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LICENSING & RESOURCE USE

INSPECTOR'S REPORT ON A TECHNICAL AMENDMENT TO A WASTE LICENCE

To: DIRECTOR

FROM: Marian Doyle - Environmental Licensing Programme

C.C.:

DATE: 21st February 2012

RE: Technical Amendment to Waste Licence Reg. No: **W0244-01**. Waterford Wastewater Treatment Plant, Springfield House, Gorteens, Co. Kilkenny from **Waterford City Council**.

The Agency received a request from Waterford City Council (WCC) for a technical amendment of Licence Reg. No W0244-01 on 23rd November 2010. WCC has requested an increase in the volumetric flow limits from two odour control units (emission points OCU-1 and OCU-2). They have also requested an amendment to Condition 6.16.3 (ii) of the licence regarding odour control measures at the facility.

1. Background

WCC was granted waste licence Reg. No. W0244-01 on 13th May 2009 for the Waterford City waste water treatment plant (WWTP). The WWTP provides secondary treatment and the sewage sludge generated is treated on site by anaerobic digestion. The final sludge is sent for disposal to landfill. Under the Waste Management Acts 1996 to 2011 the treatment of sewage sludge, where the residual sludge is sent for disposal, is a licensable activity. The principal activity is Class 6 of the Third Schedule of the Waste Management Acts 1996 to 2011: *Biological treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any activity referred to in this Schedule.*

The Waterford City WWTP was commissioned in July 2010. It is being operated by Anglian Water International (AWI) under a Design Build Operate contract. Odorous air from areas of the WWTP and the sludge treatment area is conveyed to odour abatement. Two odour control units each consist of a biofilter, droplet eliminator, extract fans and carbon filter. OCU-1 serves the inlet works and settlement tanks and OCU-2 serves the sludge treatment area. Extract fans draw odorous air from the covered void spaces of tanks, chambers etc. to the control units. In the process a negative pressure is created in the void spaces, which draws in dilution air. Treated air is emitted via two stack emission points (OCU-1 and OCU-2). The units are designed to achieve 99% H₂S reduction, which is equivalent to 95%-97% odour removal. The nearest residences are approximately 200m northwest and northeast of the site.

2. Technical Amendment Request

Schedule B.1 Emissions to Air of the licence specifies maximum volumetric flow rates (in m³/day and m³/hour) for the two odour control units. See current *Schedule B.1* below:

B.1. Emissions to Air

Emission Point Reference No:	OCU-1 (Odour Control Unit)	
Location:	Inlet Works	
Volume to be emitted:	Maximum in any one day:	331,560m ³
	Maximum rate per hour:	54,000 m ³
Minimum discharges height:	10m above ground	
Parameter	Emission Limit Value	
Ammonia	50 ppm (v/v)	
Amines	5 ppm (v/v)	
Hydrogen Sulphide	5 ppm (v/v)	
Mercaptans	5 ppm (v/v)	

Emission Point Reference No:	OCU-2 (Odour Control Unit)	
Location:	Sludge Treatment Area	
Volume to be emitted:	Maximum in any one day:	121,008 m ³
	Maximum rate per hour:	50,760 m ³
Minimum discharges height:	8m above ground	
Parameter	Emission Limit Value	
Ammonia	50 ppm (v/v)	
Amines	5 ppm (v/v)	
Hydrogen Sulphide	5 ppm (v/v)	
Mercaptans	5 ppm (v/v)	

WCC has provided figures that they now state are 'the correct maximum and average daily emission volumes from both OCU-1 and OCU-2, (see below).

OCU-1	m³/day	OCU-2	m³/day
Average/day	331,560	Average/day	142,819
Maximum/day	381,000	Maximum/day	164,000

WCC have stated that the maximum volumetric limits they are requesting relate to the air handling capacity of the OCU extract fans. In the licence application WCC stated that emission volumes from the OCUs were based on average air exchange rates. For OCU-1 they have now requested 331,560 m³/day (average) and 381,000 m³/day (maximum) compared to the licence limit of 331,560 m³/day (maximum). For OCU-2 WCC state that the emission volume given in the application (121,008 m³/day) was on the assumption that the primary and secondary sludge tanks would normally be almost full. However they now state that this was incorrect as the tanks are for emergency storage and will normally be almost empty. Accordingly WCC state that they need to draw a greater volume of air through the larger void space in both tanks resulting in a greater volumetric emission.

An odour dispersion model (ADMS 3.3) assessment was undertaken by Enpure Ltd as part of the waste licence application (Odour Dispersion Report Waterford WwTW, 10th April 2008).

In regard to the TA request, WCC were requested on 28 February 2011 to:

- (i) Clarify whether the emission rates (in terms of OU_E/sec) for the volumes requested were higher than those used in the odour dispersion model in the licence application;
- (ii) Demonstrate that emissions will not cause environmental pollution;
- (iii) Re-run the odour model where necessary.

WCC were also asked to clarify the relationship between the maximum emission volumes in m^3/hr provided in the licence application (and included in the licence) and the maximum volumes in m^3/day now requested. On 17 June 2011, the Agency subsequently asked WCC to provide the emission rates (in terms of OU_E/sec) for the maximum hourly volumes as odour dispersion modelling is normally based on hourly (short term) emissions. A response was received on 01 December 2011.

WCC maintain that at the higher volumes requested a greater volume of dilution air will be drawn through the void spaces in tanks etc., thereby reducing the odour concentration in the discharge. They did not provide emission rates in OU_E/sec . WCC also maintain that the exit velocity of treated air discharged will be higher, resulting in better dispersion. Enpure Ltd has reviewed their model and state that the odour levels at the receptor locations will be no greater than those predicted by the model submitted as part of the licence application. Notwithstanding the influence of greater dilution air on odour concentration and of efflux velocity on odour dispersion, the limits specified in *Schedule B.1* must protect the environment with respect to odour nuisance.

3. Assessment of Request

The maximum volumetric limits (m^3/day) that are specified in the licence are as provided by WCC in the licence application. Average emission volumes are not specified in the licence. For OCU-1 331,560 m^3/day was provided in the licence application as both the average and maximum discharge volume. This is now said to be the correct average figure. The maximum now requested (381,000 m^3/day) is 15% higher than what is in the licence.

For OCU-2 both the average and the maximum discharge volume were provided in the application as 121,008 m^3/day . The maximum volume now requested (164,000 m^3/day) represents an increase of 35%. This is due to the incorrect assumption by WCC that the sludge tanks would be full rather than empty. This increase may be additional dilution air, however WCC has not provided emission rates in terms of OU_E/sec to demonstrate this. Table 1 summarises what is requested, what is specified in the licence and what was assessed in the odour dispersion modelling exercise.

Table 1. Licence limits and requested emission volumes

	OCU-1	OCU-2
<u>Licence Application:</u>		
Average/day	331,560 m^3/day	121,008 m^3/day
Maximum/day	331,560 m^3/day	121,008 m^3/day
Maximum/hr	54,000 m^3/hr	50,760 m^3/hr
<u>Licence limits (W0244-01)</u>		
Maximum/day	331,560 m^3/day	121,008 m^3/day
Maximum/hr	54,000 m^3/hr	50,760 m^3/hr
<u>Requested in TA:</u>		
Average/day	331,560 m^3/day	142,819 m^3/day
Maximum/day	381,000 m^3/day	164,000 m^3/day
Maximum/hr	54,000 m^3/hr	50,760 m^3/hr

Input to Odour Model		
Average/hr	13,815 m ³ /hr	5,042 m ³ /hr
Odour emission rate	28,663 OU _E /m ² /sec	69,317 OU _E /m ³ /sec
Stack exit velocity	15.0 m/s	14.1 m/s

Although the TA request relates to daily discharge volumes from the OCUs, hourly limits are more relevant in assessing odour emissions. The discharge volumes input to the odour dispersion model were 13,815 m³/hr for OCU-1 and 5,042 m³/hr for OCU-2, as hourly averages. Over 24 hours these are equivalent to 331,560 m³/day and 121,008 m³/day respectively, which are the daily volumes specified in the licence. However the maximum hourly volumes provided by WCC in the licence application and specified in the licence are 54,000 m³/hr for OCU-1 and 50,760 m³/hr for OCU-2. These are significantly higher than the hourly rates used in the model and should not have been applied in the licence. WCC has not requested to change these limits, which they maintain are based on short time periods. It is recommended that the hourly emission limits be reduced to take account of what was input to the modeling (see below). In addition, WCC carried out emissions monitoring for OCU1 and OCU2 (See Table 2) and the measured volumetric flows (m³/hr) are significantly lower than the hourly limits specified in the licence and are in the range of what was modelled.

Table 2. Monitoring of Emissions to Air, November 2010 (AER 2010)

Emission point	Ammonia mg/m ³	Amines mg/m ³	Mercaptans mg/m ³			Volumetric flow m ³ /hr.
			Methyl	Ethyl	Butyl	
OCU-1	<0.6	<3.4	<4.3	<4.3	<4.3	14,487
OCU-2	<0.5	<3.4	<4.3	<4.3	<4.3	5,567

Odour modelling

The odour model predicted ground level odour concentrations in the vicinity of the WWTP site in terms of odour units (OU_E/m³). It predicted that odour concentrations at sensitive receptors would be ≤0.6 OU_E/m³ (as an hourly average) for 99.5% of the year. This was for normal operating conditions. Also odour concentrations would be less than 0.3 OU_E/m³ at sensitive receptors for 95% of the year (as an hourly average). There is no statutory odour standard in Ireland for industrial installations, however Agency guidance for intensive agriculture contains a target value for new pig production units of ≤1.5 OU_E/m³ (as a 98th percentile of 1-hour averaging periods). Guidance from the UK¹ also specifies a standard for WWTPs of ≤1.5 OU_E/m³ (as a 98th percentile of 1-hour averaging periods). The predicted concentration of ≤0.6 OU_E/m³ (99.5%^{ile}) is significantly below 1.5 OU_E/m³ (98%^{ile}). Therefore even if the odour emissions from OCU-1 and OCU-2 were to increase two-fold, the odour levels at the sensitive receptors would be below 1.5 OU_E/m³. Also the model predictions are based on 99.5%ile concentrations and are therefore more stringent than the standard of 1.5 OU_E/m³ (which is to be met 98% of the time). There have been no odour complaints received by the Agency since granting of the waste licence.

Based on the information provided it is considered that the requested increase in discharge volumes (m³/day) for the OCUs will not result in the relevant requirements of Section 40(4) of the Waste Management Acts, ceasing to be satisfied. WCC did not provide the emission rates (in terms of OU_E/sec) however as the predicted ground level concentrations are significantly below the commonly used odour standard it is considered that the requested increase will not have a significant impact on sensitive receptors. However it is also recommended to reduce the hourly volume limits (m³/hour) for the OCUs to be consistent with what was assessed in the odour dispersion modelling exercise. The maximum rates

¹ Environment Agency IPPC Draft Horizontal Guidance for Odour (2002).

(m³/day) requested in the TA divided by 24 are 15,875 m³/hour (OCU-1) and 6,833 m³/hour (OCU-2) and it is recommended that these be included in *Schedule B.1*. These flow rates are only slightly higher than the hourly flow rates used in the odour dispersion modelling exercise, and will not result in the relevant requirements of Section 40(4) of the Waste Management Acts, ceasing to be satisfied. The flow rates measured by the licensee in 2010 comply with these limits (see Table 2). It is considered that these changes could be incorporated by a technical amendment to the licence.

The licence has supporting requirements relating to odour including Condition 5.2, which requires that no emissions, including odours from the activities shall result in an impairment of, or an interference with amenities or the environment beyond the facility boundary or any other legitimate uses of the environment beyond the facility boundary. The licensee is also required to comply with the European Communities (Waste Water Treatment) (Prevention of Odours and Noise) Regulations S.I. No. 787 of 2005.

Recommendation for Schedule B.1

It is recommended that *Schedule B.1* be amended to include the requested maximum volume limits (m³/day) and the reduced limits (m³/hour) for OCU-1 and OCU-2. It is also recommended that biannual flow monitoring be included in *Schedule C.1.2* to demonstrate compliance with the ELVs in *Schedule B.1*.

<u>Recommended in TA:</u>	OCU-1	OCU-2
Maximum/day	381,000 m ³ /day	164,000 m ³ /day
Maximum/hr	15,875 m ³ /hr	6,833 m ³ /hr

2.1 Condition 6.16.3 (ii)

The licensee has identified a deviation from Condition 6.16.3(ii) of the licence. Condition 6.16.3 stipulates that:

The licensee shall implement measures for the control of odours from the facility. Measures shall include but not be limited to the following:

- (i) *Installation of an appropriately designed extraction and odour abatement system for the treatment of odorous air streams;*
- (ii) *Maintenance of the inlet works building and sludge building under negative pressure with ventilated air passed through an appropriately designed biofilter;*

WCC state that the inlet works and sludge buildings as a whole are not maintained under negative pressure, but that the sources of odour are individually enclosed and maintained under negative pressure. An alternative wording of the condition has not been proposed by the licensee.

The requirements of Condition 6.16.3 under the licence are as proposed by WCC in the licence application. However it is considered acceptable that the individual sources of odour are subject to negative pressure rather than the buildings as a whole. It is considered that this requested change could be incorporated by technical amendment. The following amendment to Condition 6.16.3 (ii) is recommended:

- (ii) ***Maintenance of unit operations at the inlet works building and sludge building which are sources of odour, under negative pressure with ventilated air passed through an appropriately designed biofilter;***

4. Consultation with Office of Environmental Enforcement (OEE)

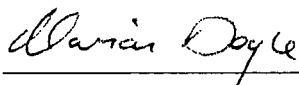
I have consulted with the OEE inspector for the facility (Senior Inspector Brendan Wall) who has confirmed that the requested changes cannot be accommodated by OEE under the existing licence (W0244-01).

5. Conclusions

Having assessed the request for a Technical Amendment and the supporting documentation, I consider that the changes to *Schedule B* and *Schedule C* can be accommodated by way of a technical amendment to the licence (Reg. No W0244-01). It is also recommended that Condition 6.16.3 be amended regarding the areas maintained under negative pressure. The changes have been incorporated into Technical Amendment A.

6. Recommendation

I recommend that the Agency grant this Technical Amendment to a Licence subject to the conditions as set out and for the reasons as drafted.



Marian Doyle
Inspector
Environmental Licensing Programme