

DUNDEE GASWORKS PHASE 2	
Description:	Remediation by Low Temperature Thermal Desorption
Form of Contract:	ICE 7 th Edition
Duration:	40 weeks in two visits
Contract Value:	Confidential
Client:	National Grid Property Holdings
Clients Representative:	White Young Green Environmental

This ground-breaking project attracted UK-wide interest. It saw the integration of innovative technology and working methods into a challenging civil engineering project at a sensitive location.

The soils at Dundee Gasworks had been impacted with coal tar from historical use as town coal gasworks. The main contaminants were hydrocarbons, phenols, benzene and toluene. These had to be treated or removed to prevent significant harm to the local ground water environment.

A detailed Remediation Options Appraisal evaluated each prospective solution on technical, environmental and economic merits. Top priority was given to seeking a sustainable clean-up method that would be economically feasible and minimise use of landfill.

The simplest option of bulk removal to landfill served as a base comparator. Soil washing, ex-situ bio-remediation and soil stabilisation were all considered but discounted, mainly on technical grounds. It was ultimately concluded that low temperature thermal desorption (LTTD) would meet the stringent environmental requirements at a comparable cost to landfilling, but with the potential for 100% re-use of treated materials. That process was also the only practicable method of dealing with the 1,000 Tonnes of material that was too heavily contaminated even for disposal to landfill.

Work was carried out in two phases. During the first visit, we excavated all contaminated material up to 5m deep down to bedrock. Numerous hardstandings and underground structures were broken out and processed for re-use. The material was selectively excavated, classified, homogenised and stockpiled for later treatment. Extensive testing was carried out at all stages. The detailed results were of fundamental importance in selecting a specialist sub-contractor and managing the risks associated with the proposed treatment method.

The second stage began with the civil engineering works for the treatment plant. The plant was shipped from Stockholm and was fully erected and commissioned within 7 weeks. Treatment took place continuously for 13 weeks, during which 22,500 Tonnes of material was processed. All of the treated material was re-used as satisfactory engineering backfill to the excavations.



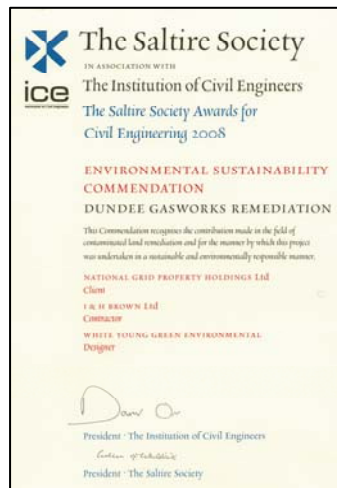
Concurrently with Dundee, the Client sought to remediate the smaller gasworks site at Leven in Fife, some 23 miles away. Leven sat in a residential area with very restricted access and working space. Some 1,000 Tonnes of material heavily contaminated with coal tars had been identified as exceeding acceptable limits for disposal to landfill.

The Dundee project team saw an opportunity to extend the success of Dundee by evolving the process into the first example in the UK of an operating 'Cluster Site'. We liaised closely with SEPA to obtain the regulator's approval to use Dundee as a 'hub site', where the Leven material could also be treated. SEPA had confidence in the robustness of the process at Dundee and recognised that there were no practicable alternatives for Leven.

The heavily-contaminated Leven material was blended with 5,000 Tonnes of less onerous material and treated successfully by the LTTD plant. A volume of 1,000 Tonnes was returned to Leven to backfill the void space at that site.

This was the first implementation in the UK of the 'Cluster Site' concept, where material from remote sites is brought to one central hub for treatment and is returned after validation to its point of origin. The strategy represents one of the most significant advances for the remediation industry in recent years, with considerable opportunity for widespread application. It is recognised as the best practice solution to the remediation of smaller sites but was never used until Dundee because of regulatory challenges.

Of some 22,500Tonnes of contaminated material treated, none was removed to landfill despite highly elevated starting concentrations of tar-related contaminants. 100% of the treated material was re-used on site and the process itself did not produce any by-products requiring disposal.



The project has to date attracted the following awards:

- Winner of the 'Most Innovative Remediation Method' at the 2007 Brownfield Briefing Awards
- Finalist in the category of 'Best Use of Combined System'
- Environmental Sustainability Commendation at the Saltire Society 2008 Civil Engineering Awards