CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

ORDER NO. R4-2004-0076

WASTE DISCHARGE REQUIREMENTS
FOR
CONOCOPHILLIPS COMPANY
FORMER 76 STATION NO. 3234
(OZONE INJECTION FOR GROUNDWATER CLEANUP)
(ID NO. 914230325)

The California Regional Water Quality Control Board, Los Angeles Region, (hereafter Regional Board) finds that:

PURPOSE OF ORDER

1. The ConocoPhillips Company (hereafter Discharger) owns the former 76 Station No. 3234 (Station) located at 13271 Moorpark Street, Sherman Oaks, California (site) (Figure 1). On March 21, 2003, the Discharger filed with the Regional Board a Report of Waste Discharge for injecting gaseous ozone into the shallow aquifer to remediate the contaminated groundwater at the site.

FACILITY DESCRIPTION

2. The Station was constructed in 1967 and operated as a retail motor vehicle fuel service station until October 2001 when it was closed for business. Two underground storage tanks (USTs), three fuel dispenser islands, one waste oil tank, one clarifier, and three hydraulic hoists were removed from the site between March and May 2002. The site is currently vacant and is surrounded by a chain-link fence.

3. In 1992, petroleum hydrocarbon contaminated soil was discovered at the site during a leak detection investigation with soil borings and installations of groundwater monitoring wells (MW-1 through MW-3) (Figure 2). Laboratory analytical results of the investigation indicated the presence of petroleum hydrocarbon contaminated soil at depths between 5 and 20 feet below ground surface (bgs) throughout the southwest portion of the site, adjacent to the gasoline and waste oil USTs, and fuel dispensers. Maximum concentrations of 13,000 milligrams per kilogram (mg/kg) petroleum hydrocarbons as gasoline (TPH_G) and 130 mg/kg benzene were reported in soil samples collected during this investigation. The maximum hydrocarbon concentration in groundwater included 70,000 micrograms per liter (µg/L) TPH_G and 10,000 µg/L benzene in the groundwater sample collected from well MW-3, adjacent to the former waste oil UST.

4. In August 1996, monitoring well MW-1 was abandoned and well MW-4 was installed during station upgrade activities. In addition, a horizontal vapor extraction well header (HW-1) was installed in the northern portion of the tank pit to facilitate future remediation activities (Figure 2).

5. Between September 1997 and February 2002, three additional soil borings (E8 through E10) were drilled and ten additional groundwater monitoring wells (MW-5 through MW-14) were installed on-site and off-site (Figure 2). Maximum concentrations of 710 mg/kg TPH_G, 9.2 mg/kg benzene, and 4.4 mg/kg of methyl tertiary butyl ether (MTBE) were detected in soil samples collected at depths of 15 feet bgs or greater. Quarterly groundwater monitoring results obtained from 1997 to 2003 indicated that TPH_G, benzene, toluene, ethylbenzene, total xylenes (BTEX) and MTBE were present in all monitoring wells except MW-5. According to the most recent Quarterly Monitoring Report (July through September 2003), the highest concentrations of TPH_G (110,000 µg/L) and benzene (8,300 µg/L) were detected in monitoring well MW-7, and the highest concentration of MTBE (53,000 µg/L) was detected in monitoring well MW-3.

SITE HYDROGEOLOGY

6. The most recent depth to groundwater at the site (measured on August 25, 2003) ranged from 20.62 feet to 22.97 feet bgs. Groundwater flow direction is to the southeast (Figure 3).

7. The site is located in the eastern portion of the San Fernando Groundwater Basin, which is bounded on the east and northeast by the San Rafael Hills, Verdugo Hills and San Gabriel Mountains; on the north by the San Gabriel Mountains and the eroded southern limb of the Little Tujunga Syncline (which separates the San Fernando Groundwater Basin from the Sylmar Basin to the north), on the northwest and west by the Santa Susana Mountains and the Simi Hills; and on the south by the Santa Monica Mountains. Groundwater in the basin moves predominantly in an easterly direction toward the basin discharge area at the Los Angeles River Narrows, with groundwater along the northern and southern basin boundaries moving toward the southeast and northeast, respectively.

REMEDIATION DESCRIPTION

8. In April 2001, the Discharger submitted a Remedial Action Plan (RAP) for an enhanced bioremediation pilot test. In August 2002, Regional Board staff requested the Discharger prepare a revised RAP to include an evaluation of alternative remediation methods to cleanup the soil and control the migration of the groundwater contamination plume offsite.

9. On October 2, 2002, the Discharger submitted a revised RAP proposing to use C-Sparge™ ozone injection technology to remediate the dissolved-phase petroleum hydrocarbon plume beneath the site. The revised RAP was approved by Regional Board staff on January 22, 2003.

10. A total of ten sparge well locations (CS-1A/B, CS-2A/B, CS-3, CS-4A/B, CS-5A/B, CS-6, CS-7, CS-8, CS-9, CS-10), some of which will be dual-nested, are proposed to be installed onsite within and around the dissolved-phase petroleum hydrocarbon plume. Each perforated sparge point is approximately 2 feet in

length and will be installed at depths of 28 to 30 feet bgs, 33 to 35 feet bgs, 45 to 48 feet bgs, 53 to 55 feet bgs, or 63 to 65 feet bgs.

11. The C-Sparge™ system operations will use microbubbles [10 to 50 micrometers (µm) in diameter] of encapsulated ozone discharged below the water table. During sparging, no groundwater or vapors will be extracted. No other known constituents will be discharged to the subsurface during system operations. Sparging will be performed on a cycled basis with each well cycled on for 5 to 10 minutes. The C-Sparge™ system will inject approximately five grams per hour of ozone at a flow rate of 3 to 6 cubic feet per minute (cfm). The concentration of ozone injected into the subsurface is adjustable from 100 to 300 parts per million in volume (ppmv) based on the concentration of oxygen input.

12. The Discharger states that ozone will lose its stability within a few hours to a few days and therefore will not migrate significantly downgradient. In addition, ozone will chemically react with hydrocarbons in the immediate vicinity of each injection point to form intermediate by-products of various smaller chain hydrocarbons and oxygenates. The following table shows the laboratory-isolated breakdown by-products that could be produced during the ozone oxidation process with the hydrocarbons:

Constituent	Breakdown Products
TPH	acetate, butyrate, formate, propionate
BTEX	Carboxylic acids
MTBE	TBA (tertiary butyl alcohol), TBF (tertiary butyl formate), formate, oxygen, hydrogen peroxide
ETBE	TBA, TBF, acetate, oxygen, hydrogen peroxide
TBA	Formaldehyde, acetate, carbon dioxide, water

Finally, the residual oxygen from the reaction encourages bioremediation which consumes the listed by-products and converts them to carbon dioxide and water.

13. Prior to initiating the C-Sparge™ technology, groundwater samples will be collected from monitoring wells MW-2, MW-3, MW-5, MW-6, MW-7, MW-8, MW-9, MW-10, MW-11, MW-12, MW-13, and MW-14 for baseline measurements of depth to groundwater, TPH_G, BTEX, MTBE, TBA, tertiary amyl methyl ether (TAME), di-isopropyl ether (DIPE), ethyl tertiary butyl ether (ETBE), ethanol, dissolved oxygen, and dissolved ferrous iron. These samples will also be collected bi-weekly during the first month of system operation. Data collected during the first month of system operation will be used to evaluate the C-Sparge™ effectiveness at this site.

APPLICABLE LAWS, PLANS, POLICIES AND REGULATIONS

14. 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 Order implements the plans, policies and provisions of the Regional Board's Basin Plan.

15. The Basin Plan designated beneficial uses and water quality objectives for groundwater within the San Fernando Groundwater Basin which underlies the site as follows:

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

16. 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.

17. 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 the San Fernando Groundwater Basin.

18. The 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 Mitigated Negative Declaration that the project, as mitigated, will not have a significant adverse effect on the environment. The Regional Board is

adopting the Mitigated Negative Declaration concurrently with its adoption of this Order.

19. 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.

IT IS HEREBY ORDERED that the Discharger, ConocoPhillips Company, in order to meet the provisions contained in Division 7 of the California Water Code and regulations and guidelines adopted thereunder, shall comply with the following:

A. Discharge Specifications

1. The discharge (injection) of ozone into the groundwater shall be performed only in accordance with the C-Sparge™ system operations described in the October 2, 2002 revised RAP.

2. The Discharger shall provide hydraulic controls, if required by the Regional Board Executive Officer (Executive Officer), that provide full and complete containment of any released materials or by-products of chemical processes, for the duration of the C-Sparge™ system operations.

3. During the C-Sparge™ system operations, the discharge volume of ozone shall be approximately five grams per hour of ozone at a flow rate of 3 to 6 cubic foot per minute (cfm). In the event that additional ozone discharge is needed, written approval by the Executive Officer shall be obtained before such discharge is carried out.

B. Discharge Prohibitions

1. The Discharger shall not allow the by-products of the chemical reduction process to migrate beyond the plume.

2. The Discharger shall not cause the groundwater outside of the remediation area to exceed background concentrations of total dissolved solids, sulfate, chloride, and boron established prior to start of the C-Sparge™ system operations.

3. The discharge of ozone or any by-products into any surface water or surface water drainage course is prohibited.

4. The Discharger shall not cause the groundwater to contain taste, color, or odor producing substances in concentrations that cause nuisance or adversely affect beneficial uses outside the treatment area.

5. The Discharger shall not cause the groundwater to contain concentrations of chemical constituents, including ozone and its by-products in amounts that may adversely affect municipal, domestic, industrial or agricultural uses.

C. Provisions

1. This Order includes the attached Monitoring and Reporting Program No. CI-8753 which is incorporated herein by reference. If there is any conflict between provisions stated in the Monitoring and Reporting Program No. CI-8753 and the Standard Provisions, those provisions stated in the Monitoring and Reporting Program prevail.

2. A copy of this Order shall be maintained at an on-site office and be available at all times to operating personnel.

3. In the event of any change in name, ownership, or control of this site, the Discharger shall notify the Regional Board in writing and shall notify any succeeding owner or operator of the existence of this Order by letter, a copy of which shall be forwarded to the Regional Board.

4. The Discharger shall file with the Regional Board technical reports on self-monitoring work performed according to the detailed specifications contained in Monitoring and Reporting Program No. CI-8753 as directed by the Executive Officer. The results of any monitoring done more frequently than required at the site and/or times specified in the Monitoring and Reporting Program shall also be reported to the Regional Board.

5. In accordance with section 13260(c) of the California Water Code, the Discharger shall file a report of any material change or proposed change in the character, location, or volume of the discharge.

6. Discharge of wastes to any point other than specifically described in this Order is prohibited and constitutes a violation thereof.

7. This Order includes the attached *Standard Provisions Applicable to Waste Discharge Requirements* which are incorporated herein by reference. If there is any conflict between provisions stated herein and the *Standard Provisions Applicable to Waste Discharge Requirements*, the provisions stated herein will prevail.

8. The Discharger shall notify Regional Board staff by telephone within 24 hours, followed by written notification within one week, in the event it is unable to comply with any of the conditions of this Order due to:

   a) Breakdown of equipment;
   b) Accident caused by human error or negligence, or other causes such as acts of nature; and
   c) Site construction or development operations.

9. The Regional Board considers the Discharger to have continuing responsibility for correcting any problem that may arise in the future as a result of this discharge.

10. The Discharger shall submit quarterly Summary Reports detailing the results of the C-Sparge™ system operations. The report should include an evaluation of the effectiveness of using ozone to remediate petroleum hydrocarbons impacted groundwater at the site, the impact of any by-products on the receiving groundwater quality, and any other effects the in-situ treatment may have caused.

11. All work must be performed by or under the direction of a California registered civil engineer, registered geologist, or certified engineering geologist, as provided in sections 6762, 7850, and 7842, respectively, of the California Business and Professional Code. A statement is required in all technical submittals that the registered professional in direct responsible charge actually supervised or personally conducted all the work associated with the project.

12. The application of ozone to groundwater may result in unintended adverse impacts to groundwater quality. Any potential adverse water quality impacts that may result shall be localized and short-term duration, and shall not impact any existing or prospective uses of groundwater. Groundwater quality shall be monitored before addition of ozone, during treatment, and after treatment is completed to verify no long-term adverse impact to water quality.

13. The Discharger shall cleanup and abate the effects of injecting ozone, including extraction of any by-products which adversely affect beneficial uses, and shall provide an alternate water supply source for municipal, domestic or other water use wells that become contaminated in exceedance of water quality objectives as a result of using ozone.

14. These requirements do not exempt the Discharger from compliance with any other laws, regulations, or ordinances, which may be applicable. They do not legalize the waste treatment facility, and they leave unaffected any further restraints on the site that may be contained in other statutes and/or required by other agencies.

15. This Order does not relieve the Discharger from responsibility to obtain other necessary local, state, and federal permits to construct facilities necessary for compliance with this Order; nor does this Order prevent imposition of additional standards, requirements, or conditions by any other regulatory agency.

16. The Discharger shall furnish, within a reasonable time, any information the Regional Board may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order. The

Discharger shall also furnish to the Regional Board, upon request, copies of records required to be kept by this Order.

17. After notice and opportunity for a hearing, this Order may be terminated or modified for cause including, but not limited to:

    a) Violation of any term or condition contained in this Order;
    b) Obtaining this Order by misrepresentation, or failure to disclose all relevant facts;
    c) A change in any condition that requires either a temporary or permanent reduction or elimination of authorized discharge.

18. In accordance with California Water Code section 13263(g), these requirements shall not create a vested right to continue to discharge and are subject to rescission or modification. All discharges of waste into the waters of the State are privileges, not rights.

19. 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 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]

D. Expiration Date:

This Order expires on May 6, 2009.

The Discharger must file a Report of Waste Discharge in accordance with sections 13260 and 13264 of the California Water Code not later than 180 days in advance of such date as application for issuance of new waste discharge requirements.

I, Dennis A. Dickerson, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Los Angeles Region, on May 6, 2004.

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Dennis A. Dickerson,
Executive Officer