



TERRATHERM®

Commercial Brownfields Project: Terminal One Tank Farm

Project Location: Richmond, California

Owner: Richmond Redevelopment Agency

Consultant: Geomatrix Consultants

Time Frame: 2005

Site Information: The City of Richmond's 14-acre site, known as the former Terminal One, was operated as a shipping and bulk storage terminal from about 1915 to the 1980s. The portion of the property being treated is known as the "Southwestern Tank Farm" where solvents and petroleum products were stored in above ground tanks. The total treatment volume is approximately 6,700 cy; of which, a small portion is under a warehouse that will be demolished after the thermal treatment is complete. The Southwestern Tank Farm is slated to become a recreational area as part of a 250 unit residential community after site cleanup is completed.



ISTD Well Field

CoCs: Contaminants of Concern are as follows: tetrachloroethene (PCE); trichloroethene (TCE); *cis*-1,2 dichloroethene (DCE); and vinyl chloride (VC).

Soil Characteristics: Soils within the thermal treatment area are composed of Bay Mud, a dark greenish gray lean clay with minor amounts (<5%) of sand. A 2-3' layer of fill exists above the Bay Mud. Thin interbedded layers with abundant shells (a few inches thick) have also been observed. The average thermal treatment depth was approximately 20 feet below ground surface (bgs).

Groundwater: Depth to water beneath the site is approximately 3 feet bgs.

Summary of Results:

		PCE	TCE	cis-1,2-DCE	VC
		ug/kg	ug/kg	ug/kg	ug/kg
Remedial Goals		2,000	2,000	17,000	230
AVG	AVG Pre	34,222	1,055	6,650	932
	AVG Post	12.36	< RL	64.68	4.73
	No. of Samples <RL (i.e., ND)	54	64	41	63
	% Reduction AVG Pre to Post	99.96%	> 99.6%	99.03%	99.49%
MAX	Max Pre	510,000	6,500	57,000	6,500
	Max Post	44	< RL	1,500	24
	% Reduction Max Pre to Post	99.99%	> 99.2%	97.37%	99.63%

RL = Laboratory Reporting Limit

AVG = Average - calculated using detected values and the RL/10 for non-detects.

Project Approach: In-Situ Thermal Desorption (ISTD) remediation at the Southwestern Tank Farm includes the following design features: a) minimum target temperature of 100°C; b) 12.0-ft spacing between thermal wells; c) 139 thermal wells; d) vapor barrier; e) granular activated carbon and potassium permanganate for off-gas treatment.

Project Staffing: As General Contractor, TerraTherm, Inc., has provided all project design, construction, operation, and equipment.

Subcontracting: TerraTherm subcontracted for construction labor, drilling, and electricians.

Project Summary: Site mobilization occurred in late January 2005. Site construction was completed in May 2005. Startup of the ISTAD system occurred on schedule in early-June 2005 and treatment was completed **on time** (100 days) and **on budget** in September 2005. **All remedial goals met** (see table above). Demobilization from the site was completed in November 2005.

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