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| **Rolls-Royce SMR RO Resolution Plan** |

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| RO unique Number: | RO-RRSMR-006 |
| RO Title: | RO-RRSMR-006 Decommissioning E3S Case for the generic Rolls-Royce SMR design |
| Lead Technical topic: | Nuclear Liabilities Regulation |
| Related Technical topic(s): | Civil Engineering  Conventional Health and Safety  Environment  Human Factors  Radiological Protection |

## Regulatory Observation

## Background

The Step 2 nuclear liabilities regulation assessment report (ref. [1]) concluded that there was insufficient detail available at that time for a judgement to be made on the adequacy of the E3S case in areas such as the design-for-decommissioning approach, and the effects from modularisation on decommissioning. However, it was recognised that there was no reason why a suitable and sufficient case could not be presented for the generic Rolls-Royce SMR design over the remainder of the Generic Design Assessment (GDA).

The Requesting Party (RP) has continued to provide additional information including, most recently, an updated detailed scope and submission plan (ref. [2]) on its justification that the Rolls-Royce SMR can be safely decommissioned. This has provided useful insight on its forward plans but has highlighted that several key documents are necessary over a short period of time. Moreover, the first ‘substantive’ submission, the Decommissioning Strategy (ref. [3]), made in December 2024, had various aspects which fell short of our regulatory expectations regarding its linking to extant government policy, comprehensiveness in setting a framework for future more detailed decommissioning plans, and fully documenting the many high-level risks and opportunities which may influence future decommissioning plans.

Working closely with colleagues in the environment agencies, we have raised several Regulatory Questions (RQs) and held Level 4 (L4) meetings with the RP to discuss these concerns. It is important to note that the RP has taken steps to progressively address our concerns, including provision of responses to the RQs and it has provided additional and useful clarity on its intended scope for future decommissioning-related submissions (ref. [2]).

However, while this has provided considerable reassurance it has also revealed the challenging nature of the work necessary, both in terms of its complicated inter-relationships/interfaces and the significant amount of effort required for a suitable level of quality and completeness. We have not yet been provided with, nor seen evidence for, an overall holistic strategy and plan for how the RP will provide the information to demonstrate that the generic Rolls-Royce SMR can be safely decommissioned. We remain concerned that without such a documented plan, that clearly identifies what underpinning work will be undertaken and how this will support both the E3S case and ongoing development of the design, further shortfalls may only become apparent later in Step 3, with insufficient time for any necessary corrective work.

In summary, despite the progress made by the RP during Step 3, there remains a significant risk that the overall safety case for decommissioning may not provide sufficiently developed claims, arguments and evidence to be consistent with the level expected during GDA, including a sufficiently robust demonstration that the overall approach for decommissioning is consistent with risks being reduced to As Low As Reasonably Practicable (ALARP) and adoption of Relevant Good Practice (RGP). Given the large amount of work identified by the RP for completion during the remainder of Step 3 (ref. [2]) we have insufficient confidence that the submissions will provide a suitable and sufficient case for decommissioning in the context of the GDA.

**Relevant Legislation, Standards and Guidance**

There are several relevant Safety Assessment Principles (SAPs) and other associated regulatory publications which provide relevant decommissioning-related expectations relevant to this RO. These include:

* SAPs DC.1 - 6, ECE.26 (ref. [4]),
* Technical Assessment Guide (TAG) NS-TAST-GD-026 (ref [5]), noting in particular its appendix on design-for-decommissioning good practices,
* the joint regulatory guidance on Higher Activity Wastes (ref. [6]).

This guidance, as well as the legislation and international standards from which it is essentially derived, is contextualised within the GDA process in further technical guidance to RPs (ref. [7]), in which subsection 3.14 contains NLR-specific guidance. Highlighted specific areas include regulatory expectations for a:

* demonstration that the generic design enables the risks from decommissioning to be minimised ALARP based on currently available technologies,
* decommissioning strategy to meet the expectations of SAP DC.2 including that the strategy needs to be integrated with other relevant strategies,
* preliminary (also known as Initial) decommissioning plan to meet the expectations of SAP DC.4,
* consideration of decontamination processes and techniques (or not).

Given the current level of the Rolls-Royce SMR design maturity we consider that meeting the expectations of this ‘GDA-applied’ guidance needs careful consideration to ensure that the more generic aspects of the decommissioning case are given due prominence, whereas the more detailed aspects should be prioritised on the higher hazard structures, systems and components. Even for these more detailed aspects of the case it may well necessitate well-founded assumptions and bounding cases to enable a meaningful GDA assessment.

Conversely, this provides an opportunity and expectation that other ‘strategic’ aspects, such as the design-for-decommissioning considerations should be well advanced and evidence sought that these high-level requirements are influencing design decisions appropriately.

**Regulatory Expectations**

For GDA we expect the RP to provide an E3S Case which provides a robust strategic framework for decommissioning underpinned by the assurance that risks are shown to be reduced to ALARP based on currently available RGP. This should also recognise the expectation that future improvements in decommissioning approaches will emerge over the coming decades, and hence the design needs not to foreclose such opportunities so far as possible through adoption of good forward thinking in the design, and, for example, appropriate design-for-decommissioning principles (see ref. [7]).

Information is required across a range of areas, including the decommissioning sequencing schedule, knowledge management and inventory determination, which are all important elements to be addressed within an overall holistic strategy. The plan should recognise and address the wider interest across other decommissioning-relevant regulatory topic areas (as identified on the front page of this RO) and provide suitable description, as appropriate, to these wider interests and needs. Previous GDAs have found inconsistencies between submissions made on decommissioning across different topic areas (ref. [7]).

In order to provide confidence that this can be achieved for the generic Rolls-Royce SMR this RO is seeking a coherent strategic plan which describes, in an integrated manner, how the decommissioning-themed submissions will deliver the overall decommissioning scope and provide sufficient claims, arguments and evidence consistent with the level expected for the RP to meet its stated objective of achieving a Design Acceptance Confirmation (DAC). The plan should also demonstrate how the submissions will provide a suitable demonstration of ALARP, and evidence of how the design has been challenged to help enable its future decommissioning.

## Regulatory Observation Actions and Resolution Plan

**RO-RRSMR-006.A1 – Provide a strategy for the delivery of the decommissioning E3S case**

In response to this Regulatory Observation Action, Rolls-Royce SMR Ltd should:

* Provide an integrated and strategic plan (or account) which demonstrates how each of the underpinning submissions, when integrated into the overall case, will meet relevant regulatory expectations on decommissioning and (for example) wider ALARP and RGP principles,
* Explain how delivery against that plan will facilitate regulatory assessment during GDA, including enabling activities,
* Provide confidence that the plan can be delivered within GDA timescales, and will contain suitable and sufficient evidence to allow assessment of the generic design.

**Rolls-Royce SMR Ltd. Resolution Plan for RO-RRSMR-006.A1**

The Resolution Plan below presents the proposed work to be undertaken to address this RO. The key deliverable for this work will be a strategy document that details how the decommissioning topic in its entirety is constructed to support the delivery of the Environment, Safety, Security and Safeguards (E3S) Case for the Generic Design Assessment (GDA). The strategy document will not form part of the E3S Case but will be produced and submitted in response to this RO. It will not provide the justification of ALARP or demonstrate how Relevant Good Practice (RGP) principles are applied to the Rolls-Royce SMR (RR SMR) design. This is provided in the tier 2 and 3 E3S Case documentation, provided during GDA as decommissioning submissions. However, the strategy document will demonstrate how these elements (justification of ALARP and incorporation of RGP) are incorporated into the decommissioning submissions and the supporting, underpinning lower tier documentation, and will demonstrate that the plan is achievable within the GDA timescales.

To ensure the document resolves the actions in RO-RRSMR-006.A1 we will undertake the following phases:

**Phase 1** – Undertake a workshop with relevant internal stakeholders from cross-cutting topic areas which includes human factors, conventional safety, environment / BAT, radiological safety and civil engineering. This includes technical leads, licensing leads and document authors, the aim of the workshop is to review the Generic E3S Case Scope and Deliverable Document – Decommissioning, Spent Fuel, Management of Radioactive Wastes, SMR0000011040, Issue 2, Reference [8], (Scope & Submission (S&S) Plan):

* Review the list of submissions and the current scope of these submissions against:
  + Requesting Party Requesting Guidance (ONR/EA),
  + NS-TAST-GD-26,
  + Radioactive Substances Regulations (RSR) guidance for nuclear sites undergoing decommissioning,
  + Review of previously successful GDAs,
  + Other guidance as applicable e.g. relevant Safety Assessment Principles (SAPs),
* Undertake top-down review of Claims – Arguments – Evidence (CAE) route map to substantiate claims as required,
* Identify any gaps in the S&S Plan, incorporating any additional submissions required,
* Identify whether the scope of existing documents should be amended,
* Define end point of decommissioning for RR SMR GDA.

The aim of Phase 1 is to demonstrate how the overarching decommissioning plan will comply with relevant regulations, meet RGP, and demonstrate the measures are ALARP. It will also provide a gap analysis against regulatory and RGP requirements and identify if additional submissions may be required to support E3S claims.

If gaps are identified then the extent of these gaps and how these gaps will be either mitigated or resolved wil be incoporated into the decommissioning strategy issued in response to this RO. It will identify if any previous submissions need to be updated and reissued, incorporating design developments, any identified improvements and incorporation of regulatory feedback. Any additional identified submissions will be included in an updated S&S Plan, with the relevant scope and structure provided as per existing submissions.

Throughout we will demonstrate how the schedule is delivered including detailed resource mapping and clarified governance.

A key focus for this phase is to ensure that the full suite of decommissioning submissions underpin the E3S Case and provide evidence that the overall approach to decommissioning demonstrates that the risks have been reduced ALARP and that decommissioning wastes can be managed appropriately.

**Phase 2** – A bottom-up analysis of decommissioning dependencies will be undertaken to document how the supporting lower tier documents meet the needs of the tier 1 E3S Case.

The output of Phase 2 aims to provide confidence that the wider schedule for dependencies aligns with that of decommissioning and the breadth and depth of the lower tier documentation meet the E3S tier 1 requirements.

Whilst undertaking this phase if opportunities for improvements are identified, action will be taken to incorporate these improvements into the appropriate schedule. These will be documented and recorded within the wider RO response.

The above phases are expected to provide information to satisfy the three key components of the action RO-RRSMR-006.A1 and outputs will be presented in the RO Resolution strategy document, submitted in response to this RO. This document will also include risks to delivery and how they will be mitigated, identifying any residual matters within a forward action plan. The RO Resolution strategy document will be produced in parallel with the production of E3S Case Version 3 and issued at the end of August 2025. This will provide further clarity on how the RR SMR design is cognisant of the required future decommissioning activities and provide additional confidence that risks associated with decommissioning will be reduced ALARP. Schedule 1 details the RO resulution plan timeline.

## Schedule 1

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***Impacted Submissions***

The table below lists the submissions on the Master Document Submission List (MDSL) that will be impacted through resolution of this RO, and how they will be impacted. Note further additional documents may be identified from the workshops and work carried out as described above.

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| **Existing GDA Submission** | **Impact** |
| Rolls-Royce Decommissioning strategy, SMR0004048 | Include a clear definition of what the end point is for the decommissioning topic area in GDA. |
| Decomissioning Waste Management Plan (DWMP), SMR0008127 | This document is a Tier 2 document that focuses on UK requirements including the cost element and demonstration of funding for decommissioning. This document will act as a signpost to decommissioning suite of documents. |
| Generic E3S Case Scope and Deliverable Document – Decommissioning, Spent Fuel, Management of Radioactive Wastes, SMR0011040 | Update to capture :   * any new documents identified, * change of scope to any documents already captured. |

| **New Submissions** | **Impact** |
| --- | --- |
| RO Resolution Strategy Document | Provide output and conclusion from the work packages described in the resolution plan, including the resource plan. |
| Decommissioning Management Plan (DMP) | This document is a tier 3 document underpinning the DWMP, that capture, the holistic ALARP case for decommissioning, supporting the E3S Case. Focusing on the elements of decommissioning management that are aligned with regulatory guidance. |

## References

[1] ONR, Generic Design Assessment of the Rolls-Royce SMR: Step 2 assessment of Nuclear Liabilities Regulation, June 2024. (Record ref. ONRW-2126615823-1993).

[2] Rolls-Royce SMR Limited, Generic E3S Case Scope and Deliverable Document – Decommissioning, Spent Fuel, Management of Radioactive Wastes, SMR0011040 Issue 2, February 2025. (Record ref. ONRW-2126615823-5953).

[3] Rolls-Royce SMR Limited, SMR Decommissioning Strategy, SMR0004048 Issue 2, December 2024. (Record ref. ONRW-2019369590-15374).

[4] ONR, Safety Assessment Principles for Nuclear Facilities (SAPs), 2014 Edition, Revision 1, January 2020. ([www.onr.org.uk/publications](http://www.onr.org.uk/publications)).

[5] ONR, Decommissioning, NS-TAST-GD-26 Issue 6, January 2024. ([www.onr.org.uk/publications](http://www.onr.org.uk/publications)).

[6] ONR, EA, SEPA and NRW, The Management of Higher Activity Radioactive Waste on Nuclear Licensed Sites, Revision 2.1, July 2021. ([www.sepa.org.uk/media/594000/joint-guidance-on-management-of-higher-activity-waste-v-21-july-2021.pdf](http://www.sepa.org.uk/media/594000/joint-guidance-on-management-of-higher-activity-waste-v-21-july-2021.pdf)).

### [7] ONR, New Nuclear Power Plants: Generic Design Assessment Technical Guidance, ONR-GDA-GD-007 Revision 0, May 2019. ([www.onr.org.uk/publications](http://www.onr.org.uk/publications)).

### [8] Generic E3S Case Scope and Deliverable Document – Decommissioning, Spent Fuel, Management of Radioactive Wastes, SMR0011040, Issue 2, February 2025.

## Record of Change

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| --- | --- | --- |
| **Date** | **Revision Number** | **Reason for Change** |
| 06/06/2025 | 1 | Issue of resolution plan |
| 15/07/2025 | 2 | Format and consistency update and alignment |

***Approvals***

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| Author: | Sign | Print | Role | Date |
| See Teamcenter | {REDACTED} | {REDACTED} | See Teamcenter |
| Reviewer | **Sign** | **Print** | **Role** | **Date** |
| See Teamcenter | {REDACTED} | {REDACTED} | See Teamcenter |
|  | **Sign** | **Print** | **Role** | **Date** |
| Approver | See Teamcenter | {REDACTED} | {REDACTED} | See Teamcenter |