DALDOWIE FUEL PLANT: ODOUR MANAGEMENT

Key facts:

- **Commissioned in 2002**
- **Has invested in odour abatement technology**
- **Converts sewage sludge into dry, low-odour fuel pellets**
- **Uses advanced process technology to monitor and control all aspects of operation**

Daldowie Fuel Plant

Daldowie Fuel Plant, near Glasgow, was commissioned in 2002 and is one of the largest sludge drying centres in Europe, processing the sewage sludge from Greater Glasgow's population of about one million people to produce waste derived fuel (WDF).

Around 90% of the sludge is delivered to the Uddingston site by pipeline from a network of wastewater treatment plants. The rest, from outlying areas, is delivered by tanker lorry.

Daldowie recovers the useful solids from the liquid sludge by physical separation and drying. It creates dry, low-odour pellets which are a type of biomass – biological material which is an ideal sustainable fuel for the current combustion sector and the new markets that are emerging which could provide further potential outlets.

A further environmental advantage is that the use of the material as a fuel is a sustainable alternative to incineration of sludge or spreading sludge on to agricultural land as a fertiliser.

Odorous air from the Lamella settling tanks is drawn off and passed through a scrubbing mixture

How we Tackle the Issue of Odorous Gas

Daldowie Fuel Plant operates subject to conditions contained in a permit issued and enforced by the Scottish Environment Protection Agency (SEPA)and is required to meet strict regulations on the emissions of odours, as set down by SEPA and Glasgow City Council's planning conditions.

SMW Ltd, a wholly owned subsidiary of ScottishPower, recognises the potential for odour nuisance arising from its operations and has therefore invested in abatement technologies at the plan and produced an odour management plan that sets out the procedures followed at all stages of the process to meet the relevant regulations. The site's performance in minimising odour is monitored continuously and results are reported regularly to SEPA.

The natural decomposition of sewage generates a wide range of odorous gases. The main gas is hydrogen sulphide (H_2S) which can be produced by the bacterial break down of organic material and has the distinctive foul 'rotten eggs' smell often associated with stink bombs or marshy ground.

Daldowie uses sophisticated odour abatement technologies

Daldowie Fuel Plant employs two forms of sophisticated odour abatement – one which tackles odour from the sludge as it arrives on site and another to prevent odour being released to the atmosphere through the plant's stacks at the end of the sludge drying process.

Our high levels of abatement and stringent odour management procedures have been successful in reducing the number of complaints about bad smells.

The fuel plant's proximity to a wastewater treatment works, a landfill site and a crematorium often makes it difficult to determine the source of odour, but SMW Ltd is committed to investigating all public complaints and takes remedial action as soon as reasonably practical if a complaint is justified.

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Our Odour Management Plan

Daldowie Fuel Plant strives to ensure that all its emissions to air are free from offensive odour and do not cause a nuisance to its neighbours. To achieve this, the plant has put in place stringent operating processes and procedures to minimise and prevent fugitive odour emissions at each stage of its operation.

These plant's procedures are laid out in the plant's Odour Management Plan which outlines all of the potential odour release points in the Daldowie process, from tankers unloading sludge at the start of the cycle to the finished pelletised product being taken off site. The plan also details the measures put in place to prevent or minimise disruption and actions to be taken in the unlikely event of an abnormal situation.

Prevention of odour escape is underpinned by efficient management of the processes involved, close attention to maintenance of plant and a regime of good housekeeping to minimise dust and spillages. For instance, access hatches, doors and shutters at potential odour release points are kept closed, with opening times are kept to a minimum by devices for the roller shutters in the Lamella settling tanks and Dewatering and Drying Building automatically closing the shutters if they are left open for five minutes.

Rigorous checks and inspections are conducted to ensure the effectiveness of the safeguards in place. Senior management conduct a daily walkabout inspection to ensure processes and procedures are being adhered to and an olfactory survey of the Daldowie site boundary is carried out at least once each day. Each week, the survey is extended to include a check for hydrogen sulphide (H_2S) emissions.

In addition, there is continuous monitoring using a Zellweger unit to test for H_2S at least once every 10 seconds to give an hourly average over a 24 hour period. The monitoring takes place at three key areas – the reception/treatment of sludge, the dewatering, drying and granule storage and the effluent treatment plant. Alarms have also been installed to provide an audible signal if H_2S levels exceed specified limits anywhere in the plant, allowing control room staff to take appropriate remedial action.

The results of all surveys are submitted monthly to SEPA.

Complaint Handling:

Daldowie has established a Procedure for Odour Complaints that outlines the response to an issue raised by a local resident.

Every complaint is investigated, a process that is assisted by the daily plant checks and monitors in place, as well as a weather station on site that provides accurate data on wind speed and direction.

In the event of a justified complaint Daldowie will inform SEPA and Glasgow Council's representatives of the actions taken to mitigate the cause of odour release.

The control room

Technology Helps Minimise Odour

A key part of our odour minimisation strategy is the use of sophisticated abatement technologies.

The first of Daldowie's two abatement systems, the ODORGARD process, tackles odour from the sludge after it arrives on site by turning the odorous compounds into a mixture of harmless salts and water.

Odorous air from the Lamella settling tanks is drawn off and passed through a scrubbing mixture, containing controlled amounts of sodium hydroxide and sodium hypochlorite, which absorbs the sulphurous compounds, such as H_2S. The catalyst for this reaction is nickel oxide and the end products are odour-free substances that can be disposed of safely. Quality of the deodorised air is monitored by a Zellwegger device to ensure no H_2S emissions greater than 30 parts per million.

Daldowie's Regenerative Thermal Oxidisers (RTO) are on each of the stacks

Daldowie also has a Regenerative Thermal Oxidiser (RTO) on each of its three stacks. These treat exhaust air before it is released into the atmosphere by oxidising any contaminants, such as odorous gasses, that are present in the exhaust.

The waste gasses pass through a bed of ceramic material which absorbs their heat. Now oxidised, the gasses then continue through a combustion chamber before being cooled on a second bed. The extremely-high temperatures involved in the oxidising process – up to 820°C – converts the exhaust gases to water and carbon dioxide.

The two heat exchangers beds used at Daldowie make the oxidising process very fuel-efficient – as the first bed cools down, the second bed heats up, at which point the air flow is reversed.