

Environment Agency permitting decisions

Variation

We have decided to issue the variation for Dogsthorpe Landfill operated by FCC Waste Services (UK) Limited.

The variation number is EPR/BV3740ID/V012

We consider in reaching that decision we have taken into account all relevant considerations and legal requirements and that the permit will ensure that the appropriate level of environmental protection is provided.

Purpose of this document

This decision document:

- explains how the application has been determined
- provides a record of the decision-making process
- shows how all relevant factors have been taken into account
- justifies the specific conditions in the permit other than those in our generic permit template.

Unless the decision document specifies otherwise we have accepted the applicant's proposals.

Structure of this document

- Description of main changes introduced by the variation
- Key issues
- Annex 1 the decision checklist
- Annex 2 the consultation and web publicising responses

Description of the changes introduced by the Variation

This is a Substantial Variation.

A Reverse Osmosis (RO) leachate treatment plant is being installed to improve the current situation regarding the management of landfill leachate produced at the site. Currently this material is removed from the site without further treatment and sent for disposal.

The RO Plant will facilitate the treatment of the landfill leachate from the site to remove organic and inorganic contaminants. The RO plant for Dogsthorpe Landfill is based on a 3-stage reverse osmosis process that 'cleans' the leachate primarily in the first and second stages and then 'polishes' the permeate further in the third stage.

The end-products of the RO process will be an aqueous permeate that is capable of being discharged to surface water and a small volume of aqueous concentrate that will be removed by tanker for off-site treatment/disposal.

Key issues of the decision

The operator is proposing to install a 3 stage Reverse Osmosis (RO) plant with a capacity to treat 250m³/day with a discharge rate to controlled waters of 200m³/day (Max 12.5l/s) of treated leachates.

As a technology, RO is well established in wastewater treatment applications. The process exploits the natural phenomenon of osmosis where by, if two aqueous solutions, with different degree of concentration, are separated by a semi-permeable membrane, water from the weakest solution will pass through the membrane to dilute the higher concentration solution on the other side. The process will continue until solutions on both side of the membrane display the same degree of concentration.

With reverse osmosis the process is reversed. Pressure is applied to a water solution, (leachate), against a semi permeable membrane forcing the water molecules to pass through the membrane, thus forming the clean "permeate". The majority of the solutes or contaminants will be left behind forming the "concentrate". Permeate is normally suitably clean to be allowed direct discharge without any further treatment. The concentrate is normally re-filtrated in the landfill body. Most commercially available plants are constructed as two stage plants with contaminant removal rates better than 99.6%. As mentioned this is a 3 stage RO process which ensures that permeate is of the highest quality.

The production of a high quality effluent (permeate) is a significant advantage of the RO process. In particular the removal of non-degradable components of leachate such as chloride, or residual COD and heavy metals.

Normally concentrate is returned to the landfill, in other instances the concentrate is disposed off-site. In addition, all chemicals required for effective operation of an RO plant are contained in the concentrate.

When considering the sustainability of the return of concentrate to the landfill:

- any predicted change in leachate concentration should be assessed;
- it must be shown that the landfill is adequately engineered so that the concentrate does not cause pollution (particular attention should be given to the impact on groundwater);
- it must be shown that the leachate treatment system can adequately treat any predicted change in leachate quality resulting from the return of the concentrate; and
- chemicals essential to the effective operation of the plant should be selected so as not to compromise the disposal of the concentrate.

In this case the Operator has proposed off-site treatment for the concentrate, and this has been added as a limitation in the activities table. As none of the work in the bulleted list above has been undertaken by the operator, it is appropriate that this option is not permitted. Treatment of imported leachates is not permitted.

Leachate is currently disposed for off-site treatment by tankering. Following introduction of the RO plant this volume will fall as only the concentrate will be sent for off-site treatment as discussed above - approx. 73% reduction in the equivalent volume of leachate. The permeate is discharged to surface water as discussed above.

An evaluation of the potential environmental and health impacts from the RO process were undertaken by the applicant and it was concluded that there was no detrimental impact on the environment or human health in relation to overall site operations as a result of RO Plant. The assessment concluded that the RO Plant:

- significantly reduces the volume of a landfill leachate requiring final disposal;
- significantly reduces the number of tanker movements associated with the removal of leachate for off-site treatment/disposal and in doing so reduces the environmental and social impact associated with the vehicle use;
- has no overall detrimental impact in relation to the environmental or health impact of site operations.

Impact on Surface Water

The RO Leachate Treatment Plant will discharge to an existing surface water ditch at point SW9 (grid ref. TF2046801910) before entering Carr Dyke (grid ref. TF2130301654). The application states that the discharge is applied for under the operators current trade effluent discharge consent Ref: PRNNF09552 issued by the National Rivers Authority in 1996. The treatment of landfill leachate and discharge of effluent to controlled waters at the facility is considered to be a Schedule 1 activity under the EPR regulations 2010 Section 5.4 Part A(1)(a)(ii) explicitly covered under Table S1.1 of the EPR permit and no further consent is required for the proposed operations.

The purpose of the existing standalone trade effluent discharge consent (PRNNF09552) is therefore considered defunct and the operator has been advised to surrender the consent.

An H1 screening assessment and river needs modelling for ammonia and BOD (Monte Carlo Assessment) in accordance with WFD 'No deterioration principals' was submitted regarding the effect of the proposed RO plant permeate discharge on the aquatic environment. The applicant concluded that the effect of the discharge was unlikely to cause significant impact on receiving waters.

Audit of Data Used For Screening

The applicant has assessed the removal efficiency of the proposed RO plant by processing the leachate from Dogsthorpe through a similar plant (Calvert Landfill).

Subsequent to the treatability trial results, 193 substances were ruled as not liable to cause pollution based on the concentration of the permeate results falling below the current laboratory detection limit. Our H1 guidance says substances not detected by chemical analysis in the effluent (in this case the permeate) need not be considered further provided that the LOD is appropriate. Appropriate LODs are those achieved for analysis of freshwater samples by a UKAS accredited laboratory and are generally in the order of no more than 10% of the EQS. Our guidance acknowledges that some effluents may have higher LODs due to the sample matrix, and in these instances the substances of interest should be run through the screening process at face value.

We compared the LODs reported in Annex 1 of the supporting information "H1 assessment –Surface Water" with those achieved by our National Laboratory Service for the analysis of freshwater and leachate samples and also with the freshwater EQSs. The LODs used by the applicant were sometimes higher than those reported by our laboratory, but are an acceptable order of magnitude. The Environment Agency agrees with the applicants conclusion that the 193 substances cited are not liable to cause pollution.

The worksheet predicted permeate concentrations for 2,4-D, Hg and MCPB. These substances were identified as not detected in the influent. We assumed that the removal rate cited in the worksheet was calculated from the results of the trial and therefore would have been detected in the leachate. An assessment of these substances was not included in the report.

It was unclear from the submission whether substances identified in the spreadsheet provided (worksheet – RO Plant Model Effluent) had been included in the H1 assessment. The worksheet indicated that a number of metals (Cd, Cr, Cu, Fe, Ni, Pb and Zn), Dichlorprop (2,4-Dp), Mecoprop and phenol were detected in the influent implying that these substances should have also been assessed. However, there was no specific mention of these substances in the H1 Surface Water Assessment report.

In the worksheet “RO Plant Model Effluent”, where a removal had been cited, mean and maximum permeate concentrations were calculated from the mean and maximum raw leachate concentration. The predicted permeate concentration for 2,4-D and Hg, is approximately 10x and 4x EQS respectively. However these estimates are impacted by the high LOD of input data. It was unclear how this data has been used to assess the potential impact of the discharge.

The current EQSs for the metals Cu, Zn, Ni and Pb are now expressed as bioavailable metal, and our H1 tool has been updated to reflect this. The assessment was found to be comparing Zn with the old EQS of 125 rather than the new EQS of 10.9 in addition a number of LOD’s appeared not to have been provided including those for 2,4-D and Hg.

We concluded that the flow data from the gauging station used by the applicant was not suitable when considering the impact of this discharge with the applicant using overestimated river flows. The point used has significantly higher flows than those in the Carr Dyke and the Folly River. We were unable to obtain the flows at the exact point of the discharge however Environment Agency hydrologists provided further data (Based on Groundwater Model) for the Folly River immediately downstream of confluence with the Carr Dyke which we considered to be more accurate, this required the assessments to be re-run using the correct flow data for substances not screened out

	Q95 (MI/d)	Q30*
Natural	5.5	29.5
Actual	4.8	28.9

A Schedule 5 request for further information was sent to the applicant on 25th August 2016 and the operator responded to this request on the 19th October 2016 however we found there to still be a number of omissions which required further clarification. An additional request for the missing information was sent via e-mail on 25th November 2016 which was subsequently responded to on 30th November 2016 to the Environment Agency's satisfaction.

Conclusion

Although all watercourses within a waterbody form part of that waterbody, compliance is physically assessed on the main river reaches (blue-line river waterbodies). Carr Dyke confluences with the Folly River at NGR TF17602 04184. The Folly River is a blue-line river waterbody, the tributary Carr Dyke is not. We are able to offer some flexibility in applying the no deterioration principles for tributaries for sanitary parameters. This is given in our operational instruction OI_50_12 (page 6) and hierarchy of setting permit limits.

The quality data for ammoniacal nitrogen presented in the applicants modelling has quite a large standard deviation which may be a result of the sample size. The data equates to a face value classification on the good/high status boundary for ammonia. This is consistent with the classification of the waterbody. The mean quality of 0.133 mg/l (High Quality) cited is similar to other sites monitored in the waterbody and the data appears to be representative.

The Environment Agency agrees with the operator's conclusion that the discharge from the proposed RO process are not likely to cause pollution or breach any specified EQS. In addition Ammonia and BOD emissions will not cause a deterioration to any WFD water classification (High - Folly River) in accordance with the WFD no deterioration principles and our operational guidance 50_12.

Annex 1: decision checklist

This document should be read in conjunction with the application, supporting information and permit/notice.

Aspect considered	Justification / Detail	Criteria met
		Yes
Receipt of submission		
Confidential information	A claim for commercial or industrial confidentiality has not been made.	✓
Identifying confidential information	We have not identified information provided as part of the application that we consider to be confidential. The decision was taken in accordance with our guidance on commercial confidentiality.	✓
Consultation		
Scope of consultation	<p>The consultation requirements were identified and implemented. The decision was taken in accordance with our Public Participation Statement and our Working Together Agreements on 13th June 2016.</p> <ul style="list-style-type: none"> • Director of Public Health • Health and Safety Executive • Foods Standards Agency • Local Authority • Public Health England 	✓
Responses to consultation and web publicising	<p>The web publicising and consultation responses (Annex 2) were taken into account in the decision.</p> <p>The decision was taken in accordance with our guidance.</p>	✓
European Directives		
Applicable directives	All applicable European directives have been considered in the determination of the application.	✓
The site		
Extent of the site of the facility	The operator has provided a plan which we consider is satisfactory, showing the extent of the site of the facility including discharge point.	✓

Aspect considered	Justification / Detail	Criteria met Yes
	<p>A plan is included in the permit and the operator is required to carry on the permitted activities within the site boundary.</p>	
<p>Biodiversity, Heritage, Landscape and Nature Conservation</p>	<p>The application is within the relevant distance criteria of a site of heritage, landscape or nature conservation, and/or protected species or habitat.</p> <ul style="list-style-type: none"> • Orton Pit (SAC, SPA) 7974m • Nene Washes (SAC, SPA, Ramsar) 4496m • SSSI Name: Dogsthorpe Star Pit (SSSI,LNR) 386m • Little Wood (LWS) 1394m <p>An assessment of the application and its potential to affect the site(s) has been carried out as part of the permitting process. We consider that the application will not affect the features of the sites.</p> <p>There are no emissions to air, land or Groundwater, the only emissions are RO permeate waters to the aquatic environment.</p> <p>Water screening shows that there is no source-pathway-receptor link between the receiving water network (Carr Dyke) and the Nene washes SAC, SPA, Ramsar approximately 4.5km away, with waters flowing in the opposite direction.</p> <p>The application is not relevant for assessment under the Habitats Regulations, CRoW Act or our wider conservation duties as there are no associated risks. No further assessment is required.</p> <p>We have not formally consulted on the application. The decision was taken in accordance with our guidance.</p>	<p>✓</p>
<p>Environmental Risk Assessment and operating techniques</p>		

Aspect considered	Justification / Detail	Criteria met
		Yes
Environmental risk	<p>We have reviewed the operator's assessment of the environmental risk from the facility.</p> <p>The assessment shows that, applying the conservative criteria in our guidance on Environmental Risk Assessment supplied by the operator and reviewed by ourselves all emissions may be categorised as environmentally insignificant with the exception of Ammonia and BOD.</p> <p>Please see key decisions section.</p> <p>The applicant has provided a Noise risk assessment in accordance with our web based 'Risk assessments for your environmental permit covering odour, noise and vibration, fugitive emissions visible plumes and accident risks. The operator's risk assessment is satisfactory.</p> <p>The EPR permit contains necessary conditions in relation to all point source and fugitive emissions from the facility to the environment including noise and vibration. These are described in 'Section 3' Emissions and Monitoring within the permit. In addition relevant operating techniques are included with section 1.2 of the EPR Permit.</p>	✓
Operating techniques	<p>We have reviewed the techniques used by the operator and compared these with the relevant guidance notes.</p> <p>The proposed RO techniques are in line with the benchmark levels contained in the IPPC SGN S5.03 'Guidance for the Treatment of Landfill leachate' and we consider them to represent appropriate techniques for the facility. The permit conditions ensure compliance with relevant BREFs and BAT Conclusions.</p>	✓
The permit conditions		
Incorporating the application	<p>We have specified that the applicant must operate the permit in accordance with descriptions in the application, including all additional information received as part of the determination process.</p> <p>These descriptions are specified in the Operating Techniques table S1.2 in the permit.</p>	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
Emission limits	<p>We have decided that emission limits should be set for the parameters listed in the permit.</p> <p>The following substances have been identified as being emitted in significant quantities and ELVs and equivalent parameters or technical measures have been set for those substances and others.</p> <p>It is considered that the numeric limits described below will prevent significant deterioration of receiving waters and provide a high level of protection for the environment.</p> <p>Ammoniacal Nitrogen 5mg/l BOD₅ 10mg/l Lead 0.01mg/l Zinc 0.02mg/l Chromium 0.05mg/l Chloride 8.90mg/l</p> <p>Limits are incorporated to ensure that receiving waters remain within current class status limits under the Water Framework Directive (WFD) no deterioration requirements and to ensure that the RO plant continues to operate to specified removal efficiencies.</p>	✓
Monitoring	<p>We have decided that monitoring should be carried out for the parameters listed in the permit, using the methods detailed and to the frequencies specified.</p> <p>Monthly monitoring has been incorporated into the permit for BOD, Ammonia, Lead, Chloride, Zinc and Chromium.</p> <p>Monitoring requirements have been imposed in order to ensure that the RO plant is operating to specified efficiencies ensuring protection of receiving waters. We made these decisions in accordance with S5.03, LFTGN02 and our operational instruction 50_12 (Water quality planning: no deterioration and the Water framework Directive). We consider this to be proportionate to the risk posed by the operation of the facility</p>	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
	<p>Continuous monitoring of key parameters will be carried out as an integral part of the plant operation. The RO process is controlled such that predetermined control levels cannot be exceeded e.g. exceeding maximum pH value, the plant will shut down automatically. The system is fitted with alarms which will activate and send alerts via telemetry if the plant fails or effluent quality is not to the correct specification.</p> <p>Based on the information in the application we are satisfied that the operator's techniques, personnel and equipment have either MCERTS certification or MCERTS accreditation as appropriate.</p>	
Reporting	<p>We have specified reporting in the permit.</p> <p>Reporting requirements for emissions from the new RO discharge point SW9 as specified in Table S3.3 have been included by way of condition 4.2.3 and Table S4.1 of the current EPR permit which remains unchanged with a reporting frequency of every 3 Months. Form Water 1 referenced in Table S4.4 has been updated to include the new emission point.</p> <p>We consider this to be proportionate to the risk posed by the operation of the facility</p> <p>We made these decisions in accordance with IPPC SGN S5.03.</p>	✓
Operator Competence		
Environment management system	<p>There is no known reason to consider that the operator will not have the management systems to enable it to comply with the permit conditions. The decision was taken in accordance with our guidance on what a competent operator is.</p>	✓
Technical competence	<p>Technical competency is required for activities permitted.</p> <p>The operator is a member of an agreed scheme.</p>	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
Financial provision	<p>There is no known reason to consider that the operator will not be financially able to comply with the permit conditions. The decision was taken in accordance with our guidance on what a competent operator is.</p> <p>The financial provision arrangements satisfy the financial provisions criteria.</p>	✓

Annex 2: External Consultation and web publicising responses

Summary of responses to consultation, and web publication advertising and the way in which we have taken these into account in the determination process. (Newspaper advertising is only carried out for certain application types, in line with our guidance.)

Response received from
Public Health England
Brief summary of issues raised
<p>Based solely on the information contained in the variation application provided, PHE has no significant concerns regarding risk to health of the local population from this proposed facility providing that the applicant takes all appropriate measures to prevent or control pollution, in accordance with the relevant sector technical guidance or industry best practice.</p> <p>Agency (EA) also consult the following relevant organisation(s) in relation to their areas of expertise:</p> <ul style="list-style-type: none">• the local authority for matters relating to impact upon human health of contaminated land; noise, odour, dust and other nuisance emissions;• the Food Standards Agency, where there is the potential for deposition on land used for the growing of food crops or animal rearing;• the Director of Public Health for matters relating to wider public health impacts.
Summary of actions taken or show how this has been covered
<p>The operation of the RO plant is considered to represent BAT in accordance with IPPC Sector Guidance Note S5.03 (Treatment of Landfill Leachate)</p> <p>Consultation requirements were identified and implemented in accordance with our working together agreements and Public Participation Statement as part of the determination process.</p> <ul style="list-style-type: none">• Director of Public Health• Health and Safety Executive• Foods Standards Agency• Local Authority <p>No further actions required</p>