

# PROJECT SNAPSHOT

## ERH Combined with Low Temperature Bioremediation

ERH

**Location:** Bothell, WA

**Client:** City of Bothell

**Contamination:** PCE and TCE DNAPL

**Volume:** 4,759 cy

**Goal:** PCE (soil): 0.05 mg/kg  
PCE (groundwater): 5 µg/L

**Number of Heaters:** 36

**Duration:** 5 months of operation

**Mass Removed:** 1,466 lbs.

## WHAT MAKES THIS PROJECT UNIQUE?

ERH was used for source zone mass removal and combined with a biostimulation/warm-water recirculation system. The biostimulation system utilized residual heat energy from the ERH project to enhance dehalorespiration rates in the larger dissolved phase plume. The overall combined remediation strategy tied the two technologies and project phases together spatially and temporally, in order to optimize projects costs, schedule, and efficiency, while maximizing the downgradient impacts of ERH treatment on bioremediation efforts.

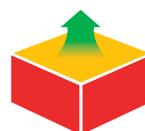
## Important Project Details

- **Approach:** The target treatment zone (TTZ) extended to 55 ft below grade, requiring the simultaneous heating of layered alluvial, till, and outwash geological units. The entire TTZ was heated to boiling and then held at boiling for 90 days. Residual heat from the ERH zone was recovered and used to heat the downgradient plume to enhance biodegradation.
- **Challenges:** Uniform heating of different geologic layers located at significantly different depths below ground surface (bgs). For example, the entire TTZ was heated to a depth of 25 ft bgs, while heating of the outwash to 55 ft was only performed in a small portion of the TTZ where a deep DNAPL pool was created by the dry cleaners disposing PCE into a deep well.
- **Results:** Confirmatory soil and groundwater samples verified all remedial goals had been achieved and that PCE concentrations in soil and groundwater had been reduced by over 99.99%.



## CONTACT INFO

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