PŴER NIWCLEAR
HORIZON
NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Radioactive Waste Strategy

Our aim

Horizon has developed a waste management strategy for wastes which are expected to arise from the operation of the Wylfa Newydd Power Station.

The strategy meets relevant legislative and regulatory waste management requirements, whilst incorporating techniques which are 'tried and tested' in the UK and internationally.

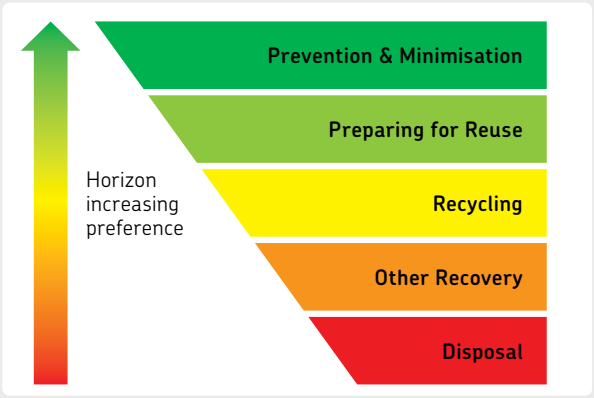
Key Principles

We have developed a set of Nuclear, Safety and Environment Principles (NSEPs) to guide the development and implementation of our waste management strategy.

Our objectives are to:

- Safely control and account for waste, applying the waste hierarchy
- Protect human health and the environment, both now and in the future
- Ensure undisturbed power production from the reactor, provided health, safety and environmental protection are not compromised

The Waste Hierarchy



The waste hierarchy is a fundamental component of our waste management strategy. We have applied the principles of the waste hierarchy to minimise the volume of waste generated and to recover the maximum value from those wastes that are produced.

Radioactive Waste Strategy

Radioactive Waste

Geological Disposal Facility (GDF)

The government is responsible for the provision of a disposal solution for spent fuel and Intermediate Level Waste (ILW). Government policy requires Horizon to safely and securely store spent fuel and ILW arising from the Wylfa Newydd Power Station on site, until it can be disposed of to a national Geological Disposal Facility (GDF).

Gaseous Radioactive Discharges

Radiological gaseous discharges would be generated during the operation of the Wylfa Newydd Power Station, from the reactor steam circuit and heating, ventilation and air conditioning system.

Gaseous radioactive waste would be managed using the off-gas system, which would minimise and control the release of entrained radiological gaseous emissions to the atmosphere by providing for hold-up, and consequential decay of radioactive gases and monitoring of the residual discharges.

A Heating, Ventilation and Air Conditioning (HVAC) system would be deployed, limiting the spread of radioactive materials from contaminated plant and equipment and filtering contaminated air prior to its discharge to atmosphere using high-efficiency particulate air (HEPA) filters.

Both systems would discharge via the main reactor stack.

Liquid Radioactive Discharges

The primary circuit and fuel pool (i.e. the plant areas containing water that comes into direct contact with irradiated fuel elements) are operated as far as is practicable as 'closed loop systems'. Water is treated for re-use in the following three systems:

- condensate water clean-up system
- reactor clean-up water system
- fuel pool clean-up system and suppression pool clean-up system

The liquid effluent treatment system in the radioactive waste building is designed to treat radioactive and potentially radioactively contaminated water. The system consists of filters for the removal of insolubles, demineralisers for the removal of solubles and sampling tanks. Effluents would either be transferred for re-use in the reactor or discharged to the environment, following sampling.

Solid Radioactive Waste

In the UK, solid radioactive wastes are classified in terms of the nature and quantity of radioactivity they contain and the heat they produce, as defined below.

Low Level Waste (LLW) (including Very Low Level Waste (VLLW)) has a radioactive content not exceeding 4 GBq (Giga Becquerels) per tonne of alpha, or 12 GBq per tonne of beta / gamma activity. VLLW is a sub-category of LLW; Wylfa Newydd will produce high volume VLLW which is defined as waste with maximum concentrations of 4 MBq (Mega Becquerels) per tonne of total activity. For waste containing tritium, the concentration limit for tritium is 40 MBq/te.

Intermediate Level Waste (ILW) is waste that has a radioactive content exceeding the LLW limit but that does not have a significant heat output.

High Level Waste (HLW) is waste that has a radioactive content exceeding the LLW limit and has a significant heat output.

Spent Fuel is fuel which has been used in the reactor and is no longer useful in sustaining a nuclear reaction. Spent fuel will be managed as a waste and stored on site until the GDF is built, in line with Government Policy.

The strategy for managing these wastes for the Wylfa Newydd Power Station is summarised in the sections below.

Radioactive Waste Type	Strategy
Low Level Waste (LLW) (including Very Low Level Waste (VLLW))	**Dry LLW** Dry LLW would consist of items generated from routine operations and maintenance, including wood, cloth, metal, pipes lagging, gas filters, concrete, glass and spent filtering materials. Dry LLW would be managed in accordance with Horizon's waste hierarchy. It would be sorted and segregated at source and packaged at the dry LLW processing facility. The dry LLW processing facility would serve both reactor units. Dry LLW would be disposed off-site via incineration, metal recycling or the Low Level Waste Repository (LLWR). VLLW would be disposed of to a permitted landfill site.
	Wet LLW Wet LLW would consist of resins and concentrates from the liquid effluent treatment system. Wet LLW would be stored in storage tanks in the radioactive waste building prior to being transferred to the wet LLW processing facility to be immobilised in cement. There would be one wet LLW processing facility per reactor unit. Once processed and packaged, Wet LLW would be disposed of to the Low Level Waste Repository.
Intermediate Level Waste (ILW)	Wet ILW would consist of sludge and resins from the fuel pool water clean-up system, the reactor water clean-up system, the condensate water clean-up system and the liquid effluent treatment system. ILW would be stored in storage tanks in the radioactive waste building prior to being transferred to the wet ILW processing facility to be immobilised in cement. There would be one wet ILW processing facility per reactor unit. For the two reactor units: • 64 packages produced every 5 years • 770 packages produced over 60 years The packages would be transferred to the ILW storage facility, prior to disposal to the Geological Disposal Facility (GDF). The ILW storage facility would serve both reactor units.
High Level Waste (HLW) / Intermediate Level Waste (ILW)	HLW would consist of control rods and other activated metals removed from the reactor during operations. HLW would be stored in a spent fuel pool for around 10 years, packaged into stainless steel canisters and transfer overpacks and transferred to the dry HLW decay storage facility. The HLW decay storage facility would serve both reactor units. There is ongoing work to optimise the storage of spent fuel and HLW, the outcome of which could result in co-locating HLW in the spent fuel storage facility. For the two reactor units: • 32 - 66 storage casks over 60 years • Re-packaged in $3m^3$ boxes • 108 packages produced for disposal HLW would be stored until such a time as it had reduced in radioactive content ('decayed') sufficiently to be categorised as ILW. At the point of disposal to the GDF, the waste would be repackaged.

Radioactive Waste Strategy

<table>
<tr><th>Radioactive Waste Type</th><th>Strategy</th></tr>
<tr><td>Spent Fuel</td><td>Spent fuel would be stored in a spent fuel pool for around 10 years, packaged into stainless steel canisters and transfer overpacks and transferred to the spent fuel storage facility.

The spent fuel storage facility would serve both reactor units.

<table>
<tr><th>Spent Fuel Assemblies</th><th>Specification</th></tr>
<tr><td>Length</td><td>4,468 mm</td></tr>
<tr><td>Weight</td><td>298 kg</td></tr>
<tr><td>Number generated per outage (18 months)</td><td>224 per unit</td></tr>
<tr><td>Total number generated (60 years)</td><td>9,600 per unit</td></tr>
</table>

Spent fuel would be stored on site for a maximum of 140 years after the end of power generation prior to disposal to the GDF. At the point of disposal to the GDF, the spent fuel would be repackaged.</td></tr>
</table>

Please let us know what you think about our plans - you can give us your feedback at this event or visit our website: **www.horizonnuclearpower.com/consultation**