



Figure 1 – Proposed housing at Pitwines, Poole. (Crest, 2004)



Figure 2 – Actual Development at Pitwines, Poole. (2010)

<p>Date: July / August 2004 Development: Residential Housing Developer: Crest Nicholson (South) Ltd Consultant: Waterman Environmental Main Contractor: Anderson Group Project End Value: £75m</p>

Site Overview

The former Pitwines Gas Works is situated in Poole, Dorset and within 330m from Poole Harbour, which is classified as a Site of Special Scientific Interest (SSSI). The gas works site occupied an area of 4.23 hectares, with much of the surrounding land being reclaimed from the sea with waste materials, including gas works waste. The site at the time was bounded by a combination of residential, retail and commercial buildings on all sides. The site had

been cleared and remained vacant for over 20 years. Crest Nicholson Ltd has obtained planning permission to develop the site for more than 500 residential units. Due to the sensitive location of the site and residential end use it was necessary to liaise closely with the contractor, the consultant and the regulators (Environment Agency and Borough of Poole Council) in order to provide the right remediation solution for the site.

Objective

The remediation strategy for the Pitwines Gas Works site was designed to address the source contamination on-site and indirectly the pathway contamination issues, with the intention of protecting the groundwater receptor, Poole Harbour.

Envirotrear were successful in undertaking this project after demonstrating ability to address the contamination issues on site following a successful treatability trial.

Methodology

An ex-situ remediation strategy was employed on-site by Envirotreat for the treatment of over 11,000m³ contaminated. The works were conducted over a 6 week period under Envirotreat's Mobile Process Licence (MPL). Specialist technology, materials and supervision were supplied by Envirotreat, whilst 3R Ltd supplied all plant, labour, odour control and general management required for the process.

The soils were contaminated with a complex mixture of contaminants typical for a gas works site i.e. heavy metals, cyanide, ammonium, phenol, PAH's and TPH. Contamination was identified within the gas holder (Figure 3), retort house and various other localised hotspots across the site. The soils were excavated, stockpiled and treated on-site using the Envirotreat E-clay technology.

Sole Providers of E-CLAY® Technology



Figure 3 – Gasholder base following the removal of contaminated soils.

To meet the time constraints on the project, three slurry production units (Photo 3) were employed to manufacture sufficient E-Clay slurry to service the three mixing zones set up. This enabled the treatment of up to 600m³ of contaminated soils per day.



Figure 4 – General site setup with E-Clay slurry manufacture in the centre of the picture.

Contaminated soils were mixed in 10m³ batches; this enabled accurate quantities of contaminated soils to be combined with the E-clay slurry and mixed. The treated soils, once stockpiled and validated were reused on-site as a substitute for

imported clean fill, this eliminated the need for costly offsite disposal.

Validation and results

In all 48 batches of treated material was validated, each batch representing 250m³ of treated soils. Samples were leached and analysed on behalf of Envirotreat by a UKAS accredited laboratory.

Table 1 summarises the mean average and 95th percentiles of the leachate of 48 batch samples taken together with the target levels determined by Envirotreat by R&D20 (Methodology for the Derivation of Remedial Targets).

Contaminant of Concern	Co Target Value (µg/l ¹)	Leachate of Treated Soil (µg/l ¹)	
		Mean Average	95 th Percentile
Arsenic	211	10.3	12.0
Cadmium	42.2	0.6	0.5
Chromium	127	10.0	10.0
Lead	211	50.0	50.0
Mercury	2.5	0.2	0.31
Selenium	84.4	3.2	4.86
Copper	42.2	13.4	25.0
Nickel	253	20.0	20.0
Zinc	337	10.7	14.0
Free Cyanide	422	87.5	206.5
Ammonium	5.66E+08	179.2	653.5
PAH's (Total of 6) *	7.560	0.622	1.465
TPH	3.78E+05	956.7	2380
Phenol	6.9E+101	61.2	173

* fluoranthene, benzo-3,4-fluoranthene, benzo-11,12-fluoranthene, benzo-3,4-pyrene, benzo-1,12-perylene and indeno (1,2,3-cd) pyrene

Table 1 – Summary of treated soils leachate results compared to Co Target Value derived from Tier 3 GW Risk Assessment conducted by Envirotreat and agreed with the Environment Agency.

The remediation project was successfully completed under the auspices of the MPL, with the results illustrating that the objective of protecting the groundwater receptor, Poole Harbour, has been achieved. The contaminants of concern have been significantly reduced to below the agreed Co Target Values.