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

RESOLUTION NO. R04-010

APPROVING THE ENVIRONMENTAL CHECKLIST AND ADOPTING A MITIGATED NEGATIVE DECLARATION FOR CONOCOPHILLIPS COMPANY 76 STATION NO. 6965 (OZONE INJECTION FOR GROUNDWATER CLEANUP) (FILE NO. 908080170, CUFID # 13344)

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

1. The ConocoPhillips Company (hereafter Discharger) owns the 76 Station No. 6965 (Station) located at 3014 N. Studebaker Road, Long Beach, California (site). On April 8, 2003, the Discharger filed with the Regional Board a Report of Waste Discharge for the injection of gaseous ozone/air mixture (ozone sparging) to remediate the petroleum hydrocarbon contaminated groundwater in the shallow aquifer at the site.

2. The Station is an active retail motor vehicle fuel service station consisting of two underground storage tanks (USTs) containing gasoline, one UST containing diesel, three dispenser islands, associated product distribution piping, and a station building. The in-place USTs are located in the same general locations as four 12,000 gallon USTs removed from the site in 1994. The area surrounding the Station includes a mixture of commercial and residential uses.

3. In a report prepared on behalf of the Discharger by SECOR International, Inc., dated November 15, 2001, the following assessment history information was reported.

4. In June 1994, four 12,000-gallon USTs, dispensers, and associated product piping were removed from the site. The USTs were reported as formerly containing gasoline and diesel. Soil samples were collected from the site. Total petroleum hydrocarbons as gasoline (TPH_G) concentrations in soil samples collected from the limits of the excavation ranged from 1.1 to 1,000 milligrams per kilogram (mg/kg), total petroleum hydrocarbons as diesel (TPH_D) concentrations ranged from below laboratory detection limits to 760 mg/kg, and benzene concentrations ranged from below laboratory detection limits to 4.4 mg/kg. All excavated material was transported offsite for disposal (Bechtel Environmental, Inc., 1994).

5. In September 1995, Tait Environmental Management (TEM) conducted additional assessment activities at the site. A total of ten soil borings were advanced around the perimeter of the dispenser islands and USTs to depths ranging from 20 to 35 feet below grade (fbg). Detectable concentrations of TPH_G and benzene were reported in soil

samples collected from the vicinity of the USTs and northern dispenser island. TPH_D was not detected in any soil samples analyzed. Three of the soil borings were completed as nested monitoring wells screened within the vadose and saturated zones. The nested monitoring wells were screened from 3 to 18 fbg and from 25 to 35 fbg. Additionally, one soil boring (B-5) was completed as a vadose monitoring well screened from 3 to 17 fbg. Groundwater beneath the site was encountered during drilling at approximately 26 fbg, however the piezometric pressure elevated the static water level in the monitoring wells to approximately 17 fbg. Dissolved concentrations of TPH_G and benzene were detected as high as 5,200 micrograms per liter (ug/L) and 1,600 ug/L, respectively, in monitoring well B-1. TPH_D was not detected in groundwater (TEM, 1995).

6. No phase-separated hydrocarbon was observed in any of the groundwater monitoring wells. Dissolved benzene concentrations in groundwater samples ranged from below laboratory detection limits to 930 ug/L, dissolved MTBE concentrations ranged from below laboratory detection limits to 1,100 ug/L and dissolved TPH_G concentrations ranged from below laboratory detection limits to 6,600 ug/L (SECOR, 2001).

7. Initial cleanup activities began at the site in June 1994 when four 12,000 gallon USTs were removed. Approximately 700 tons of petroleum hydrocarbon contaminated soil were also removed from the site. Soil and assessment activities continued into May 2001, when the Regional Board approved the initial Interim Remedial Action Plan (IRAP) which proposed pilot testing for soil vapor extraction.

8. In November 2001, the Discharger submitted a revised IRAP proposing the use of high-vacuum dual phase extraction technologies (HVDPE) to improve remediation. Regional Board staff approved the revised IRAP in correspondence dated January 18, 2002. In July, 2002, the Discharger submitted a second revised IRAP which proposed HVDPE to remediate soil contamination and ozone sparging to remediate groundwater contamination. The Regional Board approved the July 2002 IRAP in correspondence dated November 15, 2002. In correspondence dated November 6, 2003, the Regional Board acknowledged the Discharger's request to change soil and groundwater remediation methodology from HVDPE to soil vapor extraction (SVE). The Discharger expects to initiate the operation of the SVE system by May 2005.

9. The site is located approximately one-half mile west of the San Gabriel River and approximately 4 miles north of the Pacific Ocean. The site is located within the Dominguez Gap area of the Los Angeles Coastal Plain.

10. The site is situated in the City of Long Beach at the southern boundary of the Central Basin of the Los Angeles Coastal Plain. The Central Basin has been divided into the Los Angeles Forebay, the Montebello Forebay, the La Brea subarea, and the Central Basin Pressure Area. The site is located within the Central Basin Pressure Area where groundwater used for municipal supply is under confined conditions. The Central Basin Pressure Area also has locally occurring perched or semi-perched water-bearing zones (Miller Brooks Environmental, Inc., July 2002). The groundwater cleanup operations proposed are for the plume in the local shallow groundwater zone.

11. On July 15, 2002, Miller Brooks Environmental, Inc., on behalf of the Discharger, submitted an Updated Site Conceptual Model to the Regional Board proposing ozone sparging (injection of ozone to groundwater) by the use of a C-Sparge™ system (System) to remediate the dissolved-phase petroleum hydrocarbon plume beneath the site. The Regional Board approved the proposal in correspondence dated November 15, 2002.

12. The System consists of a control panel (which houses an ozone generator and a small compressor), the underground conveyance piping, and the sparge wells. The ozone generator consists of a corona discharge tube which ionizes di-atomic oxygen into ozone. The System can generate 3 to 6 standard cubic feet per minute (SCFM) of an ozone/air mixture at a maximum pressure of approximately 60 pounds per square inch (psi). The concentration of ozone in the system's output flow is adjustable from 100 to 300 parts per million by volume (ppmv) based on the concentration of oxygen input. The encapsulated ozone microbubbles sparged below the water table by the System are only 10 to 50 micrometers (µm) in diameter.

13. A total of four sparge point locations are proposed for the operation of the System. There will be dual nested sparge well-points for each location. The shallow sparge well-points will be perforated along a depth of 23 feet to 25 fbg. The deeper sparge well-points will be perforated along a depth of 33 feet to 35 fbg.

14. Sparging will be performed on a cycled basis with each well cycled on for 5 to 15 minutes. Per manufacturer specifications, the System will inject approximately five grams per hour of ozone at a flow rate of 3 to 6 SCFM. The concentration of ozone injected into the subsurface during system operations will be approximately 0.59 milligrams per liter (mg/L)

15. No other known constituents will be discharged to the subsurface during system operations.

16. 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 formed from the initial ozone reduction reaction encourages bioremediation which consumes the listed by-products and converts them to carbon dioxide and water, thereby completing the remediation process.

17. Ozone is toxic to life forms at high concentrations and can be corrosive to underground structures and piping conveyance systems. Therefore, these concerns must be addressed for any proposed ozone sparging system to insure that the operation will preclude fugitive emissions that could represent a health risk or a corrosion risk.

    The System is designed to match the ozone supplied with the demand requirements of the contaminant. Furthermore, ozone has an expected half-life of only 20 minutes and reacts quickly with contaminants. Consequently, ozone would be expended quickly and would not be expected to migrate significantly downgradient or into the vadose zone.

18. Ozone sparging results in a low-exothermic reaction that involves no explosive risk. It has been reported that the process has been successfully and safely used in remediation efforts in over 32 states and in 22 counties in the state of California.

19. In locations where groundwater has excessive levels of tri-valent chromium or brominated hydrocarbons, an evaluation should be made to insure that toxic levels of hexavalent chromium or bromides/bromate compounds are not created. In this site, there are no known problems with tri-valent chromium or brominated hydrocarbons.

20. The permeabilities associated with the soils in the groundwater zones proposed for ozone sparging are estimated to be 10^{-6} centimeters per second or greater. This represents an optimal range for the success of the ozone perfusion process.

21. Prior to initiating the C-Sparge™ technology, groundwater samples will be collected from monitoring wells B-2, MW-10, MW-11, MW-13, and MW-14 for baseline measurements of depth to groundwater, TPH_G, benzene, toluene, ethylbenzene, xylenes, MTBE, TBA, tertiary amyl methyl ether (TAME), di-isopropyl ether (DIPE), ethyl tertiary butyl ether (ETBE), ethanol, dissolved oxygen, and dissolved ferrous iron. These measurements/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.

22. 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.

23. The Basin Plan designates beneficial uses and water quality objectives for groundwater within the Central Groundwater Basin which underlies the Station as follows:

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

24. The requirements contained in the waste discharge requirements Order for this project 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.

25. 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 Central Groundwater Basin.

26. This Regional Board has assumed lead-agency role for this project under the California Environmental Quality Act (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, the Regional Board staff prepared a Mitigated Negative Declaration that the project, as mitigated, will not have a significant adverse effect on the environment.

27. 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.

28. Copies of the Initial Study, the Mitigated Negative Declaration and Tentative Waste Discharge Requirements were transmitted to all agencies and persons known to be interested in the matter.

29. All comments received have been addressed by Regional Board staff. The Regional Board considered all testimony and evidence at a public hearing held on **July 1, 2004, at the City of Simi Valley City Council Chambers, 2929 Tapo Canyon Road, Simi Valley, California**, and good cause was found to approve the Environmental Checklist and adopt a Mitigated Negative Declaration.

THEREFORE BE IT RESOLVED THAT:

1. This Regional Board hereby approves the Environmental Checklist and adopts the Mitigated Negative Declaration for the ConocoPhillips Company, 76 Station No. 6965, Long Beach, project known as Injection of Gaseous Ozone for the Remediation of Groundwater.

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 ozone into the shallow aquifer shall conform with all the requirements, conditions, and provisions set forth in *A. "Discharge Specifications," B. "Discharge Prohibitions,"* and *C. "Provisions"* of ORDER NO. R4-2004-0110.

CERTIFICATION

I, Jonathan Bishop, Interim 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 July 1, 2004.

_____ July 1, 2004
Jonathan Bishop Date
Interim Executive Officer

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