



USACE, MOBILE DISTRICT

INTERIM MEASURE IMPLEMENTATION FOR GROUNDWATER
AT SPACE LAUNCH COMPLEX 12
Cape Canaveral Air Force Station, Florida

PROJECT HIGHLIGHTS

CLIENT PROFILE

The U.S. Army Corps of Engineers (USACE) Mobile District manages a variety of programs in Alabama, Georgia, Florida, Mississippi, and Tennessee as well as Central and South America. The District's mission includes supporting all branches of the U.S. military, other federal agencies such as the U.S. EPA, and providing design and construction for civil works projects. Cape Canaveral Air Force Station (CCAFS) is an installation of the U.S. Air Force Space Command 45th Space Wing, which is headquartered at Patrick Air Force Base (PAFB) in Brevard County. CCAFS is the primary launch facility for the Command's Eastern Range and has supported America's space program since the 1950s.

PROJECT OVERVIEW

The firm provided preliminary and final remedial design, permitting, and construction at a complex site that contained a 2-acre solvent source area beneath the previously inaccessible Space Launch Complex 12 (SLC 12) launch pad structure. Bioremediation using emulsified vegetable oil (EVO) and potassium lactate was selected as the final remedy. The goal of the project was to prepare final design plans and specifications, provide turnkey construction services, complete performance monitoring, and achieve significant contaminant mass reduction as a result of the remedial efforts.

CHALLENGES

- Manufacture 116,000 gallons of a consistent EVO blend.
- Low permeable soil in the area of the injection, which resulted in injection rates that were lower than originally scoped.
- Base operations activities that limited site work schedules.

THE MSE GROUP APPROACH

Preliminary design: Included detailed review of previous EVO injection designs, review of federal and state underground injection control (UIC) permit requirements, finite-level source area investigations to determine injection pressure and depths, and bacterial microcosm studies to evaluate indigenous *Dehalococcoides* (Dhc) gene counts and interactions with potential biostimulants.

Pilot testing: Completed radius of influence injection pressure testing to provide design parameters for EVO volume and injection pressure relative to the permeability of the aquifer at specific locations at the site.

Final design: Completed final plans and permitting for EVO manufacture and injection array. Also completed the spill prevention, control, and countermeasure (SPCC) plan and Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP).

Construction/operation: Manufacture and injection of over 116,000 gallons of EVO at two contaminant source areas. Construction included turnkey EVO plant construction, installation of all distribution piping, EVO manufacture, and plant decommissioning.

ACCOMPLISHMENTS

- Self-mixing EVO saved over \$300,000 by eliminating external vendors.
- Project completed on schedule despite numerous delays due to base activities.
- Achieved 54% contaminant mass reduction in 1 year.

AREAS OF EXPERTISE

- Environmental remediation
- Design/build



A finite-interval source material investigation was conducted to isolate source area treatment parameters.



EVO delivery completed at specific subsurface intervals using direct push technology.