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CASE STUDY

Waste Treatment / Recovery

Vale Refinery, Clydach

Client

VALE

Principal Contractor

Jones
JONES BROTHERS (HENLLAN) LTD

Remediation Contractor

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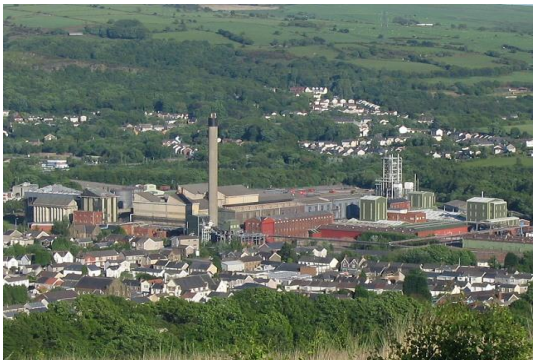
Site Background & History

The Clydach Refinery, affectionately known as the Mond, was built in Clydach, near Swansea at the turn of the 20th century and started production in 1902. The plant was built by Ludwig Mond, the inventor of the nickel carbonyl process. During the 100 years since it began production the Clydach refinery has become the largest and most versatile nickel refinery in Europe. The refinery is shown in Figure 1.

The original 30-acre site has now grown to 55-acres. The site produces about 40,000 tonnes of nickel products per annum. The products are made in pellet form for use in stainless steel appliances, nickel plating and special alloys for anti-corrosive applications. Another major processing line produces nickel in powdered form. These products are utilised in a diverse range of processes including the production of rechargeable batteries and catalytic converters.

Figure 1 – Clydach Vale Refinery



Remediation Works

Envirotreat have been involved in several projects at the Clydach Refinery.

In 2010, Envirotreat were commissioned to evaluate treatment options for a waste stream on the site.

The waste stream (referred to as Bobby Waste) comprises of filter bed media from the on-site water treatment plant. The filter media ranges from sands to large gravel (50mm).

The Bobby Waste is typically collected and stored in bags as shown in Figure 2.

Figure 2 – Stored Bobby Waste

After prolonged use the filter media becomes coated in nickel deposited on the surface and as a consequence, the media becomes ineffective and requires replacement. The used filter media has traditionally been disposed of

at a hazardous waste landfill in England at a distance from site exceeding 100 miles. This was considered to be unsustainable. Vale therefore undertook to identify a more sustainable and economically viable alternative to offsite disposal. The Bobby Waste is shown in Figure 3.

Figure 3 – Waste Stream (Bobby Waste)

Envirotreat demonstrated through treatability trials that the Bobby Waste could be treated to produce an inert waste, enabling cost effective disposal at a local landfill.

Having demonstrated that the waste can be satisfactorily treated, Envirotreat were commissioned to undertake the on-site treatment of 150 tonnes of the waste. The treatment process involved screening, crushing and treatment with a designated E-Clay formulation. The resultant material was tested to confirmed to be suitable for reuse onsite.

A similar project in 2011, involved the treatment of circa 22 tonnes of Bobby Waste in combination with 21 tonnes of contaminated soil arisings resulting from recent civil engineering works at the site and circa 5 tonnes of copper waste. The soil arisings are shown in Figure 4.

It was decided that the treated material could remain on site (following treatment and validation), partly due to impending changes with Landfill Tax which could have resulted in the treated material being taxed at £64/tonne and the stated requirement for fill material on site.

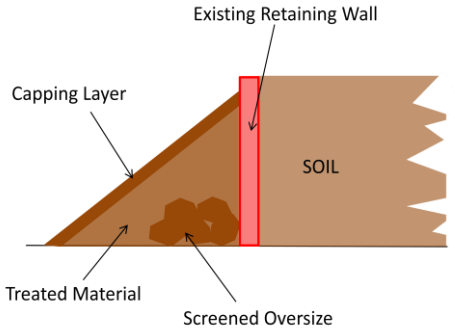
Figure 4 – Soil Arisings

The treatment strategy was therefore to enable a waste recovery process to be implemented, producing a treated material which could be utilised on site as a substitute for imported fill.

The contaminated soil arisings were screened and tested to determine the treatment requirements. Larger screened material was stockpiled pending reuse and the remaining soils were stockpiled pending treatment / reuse. The copper waste was also tested to determine the composition and treatment requirements.

The requirement was to reuse the treated material on site as a fill material, specifically to provide a batter for a section of retaining wall which had become unstable. The treated material was required to comply with an engineering fill specification and risk based remediation criteria for groundwater protection based on freshwater Environmental Quality Standards for the identified contaminants of concern. All three waste streams were treated with a stabililisation medium incorporating a designated E-Clay formulation to achieve the required engineering and environmental target objectives.

Figure 5 – Schematic Showing Reuse of Treated Material in a Batter



The treated materials achieved both the environmental and engineering requirements to enable reuse on site (as a waste recovery process).