Environment Agency permitting decisions

Variation

We have decided to issue the variation for South Pit, Phase 3 Landfill operated by Tarmac Cement and Lime Limited.

The variation number is EPR/RP3039SZ/V007

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.

Description of the changes introduced by the Variation

This is a Substantial Variation.

This variation adds an additional activity to treat hazardous leachate (Section 5.3 Part A1(a) (ii) - Disposal or recovery of hazardous waste with a capacity exceeding 10 tonnes per day involving physico-chemical treatment) arising from the South Pit, Phase 3 landfill. There will be no leachate imported to the leachate treatment plant from any other site.

In adding the above activity, two additional point source emissions (one to air (AMP1) and other to the sewer (S1)) are authorised.

This variation also :

- incorporates an updated methodology for measuring and assessing the leachate level in the monitoring boreholes;
- amends leachate head limits in closed cells; and
- changes the groundwater compliance point from the current borehole G12 to EW7/14.

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

- Key issues
- Annex 1 the decision checklist
- Annex 2 the consultation and web publicising responses

Key issues of the decision

Leachate production

It is thought that the most likely reason to the production of leachate is:

- Leachate generation as a result of surface water percolation through the CKD waste mass.
- Interaction of groundwater in the insitu alluvium with the CKD waste at the base of the waste mass.

The operator has investigated and suggests that leachate is being produced mainly because the groundwater coming into contact with the in filled cement kiln dust (CKD),and leachate is then being “squeezed” out between landfill and alluvium below.

There may also be a small contribution to the leachate production from surface water coming in contact with the CKD. The operator assessed this and concluded that this is the case, as to date there is little or no evidence of perched leachate breakouts which would be expected if surface water was a major contributor to the leachate formation.

Therefore, the main contributor to the leachate production is the interaction of groundwater in the insitu alluvium with the CKD waste at the base of the waste mass. The CKD is on unconsolidated and saturated alluvium deposits, which have slowly settled due to the loading from the waste. This is thought to be “squeezing” out the water from the alluvium, and this flows along the lower layers of the waste, interacting with the waste and forming leachate.

The leachate is breaking out, causing “die back” of the vegetation around the site and pollution of the surrounding water courses. The leachate is hazardous primarily because the pH is greater than 13, and this needs to be treated to reduce the pH before it can be discharged to the sewer.

The recent review of the Hydrogeological Risk Assessment (HRA) concluded that the groundwater primarily arises from the aquifers below the site (Alluvium, River Terrace and Chalk) and is protected by the in-situ alluvial clay. There is a large amount of historical infilling of CKD in the immediate locality.

Originally, this site was thought not to produce leachate by the operator due to the cohesive properties of the CKD, therefore no leachate blanket or collection system was installed. Therefore, in order to collect the leachate the operator has had to install a collection system around the infilled area to collect the leachate which is then pumped to the leachate treatment plant via a series of pipes and sumps.

It is necessary to collect the leachate in this way as it is not produced in the conventional manner i.e. degradation of the infilled waste.

Options for Leachate Treatment

The application considered the following different options for dealing with the leachate:

a) Treatment in a plant to allow the leachate to be directly discharged to the River Thames;
b) Tankering the leachate to an appropriately permitted treatment works; and
c) Treatment to reduce the pH to a level that would allow the leachate to be discharged to sewer with methane stripping. This could be done in one of two ways:

   i) Reducing the pH of the leachate by mixing with acid.

   ii) Treating the leachate with liquid carbon dioxide (CO_2) to form carbonic acid.

Option a) was assessed. The conclusion was that it would be very difficult and expensive to reduce the pollutants within effluent sufficiently to allow the direct discharge to the River Thames. Also, any discharge point will be influenced by tidal fluctuations which may be difficult to permit.

Option b) is possible. However, it would be very expensive and a suitably permitted effluent treatment works would be a long distance away due to the hazardous nature of the leachate.

Option c) i) was assessed. pH reduction by the addition of acid was investigated but dismissed on both Health and Safety and environmental grounds. As well as due to concerns about raw materials.

Option c) ii) was chosen as the best overall option. This involves the pH of the effluent being reduced by injection of liquid carbon dioxide which leads to the production of carbonic acid and therefore a reduction in leachate pH prior to the effluent being discharged to sewer. The operator has obtained consent to discharge to the sewer from the local sewage undertaker.

Leachate Treatment Plant

The Leachate Treatment Plant (LTP) is located on the landfill

It consists of the following:-

- 2 x 25 m^3 storage tanks
- 1 x 25 m^3 treatment tank
- 1 x storage tank for liquid Carbon Dioxide
- Control Building housing the instrumentation to monitor the treatment process
- Biofilter to treat any methane stripped from the leachate and control any associated odour
- Hardstanding with a drainage system to allow any leakage, spillage or rainwater to be pumped back into the treatment tanks
- Security gate and fence

The area is bunded to 110% of the total volume of the tanks. This is to ensure that the site has sufficient containment to cope with a with an incident such as flooding, a leak from the tanks or fight a fire.

The leachate is treated in one of two tanks by dosing with liquid carbon dioxide as it is pumped into the treatment tank. This results in the formation of carbonic acid (H_2CO_3). The carbonic acid reduces the pH of the leachate from pH 13 to approximately pH 10 and allows it to be discharge to the sewer.

The following equations illustrate the reactions that are taking place:-

$CO_2 + H_2O \longrightarrow H_2CO_3$

$H_2CO_3 + 2NaOH \longrightarrow Na_2CO_3 + 2H_2O$

$H_2CO_3 + Na_2CO_3 \longrightarrow 2NaHCO_3$

The dosing of the CO_2 is closely controlled to avoid a precipitate being formed to the extent that it will then cause scaling of the plant. The addition of the CO_2 will be done using a pH meter to ensure over dosing does not occur.

Prior to discharge of the leachate to sewer the pH is tested, and if it has not reduce to pH 10 it will be recirculated back into the system to be treated again. Diffuse air is then pumped through the effluent removing dissolved methane prior to discharge to sewer, the air then passes through the biofilter.

Process control

pH meters will continually monitor the addition of carbon dioxide to decrease the pH to Trade Effluent Discharge Consent (TEDC) standard.

Dissolved oxygen meters will continually monitor the aeration process to strip methane from the leachate to ensure that it is removed to the TEDC consent standard.

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 been made. 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.	✓
Identifying confidential information	We have 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	The consultation requirements were identified and implemented. The decision was taken in accordance with RGN 6 High Profile Sites, our Public Participation Statement and our Working Together Agreements. For this application we consulted the following bodies: • Food Standards Agency • Public Health England • Health and Safety Executive • Dartford Borough Council – planning and environmental health departments • Southern Water Services • Kent County Council	✓

Aspect considered	Justification / Detail	Criteria met Yes
Responses to consultation and web publicising.	The web publicising and consultation responses (Annex 2) were taken into account in the decision. The decision was taken in accordance with our guidance.	✓
The facility		
The regulated facility	The extent/nature of the activities and operations taking place at the site required clarification. The decision on the facility was taken in accordance with Appendix 2 of RGN 2 "Understanding the meaning of regulated facility", Appendix 1 and 2 of RGN 2 "Understanding the meaning of regulated facility". The regulated facility is an installation which comprises the following activities listed in Part 2 of Schedule 1 to the Environmental Permitting Regulations and the following directly associated activities (DAA). • Section 5.2 Part A(1) (a), The disposal of waste in a landfill - D5 –Specially engineered landfill; R5 - the recycling or reclamation of inorganic material; and R10 – Land treatment resulting in benefit to agriculture or ecology. • Section 5.3, Part A(1)(a)(ii), Physico-chemical treatment of hazardous waste - D9 – Physico-chemical treatment of waste. • DAA - Storage of raw material used for leachate treatment - Storage of Carbon Dioxide for use in the treatment of leachate.	✓
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 points. A plan is included in the permit and the operator is required to carry on the permitted activities within the site	✓

Aspect considered	Justification / Detail	Criteria met Yes
	boundary.	
Site condition report	The operator has provided a description of the condition of the site. We consider this description is satisfactory. The decision was taken in accordance with our guidance on site condition reports and baseline reporting under IED – guidance and templates (H5).	✓
Biodiversity, Heritage, Landscape and Nature Conservation	The application is within the relevant distance criteria of a site of heritage, landscape or nature conservation, and/or protected species or habitat . A full assessment of the application and its potential to affect the sites and habitat has been carried out as part of the permitting process. We consider that the application will not affect the features of the site or the habitat.	✓
Environmental Risk Assessment and operating techniques		
Environmental risk	We have reviewed the operator's assessment of the environmental risk from the facility. The operator's risk assessment is satisfactory.	✓
Operating techniques	We have reviewed the techniques used by the operator and compared these with the relevant guidance notes. We consider that the emission limits included in the installation permit reflect the BAT for the sector. The proposed techniques/emission levels for priorities for control are in line with the benchmark levels contained in the TGN and we consider them to represent appropriate techniques for the facility. The permit conditions ensure compliance with relevant BREFs and ELVs deliver compliance with BAT-AELs. The operating techniques are in with the indicative BAT in the following TGN's • How to comply with your environmental permit • SGN 5.03 - Guidance for the Treatment of Landfill Leachate	✓

Aspect considered	Justification / Detail	Criteria met Yes
The permit conditions		
Improvement conditions	Based on the information on the application, we consider that we need to impose an improvement condition. We have imposed an improvement condition to ensure that the plant is constructed in line with the design and if the operator has had to deviate from the approved plan that the change is justified and appropriate. Also, to ensure that the plant is capable of processing the leachate to the appropriate standard required by the Trade Effluent Consent.	✓
Incorporating the application	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. These descriptions are specified in the Operating Techniques table in the permit.	✓
Emission limits	We have decided that emission limits should be set for the parameters listed in the permit. We have set the groundwater compliance limit to a new downstream groundwater borehole (EW7/14), replacing the current one (G12) as it has become impacted and is no longer providing suitable samples. Limits have been derived for the same determinants, namely:- • Chromium (Total) : 0.05 mg/l • Potassium (Total) : 311 mg/l • Sulphate (as SO_4) : 842 mg/l • Selenium (Total) : 0.166 mg/l It is considered that the compliance limits above will ensure that significant pollution of the environment is prevented and a high level of protection for the environment secured.	✓
Monitoring	We have decided that monitoring should be carried out	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
	for the parameters listed in the permit, using the methods detailed and to the frequencies specified. The following amendments are made by this variation to the monitoring of the site: a. change the monitoring point as described above, and b. the method of measuring and assessing the leachate levels. In the original Hydrogeological Risk Assessment for the site and its subsequent review the conclusion was drawn that a leachate depth of less than 2.5m above the potentiometric groundwater surface did not pose a risk to groundwater. The potentiometric surface of the groundwater was calculated to be approximately 5.5m above the base of the waste, but this has not proved to be a reliable method of calculation due to the fluctuations in base of the site and in groundwater level. Further investigation into the groundwater level has shown that that the effect of tidal intrusion can be significant due the sites proximity to the River Thames estuary. The operator has proposed to change the current methodology to use an average groundwater level (mAOD), which is calculated from measurements taken at down gradient groundwater monitoring points at the same time as the leachate level measurement. This is then compared to measured leachate level (mAOD). The operator proposed that any result for the individual leachate monitoring points that was 2.5m above the average groundwater (mAOD) would be non-compliant. We are satisfied that a change to this method of assessing the groundwater and the subsequent leachate compliance level would ensure that significant pollution of the environment is prevented and a high level of protection for the environment secured. All other monitoring requirements have not changed as a	

Aspect considered	Justification / Detail	Criteria met Yes
	result of this variation.	
Reporting	We have specified reporting in the permit. We made these decisions in accordance with How to comply with your environmental permit and SGN 5.03 - Guidance for the Treatment of Landfill Leachate.	✓
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 RGN 5 on Operator Competence.	✓
Technical competence	Technical competency is required for activities permitted. The operator is a member of an agreed scheme.	✓
Relevant convictions	The National Enforcement Database has been checked to ensure that all relevant convictions have been declared. No relevant convictions were found. The operator satisfies the criteria in RGN 5 on Operator Competence.	✓
Financial provision	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 RGN 5 on Operator Competence. The financial provision arrangements satisfy the financial provisions criteria.	✓

Annex 2: External Consultation, web publicising and newspaper advertising responses

Summary of responses to consultation and web publication 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
HSE
Brief summary of issues raised
No issues were raised.
Summary of actions taken or show how this has been covered
None

Response received from
Public Health England (PHE)
Brief summary of issues raised
PHE recommended that any Environmental Permit issued for this site should contain conditions to ensure that the following potential emissions do not impact upon public health: • emissions to water from activities on site including handling, storage, treatment and transfer; • emissions to air including gases (e.g. methane), volatile organic carbons (VOCs) and metal compounds from point and fugitive sources on site; and • odours arising from activities on site including handling, storage and treatment from point and fugitive sources on site.
Summary of actions taken or show how this has been covered
We are satisfied the conditions contained within the variation and the appropriate measures proposed by the operator will ensure that there is not an impact on public health.

No other responses were received for other consultees.