

# Case Study:

## Terminodour™ - Odour Control System



<b>Site:</b>	<b>Swansea</b>	<b>Key Project Partners:</b>	
<b>Client:</b>	<b>Dwr Cymru (Welsh Water)</b>	<b>Client:</b>	<b>Dwr Cymru (Welsh Water)</b>
<b>Project:</b>	<b>Terminodour - Odour Control</b>	<b>Works Operator:</b>	<b>Dwr Cymru (Welsh Water)</b>
<b>Completion Date:</b>	<b>November 2007</b>	<b>Main Contractor:</b>	<b>Imtech Process</b>



### Scope of Contract:

Design, manufacture supply install, test, commission and service 3 No. Terminodour systems to treat odour in the Primary Lamella area, inlet screen and FOG area, the Oxidation tanks and the outfall pumping station.

### Background:

The Swansea waste water treatment plant was constructed in 1996 to meet the stringent European Union tests for Swansea Bay. At the time of construction it was deemed to be one of the most technologically advanced waste water treatment plants in the world. It was constructed partially below ground so as to be virtually invisible from inland. The works included an activated sludge plant providing inlet screening, primary, secondary and tertiary treatment prior to UV disinfection and discharge via a long sea outfall into Swansea Bay. The plant is designed to handle a population equivalent of 165,000. Due to the location of the plant in close proximity to residential areas careful attention was paid to odour control and twin train three stage chemical scrubbers, With each train capable of handling an airflow of 70,000m<sup>3</sup>/hr. Each train consists of a sulphuric acid scrubbing tower followed by two Sodium Hydroxide/hypochlorite scrubbers (pH<sub>9</sub> and pH<sub>11</sub>) the emission discharge limit for H<sub>2</sub>S was set at 70ppb. A number of sporadic odour complaints had been received and investigated and were determined to coincide with the doors being opened. In 2006 the chemical scrubber developed a leak and extensive refurbishment/replacement was going to be required. The plant is owned by Dwr Cymru who appointed Imtech Process (formerly MEICA) as their process contractor partners to carry out all new upgrade work for the whole of Wales. The works is operated by Dwr Cymru (Welsh Water).

### Client options and process selection:

With the chemical scrubber requiring major refurbishment of the scrubber vessels the client requested Imtech to investigate potential options and address the poor air quality issues within the building that had led to the doors being opened to improve ventilation rates. The following options were actively considered:

- Refurbish/replace and increase the volumetric flow through the chemical scrubber.
- Replacement of the primary lamella tank covers.
- Septicity control applied to the incoming sewer.
- Terminodour.

Replacement of the primary lamella tank covers was eliminated due to the lack of manpower available on site to constantly remove and replace the covers for de sludging and backwashing arrangements.

Septicity control was eliminated as the operational cost of dosing was not sustainable.

The refurbishment/replacement of the existing chemical scrubber was technically an acceptable solution but the capital costs were significantly high (£1.2-£1.5 million) and the technical limitations on improving the extraction rate were considerable.

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◀ Air handling unit installed at Swansea Bay.

following benefits have been noted:

- The system continues to provide effective odour control and no odour complaints received.
- Capital cost of the system was less than 50% of refurbishing the chemical scrubber.
- Operators no longer have to wear breathing apparatus to carry out their duties.
- The client has been able to reclassify and downgrade hazardous areas.
- Corrosion within the building and particularly to the control panel BUS bars and wiring, which were being replaced every 6 months, has been eliminated.
- Maintenance is minimal but carried out by CSO under a quarterly service agreement.
- Operational costs have been drastically reduced.

### Process Description:

The Terminodour™ system is located in an Air Handling Unit (AHU) situated within the building. The Terminodour AHU is manufactured from Double skin Galvanised mild steel (stainless steel is also available) with foam core providing acoustic insulation and protection from the elements.

Air is drawn in via the external louvers by duty fans, mounted within the AHU, and then filtered to remove particulates. The filtered air is then fed into the plasma reactor section where the air flows over corona discharge tubes and oxygen molecules are ionised. The ionised air is then fed via stainless steel ductwork into the lamella tank area.

When the negatively charged oxygen ions meet the positively charged Hydrogen Sulphide ions a collision occurs and the oxidation reaction commences, this of course happens many thousands of times to achieve efficient oxidation of the H<sub>2</sub>S.

No separate ventilation system is required for the building as the Terminodour system provides ventilation and odour abatement. The Terminodour process is ATEX certified.

For further information Terminodour™ odour control system, chemical scrubbing, Biofiltration and turn key odour abatement solutions, please contact us on:

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### Client Options and Process Description (continued):

Terminodour had a relatively low capital cost and very low operational costs but was unproven on a project of this magnitude although it had worked successfully at several smaller Dwr Cymru sites.

Imtech decided to carry out a trial of Terminodour in the primary lamella tank area of the building which was the worst area of the plant. If the trial was to be successful Terminodour would be installed throughout the building.

### Performance testing:

The primary lamella area was sectioned off from the other parts of the building and Terminodour installed. Odalog monitors were installed just above the top water level (TWL) and a further set of monitors were located on the hand rail approximately 1.5m above the lower logger. The criteria for success was determined to be an 80% reduction in odours between the two logger points. The results are detailed in the table below:

Location:	Average H <sub>2</sub> S (ppm)	Maximum H <sub>2</sub> S (ppm)
TWL:	2.00	22.00
Handrail:	0.15	0.66
% Reduction:	92.5%	97%

The system easily met the performance requirements but the views of the operators were also sought and their favourable response combined with the performance test data led to CSO Technik being awarded the balance of the contract. Terminodour was then installed to service the inlet screenings and Fats, Oil and Grease (FOG) area, and the aeration tanks as well as the outfall area.

### Post Installation Review:

The system has run effectively for several years now and the