



Consulting Group, Inc.

ISCO CASE STUDY: USE OF PEROXIDE ACTIVATED SODIUM PERSULFATE FOR TREATMENT OF BTEX AND MTBE, LAKE SHASTA, CA

INTRODUCTION

In July 2008, JAG Consulting Group, Inc., implemented a peroxide activated sodium persulfate groundwater treatment at a former marina UST site at Lake Shasta, California. Peroxide activated sodium persulfate was selected to remediate the groundwater plume due to its rapid timeframe and cost effectiveness.



PROJECT BACKGROUND

The Site is a former UST marina fueling facility located on the North shore of Lake Shasta. Near the source area, elevated levels of BTEX, MTBE, and TAME were present. The treatment area consists of an area which measured approximately 45 feet by 85 feet (3,825 square feet) near the former underground storage tanks (USTs). The soils at the Site consisted primarily of silts and sands to a depth of 62 feet. The depth to groundwater at the Site was approximately 20 feet below ground surface (bgs).

ISCO DESIGN

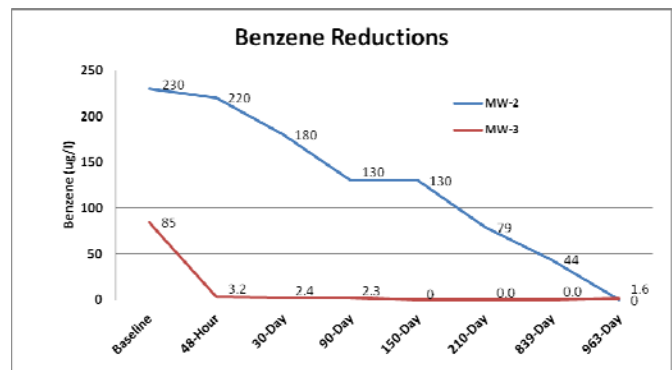
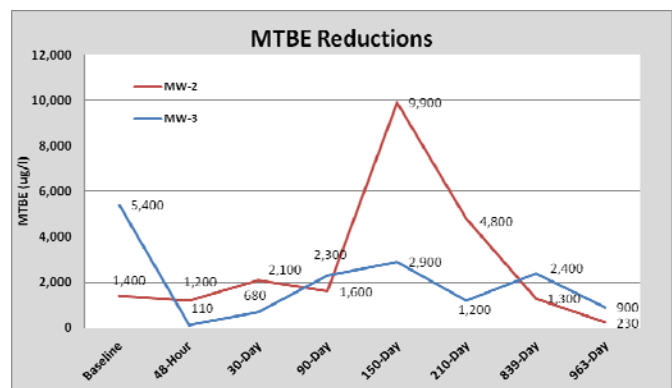
The ISCO treatment area was prepared by installation of 12 injection wells, with two of the wells being deep nested wells (screened from 50 to 70 feet) constructed alongside shallow wells (screened from 20 to 40 feet). Each well was estimated to have a radius of influence of approximately 13 feet each. Approximately 12,000 pounds of sodium persulfate were injected first, followed by injection of 11,700 gallons of 10% hydrogen peroxide to act as the catalyst. For safety reasons, no excess pressure was applied during the injections. The injections were performed simultaneously into all 12 injection wells using a manifold system.

The chemical oxidation process can be described as a controlled, moderate-high temperature, and low-

pressure application. In-situ temperatures between 120 and 130 degrees Fahrenheit were continuously monitored and maintained using thermocouples and data-loggers during the injections, which ensured the optimal generation of hydroxyl radicals and desorption of contaminants from the soil.

ISCO EFFECTIVENESS

An overall MTBE reduction of 91%, a TAME reduction of 85%, and a Benzene reduction of 100% was achieved as a result of the ISCO injections. Graphs of the MTBE and Benzene reductions following the ISCO injections are presented below. Note the dramatic increase in MBTE levels at Day 150 is believed to be due to a significant rise in the water table (re-saturating the smear zone). Dual phase extraction was performed as a polishing technology after ISCO.



Based on the declining trend of all contaminants, closure of the site (No Further Action) was granted by the Central Valley Regional Water Quality Control Board in August 2012.

CONTACT INFORMATION

JAG Consulting Group
Phone: 714-241-7722
Email: gary@jagconsultinggroup.com