

Environment Agency permitting decisions

Variation

We have decided to the variation for Roxby Landfill operated by Biffa Waste Services Limited.

The variation number is EPR/BW2951IM/V010.

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 the 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.

The variation is for the addition of a leachate solidification process, as a directly associated activity, to the permit. The facility will treat up to 100 tonnes of leachate per day in batches of between 4.5 m³ to 9 m³, making it a listed activity, section 5.4 A(1)(a)(ii).

Leachate from Roxby landfill will be blended with solid fines and cement. The fines will be part of the wastes that are currently permitted for disposal in the landfill. The blending will result in a solid material that will be used for landfill cover, for haul road construction and for making non-structural blocks.

The process will result in a reduction in the amount of leachate that will need to be exported off site. The activity will be carried over engineered areas of the landfill. The plant will be able to be relocated around the site to accommodate for progressive filling on current and future cell area that are located in the northern section of the site.

The treatment process is unlikely to be located right on the boundary, but as a worst case the impact assessments in the application were based on distances to receptors from the boundary. The closest residential receptors to the boundary of the northern part of the site are Old Cliff Farm (500 m) and properties west and east of Roxby Road (425 m).

Key issues of the decision

1. Waste acceptance

The treatment facility will use waste streams that are already accepted for disposal in the landfill. These wastes are subject to existing pre-acceptance and acceptance procedures.

Once received at site, fines suitable for use in the leachate treatment will be directed to designated areas.

2. Waste and Materials Storage

All materials will be stored on areas of the landfill that are engineered.

Cement

Cement will be delivered by tanker and transferred to a horizontal powder silo. The silo will be fitted with a filter to remove dust from air that is vented during transfer to the silo. The filters will be cleaned by either reverse jet or mechanical shaking. The silo will be fitted with either a high pressure sensor or a high powder level sensor connected to an alarm to prevent overfilling. The silo will be fitted with a pressure relief valve.

Waste fines

Fines are currently used for daily cover with stockpiles on engineered areas located close to or within the footprint of the operational cell. The leachate solidification facility (LSF) will be located close to the stockpiles. In the event that the LSF is a distance from the stockpiles then an intermediate stockpile will be created adjacent to the LSF.

Leachate

Leachate will be extracted from the existing leachate storage infrastructure. In addition intermediate storage tanks will be used with a maximum capacity of 5 m³. These tanks will allow a measured discharge to the LSF.

3. Treatment method

A screen will be used to ensure that fines are a suitable size to prevent damage to equipment.

The cement silo will have load cells and an auger that will transfer cement to a discharge sock and into the mixer via a hopper. The mixers will be static drum or volumetric mixers. Leachate will be pumped from tanks to the discharge sock and into the mixer. The cement silo feed system will be PLC controlled, it will enable specific cement to leachate weight amounts to be loaded.

Solid waste fines will be added by bucket. Trials have shown that measurement by bucket has provided enough control to ensure that the correct amount of fines are added.

Most of the material will be used for landfill cover. After mixing, batches will be discharged onto the ground where it will flow down into curing bays, alternatively it could be transferred by slurry pump or dumper. The mixed material will be allowed to cure for typically two days. The duration will depend on weather conditions. After curing it will be excavated, loaded onto dumpers and transported for use. It will be spread by dozer or excavator, or it could be sprayed at low height using an agricultural spreader.

Batches of mixed material for non-structural blocks and temporary haul roads will be transferred directly to the construction areas via a slurry pump or a dumper.

Curing bays will be constructed from materials such as tyres or earth bunds. The bays will be located at least 30 m from the crest of any waste slopes.

Trials at Trecatti Landfill in Merthyr Tydfil have shown that the amount of leachate that is released from the mixture during curing (free leachate) depends on the cement to leachate ratio. The ratio that will be used at Roxby will give less than 5% (typically 2-3%) of the leachate input to the mixers. Material used for haul roads and non-structural blocks will have a higher cement ratio and will result in negligible free leachate.

Equipment will be rinsed at the end of each day or if there is a delay between batches. Rinse waters will be ejected into the landfill.

4. Testing

Tests were carried out at Trecatti landfill site on leachate with varying COD and ammoniacal nitrogen concentrations. The trials showed that the varying leachate reacted in the same way with identical curing times and free leachate. The COD and ammoniacal nitrogen concentrations in the leachate at Roxby are similar to those at Trecatti. A Monthly A L/S 10 leaching test will be carried out on a solidified sample. Compression tests, over 28 days, will be carried out on selected samples.

5. Product use

The blending will result in a solid material that will be used for landfill cover, for haul road construction and for making non-structural blocks. BAT assessment

The operator compared their proposed techniques with the indicative BAT set out in guidance note IPPC S5.06. The proposed treatment process meets the indicative BAT requirements with the exceptions as shown below:

Indicative BAT	Operator's proposal
Indicative BAT is for treatment to be carried out on an impervious surface within a bunded area.	Carried out within the engineered area of the landfill and therefore no further secondary containment is required.
Leachability and compression tests to be carried out on every batch	Monthly leachability tests proposed. Compression tests proposed on

	selected sample. The reduced frequency is because the treated leachate will be re-deposited back into the landfill
Operator to show how non-conformances will be dealt with	The operator provided details of this in the application. The criteria relate to firmness of the cured material. Non-conforming batches would be re-processed if possible. If reprocessing cannot be done the material will be disposed of in the landfill
Waste charging should be enclosed. Manual charging of wastes with JCBs or similar should be avoided	Waste fines will be charged using buckets.

6. Risk assessment

6.1 HRA review

The operator submitted a review of the HRA which is summarised below:

Trials have shown that leachate can be released during curing of the batches that are intended for use as landfill cover. The trials have shown that during curing <5% (typically 1% to 3%) of the volume of leachate that was used in the batch will be released. The maximum treatment capacity is 100 tonnes per day of leachate. Therefore at the maximum capacity < 5 tonnes of leachate per day will be re-circulated back into the landfill and into the underlying waste deposits. Leachate used for rinsing will increase the re-circulated amount but the total volume will not have a significant effect on leachate levels in the cells. As an example, phase 10 with a permitted leachate head of 3.0 m will have a surface area of leachate of 19,244 m². An input rate of 5 m³ per day would increase the leachate head by 0.26 mm per day. This is an amount that would be difficult to detect and in reality the 3 m limit would be met because the rate of extraction from the site will be higher than the amount re-circulated.

Leachate contaminant levels will be reduced by the solidification process. Trials showed that the ammonia was reduced by a third, COD reduced by 50%. The pH of the free leachate was increased from 8 to ~ 11. The small quantities re-circulated are not likely to change the composition of the basal leachate in each cell.

Curing bays and mixing plant will be positioned a least 20 m from waste slopes so that the potential for lateral leachate movements will be very low. The material will be perforated/punctured by the use of studded metal wheels or mechanical shovel or stripped prior to the deposit of waste over the layer to avoid forming an impermeable layer and cause layers of perched leachate. Where necessary, any temporary expired temporary haul roads will also be punctured/penetrated prior to over tipping with wastes.

Monolithic tank tests were carried out to determine the leachability of contaminants from cured material over time. The tests showed a period of initial leaching which quickly reduces indicating a superficial washing on monoliths rather than mobilisation of contaminants from within. The tests show that there is unlikely to be an effect on basal leachate quality.

The fluff layers are applied to a thickness of at least 3m at Roxby. Landfill cover material will therefore not be applied within 3 metres of the sidewall and basal liners.

6.2 Stability risk assessment review

The additional leachate inputs are negligible and will not change the leachate level and not change the stability risk assessment. However as a worse case the model included an assessment of localised raising of the leachate level by 0.5 m. This could not actually occur because the permit limit of 3 m is still in place.

The assessment showed that increasing the level to 3.5 m would have very little impact on stability.

The conclusions were:

- The facility should be at least 20 m away from the crest of any waste slope
- If ground loadings from plant or materials are anticipated to exceed 50 tonnes over a 10 m length an additional assessment should be completed.
- The parts of the facility that input liquid back into the waste should be at least 30 m from the crest of waste slopes.

The conclusions were incorporated in table S1.2 as operating techniques in the permit.

6.3 Landfill gas risk assessment review

Recirculation of leachate can lead to accelerated landfill gas generation. However given the small amounts involved this is not likely to affect gas production.

6.4 Amenity risk assessment

Screening of fines is anticipated to be needed for only 10% of the solid materials, although the risk assessment was based on a worst case of all the fines being screened. The screening will always be carried out close to the solidification plant. Waste fines will typically be moist with stockpile durations limited to less than 24 hours, and no longer than 5 working days. The surfaces of stockpiles will be dampened down during periods of dry weather. Dry, dusty wastes delivered to the landfill site will not be directed to the LSF for use in the treatment operations

All transfers will be supervised by trained site operatives. Drop heights on to the screening grate will be minimised as far as reasonably possible. Continuous visual assessment of excessive dust emissions will be carried out by trained operatives. If necessary, a spray device can be utilised to prevent dust release at the batching plant. Cement will be stored in a silo and transferred to a mixer via a discharge sock. Waste fines are already stored in stockpiles and used for landfill cover. Use for the solidification process will not pose any increase in risk. Input materials will be loaded by a hopper. The mixing process will be wet and not pose a risk of dust emissions.

Volatiles can be released but are short in duration and disperse quickly within 25 m of the source.

There is potential for noise from the loading shovel, mixer plant, generator and pumping systems. The nearest residential receptors are ~425 m from the edge of the landfill. The treatment plant is unlikely to be located right on the boundary but even considering this worst case distance there is not likely to be a significant impact from noise. Measures will be used to minimise noise including use of screening by perimeter attenuation bunds, stockpiles and other static equipment.

The site odour management plan has been updated to include the treatment process. Odour generated from the process is not likely to be significant. Trials at the Trecatti site showed that emissions (typically ammonia) disperse within 25 m of the source. Transfer station fines will not be stored for more than 48 hours. Any remaining material after this time will be disposed of in the landfill. Stockpiles will be monitored for evidence of odour generation. Any fines material with increased odour will be transported to the landfill for immediate disposal. No odorous solid wastes received at the landfill will be used in the solidification process.

Mobile odour neutraliser units will be utilised as necessary.

The risk assessments considered the location of receptors. The distance from receptors was taken from the permit boundary. The operator stated that it is unlikely that the treatment plant will be located immediately adjacent to the boundary and so the risk assessment is a worst case.

6.5 Ecological impact

There is one habitat site within the screening distance:

Humber Estuary SPA, SAC and Ramsar which is ~5 km away at its nearest point. There is one SSSI (Conesby Quarry) and several local wildlife sites within the screening distance.

The variation will not result in any significant changes to the impacts that already exist. There will therefore not be any impact on any of the ecological sites.

6.6 Accident risk

The application stated that volatile materials could be released. We asked the operator about any fire risk from this. The risk was stated to be very low for the following reasons:

- The leachate flashpoint is $>250^{\circ}\text{C}$, as confirmed by testing. The exothermic reaction with the cement binder peak after a couple of days and is typically less than 50°C .
- The amount of volatiles released is low.
- The wet nature of the process reduces the risk of sparks and increases the moisture content of the air in the mixer.
- Monitoring at the Trecatti site showed that flammable gas concentrations were low in the immediate vicinity of the plant.

6.7 Quantities

We have limited the capacity of the solidification process to ensure that potential impacts are controlled. The amount of leachate is limited to 30,000 tonnes per year as specified in the application. We have also limited the amount of fines that can be screened. The operator's risk assessment is satisfactory but the process does have the potential to generate dust. The operator stated that screening is likely to be limited to 10% of total solids, so we have set an annual limit of 8,500 tonnes.

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	<p>A claim for commercial or industrial confidentiality has been made.</p> <p>We have accepted the claim for confidentiality. We consider that the inclusion of the relevant information on the public register would prejudice the applicant's interests to an unreasonable degree. The reasons for this are given in the notice of determination for the claim. The decision was taken in accordance with our guidance on commercial confidentiality.</p>	✓
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.</p> <p>For this application we consulted the following bodies:</p> <ul style="list-style-type: none">• North Lincolnshire Council – Environmental protection department• Health and Safety Executive• Public Health England• Director of public health	✓
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		

Aspect considered	Justification / Detail	Criteria met
		Yes
Biodiversity, Heritage, Landscape and Nature Conservation	<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> <p>A full assessment of the application and its potential to affect the sites 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>See key issues section for more details.</p> <p>An appendix 11 was sent to Natural England for information.</p>	✓
Environmental Risk Assessment and operating techniques		
Environmental risk	<p>We have reviewed the operator's assessment of the environmental risk from the facility.</p> <p>The operator's risk assessment is satisfactory.</p> <p>The assessment shows that, applying the conservative criteria in our guidance on Environmental Risk Assessment all emissions may be categorised as environmentally insignificant.</p> <p>See key issues section.</p>	✓
Operating techniques	<p>We have reviewed the techniques used by the operator and compared these with the relevant guidance notes.</p> <p>See key issues section for details of the assessment.</p> <p>The proposed techniques are in line with the measures contained in the TGN and we consider them to represent appropriate techniques for the facility.</p> <p>We have reviewed and approved the revised Odour Management Plan and consider it complies with the requirements of our H4 Odour management guidance note. We agree with the scope and suitability of key measures but this should not be taken as confirmation that the details of equipment specification design, operation and maintenance are suitable and sufficient. That remains the responsibility of the operator.</p>	✓
The permit conditions		

Aspect considered	Justification / Detail	Criteria met
		Yes
Use of conditions other than those from the template	Based on the information in the application, we consider that we do not need to impose conditions other than those in our permit template, which was developed in consultation with industry having regard to the relevant legislation.	✓
Waste types	There are no changes to the waste types that can be received. However we have limited the waste types that can be used for the new leachate solidification process in table S1.1 of the permit.	✓
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 in the permit.</p>	✓
Emission limits	<p>We have decided that emission limits should be set for the parameters listed in the permit.</p> <p>No emission limits have been added, amended or deleted as a result of this variation.</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>Process monitoring has been added regarding testing of the solidified leachate, see table S3.11.</p>	✓
Operator Competence		
Environment management system	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.	✓

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 variation does not affect the financial provision arrangements for the landfill.</p> <p>The financial provision arrangements satisfy the financial provisions criteria.</p>	✓

Annex 2: External Consultation and web publicising and newspaper responses

Summary of responses to consultation and web publication and the way in which we have taken these into account in the determination process.

Response received from Public Health England
Brief summary of issues raised
<p>The Regulator should ensure that the Operator's proposals around the siting and monitoring of the leachate solidification process and the subsequent processing of the concrete product are followed.</p> <p>Based on the information contained in the application supplied to us, Public Health England has no significant concerns regarding the risk to the health of the local population from the installation.</p>
Summary of actions taken or show how this has been covered
<p>The permit will ensure that the operator's proposals are followed. Operating techniques are incorporated into the permit through table S1.2</p>