

# Site Specific Baseline for Low Level Waste Repository, near Drigg

## Low Level Waste Repository (LLWR), near Drigg

The LLWR nuclear facility, near Drigg, is located in Cumbria and covers some 110 hectares.

The principle operations at LLWR cover receipt, storage and disposal of Low Level Waste (LLW) which has been undertaken since 1959 with current planned disposals until 2080. Construction and commissioning of a new vault (vault 9) was completed in spring 2010 and will initially provide 110,000 m<sup>3</sup> of capacity, although it will be capable of being continually extended to give additional capacity. Through the use of an Extended Disposal Area the repository could take all the LLW in the United Kingdom Radioactive Waste Inventory, which includes waste up to 2127 (assuming diversion of Very Low Level Waste and the establishment of multiple waste treatment routes e.g. metallic, combustible, super-compaction etc).

The LLWR has produced an Environmental Safety Case (ESC) which was submitted to the Environment Agency (EA) in May 2011. We believe the ESC meets the requirements of the EA as set out in their relevant guidance. The ESC confirms it is safe to continue to dispose of LLW at the site both now and in the future.

In addition to LLW operations, remediation activities (including the remediation of the Plutonium Contaminated Materials (PCM) facilities) are currently being conducted with the transfer of all bulk PCM material from the site completed in 2007. Work is currently focusing on facility clean up and decommissioning prior to demolition, which supports future vault construction. It is planned to retain and reuse some buildings to support future LLW operations.

It is planned to install an engineering cap over the LLW disposals in a phased approach which will be completed following final waste disposal. A period of institutional control will follow prior to final site closure.

### Site End State Assumption

The preferred end state for the LLWR near Drigg is to achieve an end state which allows waste to be finally disposed with no disturbance of emplaced waste. This will be characterised by a significant period of institutional control (100 years) following closure of the Low Level Waste (LLW) disposal vaults which will then be withdrawn.

## Current Environmental Baseline

**Table 8: Baseline Data across all topics for Drigg LLWR**

| SEA Objective             | Key Environmental Baseline  | Source  |
|---------------------------|---|---|
| <p><b>Air Quality</b></p> | <p>Copeland Borough Council monitors air quality in the borough (within which the site is situated). The 2006 air quality review undertaken by the Council confirmed that all of the measured pollutants were well below national air quality objectives. Estimated annual mean background Nitrogen Dioxide (NO<sub>2</sub>) and Particulate Matter (PM10) concentrations for 2006 showed that in the vicinity of the site ambient background concentrations of these two pollutants were 4.0 and 11.2 µg/m<sup>3</sup> respectively.</p> <p>Monitored discharges from all LLWR Permitted Aerial discharge points was 0.043 MBq of alpha emitting radionuclides and 0.112 MBq of beta / gamma emitting radionuclides during 2010.</p> <p>. There is a grout (cement) production facility on the site, which is a prescribed process, however, this is a contained activity. No Pollution Prevention Control (PPC) limited substances were discharged to the atmosphere. Air quality standards have not been exceeded on the site to date. There are no estimates for gaseous discharges from the location in RIFE 16.</p> <p>Radiological discharges from LLWR site were assessed to result in doses to the critical group (a group or representative individual who receive the largest dose from artificially produced radionuclides due to their habits, diet and where they spend their time) of 0.015 mSv/y (RIFE). Note: It was noted, in agreement with the EA, in the Nuclear Industry Sector Plan report (2009) that this "estimated dose to the most exposed group near the LLWR was mainly due to other sources of radionuclides in the environment, in particular discharges from Sellafield") or less than 2% of the dose limit for members of the public.</p> <p>(Note: The Critical Group Dose assessment produced by LLWR identifies a dose of 0.00033 mSv from aerial discharges monitored at LLWR during 2010 (Total Critical Group dose pessimistically assess for LLWR is 0.032mSv/y with &gt;95% due to direct radiation dose)).</p> | <p>NDA (2005) <i>EAPINS Project Questionnaire</i></p> <p>British Nuclear Group (2007) <i>Planning Application for the Construction and Operation of Vault 9 for the Storage of LLW – Environmental Statement (Volume 1)</i>; Environment Agency et al. (2009) <i>Radioactivity in Food and the Environment</i></p> <p>Low Level Waste Repository (LLWR) Retrospective Dose Assessment / Critical Group Doses for 2010</p> |

| SEA Objective                    | Key Environmental Baseline  | Source   |
|----------------------------------|---|--|
| <b>Climate Change and Energy</b> | <p>The climate of the site's surroundings is described as 'cool temperate' and the prevailing wind is south westerly. Over the last several decades, the mean annual temperature has been 9.3°C for the West Cumbrian coast, and the average annual precipitation is about 1000 mm.</p> <p>Assessment of all LLWR activities, including Waste Services work, has been undertaken utilising the Carbon Trust Carbon Calculator. In 2010, the LLWR near Drigg contributed to the emission of 3000 tonnes of CO<sub>2</sub>. This included the consumption of some 14 TJ of energy.</p> <p>The height of the site above sea level varies from less than 5m at the southern end and about 25m at the northern end. Significant work is being undertaken as part of the development of the LLWR Environmental Safety Case (ESC) The ESC is a major safety case in which the consequences of climate change have been thoroughly analysed and taken into account (including coastal erosion and improving geological understanding of the coast).</p> | <p>AMEC (2007)<br/>           NDA End States Reconciliation Process 2007-<br/> <i>Mapping Report for the LLWR, near Drigg</i></p> <p>NDA (2005)<br/> <i>EAPINS Project Questionnaire</i>;<br/>           Nexia Solutions (2008) <i>Position Paper on Climate and Landscape Change Effects at NDA Sites</i></p> |

| SEA Objective                               | Key Environmental Baseline   | Source  |
|---|--|---|
| <p><b>Biodiversity, Flora and Fauna</b></p> | <p>The LLWR near Drigg is not itself designated for nature conservation purposes. However, there are ecological features of local value within the site such as areas of woodland and scrub, Drigg Stream and the acid grassland habitats. A range of flora and fauna have been observed on the site, including the plants Pillwort and Pennyroyal, protected animals (including Great Crested Newt, Badger, Natterjack Toad and Adder), and protected birds (including Barn Owl and Kingfisher). Protected and notable habitats and species are also known to be present in the wider surrounding area. LLWR have produced a Biodiversity Action Plan as part of the Landscape and Wildlife Management Strategy. This BAP has taken cognisance of the Cumbria BAP.</p> <p>The LLWR site is situated adjacent to the Drigg Coast Special Area of Conservation (SAC). The SAC is a complex of relatively flat, vegetated coastal dunes and beaches supporting ten Annex I habitats. It has primarily been designated for its bar-built estuary; Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>); and dunes with creeping willow (<i>Salix repens ssp. Argentea</i>). The SAC covers an area of approximately 1,397 hectares in total and extends for almost 11km along the West Cumbrian coast from Seascale towards Bootle.</p> <p>Just over 1,400 hectares of the Drigg Coast SAC is designated a Site of Special Scientific Interest (SSSI). Natural England indicate that currently over 90% of the SSSI is in favourable condition. The remainder, however, is considered to be in an unfavourable condition, 2.3% of which is considered to be 'unfavourable and declining'. Part of the SAC (around 2km south / south east of the site) is also a Local Nature Reserve (LNR) known as Drigg Dunes and Gullery LNR.</p> <p>Other designated nature conservation sites in the wider surrounding area include Hallsennia Moor SSSI (also designated a National Nature Reserve), over 1.5km north east of the site, and Driggolme SSSI, over 1km east of the site.</p> <p>A generic assessment on the impacts of the radioactive discharges on wildlife from the UK's nuclear facilities concluded that the chronic dose rate guideline was not exceeded for any of the assessed marine or terrestrial organisms. Furthermore, the estimated doses to wildlife were below the level at which the effects could be observed.</p> <p>The LLWR ESC Assessment on the Impacts on non-human biota made estimates of the radiation doses to the non-human biota in the vicinity of the LLWR at the present day and into the future. In almost all cases, the absorbed dose rates are below a cautious screening level of 10 µGy h<sup>-1</sup> recommended by the Environment Agency, for which no significant radiological effects are expected in even the most sensitive types of organisms present.</p> <p>Absorbed dose rates related to groundwater are typically factors of 1000 lower than the screening level; those due to C-14 gas release over the cap can approach but remain below the screening level even at time shortly after vault closure. Absorbed dose rates above the screening level are calculated in the case of biota residing permanently and gaining all sustenance in the cliff and beach areas during erosion of the wastes, but the most irradiated organisms are relatively insensitive to radiation.</p> <p>Furthermore, the cliff and beach are transient environments with continual turnover, migration and movement of organisms. Hence, there is no potential for significant harm to local populations.</p> | <p>NDA (2005)<br/> <i>EAPINS Project Questionnaire</i></p> <p>Natural England<br/> <a href="http://www.natural-england.gov.uk">www.natural-england.gov.uk</a></p> <p>MAGIC<br/> <a href="http://www.magic.gov.uk">www.magic.gov.uk</a></p> <p>AMEC (2007)<br/> <i>NDA End States Reconciliation Process 2007- Mapping Report for the LLWR, near Drigg;</i><br/>   Environment Agency (2002)<br/> <i>Impact Assessment of Ionising Radiation on Wildlife</i></p> <p>LLWR ESC</p> |

| SEA Objective               | Key Environmental Baseline   | Source   |
|-----------------------------|--|--|
| <b>Landscape and Visual</b> | <p>The LLWR site is located on a coastal plain along the West Cumbrian coast about 0.5km inland from the Irish Sea. The surrounding inland area is characterised by lowland farming and open countryside, notwithstanding an industrial tone associated with the nuclear facilities in the area, including the LLWR. The site is separated from the estuary by an open area of undulating raised dune grassland. The site slopes gently towards the sea, falling from about 25 m AOD at the north of the site to less than 5 m AOD at the south western boundary. The Drigg stream runs parallel with the south west boundary towards the River Irt. The Cumbrian mountains rise to the east of the site.</p> <p>The site falls within the West Cumbria Coastal Plain landscape character area, which includes varied open coastline and open agricultural landscapes with extensive views to the higher fells in the east. There are no statutory or non statutory landscape designations covering the site or the surrounding area. However, there are a number of other designated sites in the area surrounding the site that contribute to the visual characteristics of the landscape (e.g. such as the Drigg Coast SPA / SSSI and the Lake District National Park). The coastal land from north of Sellafield to St Bees head is designated a Landscape of County Importance.</p> <p>Tree screens were introduced around the site to minimise the visual intrusion of the site. However, these screens were damaged in severe weather in 2005. There has been extensive re-planting of mixed woodland following these storms and this is gradually becoming established as a screen for the site.</p> | <p>AMEC (2007)<br/>           NDA End States Reconciliation Process 2007-<br/> <i>Mapping Report for the LLWR, near Drigg</i></p> <p>British Nuclear Group (2007)<br/> <i>Planning Application for the Construction and Operation of Vault 9 for the Storage of LLW – Environmental Statement (Volume 1)</i></p> |
| <b>Cultural Heritage</b>    | <p>There are no designated Conservation Areas, Listed Buildings or Scheduled Ancient Monuments within or in close proximity (1km) to the site. The Cumbria Historic Environment Record includes a number of archaeological records for the area surrounding the site (ranging from find spots to archaeological sites). It is unknown whether any archaeological records are held for within the site however the site was used as a Royal Ordnance Factory (ROF) primarily focused on TNT production during WWII. The ROF building no longer exist but records are available.</p> <p>Cultural heritage features in the wider surrounding area include Muncaster Castle Grade I Listed Building and Scheduled Monument, and its Grade II Listed Registered Historic Parks and Gardens, and Ravenglass Conservation Area.</p> <p>The site lies just outside of the Lake District National Park, which covers an area of 2,292sq/km. National Route 72 of the National Cycle Network and the Cumbria Coastal Way pass alongside the southern boundary of the site.</p>   | <p>NDA (2005)<br/> <i>EAPINS Project Questionnaire</i></p> <p>MAGIC<br/> <a href="http://www.magic.gov.uk">www.magic.gov.uk</a></p>  |

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| <p><b>Groundwater, Geology and Soils</b></p> | <p>The geological structure in the region of the LLWR consists of Quaternary age deposits (up to 2.6 million years old) overlying older bedrock. Quaternary deposits at the LLWR site are a result of complex glacial processes, which were responsible for the deposition of a sequence of deposits of clay, sands and gravels up to 60 m thick. The Quaternary deposits overlie Triassic Ormskirk Sandstone (around 240 million years old) in the vicinity of the LLWR site.</p> <p>In the area of the LLWR site, groundwater generally flows from the Lake District hills towards the coast. Groundwater observations have allowed the identification of an Upper and Regional Groundwater. The Upper Groundwater is present within the upper Quaternary deposits and overlies the Regional Groundwater. The Upper Groundwater is most evident in the north-west and central parts of the site, where it has a groundwater flow pattern that is distinct from that of the Regional Groundwater. The Regional Groundwater is observed in the Quaternary drift deposits and in the underlying Ormskirk Sandstone. The groundwater flow direction in the Regional Groundwater at the LLWR is generally to the south-west (towards the coast), where it discharges to the inter-tidal zone and off-shore. Towards the south-east boundary of the site, the direction of groundwater flow in the Upper Groundwater merges with that in the Regional Groundwater and the two cannot be differentiated. A component of the Regional Groundwater passing under the south-eastern part of the site (but not the disposal area) discharges to the River Irt and the Ravenglass Estuary.</p> <p>Approximately 200 m<sup>2</sup> of two areas within the site, referred to as “slabs”, are known to have some contamination with remedial work undertaken on one during 2009 which has significantly reduced levels. The historic area utilised by the historical Royal Ordnance Factory (ROF) facilities also has the none radiological contamination including asbestos and explosive residues.</p> <p>The agricultural land surrounding the site is classified as grade 3 (of moderate quality). Groundwater is classified as being of good chemical status and good quantitative status in accordance with the Water Framework Directive.</p> | <p><i>LLWR 2011 ESC</i></p> <p>NDA (2005)<br/> <i>EAPINS Project Questionnaire</i></p> <p>MAGIC<br/> <a href="http://www.magic.gov.uk">www.magic.gov.uk</a></p> <p>British Nuclear Group (2007)<br/> <i>Planning Application for the Construction and Operation of Vault 9 for the Storage of LLW – Environmental Statement (Volume 1); Environment Agency (2009) Water for life and livelihoods – River Basin Management Plan North West River Basin District</i></p> |

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|---|---|---|
| <p><b>Surface Water Resources and Quality</b></p> | <p>The site is located on a coastal plain along the West Cumbrian Coast, about 0.5 km inland from the Irish Sea. The Drigg stream crosses the western section of the site parallel with the south western boundary and joins a second stream, the East West Stream, in the centre of the site. The Drigg Stream is partially contained in a deep man made channel and forms a tributary of the River Irt, discharging into the Ravenglass Estuary and ultimately the Irish Sea approximately 1km south of the site.</p> <p>The water quality of Drigg Stream has not been classified. The water quality in the River Irt is classed as compliant by the Environment Agency in accordance with the Water Framework Directive national and European targets. The coastal waters adjacent to Drigg have been classified as being of moderate ecological quality and good chemical quality in accordance with the Water Framework Directive.</p> <p>The total alpha and beta emitting radionuclides discharged to controlled waters per annum were <math>0.70 \times 10^{-4}</math> TBq and 0.00076 TBq respectively. In addition, around 0.09 TBq of tritium was also estimated to be discharged to controlled waters during this period. The discharges were assessed to result in doses to the critical group (a group or representative individual who receive the largest dose from artificially produced radionuclides due to their habits, diet and where they spend their time) of less than 0.005 mSv/y or less than 0.5% of the public dose limit (RIFE 15).</p> <p>In 2004, a low concentration of tritium was found in groundwater off the site, and was anticipated to be due to the leaching of tritium from the site. The completion of the construction of the curtain wall around the landfill has resulted in reducing such emissions.</p> <p>In 2004 the site consumed approximately 9,200 m<sup>3</sup> of water per annum. In 2011, the LLWR consumed 10,463 m<sup>3</sup> of water.</p> | <p>AMEC (2007)<br/>       NDA End States Reconciliation Process 2007-<br/> <i>Mapping Report for the LLWR, near Drigg</i></p> <p>NDA (2005)<br/> <i>EAPINS Project Questionnaire</i>;<br/>       NDA (2008) <i>NSP Returns</i></p> <p>British Nuclear Group (2007)<br/> <i>Planning Application for the Construction and Operation of Vault 9 for the Storage of LLW – Environmental Statement (Volume 1)</i>;</p> <p>Environment Agency et al. (2009)<br/> <i>Radioactivity in Food and the Environment</i>;</p> <p>Environment Agency (2009)<br/> <i>Water for life and livelihoods – River Basin Management Plan North West River Basin District</i></p> |

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|---------------------|---|---|
| <p><b>Waste</b></p> | <p>The LLWR near Drigg is the UK's principal facility for the disposal of solid LLW. The site has been operational since 1959 and receives wastes from a range of sources, including nuclear power stations, nuclear fuel cycle facilities, universities, general industry and from the remediation of historically contaminated sites. Only LLW waste is accepted for disposal at the site.</p> <p>Disposal facilities were upgraded in 1987 to phase out trench disposal in favour of vault disposal, which involves the orderly emplacement of containerised conditioned wastes in engineered concrete vaults. This disposal system has been in use since 1995.</p> <p>In 2004, the area within the site currently consented for authorised disposals contained approximately 1,000,000 m<sup>3</sup> of packaged volume LLW and has capacity for approximately a further 700,000 m<sup>3</sup> of packaged volume LLW between 2005 and 2010.</p> <p>Around 5,000 PCM drums resulting from the early military operations on the site were known to be present on the site in 1997. Operations commenced at this time to remove the PCM and transport it to the neighbouring Sellafield site for long term storage. All of this PCM was retrieved and consigned to the neighbouring Sellafield site by the end of July 2007</p> <p>It is estimated that decommissioning will generate some 351 m<sup>3</sup> of packaged volume ILW and 202,000 m<sup>3</sup> of packaged volume LLW. As of the 1<sup>st</sup> April 2007, there was 358 m<sup>3</sup> packaged volume ILW and 156,000 m<sup>3</sup> of packaged volume LLW in storage on the site.</p> <p>In 2007, some 78.6 tonnes of non hazardous waste was generated, of which 36 % was reused or recycled, and 2.5 tonnes of hazardous waste was generated, of which none was reused or recycled. Some 18 tonnes of inert waste was also generated, of which none was reused or recycled.</p> <p>During 2010, the Nuclear Industry LLW Strategy was approved by Government. The key objectives of the strategy are to encourage application of the waste hierarchy, make best use of existing assets, and open new fit-for-purpose treatment and disposal routes. Implementation of the strategy is now underway with LLWR developing additional services for the recycling of metals and treatment of combustible waste with the aim of reducing volumes going for disposal.</p> <p>The National Strategy is now in place, and is being delivered via a National Waste Programme overseen by LLWR Ltd. on behalf of the NDA. The use of LLWRs framework services for Metallic and Combustible waste treatment are increasing, with new transportation, VLLW and characterisation services coming online in 2012.</p> | <p>AMEC (2007) NDA End States Reconciliation Process 2007- Mapping Report for the LLWR, near Drigg</p> <p>NDA (2005) EAPINS Project Questionnaire</p> <p>NDA (2006) Low Level Waste Repository 2006/07 Lifetime Plan ; NDA (2008) The 2007 UK Radioactive Waste Inventory</p> |

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|------------------------------------|--|--|
| <b>Economy, Society and Skills</b> | <p>The population of Copeland Borough was 70,300 people in 2007, of which 67.1% of the working population were employed during this time. Unemployment in the Borough (8.6% in 2007) remains substantially higher than the national average (5.4%). The economy of the Borough has been traditionally associated with mining, shipbuilding and other heavy industries, which has declined substantially over the last decade. This has resulted in significant job losses and severe long term economic difficulties in the area. The local economy of the Borough is currently dominated by the Sellafield site.</p> <p>In December 2006 the LLWR, near Drigg supported 132 members of staff. In 2004, the site contributed some £5.4 million to the local economy. In December 2011 LLWR employed 176.</p> <p>Educational attainment levels at GCSE level in Copeland Borough are currently much lower than average. In 2006/07 51.4% of 16 year old pupils achieved GCSE Grades A* to C, compared to the national average of 62%. In 2007, 14.2% of the working age population of the borough had no qualifications, which is higher than the national average of around 13.6%.</p>   | <p>NDA (2005)<br/> <i>EAPINS Project Questionnaire</i></p> <p>British Nuclear Group (2007)<br/> <i>Planning Application for the Construction and Operation of Vault 9 for the Storage of LLW – Environmental Statement (Volume 1)</i></p> <p>NOMIS<br/> <a href="http://www.nomisweb.co.uk">www.nomisweb.co.uk</a></p>                                       |
| <b>Traffic and Transport</b>       | <p>Access to the site is from the B5344, a single carriageway road running west from the A595 at Holmbrook to Drigg village. The B5344 continues north to Seascale and then east to rejoin the A595 at Gosforth. However, an awkward low bridge under the railway at Seascale prevents HGV access to the site via Seascale. The A595 is a single carriageway main road that links to the A5092, providing access via the A590 to the M6 (Junction 36) south of the site and access to the A66 to the M6 (Junction 40) north of the site. The site itself has a paved internal road network.</p> <p>The Carlisle to Barrow-in-Furness railway line runs along the eastern boundary of the site and is linked with the LLWR via rail sidings. The Cumbrian Coast Line forms a rail loop that connects to the West Coast Main Line at both Carnforth South Junction to the south and Currock Junction (near Carlisle) to the north. Significant volumes of freight travel along these lines.</p> <p>In 2010, it was estimated that, the total number of miles covered by road transport associated with the site was around 116,000 miles per annum, including deliveries to the site. On an annual basis, the site received around 200 deliveries of bulk materials for the grout facility. In the 2010/11 year there were approximately 500 deliveries to the LLWR site including approximately 6 weekly HGVs trip, compared to 10 per day in 2004 (based on a 2004 traffic count).</p> | <p>AMEC (2007)<br/> <i>NDA End States Reconciliation Process 2007- Mapping Report for the LLWR, near Drigg</i></p> <p>NDA (2005)<br/> <i>EAPINS Project Questionnaire</i></p> <p>British Nuclear Group (2007)<br/> <i>Planning Application for the Construction and Operation of Vault 9 for the Storage of LLW – Environmental Statement (Volume 1)</i></p> |

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|-------------------------------------|--|--|
| <b>Land Use and Material Assets</b> | <p>Disposal of LLW at the site has taken place since 1959. The site comprises a number of parcels of land divided by streets and buildings, large areas of which are undeveloped land currently supporting semi-natural habitat. The Site was previously used as a Royal Ordnance Factory (ROF) with the legacy of these operations still present in the form of historic building foundations and bunding mounds, with the residue of ROF buildings incorporated into the undeveloped land. A series of seven parallel trenches previously in filled with LLW are located in the northeast part of the site. The site has a total area of approximately 100 hectares.</p> <p>The surrounding inland area is characterised by lowland farming and open countryside, notwithstanding an industrial tone associated with the nuclear facilities in the area, including the LLWR. A former local council landfill site is located to the southeast of the site. Drigg village is situated immediately east of the site.</p> <p>In 2011, the LLWR site in total consumed 10,463 m<sup>3</sup> of water and produced around 140 m<sup>3</sup> of grout (using Pulverised Fuel Ash, Ordinary Portland Concrete and water) by the Grout facility on site. The latter figure being significantly lower than the previous year due to a planned extended outage of the Grout Facility following replacement of its electrical substation.</p> | <p>MAGIC (<a href="http://www.magic.gov.uk">www.magic.gov.uk</a>);</p> <p>NDA (2005) <i>EAPINS Project Questionnaire</i>;</p> <p>NDA (2008) <i>NSP Returns</i> ;</p> <p>British Nuclear Group (2007) <i>Planning Application for the Construction and Operation of Vault 9 for the Storage of LLW – Environmental Statement (Volume 1)</i></p> |
| <b>Noise and Vibration</b>          | <p>The site is located in a relatively rural area and is largely surrounded by agricultural land. As such it is considered to be in a noise sensitive area. However, a railway, main road and heavy artillery firing range are located near by that contribute to the ambient noise levels of the site.</p> <p>Current activities at the site comprise the movement of waste freight by train, lorry and fork lift, delivery of cement for the grouting facility, and general site maintenance. There are a number of locations on the site where hearing protection is required, which include the grouting facility, operations in the Vault areas and fan room. In compliance with planning conditions LLWR implement a comprehensive noise monitoring programme at both on and off site locations to gauge impact on those residences closest to the site boundaries. Results to date show that the noise levels are below the limits set by our Regulators and the Waste Planning Authority.</p>  | <p>NDA (2005) <i>EAPINS Project Questionnaire</i></p> <p>British Nuclear Group (2007) <i>Planning Application for the Construction and Operation of Vault 9 for the Storage of LLW – Environmental Statement (Volume 1)</i></p>  |
| <b>Health and Safety</b>            | <p>The discharges to water were assessed to result in doses to the critical group (a group or representative individual who receive the largest dose from artificially produced radionuclides due to their habits, diet and where they spend their time) of less than 0.005 mSv/y or less than 0.5% of the public dose limit. The exposure to the critical group to discharges to the atmosphere was 0.015 mSv/y or less than 2% of the dose limit for members of the public.</p> <p>In 2010/11, the mean employee dose was 0.37 mSv/y and the dose to the most exposed worker was 1.11 mSv/y. These doses compare to the worker dose limit of 20 mSv/y.</p> <p>In 2010/11 the site recorded 0 RIDDOR incidents and had an Occupational Safety and Health Administration (OSHA) Total recordable Incident Rate (TRIR) of 0.</p>  | <p>NAD (2005) <i>EAPINS Project Questionnaire</i></p> <p>Environment Agency et al. (2009) <i>Radioactivity in Food and the Environment, 2007</i>;</p> <p>NDA (2008) <i>Annual HSSE Report</i></p>  |

## Future Developments

Discharges are very low and are likely to continue to be so during the operational phase of the site and are likely to decrease further when the site reaches final site closure and is engineered for long term isolation.

Key post closure scenarios likely to dominate future human and environmental exposures will be those which challenge the isolation of wastes in the site in the far future – for example future human intrusion. These issues have been considered in the site's Environmental Safety Case which was submitted to the environment Agency in 2011.

The LLWR anticipates a slight increase in the number of employees to support Waste Management Services and Segregation of Waste.

## Environmental Issues

The location of the site along the coast means that the site will be vulnerable to coastal erosion in the next several hundred to thousands of years in the future. The site is currently protected by adequate natural coastal defences, but there is the potential for changes in climate to result in sea level rises, which could make the site more vulnerable to erosion and flood risk. The potential for significant erosion is anticipated to be within the region of a few hundred to a few thousand years. This was assessed as part of the development of an Environmental Safety Case for the site which was successfully produced and submitted to the Environment Agency by the required target date.

Soil and groundwater at the LLW Repository near Drigg is of potential concern due mainly to radioactive contamination, as described above. The site is not yet fully characterised.