

Tokyo Gas Environmental Remediation



An Australian environment solution to a global issue: Using biotechnology to decontaminate a former Japanese gas site in less than 90 days

After discovering soil contamination on-site during land rezoning and re-development, Dowa Eco-System Co Ltd (DES) and Mitsubishi successfully used Enretech's Remediator solution to help them clean and restore the soil onsite to enable redevelopment to proceed.

In Hoshu district, the former manufacturing site of Tokyo Gas, located on the wharf of Hoshu and surrounded by Tokyo's business district, was being rezoned and redeveloped for the Tokyo Fish markets to commence operations.

Accordingly, Tokyo Gas engaged DES to investigate the best and most effective approach to address the soil contamination caused by the operation of their gas manufacturing facility. In some parts of the 50,000 m³ site, it was discovered soil had been contaminated by volatile organic compounds including benzene and oil as well as by arsenic and other heavy metals.

In response to the adverse findings, Tokyo Gas and DES launched a clean-up of all soil contamination. For soils contaminated with oil and fuel, the process was to be carried out in a purification yard established in one corner (approx. 8900m²) of the vast site.

Bioremediation was used to decompose oil contaminants in less than 90 days

To effectively remove these contaminants quickly and cost-effectively, Tokyo Gas and DES agreed with Mitsubishi that bioremediation was the best and most sustainable approach. Enretech was then selected to provide the bioremediation solution known as Remediator – which is manufactured in Australia from recycled cotton-waste and is 100% biodegradable.

This soil decontamination process was conducted in-situ and involved the introduction by Enretech of bespoke bacterial microbes into the soil which naturally consume the offending contaminants.

By further supplementing the bacterial culture with specialised nutrient sources to enrich the bioremediation process the natural dissolution of oil in the soil was achieved within the first 4-6 weeks. The natural eradication of the contaminants in the soil also reduced levels of Polycyclic Aromatic Hydrocarbons (PAHs) by 95% within 90 days.

Enretech's Remediator solution was able to achieve these results quickly given it contains oil-degrading, naturally occurring and supplementary micro-organisms that use hydrocarbons as a food source and break down the soil contaminant into its non-harmful constituents. The cotton-based absorbent also acted as a "host" to enable bacterial cultures to grow and accelerate the bioremediation process.

The bioremediation process using Remediator was undertaken by DES and Mitsubishi in a phased manner as follows:

- The site was tested and analysed by DES to confirm the type and volume of contaminants, as well as how long they've been present.
- Organism activity was examined, along with the abundance of relevant organisms, and cultures were developed that contain the right mix of micro-organisms, based on previous testing and analysis of the contaminated soil.
- Using bio-augmentation these supplement cultures, along with Remediator, were then mixed into contaminated soil in the purification yard located on-site.
- The treated soil was then monitored, mixed and aerated twice a week, so that the microbial activity remained at optimum levels.

Once DES confirmed the bioremediation process in the purification yard had achieved the desired environmental targets, the soils were returned to the site to enable the redevelopment of the Tokyo Fish markets to commence.

Better and faster results using a sustainable approach

The choice by Tokyo Gas and DES to use in-situ bioremediation and Enretech's Remediator solution was made for several reasons:



Faster results

Using bioremediation and Remediator to treat contaminated was a much easier and quicker process and could be done in-situ. Tokyo Gas was able to achieve a level of decontamination in less than 90 days and the soil was treated on site.

"In summer, the decomposition of oil contaminants was achieved to acceptable levels in only a month and a half". - Nobuichi Kojima, Simizu Construction JV



A more effective approach

The Local Administration Department Lot Environmental Maintenance Manager Ryoshi Maruyama explains, "it is cheaper to carry out this bioremediation process within the site than carrying the dug soils outside to have them treated. It even takes less time."



A sustainable approach to environmental remediation

Given this manufacturing site was to be redeveloped and used as the Tokyo Fish markets, emphasis was given to the protection of the site and its surrounding environment - especially considering the proximity of the proposed Tokyo Fish Markets to the nearby Tokyo business district. Measures were put in place to protect against dust generation, drainage was collected and purified, and trucks carrying contaminated soils had their tyres washed on entry and exit - all to prevent the spreading of contaminants outside the site.



Bioremediation played an important role in this, ensuring that the oil and fuel contaminated soil was treated onsite, without risk of spreading the contamination or any related fumes to the neighbouring sites or Tokyo business district. Bioremediation was also regarded as the best sustainable approach to addressing the environmental remediation issues.

The contaminated soils which could not be effectively decomposed by microbes (predominantly heavy metals) were processed offsite using a thermal facility and soil washing. Ideally, in the future, Tokyo Gas and DES indicated they would prefer to treat all contaminated soil using in-situ bioremediation. However, the Tokyo Fish Markets are now operating successfully at the former gas manufacturing facility and all environmental remediation targets were met using Enretech's Remediator solution.

If you are interested in exploring if bioremediation and Enretech's Remediator solution are able to address your contaminated site, get in touch for a no-obligation discussion.



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