Lillyhall Landfill radioactive substances permit variation: Summary of consultation responses

Version 1 February 2020

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1. Introduction

The Environment Agency has received an application from FCC Recycling (UK) Ltd to vary Lillyhall landfill site's radioactive substances activity (RSA) environmental permit. The site currently receives and disposes of non-radioactive waste under a non-hazardous landfill environmental permit and has a RSA environmental permit to dispose of very low level radioactive waste.

Currently, Lillyhall landfill site is permitted to accept radioactive waste at very low levels (a maximum average activity of 4 Bq/g, or 40 Bq/g for tritium). The permit was granted in 2011 and to date the landfill has not accepted any radioactive waste. The operator is proposing to increase the activity limits to a maximum average activity of 200 Bq/g, as the current limits are very restrictive.

There are currently three other landfill sites in England that have been permitted to dispose of radioactive waste with similar higher activity limits and these proposed changes would bring Lillyhall broadly in line with these other sites.

The application to vary the RSA environmental permit is supported by a revised environmental safety case (ESC), which considers the radiological risks from the site, and a hydrogeological risk assessment which considers the impact of the site on the groundwater. We are reviewing these as part of our determination process.

2. How we ran the consultation

We ran the consultation from 4 March 2019 to 6 May 2019. The consultation was also published on gov.uk on 5 March 2019.

We informed the following government bodies, local authorities, interest groups and other interested parties of the consultation via email and letter. We also attended the operator's stakeholder event in December 2018 and met with the Dean Parish Councillors in April 2019.

Government bodies

BEIS (Department for Business, Energy & Industry Strategy)

Office for Nuclear Regulation (ONR)

COMARE (Committee on Medical Aspects of Radiation in the Environment)

Public Health England (PHE)

Food Standards Agency (FSA)

Natural England (NE)

Local authorities

Allerdale Borough Council

Copeland Borough Council (border council)

Workington Town Council

Cumbria County Council

NGOs and interest groups

West Cumbria Site Stakeholder Group (WCSSG)

Cumbrian's Opposed to Radioactive Environment (CORE)

Radiation Free Lakeland

NFU (National Farmers Union)

Communities

Communications via parish/ward/local councillors

Companies

Sellafield Ltd

LLWR Ltd (Low Level Waste Repository)

Cyclife Ltd (Lillyhall Metals Recycling Facility)

United Utilities (UU)

SJS Scientific Ltd

MPs

Sue Hayman MP

Trudy Harrison MP (boarder MP)

Parish Councils

Distington

Winscales

Dean

Ward Councillors

Harrington

Clifton

Stainburn

Distington & Moresby

Dalton

Moresby

District Councillors

Harrington

St John's and Great Clifton

Howgate

We received 8 responses from local authorities, Public Health England, COMARE, Low Level waste Repository (LLWR), Radiation Free Lakeland, and members of the public.

3. Responses to the questions and our responses to these

We did not set specific questions for consultees to respond to. We have summarised the consultation responses which will be included in our final decision document along with our response to the comments.

The responses varied from being technical in nature, for example asking specific questions relating to the activity limits and management of the site, to quite general comments on the area. Some of the responses were very detailed and seeking further clarification on points made in the ESC. We have requested some further information from the applicant in response to these comments, although some are not relevant (out of our remit) or we do not consider we need further information.

Comment Summary	Environment Agency consideration of issues
Topic: Tritium limit & drinking water borehole	
Radiation Free Lakeland commented that the proposed limit of 200 Bg/g for tritium was 5 times higher than in the current permit. They presented various papers which state tritium is more hazardous than previously thought and stated: **'The most comprehensive report on tritium was published by the UK Government's senior Advisory Group on Ionising Radiation (AGIR, 2008). This report strongly recommended that tritium's hazard (i.e. its radiation weighting factor) should be doubled from 1 to 2. However other scientists (Fairlie, 2008; Fairlie, 2007a; Fairlie, 2007b; MelintESC u et al, 2007; Makhijani et al, 2006) have presented evidence for even larger increases in tritium's radiotoxicity, including the US EPA (2006) which recommended a 2.5 fold increase in hazard.** **Instead of reducing the activity limit allowed by 2.5 the operators of Lillyhall landfill**	We are aware of the debate regarding the radiation weighting factor for tritium. The International Commission on Radiological Protection (ICRP) reviews the scientific evidence when defining radiation weighting evidence and in its 2007 recommendations (ICRP, 2007) took account of the evidence at that time. It concluded that a radiation weighting factor of 1 for tritium continues to be appropriate for general radiological protection purposes, which our radioactive substances permitting falls under. The Health Protection Agency (HPA) (now Public Health England, PHE) reviewed the application of the 2007 ICRP recommendations to the UK (HPA, 2009). HPA noted the Advisory Group on Ionising Radiation report and the advice on the radiation weighing factor for tritium. HPA concluded that it agreed with ICRP's view that the radiation weighting factor of 1 should continue to be applied for tritium. It is worth noting that the risk of early fatality to members of the public from disposals of tritium to the Lillyhall landfill site at the increased activity concentration limit are much less than 1 in a million per year. Hence, even if a higher radiation weighting factor of 2.5 was used, the risks to members of the public would still be acceptable.

are asking for a fivefold increased activity limit.'	
Radiation Free Lakeland commented the Lillyhall landfill site is just 200 metres from a potable fresh water supply.	In relation to public drinking water boreholes and water abstraction, the operator has been asked to change the assessment to reflect that the scenario of groundwater abstraction during the Period of Authorisation is 'certain to occur' and that this risk is assessed. This will be assessed against the standards described in the Guidance on Requirements for Authorisation for Near Surface Disposal Facilities.
Radiation Free Lakeland are opposed to this variation.	Noted.
Topic: Matters outside the Environment Agency's remit	
Workington Town Council Planning Committee queried why this site has been selected for this type of waste rather than other facilities in the area that already have the appropriate systems and staffing in place.	We do not influence or regulate site selection. This decision is made by the operator in consultation with the local planning authority. We can only take account of issues within the relevant environmental regulations or inside the remit of the Environmental Permitting Regulations 2016. The local planning authority would be responsible for granting permission for change of use under planning law. The National Planning Policy Framework published in 2019 (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf) confirms that the planning system should not duplicate controls that exist under pollution control regimes and, where a planning decision has been made, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities, such as the Environmental Permitting regime administered by the Environment Agency.
Workington Town Council Planning Committee expressed concerns that 26% of the waste comes from outside of the area and would like to seek clarification as to why this waste has to be disposed at	The 2007 Government policy on LLW management is explicit in stating that the proximity principle needs to be taken into account when consigning sites take waste management decisions. The policy also states that the proximity principle needs to be weighed against other factors when considering options. This will inevitably mean that sometimes

this site rather than at facilities closer to its location of origin.	the preferred option may not be the nearest to the site of origin of the waste. There are currently three other landfill sites permitted to accept low activity LLW in England. These are CLESA at Sellafield in Cumbria, which only accepts waste generated on the Sellafield site; Clifton Marsh in Lancashire and Kings Cliffe in Northamptonshire. Having these sites has reduced the amount of waste being disposed of to the LLWR in Cumbria, which is a long distance from some nuclear sites. If a number of landfill sites are authorised for the disposal of low activity LLW this will help, in part, to address the proximity principle.
Workington Town Council Planning committee are keen that the surrounding community should be properly compensated for having to accept this type of radioactive waste.	This is a matter for the operator to discuss with the local community.
Dean Parish Council commented that the consultation did not address transport issues.	The Office for Nuclear Regulation regulate the transport of radioactive wastes from nuclear sites along with the planning authority under the planning regime. We can only take account of issues within the relevant environmental regulations or inside the remit of the Environmental Permitting Regulations 2016.
A member of the public commented on the increased volume of waste to be disposed of at the site and that the extra volume of waste is making Allerdale a 'nuclear dumping ground'. They stated that this was 'not good publicity for future businesses to invest in this area'.	The potential effect on future investment in the area is not in the Environment Agency's remit and we cannot comment on this.
Topic: Further clarification on the information submitted by the applicant	
COMARE have commented on a number of paragraphs within the Environmental Safety Case (ESC), based on seeking	We have addressed each comment individually below:

further clarification and highlighting mistakes they have noticed. Each comment is listed below in points 1-16:	
1. Paragraph 16 & 17. Paragraph 16 refers to planning permission 2/12/9007 condition 4, while Paragraph 17 refers to permission 2/13/2007 condition 4. Is this a typographical error or are two different documents being referred to? These do not seem to form part of the supporting documentation.	Two different documents are being referred to. They were not submitted as part of the application but have since been requested.
2. Paragraphs 26 and 27 appear contradictory.	We have requested further clarification on the figures provided, and note that more up to date information is available in subsequent iterations of the UK Radioactive Waste Inventory.
3. Paragraph 38 tells the reader that the radiation dose to the Cumbria Average Group is 2.1 mSv y^{-1}; however, the evidenced reference, paragraph 12 (the EA permit) contains no data on the CAG.	We have requested that the report is updated with the correct reference.
4. Paragraph 62 mentions 12 cells, while Fig 5 shows a cell 11, not mentioned in the text.	This refers to the existing cells (shown in red on Figure 5). However, we have requested clarification based on paragraph 6 & 7 of the non-technical summary and paragraph 13 and 65 of the main text which states that the application is for cells 7-10, while Figure 5 shows a cell 11 in addition to the 5 proposed cells for which planning permission is in place (7, 8, 9, 9a & 10).
5. Paragraph 171 notes record retention for 10 years. This should extend to site controlled lifespan.	We have requested this is amended in the ESC.
6. Paragraph 186 the use of a public dose limit being applied	We have requested that the use of this dose limit is changed as follows: Change reference to ‘worker

to onsite workers is confusing, which is also noted in document R5.	annual effective dose limit' and emphasise that dose limits for members of the public (i.e. not those working with ionising radiation and categorised as classified workers, therefore including workers at Lillyhall) is 1,000 µSv as defined in Article 13 of the BSS Directive 96 (cf. paragraph 9.4.7 of the NS-GRA).
7. In Paragraphs 195 and 196, doses are close to limits even for the more optimistic assumptions, while it is noted that other scenarios give rise to much higher doses.	While doses to the public in certain scenarios are close to the limits in the period after authorisation, the calculated doses are nonetheless less than the limit and are therefore acceptable. However, we note that these doses/risks are initially assessed at a higher level and only reduced to those quoted when uncertainties relating to Cl-36 are accounted for (drinking water pathway) and less likely exposure scenarios are discounted (recreational user). We have requested that the operator tightens its use of terminology in this regard, e.g. 'would probably be' and 'could be broadly in the range of' and provides further justification. Without this we do not think it appropriate to make the statement given in paragraph 197 that 'The assessment shows that the annual risk and annual effective dose are below the required criterion'.
8. Paragraph 265 refers to section 3, but it is actually section 2.2.	We have requested that the document is reviewed in order to ensure accurate cross-referencing
9. Paragraph 266 makes the suggestion that "When contaminants are transported in groundwater or discharged to sewer, for example, it is likely that substantial mixing will occur so members of an exposed group are exposed to radionuclide concentrations in environmental media that are a function of some average of those in the landfill. However, for certain cases, it is more reasonable to consider the radiation dose to be proportional to the average activity concentration over some smaller volume of the	We have requested a reference.

landfill." A reference would be very helpful here.	
10. Paragraph 268 introduces the pSv – is this correct?	We have requested clarification, this is likely to be a typographical error and should refer to microsieverts rather than picosieverts as given in the NS-GRA.
11. For Paragraph 270, the supporting documentation for tables 10 and 11 could not be identified.	We have requested that this paragraph is modified due to a lack of clarity.
12. Paragraph 272 is incorrect.	We have requested the operator to provide the correct equation.
13. Paragraph 289 references Paragraph 435. There is no Paragraph 435. **Paragraph 294 references Paragraph 436. There is no Paragraph 436.**	We have noted this with the operator, and, due to this and inaccurate cross-referencing elsewhere in the document, that the resubmission is fully checked for consistency.
14. Paragraph 304 states that samples will be collected on two occasions – presumably 'per year'?	We have requested that the operator clarifies this statement with the timescale over which these samples will be collected.
15. Appendix A, is not discussed in the document except for a brief mention in Paragraph 41.	We have made a number of comments to the operator about Appendix A and its contents both in relation to the main body of the ESC and to the supporting documentation. We expect these to be resolved in the re-submitted documents.
16. Appendices B, C, D & E are not included in the document, and reference is not made to the title of the documents that contain the appropriate data.	.Appendices B to E were provided as part of the submission. We expect these to be fully incorporated into the re-submitted documents.
PHE Comments on R5 - Period of Authorisation Rev A - Final Table 2, page 7 refers to "Section 2.12 and Section 3 of the main report [FCC, 2018d]" which is given as ESC: Disposal of Low Activity Low Level Radioactive Waste (LA-	We have requested the operator to review the report(s) and ensure that any cross-references are accurate.

LLW) at the Lillyhall Landfill Site, 2018. However, these are not the correct sections and Section 2.12 does not exist. Appendix D, page 32 – footnote refers to "activity concentrations given in Section X of the main report". Section X should refer to the correct Section in the main report and it needs to be made clear what the main report is.	
PHE Comments on R6 - After Period of Authorisation Rev A - Final Table 3, page 13 refers to the time periods "60 to 100 years" and "1000 to 10,000 years". We believe that it should be "100 to 10,000 years".	We agree with this comment and have requested clarification.
PHE Comments on R7 - Intrusion Rev A Final are listed below in points 1-4:-	We have addressed each comment individually below:
1. Section 1.2 states that "A number of exposure scenarios were initially identified and assessed on a risk rating considering the likelihood of occurrence and the impact of that occurrence. These are shown in Table 1." However, the risk ratings are not shown in Table 1. Table 1 has a footnote indicated but no note is present in the table.	We believe that this comment relates to a misunderstanding, and that the reference to Table 1 relates to the exposure scenarios, not the risk rating. The risk rating is shown in Appendix A of the main ESC.
2. The scenarios given in Table 1 do not correspond with those considered.	We have requested clarification.
3. The justification for using Tc-99 as a surrogate for C-14 and Ca-41, which is discussed in	We have requested clarification.

Section 2.1.1.3, should be more strongly made.	
4. Section 2.1.1.5 on the sensitivity analysis should be expanded to consider other assumptions that may lead to a conservative estimate of doses, for example the assumptions that the land is used by a subsistent farmer who grows all his own food and that no dilution of the waste has occurred.	We agree with this suggestion and will request that this section is expanded. However, we note that it would be disproportionate to consider all assumptions/scenarios that may lead to a conservative estimate of dose.
Topic: Management	
Workington Town Council Planning Committee would like assurances that staff on site would receive appropriate training to work with the new waste material safely.	The physical form of the wastes types received will not differ from those the site can already accept. However the amount of radioactivity that the waste contains may be higher. This will necessitate some additional training. FCC ensures that all staff have training necessary for the relevant job role. A documented procedure is operated to ensure that: Training needs are assessed annually through performance and the Individual Development Scheme; Employees are trained and developed in their roles; Training records are maintained. The management of LLW will be subject to appropriate Health Physics controls and supervision by an accredited Radiation Protection Supervisor (RPS). Evidence has been provided that staff have received the necessary training. There are also specific procedures in place for the disposal of the low level waste. The site also have access to and will also consult with a Radiation Protection Advisor as necessary. The management system, which includes staff training, will be assessed as part of our determination of this application.
COMARE's Authorisation Working Group: The approach taken in section 6.4.2 is heavily dependent upon the declaration of radioactive content made by the consignor and is not clear on how waste containing a mixture of	Consignors of waste are required by their permit to provide accurate information to the consignee in accordance with the requirements of the waste receiving sites. The site will be expected to ensure accurate information is received from consignors and that any consignment meets the site Conditions for Acceptance – this will contain the total activity of a list of radionuclides and/or groups of radionuclides

radionuclides will be considered.	the waste receiving site can accept. We, or other relevant environment agencies, regulate these transfers of waste between the consignor and consignee. We will expect both consignors and consignees to work closely together to ensure accurate and appropriate information is made available.
COMARE's Authorisation Working Group: Paragraph 52 and others throughout the document. This Paragraph and others explain thorough and exemplary procedures that will be put in place with regard to operational and passive management once the facility is operational. There is no inclusion of any overview of how this will be reported on or audited.	The management system is accredited to ISO14001 & 9001 and will be subject to external auditing for re-accreditation. The Executive Committee of FCC defines and refines a set of overall Management System Objectives, which are used by managers as the framework for all subsequent objective setting and measurement. These objectives are designed to promote continual improvement. Management reviews are carried out following a defined agenda and at a regular frequency to ensure that the IMS remains effective and is continually improved. The management of the site will be subject to audit /inspection as part of our regulatory interactions to assess compliance against the conditions of the permit.
Topic: Disposal limits, volumes, waste streams	
Workington Town Council: The committee wanted to know why the original limit was set at the lower level and what measures have been taken for it to be safely raised. At this point, the committee felt that there was no clear evidence that the site is more suitable than when it was originally designed.	It is the operator's decision what disposal limits they apply for. As part of the application to vary the permit the operator has submitted a radiological risk assessment as part of their Environmental Safety Case which considers the impacts of the disposals on a number of receptors during the operational life of the landfill and after it has ceased operations. Based on the proposed disposal limits this radiological risk assessment must demonstrate that specified dose and risk constraints are met both during and after the Period of Authorisation. These dose and risk constraints are detailed in Environment Agency guidance available at: https://www.gov.uk/government/publications/near-surface-disposal-facilities-on-land-for-solid-radioactive-wastes
A member of the public felt that the increase in disposal limit was too high.	The Environmental Safety Case, incorporating a radiological risk assessment, provided by the operator as part of their submission assesses the

	dose and risk posed by disposals at the proposed limits against specific dose and risk constraints detailed in Environment Agency guidance available at: https://www.gov.uk/government/publications/near-surface-disposal-facilities-on-land-for-solid-radioactive-wastes. If we are not satisfied with this assessment, or if the doses or risks are unacceptably high compared to these constraints, then a permit would not be granted.
COMARE's Authorisation Working Group was interested to know the current annual waste volume received at the site.	The site has not received any radioactive waste under the current EPR permit. In the past they have received radioactive waste under Exemption Orders relating to the Radioactive Substances Act 1993. These include Naturally Occurring Radioactive Material (NORM) waste streams produced by the oil and gas industry. The main disposals under such Exemption Orders are summarised in Table 5 of the Environmental Safety Case.
COMARE also asked how might the volumes increase if the application is approved (i.e. what proportion of waste going to LLWR might be diverted)? This is germane also to the transport implications.	The proposals are that the entire remaining non-engineered capacity of cells 7-10 are utilised for the disposal of Low Level Waste. This equates to 891,053 m^3 or c.1.60 million tonnes of waste, assuming a waste density of 1.8 te/m^3 (1800 kg/m^3). However, in practice, the volume of low activity LLW waste that could be accepted will be less than this maximum capacity figure due to an annual limit in the permit of 26000 m^3 and a lifetime limit of 582000m^3 of low activity LLW. Volume will additionally be taken up by the acceptance of non-radioactive waste, void space and daily coverage of the waste. Therefore, the possible maximum diversion of waste from LLWR is 26000 m^3 per year, although this is subject to considerations such as Best Available Techniques, commercial aspects, volumes of suitable radioactive waste available for disposal over the operational lifetime of the landfill and the presence of other Low Level Waste landfills which may be utilised for disposals.
COMARE's Authorisation Working Group suggested examples of the other facilities accepting Low Level Waste should be provided.	The submission received is from a commercial entity, and it may not in their interests to consider alternative disposal facilities. However, disposals of waste at any facility will be subject to BAT considerations on the part of the consignor, which

	will include options for disposal at all sites with relevant permits for those wastes.
COMARE's Authorisation Working Group: Paragraph 32 states that "Based on our analysis of waste streams potentially suitable for disposal at the Lillyhall landfill site it is believed that the average activity concentration across all waste streams so disposed would be a few tens of Bq g-^{1}". The assertion is repeated in Paragraph 265 but there appears to be no explicit justification for the statement.	We note this comment and have asked the operator to provide justification for this statement.
COMARE's Authorisation Working Group: Paragraph 81 states "The depth and placement of restoration soils above the protective geotextile cap layer have been modelled as 10% of the total waste disposals (i.e. 100,000 m^3 in total). There is considerable uncertainty relating to forecast arising of LA-LLW and it is considered that this assumption is likely to be cautious as annual disposals of LA-LLW for certain years could be much less than this, or far greater." More explanation is needed given that the disposals could be either much less than this, or far greater. It is not evident how this provides reassurance of a conservative approach.	We acknowledge this comment and have asked the operator to provide further clarification. It is not clear from the statement in paragraph 81 how this could be considered cautious, nor is it clear why the depth and placement of restoration soils has been modelling in this way.
COMARE's Authorisation Working Group: In Paragraph 125 et seq the derivation of the inventory presented, based on an analysis of 281 potentially relevant waste streams, is not clear. How were the 'potentially	We acknowledge this comment. We have requested further information on the derivation of the inventory, including why this is based on the 2010 UKRWI rather than the current iteration. With regard to table 4 total inventory and density, we have requested clarification on whether the figures presented relate to an average density of

relevant' sources selected to calculate the average activity concentrations shown in table 4? **Also in table 4, the total inventory appears to be calculated as 1.335 x 10E^{9} times the average content per gramme – is this correct if the average density is 1.8te/m^{3}?**	1.8te/m^{3}. We have also requested clarification on why other density values are used in other parts of the Environmental Safety Case and supporting information and also a justification for the use of 1.8te/m^{3} in the main Environmental Safety Case.
COMARE's Authorisation Working Group: Paragraph 206 describes an individual package permitted to have an activity of 1000 Bq/g-^{1} as a 'disposal bag or 210l drum', but Paragraph 317 suggests that it could be 'a consignment' – which is correct?	We have requested clarification. Paragraph 206 states that individual packages could have an activity concentration up to 1000 Bq/g-^{1} (with the overall activity limit in the consignment being below 200 Bqg-1), but paragraph 317 states that the proposal is for 1000 Bq/g-^{1} averaged over a consignment. The two paragraphs are contradictory, and we have requested clarification.
Topic: Habitats and food chain impact assessments	
COMARE's Authorisation Working Group: In Paragraph 234, it not clear how the doses to biota were estimated.	This comment is noted. The assessment methodology is described in more detail in Appendix E Radiological Assessments: R9 Environmental Radioactivity.
COMARE's Authorisation Working Group: In the summary for Environmental Protection (page 6) the report states that "The ESC demonstrates that for the amount determined, for all reasonably foreseeable circumstances, doses or risks remain below the relevant dose and risk guidance levels defined by the EA for humans and for biota." However, the doses for biota in one scenario exceed DCRLs and for the public the doses are close to the limits after authorisation (Table 7).	We have noted that the maximum calculated dose rate for terrestrial biota is double the relevant dose rate threshold, and have requested further justification, in order to satisfy us that negative impacts will not occur. While doses to the public in certain scenarios are close to the limits in the period after authorisation, the calculated doses are nonetheless less than the limit and are therefore acceptable. However, we note that these doses and risks are initially assessed at a higher level and only reduced to those quoted when uncertainties relating to Cl-36 are accounted for (drinking water pathway) and less likely exposure scenarios are discounted (recreational user). We have requested that the operator tightens its use of terminology in this regard, e.g. 'would probably be' and 'could be

	broadly in the range of' and provides further justification. Without this we do not think it appropriate to make the statement given in paragraph 197 that 'The assessment shows that the annual risk and annual effective dose are below the required criterion'.
COMARE's Authorisation Working Group: In the case of intrusion, the estimated doses for lichen and bryophytes exceed the Environment Agency threshold by a factor of 2 and are within the relevant ICRP DCRL band which suggests some chance of deleterious effects of ionising radiation occurring to individuals within a population. Taking account of the small area impacted the author's state that "impacts across the population are therefore considered to be extremely unlikely". This conflicts with the statement in the non-technical summary of "reasonably foreseeable circumstances" and implies that the intrusion scenario is not reasonably foreseeable (see note above).	See response above
The Food Standards Agency have undertaken a risk assessment to estimate the potential dose to the public via the food chain. The assessment showed that the dose to the public via the food chain, calculated using conservative assumptions within their screening methodology, is below the Environment Agency acceptable dose criteria for the site of 20 microsieverts per year (µSv/y). The Food Standards Agency had no objections to the application.	Noted.

A member of the public was concerned about the local watercourse and the impact on it if the waste was to enter it.	Distington Beck runs adjacent to the site. Clean surface water is collected in a series of lagoons, including a settlement lagoon, prior to discharge to Distington Beck. The surface water management plan was developed in accordance with the existing landfill Environmental Permit and was approved by the Environment Agency. A small area in the south of the site (away from the proposed cells) shows groundwater contours indicating flow toward Distington Beck. However, this is thought to be unlikely to affect groundwater flow directions under the proposed disposal cells. Due to the depth to groundwater and the thickness of Glacial Till in the area of the Beck it is not thought to be in hydraulic continuity with groundwater. Therefore, Distington Beck is not considered a likely receptor. There is a programme of environmental monitoring around the site which does include taking samples from the beck. The results would show if the landfill site was having an impact on the stream.
Topic: Dose calculations	
PHE commented the calculated doses for human intrusion are inconsistent. For example, in the ESC the doses are given as 0.09 and 4.04 effective dose (µSv) in Table 8 and as 0.09 and 4.04 mSv in Paragraph 204. **The text on page 7 of the ESC "The maximum annual dose from potential future situations where the waste is unintentionally brought to the surface is 4.04 µSv compared to the EA acceptable dose criteria of 3 mSv per annum." should be amended.**	This has been noted and the operator has been asked to amend the relevant sections in the ESC as part of a request for further information.
PHE have suggested it would be useful if there was more discussion on the assumptions made in the assessment likely to lead to an overestimation of doses if it exceeds 3 mSv y^{-1},	This comment has been noted. Further information is provided in the supplementary document 'R7: Human Intrusion After the Period of Authorisation'.

for human intrusion after the period of authorisation.	
PHE - The calculations of the inventory to be disposed are difficult to follow, for example the calculation of the totals in Table 4, page 38 of the ESC are not explained clearly.	We acknowledge this comment. We have requested further information on the derivation of the inventory, including why this is based on the 2010 UKRWI rather than the current iteration.
PHE - Comments on the ESC table 4, page 38 - It is not clear how the potential total inventory or the total activity concentrations were derived.	With regard to table 4 total inventory and density, we have requested clarification on whether the figures presented relate to an average density of 1.8te/m^3. We have also requested clarification on why other density values are used in other parts of the ESC and supporting information and also a justification for the use of 1.8te/m^3 in the main ESC.
PHE – comments on R7 A.1 page 14 activity concentrations are given and the footnote refers to Section 3 of the ESC but that does not appear to be relevant.	We have requested further information on the derivation of the inventory used. The inventory in the main Environmental Safety Case and that given in other supporting documents differ. The operator has been asked to justify the use of different inventories in the supporting documentation. We assume that the footnote is a typographic error.
Topic: Consultation process	
Dean Parish Council have no objections to the application but made the following comments on the consultation process: They felt they were not consulted in a timely manner.	Dean Parish Council were notified of the consultation. We met with the Parish Councillors on the 3rd April 2019 and had a question and answer session with them. Representatives from the Environment Agency, FCC and the planning authority were present at this meeting to answer any questions. We extended the consultation to provide enough time for the Parish Council to provide a response to the consultation. A site visit, for the parish councillors, was also arranged on the 26th April 2019.
LLWR are in support of the application	Noted.

4. Next steps

We are currently assessing the application and the consultation responses will be considered as part of this assessment. We expect a decision to be made by the summer 2020.

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