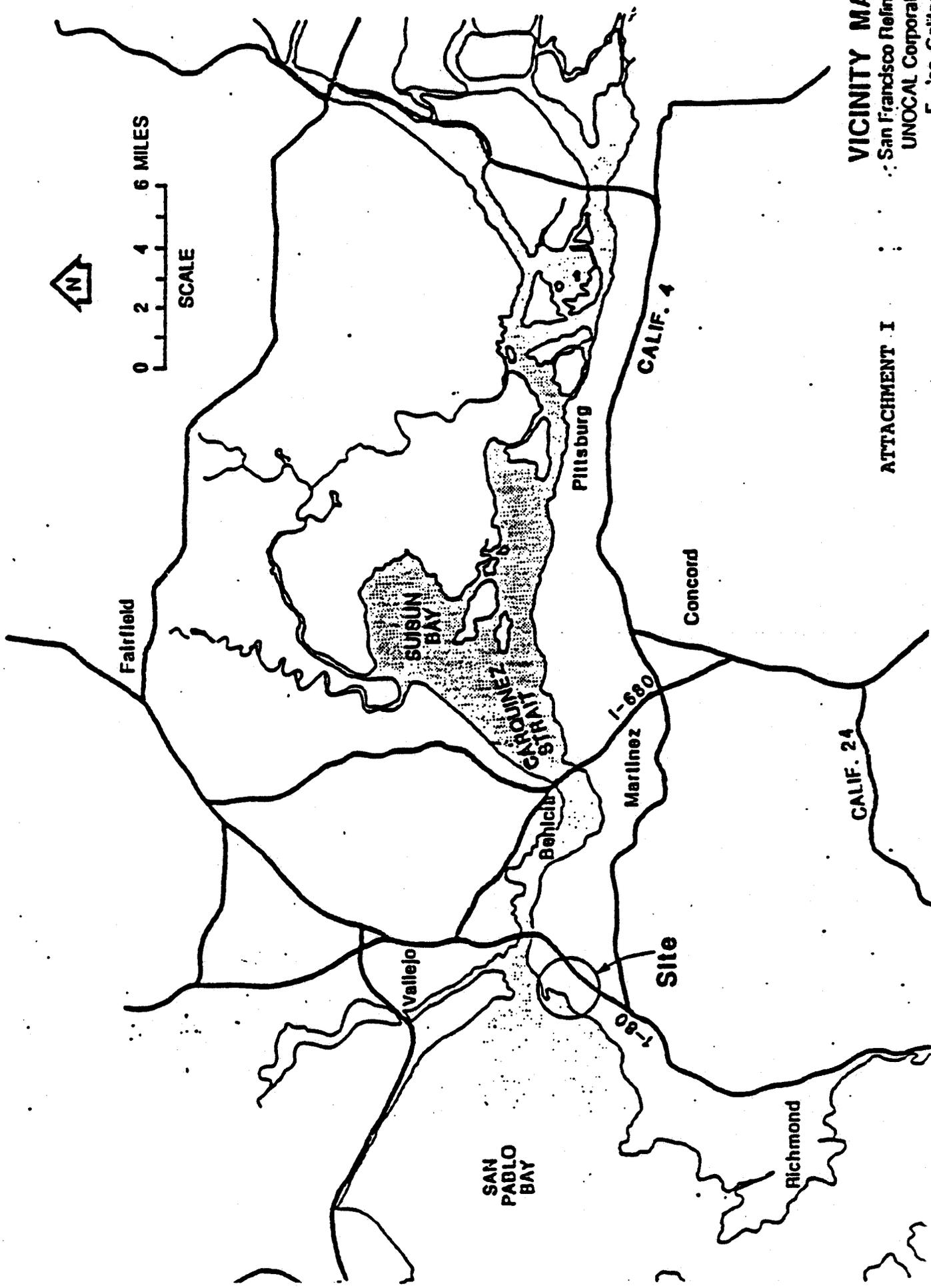
23. Order No. 95-209 is herewith rescinded.
24. This Order is subject to Board review and updating, as necessary, to comply with changing State or Federal laws, regulations or policies, or guidelines; changes in the Boards Basin Plan; or changes in discharge characteristics.

I, Loretta K. Barsamian, 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 February 19, 1997.


Loretta K. Barsamian
Executive Officer

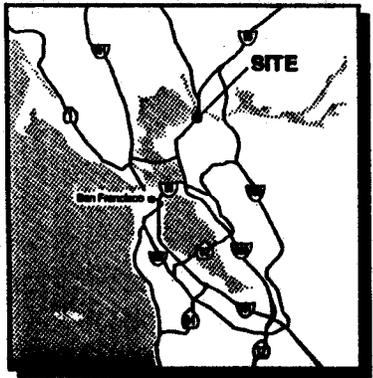
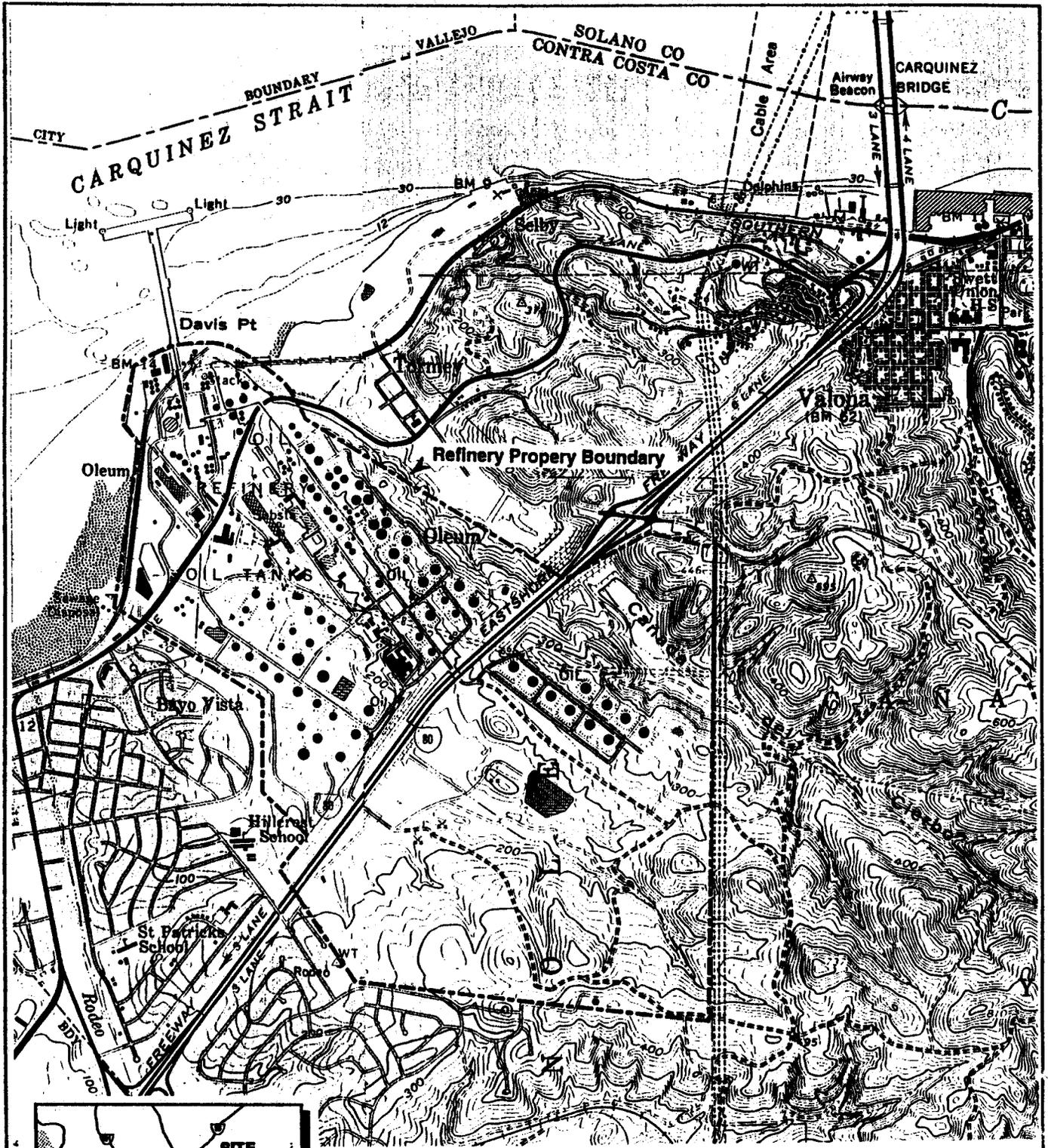
Attachments:

1. Attachment 1: Vicinity Map
2. Attachment 2: Site Location Map
3. Attachment 3: Site Map
4. Attachment 4: Inactive Management Unit Map
5. Attachment 5: Discharge Monitoring Program



VICINITY MAP
 San Francisco Refinery
 UNOCAL Corporation
 P.O. Box 100000
 Richmond, California 94801

ATTACHMENT I



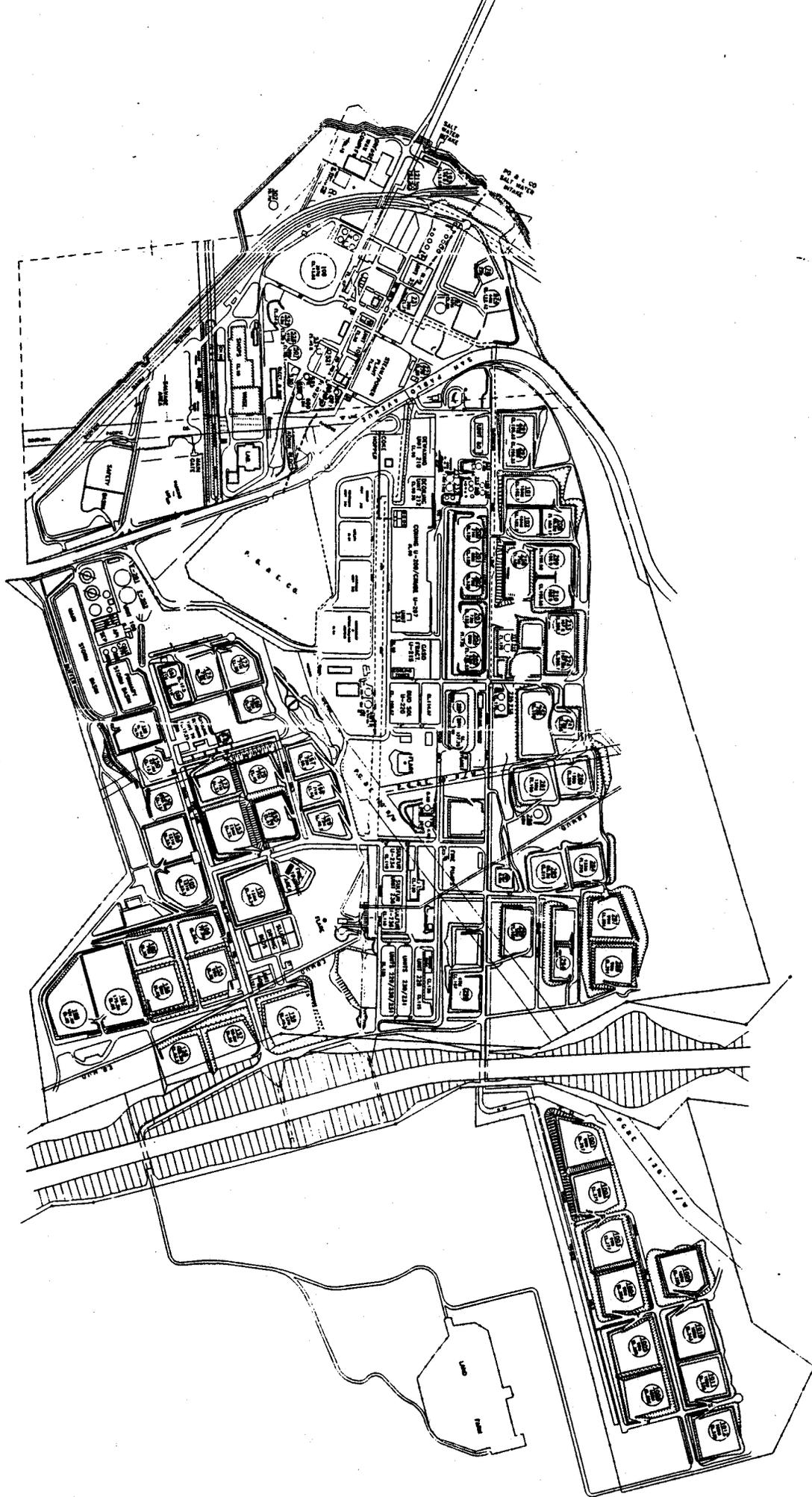

MONTGOMERY WATSON
UNOCAL SAN FRANCISCO REFINERY
RODEO, CALIFORNIA
SITE LOCATION MAP

USGS Topographic Maps, 7.5', Mare Island and Benicia CA Quads., 1980.

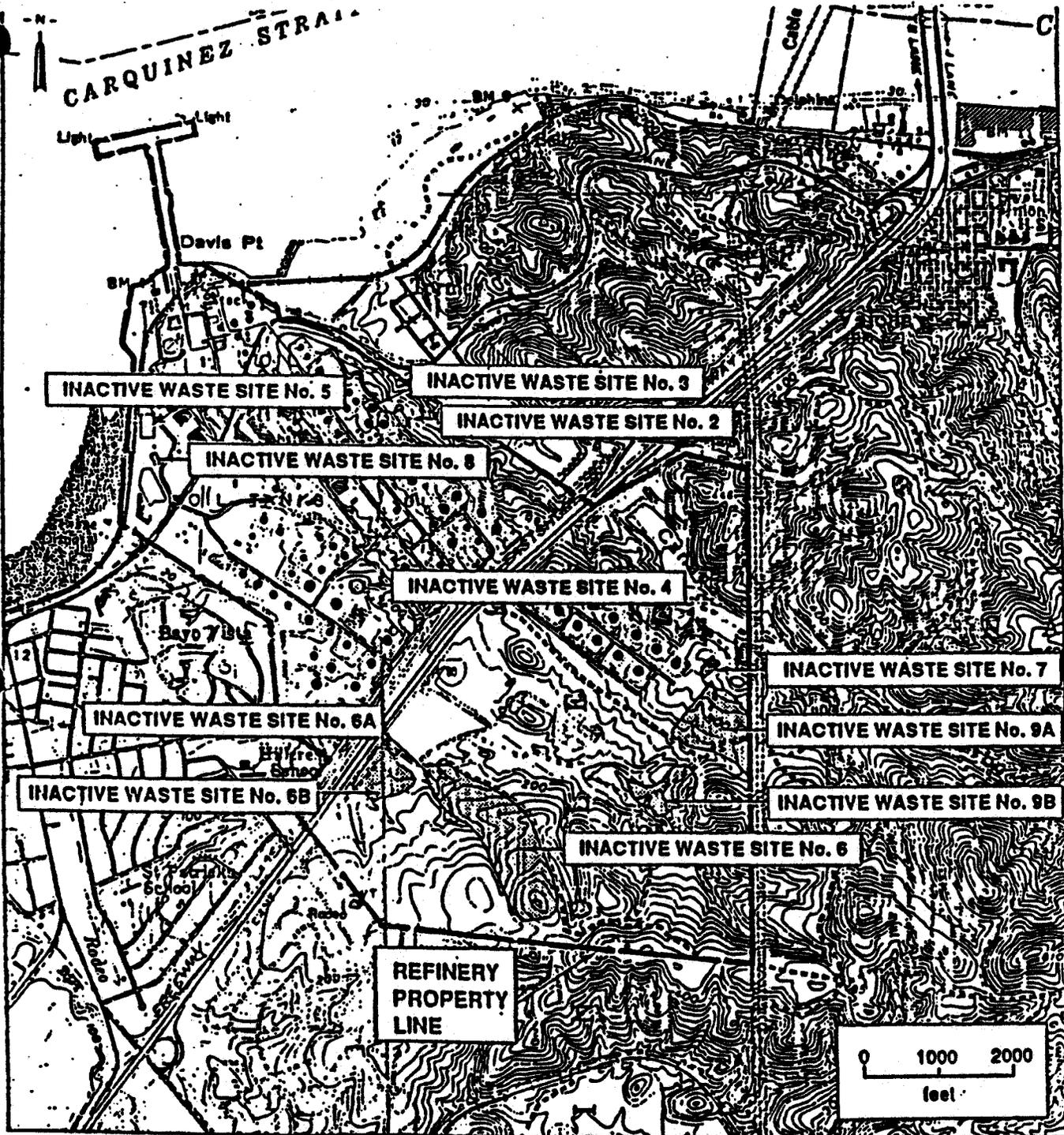
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PLAN OF SUBDIVISION IN THE CITY OF CALIFORNIA
RECORDED 1988

SCALE 1" = 100'



Attachment 3: Site Map



CARQUINEZ STRAIT

Light Light

Davis Pt

INACTIVE WASTE SITE No. 5

INACTIVE WASTE SITE No. 3

INACTIVE WASTE SITE No. 2

INACTIVE WASTE SITE No. 8

INACTIVE WASTE SITE No. 4

INACTIVE WASTE SITE No. 6A

INACTIVE WASTE SITE No. 7

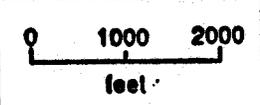
INACTIVE WASTE SITE No. 9A

INACTIVE WASTE SITE No. 6B

INACTIVE WASTE SITE No. 9B

INACTIVE WASTE SITE No. 6

REFINERY
PROPERTY
LINE



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

SAN FRANCISCO BAY REGION

DISCHARGE MONITORING PROGRAM

FOR

UNOCAL CORPORATION

SAN FRANCISCO REFINERY

RODEO, CONTRA COSTA COUNTY

ORDER NO. 97-027

CONSIST OF

PART A

AND

PART B

PART A

A. GENERAL

Reporting responsibilities of waste dischargers 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. This Self-Monitoring Program is issued in accordance with Section C.2.k of Regional Board Order No.97-027.

The principal purposes of a self-monitoring program by a waste discharger are:

- (1) to document compliance with waste discharge requirements and prohibitions established by the Board,
- (2) to facilitate self-policing by the waste discharger in the prevention and abatement of pollution arising from waste discharge,
- (3) to develop or assist in the development of effluent standards of performance, pretreatment and toxicity standards, and other standards, and (4) to prepare water and wastewater quality inventories,
- (4) to assist the discharger in complying with the requirements of Article 5, Chapter 15 as revised July 1, 1991.

B. SAMPLING AND ANALYTICAL METHODS

Sampling

Sample collection, storage, and analyses shall be performed according to most recent version of EPA Standard Methods for the Analysis of Wastewater and in accordance with an approved sampling and analysis plan.

Water and wastewater analysis shall be performed by a laboratory approved for these analyses by the State of California. The director of the laboratory whose name appears on the certification shall supervise all analytic work in his/her laboratory and he/she or their authorized representative 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.

C. DEFINITION OF TERMS

1. A grab sample is a discrete sample collected at any time.
2. A composite sample is a sample composed of individual grab samples mixed in proportions varying not more than plus or minus five percent from the instantaneous rate of waste flow corresponding to each grab sample collected at regular intervals not greater than one hour, or collected by the use of continuous automatic sampling devices capable of attaining the proportional accuracy stipulated above throughout the period of discharge or 24 consecutive hours, whichever is shorter.
3. Receiving waters refers to any water which actually or potentially receives surface or groundwater which pass into, through, or under the waste management units or contaminated soils. The receiving waters are the groundwater beneath and adjacent to the waste management units, the surface runoff from the site, and the drainage ditches surrounding the site. San Francisco Bay or it's subbasins or nearby streams into which water from the unit discharges are considered receiving waters.
4. Standard observations refer to:
 - a. Receiving Waters
 - 1) Floating and suspended materials of waste origin: presence or absence, source, and distance of travel.
 - 2) Discoloration and turbidity: description of color, source, and nature of material.
 - 3) Evidence of algal or other unusual growth presence or absence.
 - 4) Evidence of odors, presence or absence, characterization, source, and distance of travel from source.
 - 5) Evidence of beneficial use: presence of water associated wildlife.
 - 6) Flow rate.
 - 7) Weather conditions: wind direction and estimated velocity, total precipitation during previous five days and day of observations.

- b. Perimeter of the waste management unit.
 - 1) Evidence of liquid leaving or entering the waste management unit, estimated size of affected area. (Show affected area on map)
 - 2) Evidence of algal or other unusual growth, presence or absence, characterization, mineral or salt deposition.
 - 3) Evidence of erosion and/or daylighted refuse.

- c. The waste management unit.
 - 1) Evidence of algal or other unusual growth. Precipitation of sludge or minerals, quantity, nature and chemical composition.
 - 2) Evidence of erosion and/or daylighted refuse.
 - 3) Evidence of odors, presence or absence, characterization, source and distance of travel from source.

D. SCHEDULE OF SAMPLING, ANALYSIS, AND OBSERVATIONS

The discharger is required to perform sampling, analysis, and observations according to the schedule specified in Part B, and the sampling and analysis plan, in the following media:

- 1. Groundwater per Section 2550.7(b)
- 2. Surface water per Section 2550.7(c) and per the general requirements specified in Section 2550.7(e) of Article 5, Chapter 15.
- 3. Vadose zone per Section 2550.7(d), wherever feasible.

E. RECORDS TO BE MAINTAINED

Written detection monitoring reports shall be maintained by the discharger or laboratory and shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by the Board. Such records shall show the following for each sample:

- 1. Identity of sample and sample station number.
- 2. Date and time of sampling.
- 3. Date and time that analyses are started and completed, and name off the personnel performing the analyses.
- 4. Complete procedure used, including method of preserving the sample, and the identity and volumes of reagents used. A reference to a specific section of

standard EPA methods.

5. Calculation of results.
6. Results of analyses, and detection limits for each analyses.

F. REPORTS TO BE FILED WITH THE BOARD

1. Written detection monitoring reports and the annual report shall be filed by the discharger as indicated in the Reporting Schedule of Item H. The reports shall be comprised of the following:

- a. Letter of Transmittal

A letter transmitting the essential points contained in each self-monitoring report should accompany each report. Such a letter shall include a discussion of any required information, violations found during the last reporting period, and actions taken or planned for correcting the violations, such as, operation and/or facilities modifications. If the discharger has previously submitted a detailed time schedule for correcting violations, a reference to the correspondence transmitting such information will be satisfactory. If no violations have occurred in the last report period this shall be stated in the letter of transmittal. Monitoring reports and the letter transmitting the monitoring reports shall be signed by a principal executive officer at the level of vice president or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge originates. The letter shall contain a statement by the official, under penalty of perjury, that to the best of the signer's knowledge the report is true, complete, and correct.

- b. The annual monitoring report shall include a compliance evaluation summary sheet which shall contain:

- 1) The sample mean and the sample variance for all sample sets taken from all compliance points, and shall determine if the difference between the mean of each sample set and the water quality protection standard is significant at the 0.05 level as described in Section 5 of Chapter 15. The discharger may propose a statistical procedure to be used in making this determination pursuant to Article 5, Section 2550.7, Subsection (e)(7), (e)(8), and (e)(9) of Chapter 15. If a statistically significant difference is found this shall be reported as a suspected release

requiring the discharger to enter into a verification monitoring program.

- 2) A graphic description and map of the direction and elevation of groundwater flow and the piezometric surface under/around the waste management unit, based upon the past and present water level elevations and pertinent visual observations.
 - 3) The method and time of water level measurement, the type of pump used for purging, pump placement in the well; method of purging, pumping rate, equipment and methods used to monitor field pH, temperature, and conductivity during purging, calibration of the field equipment, results of the pH, temperature, conductivity and turbidity testing, well recovery time, and method of disposing of the purge water.
 - 4) Type of pump used, pump placement for sampling, a detailed description of the sampling procedure; number and description of equipment, 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 observations. The chain of custody record.
- c. A map or aerial photograph shall accompany each report showing observation and monitoring station locations.
- d. Laboratory statements of results of analyses specified in Part B must be included in each report. The director of the laboratory whose name appears on the laboratory certification shall supervise all analytical work in his/her laboratory and shall sign all reports of such work submitted to the Board.
- 1) The methods of analyses and detection limits must be appropriate for the expected concentrations. Specific methods of analyses must be identified. If methods other than EPA approved methods or Standard Methods, are used the exact methodology must be submitted for review.
 - 2) In addition to the results of the analyses, laboratory quality control/quality assurance (QA/QC) information must be included in the monitoring report. The laboratory QA/QC information should include the method, equipment and analytical detection limits; the recovery rates; an explanation for any recovery rate that is less

than 80%; the results of equipment and method blanks; the results of spiked and surrogate samples; the frequency of quality control analysis; and the name and qualifications of the person(s) performing the analyses.

G. CONTINGENCY REPORTING

- a. A report shall be made by telephone of any seepage or overflow from the waste management unit immediately after it is discovered. A written report shall be filed with the Board within five days. This report shall contain the following information:
 - 1) a map showing the location(s) of any seepage or dike rupture.
 - 2) approximate rate of overflow.
 - 3) nature of effects; i.e. all pertinent observations and analyses; and
 - 4) corrective measures underway or proposed.
- b. A report shall be made in writing to the Board within seven days if a statistically significant difference is found between a self-monitoring sample set and a WQPS. Notification shall indicate what WQPS(s) have been exceeded. The discharger 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.
- c. If resampling and analysis confirms the earlier finding of a statistically significant difference between self-monitoring results and WQPS(s) the discharger must submit to the Board within 90 days an amended Report of Waste Discharge for establishment of a verification monitoring program meeting the requirements of Section 2557 of Article 5 of Chapter 15. This submittal shall include the information required in Section 2556(b)(2) of Chapter 15.
- d. The discharger must notify the Board within seven days if the verification monitoring program finds a statistically significant difference between samples from the verification monitoring program point of compliance and the WQPS(s).
- e. If such a difference or differences are found by the verification monitoring program, it will be concluded that the discharger is out of compliance with this Order. In this event the discharger shall submit within 180 days an amended Report of Waste Discharge requesting authorization to establish a corrective action program meeting the requirements of Section 2550.10, of Article 5 of Chapter 15. This submittal shall include the information required in Section 2550.12(g)(3) of Chapter 15.

H. REPORTING

Reporting Schedule:

The discharger shall report in accordance with the reporting schedule described below.

<u>MONITORING PERIOD</u>	<u>REPORT PERIOD</u>	<u>REPORT DUE</u>
First Quarter (first semiannual event)	January to March	May 30th
Second Quarter	April to June	August 29th
Third Quarter (second semiannual)	July to September	November 29th
Fourth Quarter (includes Annual report)	October to December	April 30th

Annual Report:

By April 30th of each year the discharger shall submit an annual report to the Board covering the previous calendar year. This report shall contain:

- a. Tabular and graphical summaries of the monitoring data obtained during the previous year.
- b. A comprehensive discussion of the compliance record, and the corrective actions taken or planned which may be needed to bring the discharger into full compliance with the waste discharge requirements.
- c. A map showing the waste management units, monitoring well locations, ground and casing point measuring elevations and data on elevations at pond sampling and freeboard measuring locations.
- d. A written summary of the groundwater analyses indicating any change in the quality of the groundwater.
- e. Poned water analytic data.

I. WELL LOGS

1. An evaluation of the effectiveness of the extraction systems, which includes an evaluation of a summary of volumes of extracted waters removed from the units and a discussion of the groundwater disposal methods utilized.
2. A boring log shall be submitted for each sampling well established for this monitoring program, as well as a report of inspection or certification that each well has been constructed in accordance with the construction standards of the Department of Water Resources. These shall be submitted within 30 days after well installation.

- a. For all monitoring wells established for this program continuous core samples must be taken in all borings, unless multiple wells are to be constructed in the immediate vicinity, in which case only the deeper boring would need to be continuously sampled. Each boring log must include the name, registration number and signature of the supervising geologist, the name of the person actually logging the hole, the name of the drilling company, type of drilling method used, grain size distribution analysis, soil moisture content, blow count, sample recovery rate, initial and stabilized water levels, in-place permeability, and ground surface elevation. Soil and clay samples should be retained for chemical analyses to determine if pollution or adsorption has occurred from pond seepage.
- b. For all monitoring wells established for this program the rationale for the selected slot size and sand pack; and the method used to place the sand pack, seal, and grout must be reported. The well annulus must be sealed with bentonite concrete and a surface concrete seal must be placed at the top of the well. All wells must be surveyed to a clearly marked common reference point.
- c. For all monitoring wells established for this program transmissivity, hydraulic conductivity and gradient must be estimated.

PART B

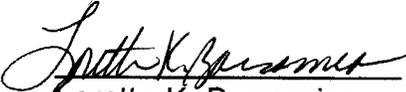
DESCRIPTION OF OBSERVATION STATIONS AND SCHEDULE OF OBSERVATIONS

a. GROUNDWATER MONITORING

1. The discharger shall collect groundwater samples at the compliance points. The discharger shall prepare a map showing all compliance points, which data shall be combined with the piezometric surface map. The discharger shall designate on the map all wells having floating hydrocarbons.
2. Groundwater samples shall be collected at the following compliance points:
 - The Seasonal Products Storage Tank Area
 - The Upper Tank Farm
 - The Lower Tank Farm
 - Soils Biotreatment Area
 - Primary and Main Storm Basin
 - The Perimeter Wells
 - Effluent Safety Basin
 - All closed and inactive Waste Management Units
3. The discharger shall sample the discharge from the extraction trench quarterly. The results shall be reported quarterly.
4. Groundwater from monitoring wells having floating hydrocarbons shall not be sampled or analyzed.
5. The Discharger shall perform pH field measurements of all collected water samples.
6. The discharger is required to collect samples for all monitoring points in accordance with the attached Well Network Sampling Analytical Protocol.
7. The discharger shall submit an annual summary report to the Board covering the previous 4 quarters of monitoring.
8. The discharger shall inspect all facilities once per quarter to insure proper and safe operation and report any incidents not in compliance with this Order.

I, Loretta K. Barsamian, Executive Officer hereby certify that the foregoing self Monitoring Program:

1. Has been developed in accordance with the procedures set forth in this Board's resolution No. 73-16 in order to obtain data and document compliance with waste discharge requirements established in this Board's Order No. 97-027.
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.


Loretta K. Barsamian
Executive Officer

Date Ordered: February 19, 1997

Attachment:
Well Network Sampling Analytical Protocol

TABLE 3
UNOCAL SAN FRANCISCO REFINERY, RODZD, CA
ANALYTICAL PROTOCOLS FOR GROUNDWATER MONITORING WELLS NETWORK

Well No.	Area Monitored	Proposed Sampling Frequency	PROPOSED TEST METHODS																	
			Arsenic EPA 7060	Barium EPA 6010	Cadmium EPA 7131	Chromium EPA 6010	Cobalt EPA 7421	Lead EPA 7421	Mercury EPA 7170	Nickel EPA 6010	Selenium EPA 7131	Vanadium EPA 6010	Zinc EPA 6010	Aromatic Organics EPA 8210	Extractable TPH-D EPA 8160	Volatile Organic Compounds EPA 8210	Semi-volatile Organic Compounds EPA 8210	Specific Conductance EPA 120.1	pH EPA 120.1 or EPA 9240	TDS EPA 160.1
MW-189	RGBP*	Quarterly*	X		X															
MW-190	RGBP*	Quarterly*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-191	RGBP*	Quarterly*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-192	RGBP*	Quarterly*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-193	RGBP*	Quarterly*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-194	RGBP*	Quarterly*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-195	RGBP*	Quarterly*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-183	TGBP	Semi-monthly	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-184	TGBP	Semi-monthly	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-138	TGBP	Semi-monthly																		
MW-131	TGBP	Semi-monthly																		
MW-123	TGBP	Semi-monthly																		
MW-124	TGBP	Semi-monthly																		
MW-125	TGBP	Semi-monthly																		
MW-126	TGBP	Semi-monthly																		
MW-127	TGBP	Semi-monthly																		
MW-129	TGBP	Semi-monthly																		
MW-144	TGBP	Semi-monthly																		
MW-173	TGBP	Semi-monthly																		
MW-174	TGBP	Semi-monthly																		
MW-175	TGBP	Semi-monthly																		
MW-176	TGBP	Semi-monthly																		
MW-182	TGBP	Semi-monthly																		
MW-196	RGBP*	Quarterly*																		
MW-197	RGBP*	Quarterly*																		
MW-198	RGBP*	Quarterly*																		
MW-199	RGBP*	Quarterly*																		
MW-200	RGBP*	Quarterly*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-201	RGBP*	Quarterly*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

- Notes:
- * LTA wells to be used for volatile organics by EPA 624 and acid/base metals by EPA 625 instead of EPA Methods 8240 and 8270, respectively.
 - * Filtered and unfiltered samples should be taken for LTA wells; lead samples for LTA wells such as by Method 6010. All other samples for metals will be field filtered.
 - * Wells to be sampled Quarterly until July 1996, per RWQCB Order No. 95-209, Provision No. 2c.
 - * Samples will be used for SVOC by EPA 8270 if TPH-D detected at >2.0 mg/L.
 - * Wells located north of the FG&E Discharge Channel.
 - * Wells located between the FG&E Discharge Channel and the ESB Discharge Channel.
 - * Wells located south of the ESB Discharge Channel.
 - * Wells located downstream of the interceptor trench.
 - * Beginning 1st Quarter of 1997 sample will be used for MTBE for four sampling events.

TWS - Inactive Waste Site
 TGBP - Torrey Groundwater Basin Perimeter
 RGBP - Refinery Groundwater Basin Perimeter
 LTA - Land Treatment Area
 PSB - Primary Storm Basin
 MSB - Main Storm Basin
 ESB - Effluent Settling Basin
 PC - Post-closure