



**Periodic Safety Review**

**ONR Assessment of the Hunterston A Decennial Periodic Safety Review**

Project Assessment Report ONR-SDFW-PAR-21-008  
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## EXECUTIVE SUMMARY

### Title

ONR Assessment of the Hunterston A Decennial Periodic Safety Review.

### Permission Requested

This report presents the ONR assessment of the Periodic Safety Review (PSR) for Hunterston A site and sets out the regulatory justification for recommending the issue of an ONR Decision Letter to confirm that the licensee, Magnox Limited (ML), has carried out an adequate PSR of the Hunterston A Reference Safety Case for the period 2021-2031.

### Background

It is a requirement for licensees to carry out a periodic and systematic review and reassessment of safety cases to comply with Nuclear Site Licence Condition 15: Periodic Review. The purpose of the PSR is to determine, by means of comprehensive assessment:

- The degree to which the safety case conforms to modern standards and relevant good practices.
- The degree to which the safety documentation addresses the remaining life of the facility, taking into account changes in plant status through operations and decommissioning.
- The adequacy of arrangements in place to maintain safety until the next PSR.
- Whether any reasonably practicable safety improvements can be implemented to resolve any identified safety issues.

This is achieved by the licensee reviewing the previous 10 years of its operation together with considering any changes in activities that may impact on nuclear safety over the next 10 years. The review takes into consideration conformance with modern standards and potential impact of ageing and obsolescence. The Hunterston A PSR submission was made to ONR on 24 June 2020.

### Assessment and inspection work carried out by ONR in consideration of this request

ONR carried out a detailed assessment of the Hunterston A PSR and the licensee's underpinning assessments. The ONR assessment was based on:

- Requirements set out in ONR's Nuclear Safety Technical Assessment Guide for Periodic Safety Review (NS-TAST-GD-50)
- Adherence to relevant good practice as set out in ONR's Safety Assessment Principles for Nuclear Facilities

Individual specialist assessments were carried out on the following topic areas:

- Civil engineering and external hazards
- Mechanical engineering
- Radiological Protection
- Conventional Health and Safety

- Fault Studies
- Nuclear Liabilities Regulation

The scope of the assessment was informed by a high-level scoping exercise carried out by a Fault Studies specialist to identify the key areas of plant and significant hazards on the site that should be considered in the PSR assessment and was agreed with the Delivery Lead for the PSR. In addition to this, the assessment carried out by ONR was proportionate to the hazards associated with the faults identified in the PSR.

ONR's assessment scope is consistent with recent ML PSR assessments. ONR has included conventional health and safety within the assessment scope recognising that this area has previously not been considered in ML PSRs. Due to the limited material relevant to conventional health and safety aspects in the PSR submission, a minor assessment was carried out by the conventional health and safety assessors and an assessment note was produced. It is noted that ONR is currently engaging with ML to review and agree the future scope of PSRs.

### **Matters arising from ONR's work**

The PSR considers the changes to the Reference Safety Case during the period covered by the previous PSR and the implications of plant ageing to the safety case up to the end of June 2031, with a further five-year period until 2036 to confirm the absence of any cliff edge effects. The Hunterston A PSR has been aligned with the production of the Re-baselined Facilities Safety Case which has been prepared to bring the safety case covering routine site operations up to modern standards.

The licensee's PSR identified no significant safety shortfalls or findings, however, 35 observations were made resulting in 22 associated actions. As of July 2021, ML has completed 19 of the 22 actions and is committed to closing the remaining three actions by March 2022.

During ONR's assessment, ML responded to queries raised by ONR; in some cases this required additional dialogue and explanation of the licensee's safety case process which was followed up between ML and individual assessors. No significant nuclear safety issues were identified. Three recommendations and eight observations have been raised by ONR. These include the requirement to:

- review and update decommissioning documents to align with current decommissioning plans; consider how corporate arrangements for OPEX could conform better to RGP, and;
- provide a justification that the formal inspection interval for fragile or degraded roof structures has reduced risks to ALARP.

These recommendations and observations have been fed back to the licensee, and a suitable forward improvement programme to address them will be agreed. Closure of actions arising as a result of the recommendations will be monitored through raising regulatory issues and by subsequent routine regulatory activities.

### **Conclusions**

ONR considers that ML has carried out an adequate PSR of the Hunterston A site safety case, that justifies continued safe operation for the period 2021-2031. This is based on the assessments and findings of both ML and ONR. No significant nuclear safety issues have been identified and ML has given a commitment to address the recommendations made by both ONR, and the findings from its own assessments.

### **Recommendation**

It is recommended that ONR issues a Decision Letter confirming the adequacy of ML's Hunterston A PSR submission and associated improvement programme to support continued operations on the site for the period up to 30 June 2031.

This recommendation is based on the assumptions that the licensee will address:

- The remaining three outstanding actions from its own review of the PSR by the end of March 2022;
- The findings of this PSR assessment, on timescales to be agreed with ONR.

Completion of the three remaining PSR actions should be monitored through routine regulatory activity. Progress against the findings of ONR's PSR assessment should be monitored through raising regulatory issues on the forward improvement programme and also followed up during routine regulatory activity.

## LIST OF ABBREVIATIONS

ALARP	As low as reasonably practicable
AMD	Asset Management Database
ASF	Acid Storage Facility
C&M	Care and Maintenance
C&MP	Care and Maintenance Preparations
CDM	Construction (Design and Management) Regulations 2015
DRM	Dose Reduction Measure
EIM&T	Examination, Inspection, Maintenance and Testing
ILW	Intermediate Level Waste
ILWS	Intermediate Level Waste Store
INSA	Independent Nuclear Safety Assessment
LLW	Low Level Waste
LTP	Lifetime Plan
ML	Magnox Limited
NSC	Nuclear Safety Committee
ONR	Office for Nuclear Regulation
OPEX	Operational Experience
PHM	Plant Handling Machine
PSR	Periodic Safety Review
RFSC	Rebaselined Facilities Safety Case
RGP	Relevant Good Practice
RSC	Reference Safety Case
RSP	Relevant Statutory Provision
SAP	Safety Assessment Principle(s)
SAWB	Solid Active Waste Building
SAWBR	SAWB Retrieval Facility
SILWE	Solid ILW Encapsulation Facility
SRT	Sludge Retention Tanks
TAG	Technical Assessment Guide (ONR)
TR	Technical Report
WILWREP	Wet ILW Retrieval and Encapsulation Plant

## TABLE OF CONTENTS

1	PERMISSION REQUESTED .....	7
2	BACKGROUND .....	7
3	THE LICENSEE'S PSR SUBMISSION .....	8
4	ASSESSMENT AND INSPECTION WORK CARRIED OUT BY ONR IN CONSIDERATION OF THIS REQUEST .....	9
5	MATTERS ARISING FROM ONR'S WORK.....	11
6	CONCLUSIONS .....	14
7	RECOMMENDATIONS.....	15
8	REFERENCES .....	16
	APPENDIX 1 – PSR TECHNICAL REPORTS .....	18
	APPENDIX 2 – RECOMMENDATIONS AND OBSERVATIONS RAISED BY THE ONR ASSESSMENT OF THE HUNTERSTON A PSR .....	19

## 1 PERMISSION REQUESTED

1. This report presents the Office for Nuclear Regulation (ONR) assessment of the Periodic Safety Review (PSR) for Hunterston A and sets out the regulatory justification for recommending the issue of an ONR Decision Letter to confirm that the Licensee, Magnox Limited (ML) has carried out an adequate PSR of the Hunterston A site safety case for the period 2021-2031.
2. The requirement to carry out a PSR is set out under Licence Condition (LC) 15: Periodic Review. International standards [1] recommend that the periodicity between PSRs should be 10 years. The scope of the Hunterston A PSR submitted to ONR by ML considers changes to the Reference Safety Case (RSC) during the period covered by the previous PSR and the implications of plant ageing to the safety case up to the end of June 2031, with consideration given to a further five years to 2036 to confirm the absence of any cliff edge effects [2].
3. ONR's guidance [3] states that the purpose of the PSR is to consider all factors that may affect the safety of the plant over its lifetime and can be summarised as follows:
  - The degree to which the safety case conforms to modern standards and relevant good practices.
  - The degree to which the safety documentation addresses the remnant life of the facility given changes in plant status through construction, commissioning, operations, post operations and decommissioning.
  - The adequacy of the arrangements in place to maintain safety until the next PSR or end of life.
  - Safety improvements to be implemented to resolve any identified safety issues.
4. The regulatory process set out in ONR's Technical Assessment Guide (TAG) on PSRs [3] requires ONR to issue a statement in writing (a 'Decision Letter') confirming its position on the adequacy of the Licensee's PSR submission. The Decision Letter is normally issued one year after the submission of the PSR and sets out any regulatory requirements from ONR's assessment of the PSR. The duration of one year between the PSR submission and issuing a Decision Letter is considered reasonable time to allow the Licensee to address significant safety findings identified in their review and to allow ONR to assess the submission in sufficient depth. The Decision Letter sets out any regulatory requirements from the assessment of the PSR.
5. In the case of Hunterston A, the submission was received in June 2020 and ONR's original Decision Date was intended to be 30 June 2021. However, due to restrictions related to the Covid-19 pandemic, a site familiarisation visit to support ONR's assessment was not able to be completed until May 2021. As a result, ONR and ML agreed a new Decision date of 31 October 2021.

## 2 BACKGROUND

6. The Hunterston A site comprises two shut-down Magnox reactors housed separately in individual reactor buildings. The site ceased generation in 1989 and has been defueled. A single separate Pond Building serviced both reactors; the pond has been emptied and drained, however some waste

associated with the pond clean-up work is still stored within the building. Other significant facilities on the site include: the Intermediate Level Waste Store (ILWS); the Solid Active Waste Building (SAWB) and the attached Package Export Facility, together known as the SAWB Retrieval Facility (SAWBR); the Acid Storage Facility (ASF), and; the Wet ILW Retrieval and Encapsulation Plant (WILWREP). There is also the Solid ILW Encapsulation Facility (SILWE) which is currently under construction and yet to be actively commissioned, although this is out of scope of the PSR.

7. Radioactive materials resulting from historic and current operational activities are present in the Reactor Buildings, Pond Building, SAWB Bunker 1, the Sludge Retention Tanks (SRTs) in WILWREP, the ASF, and in the Low-Level Waste (LLW) Facilities. ILW is retrieved and packaged into 3m<sup>3</sup> boxes or drums and stacked in the ILWS for long term storage prior to disposal. LLW continues to be retrieved, sentenced and packaged for disposal off-site [2]. ML is currently progressing waste retrieval and processing activities on site as part of Care and Maintenance Preparations (C&MP).
8. The Hunterston A Lifetime Plan LTP17 currently shows entry into Care and Maintenance (C&M) to be in 2024, however C&M entry is currently forecast to be 2030. A company-wide strategic review is underway, with the intention of moving to a rolling programme of reactor dismantling at some sites. The business case for this approach is still being assessed and ML is yet to determine site-specific strategies. The options selection for each site will take place this financial year, and any resultant changes to the next PSR will be considered and discussed with ONR [4].
9. If Hunterston A does move to a C&M state in 2030, it will prepare a C&M safety case as part of the preparations for this phase which will be aligned to the next PSR; this is likely to take place in 2029 [4]. However, ML is currently considering changes to its approach to PSRs and is in discussion with ONR [5]. ML intends to categorise its sites according to the hazards they pose and then only submit PSRs to the ONR for assessment and a decision if the site is Category 1 (the highest hazard). Although this categorisation has not yet been undertaken, ML does not consider that Hunterston A will be a Category 1 site [4].

### **3 THE LICENSEE'S PSR SUBMISSION**

10. ML has undertaken a PSR to cover the ten-year period of site operation from 1<sup>st</sup> July 2021 to the 30<sup>th</sup> June 2031. The PSR submission has been produced in accordance with ML's PSR arrangements [6, 7] and follows the same structure as used by other ML sites e.g. Sizewell A and Oldbury. The PSR submission comprises a PSR Outcome Report [2] which provides an overall summary of the PSR and nine Technical Reports (TRs), these are listed in Appendix 1.
11. In the period up to this PSR, the site has continued with waste retrieval and processing activities including construction and commissioning of the ILWS, progressive emptying of the SAWB and the emptying and draining of the Pond [2]. To reflect this change, and in accordance with ML arrangements [7], the site has rebaselined a number of its plant safety cases and produced the Rebaselined Facilities Safety Case (RFSC) [8]. The RFSC was produced as part of the preparation for the PSR and covers the baseline operational activities on the site, including routine operations required to maintain safe



storage of the existing inventory of radioactive waste on the site, and to maintain facilities in their current state and configuration. This approach is consistent with other Magnox PSRs.

12. The WILWREP and SAWBR facilities, and the cross-site transporters are excluded from the RFSC as they are covered by separate, recently prepared safety cases covering specific waste retrieval activities. The SILWE facility is also out of scope of the RFSC, and the PSR, as it is yet to be actively commissioned.
13. The principal purpose of the PSR is to review the safety case against modern standards, and review plant configuration and continued validity of the PSR period up to 2031, with an additional five year look ahead to 2036 to confirm the absence of any cliff-edge effects. ONR is satisfied that these requirements have been addressed through production of the RFSC which forms part of the site's Reference Safety Case (RSC), and through the review of the RSC in PSR Technical Report (TR) 1 (see Appendix 1).
14. The second objective to review plant configuration and the continued validity of the PSR has been addressed by reviewing the areas of safety case record management, compliance with company site procedures associated with nuclear safety, maintenance and engineering stewardship, radiological protection arrangements, emergency preparedness arrangements, safety and compliance culture, operational experience, and relevant findings from other sites' PSRs, addressed through the other eight TRs (see Appendix 1). ML systematically reviewed each of these topic areas to verify that there were no issues that might challenge the validity of the RSC or the continued safe operation of the Site. The TRs formed the basis underpinning the PSR Outcome Report [2].
15. The ML PSR Outcome Report [2] identified no significant safety shortfalls or findings, however 35 observations were made resulting in 22 associated actions. As of July 2021, ML has completed 19 of the 22 actions and ML has committed to closing the remaining three actions by March 2022.
16. The PSR and RFSC have been subject to review in accordance with ML's arrangements, which includes independent nuclear safety assessment (INSA) and endorsement from the Nuclear Safety Committee (NSC). The outcome report was reviewed by ML's INSA function [9] and the NSC endorsed the outcome report on 24 June 2020 [2].

#### **4 ASSESSMENT AND INSPECTION WORK CARRIED OUT BY ONR IN CONSIDERATION OF THIS REQUEST**

##### **4.1 ASSESSMENT SCOPE**

17. ONR has carried out a programme of work for the Hunterston A PSR which is proportionate to the hazards present on site and the risks associated with the on-going decommissioning activities.
18. To inform the scope of the PSR assessment, a high-level scoping exercise was carried out by a Fault Studies specialist to identify the key areas of plant and significant hazards on the site that should be considered in the PSR assessment [10]. Based on this exercise, and through discussion with the ONR

Hunterston A Site Inspector, the assessment was targeted on the following areas:

- **Fault Studies** [11] – This assessment focused on the deterministic safety case and sampled the initiating faults with the potential to lead to a person receiving a significant dose of radiation, or to the escape of a significant quantity of radioactive material.
  - **Civil Engineering and External Hazards** [12] – This assessment sampled the civil engineering structures on site, including the reactor buildings, pond building, SAWB, and ILW Store. The assessment also considered the adequacy of the identification and characterisation of the external hazards identified in the RFSC, focusing on those which presented the most significant hazards with respect to nuclear safety.
  - **Mechanical Engineering** [13] – This assessment focused on the examination, inspection, maintenance and testing (EIM&T) of mechanical assets on site, consideration of operational experience (OPEX) in the PSR, asset management arrangements for mechanical systems, structures and components, and a sample of lifting equipment on site.
  - **Conventional Health and Safety** [14]– This assessment focused on ML’s plans for modifications to several civil engineering structures on the site, and their consideration of relevant statutory provisions (RSPs) associated with conventional hazards and risks for these modifications, including the Construction (Design and Management) Regulations 2015 (CDM) and the Work at Height Regulations 2005.
  - **Nuclear Liabilities Regulation** [15] – This assessment focused on the radioactive waste management, decommissioning and land quality management aspects of the Hunterston A PSR.
  - **Radiation Protection** [16] – The assessment focussed on the radiological protection and emergency arrangements aspects of the site over the PSR period, particularly in relation to compliance with the Ionising Radiations Regulations 2017.
19. The inclusion of a Conventional Health and Safety assessment in the scope of the PSR assessment was based on ONR’s recommendation from previous PSR assessments that ML should review its approach to PSR to include consideration of conventional health and safety such that safety is considered in a holistic way, not just in relation to nuclear safety. The conventional health and safety assessment is not key to the justification for the ONR regulatory judgement for the PSR. In addition, the findings from the assessment are outside the scope of the PSR and therefore the report has been categorised as an ‘other report’ rather than a routine or major report, in line with ONR’s guidance on the production of reports [17].

#### 4.2 ASSESSMENT PROCESS

20. Due to restrictions related to the ongoing Covid-19 pandemic, the site familiarisation visit was unable to be completed at the start of the assessment process and was delayed until May 2021 [18]. In addition to the assessors visit to site, the PSR Project Inspector also visited site in June 2021 [19].
21. The site familiarisation visit included a general external tour of the site and visits to facilities to observe their condition; this included Reactor Buildings 1

and 2, the SAWBR, ILW Store, WILWREP and the Cross-site Transporters. The visit also included the Beyond Design Basis Container and Health Physics Building No. 1 to observe emergency response and radiation protection arrangements on site. The site visit served to inform the assessors undertaking these assessments.

22. The preliminary assessment findings were communicated to the licensee in a meeting in July 2021 [20] and the assessments were completed in August 2021.
23. Regulatory findings, recommendations and observations were identified where ML's assessment findings and further clarification could not reconcile queries raised by ONR [21]. Closure of actions arising as a result of the recommendations will be monitored through raising regulatory issues and by subsequent routine regulatory activities (see Appendix 2).

## **5 MATTERS ARISING FROM ONR'S WORK**

24. From inspection and assessment of the Hunterston A PSR, ONR considers that an adequate review of safety has been carried out. This view is formed by:
  - The Hunterston A site's PSR found no significant safety findings over the PSR period that would preclude the continued safety of operations, this was supported by the INSA review of the PSR.
  - ONR's assessment of the licensee's safety documentation from the Hunterston A PSR concurred with this and found no significant findings.
  - A site inspection and plant walk down, undertaken to observe the condition of the facilities and key civil and mechanical structures to support the assessments identified no issues of significant safety concern. However, a number of areas of significant corrosion were observed on site, including the redundant cradle rails, guttering and downcomers on the reactor buildings, and the wind girder and cladding rails within the reactor buildings. Although there was significant degradation in some areas, the assessors confirmed that ML has plans in place to remove the reactor cradle rails and to repair the guttering, downcomers and reactor building steel work [18]. This has been considered further in the Civil Engineering Assessment [12].
25. ONR specialist inspectors confirmed that a systematic approach has been undertaken in the areas assessed and that the conclusions made in the PSR Outcome Report were justified by evidence presented in the reviews undertaken and TRs compiled in support of the PSR.
26. ONR's assessment took into account ML's review and assessment of issues during its review phase. ML's PSR identified 35 observations resulting in 22 associated actions [2]. As of July 2021, ML has completed 19 of the 22 actions and ML has committed to closing the remaining three actions by March 2022. None of the observations, by the licensee's definition, impacts directly on Hunterston A's ability to demonstrate continued safety of operations over the next PSR period. The remaining outstanding observations are related to the implementation of the RFSC.
27. Three recommendations and eight observations have been raised by ONR assessors [21]. These findings will be discussed with the licensee and a

suitable forward improvement programme to address them agreed [20, 22]. A discussion of the key assessment findings and recommendations is included below.

28. The Fault Studies assessor [11] reviewed the updated Fault Schedule and judged ML's hazard identification to reflect relevant good practice (RGP) and provide a firm basis for the RFSC. ONR's recent review of ML standard S-259 identified that some aspects of ML's process for nuclear safety assessment did not fully align with the expectations of the SAPs [23]. Based on the faults sampled the assessor concluded that there was no significant concern related to the implementation of S-259 at Hunterston A. ONR sampled the most severe unmitigated on-site and off-site accident doses and confirmed that they met the dose targets (Target 4 and Target 8) in the SAPs [24]. ONR also sampled the one Safety Measure claimed within the safety case and confirmed that it had only a modest influence on dose reduction for one fault and that it was not reasonably practicable to provide more engineering provision for the fault in question [11]. Finally, although the PSR and supporting documentation does not make an explicit statement on whether operations for the next PSR period are ALARP, based on the assessor's review of the submissions and a consideration of the low radiological consequences of relevant fault sequences, they are satisfied that the overall position, from a fault studies perspective, is ALARP [11].
29. The Civil Engineering and External Hazards assessor [12] considered that overall, the PSR was adequate and addressed the expected topics relevant to a decommissioning site when judged against RGP. However, ONR considered that the PSR could have included information on the benefits of the proposed weather envelope, and potential impacts should this be further delayed, and a wider review of the effects of changes in codes, standards and RGP since the last PSR. ONR raised an observation to capture the need for ONR engagement with licensee while it reviews its PSR procedure S-013 to ensure that it takes account of ONR's expectations for the proportionate review of implications of changes in codes and standards on the claims made on civil engineering structures [Ref 25].
30. ONR considered that there are adequate arrangements in place for the engineering stewardship of the civil engineering structures, systems and components, which include an adequate inspection procedure with which there was a good level of compliance. However, minor shortfalls were identified with respect to arrangements for reporting and managing defects; ONR raised a recommendation for the licensee to address this which has since been closed out through further engagement [Ref: 26] . Overall, ONR considered the condition of the civil structures sampled was adequate, but that there were significant problems with the degraded roof structures and water ingress to some buildings. ONR was satisfied with ML's proposals to address these defects but judged that the current inspection interval for fragile and degraded roofs was not adequate and recommended the licensee address this. This recommendation was addressed via further engagement with the licensee and closed out [Ref. 27] ONR also assessed the ALARP argument for external flooding on site, and while the assessor acknowledged that the predicted radiological consequence was low, they judged that there was inadequate evidence to conclude that the risks due to external flooding were ALARP; ML

provided additional information following completion of the assessment to address this [Ref. 28] [12].

31. The Conventional Health and Safety assessors [14] found that none of the PSR documents contained information on how ML would manage the planned repair and maintenance projects on site, the risks associated with them, and the selection and use of contractors and equipment throughout the lifecycle of the projects. These projects, which include the roof repairs and construction of the reactor weather envelope, are yet to start and do not form part of the current safety case and are therefore considered to be outside the scope of this PSR assessment. The shortfalls identified will therefore be followed up through routine regulatory engagement at appropriate permissioning stages for the projects sampled.
32. The Mechanical Engineering assessors [13] sampled the Package Handling Machine (PHM) in the ILW store. No ALARP argument was presented in the PSR for PHM operations, however, through discussions with ML on the claims, arguments and evidence for the PHM, and noting the low radiological consequences of dropped packages, ONR inspectors were satisfied that the ALARP argument was adequate and proportionate. This was supported by a visual inspection of the PHM which confirmed that it appeared to be in good condition. ONR judged the EIM&T of the lifting equipment in the ILW store was acceptable, having sampled evidence of a modification to the hoist rope fleet angle, and inspection reports of an oil drip identified through routine inspections. The assessors noted that ML are actively implementing the ML Corporate Asset Management Strategy but identified a minor shortfall with regards to recording evidence of work to complete actions in the Asset Management Database (AMD); this shortfall was also noted by the radiological protection assessor. ONR noted this shortfall as an observation, reflecting that the 'golden thread' of evidence from mitigation, to 'follow-up action' was not clear.
33. Several of the assessors considered that the PSR would have benefited from a review of relevant wider industry OPEX rather than just that of the site and the Magnox fleet. However, it is noted that Hunterston A are complying with the ML corporate arrangements for PSRs in terms of the consideration of OPEX [7]. The Mechanical Engineering assessors raised an observation that these arrangements could conform better to what is specified in RGP, specifically IAEA SSG-50 [13].
34. The Radiation Protection assessor [16] reviewed radiation protection arrangements for planned operations on site, including ML's approach to radiological risk assessments, dose reduction measures (DRMs) and engineered and passive measures to restrict exposure. ONR considered that ML had taken a proportionate approach in their arrangements, and over the PSR period had shown that appropriate DRMs are in place. ONR noted that there has been a general steady fall in actual collective dose from 2016 to 2019 and that contamination events on site had been low over the PSR period. ONR considered that the predicted future reduction in dose as the radiological hazard on site is reduced was reasonable, but that if the site strategy changed from the currently planned C&M entry to continuous decommissioning then this would need to be reassessed.

35. The Radiation Protection Assessor noted the site has now moved from emergency arrangements to contingency arrangements, which were first demonstrated in 2017 and were judged as adequate [29]. ONR has carried out an assessment of the new arrangements, including inspection of the licensee's arrangements to ensure it is consistent with the requirements of LC11. The assessor is satisfied that HNA site has a comprehensive suite of radiological contingency plans.
36. The Nuclear Liabilities Regulation (NLR) assessor [15] focused on the radioactive waste management, decommissioning and land quality management aspects of the PSR. ONR found that the Hunterston A site is following the corporate waste management strategy and has a Radioactive Waste Management Case (RWMC) for the site that covers the full radioactive waste inventory and aligns with the Scottish Government policy for HAW management. The assessor also confirmed that for each HAW waste stream a Letter of Compliance (LoC) from RWM has or is being obtained providing confidence that the waste packages generated will meet the waste acceptance criteria for the GDF. The assessor noted that LLW and VLLW were characterised and segregated on site for offsite treatment and disposal, and that where disposal routes for VLLW and LLW were not available, the site had adequate contingency plans to store the wastes on site until the disposal routes become available.
37. From a land quality management perspective, the assessor considered that the Land Quality Strategy of splitting the site into zones would enable the site to prioritise higher hazard areas of the site. The assessor found that the site land quality management plan (LQMP) provides an overarching picture of the site from a land quality perspective. However, the LQMP was last issued in 2015 and requires updating prior to entry into C&M; the assessor raised an observation to capture this and noted that ML could consider amending the stakeholders identified in the plan to include the local council and local community representatives.
38. From a decommissioning perspective, the assessor raised an observation to reflect the requirement for the decommissioning strategy to be updated to reflect the current timescales for entry into C&M.
39. Close out of all recommendations and observations in Appendix 2 will be monitored through raising regulatory issues on the forward improvement programme and followed up through routine regulatory engagement.

## **6 CONCLUSIONS**

40. ONR considers that the licensee has carried out an adequate periodic review of its safety case that justifies continued safe operation for the period 2021-2031. The programme of work undertaken includes the production of the RFSC which has been aligned to the PSR. Both the PSR and the RFSC have been subject to independent review by the licensee's INSA process and NSC [9]. No significant nuclear safety issues were identified and ML has given a commitment to address the remaining PSR actions by March 2022.
41. ONR has completed a proportionate and targeted assessment of the PSR based on the hazards identified on the Hunterston A Site [10]. No significant safety issues have been identified by ONR, however, ONR raised three

recommendations and eight observations (see Appendix 2), which have been fed back to the licensee [22]. Close out of actions to address the recommendations will be monitored through raising regulatory issues on the forward improvement programme and followed up through routine regulatory engagement.

## **7 RECOMMENDATIONS**

42. The project assessment report recommends that ONR issues a Decision Letter confirming the adequacy of ML's Hunterston A PSR submission and associated improvement programme to support continued operations on the site for the period up to 30 June 2031.
43. This recommendation is based on the assumptions that the licensee will address:
  - The remaining three outstanding actions from its own review of the PSR by the end of March 2022;
  - The findings of this PSR assessment, on timescales to be agreed with ONR.
44. Completion of the three remaining PSR actions should be monitored through routine regulatory activity. Progress against the findings of ONR's PSR assessment should be monitored through raising regulatory issues on the forward improvement programme and also followed up during routine regulatory activity.

## 8 REFERENCES

1. Periodic Safety Review for Nuclear Power Plants. International Atomic Energy Agency (IAEA). Specific Safety Guide SSG-25. IAEA. Vienna. 2013. - [www.iaea.org](http://www.iaea.org).
2. Hunterston Site: 2021 Periodic Safety Review – Outcome Report. NP/SC 5376 Addendum 1, Revision 1, June 2020. 2020/229801
3. ONR Technical Assessment Guide – NS-TAST-GD-050 – Periodic Safety Reviews. Revision 7, July 2017. 2019/47761
4. Hunterston A PSR – Summary of ML Position on Decommissioning Strategy Changes in the PSR Period – 29 July 2021. 2021/58928
5. ONR-SDFW-CR-21-258 – Planned ONR/Magnox Ltd LC15 PSR Workshop, 18 June 2021. 2021/50463
6. Magnox Ltd. – Paper for Information: Optimisation of the LC15 Periodic Safety Review Programme. NP/SC 5132, Revision 1, September 2012. 2013/38988.
7. Magnox Standard Procedure: Periodic Safety Review, S-013, Issue 1, February 2018. 2019/266920
8. Hunterston A Site - Rebaselined Facilities Safety Case – HNA/3300/2018/SS/1350 (NP/SC 5391), May 2019. 2020/260647
9. Hunterston A Site 2021 PSR Outcome Report – Final INSA Statement. HNA/NSC/5376 Addendum 1, Revision 1, June 2020. 2020/229804
10. Hunterston A PSR – ONR Scoping Exercise – Fault Studies Specialist Inspector – 3 September 2020 – C Donnelly. 2020/292801.
11. ONR-SDFW-AR-20-050 – Hunterston A PSR Fault Studies Assessment [REDACTED] 2021/13134
12. ONR-SDFW-AR-20-058 – Hunterston A PSR Civil Engineering & External Hazards Assessment – F Duff. 2021/34496
13. ONR-SDFW-AR-20-053 – Mechanical Engineering Assessment of the Hunterston A Periodic Safety Review – [REDACTED]. 2021/11488
14. ONR Conventional Health and Safety Assessment of Hunterston A Periodic Safety Review. Assessment Note, July 2021 – [REDACTED]. 2021/49751
15. ONR-SDFW-AR-21-007 – Hunterston A Periodic Safety Review Nuclear Liabilities Regulation Assessment – [REDACTED]. 2021/40091
16. ONR-SDFW-AR-20-062 – Hunterston A Periodic Safety Review, Assessment of Radiological Protection and Emergency Arrangements Aspects – [REDACTED]. 2021/37622
17. ONR Guide – NS-PER-GD-015 – Guidance on Production of Reports for Permissioning. Revision 2, June 2020. 2020/288716
18. ONR-SDFW-CR-21-130 – Hunterston A PSR – Site Familiarisation Visit – 19 May 2021 – [REDACTED]. 2021/44121.
19. ONR-SDFW-CR-21-277 – Site familiarisation visit in support of the HNA PSR Assessment – 23 June 2021 – [REDACTED]. 2021/50213
20. ONR-SDFW-CR-21-390 – Meeting with Magnox to discuss findings from the ONR assessment of Hunterston A PSR – 26 July 2021 – [REDACTED]. 2021/57787



21. Hunterston A PSR – ONR Assessment Findings – Updated December 2021 – [REDACTED]. 2021/75661
22. Hunterston A PSR – Provision of Approved ONR Assessment Findings to ML – 22 July 2021 – [REDACTED]. 2021/57777
23. ONR – Fault Studies Assessment of Magnox’s S-259, February 2021. 2021/7764
24. ONR – Safety Assessment Principles for Nuclear Facilities. 2014 Edition, Revision 1, January 2020. [www.onr.org.uk/saps](http://www.onr.org.uk/saps)
25. Hunterston A PSR – Civil Engineering Recommendation 1 – Modern Standards – Evidence of closure of recommendation [REDACTED] – 10 December 2021. 2021/90187
26. Hunterston A – 2021 PSR – Response to Civil Action HNA\_PSR\_R3 & R4 – ONR Response – 8 October 2021. 2021/83556
27. Hunterston A – 2021 PSR – Response to Civil Action HNA\_PSR\_R3 – Email confirming closure – 17 November 2021. 2021/83537
28. Hunterston A PSR 2021 – Response to Civil Action HNA\_PSR\_R2 – confirmation of closure – 8 October 2021. 2021/74250
29. ONR-SDFW-IR-19-187 Revision 0, Magnox Limited Hunterston A Ionising Radiations Regulations 2017 Inspection, ONR, March 2020. 2020/89728.
30. HNA-3304-ED-REP-1357 – 2021 PSR - Technical Report 1: Review of the Reference Safety Case. 2020/229813
31. HNA-3304-ED-REP-1363 – 2021 PSR – Technical Report 2: Adequacy of the Site Reference Safety Case Record Management System and Configuration Control Process. 2020/229858
32. HNA-3304-ED-REP-1374 – 2021 PSR – Technical Report 3: Compliance with Company Site Procedures Associated with Nuclear Safety. 2020/229870
33. HNA-3304-ED-REP-1350 – 2021 PSR – Technical Report 4: Adequacy and Effectiveness of Maintenance and Engineering Stewardship Arrangements. 2020/229877
34. HNA-3304-ED-REP-1415 – 2021 PSR – Technical Report 5: Adequacy and Effectiveness of Radiological Protection Arrangements. 2020/229885
35. HNA-3304-ED-REP-1370 – 2021 PSR – Technical Report 6: Adequacy and Effectiveness of Emergency Preparedness Arrangements. 2020/229893
36. HNA-3304-ED-REP-1369 – 2021 PSR – Technical Report 7: Review of Operational Experience Culture. 2020/229906
37. HNA-3304-ED-REP-1375 – 2021 PSR – Technical Report 8: Review of Safety and Compliance Culture. 2020/229900
38. HNA-3304-ED-REP-1347 – 2021 PSR – Technical Report 9: Actions from Previous PSR and Relevant Findings from other site’s PSRs. 2020/229922

## APPENDIX 1 – PSR TECHNICAL REPORTS

The following list identifies the topic reports produced by the licensee in support of the Hunterston A PSR.

- Technical Report 1: Review of the Reference Safety Case [30]
- Technical Report 2: Adequacy of the Site Reference Safety Case Record Management System and Configuration Control Process [31]
- Technical Report 3: Compliance with Company Site Procedures Associated with Nuclear Safety [32]
- Technical Report 4: Adequacy and Effectiveness of Maintenance and Engineering Stewardship Arrangements [33]
- Technical Report 5: Adequacy and Effectiveness of Radiological Protection Arrangements [34]
- Technical Report 6: Adequacy and Effectiveness of Emergency Preparedness Arrangements [35]
- Technical Report 7: Review of Operational Experience Culture [36]
- Technical Report 8: Review of Safety and Compliance Culture [37]
- Technical Report 9: Actions from Previous PSR and Relevant Findings from other site's PSRs [38]

## APPENDIX 2 – RECOMMENDATIONS AND OBSERVATIONS RAISED BY THE ONR ASSESSMENT OF THE HUNTERSTON A PSR

Note: “ONR Reference” in the table below identifies assessment issues either as a recommendation (denoted “R”) or as an observation (denoted “O”).

ONR Reference	ONR Findings
HNA-PSR-R1	<p>With respect to external flooding, the Licensee should provide a full justification that its position has reduced risks ALARP. This justification should provide detail on the characterisation of the hazard, including consideration of modern standards, climate change, the assessment of the consequences, and an ALARP justification.</p> <p><i>Note: Following completion of the Civil Engineering assessment, this recommendation has been closed out via further engagement between ONR and the licensee [26].</i></p>
HNA-PSR-R2	<p>The Licensee should review the formal inspection interval of five years for fragile or degraded roof structures and provide a justification that its inspection regime has reduced risks ALARP.</p> <p><i>Note: Following completion of the Civil Engineering assessment, this recommendation has been closed out via further engagement between ONR and the licensee [28].</i></p>
HNA-PSR-R3	<p>The Licensee should improve the implementation of its procedure for civil engineering inspection and assessment (S-268), to ensure that adequate written justifications are provided where:</p> <ul style="list-style-type: none"> <li>- Judgements are made regarding the condition of inaccessible areas.</li> <li>- Defects of the highest significance have not been repaired within the timescales recommended by the latest inspection</li> </ul> <p><i>Note: Following completion of the Civil Engineering assessment, this recommendation has been closed out via further engagement between ONR and the licensee [27]</i></p>
HNA-PSR-O1	<p>The Civil Engineering Assessor observed that recent PSRs for Chapelcross and Hunterston A have not included proportionate reviews of the implications of changes in codes and standards on the claims made on civil engineering structures. The assessor considered that, as part of normal business, ONR should engage with Magnox Ltd on this matter at a corporate level so that Magnox Ltd can take into account ONR’s expectations when reviewing its PSR procedure S-013.</p>
HNA-PSR-O2	<p>The Mechanical Engineering assessors noted that HNA follow Magnox corporate arrangements regarding OPEX and that these arrangements could conform better to what is specified in RGP, specifically IAEA SSG-50.</p>

HNA-PSR-O3	The Mechanical Engineering assessors noted that there were a large number of open actions in the Event Review Team Meeting minutes. HNA should reduce this number significantly by appropriately addressing the actions in a timely manner.
HNA-PSR-O4	ONR noted that the 'golden thread' between the evidence of the completion of any raised actions on the Asset Management Database was not always clear, and that the AMD had not yet been fully populated with all key assets on the site.
HNA-PSR-O5	The Radiation Protection assessor noted that the licensee's documentation should acknowledge that the Periodic Safety Review for a licenced site takes into account relevant legislation applicable to Great Britain and not just the ONR licence conditions. This will be taken forward via engagements with ML Corporate on the scope of future PSRs.
HNA-PSR-O6	The Nuclear Liabilities Regulation assessor noted that the Hunterston A site internal waste and decommissioning management arrangements have been produced over a number of years; ML should consider reviewing these arrangements to ensure they align with each other and ML corporate arrangements.
HNA-PSR-O7	The Nuclear Liabilities Regulation assessor noted that the Hunterston A Land Quality Management Plan (LQMP) will be updated prior to entry into the C&M Phase. During this review and update, ML should consider whether the stakeholders identified in the plan should be updated to include the local council and local community representatives. ML should ensure that milestones and targets in the LQMP are aligned in other land quality documentation.
HNA-PSR-O8	The Nuclear Liabilities Regulation assessor noted that the Hunterston A Decommissioning Strategy requires updating to reflect the current timescales for C&M entry. This should take account of the impact of Covid and ongoing working practices. Consideration should also be given to any cliff edge effects regarding short and mid-term storage requirements of the wastes and confirmation that all the required stores will be operational at the required time.