Electronics Manufacturing Facility (EMF) CERCLA Site

CALIBRE
Our Success Follows Yours

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About CALIBRE

CALIBRE Systems, Inc. is an employee-owned management consulting and information technology solutions company supporting government and industry.

CALIBRE is committed to the success of our customers and delivers enduring solutions that solve management, technology, and program challenges.

Solutions That Make a Difference

We work in multidisciplinary teams, partnering with organizations to support mission-essential needs at every stage of program, product, and business lifecycles, and help achieve business objectives. This collaborative work style helps produce the results you seek – today and where you want to be tomorrow.

Project Scope

>> *The work completed on this Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) project has included: 1) Scoping/planning project based on data quality objectives (DQOs) to identify data gaps; 2) Preparing project work plans and quality assurance plans for site investigations; 3) Conducting Remedial Investigation and Feasibility Study (RI/FS); 4) Implementing pilot tests that were later expanded to plume-wide treatment; 5) Completing an Engineering Evaluation/Cost Analysis (EE/CA); and 6) Performing site wide monitoring and reporting.*

Benefits to the Customer

>> *Since joining this project, CALIBRE Systems, Inc. (CALIBRE) has successfully bounded the extent of the VOC plume and established multiple biological treatment zones for site remediation. The in-situ biological treatment has reduced contamination in groundwater to less than 0.1% the historical baseline levels and removed the VOC plume over an area extending 1,200 feet up gradient from the point of compliance.*

PROJECT SUMMARY

The former Electronics Manufacturing Facility (EMF) is located at Boeing Field/King County International Airport (KCIA) in Seattle, Washington (Figure 1). Past industrial activities at the EMF property resulted in a release of trichloroethene (TCE) to groundwater beneath the property and the volatile organic compound (VOC) plume has been transported by groundwater flow towards the Lower Duwamish Waterway (LDW), the down-gradient boundary of the site and point of compliance. The LDW is located approximately 3,600 feet from the EMF property.

The release of TCE at the EMF property was identified and reported in the 1980's with initial chlorinated VOC (CVOC) concentrations in excess of 400,000 ug/L (CVOCs as sum of TCE and its degradation daughter products). TCE was found at the site as a separate phase dense non-aqueous phase liquid (DNAPL). The TCE DNAPL served as a source of dissolved phase contamination, creating a stratified VOC plume between approximately 35 and 55 feet below ground surface (bgs) that migrated southwest towards the LDW. The contaminants of concern (COCs) at the EMF site are TCE, cis-1,2-dichloroethene

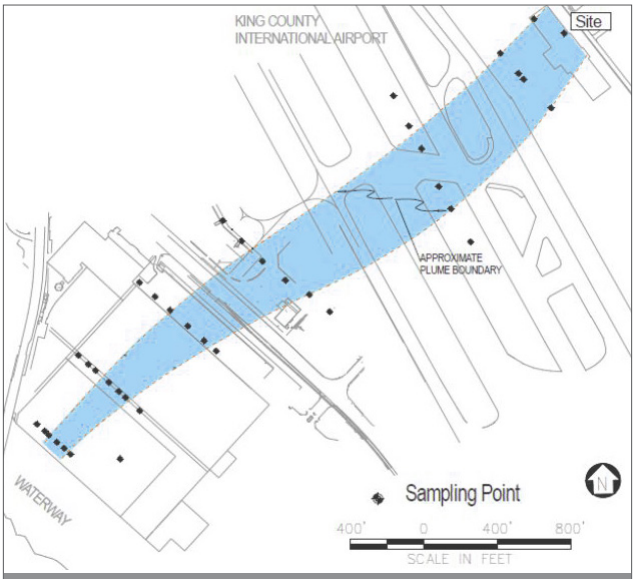

Figure 1 – Plume Configuration

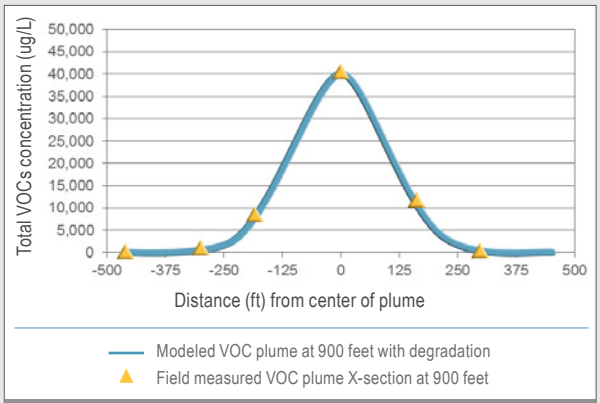

Figure 2 – Typical Plume Cross-Section

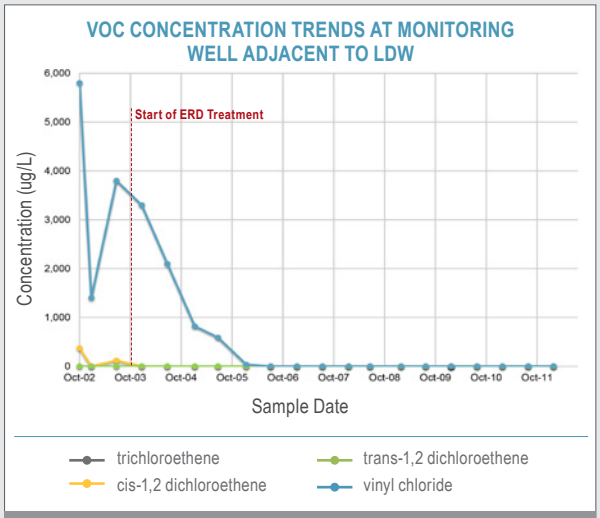

Figure 3 – Final monitoring well at LDW; 99.96% reduction in total CVOCs from pre-remedial action levels

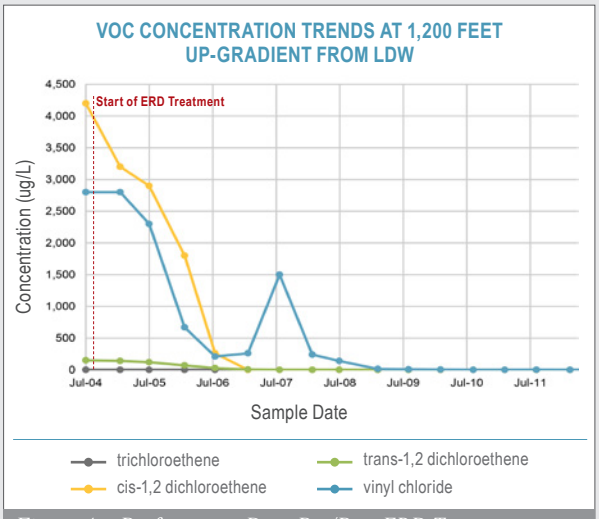

Figure 4 – Performance Data Pre/Post ERD Treatment at 1,200 feet up-gradient from waterway

(cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), and vinyl chloride.

CALIBRE implemented full scale in-situ chemical oxidation (ISCO) as source-area treatment (using permanganate and persulfate) in 2000. Subsequent groundwater monitoring demonstrated a 95% reduction in total VOCs (primarily DCE and vinyl chloride) from a well located immediately down gradient of the ISCO treatment area. A larger VOC plume (i.e., larger than the EMF property) was identified during site characterization work completed in 1999; total CVOC concentrations of 44,000 ug/L and 6,200 ug/L were identified at distances of approximately 1,000 feet (Figure 2) and 3,600 feet down gradient from the source area.

CALIBRE's remedial actions have significantly increased the biodegradation rate resulting in rapid degradation of the VOCs present

CALIBRE initiated a plume-wide remedial action using enhanced reductive dechlorination (ERD). This in-situ treatment used a number of injection well transects (bio-barriers) installed perpendicular to the VOC plume. With this treatment process, CALIBRE has significantly increased the biodegradation rate (the VOC half-life [T ½] at ~ 21 days) resulting in rapid degradation of the VOCs present. The last well at the waterway has shown 99.96% reduction in total CVOCs from baseline levels (prior to start of remedial actions); the performance monitoring data from this point-of-compliance well are shown in Figure 3. The leading edge of the VOC plume has pulled back more than 1,200 feet from the waterway (see Figure 4).

The performance monitoring data collected during the remedial action has demonstrated significant progress in mitigating site risks and meeting the remedial action goals.