

Odour Control Systems Ltd BIODOX™

Dosing Trials to control Hydrogen Sulphide at Wisbech for Anglian Water Ltd, December 2007

Odour Control Systems Ltd

Odour Control Systems Ltd
33a Castle Close, Manor Lane
Hawarden Industrial Park
Hawarden, Flintshire CH5 3QX

Phone: +44 (0)1244 536700

Fax: +44 (0)1244 535184

E-mail: mail@odourcontrolsystems.ltd.uk

Web: www.odourcontrolsystems.ltd.uk

Overview

Anglian Water were experiencing high levels of hydrogen sulphide at various locations around Wisbech and the associated STW at West Walton, which resulted in numerous complaints from local residents. Due to the success of recent work carried out by Odour Control Systems Ltd, (OCS) on the installation of an odour control spray system at West Walton STW, The following trials were undertaken to establish the effectiveness of the OCS dosing system based on Biodox™ that uses the powerful oxidising capability of stabilised liquid chlorine dioxide.

Objective

The pumping station at Railway Road, Wisbech, was found to be generating high levels of hydrogen sulphide with peak levels detected of up to 200 parts per million gaseous (ppm). Dosing was taking place at Railway Road with a nitrate based product (ANOMEX) in an attempt to control these levels. OCS were commissioned to conduct trials to dose Biodox™ at the well at Railway Road in order to judge the effectiveness of the product in controlling sulphide levels in the sewage system between Railway Road pumping station and the final destination at West Walton treatment works.

Set Up

The trials commenced on 11/12/2007 and were conducted as follows.

11 December 2007	1. Delivery of 2000 litres BIODOX™ to Railway Road PS 2. Delivery of dosing unit to Railway Road PS 3. Delivery of dosing unit to Lynn Road PS (BIODOX™ already in place) 4. Installation of Gastec H₂S odour logger beneath manhole at Churchill Rd 5. Installation of Gastec H₂S odour logger in well at Railway Rd 6. Installation of Gastec H₂S odour logger to inlet works West Walton STW 7. Connect dosing systems prior to dosing trials.
12 December 2007	1. 10.03 hrs. Commence shock dose of 1000 litres Biodox™ into well at Railway Road 2. 10.30 hrs. Check dosing level of Anomex system 3. 10.45 hrs. Configure Railway Road pump _ problems encountered 4. 13.45 hrs. Collect pump from Lynn Road and set up at Railway Road 5. 15.00 hrs. Commence dosing at Railway Road at 12 litres/hr
13 December 2007	1. 09.20 hrs. Dosed 20 litres into HR Filter scum channel well at West Walton STW 2. 10.00 hrs. Commissioned spray pump with Lowara engineer and made system good 3. 11.54 hrs. Slowed dosing rate at Railway Road to 5 Litres/hr 4. 12.40 hrs. Shock dosed 60 litres at Lynn Road 5. 13.00 hrs. Slowed dose rate at Lynn Road to approx 60 litres/hr 6. 13.45 hrs. Removed logger from WW inlet works 7. 14.00 hrs. Relocated logger to scum channel well (23 ppm registered) 8. 14.30 hrs. Dosed direct into well for 5 minutes 9. 15.35 hrs. Dosed 30 litres into HR Filter scum channels over 10 minutes. 10. 18.00 hrs. increased dosing at Railway Road to 10 litres/hr
14 December 2007	1. 06.00 hrs. Stopped dosing at Lynn Road and decommissioned system plus logger 2. 08.00 hrs. Stopped dosing at Railway Road and decommissioned system 3. 09.50 hrs. Dosed 40 litres into HRF scum channel outlets 4. 10.38 hrs. Removed logger from manhole at Churchill Rd 5. 12.30 hrs. Dissolved sulphide test at WW inlet works - 0ppm 6. 12.40 hrs. Dissolved sulphide test at WW aeration tank - 3ppm 7. 12.50 hrs. Dissolved sulphide test at WW scum channel well - 1ppm 8. 13.00 hrs. Dissolved sulphide test at WW HRF Scum channels - 1ppm 9. 13.30 hrs. Removed logger and concluded trial

Results

The results of the Gastec monitoring can be found in the graphs and tables in appendix A.

Analysis of Results

The three graphs show H₂S measurements from the following locations:

West Walton odalog 4.oda: Railway Road Well

West Walton 3 6 log.oda: Churchill Road manhole

West Walton log 2.oda: STW inlet works and scum channel well

NB: All odour loggers were not set with correct time and date prior to leaving factory. Logs are accurate and can be read consecutively in real time, but logged times are not in actual time or date.

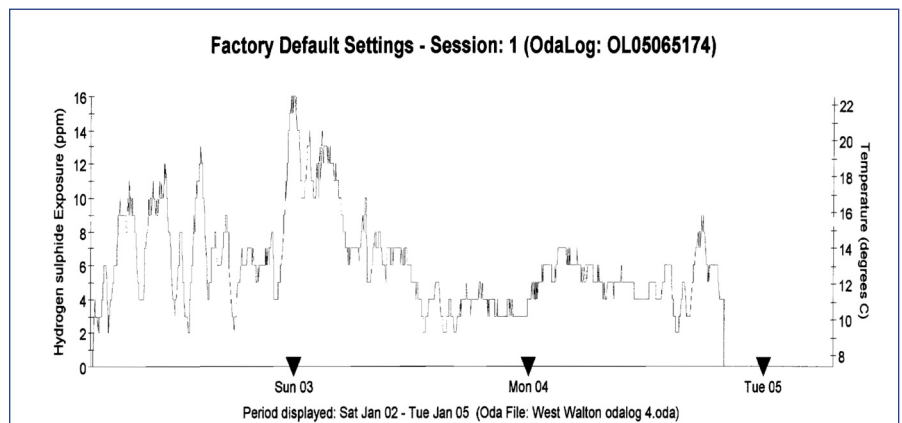
Log starting times are all approximately 11/12/07 at 12.00 hrs and finish at approx.14/12/07 at 21.00 hrs.

Graph: West Walton odalog 4

First 1/3 of graph shows dosing with Anomex 64 only.

Second 1/3 of graph shows shock dosing and trickle dosing at 12 litres/hr into well with Biodox™

Final 1/3 of graph shows trickle dosing of BIODOX™ at 5 litres/hr followed by 10 litres/hr

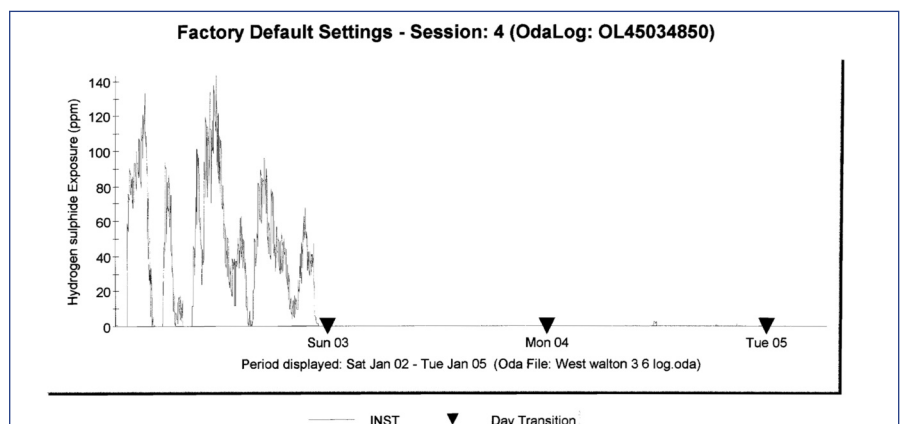


Graph: West Walton 3 6 log

First 1/3 of graph shows dosing of Anomex 64 at 15 litres/hr only, (no Biodox™).

Second 1/3 of graph shows shock dose of BIODOX™ plus trickle dose at 12 litres/hr

Final 1/3 of graph shows trickle dose of BIODOX™ at 5 litres/hr then 10 litres/hr

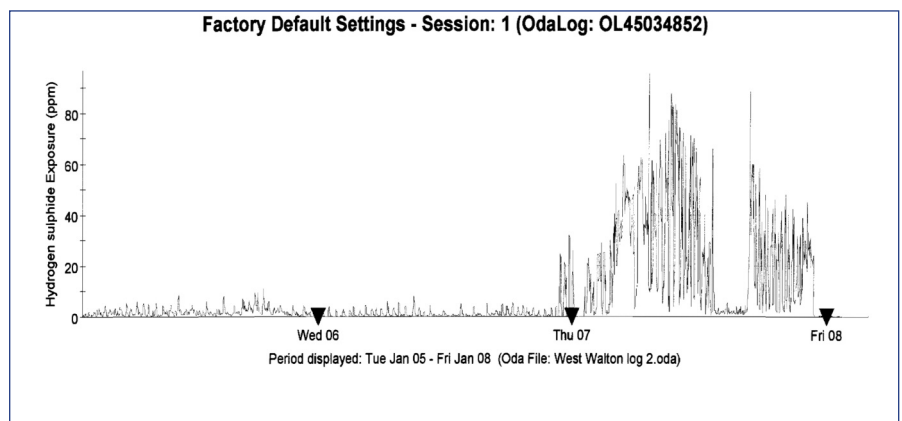


Graph: West Walton log 2

First 1/3 of graph shows inlet works levels with Anomex dosing only at Railway Rd

Second 1/3 shows inlet works levels with BIODOX™ dosing at Railway Road

Final 1/3 shows results of dosing trials with BIODOX™ into scum channel well



The correspondingly named Excel spreadsheets provide more detailed analysis if required.

Conclusions

It is clear that OCS BIODOX™ was able to control sulphide levels downstream of Railway Road PS to a general level of 0 ppm during dosing at between 5 and 12 litres/hr with no significant peaks. The Anomex 64 product was controlling sulphide levels here at an average of around 60 ppm from an unknown undosed average level, but with peaks of up to 140ppm. Dosing of BIODOX™ was not tested below 5 litres/hr due to time constraints, but results indicate that dosing levels below 5 litres/hr may well control sulphides to an acceptable level.

Dosing into the well at Railway Road controls sulphide extremely well downstream, but only to a moderate level in the well itself due to insufficient mixing time. It is recommended that dosing is initiated upstream of Railway Road if the full benefit is to be realised at the well, along with the zero levels downstream. This needs to be no more than probably 100 metres upstream. An alternative would be to dose at the well but control odours locally by fitting a small OCS Peacemaker™ dry filter scrubber, which uses the same oxidising technology as OCS BIODOX™, to the well itself. This would remove the unsightly gasses escaping from the well, while completely removing the odours caused by the escaping sulphides and mercaptans.

Dosing at Lynn Road was somewhat inconclusive due to the fact that tankering had been suspended during these trials. There is evidence from the trials that sulphide levels were reduced during day 2, but this could be a combination of dosing at Railway Road and/or Lynn Road. In any event, the dosing at Lynn Road had been scheduled prior to the suspension of tankering and further trials will be needed once tankering resumes, either from a temporary system or permanent installation.

The sulphide levels at West Walton inlet works were at very low levels due to the suspension of tankering. It was therefore decided to relocate the logger to the well that receives the scum channel effluent from the high rate filters. This well constantly fills and then discharges. During the filling stage, the heavy hydrogen sulphide accumulates in the well and is discharged out of the well during the pumping phase, leading to peaks of over 80 ppm. This is a noticeable source of odour at the works. A makeshift dosing system was tested on days 3 and 4 of the trials dosing BIODOX™ into the scum channel outlets. The West Walton log 2 graph shows that dosing in this location could well be very effective, with levels reduced to below 5 ppm.

Dissolved sulphide ion readings were taken at the works during the trials and were found as follows

Inlet: 0ppm (gaseous 0-2)

Main Aeration Tank 3ppm (gaseous 2ppm)

Scum Channels 1.5ppm (gaseous 0ppm)

Scum Channel Well 1.5ppm (gaseous up to 100 ppm)

Further discussion is required to optimise the odour control regime, but clearly, BIODOX™ has a major role to play in odour control at Wisbech and West Walton.

Ian McNulty

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preserving the environment

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33a Castle Close, Manor Lane
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