

Case Study



Former Lednez / Union Carbide Site and Homebush Bay, NSW

Green File

This is a highly sensitive project requiring attention to detail, specialist equipment and third party auditing to ensure environmental validation standards are met.

Location

Rhodes, NSW

Client

Renewing Homebush Bay Pty Ltd (RHB) and NSW Maritime Authority

Value

\$103 Million

Duration

Contract awarded December 2001; mobilised to site May 2005; completion expected mid 2010.

Contract Type

Contract Agreement – Lump Sum

Referee

Renewing Homebush Bay Pty Ltd:

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NSW Maritime:

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Thiess Services is contracted to remediate the soil at the former Lednez / Union Carbide site and sediment from the adjoining Homebush Bay at the Rhodes Peninsula in Sydney's inner-west.

The soil at the site and the sediment of adjacent Homebush Bay are each considered some of the most contaminated in the world, containing chlorinated and non-chlorinated organics such as dioxin, hexachlorobenzene, DDT and benzo(a)pyrene.

The former Lednez/Union Carbide site was home to chemical manufacturing plants for 60 years until the late 1980s. The site became contaminated when process lime from pesticide and herbicide plants and ash waste containing chemical residues was used for land reclamation from the 1940s to 1970s. Eventually, the surrounding waters of Homebush Bay were impacted by these activities and consequently, sediment hotspots are being removed as part of the project.

The scope of project works includes the excavation, classification, backfilling and reinstatement of 450,000m³ of contaminated material with 100,000m³ of this material requiring treatment. A total area of 7.5 hectares of bay sediment is being remediated. This involves excavating the top half a metre of contaminated sediment in the wet and replacing it with Virgin Excavated Natural Material (VENM), forming a cap.

A replacement seawall, 520 metres in length, is being constructed along the alignment of the existing seawall and a new sewer system is being constructed. Works by Thiess Services prior to remediation activities included the demolition of buildings and ground slabs that were identified as containing asbestos.



A process of directly heated thermal desorption (DTD) is being used to treat the soil and sediment within a plant constructed on site. This involves heating the soil or sediment in a rotary drum to between 450°C and 550°C, forcing the contaminants to separate from the soil as gas. The gas is then heated to between 930°C and 1000°C converting it into a gas stream of carbon dioxide and water. To prevent the contaminants from reforming, the gas stream is rapidly cooled by a fine water spray. It then passes through a large fabric filter to remove dust and a scrubber to remove any hydrochloric acid that may have formed, before being released to the atmosphere.



The plant was purchased by Thiess Services from American company Astec and shipped to Australia in pieces in January 2008. It has been built with an elongated thermal oxidiser tower to give the gas stream the maximum possible treatment time in the oxidiser and improve the efficiency of contaminant destruction.

An independent environmental audit process that involved extensive laboratory testing of treated soil confirmed the soil could be re-used on site. The material re-use criteria was developed to protect both human health and the environment. An Auditor accredited by the Environment Protection Authority (EPA) oversaw the process.

Thiess Services assumed total responsibility for obtaining all approvals and permits for the project. This involved the preparation of a development application, an environmental impact statement, human health risk assessments, ecological risk assessments, remedial action plans and technology licence applications.

Quantities

- Material excavation and reinstatement: 450,000m³.
- Treatment: 100,000m³.

Challenges / Unusual Features

Given that the former industrial sites at Rhodes Peninsula are well recognised as containing some of the worst contamination known, including organochlorine pesticides and dioxins, rival remediation contractors, regulators and consultants are showing great interest in how DTD technology is being applied to such a complex project.

Operation of a commercial scale thermal treatment plant within a growing residential area and compliance with licence conditions in relation to noise and emissions are significant challenges for the project.

The DTD plant operates 24 hours a day, seven days a week with the nearest residents living approximately 120 metres away from the plant.



The nature of the material that requires treatment is also highly variable, with lime sludges containing as much as 45% moisture. Pre-treatment blending and the reduction of this moisture content to less than 20% are critical to the overall success of the treatment process and both occur in a specially designed building.

OHSE

Strict OHSE precautions have been implemented in accordance with international standards for the handling of the contaminants found on site. An applicable health monitoring program, including periodic blood testing for all site personnel, is in place.

Thiess Services employs emission testing specialists to monitor the quality of the gas discharged from the DTD plant and ensure emission levels meet strict criteria set by the project regulator, the NSW Department of Environment, Climate Change and Water (DECCW).

Environmental monitoring data is submitted in monthly reports to the DECCW and presented electronically to the Rhodes Community Consultative Committee (RCCC). At monthly meetings, RCCC members review project progress reports and environmental monitoring data and give feedback to Thiess Services project team members. The local community is notified via email whenever odourous excavations may impact them.

Community Engagement

The adaptation and improvement of standard community engagement strategies has enhanced stakeholder relationships and built a positive public profile for the project.

A project that was initially perceived by many community members to be high-risk was quickly accepted after community education processes were implemented.