

**STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION**

RESOLUTION NO. R06-001

**APPROVING THE INITIAL STUDY AND ADOPTING
A MITIGATED NEGATIVE DECLARATION FOR
EXXON MOBIL CORPORATION
(20310 MADRONA, TORRANCE REFINERY)
(PILOT INJECTION TEST OF CALCIUM POLYSULFIDE AND SUBSEQUENT FULL SCALE
REMEDICATION FOR CHROMIUM VI IN GROUNDWATER AND SOIL)
(FILE NO. 05-045)**

WHEREAS, the California Regional Water Quality Control Board, Los Angeles Region (Regional Board) finds that:

1. On January 26, 2005, Exxon Mobil Corporation (hereafter Discharger) filed a Report of Waste Discharge (ROWD) and applied for Waste Discharge Requirements to inject calcium polysulfide solution (CPS) into soil and shallow groundwater to remediate a limited area of hexavalent chromium (CrVI) contamination.
2. The proposed remediation area (Site) is located adjacent to Del Amo Boulevard in Torrance, California, as shown on Figure 1. The Site measures approximately 350 feet long by 150 feet wide, and includes:
 - a. Property located at 20310 Madrona Avenue and owned by Exxon Mobil Oil Corporation; and
 - b. Property owned by Exxon Mobil Corporation, but with a transportation easement granted to the City of Torrance (on Figure 1 north of the fence line).
3. The Site is currently vacant. Adjacent Exxon Mobil-owned parcels to the north and south are also vacant except for horse stables maintained by the Torrance Mounted Posse and two oil production wells and associated storage equipment operated by Power Run Oil Company.
4. The Site is located on the Torrance Plain of the West Coast Groundwater Basin, in the southwestern part of the Los Angeles Coastal Plain (Latitude 33° 50' 53", Longitude 118° 20' 35"). A zone of shallow groundwater is present at a depth of approximately 70 feet below ground surface (bgs) beneath the Site. Shallow groundwater is supported by low permeability silts and clays of the Bellflower Aquitard. The shallow groundwater zone is generally less than 5 feet thick and was not observed to be present between 1991 and 1993 or in late 2002. When present, shallow groundwater flow direction is locally variable and controlled primarily by the stratigraphy of the underlying silt/clay layers. No shallow groundwater or potential perching layers have been observed to the south or southeast of the Site

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5. Underlying the shallow groundwater zone are the deeper Gage-Gardena, Lynwood, and Silverado aquifers. The Gage-Gardena Aquifer is present at a depth of approximately 110 feet bgs and flows towards the east-southeast beneath the Site. There is one active water supply well screened in the Gage-Gardena Aquifer located 4,200 feet north of the Site. This well operated by Southern California Edison extracts less than 5 acre-feet per month.
6. Three active municipal water supply wells are located within one-half mile south of the Site. These wells are all screened in the deeper Lynwood and Silverado aquifers, more than 200 feet below the zone of shallow groundwater. Groundwater flow in the deeper Lynwood and Silverado aquifers is from west to east in this area.
7. Groundwater investigation, monitoring, and remediation activities at the adjacent Exxon Mobil Oil Corporation Torrance Refinery are currently conducted under Cleanup and Abatement Orders (CAOs) 85-17, 89-136 and 95-116. The Discharger samples monitoring wells at and in the vicinity of the Site in April and October as part of the approved sampling plan.
8. Hexavalent chromium (CrVI) was first detected in the shallow groundwater zone underlying the Site in October 2000, during the Refinery's routine groundwater monitoring activities conducted under CAOs 89-136 and 95-116.
9. Subsequent investigations were conducted between 2000 to 2004 on a voluntary basis by the Discharger, including the installation of 19 cone penetrometer test (CPT) boreholes, 24 hollow-stem-auger boreholes for soil and groundwater grab sampling, 15 hand-auger boreholes for shallow soil sampling, and 8 shallow zone groundwater monitoring wells.
10. The results of the subsurface investigations indicated the presence of CrVI concentrations in soil and shallow groundwater beneath the Site. Concentrations of CrVI in soil range from non-detectable to 95.5 milligrams per kilogram (mg/kg), with concentrations exceeding 1 mg/kg limited to an area approximately 50 feet by 30 feet in size. Detected concentrations of CrVI in shallow groundwater have been as high as 200 milligrams per liter (mg/L), and are limited to an area measuring approximately 150 feet by 50 feet. No CrVI has been detected in the underlying Gage-Gardena or Lynwood aquifers beneath or downgradient of the Site.
11. No definite sources of CrVI were identified during the investigations. Additional source investigations will be accomplished during the implementation of future CAO directives.
12. Electrochemical reduction of CrVI to trivalent chromium may be accomplished through injection of a chemical reducing agent, CPS (also known as lime sulfur). CPS is used as an agricultural soil amendment, an insecticide-fungicide for fruit crops and for removal of metals in water treatment systems. The chemical reaction of CPS with CrVI will generate chromium hydroxide (hydrolyzed trivalent chromium), elemental sulfur, and calcium salts.
13. In January 2002, the Regional Board adopted General WDRs for Groundwater Remediation at Petroleum Hydrocarbon Fuel and/or Volatile Organic Compound Impacted Sites (Order No. R4-2002-0030). These General WDRs permit the injection of

CPS, but do not specifically provide for the use of CPS to remediate CrVI. Therefore, these individual waste discharge requirements have been developed for the remediation of CrVI at the Site.

14. The Discharger conducted a bench-scale pilot study in October 2003 to evaluate the effectiveness of CPS in reducing CrVI to trivalent chromium. The results of the study indicated that CPS was able to significantly reduce CrVI concentrations in soil and shallow groundwater samples from the Site, in both sandy and silty soils. The mass of CrVI in soil-groundwater slurry samples was reduced nearly 100 percent following 30 minutes of treatment. Soil column studies indicated successful reduction of total chromium concentrations in soil leachate samples following infiltration with CPS, to below the State of California Maximum Contaminant Level of 0.050 mg/L.
15. In October 2004, the Discharger submitted a Workplan to the Regional Board, proposing the injection of CPS into vadose zone soil and shallow groundwater to electrochemically reduce CrVI to trivalent chromium. The Workplan presents the rationale and field methods for pilot testing and subsequent full-scale implementation of in situ CrVI remediation at the Site. The Workplan and January 26, 2005 ROWD present the procedures for monitoring the remediation program and evaluating the injection volume and concentrations. The frequency of injection will be adjusted based on the results of field monitoring. There is an existing network of groundwater monitoring wells located upgradient/cross-gradient, within, and downgradient of the planned injection area. Shallow groundwater conditions will be monitored during the operation to determine the efficiency of the injection. The Discharger proposes to inject up to 60,000 gallons of solution into the vadose zone soil and up to 140,000 gallons of solution directly into the shallow groundwater zone through wells at the Site. The Discharger will obtain written approval from the Regional Board before exceeding these injection volumes.
16. On June 13, 1994, the Regional Board adopted a revised *Water Quality Control Plan for Coastal Watersheds of Los Angeles and Ventura Counties* (Basin Plan) which was amended on January 27, 1997 by Regional Board Resolution No. 97-02. The Basin Plan (i) designates beneficial uses for surface waters and groundwater, (ii) sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State anti-degradation policy (*Statement of Policy with Respect to Maintaining High Quality Waters in California*, State Water Resources Control Board (State Board) Resolution No. 68-16, October 28, 1968), and (iii) describes implementation programs to protect all waters in the Region. In addition, the Basin Plan incorporates by reference applicable State and Regional Board plans and policies and other pertinent water quality policies and regulations. The Regional Board prepared the 1994 update of the Basin Plan to be consistent with previously adopted State and Regional Board plans and policies. This project implements the plans, policies and provisions of the Regional Board's Basin Plan.
17. The Basin Plan designates beneficial uses and water quality objectives for groundwater within the West Coast Basin as follows:

Existing: municipal and domestic supply; industrial service supply; industrial process supply, and agricultural supply.

18. The requirements contained in this Order are based on the *Basin Plan*, and, as they are met, will be in conformance with the goals of the aforementioned water quality control plans and will protect and maintain existing beneficial uses of the groundwater.
19. The permitted discharge is consistent with the anti-degradation provisions of State Board Resolution No. 68-16 (Anti-degradation Policy). The discharge may result in some localized temporary exceedance of background concentrations of dissolved oxygen, dissolved ferrous iron, total dissolved solids, sulfate, chloride, and boron. However, any parameter change resulting from the discharge:
 - a. will be consistent with maximum benefit to the people of the State,
 - b. will not unreasonably affect present and anticipated beneficial uses of such waters, and
 - c. will not result in water quality less than that prescribed in the Water Quality Control Plan for groundwater within the Central Basin of the Los Angeles Coastal Plain.
20. This Regional Board has assumed lead-agency role for this project under the California Environmental Quality Act (CEQA) (Public Resources Code section 21000 et seq.) and has conducted an Initial Study in accordance with section 15063 of the "State CEQA Guidelines" at California Code of Regulations, title 14, section 15000 et seq. Based upon the Initial Study, Regional Board staff prepared a Negative Declaration that the project, as mitigated, will not have a significant adverse effect on the environment.
21. The Regional Board has notified the Discharger and interested agencies and persons of its intent to prescribe Waste Discharge Requirements for this discharge and has provided them with an opportunity to submit their written views and recommendations. The Regional Board, in a public meeting, heard and considered all comments pertaining to the discharge and to the tentative requirements.
22. Copies of the Initial Study, the proposed Mitigated Negative Declaration, and Tentative Waste Discharge Requirements were transmitted to all agencies and persons known to be interested in the matter.
23. Regional Board staff has addressed all comments received. The Regional Board considered all testimony and evidence at a public meeting held on March 9, 2006, and a good cause was found to approve the Initial Study and adopt a Negative Declaration.

THEREFORE BE IT RESOLVED BY THE REGIONAL BOARD THAT:

1. The Regional Board hereby approves the Environmental Checklist and adopts the Negative Declaration for the Exxon Mobil Corporation, 20310 Madrona Avenue, Torrance, project known as Injection of Calcium Polysulfide for the Remediation of Groundwater and Soil.
2. A copy of this Resolution shall be forwarded to the State Water Resources Control Board.
3. A copy of this Resolution shall be forwarded to all interested parties.

4. The discharge of calcium polysulfide into the shallow aquifer shall conform to all the requirements, conditions, and provisions set forth in A. *"Discharge Specifications,"* B. *"Discharge Prohibitions,"* and C. *"Provisions"* of ORDER NO. R4-2004-0179.

CERTIFICATION

I, Jonathan Bishop, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of a Resolution adopted by the California Regional Water Quality Control Board, Los Angeles Region on March 9, 2006.

JONATHAN S. BISHOP
Executive Officer

March 9, 2006
Date