RNAS REMEDIATION PRODUCTS
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SEAL BEACH, CA – NAVAL WEAPONS STATION

SITE OVERVIEW

The Seal Beach Naval Weapons Station is a US Navy weapons and munitions loading and storage facility located in Seal Beach, California. From 1962 to 1973 NASA and its contractors utilized IRP Site 70 to design and manufacture the second stage of the Saturn V launch vehicle for the Apollo Program. Large quantities of TCE were released resulting in high concentrations of dissolved TCE in the surficial aquifer and suspected DNAPL in the source area.

GOALS AND CHALLENGES

Prior to treatment the plume extended approximately 4,000 feet downgradient of the source area, reached depths of up to 160 feet below ground surface and covered an area of about 75 acres. Active treatment targeted the plume area where TCE concentrations exceeded 250 µg/L. Remediation using a pump-and-treat system was largely ineffective at reducing contaminant mass or the overall extent of the plume. The primary treatment challenge is the large dissolved plume area and volume. A relatively high ground water flow velocity and high sulfate concentrations consumed electron donor and limited the longevity of electron donor injections.

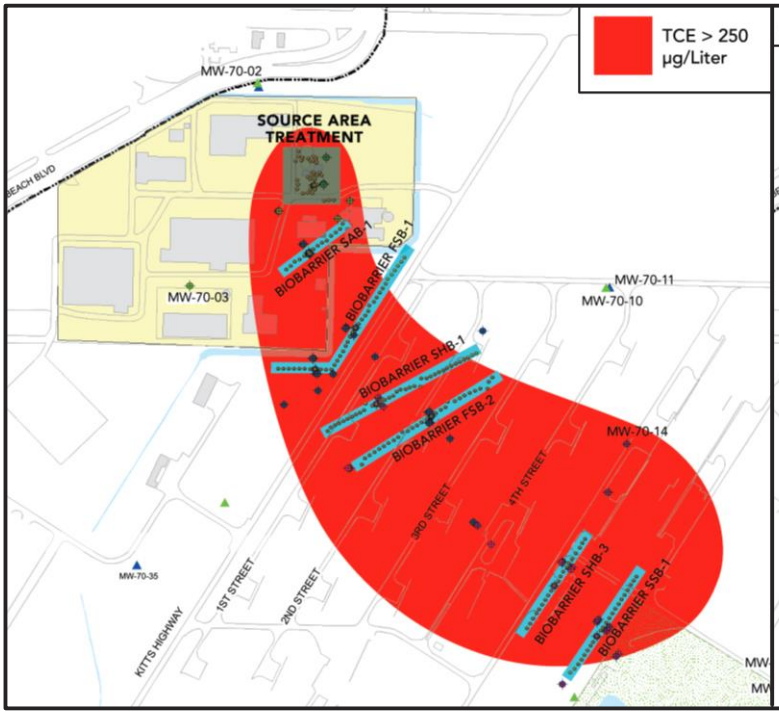
REMEDIATION APPROACH – NEWMAN ZONE EVO

Enhanced In Situ Bioremediation (EISB) was implemented to address the dissolved plume and source area. Newman Zone® emulsified vegetable oil (EVO) was selected for an electron donor because the small uniform oil droplet size allowed for large volume injections and circulation between widely spaced wells. Bioaugmentation using the SiREM KB-1® culture was also used to ensure complete dechlorination of TCE to ethene. Source area injections were completed in 2009 using 56 injection wells. Six biobarriers were used to treat the large dissolved plume using a total of 154 injection wells. The EVO solution was applied to the biobarriers using recirculation between the wells in 2010. Multiple screened intervals at each well location allowed injection over a large vertical interval.

RESULTS

By 2012 the extent of the dissolved TCE plume was dramatically reduced. Significant concentrations of daughter products DCE and VC were still present but strong evidence of complete dechlorination to ethene was observed in all biobarriers and the source area wells. Modeling predicts that maintaining the biobarrier activity for an extended number of years may be needed to reach final treatment goals.

2008 Baseline TCE Extent



2012 TCE Extent