



# CASE STUDY #0104

## IN-SITU OXIDATION OF A CHLORINATED PESTICIDE IMPACTED SOIL

### SITE OVERVIEW

Former Agricultural Area in Southern California

### CONTAMINATION

DDE, DDD, DDT, Toxaphene

### HISTORY

- Residual concentrations of chlorinated pesticides (DDE, DDD, DDT, and Toxaphene) were identified in soils around the former farm and dairy.
- DDT and Toxaphene are chlorinated pesticides that were commonly used to control insects. DDE and DDD are common impurities and metabolites of DDT.
- The size of the impacted area was approximately fifteen acres to a depth of two feet. The approximate amount of impacted soil was 25,000 tons.
- No impact has been detected in the ground water.

### BENCH SCALE STUDY

- A bench scale study was performed on samples collected from the site and composited in the laboratory. The samples were treated with EN Rx's Reagent™ along with and without EN-Rx-SC™a soil conditioner. With no statistical difference between the two results, the WITHOUT results are shown. The results of the study are:

#### EN Rx Reagent™ without EN-Rx-SC™

Date	DDT Results	DDD Results	DDE Results	DDX Results
Initial Concentration	18,900	1,680	1,320	21,900
4 days after treatment	22,600	1,890	1,580	26,070
14 days after treatment	5,380	694	618	6,692
21 days after treatment	76.4	35.6	38.9	150.90

All results in ug/kg

After twenty-one (21) days, destruction was approximately 99%. Based on these results, the results were scaled up for full scale field activities.

### SITE ASSESSMENT

The site was assessed and all points plotted in a GPS. This would allow for precision excavation during the remediation stage. It was discovered that contamination was primarily in the top two feet of soils. The results varied greatly. Toxaphene was only found in limited areas with the highest concentrations in the range of 2500 ug/kg. For DDx, the following is a summary of the results:

The concentrations prior to application were:

Analyte	Concentration (ug/kg)	
	Average	High
DDT	3,550	10,000
DDD	1,250	1,700
DDE	570	840

The clean up levels for the site were based on the California Human Health Screening Levels (CHHSLs) (CalEPA2004). These levels are:

Analyte	DDT	DDE	DDD	Total DDx	Toxaphene
Concentration (ug/kg)	1600	1600	2300	1600	460

**REMEDIATION ACTIVITIES**

- The impacted soil was scraped and moved into treatment tables.
- The following treatment plan was followed using a road bed stabilizer (RBS) for application.
  - First pass of the RBS homogenized and mixed the soil.
  - Second pass of the RBS added EN Rx's oxidizer SSO™ in liquid form while mixing the soil.
  - Third pass of the RBS added EN Rx's catalyst Synergist-D™ in liquid form while mixing the soil.
  - The soil was compacted and had its moisture maintained at about thirty percent (30%).
- After thirty (30) days, confirmatory samples were collected. All but two samples were below all CHHSLs. They were below individual CHHSLs, but were slightly above the Total DDx CHHSL. An additional one week of reaction was allowed, and the samples were recollected. These samples were all below established CHHSLs.
- Site is now closed and ready for development.
- Based on work on previous sites it has been observed that EN Rx's products can remain active for over ninety (90) days. Therefore it is possible for additional reduction in the levels of remaining analytes.