

# DALDOWIE FUEL PLANT ODOUR MANAGEMENT



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## OVERVIEW

The Daldowie Fuel Plant, operated by ScottishPower subsidiary SMW Ltd, is one of the largest sludge drying centres in Europe. It

converts sewage sludge into dry, low-odour fuel pellets.

Daldowie uses advanced process technology to monitor and control all

aspects of operation and to ensure stringent safety, quality control and environmental requirements are met. In particular, the

plant has invested in odour abatement technology to ensure it meets the strict regulations on odours set out by the authorities.

## INTRODUCTION TO DALDOWIE FUEL PLANT

Daldowie Fuel Plant, near Glasgow, processes the sewage sludge from Greater Glasgow's population of about one million people to produce waste derived fuel (WDF).

The plant was commissioned in 2002 and is one of the largest sludge drying centres in Europe. 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 that are currently co-fired with coal to produce electricity at Longannet Power Station in Fife.

In 2009, Daldowie Fuel Plant processed 1,941,835 m<sup>3</sup> of sludge, creating 42,121 tonnes of WDF that generated 67,130 MW/hr of electricity.

The pellets produced at Daldowie are classified as a type of biomass – biological material that is deemed to be a sustainable form of fuel.

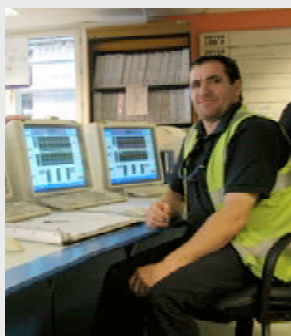
The use of the material as a fuel is a sustainable alternative to incineration of sludge or spreading sludge on to agricultural land as a fertiliser.

## CONTACT US

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■ *Daldowie's triple stacks have RTOs to treat exhaust gases*



■ *Monitoring production in Daldowie's control room*

Daldowie Fuel Plant operates subject to conditions contained in a permit issued and enforced by the Scottish Environment Protection Agency (SEPA).

The plant 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 recognises the potential for odour nuisance arising from its operations and has therefore invested in abatement technologies at the plant.

The natural decomposition of sewage generates a wide range of odorous gases.

The main gas is hydrogen sulphide (H<sub>2</sub>S) which can be produced by the bacterial break down of organic material.

This gas has a distinctive foul "rotten

## HOW WE TACKLE THE ISSUE OF ODOROUS GAS

eggs" smell often associated with stink bombs or marshy ground.

Daldowie Fuel Plant employs two forms of sophisticated odour abatement.

The first tackles odour from the sludge as it arrives on site and the other prevents odour being released to the atmosphere through the plant's stacks at the end of the sludge drying process.

SMW Ltd has also produced an odour management plan that sets out the procedures we will take 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.

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

The number of justified complaints about odour relating to our activities was two in the 12-month period to December 2009.

The fuel plant is located close to a wastewater treatment works, a landfill site and a crematorium and it is often difficult to determine the source of odour.

Nevertheless, SMW Ltd is committed to investigate all public complaints and take remedial action as soon as reasonably practical if a complaint is justified.

# DALDOWIE FUEL PLANT ODOUR MANAGEMENT

## DALDOWIE'S 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 procedures are laid out in the plant's Odour Management Plan. This document 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 Odour Management Plan describes the potential risks of odour escape, 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



■ Daldowie has procedures in place for all operations, such as tanker unloading

points are kept closed and opening times are kept to a minimum.

In summer 2009, Daldowie invested in new closing devices for the roller shutters in the Lamella settling tanks and Dewatering and Drying Building, which automatically close 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 walk-about inspection to ensure processes and procedures are being adhered to.

An olfactory survey of the Daldowie site boundary is carried out at least once each day while each week the survey is extended to include a check for hydrogen sulphide (H<sub>2</sub>S) emissions.

Daldowie also employs continuous monitoring of H<sub>2</sub>S at three key areas – the reception/treatment of sludge, the dewatering, drying and granule storage and the effluent treatment plant.

The continuous monitoring uses a Zellweger unit to test for H<sub>2</sub>S at least once every 10 seconds to give an hourly average over a 24 hour period.

The results of all these surveys are submitted monthly to SEPA.

Alarms have also been put in place to provide an audible signal if H<sub>2</sub>S levels exceed specified limits anywhere in the plant, allowing control room staff to take appropriate remedial action.



■ Above, the short stacks (right) for the ODORGARD abatement equipment and, below, the RTO units and stacks



■ The Dewatering and Drying Building at Daldowie Fuel Plant

## TECHNOLOGY HELPS TO 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 tackles odour from the sludge after it arrives on site. The ODORGARD process reduces the odorous compounds in the sludge to 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<sub>2</sub>S.

The catalyst for this reaction is nickel

oxide and the end products are odour-free substances that can be disposed off safely. Quality of the deodorised air is monitored by a Zellweger device to ensure no H<sub>2</sub>S emissions greater than 30 parts per million.

Daldowie also has a Regenerative Thermal Oxidiser (RTO) on each of its three stacks to treat exhaust air before it is released into the atmosphere.

RTOs work by oxidising any contaminants, such as odorous gases, that are present in the exhaust.

The waste gases pass through a bed of ceramic material which absorbs its heat. The oxidised gases continue through a combustion chamber then the hot gasses are cooled on a second bed.

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

The extremely-high temperatures involved in the oxidising process – up to 820°C – converts the exhaust gases to water and carbon dioxide.

In 2003, Daldowie increased to 26m in height and reduced the diameter of the RTO stacks to improve the dispersal of exhaust gases.

## 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.