Environmental Solutions

Terramend® Reagent
Case Study

Remedial Goal Achieved in a Single Terramend® Reagent Application

Soil Remediation from Roadside Crude Oil Tanker Rollover

Site Overview

Site: Former Main Roads Gravel Pit Borrow Site

Purpose: Remediate Soils for Gravel Pit Rehabilitation

The site is located about 2 hours' drive north of Perth, Western Australia in an agricultural area along Brand Highway. The release of 40,000 liters of crude oil into the environment along remote stretch of highway resulted in Gemec Remediation Services, Pty Ltd. (GEMEC) being called in. The default remedial option was excavation and removal of impacted soil to a remote landfill site – at a relatively high cost. GEMEC, however, recognized a good opportunity to solve two problems at once: a Main Roads gravel pit site that requires eco-restoration and the crude oil-impacted soil. Once treated, the crude oil-impacted soils could be used to provide soil material relatively richer in organic matter, and thus better suited to the task, than other soils available in the area. Based on PeroxyChem's history of success in treating similar soils, GEMEC selected Terramend® reagent as the preferred technology to achieve these goals.

Stockpiled Soil Prior to Treatment

Solution

As is typical with Terramend® Reagent soil treatment projects, the soil was tilled prior to product incorporation. The initial target Terramend® Reagent dosage was 2.5% w/w on a dry soil basis, with an additional, optional 0.5 wt.% to be applied after several months as and if needed. Site conditions were very windy at the time of initial product application. As a result, approximately one-third of the product was added to the soil with very small amounts of water to 'tackify' the surface in strong winds (25 knots), rather warm temps (35° C), and drying conditions (very low humidity).

Once the Terramend® Reagent was tilled in, moisture content was adjusted towards the goal of approximately 60% of the soil's water holding capacity (WHC).

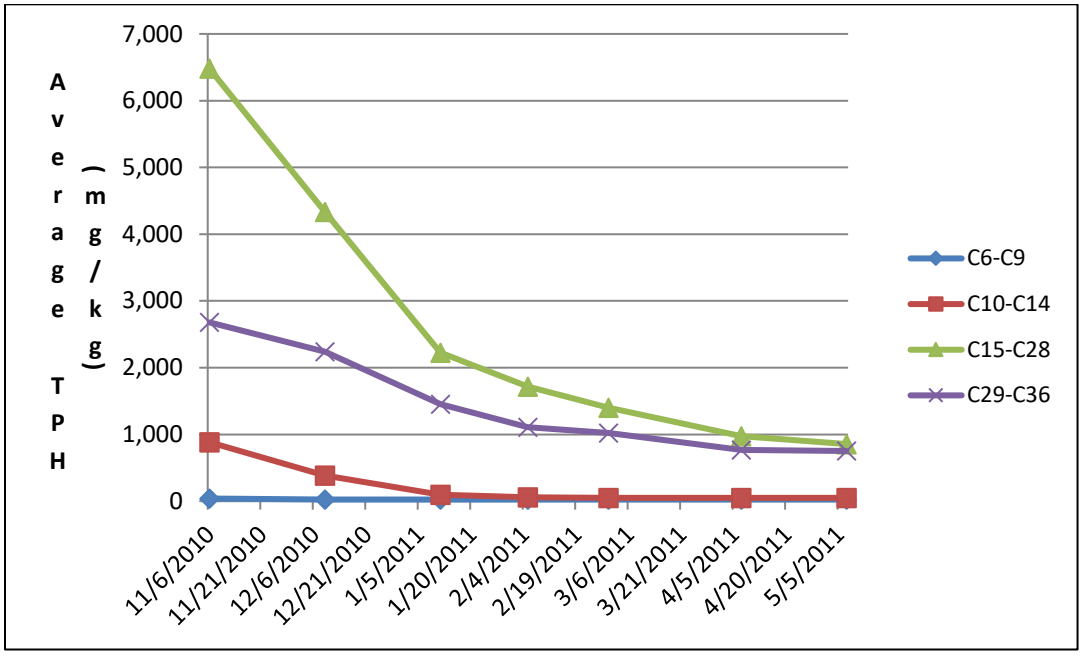
Although a few project challenges occurred (difficulty securing labor due to the onset of harvest season for local farmers and some start-up issues with the watering system), the bioremediation process worked very well. Terramend® Reagent treatment succeeded despite challenges meeting moisture goals (mostly too low at first, followed by a short period with excess moisture in a low area), as well as difficulty in achieving the desired twice-weekly tilling frequency.

GEMEC made a series of arrangements to help ensure project success. These included:

- Procuring a specialty tiller to enable effective soil tilling operations.
- Installing an automated and removable drip irrigation system to minimize labor effort and water usage.
- Using local labor resources (e.g., irrigation contractor and farmer) to keep a close eye on the process in a very cost-effective manner.

Results

The chart below presents soil hydrocarbon concentrations over the six-month treatment period.



At the final sampling, essentially all relevant criteria were below the associated treatment goals. However, one of fifteen subsamples marginally exceeded the >C16 to C35 Health Investigation Levels (HILs) of 450 mg/kg. Given that the average sample value (299 mg/kg) was far less that this value, GEMEC could demonstrate what the 95% Upper Confidence Limit (UCL) was well below the >C16 to C35 aromatic HIL.

Summary

Soil contaminated with crude oil was effectively treated using Terramend® Reagent in a six-month period in this remote, arid location. A single product application proved sufficient to accomplish the remedial goals. Sampling results have shown that:

- The Tier 1 and Tier 2 screening health and ecological risk assessments indicated that the soils pose no risk to human health and / or the environment.
- The soils are suitable for use in restoration of the gravel pit whenever Main Roads elects to conduct the work.

The small quantity of soil that may have exceeded criteria was statistically insignificant.