

**STATE OF CALIFORNIA  
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LOS ANGELES REGION  
320 West 4<sup>th</sup> Street, Suite 200, Los Angeles, California 90013**

**FACT SHEET  
WASTE DISCHARGE REQUIREMENTS  
FOR  
NAVAL BASE VENTURA COUNTY**

**OZONE INJECTION**

**ORDER NO. R4-2005-0030 (SERIES NO. 021)  
CI-8923 FILE# 94-073**

**FACILITY ADDRESS**

Pacific and Islip Roads  
Naval Base Ventura County  
Port Hueneme Facility  
Port Hueneme, CA 93043

**FACILITY MAILING ADDRESS**

Mr. Steve Granade  
Naval Base Ventura County  
Environmental Division, Code N45V  
311 Main Road, Suite #1  
Point Mugu, CA 93042-5000

**PROJECT DESCRIPTION**

The site does not have an address. It is located near the intersection of Pacific and Islip Roads, at the existing Equilon test plot, (Latitude 34° 9' 45", Longitude -119° 12' 13") (Figures 1, 2, 3, and 4). Naval activities began at the Port Hueneme facility in 1940. A gas station, built in 1950, is located at the southeast corner of 23<sup>rd</sup> Avenue and Dodson Street, at the Port Hueneme facility. A plume of groundwater contaminated with dissolved fuel hydrocarbons including benzene, toluene, ethylbenzene, xylenes, (BTEX) and methyl tertiary butyl ether (MTBE), was discovered beneath and downgradient from the gas station in 1985. Detectable BTEX is present approximately 800 feet downgradient of the gas station, while detectable MTBE extends approximately 5,600 feet downgradient (southwest) from the gas station.

To control the migration of MTBE, three in-situ, flow through, bioremediation barriers (biobarriers) have been installed along the plume (Figure 2). The initial biobarrier was installed about 850 feet downgradient of the gas station. Based on the success of that installation, two additional biobarriers were installed; one at midplume approximately 2,500 feet downgradient and at the toe of the plume approximately 5,600 feet downgradient. The biobarriers control migration of petroleum hydrocarbons contamination.

Shell Global Solutions and Arizona State University in conjunction with The U.S. Navy are planning to evaluate the efficacy (radius of influence) and most efficient mode of operation for three groundwater oxygen delivery technologies. One of the systems being evaluated is the Kerfoot Technologies C-Sparge system which utilizes ozone as part of the oxygen delivery mechanism as described by the equation  $O_3 + H^+ + 2e^- \rightarrow O_2 + H_2O$ . The evaluation will be conducted at the existing Equilon test plot. This location is within the MTBE plume, approximately 2,000 feet downgradient of the point of release and 500 feet above the mid-plume biobarrier (Figure 2). The test plot measures approximately 60 feet by 100 feet (Figure 3). The test plot was formerly used by Shell Global Technologies and Arizona State University to evaluate the potential for in situ bioremediation for groundwater contaminated with MTBE.

## **VOLUME AND DESCRIPTION OF INJECTION**

Ozone will be delivered to groundwater using the C-Sparge system. Ozone generated by the system will be injected at a maximum concentration of 6% (by volume) in air via a single 30' diffuser set at 17.5 feet to 20 feet below grade. The diffuser will be installed using direct push methods. The initial injection is estimated at 2 standard cubic feet per minute (scfm) of the 6% ozone mix in air (a total injection volume of 80 ft<sup>3</sup> daily, with an ozone injection volume of 5 ft<sup>3</sup> daily (0.7 lb.)). Groundwater dissolved oxygen concentrations will be monitored with both shallow and deep monitoring wells at 16 locations about the point of injection as shown in Figure 4. Based on system performance, the ozone injection rate will likely be adjusted to maximize both O<sub>2</sub> distribution and operating efficiency. The maximum injection of ozone is not expected to exceed 50 ft<sup>3</sup>/day (7 lb.).

The duration of the test is not expected to exceed six months.

Details of the test procedures, methods, and evaluation plan are included in a document titled, *Permit Package for Project Review Board, Test of Oxygen Delivery System Efficiency*, dated June 22, 2005. The Workplan was approved in a Regional Board letter dated June 27, 2005.

The injection of ozone into the groundwater are discharges of waste as defined in Section 13260 of the California Water Code. However, the discharges are intended to provide useful information on the most efficient method of oxygen delivery to groundwater as part of in-situ flow through bioremediation barriers such as those utilized along the MTBE plume at Naval Base Ventura County.

The Water Quality Control Plan for the Los Angeles Region designates the groundwater in the Oxnard Plain Basin for beneficial uses including municipal and domestic supply, industrial process supply, industrial service supply, and agricultural supply.

The permitted discharge is consistent with the antidegradation provisions of State Water Resources Control Board Resolution No. 68-16 (Anti-degradation Policy). The discharge is not anticipated to affect general groundwater chemistry within the plume area and is likely to reduce MTBE concentrations during the period of operation.

A "Form 200, Report of Waste Discharge" for this project was received on June 22, 2005. Regional Board staff documented that the form was complete in a letter dated June 27, 2005.

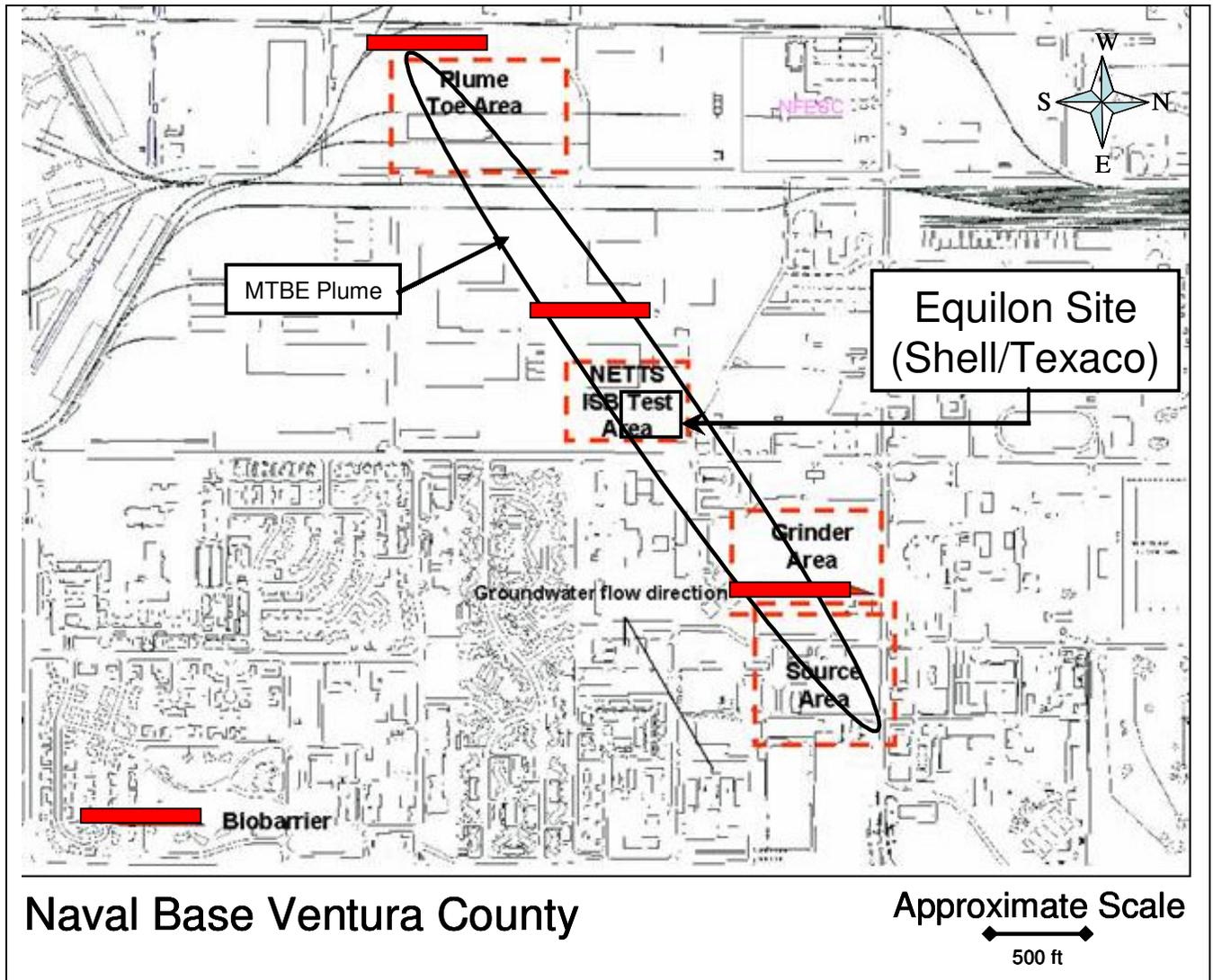


Figure 2: Map of Naval Base Ventura County with MTBE Plume, Locations of Biobarrier Installations, and Location for Study

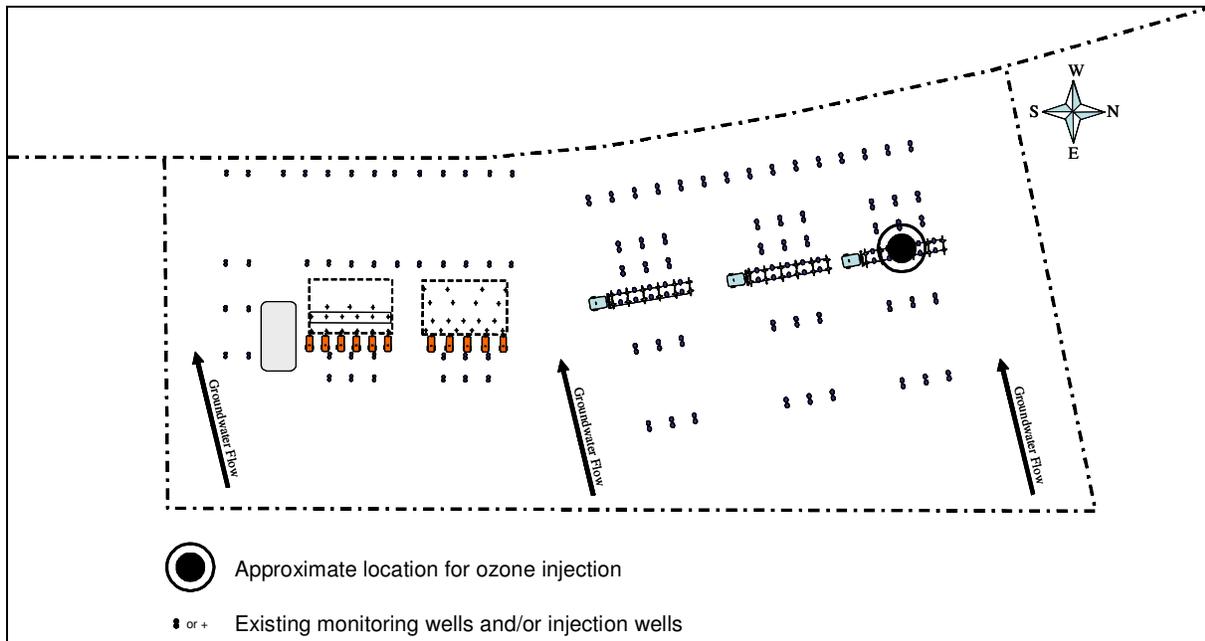


Figure 3: Layout of Test Site With Existing Infrastructure, Network of Existing Monitoring Wells, and Location for Ozone Injection and Associated Monitoring Network (details for which are shown in Figure 3)

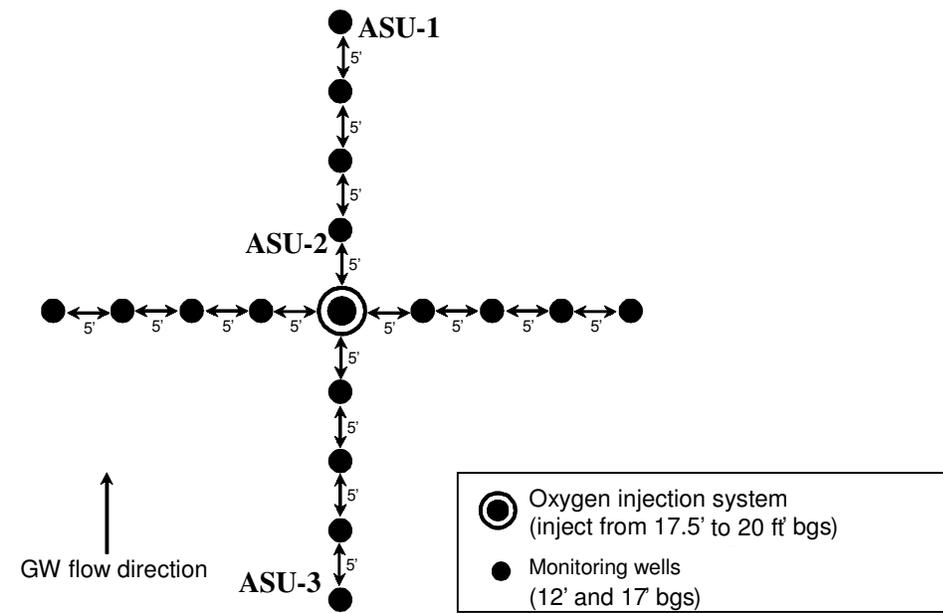


Figure 4: Detail of Groundwater Monitoring Network for Study