



TERRATHERM®
Commercial Project—California

Project Name: Former Wood Treatment Area

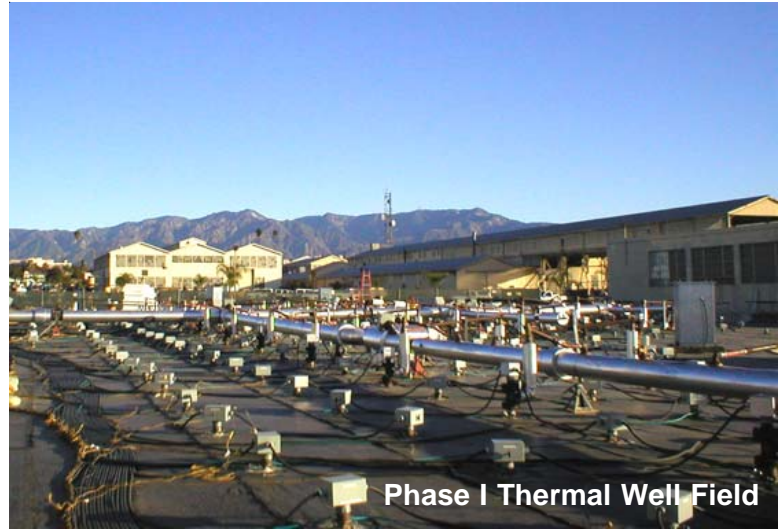
Project Location: Alhambra, California

Owner: Southern California Edison (SCE)

Consultant: Shaw Group

Time Frame: May 2002 - Early 2006

Site Information: SCE's Alhambra Combined Facility occupies approximately 33 acres and is currently used for storage, maintenance, and employee training. The former wood treatment area (AOC-2) occupies a 2-acre portion of the site. SCE carried out wood treatment at the area from approximately 1921 to 1957, by immersing utility poles in creosote. The total treatment volume is approximately 16,200 cy of vadose zone soil, and includes a variety of buried subsurface features, including treatment tanks, the structural remains of the former boiler house and tank farm, and various buried utilities.

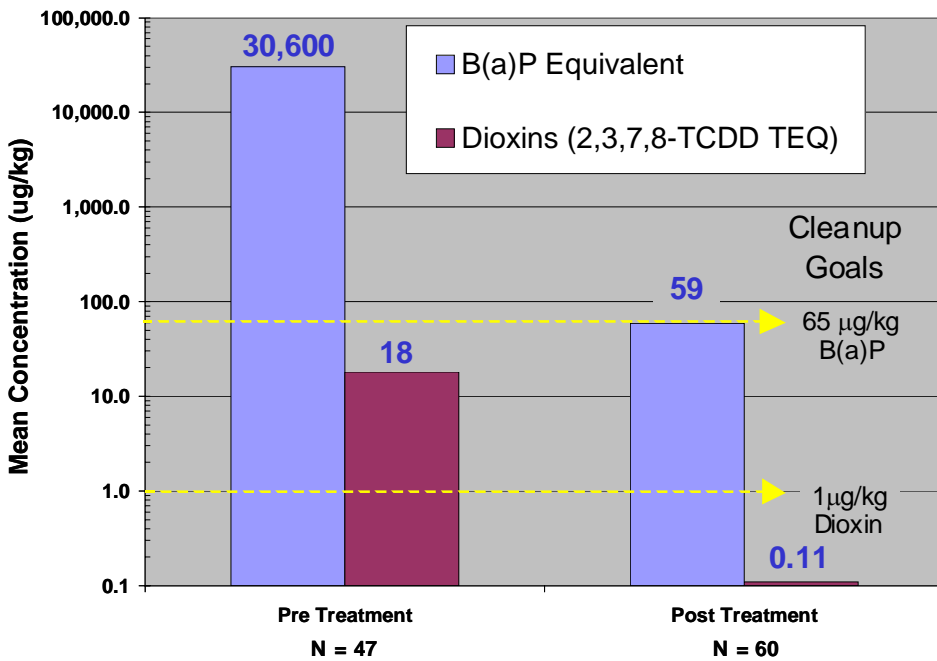


Phase I Thermal Well Field

CoCs: Contaminants of Concern are as follows: polycyclic aromatic hydrocarbons (PAHs) are present in site soils to a maximum concentration of 35,000 mg/kg and mean concentration of 2,306 mg/kg Total PAHs; pentachlorophenol (PCP) to a maximum concentration of 58 mg/kg and mean concentration of <1 mg/kg; and dioxins (expressed as 2,3,7,8-tetrachlorodibenzodioxin [TCDD] Toxic Equivalency Quotient [TEQ]) to a maximum concentration of 0.194 mg/kg and mean concentration of 0.018 mg/kg.

Site Characteristics: Soils within the thermal treatment area are composed of fill and silty sands, inter-bedded with sands, silts, and clays. The average thermal treatment depth is approximately 20 feet below ground surface (bgs) and in some areas extends to over 100 feet bgs. The depth to the water table is greater than 240 feet bgs.

Project Goals: The soil remediation standard for PAHs (expressed as benzo(a)pyrene [B(a)P] toxic equivalents) is 0.065 mg/kg; for PCP, 2.5 mg/kg; and for dioxins (expressed as TEQ), 0.001 mg/kg.



Project Approach: In-Situ Thermal Destruction (ISTD) remediation at the Alhambra facility includes the following design features: a) minimum target temperature of 635°F (335°C), maintained for 3 days; b) 7.0-ft spacing between thermal wells; c) 785 thermal wells (131 heater-vacuum and 654 heater-only wells); d) insulated surface seal; and, e) thermal oxidizer, heat exchanger, and granular activated carbon (GAC) for off-gas treatment.

The measured dioxin emission rate for compliance with the air discharge permit is 0.036 billionths of a pound of TCDD TEQ/hr. This is equal to <1 millionth of a pound TCDD TEQ over the life of this project, a very low amount and less than one-thousandth of the annual TCDD TEQ emission from a typical hazardous waste treatment unit.

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

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

Project Time Line: ISTD Phase 2 treatment: July 2004- September 2005; Demobilization from the site was completed in March 2006.

Project Results: *All remedial goals met* (see figure above). Agency oversight provided by California's Department of Toxic Substances Control under California's Expedited Remedial Action Program (ERAP).

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