

## Pilot Test of ISCO Soils Treatment in Industrial Area, Italy

Soil mixing with PersulfOx provides a rapid decrease in contamination in unsaturated soils



### Summary

At a former oil refinery in Italy, leaks from several large Aboveground Storage Tanks (ASTs) had caused the soil to become impacted with fuel. Concentrations of up to 3,000 mg/kg of petroleum hydrocarbons were measured in the unsaturated soil within the immediate vicinity of the ASTs. Preliminary activities consisted of physical removal of several ASTs, but additional activities were required to address the residual contamination present in unsaturated soil below and around the tanks' area. The site required a rapid and significant reduction in the contaminant mass within the shallow soils without excavation and disposal due to scale and cost. PersulfOx was selected as the treatment technology for a large-scale pilot study in order to provide safe and effective chemical oxidisation of the contamination.

### Design & Application

PersulfOx is a sodium persulfate based chemical oxidation agent in which a patented catalyst has already been premixed into the formulation. This allows for safe and simple fieldwork and avoids the delivery and handling of large amounts of hazardous activator chemicals onsite. The reduced fieldwork complexity and smaller application volumes also provide cost savings for the remediation project.

ISCO relies on making good contact with the contamination and a soil-mixing approach was used on this site to achieve good distribution. The PersulfOx was applied by spraying it evenly onto the impacted soils and then mixed using soil-turning machinery. Further water was applied during the mixing in order to assist with the distribution of the PersulfOx and control the moisture content of the treated soils. A balance in the amount of liquid applied was required in order to ensure good chemical oxidation, whilst maintaining the geotechnical integrity of the soils.

### What's Special?

- PersulfOx contains a unique built-in catalyst to enhance the oxidative destruction of hydrocarbons in the subsurface. The patented catalyst is already mixed in the product, so the application is much safer and easier to apply compared to other ISCO products.
- The simple soil-mixing strategy was successful and is easily scalable to the full-scale treatment of the site.

### Remediation Details

#### Site Type:

Industrial area

#### Project Driver:

Regulatory driven with risk based target levels

#### Remediation Approach:

ISCO

#### Technologies:

PersulfOx®

### Geology

	Bedrock
	Gravel
X	Sand
X	Silt
	Clay
X	Made Ground

### Medium

	Groundwater
	Saturated Soil
X	Vadose Zone

### COC

X	Petro HCs
	Petro LNAPL
	Chlorinated VOCs
	Metals

#### COC Concentration Levels:

3,000 mg/kg

#### Treatment Level:

0 to 1 m BGL

#### Treatment Area:

Approx 1,200 m<sup>2</sup>

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