

PROJECT

Soil Remediation from Roadside Crude Oil Tanker Rollover
Former Main Roads Gravel Pit Borrow Site
Confidential Client
Consultant: GEMEC Remediation Services, Pty Ltd.
Purpose: Remediate Soils for Gravel Pit Rehabilitation

SUMMARY

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 litres 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, recognised 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 FMC's history of success in treating similar soils, GEMEC selected TERRAMEND® aerobic bioremediation product as the preferred technology to achieve these goals.



Stockpiled Soil Prior to Treatment

THE CHALLENGES

The remote location, arid climate, and high temperatures increased challenges associated with staffing on an 'as needed' basis during the treatment process and minimizing use of water (an especially precious commodity in the local area), while at the same time accomplishing treatment efficiently and effectively.

SITE PREPARATIONS

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 labour effort and water usage.
- Using local labour resources (e.g., irrigation contractor and farmer) to keep a close eye on the process in a very cost-effective manner.



FIELD WORK

As is typical with TERRAMEND aerobic bioremediation product soil treatment projects, the soil was tilled prior to product incorporation. In this particular case, the initial target TERRAMEND aerobic bioremediation product 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).

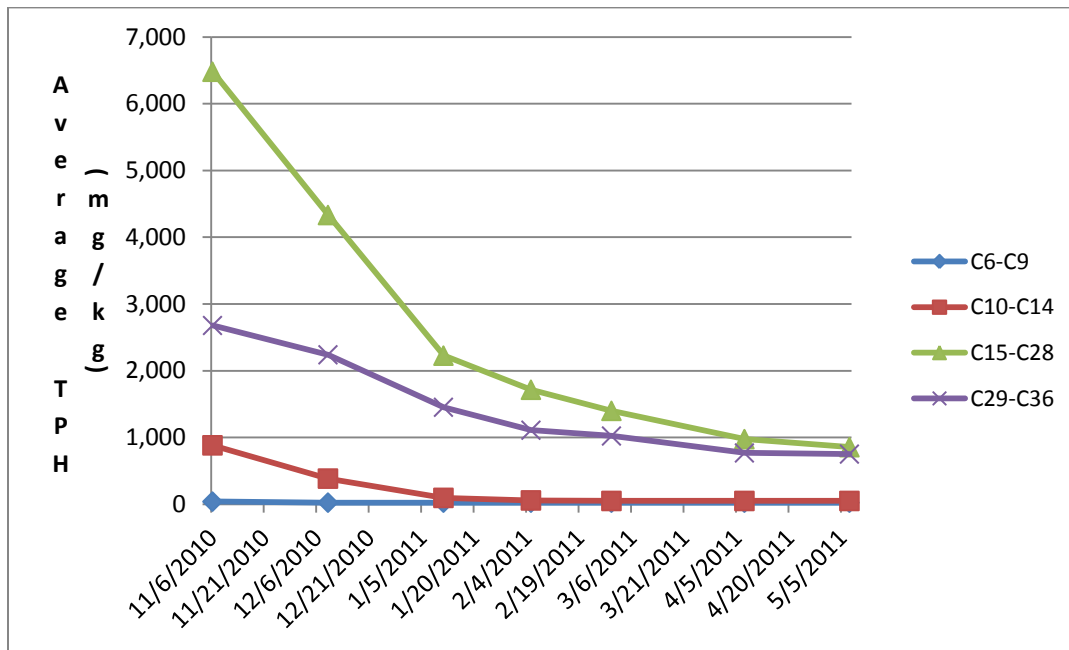
Once the TERRAMEND aerobic bioremediation product was tilled in, moisture content was adjusted towards the goal of approximately 60% of the soil's water holding capacity (WHC).

Although a number of project challenges occurred (difficulty securing labour 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 aerobic bioremediation product 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.



THE 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 than this value, GEMEC was able to demonstrate the 95% Upper Confidence Limit (UCL) was, in fact, well below the >C16 to C35 aromatic HIL.

CONCLUSIONS

Soil contaminated with crude oil was effectively treated using TERRAMEND aerobic bioremediation product 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.

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