



Not Duly Made Question 11:
Waste Minimisation Assessment for Filter Cake/Sludge

The effluent treatment plant at Anochrome Limited enables on-site treatment of most of the waste process solutions and waste rinse waters that are produced on site. The filter press used to dewater the metal hydroxide sludge operates between 5 and 10 bar. This is sufficient pressure to increase the solids content of the filter cake to about 20 to 30% with the remainder being water; the solids content of the original metal hydroxide sludge is around 3%.

The amount of waste metal hydroxide filter cake generated each year will vary dependent on business levels and the utilisation of specific process lines. Typically, the amount of filter cake generated per annum is between 140 and 160 metric tonnes (MT); the total was 151 MT in 2023. If the permit variation is granted, there is unlikely to be any reduction in the annual amount of waste filter cake generated as a result of installing the new Automatic VAT line and decommissioning the existing one.

The waste metal hydroxide filter cake is currently stored in a metal skip within the effluent treatment plant which is located within the site's current permitted area. The maximum quantity of the filter cake waste stored on site at any one time does not exceed 8 MT. Once the metal skip is full then arrangements are made with a licenced waste carrier to remove the full metal skip and replace it with an empty metal skip to facilitate capture of the next filter cake load.

The full metal skip is then transported *via* road and disposed of at a specific landfill site, White Moss, in Lancashire; a road journey of approximately 100 miles. White Moss is currently the only known landfill site within the United Kingdom willing to accept the waste filter cake generated at Anochrome Limited.

Waste Minimisation Options

Two potential waste minimisation options are currently under consideration:

- a) Reconfiguration of the effluent treatment plant to accommodate a larger metal skip
- b) Replacement of the existing filter press with an alternative filter press capable of generating higher solids (ca. 40%) filter cake waste

The reconfiguration of the effluent treatment plant is contingent on the permit variation application being granted so that the existing permit area and boundary can be extended. If successful, a subsequent permit variation would be submitted seeking permission to reconfigure and extend the effluent treatment plant to enable a larger metal skip to be housed within the plant to capture filter cake waste. The use of a larger metal skip would:

- a) Increase the maximum amount of filter cake stored on site at any one time to approximately 13 MT
- b) Lead to an approximate 40% reduction in the number of road journeys to White Moss to dispose of the filter cake generated each year

The replacement of the existing filter press with an alternative filter press capable of generating higher solids filter cake waste is not contingent on the permit variation being granted. However, this option is still undergoing a feasibility study aimed at establishing the:

- a) Effectiveness and efficiency of an alternative filter press to generate consistent higher solids filter cake
- b) Impact of higher solids on the hazardous waste properties of the filter cake

Assuming future business activity remained static, the generation of higher solids filter cake waste would reduce the amount being generated per annum by approximately 40%. However, increased solids could lead to different or more severe hazardous properties being assigned to the waste filter cake. If such a change in hazardous properties were realised then our only landfill partner, White Moss, may have difficulty accepting the filter cake for landfill. Although theoretically possible to use alternative landfill/waste treatment options in mainland Europe for higher solids filter cake, it is envisaged that:

- a) Disposal costs would significantly increase and become prohibitive
- b) Longer journey distances are likely to deliver a net increase in carbon emissions

Consequently, further detailed investigation is required before adopting this path.

Another potential option for waste minimisation is electrolytic metal recovery which is considered economically viable for many precious metals. However, the major constituent metals in the Anochrome Limited effluent are iron and zinc which presently have little commercial value when recovered. It is therefore considered uneconomic to install electrolytic metal recovery at Anochrome Limited at this time especially given recent price increases in electricity. However, it is recognised that electrolytic recovery would reduce the quantity of filter cake being disposed to landfill and therefore Anochrome Limited will continue to review emerging recycling techniques and investigate those that appear economically attractive.