

## REGULATORY OBSERVATION

### REGULATOR TO COMPLETE

<b>RO unique no.:</b>	RO-UKHPR1000-0040
<b>Revision:</b>	0
<b>Date sent:</b>	15/04/20
<b>Acknowledgement required by:</b>	06/05/20
<b>Agreement of Resolution Plan Required by:</b>	30/04/20
<b>CM9 Ref:</b>	2020/70794
<b>Related RQ / RO No. and CM9 Ref: (if any):</b>	RO-UKHPR1000-0005 (2018/318848); RQ-UKHPR1000-0477 (2019/279802); RQ-UKHPR1000-0507 (2019/309543).
<b>Observation title:</b>	Provision of an adequate safety case for the interim storage of Intermediate Level Waste (ILW)
<b>Lead technical topic:</b>	<b>Related technical topic(s):</b>
17. RadWaste, Decommissioning & Spent Fuel Management	5. Conventional Health & Safety 9. Fault Studies 11. Human Factors 14. Mechanical Engineering 16. Radiological Protection 20. Structural Integrity 21. Environmental

### ***Regulatory Observation***

#### **Background**

In December 2018, the UK Government set out its updated framework for managing higher activity radioactive waste in the long-term through geological disposal, preceded by safe and secure interim storage (Ref.1). The Base Case set out in the UK Government's guidance on Funded Decommissioning Programmes for new nuclear power stations assumed that Intermediate Level Waste (ILW, a subset of Higher Activity radioactive waste) arising from operations and decommissioning will be stored in safe and secure interim storage facilities on the site of the power station, pending disposal in the same geological disposal facilities to be used for the disposal of ILW from existing nuclear facilities (Ref.2).

New stores currently being built typically have a design life of 100 years. The Requesting Party (RP) for the Generic Design Assessment (GDA) of the UK HPR1000 reactor design has assumed the design lifetime of the Interim Storage Facility (ISF) for ILW to be at least 100 years (Ref.3), consistent with existing industry guidance (Ref.4).

ONR has received the RP's conceptual design for an ISF for ILW arisings from the UK HPR1000 (Ref.5). ONR has assessed it against the relevant expectations set out in ONR's Safety Assessment Principles (SAPs, Ref.6). Throughout the assessment, ONR sought clarifications and further information from the RP through RQ-UKHPR1000-0477, which was superseded by RQ-UKHPR1000-0507 (Ref. 7). The RP's response to RQ-UKHPR1000-0507 (Ref.7) largely referred to information in an updated version of the Conceptual Design Report (Ref.8).

ONR has assessed the updated Conceptual Design Report and has concluded that, together with Version 0 of Pre-construction Safety Report (PCSR) Chapter 23 on radioactive waste management (Ref. 3), Refs. 3 and 8 do not provide an adequate safety justification for the design of the ISF for ILW, nor a robust demonstration that relevant risks associated with the storage of ILW arising from the operational phase of the UK HPR1000, and from decommissioning, will be reduced, so far as is reasonably practicable (SFAIRP). This Regulatory Observation (RO) has therefore been raised to:

- Explain ONR's regulatory expectations;
- Obtain confidence that an adequate safety case will be provided by the RP to support the claims and arguments made in the UK HPR1000 generic safety case relevant to the interim storage of ILW; and
- Assist ONR's judgement of whether a robust demonstration that ILW arising from UK HPR1000 operations and decommissioning, can be safely stored on the generic site, until final disposal.

### **Relevant Legislation, Standards and Guidance**

The relevant sections of ONR's SAPs (Ref.5) are:

#### **ENM.2:**

*"Nuclear matter should not be generated on the site, or brought onto the site, unless sufficient and suitable arrangements are available for its safe management on the site."*

Such arrangements include as appropriate:

(d): designated storage facilities and areas, of **appropriate capacity**;

#### **RW.1:**

*"A strategy should be produced and implemented for the management of radioactive waste on a site."*

The strategy should:

(q): ....**ensure that the adequacy of the storage capacity** needed is reviewed at appropriate intervals, e.g. to take account of current and future wastes generated, the safe operating lifetimes of existing stores and planned additional stores;

#### **RW.5:**

*"Radioactive waste should be stored in accordance with good engineering practice and in a passively safe condition."*

A safety case should be produced which should:

(c): ...**justify the continued safe storage of the waste for the entire planned storage period.**

Also of relevance are:

#### **FP.4:**

Dutyholders must demonstrate effective understanding and control of the hazards posed by a site or facility through a comprehensive and systematic process of safety assessment.

#### **SC.4:**

A safety case should be accurate, objective and demonstrably complete for its intended purpose.

ONR has a specific Technical Assessment Guide (TAG) on Demonstration of ALARP (As Low As Reasonably Practicable) which sets out ONR's expectations of a duty holder (i.e. the RP) in meeting its legal requirement to reduce risks so far as is reasonably practicable (SFAIRP) (Ref 9).

In addition, ONR has a specific TAG on radioactive waste management (Ref.10) which contains further information including fundamental expectations, policy considerations and refers to relevant international guidance.

ONR and the Environment Agencies (EA, Scottish Environmental Protection Agency (SEPA) and Natural Resources Wales (NRW)) have also issued joint guidance to nuclear licensees on the management of higher activity waste on nuclear licensed sites known as the "Joint Guidance" (Ref.11).

## **Regulatory Expectations**

ONR expects the claims presented in the PCSR to be adequately substantiated by suitable and sufficient arguments and evidence. Based on the expectations from the standards and guidance listed above, ONR expects the safety case for the interim storage of ILW to adequately justify the chosen design, with reference to the overall relevant risks and hazards associated with the various options available, and an adequate justification that the selected design/option(s) will reduce risks, SFAIRP.

ONR notes the RP's current baseline option is to size and construct an ILW ISF to accommodate 30 years of operational ILW arisings for a twin unit reactor site. The generic site/design is based on a single unit with a 60 year design life. In raising this RO, ONR is seeking to understand the RP's current approach to the sizing of, and approach to, providing the necessary ILW interim storage capacity for UK HPR1000. However, ONR's expectations are that, whatever approach to providing the necessary capacity is selected, it must be underpinned by an adequate, holistic demonstration of safety.

For a GDA, ONR also recognises there is a balance to strike between providing a sufficient level of design detail to enable a meaningful assessment to be carried out, versus important site specific differences and/or future operator decisions (i.e. a twin unit site, shared radioactive waste management facilities etc.). In this regard, ONR expects an appropriate balance to be struck and for sufficient design information to be provided to enable a meaningful assessment of the generic design to be undertaken.

Early in Step 3, ONR raised RO-UKHPR1000-0005, *Demonstration that the UK HPR1000 Design Reduces the Risks Associated with Radioactive Waste Management, So Far As is Reasonably Practicable* (Ref. 12). Ref. 12 and this RO are inextricably linked. ONR would therefore expect the RP to take account of any inter-dependencies between the work being delivered to resolve RO-UKHPR1000-0005 and work to address this RO.

More detailed regulatory expectations are provided under Regulatory Observation Action (ROA) 1 under this RO, below.

## **References**

1. *Implementing Geological Disposal – Working With Communities, an updated framework for the long-term management of higher activity radioactive waste*, Department for Business, Energy and Industrial Strategy, December 2018. <https://www.gov.uk/government/publications/implementing-geological-disposal-working-with-communities-long-term-management-of-higher-activity-radioactive-waste>
2. *The Energy Act 2008, Funded Decommissioning Programme Guidance for New Nuclear Power Stations*, Department for Energy and Climate Change, December 2011. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/42628/3797-guidance-funded-decommissioning-programme-consult.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/42628/3797-guidance-funded-decommissioning-programme-consult.pdf)
3. *Pre-Construction Safety Report, Chapter 23, Radioactive Waste Management*, HPR/GDA/PCSR/0023, Rev. 001, GNS, February 2020. (Incorporating the superseded Rev. 000). <http://www.ukhpr1000.co.uk/wp-content/uploads/2020/02/HPR-GDA-PCSR-0023-Pre-Construction-Safety-Report-Chapter-23-Radioactive-Waste-Management-Rev-001.pdf>
4. *Industry Guidance, Interim Storage of Higher Activity Waste Packages – Integrated Approach*, Issue 3 (effective from January 2017), Nuclear Decommissioning Authority, December 2016. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/600642/Industry\\_Guidance\\_-\\_Interim\\_Storage\\_-\\_Integrated\\_Approach.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/600642/Industry_Guidance_-_Interim_Storage_-_Integrated_Approach.pdf)
5. *Conceptual Proposal of ILW Interim Storage Facility, GH X 00100063 DN FF03 GN*, Rev B, August 2019. CM9 Ref. 2019/252630.
6. *Safety Assessment Principles for Nuclear Facilities*, 2014 Edition, Revision 1 (January 2020), Office for Nuclear Regulation, 2014. [www.onr.org.uk/saps/saps2014.pdf](http://www.onr.org.uk/saps/saps2014.pdf)
7. GNS Response to RQ0507, GDA-REC-GNS-005658 FRQ-UKHPR1000-0507. CM9 Ref. 2020/3980.
8. *Conceptual Proposal of ILW Interim Storage Facility, GH X 00100063 DN FF03 GN*, Rev C, December 2019. CM9 Ref. 2020/498.
9. Nuclear Safety Technical Assessment Guide - Guidance on the Demonstration of ALARP (As Low As Reasonably Practicable), NS-TAAS-GD-005, Revision 10, Office for Nuclear Regulation, December 2019. [http://www.onr.org.uk/operational/tech\\_asst\\_guides/ns-tast-gd-005.pdf](http://www.onr.org.uk/operational/tech_asst_guides/ns-tast-gd-005.pdf)
10. Nuclear Safety Technical Assessment Guide - Management of Radioactive Materials and Radioactive Waste on Nuclear Licensed Sites, NS-TAST-GD-024, Revision 6, Office for Nuclear Regulation, September 2019. [http://www.onr.org.uk/operational/tech\\_asst\\_guides/ns-tast-gd-024.pdf](http://www.onr.org.uk/operational/tech_asst_guides/ns-tast-gd-024.pdf)

11. The management of higher activity radioactive waste on nuclear licensed sites, Revision 2, February 2015, ONR, NRW, SEPA and EA, February 2015. <http://www.onr.org.uk/wastemanage/waste-management-joint-guidance.pdf>
12. Demonstration that the UK HPR1000 Design reduces the risks associated with radioactive waste management, so far as is reasonably practicable. RO-UKHPR1000-0005. 26 October 2018. CM9 Ref. 2018/348624.

### **Regulatory Observation Actions**

**RO-UKHPR1000-0040.A1** – Provide a suitable and sufficient safety case for the interim storage of all ILW arising from the operation and decommissioning of the UK HPR1000.

In response to this ROA, ONR would expect the RP to provide:

- Confirmation of all the types of ILW which may arise from the operation and decommissioning of the UK HPR1000, including those which may arise as a result of reasonably foreseeable accidents and incidents, together with a suitable justification of the proposed waste packages.
- The conceptual strategy for storage of ILW arising from reasonably foreseeable incidents and accidents.
- A suitable and sufficient demonstration of consideration of options in the selection of the design of the ILW Interim Storage Facility (including e.g., whether single or multiple phased construction of the facility is proposed, mode of storage of packages and conceptual design). The optioneering should give adequate weighting so that the final design balances health, safety, security and environmental aspects in an optimised manner such that regulatory expectations of ALARP (and BAT) are met.
- A clear identification of what Operational Experience Feedback (OPEX) has been used to inform the design of the ILW Interim Storage Facility and a robust justification for why this represents the optimal design solution for the ISF.
- A clear demonstration that the capacity of the ILW Interim Storage Facility is sufficient for the expected ILW arisings anticipated throughout the whole lifecycle of the wastes prior to disposal.
- For the selected design, suitable and sufficient identification and assessment of the relevant hazards and risks to: workers, members of the public and to the safety of the reactor (including any risks associated with a phased approach to construction of interim storage capacity, where applicable), and a robust demonstration that the identified risks will be reduced, SFAIRP.
- The identification of indicative operational limits and conditions needed for safe interim storage of the radioactive waste packages, taking account of RGP and OPEX.
- Provision in the design of the ILW Interim Storage Facility for protection against identified faults.
- An outline of the monitoring, examination, inspection, maintenance and testing arrangements for the facility and its stored wastes.

**Resolution required by: 'to be determined by General Nuclear System Resolution Plan'**

#### **REQUESTING PARTY TO COMPLETE**

<b>Actual Acknowledgement date:</b>	
<b>RP stated Resolution Plan agreement date:</b>	