Consulting Group, Inc.

CASE STUDY: IN-SITU CHEMICAL OXIDATION USING CATALYZED HYDROGEN PEROXIDE FOR TREATMENT OF A BTEX PLUME, WEST LOS ANGELES, CA

INTRODUCTION

In June 2003, while a Senior Project Manager with Tait Environmental, Gary Cronk was responsible for implementing a Catalyzed Hydrogen Peroxide groundwater treatment at a former gasoline station site in West Los Angeles, California. A combined soil vapor extraction and air sparging (SVE/AS) system had previously been used for five years to remediate the soil and groundwater beneath the site. The combined SVE/AS system was successful in removing most of the contamination under the site, but a significant dissolved BTEX plume extended approximately 150 feet down-gradient of the site. For cost reasons, in-situ chemical oxidation (ISCO) using the Catalyzed Hydrogen Peroxide was selected to remediate the remaining off-site groundwater plume.

PROJECT BACKGROUND

The Site was a typical gasoline station facility encompassing a small corner lot. The BTEX plume extended beneath a very busy intersection on Robertson Boulevard in West Los Angeles. To minimize disruption of the active commercial and retail businesses occupying the adjacent properties, the groundwater plume required treatment through the use of injection wells located in the street. The shallow groundwater zone consists of a low permeability clayey silt and sandy silt.

REMEDIATION SOLUTION

Engineering design of the ISCO application included 21 injection wells with an overlapping radius of influence of approximately 15 feet each. The injection wells were screened at depths of 30-45 feet. Injection rates were estimated to be low, on the average of about 0.25 gallons per minute. The ISCO injections were performed over a period of 20 days, working both a day shift and a night shift. Approximately 8,600 gallons of hydrogen peroxide were injected and then activated using a low pH ferrous iron solution (Fenton's type reaction). The injections were performed in six phases of 3-4 wells each, since only one lane of traffic could be blocked at a time to minimize disruption to the vehicular traffic.

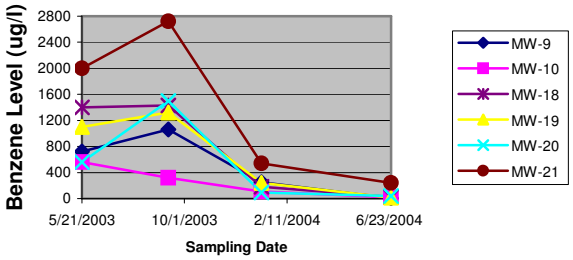
The chemical oxidation process utilized is described as a controlled, moderate-temperature and low-pressure application that ensures the optimal generation of hydroxyl radicals and superoxides. To determine treatment efficiency, contaminant mass was calculated

for the affected area prior to and after the hydrogen peroxide application.

REMEDIATION EFFECTIVENESS

An overall benzene reduction of 96% and a TPHg reduction of 93% was achieved as a result of the ISCO application. A summary of the dissolved benzene reductions from the ISCO application over a one year period is presented in the graph below.

Benzene Reductions in the Monitoring Wells



This project recently received a No Further Action (Final Closure) from the Los Angeles Water Quality Control Board, the first closure granted by this agency for a Hydrogen Peroxide ISCO treatment.

CONTACT INFORMATION

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