State-Funded Cleanup of Former Service Station on Reservation Land

Enhanced Aerobic Biodegradation and *In Situ* Chemical Oxidation
Provides Safe Approach to Remediate TPH-g and BTEX

Project Highlights

- Extensive coordination was required between state-funded Pollution Liability Insurance Agency (PILA) of Washington and US EPA Region 10
- Combined remedy approach using ORC Advanced® and PersulfOx® provided a safe solution for land used to raise livestock

Project Summary

The site located in Wapato, Washington is a former gas station situated on Reservation Land with historical releases dating back >20 years. The site is regulated through US EPA Region 10 and was previously an empty lot used for ranging cattle.

Initial remedial activities included excavation of source-area soil, however persistent contamination remained. Concerns were raised regarding how amendments might affect livestock. As a result, the remediation approach needed to be environmentally benign. The revised remedial plan included Enhanced Aerobic Biodegradation (ORC Advanced) and *In Situ* Chemical Oxidation (PersulfOx) to reduce the remaining concentrations and meet regulatory goals.

Technology Description

PersulfOx is a chemical oxidant that rapidly reduces the mass of the contaminants. This chemical consists of 90% sodium persulfate and 10% catalyst powder. PersulfOx is very effective in rapid oxidation of petroleum hydrocarbons in both soil and groundwater.

ORC Advanced is an engineered, oxygen release compound designed specifically for enhanced, *in situ* aerobic bioremediation of petroleum hydrocarbons in groundwater and saturated soils.

Site Details

Site Type: Former Service Station/ Reservation Land

Contaminant of Concern: PHCs

Concentration: TPH-g: 36 mg/L, BTEX: 1.4-7 mg/L (benzene: 7, toluene: 1.4, ethylbenzene: 1.8, xylene: 5.2), Trimethylbenzene: 1.6 mg/L, Napthalene: 0.6 mg/L

Remediation Approach: Enhanced Aerobic Biodegradation, *In Situ* Chemical Oxidation

Soil Type: Silty Sand

Technology Used:

PERSULF Ox Catalyzed Persulfate

ORC ADVANCED OXYGEN RELEASE COMPOUND

Results

An integrated treatment strategy was devised, which included injections in three separate areas. Two areas were treated with PersulfOx and ORC Advanced. The third area was treated with ORC Advanced only.

The by-products of ORC Advanced and PersulfOx are both insoluble and non-toxic, making the application safe and effective. Consequently, there were no issues relating to the landowner's concern for amendments affecting livestock. A total area of 4,100 ft^2 was treated for high levels of BTEX and TPH-g. Monitoring is ongoing.

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